

ATR

Vstone™

Robovie-NANO



Vstone Co.,Ltd.
ATR

0. Introduction

Please Read First

Thank you for purchasing the Robovie-nano bipedal robot kit. Contained herein are the directions for assembling the robot kit. Please carefully follow the instructions and have fun.

This is a do it yourself assembly kit. The quality of the end product will vary depending on how the robot is assembled by the user, so careful attention must be followed to following the directions. Please do not hesitate to seek assistance if any problems arise during the course of the assembly.

After assembling the robot, a personal computer (PC) will be required for programming purposes. A software usage guide is included with the kit, however, the manufacturer will not be able to answer any Windows specific questions. A working level knowledge of PCs is assumed from this point forward.

A battery charger is not included with this kit, however 4 AA batteries are required for operation, so it is recommended that the user purchase rechargeable Ni-MH batteries and an off the shelf battery charger.

※ Please note that the specifications listed herein are subject to change without advanced notice, in order to enhance performance of the Robovie-nano system.

Safety Warnings

- As for this product, this is a do it yourself robot kit so much of the stated performance in this manual cannot guaranteed, due to the nature of varying methods of user assembly..
- Please do not use of this product, assemble, or store parts around small children, This kit contains small pieces which may be easily swallowed.
- This product is not a toy. If shown in front of kids, always make sure an adult is present.
- The product can get damaged or ruined is left in areas of high moisture, humidity or condensation.
- Please use adequate safety measures and techniques when using tools.
- Please do not modify or alter any of the circuitry or electrical components. This could result in equipment failure, electric shock, or even fires.
- Do not apply any foreign objects, especially metals or substrates to the electronic circuitry. This could result in equipment failure, electric shock, shorts or even fires.
- Please prepare adequate table space when assembling, programming and testing the robot. During programming, the robot can suddenly move and knock items over, and possibly cause personal injury to the user or anyone nearby due to high torque servo motors and sharp brackets.
- Please check the polarity of the connectors. Fire and other hazards may occur if installed incorrectly.
- Please be careful to avoid crimping the cables in the robot frame. Short can occur.
- Please remove all cables and connectors at the plug end. Failure to do so could tear the wire and lead to shorts or fires.

About the Servo Motors

A servo motor has an important rule and concept concerning its mounting. If it is mounted in a wrong way, the robot will not move correctly. When assembling the servo motor, read this page thoroughly.

○Servo motor original position

The servo motor is controlled by the CPU and can be programmed by the user to freely run. The servo motor VS-S020 used for the Product has frame mounting holes in the top and back covers, into which a frame is mounted. Then, mount a servo horn to an output shaft (power supplied shaft), followed by the frame there, to use it as the robot's joint. A movable range of the robot's joint depends on this mounting of the servo horn.

The servo motor has its movable range. The VS-S020 used for the Product moves within a range of about 130°, that is from -65° to +65°.* **The central position of 0° is called the “origin.”**

each servo motor has a slight angle discrepancy. Even if the angle of the origin is sent from the CPU board to the servo motor, it may be slightly dislocated from the origin. Assuming that the origin position based on a signal from the CPU board is correct, this robot uses software to adjust an error produced in the actual servo motor. (An error adjusting method is described later.) In the following description, **“origin” is used as the “origin set by the CPU board.”**

○Mounting a servo horn

A servo horn mounting angle to the origin is important in order to set a movable range of the joint more accurately. **If the origin is not accurately set, the robot cannot move successfully in motions, such as getting up, which require an accurate movable range.** Try each hole in the servo horn one after another until it is located at the most accurate angle to the origin. When mounting the servo horn to the output shaft, do not allow the servo motor's output shaft to be rotated.

○About “motor lock.”

Some servomotor can not rotate in 130° by some joint frame. We limit the rotating range in software, however we can not limit the rotating range perfectly at the legs and arms.

If a hand or a foot gets caught on the body at the time of activating the servo motors, an excessive load will be applied to the servo motors. This condition is called “motor lock.” If this condition persists, the servo motors will be heated and go out of order (breaking gear/case/servo circuit board/CPU board). While compensating, touch the servo motors periodically with your hand to check if they are heated. If they are too hot to touch, turn off the Power switch of the Robot immediately and wait until the servo motors are cooled down. Please be careful of Motor lock.

1. Equipment

Please prepare the following tools and have readily available during and after assembling the robot.

●Personal Computer

CPU : Pentium 3 or equivalent (1GHz or Greater)

RAM : 128MB

OS : Windows 2000 / XP / Vista

Display : XGA or Better

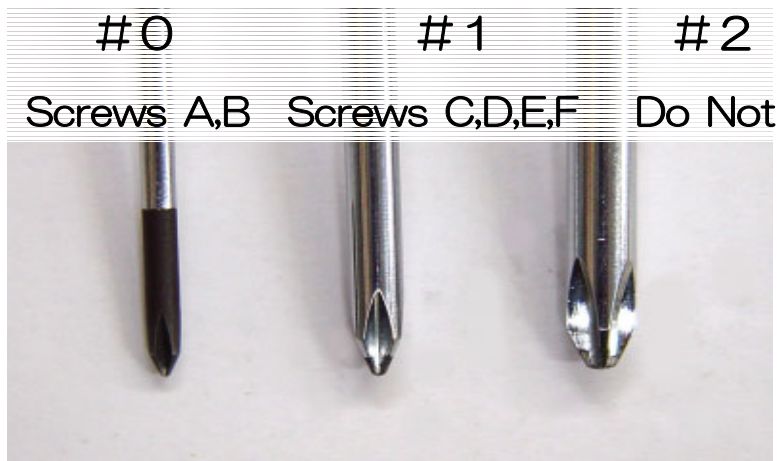
Interface : USB

CD-ROM Drive Installed.

●Tools

• Screw Drivers

#0、#1 Philips (#2 cannot be used)



●Other useful items

Screwdriver, tweezers, towels, cellophane tape, bowl for screws

2. Parts Discription

Included Parts

▪ Servo Motor VS-S020

Dimensions: 22.5 × 11.5 × 24.6mm (L × W × H)

Torque: 2.2kg·cm

Speed: 0.11S/60°

Weight: 12g

Range of Motion: 140°

Electrical Input: 4.8V~6V (7.4V Optimal)

Protocol: PWM



▪ Robot Internal CPU Board VS-RC003HV

Dimensions: 52x48(44)x13mm

Weight: 21g

Servo Motor Output: 30ch

Voice/Sound Output: 2W

Electrical Input: 5V~16V

PC interface: USB (HID)

Remote Control: PS2 Wireless Remote, Probo

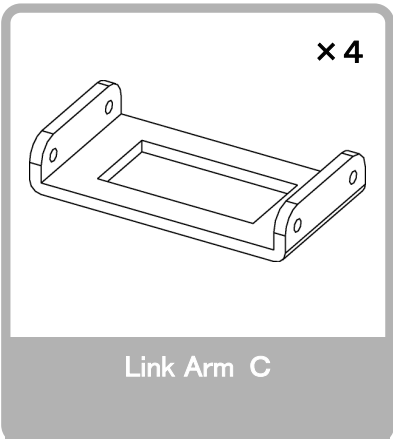
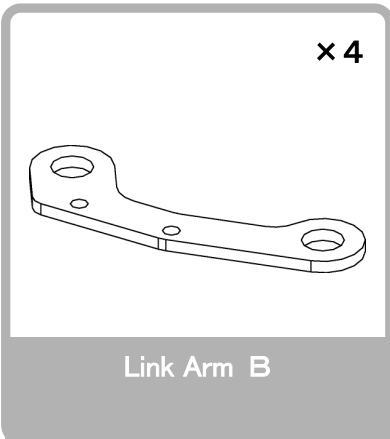
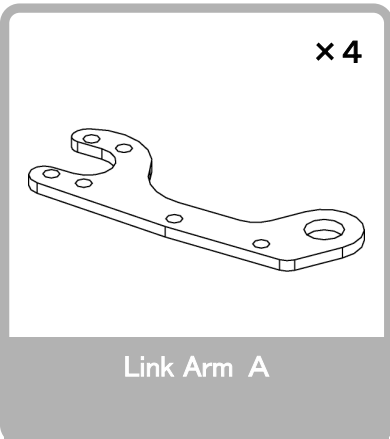
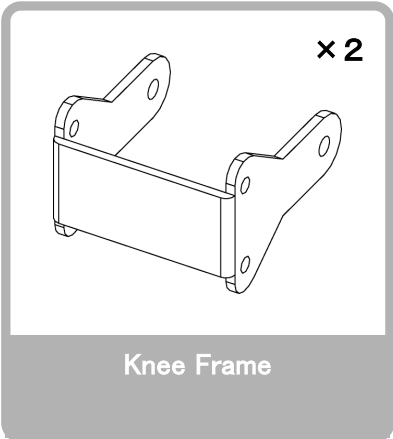
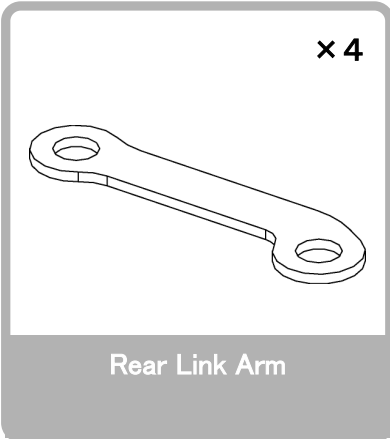
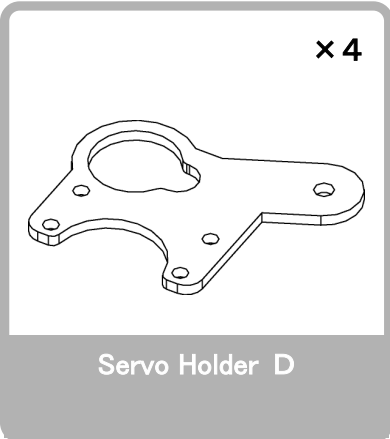
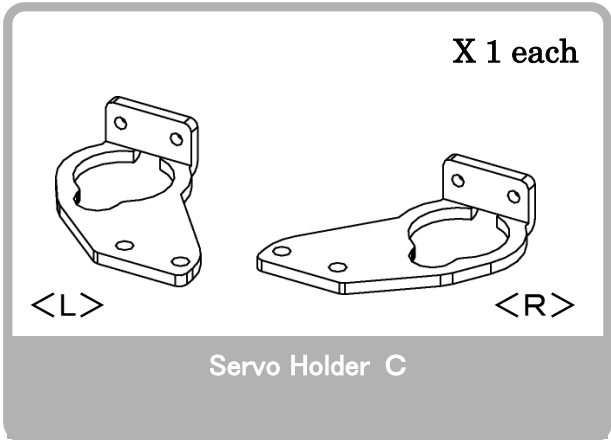
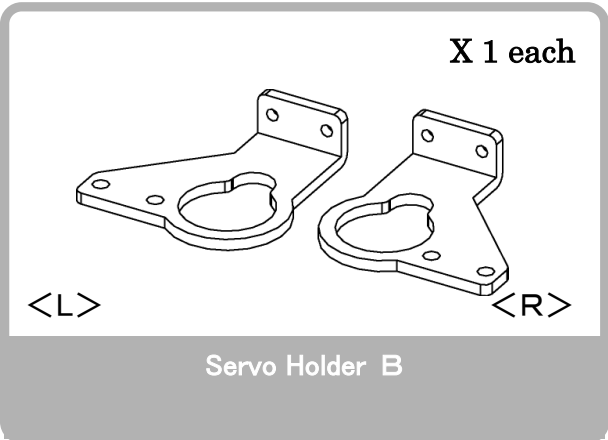
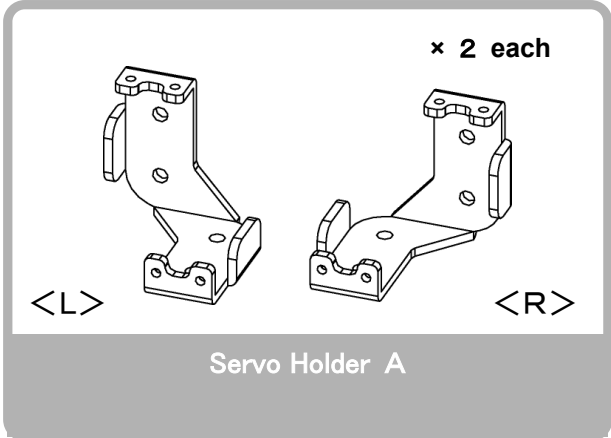
Expansion Boards: IXBUS × 1

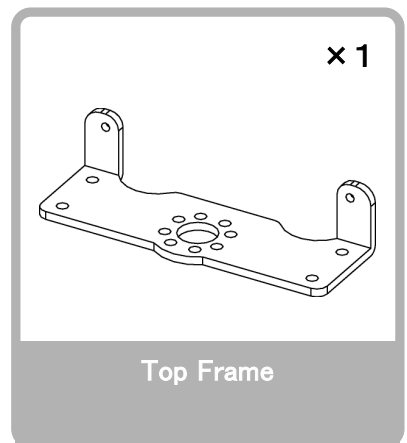
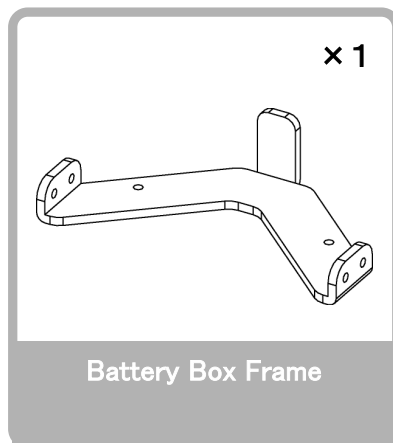
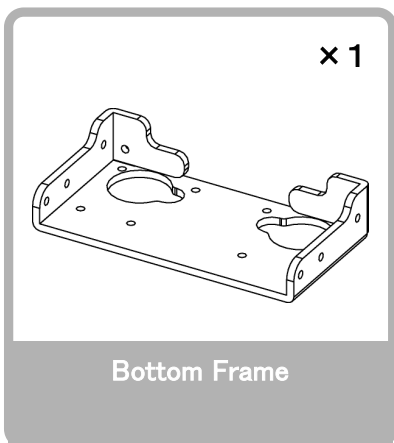
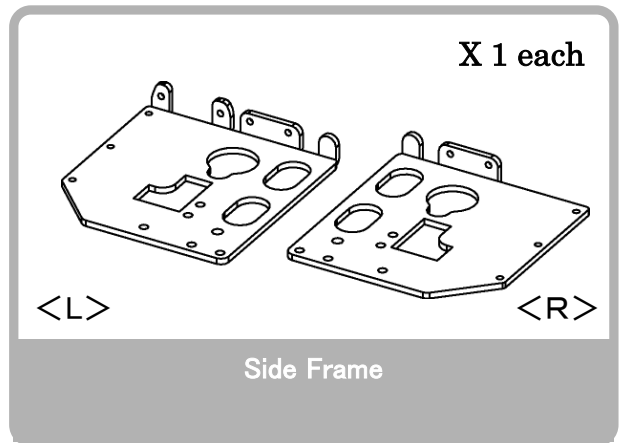
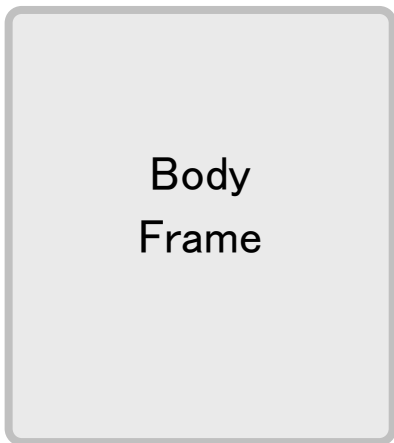
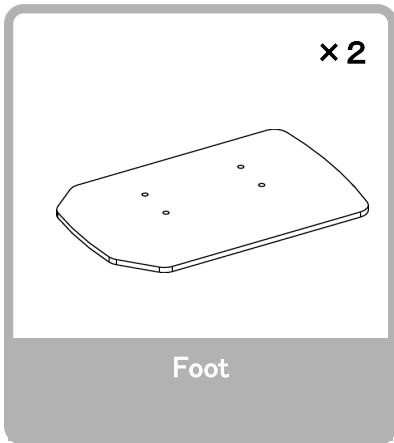
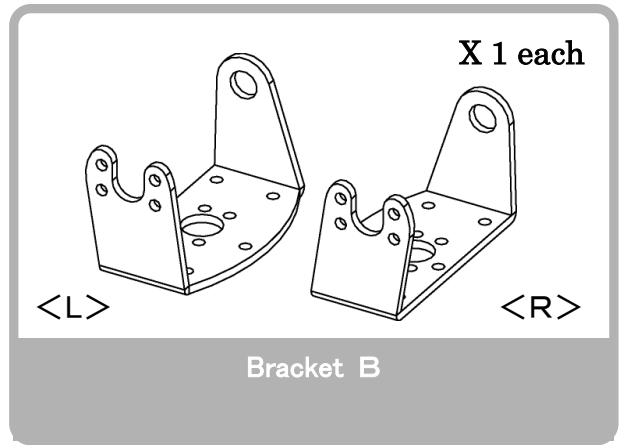
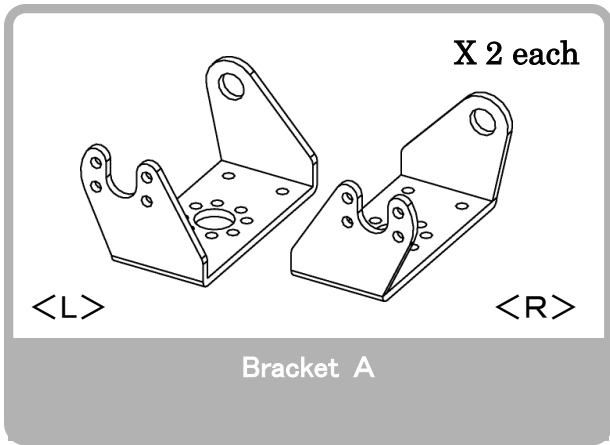


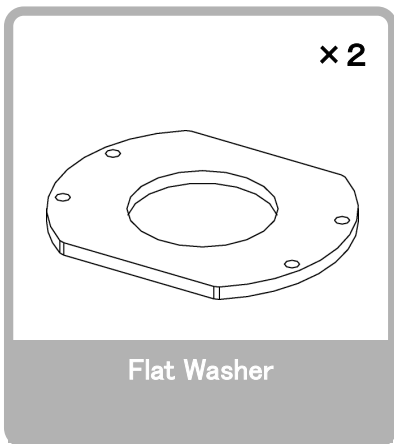
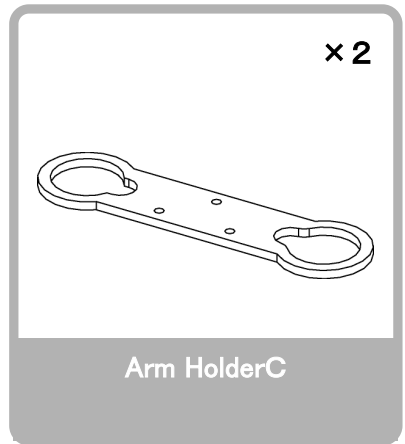
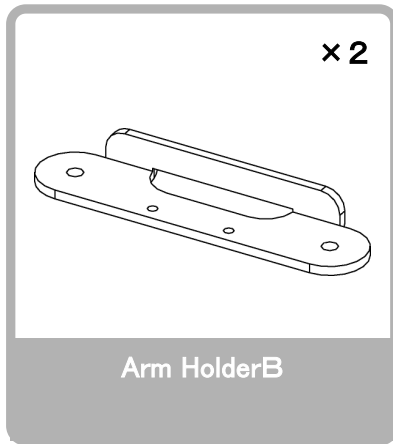
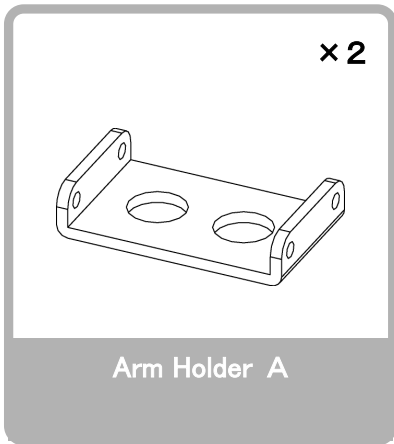
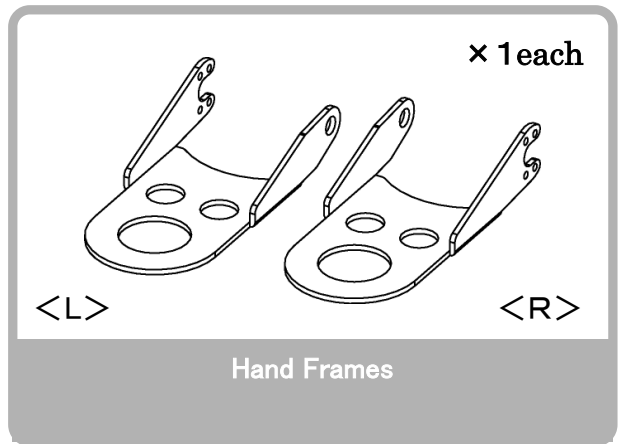
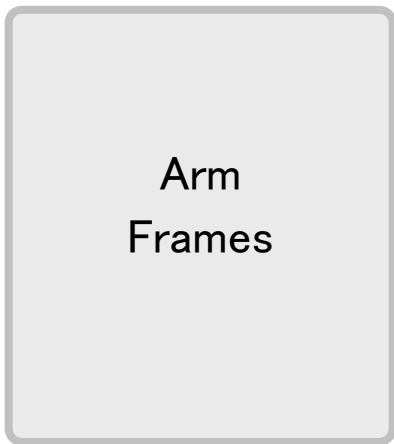
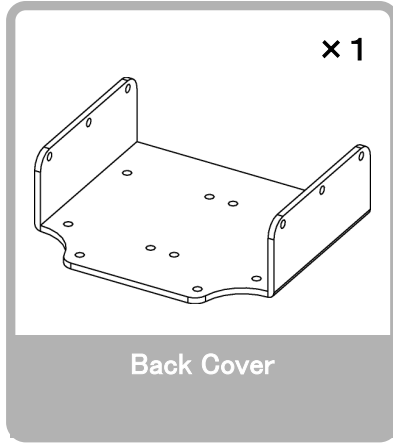
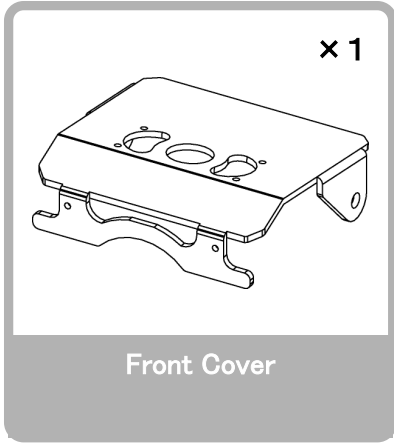
Parts List

Please confirm all parts are included in kit

Main Body
Frame







Screw Varieties

B Binding Screw

S S Tight Screw

Sp Spacer

M2- 3 × 102



Screw NA
M2-3 Course Thread

M2- 4 × 4



Screw NB
M2-4 Course Thread

M2- 4 **S** × 75



Screw NC
M2-4 S Tight

M2- 5 **B** × 10



Screw ND
M2-5 Binding

M3- 6 × 24



Screw NE
M3-6 Fine Thread

M3- 8 × 4



Screw NF
M3-8 Fine Thread

M2- 3 **Sp** × 2



Spacer A
M2-3(Hex spacer)

M3- 20 **Sp** × 2

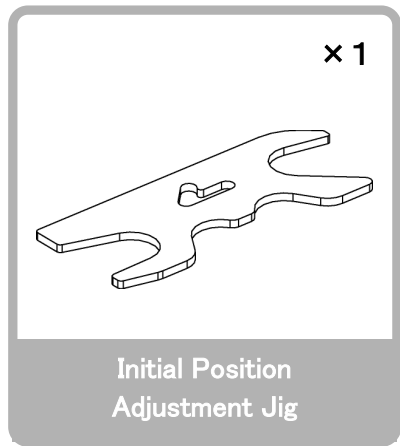
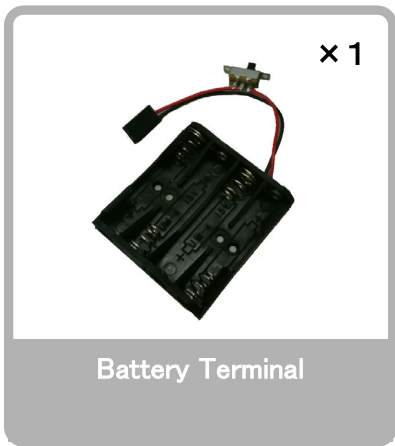
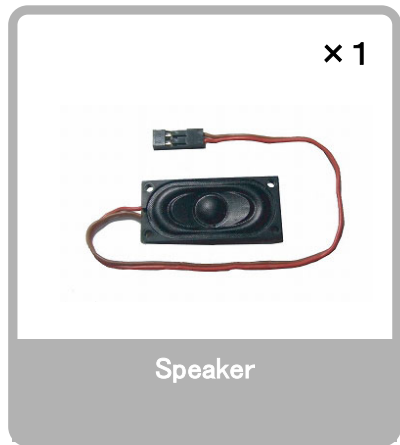
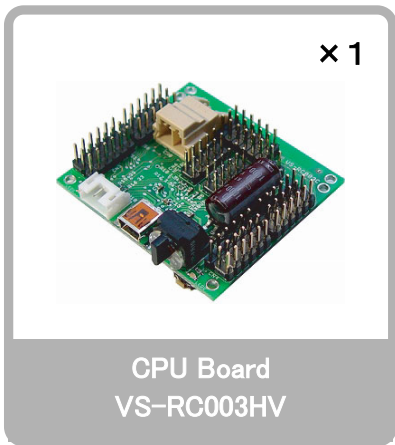
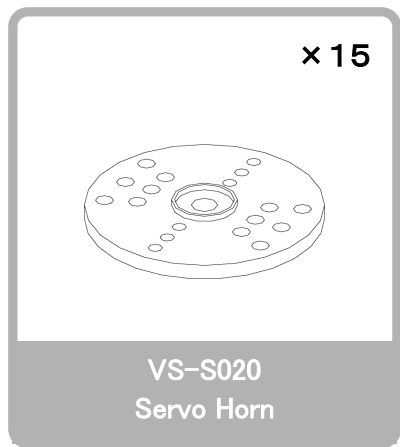


Spacer C
M3-20(Hex Spacer)

× 2



Twist Screw



3. Assembly

Important Points

- **Please use new screw driver.**

Philips head screwdriver #0: M2-3 Course thread, M2-4 course thread.

Flat head screwdriver #1: M2-4S tight, M2-5 Binding, M3-6, M3-8 screws.

- **Please make sure to use correct screw type.**

In particular, M2-4 tapping screws and M2-5 tapping screws are very similar. Please note that if you use M2-5 tapping screw for the output shaft of the servo, it may cause a malfunction of the robot.

- **Please install the servo horn in specified center position.**

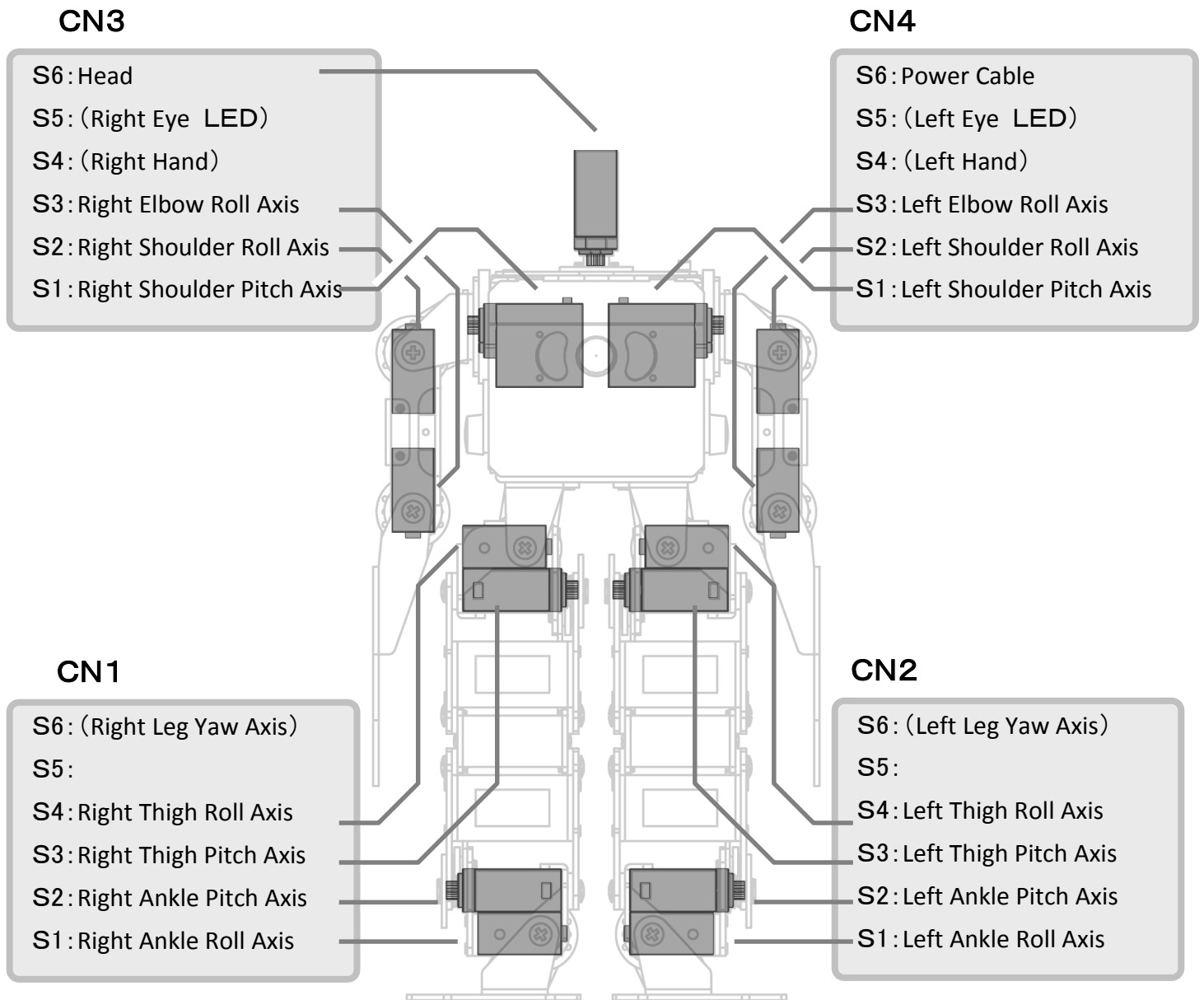
When installing the servo horn to servo, please try several times until you find the center position. If you install the servo horn in wrong position, the robot may not be able to play motions properly.

Assembly Instructions

Please follow the following instruction in order.

- ① Setting up servo motors
- ② Assembling right leg
- ③ Assembling left leg
- ④ Assembling right arm
- ⑤ Assembling left arm
- ⑥ Assembling Body
- ⑦ Attaching legs and arms onto the body
- ⑧ Wiring
- ⑨ Attaching covers onto front and back

Naming and positioning of the servo motors



① Setting up servo motors

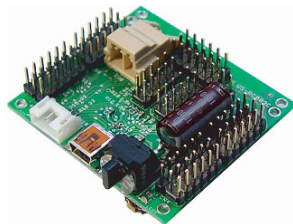
Please prepare the necessary parts

× 15



Servo motor
VS-S020

× 1



CPU Board
VS-RC003HV

× 1



Battery Box

× 1



USB Cable

Other Parts

PC

NiCad rechargeable battery
(AAA, full charged)

If you are installing Yaw axis extension kit, please prepare following parts.

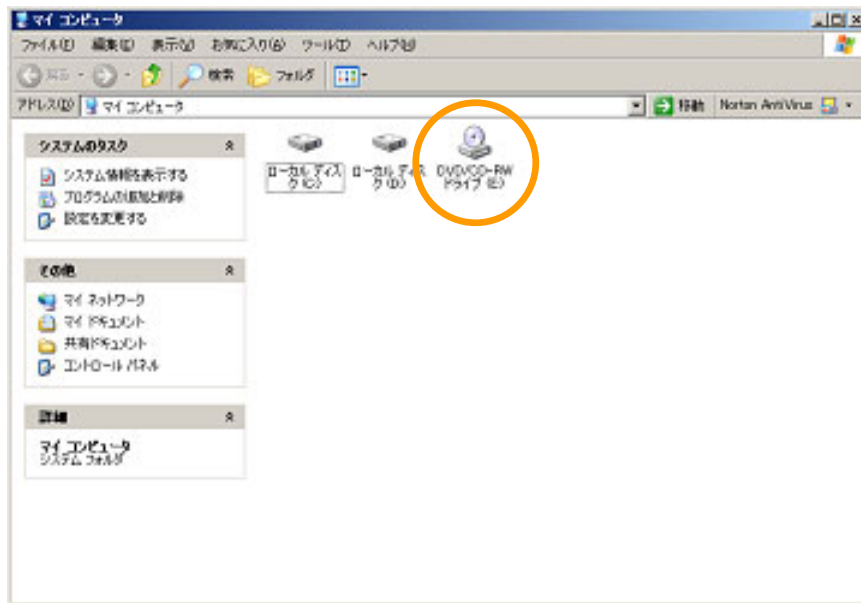
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Servo Motor
VS-S020

1 Installing RobovieMaker2

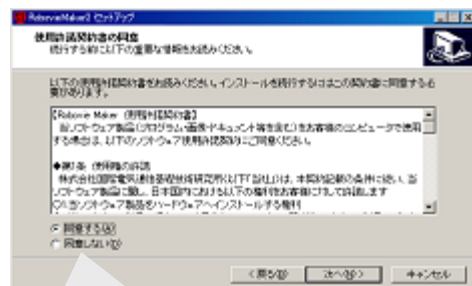
Please insert RobovieMaker2 Install CD into CD drive of your PC, and open the folder from MyComputer.



Please Double click the file called "RobovieMaker2_Inst_***.exe"
(* ** indicates the software version)

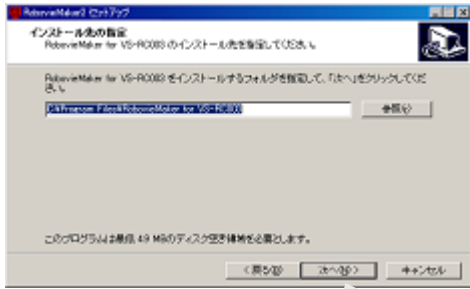


Click Next

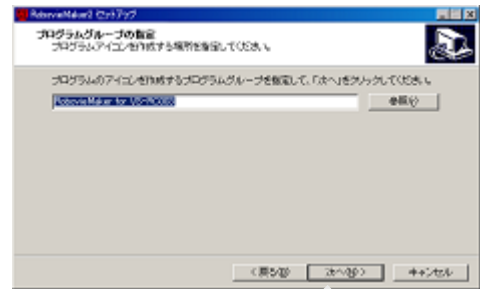


Read the license agreement and select "Agree".

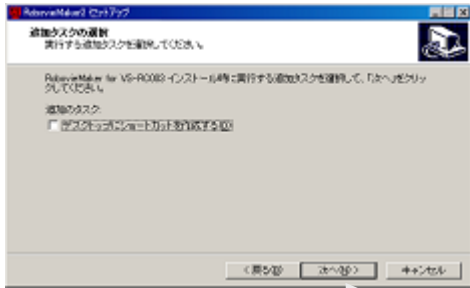
Click Next



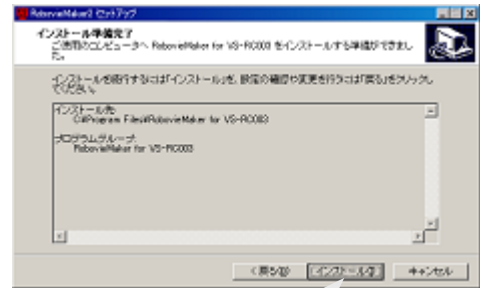
Click Next



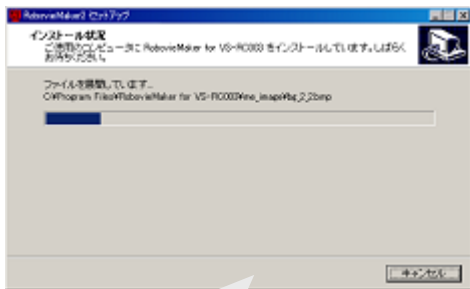
Click Next



Click Next



Click Install



It takes a few minutes



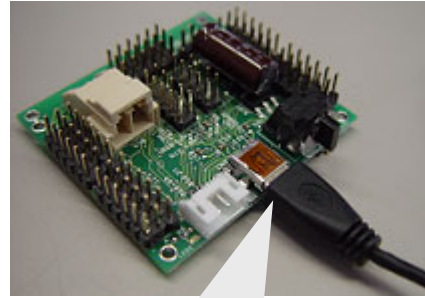
Click Finish

2 Connect CPU board to PC

Connect CPU Board to PC and PC will recognize the CPU Board.



Connect USB cable to CPU Board.



Connect to PC

Insert the cable firmly.



PC will automatically detect the CPU Board when it is connected.

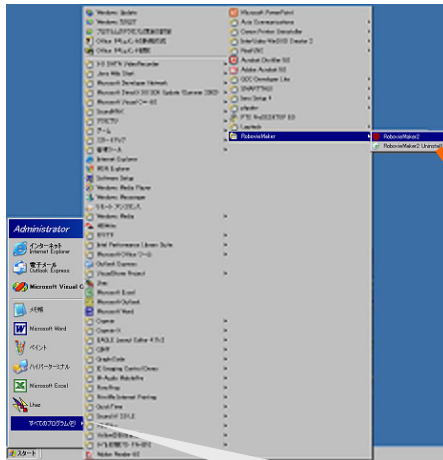
It may take several times to detect the CPU board when you are connecting it for the first time.

Please wait until PC detects the CPU Board.



5 Creating new robot project

Start RobovieMaker and prepare for controlling Robot from PC.




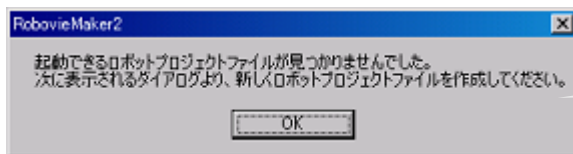
① Click Start

② Place the cursor over the "All Programs".

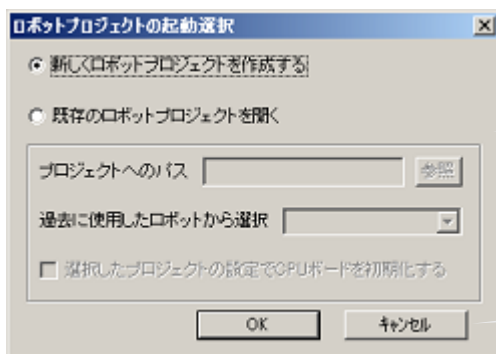
③ Click 「RobovieMaker2」



 The following dialogues will appear when you start the program for the first time.

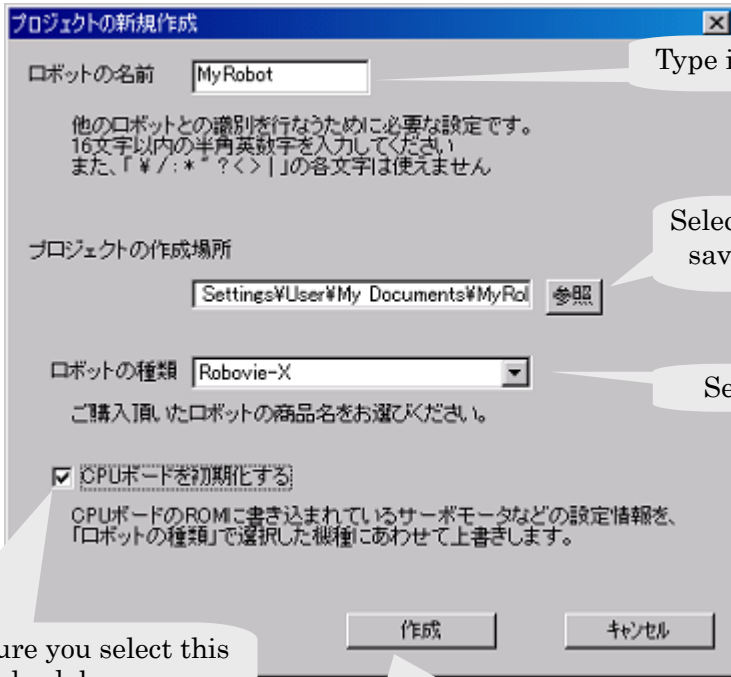


Click 「 OK 」



Select create new project.

Click 「 OK 」



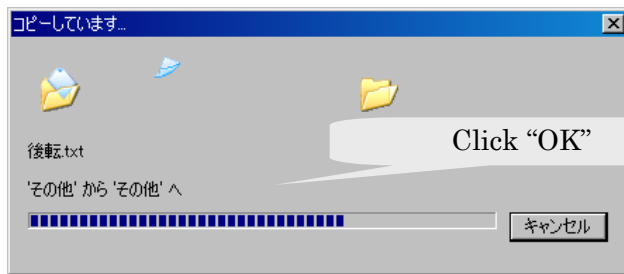
Type in name of your robot.

Select directory your want to save the data of the robot.

Select "Robovie-nano"

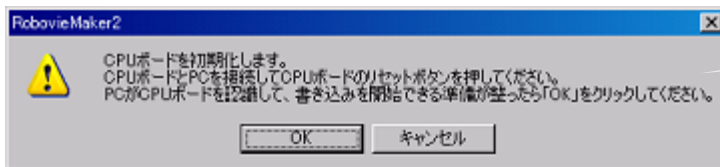
Make sure you select this check box.

Click "Create"



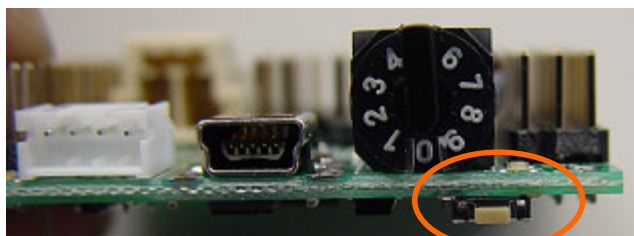
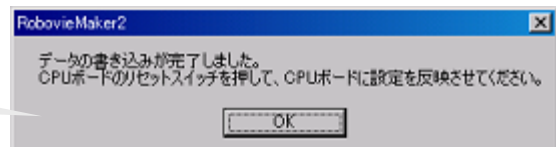
Click "OK"

⚠ Please initialize your CPU Board if you are using new board.



Click OK

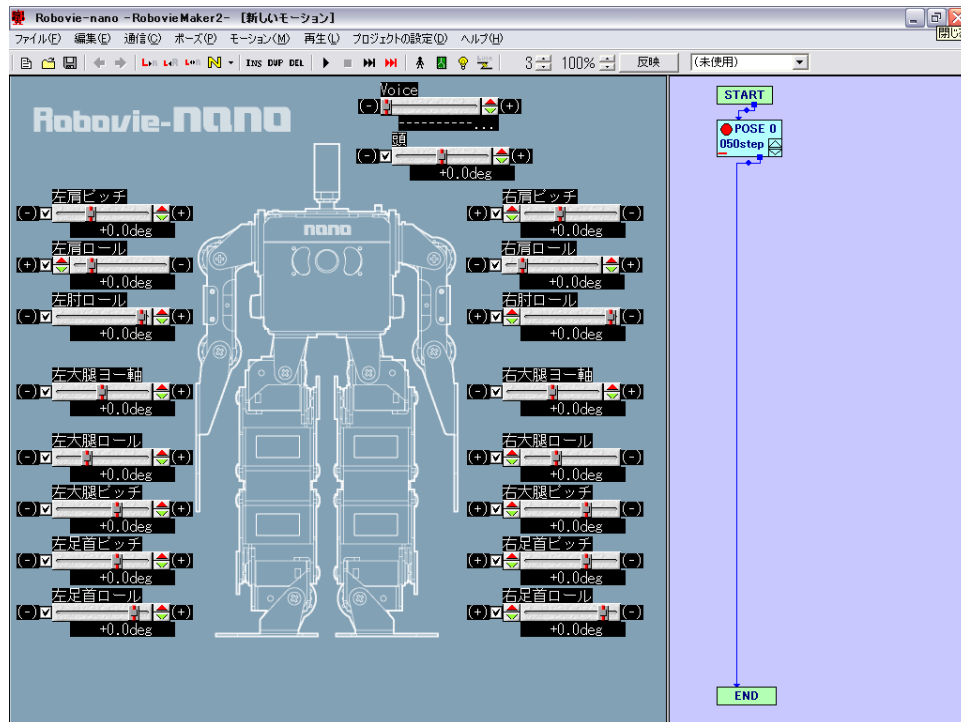
Push the reset button on the CPU Board and click "OK".



⚠ Make sure you press the reset button before you click the "OK" button.

The initialization of the CPU Board is completed.

It will open the following window.



3 Numbering Servo Motors

Placing number tags on to the cable of each servo motor.



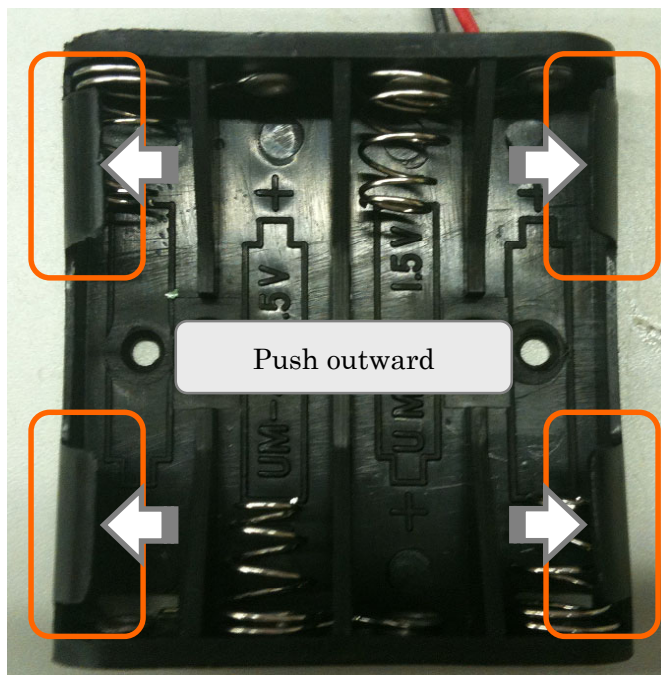
Please place the tag onto the cable, not the connector.

Please use CN1-S6 and CN2-S6 for “Yaw Axis kit”.

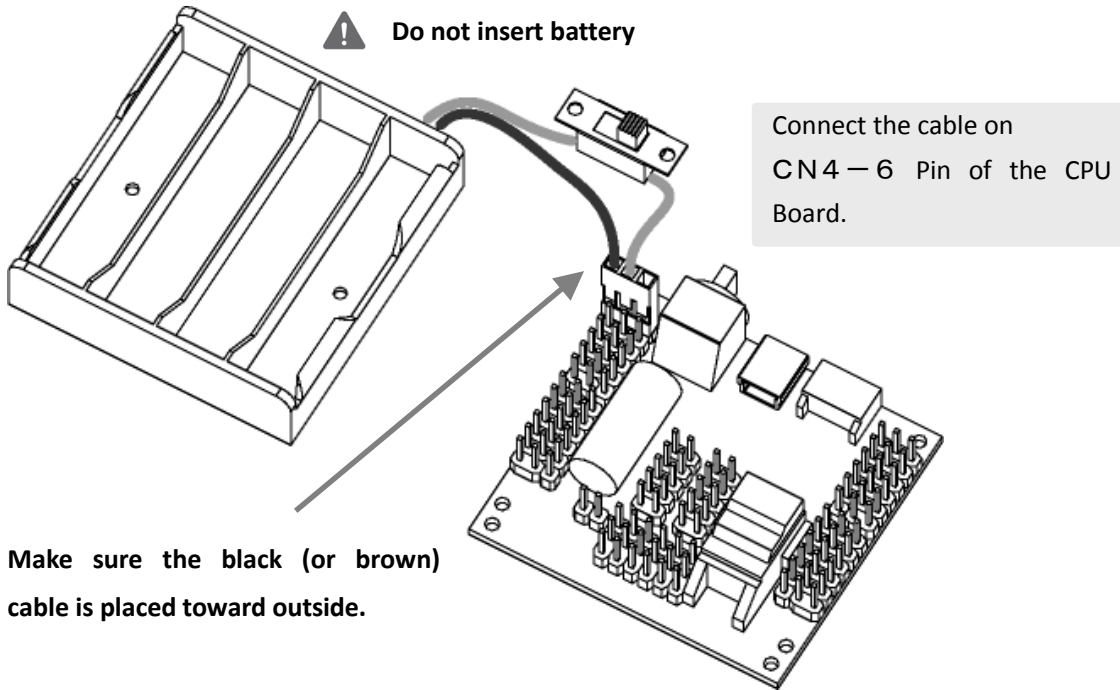
⚠ If you are installing the Yaw Axis kit, please place the CN1-S16 and CN2-S6 to the servo cables.

4 Preparing Battery Box

Please push the tabs (circled in orange) outward so that you can insert and takeout the battery easily.

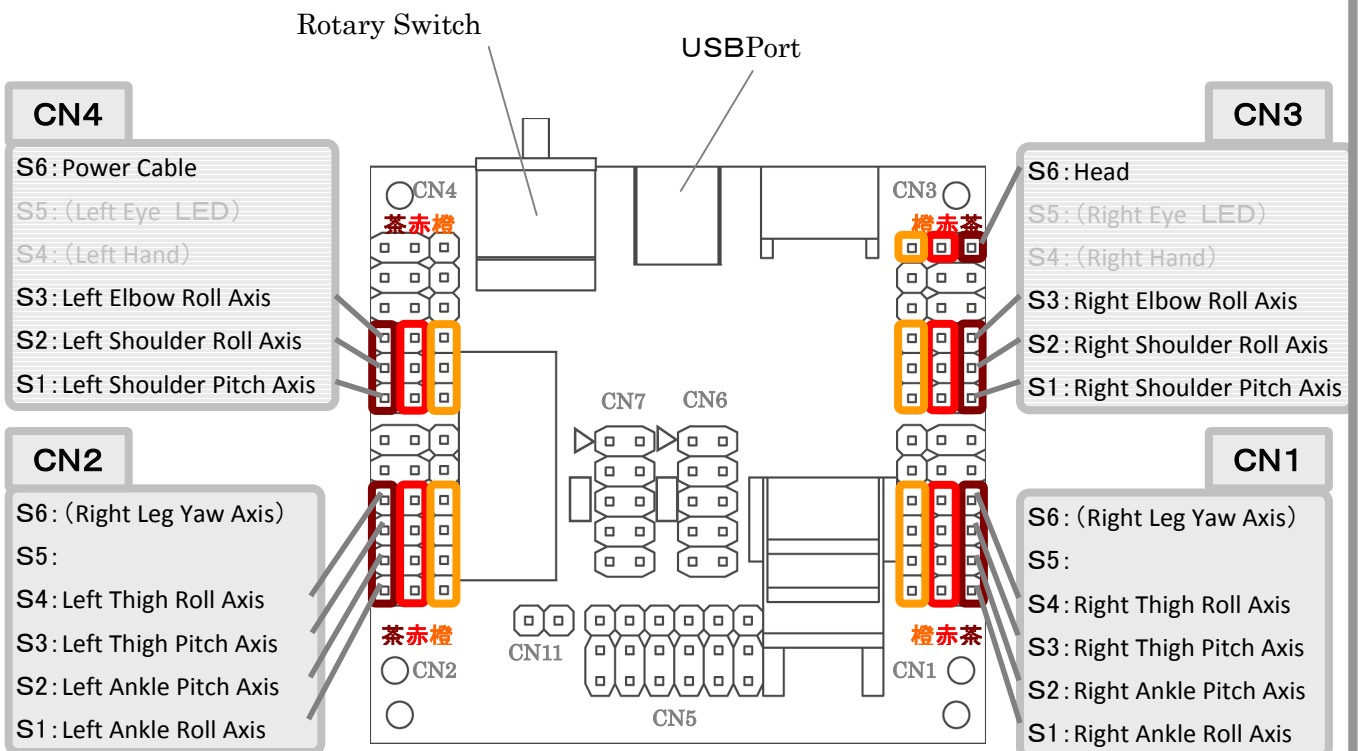


5 Connecting Battery Box



6 Connecting Servo Motors

Connecting all servo motors onto the CPU board.



! Place the cables so that the brown or black cable goes to outside.


! If you connect wires wrong, the robot may not work properly.

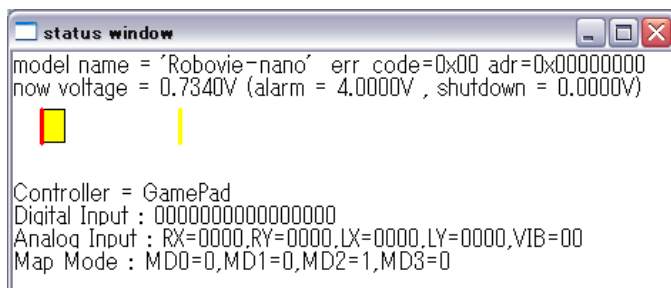
7 Positioning Servo Motors


Start up RobovieMaker2.




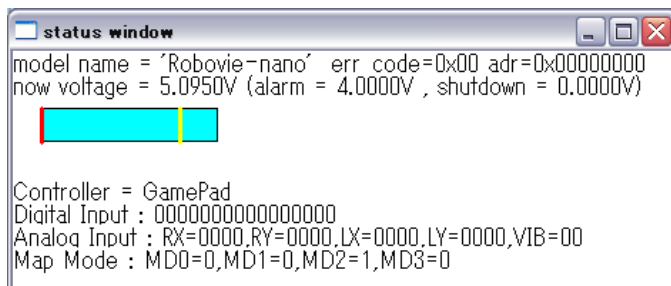
Servo Motor ON/OFF Button Communic

Connect CPU Board to PC and push the  button in tool bar.





 Button opens status window.

Place batteries in the battery box and turn on the switch, and turn on the switch on the CPU Board. Then, click servo motor ON/OFF button  in tool bar. It will power up the servo motors.



When you turn on the power, it will change the voltage shown in the status window.

If you press the  button, all the servo motors moves to center position.

After verifying that all the servo motors are running, press the ON/OFF button  again and turn all servo motors off.

Now, follow the above procedure reverse direction, and turn off the switch. Then, remove the USB cable, battery box, and servo motors from CPU board.

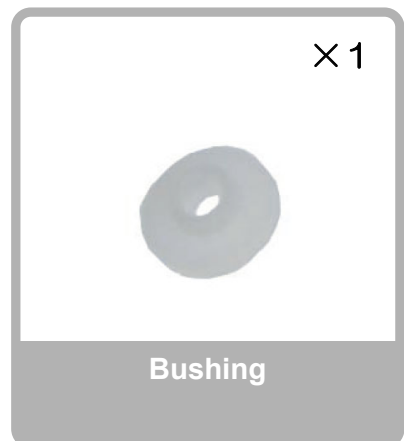
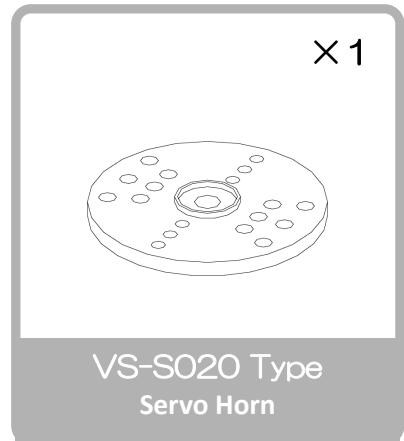
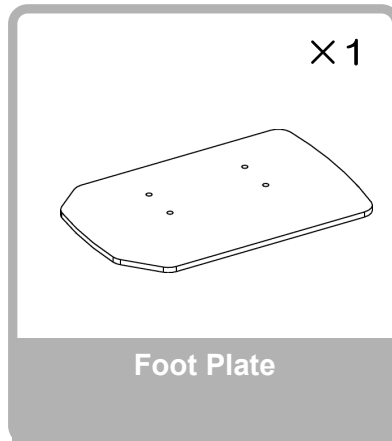
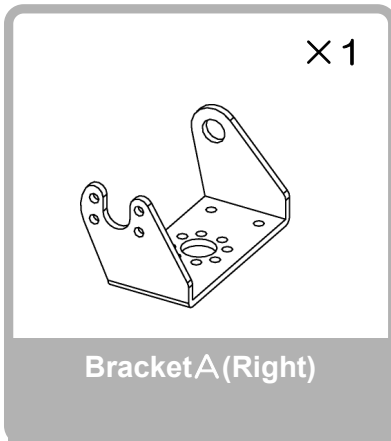
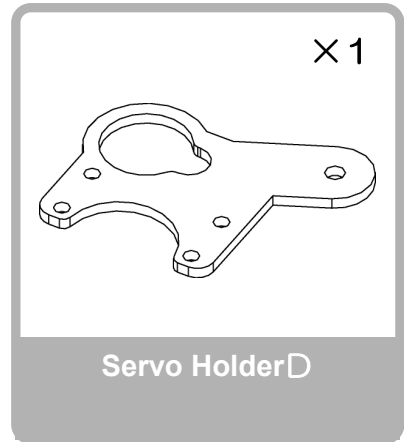
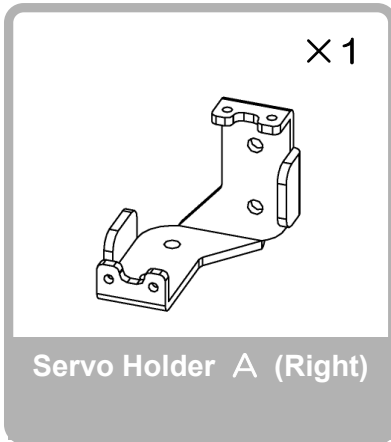
You have completed steps to find center position of servo motors. For the farther steps, do your assembly relative to this center position.



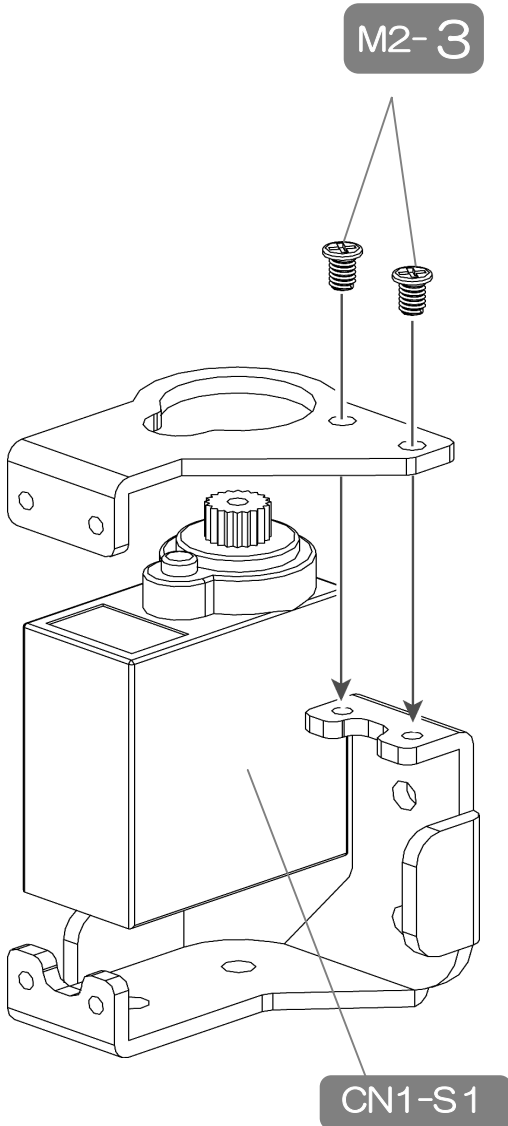
Please do not move the output shaft of the servo motors while placing servo horns.

②Right Leg Assembly

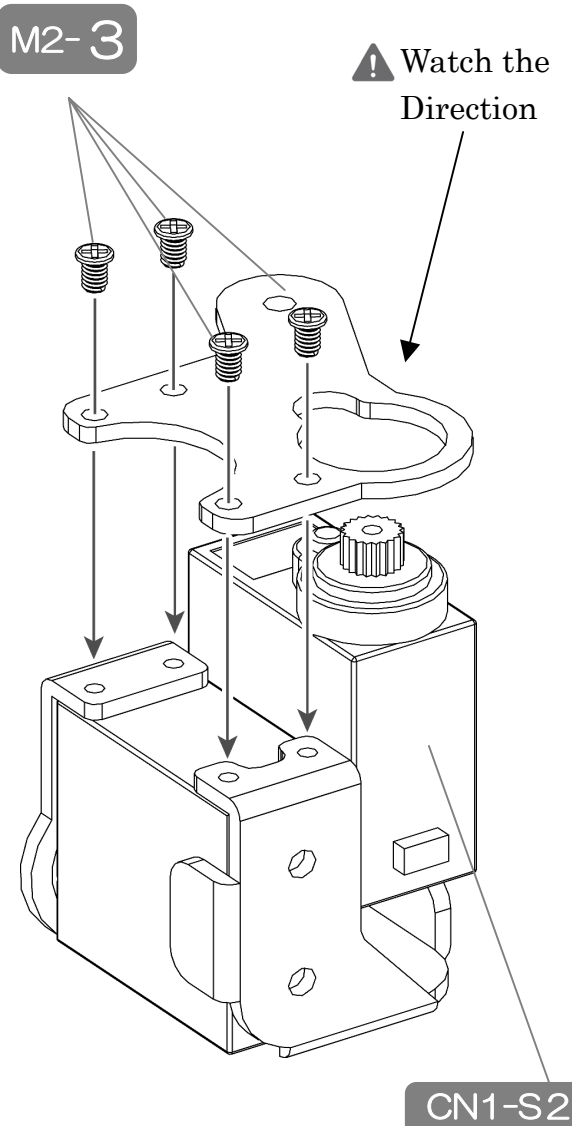
Please gather the necessary parts



1 Right Ankle Block Assembly ①

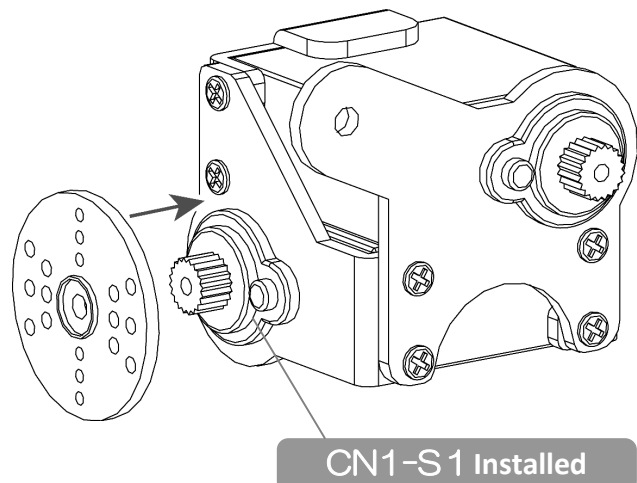
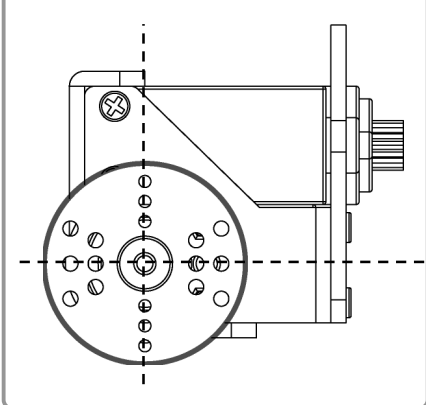


2 Right Ankle Block Assembly ②

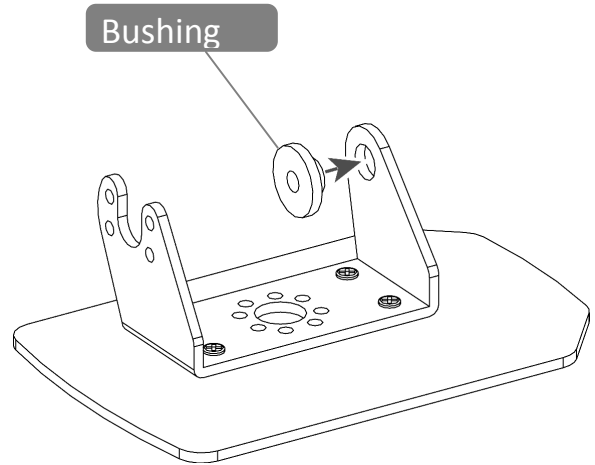
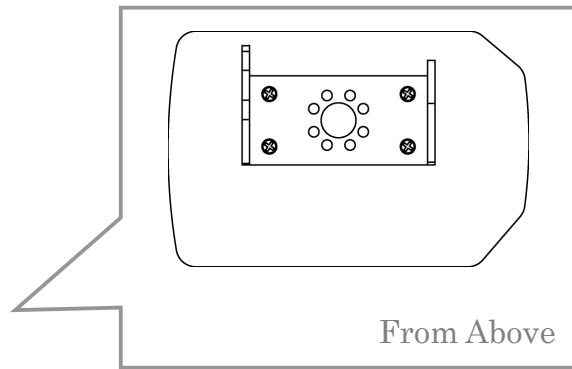
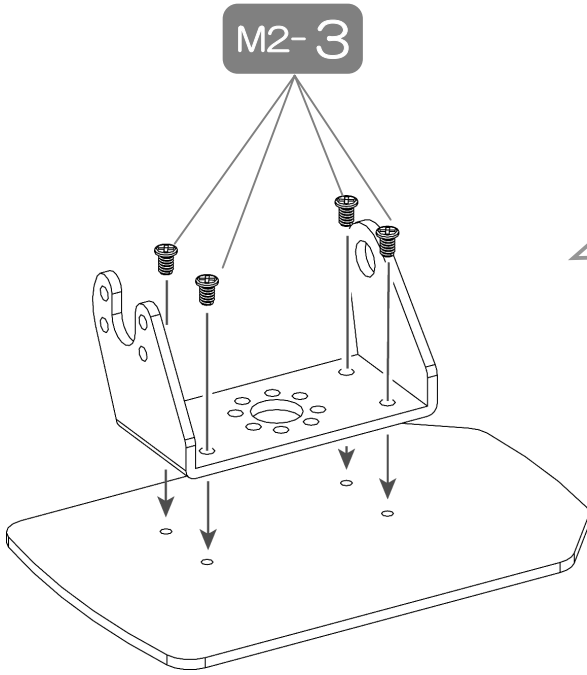


3 Back of Right Leg ①

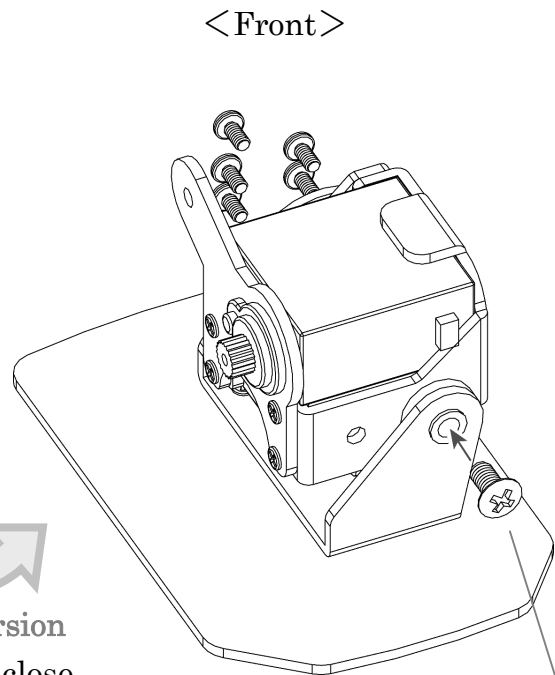
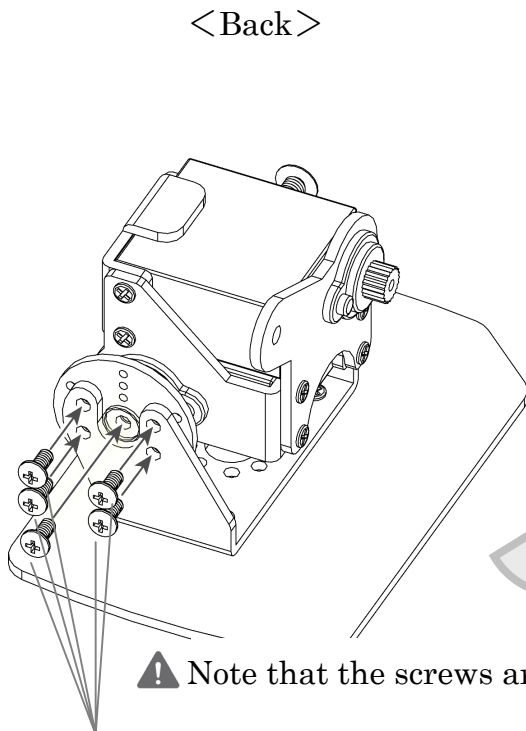
Servo Horn Positioning



4 Back of Right Leg ②

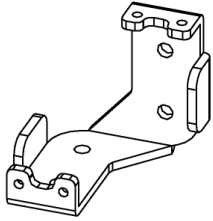


5 Back of Right Leg ③



Please gather the necessary parts.

×1



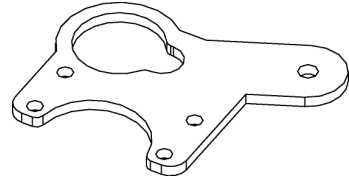
Servo Holder A (Right)

×1



Servo Holder C (Right)

×1



Servo Holder D

×2



※Please prepare the servos with the following seals attached.

CN1-S3

CN1-S4

Servo Motor
VS-S020

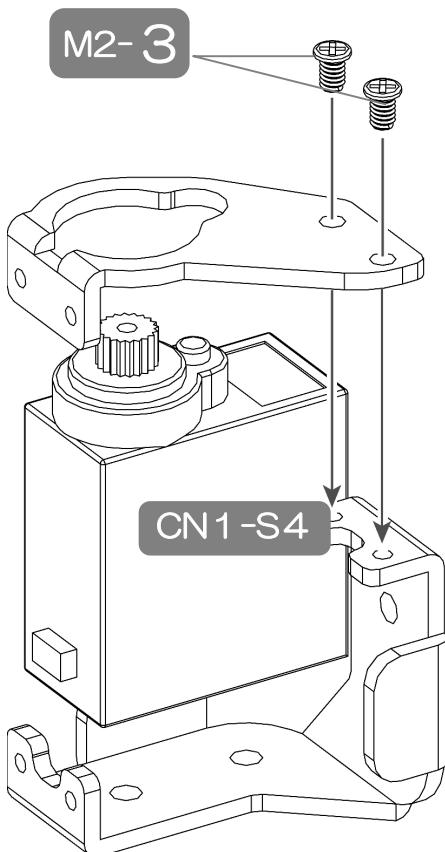
×6

M2-3



Screw NA
M2-3 Course Thread

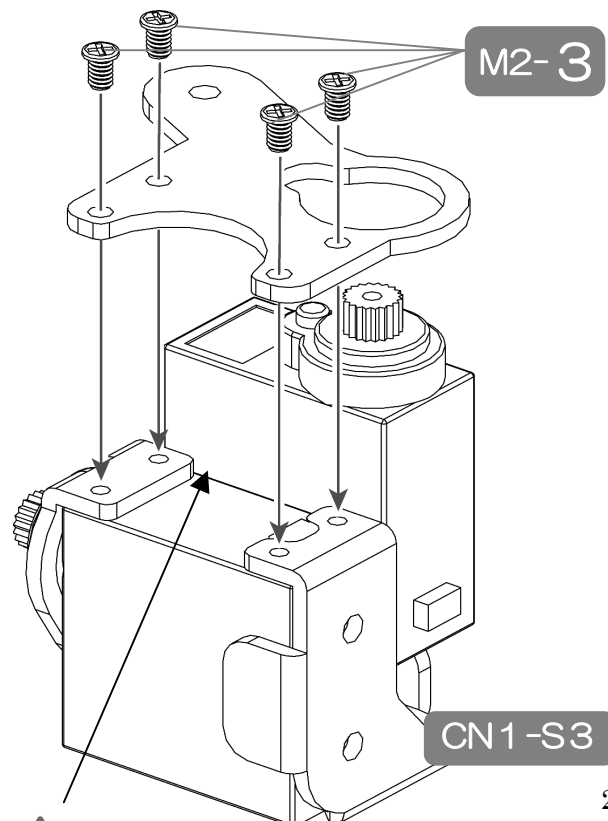
6 Right Thigh Assembly ①



M2-3

CN1-S4

7 Right Thigh Assembly ②



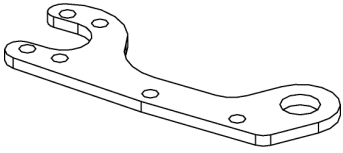
M2-3

CN1-S3

⚠ Do NOT Pinch the Cables!

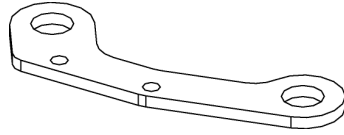
Please gather the necessary parts

×2



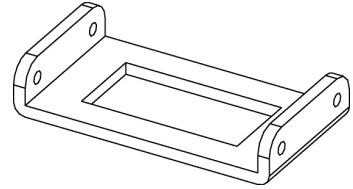
Link Arm A

×2



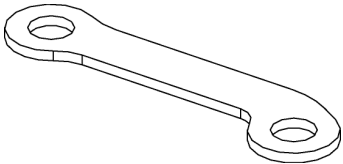
Link Arm B

×2



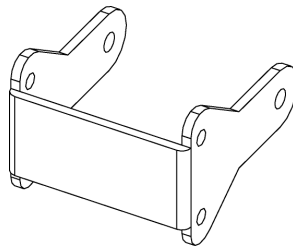
Link Arm C

×2



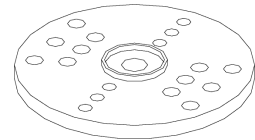
Rear Link Arm A

×1



Knee Frame A

×2



VS-S020Type
Servo Horn

M2-3

×8



Screw NA
M2-3 Course Thread

M2-4

S

×10



Screw NC
M2-4 S Tight

M3-6

×8



Screw NE
M3-6 Fine Thread

M3-8

×2



Screw NF
M3-8 Fine Thread

×10



Bushing

M3-20

ス

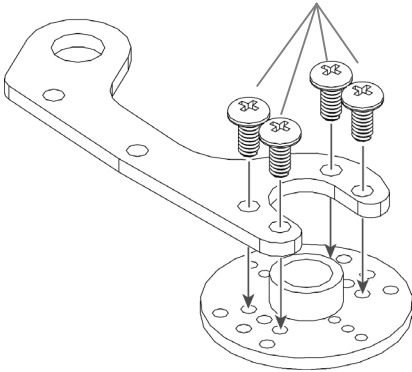
×1



Spacer C
M3-20(Hexagonal)

8 Right Link Arm Assembly

M2-4 S

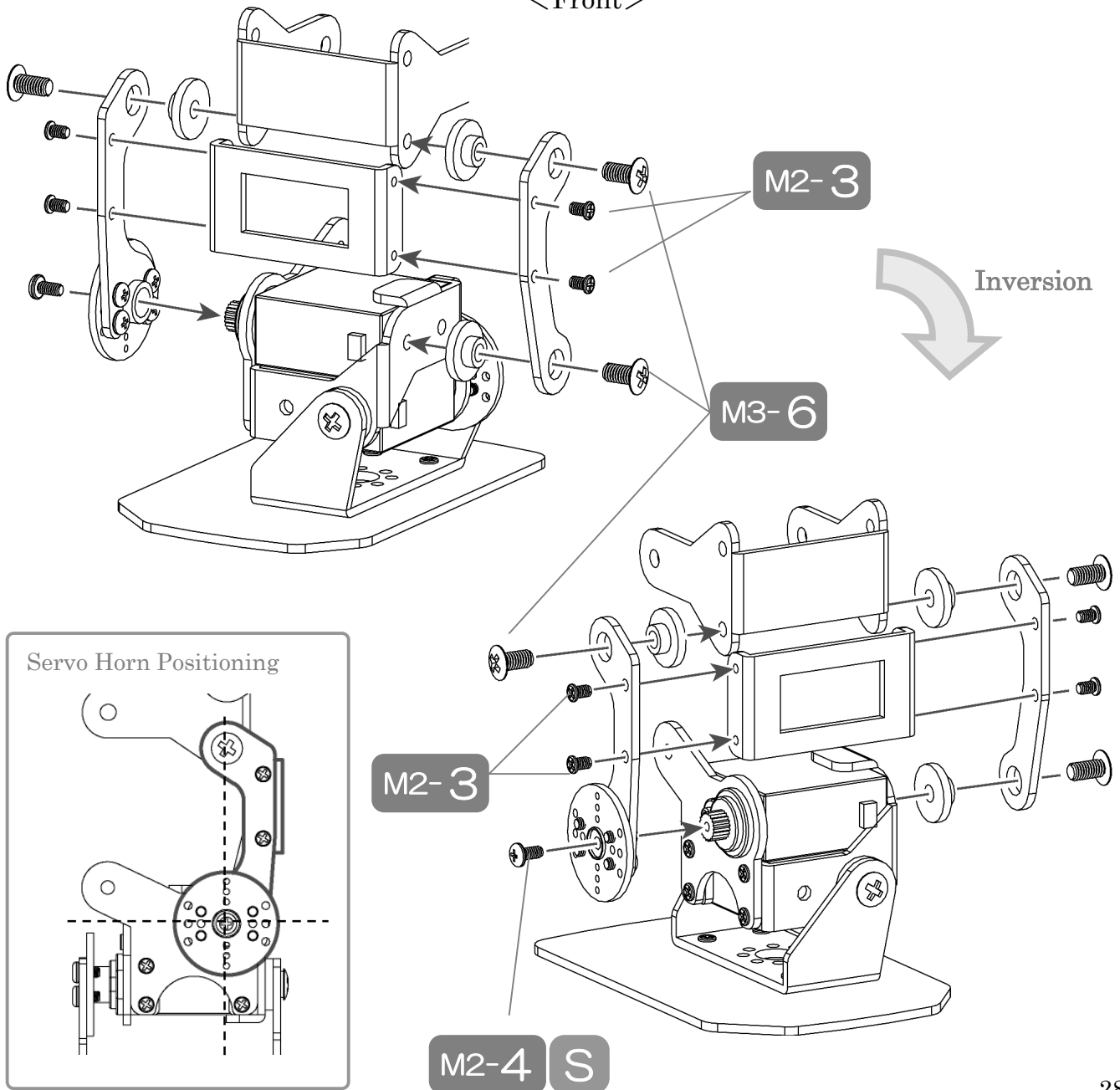


⚠ 2 Sets

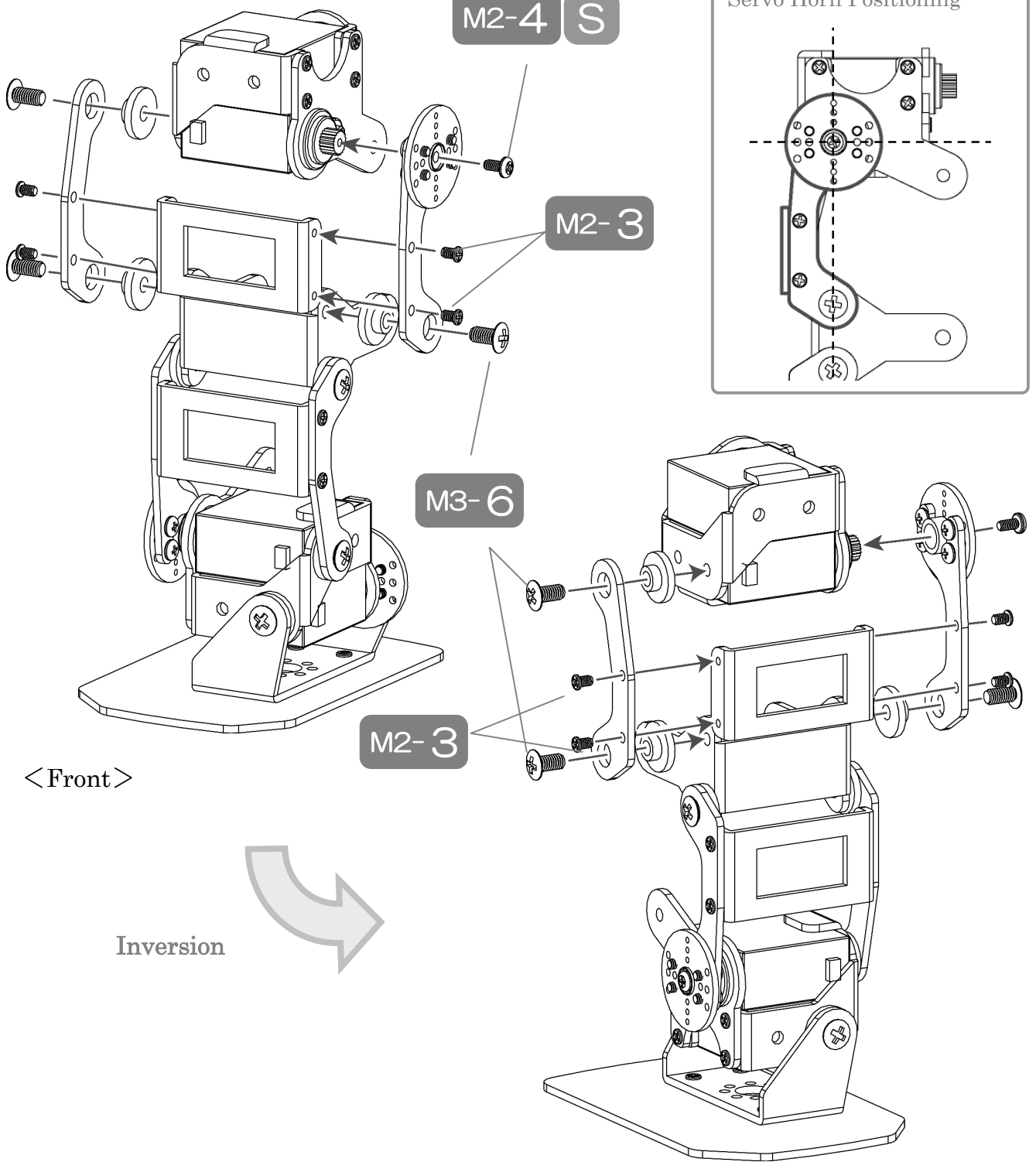
⚠ DO NOT Strip the Screw Threads !

9 Right Arm Link Assembly ①

<Front>

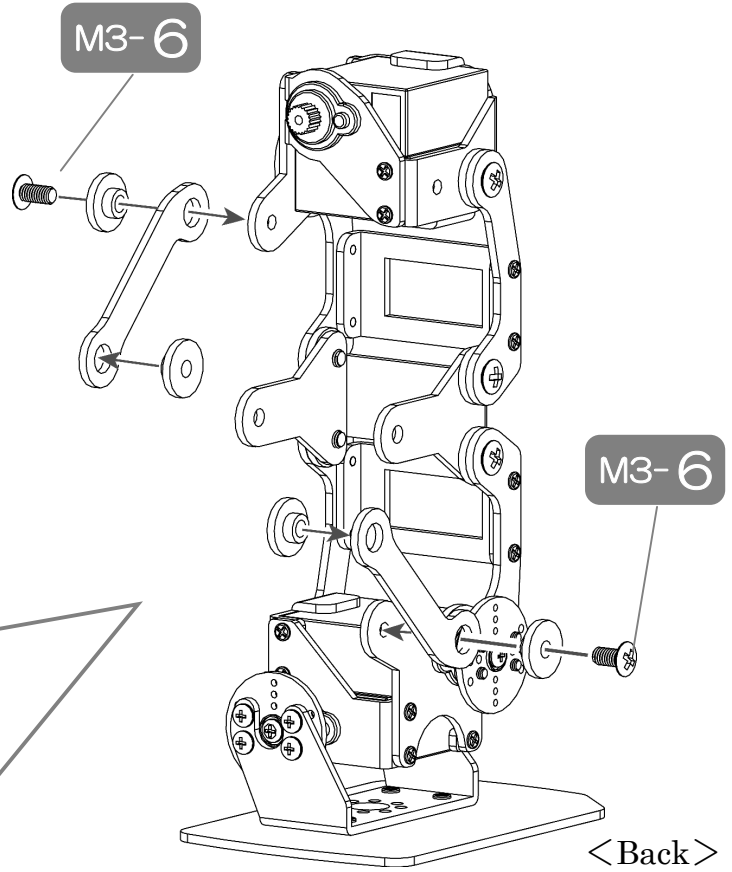
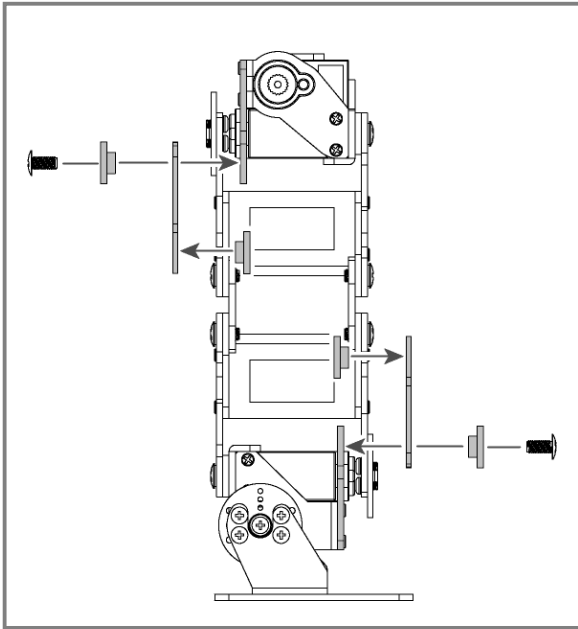


10 Right Link Arm Assembly ②



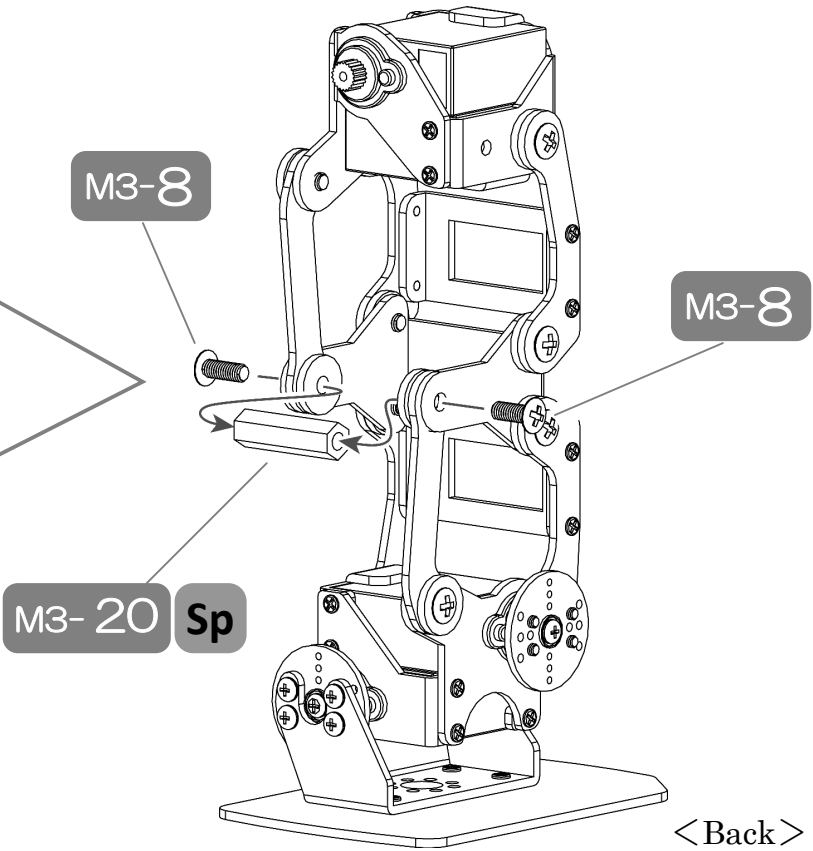
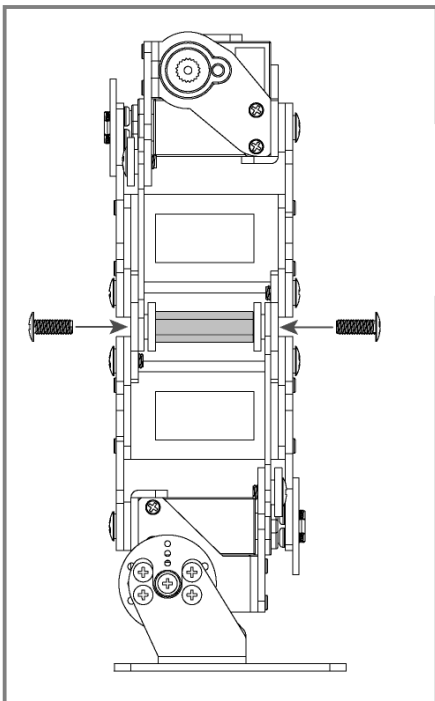
1 1 Attaching the rear link ①

Side View

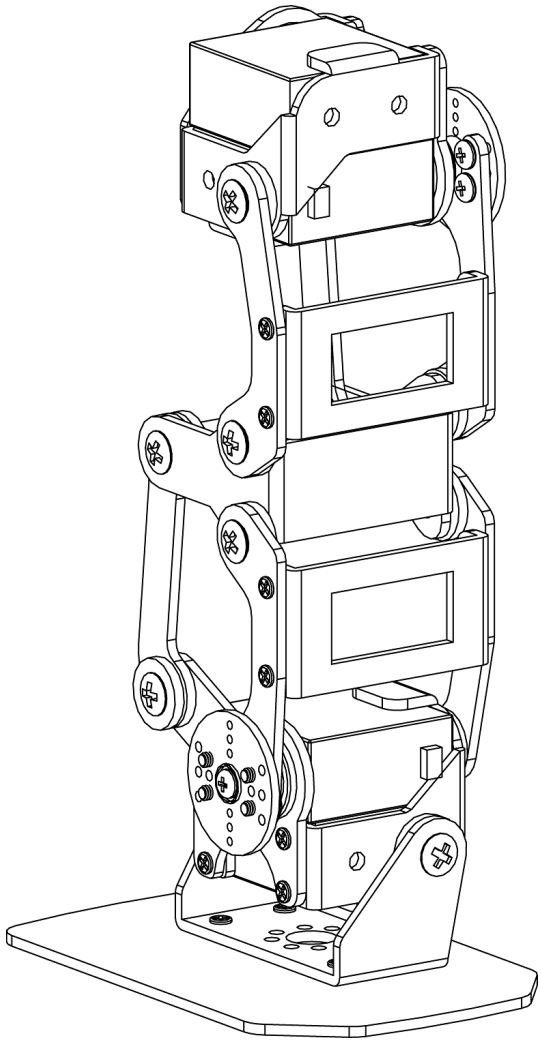


1 2 Attaching the rear link ②

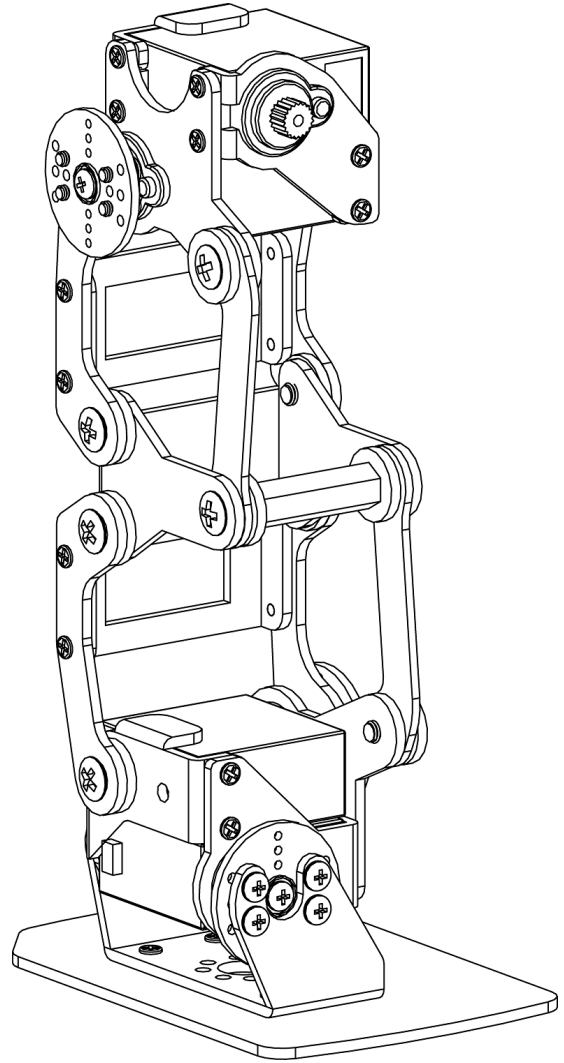
Side and Rear View



1 3 Completed Right Leg Assembly



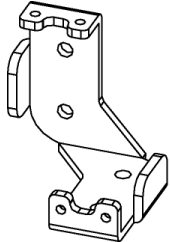
< Front >



< Back >

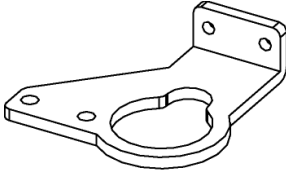
③Left Leg Assembly

Please gather the necessary parts



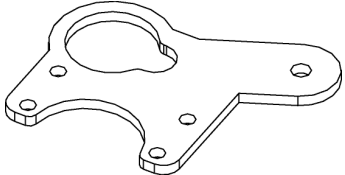
×1

Servo Holder A (Left)



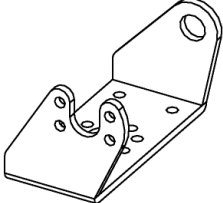
×1

Servo Holder B (Left)



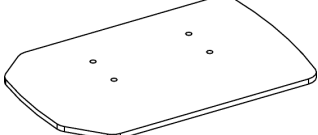
×1

Servo Holder D



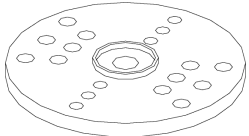
×1

Bracket A (Left)



×1

Right Foot Plate



×1

VS-S020Type Servo Horn



×2

※Please prepare the servos with the following seals attached

CN2-S1 CN2-S2

Servo Motor VS-S020



M2-3 ×10

Screw NA M2-3 Course Thread




M2-4 S ×5

Screw NC M2-4 S Tight



M3-6 ×1

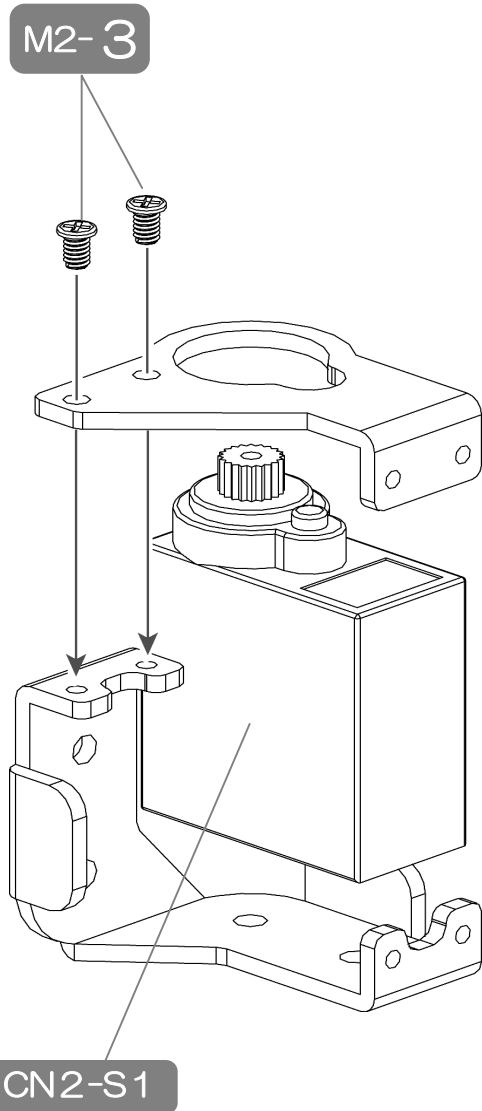
Screw NE M3-6 Fine Thread



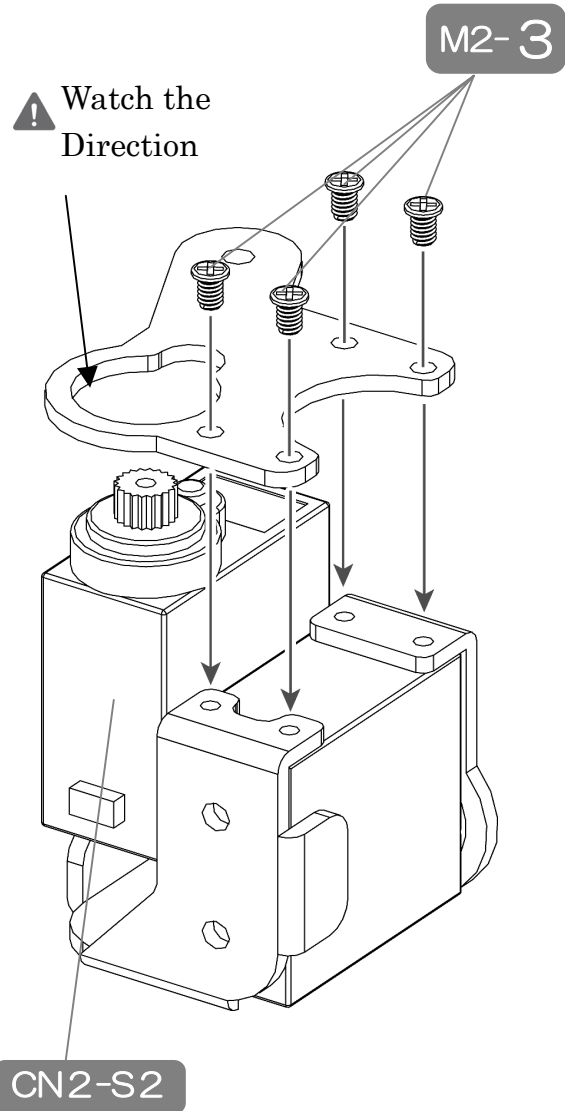
×1

Bushing

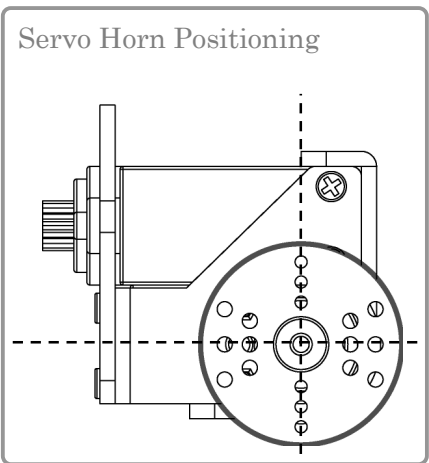
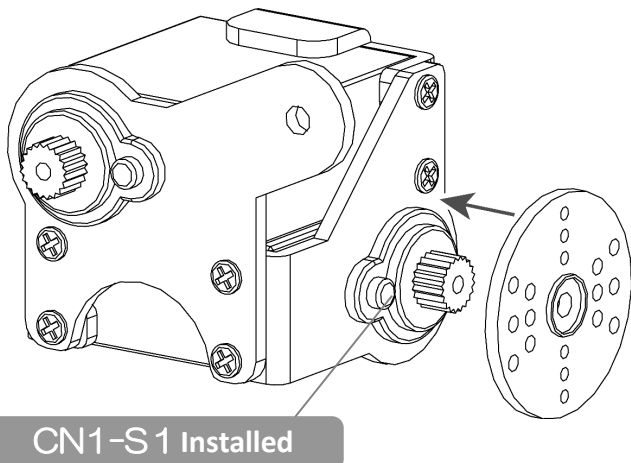
1 Left Ankle Block Assembly ①



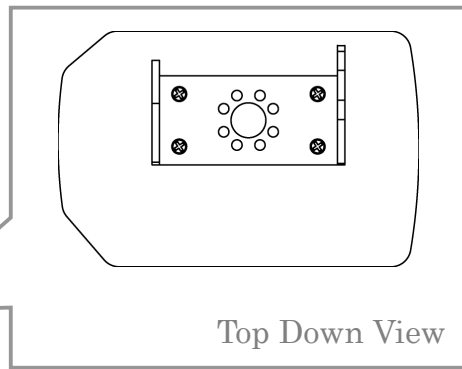
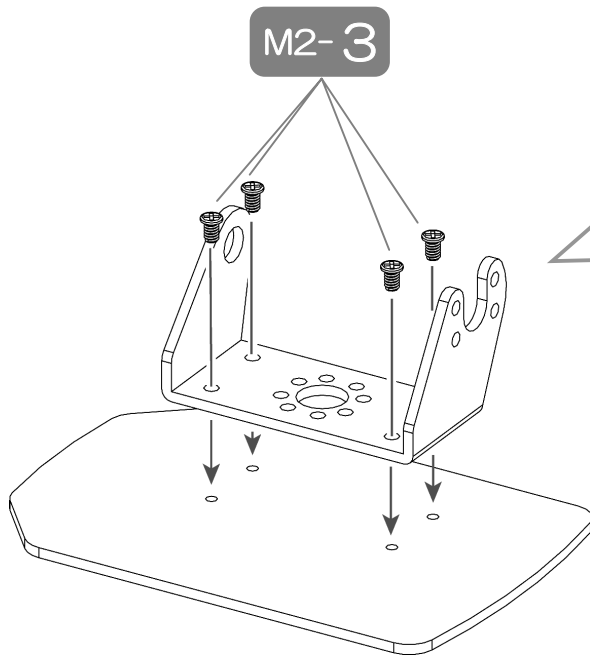
2 Left Ankle Block Assembly ②



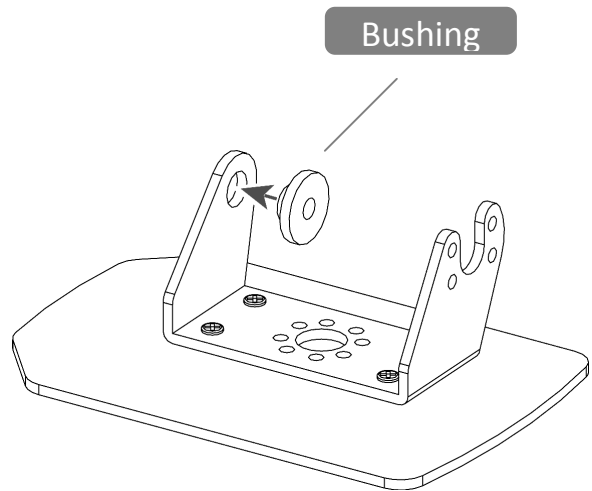
3 Back of Left Leg ①



4 Back of Left Leg ②

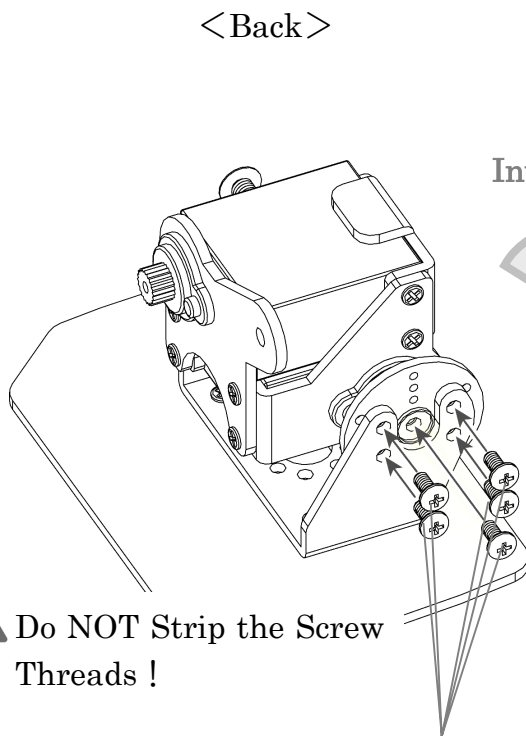


Top Down View



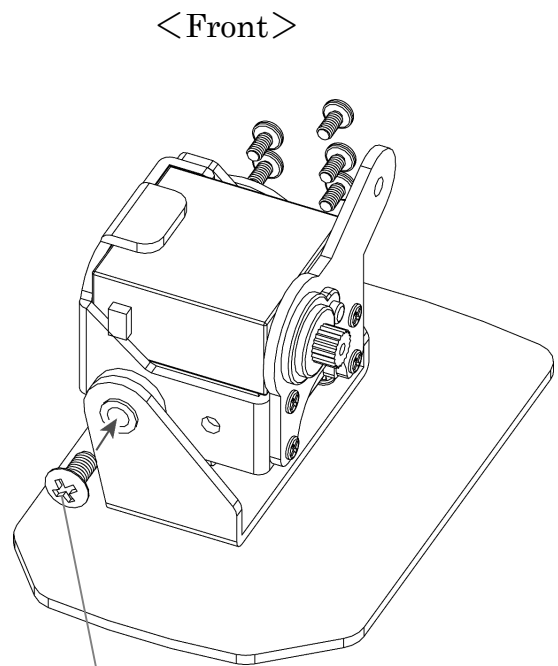
Bushing

5 Back of Left Leg ③



⚠ Do NOT Strip the Screw Threads !

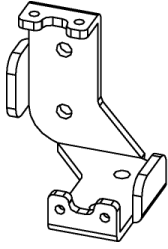
M2-4 S



M3-6

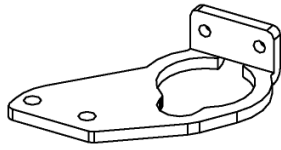
Please gather the necessary parts.

×1



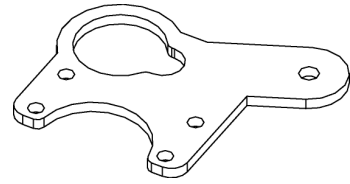
Servo Holder A (Left)

×1



Servo Holder C (Left)

×1



Servo Holder D

×2



※Please prepare the servos with the following seals attached.

CN2-S3

CN2-S4

Servo Motor
VS-S020

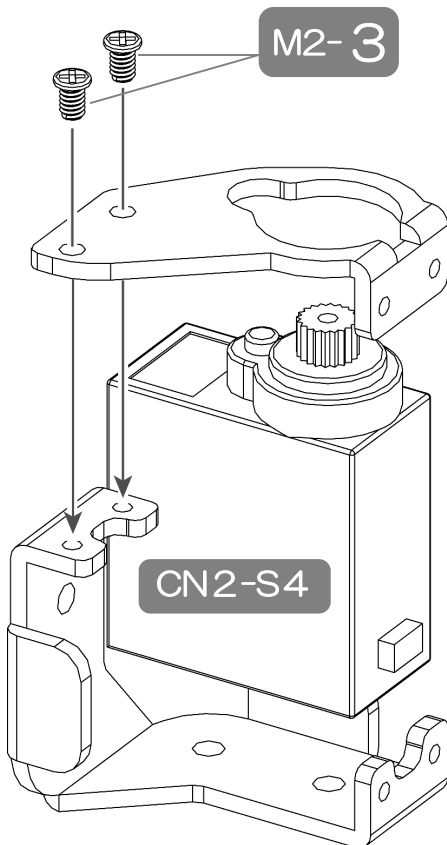
×6

M2-3

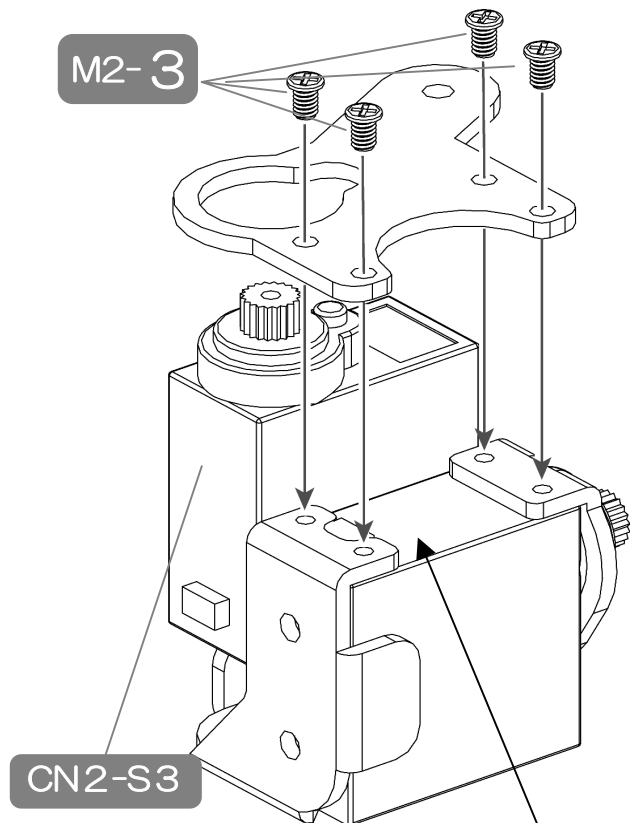


Screw NA
M2-3 Course Thread

6 Left Thigh Block Assembly ①



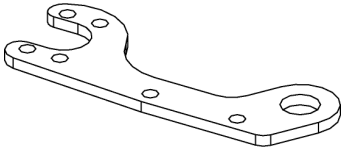
7 Left Thigh Block Assembly ②



⚠ DO NOT Pinch the Cables!

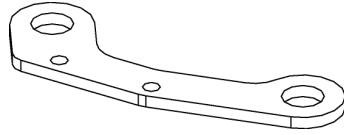
Please gather the necessary parts

×2



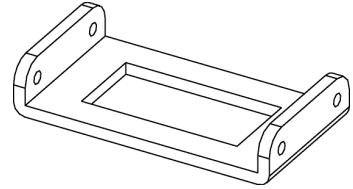
Link Arm A

×2



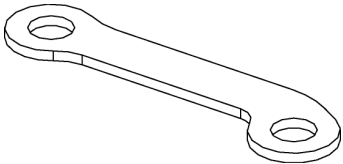
Link Arm B

×2



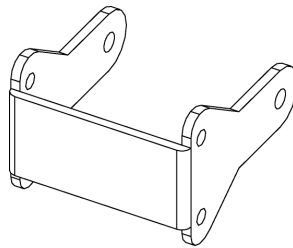
Link Arm C

×2



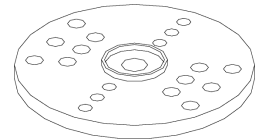
Rear Link Arm A

×1



Knee Frame A

×2



VS-S020Type
Servo Horn

M2-3

×8



Screw NA
M2-3 Course Thread

M2-4

S

×10



Screw NC
M2-4 S Tight

M3-6

×8



Screw NE
M3-6 Fine Thread

M3-8

×2



Screw NF
M3-8 Fine Thread

×10



Bushing

M3-20

ス

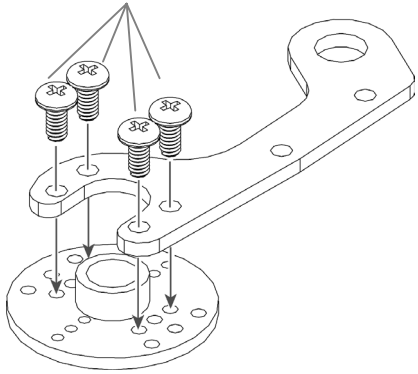
×1



Spacer C
M3-20(Hexagonal)

8 Left Link Arm Assembly

M2-4 S



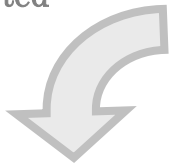
⚠ 2 Sets

⚠ DO NOT Strip the Screw Threads !

9 Left Arm Link Assembly ①

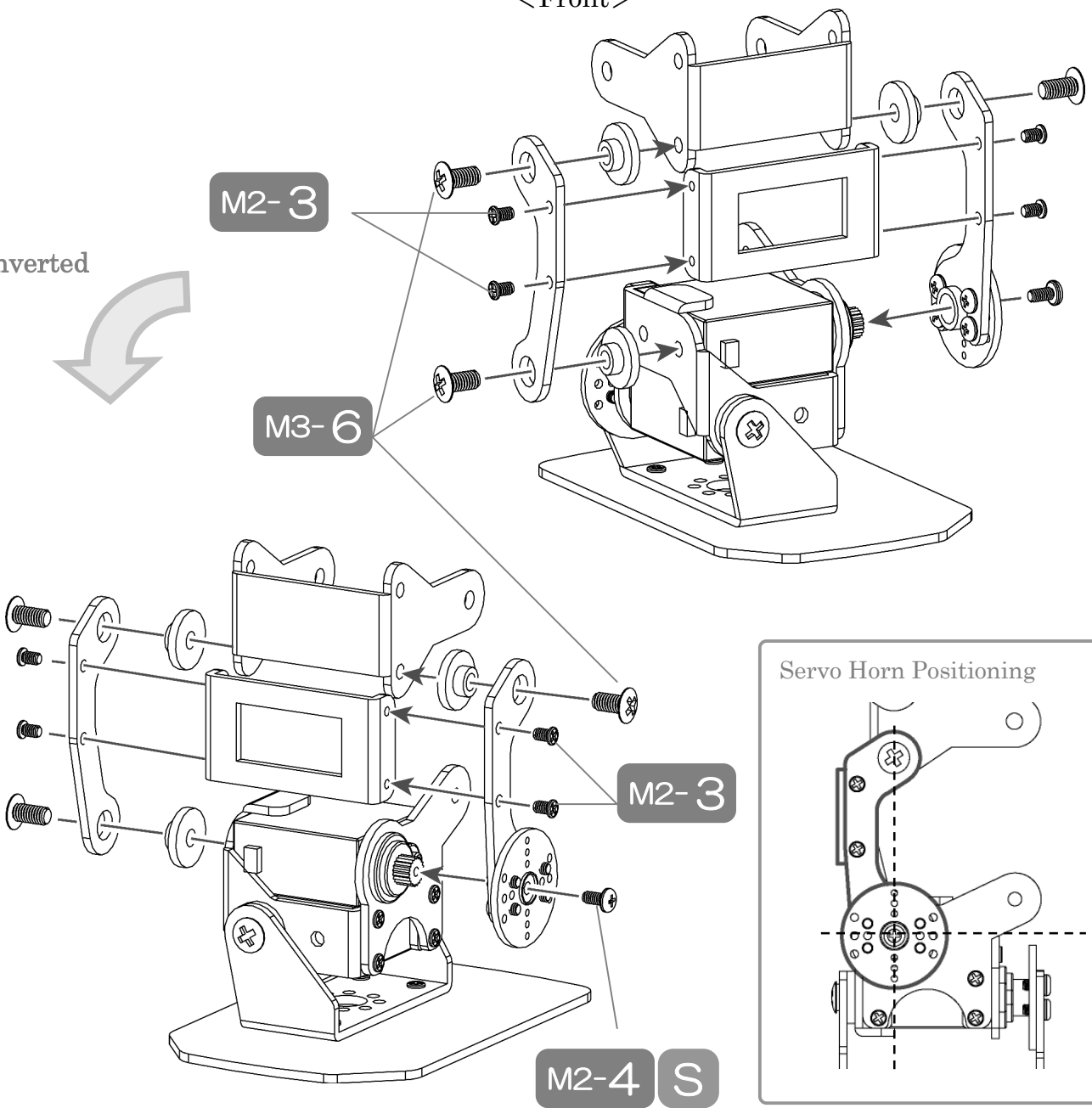
< Front >

Inverted



M2-3

M3-6



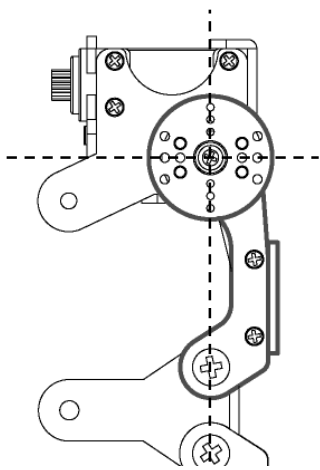
M2-3

M2-4 S

Servo Horn Positioning

10 Left Link Arm Assembly ②

Servo Horn Positioning



M2-4 S

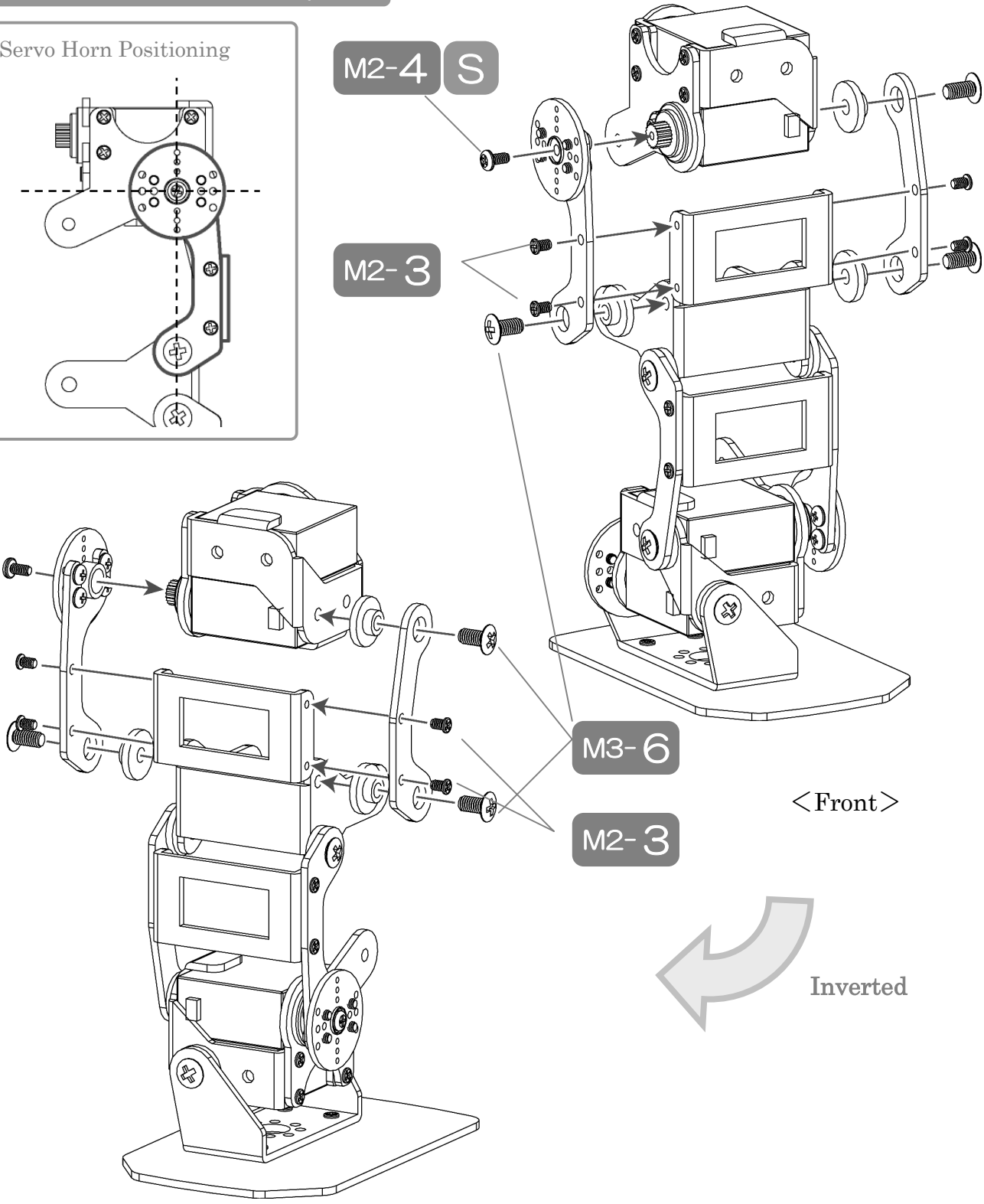
M2-3

M3-6

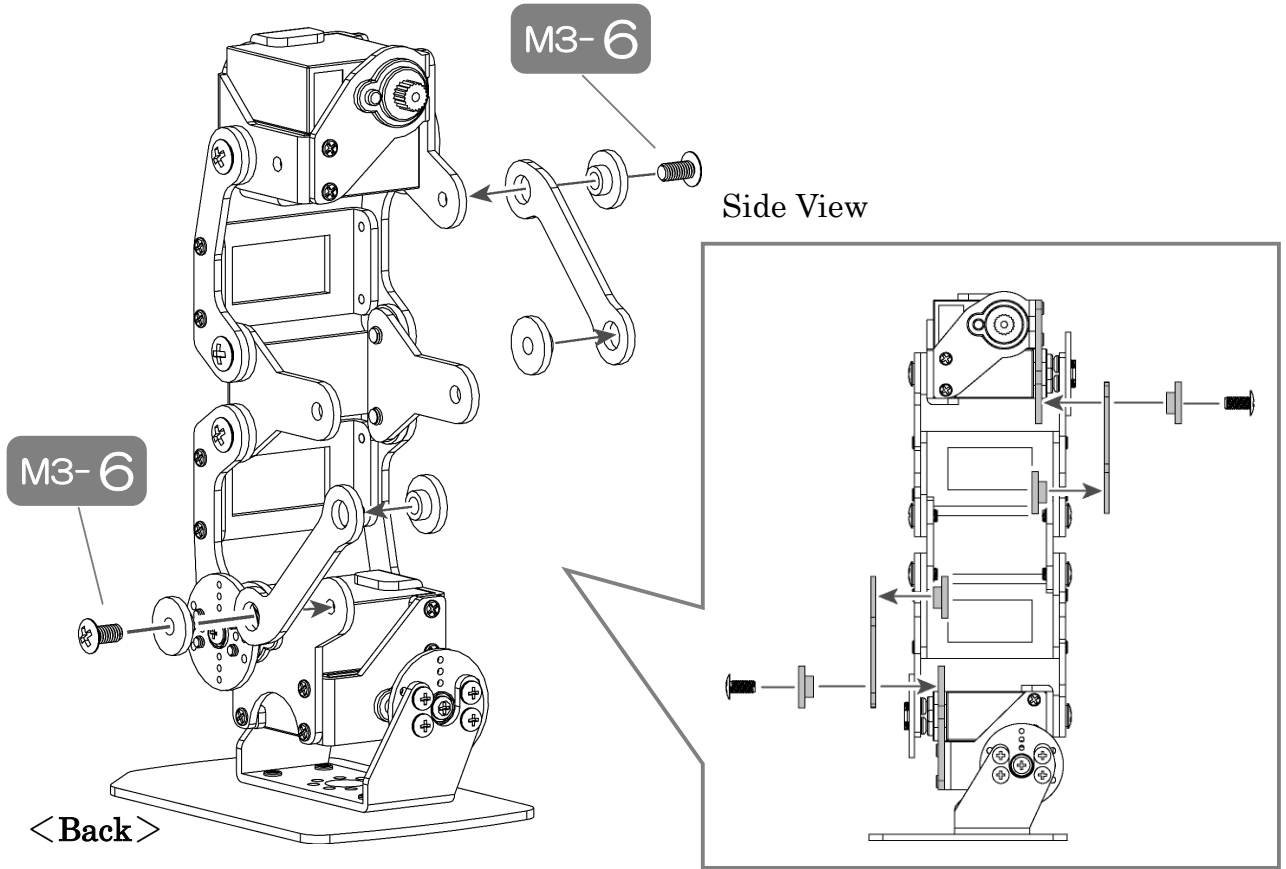
M2-3

< Front >

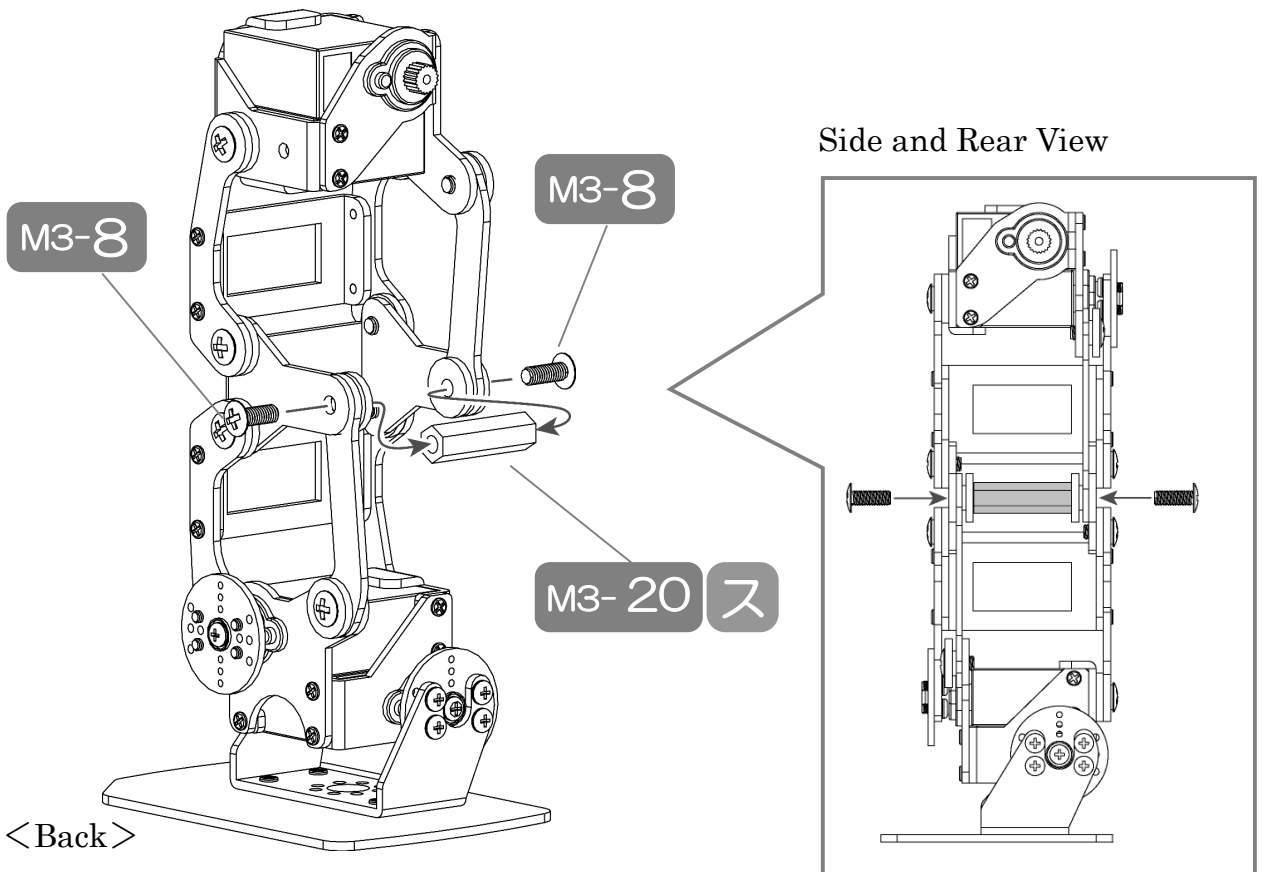
Inverted



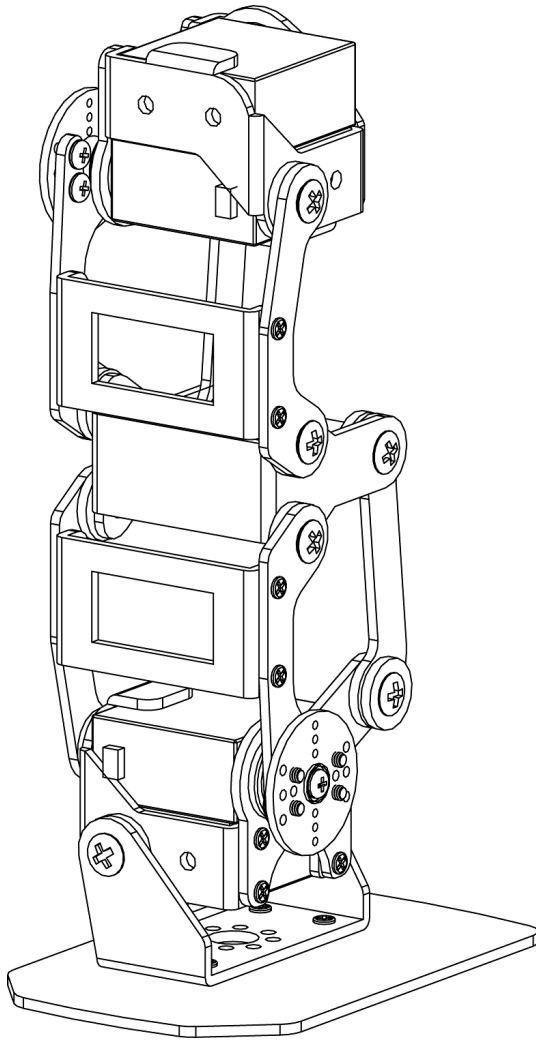
1 1 Attaching the rear link①



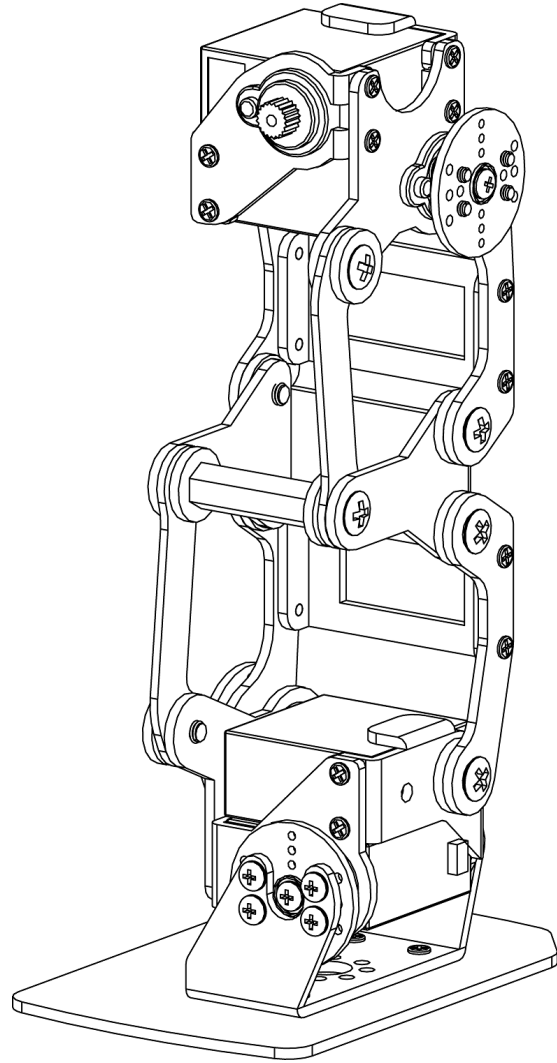
1 2 Attaching the rear link ②



1 3 Completed Left Leg Assembly



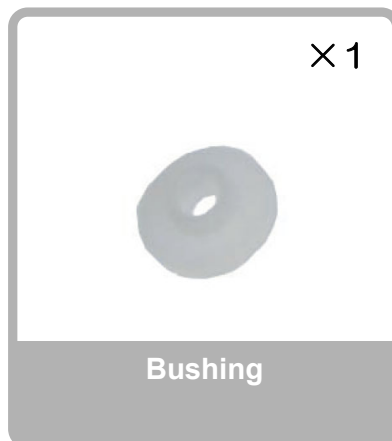
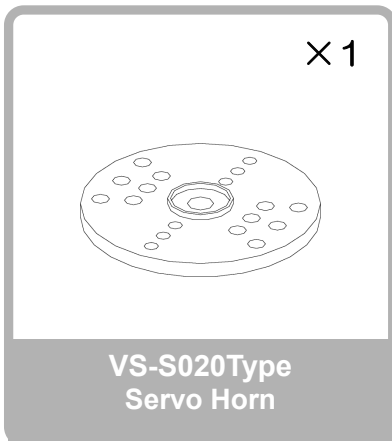
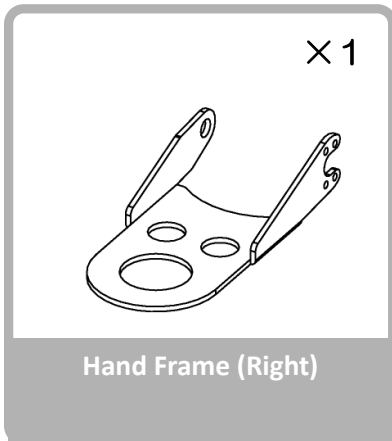
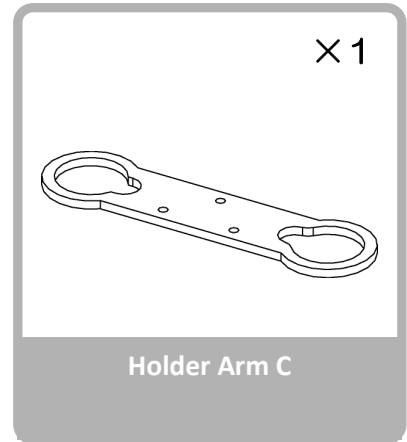
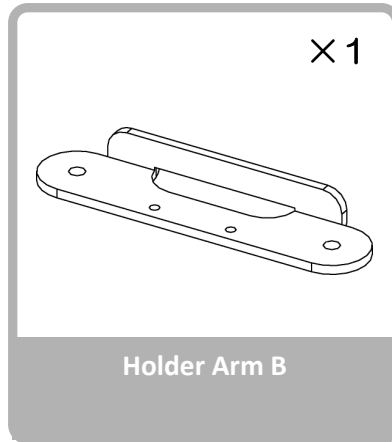
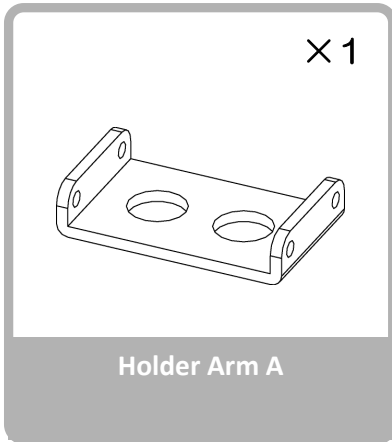
< Front >



< Back >

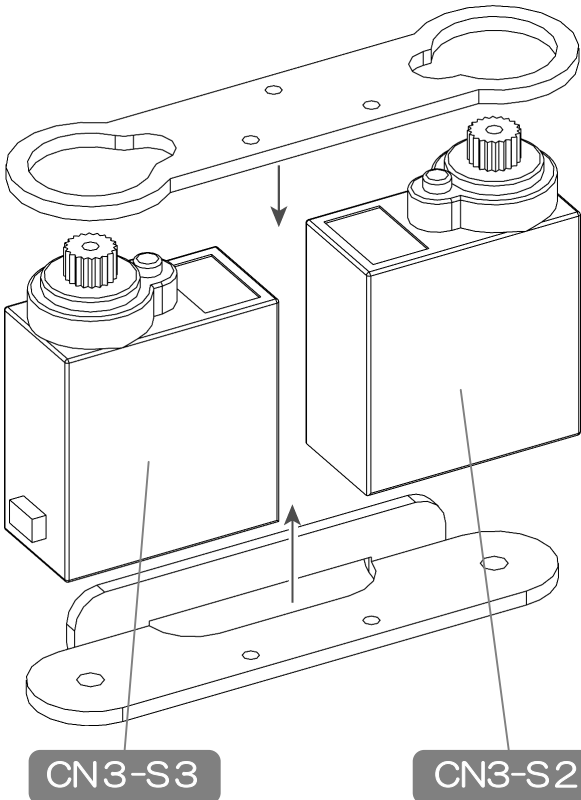
④ Right Arm Assembly

Please gather the necessary parts

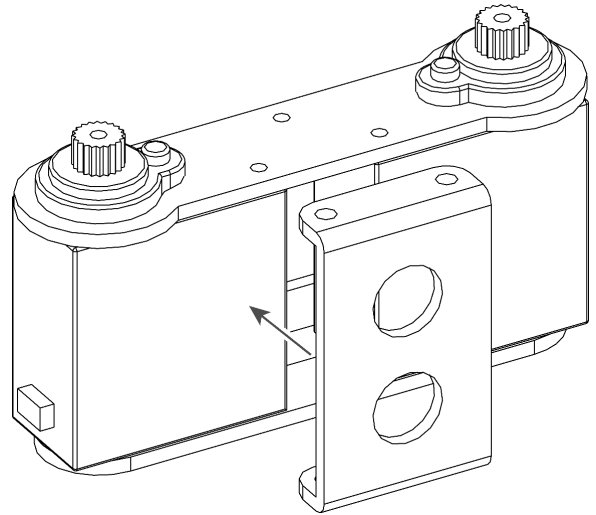


1 Right Arm Block Assembly ①

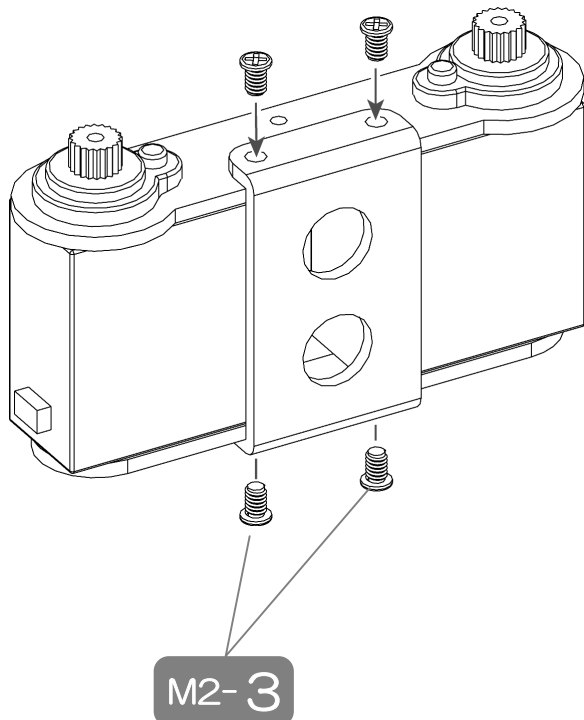
Watch the
⚠ Direction !



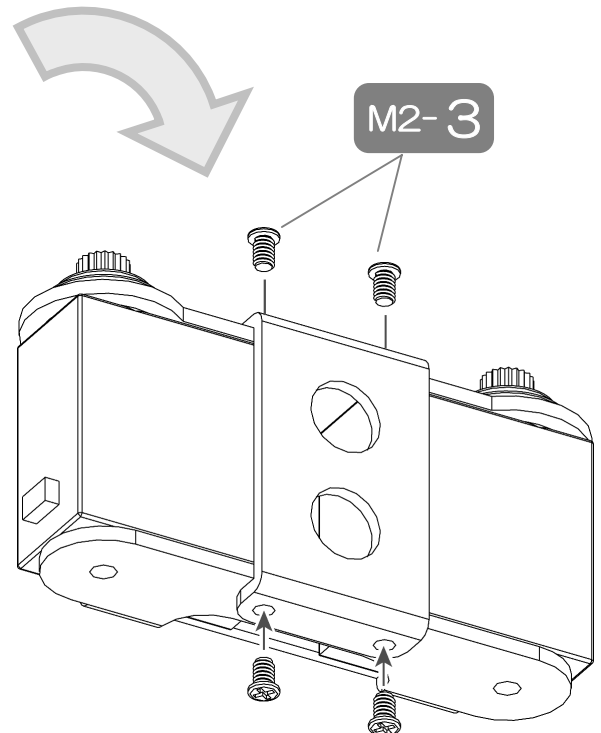
2 Right Arm Block Assembly ②



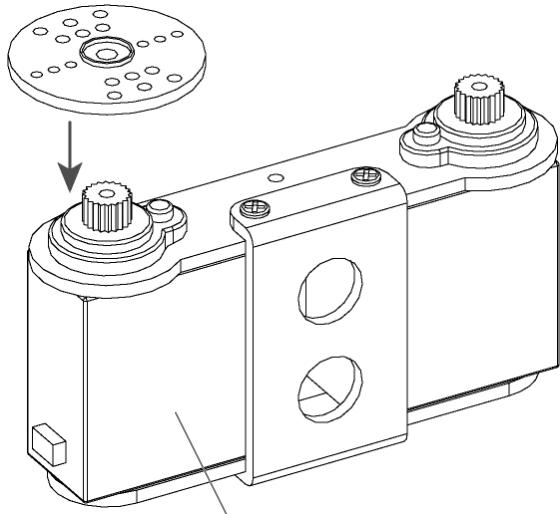
3 Right Arm Block Assembly ③



Inverted

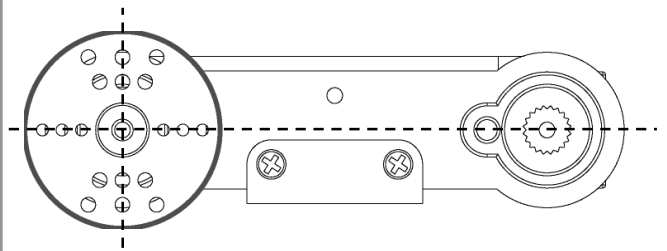


4 Attaching the Right Forearm ①

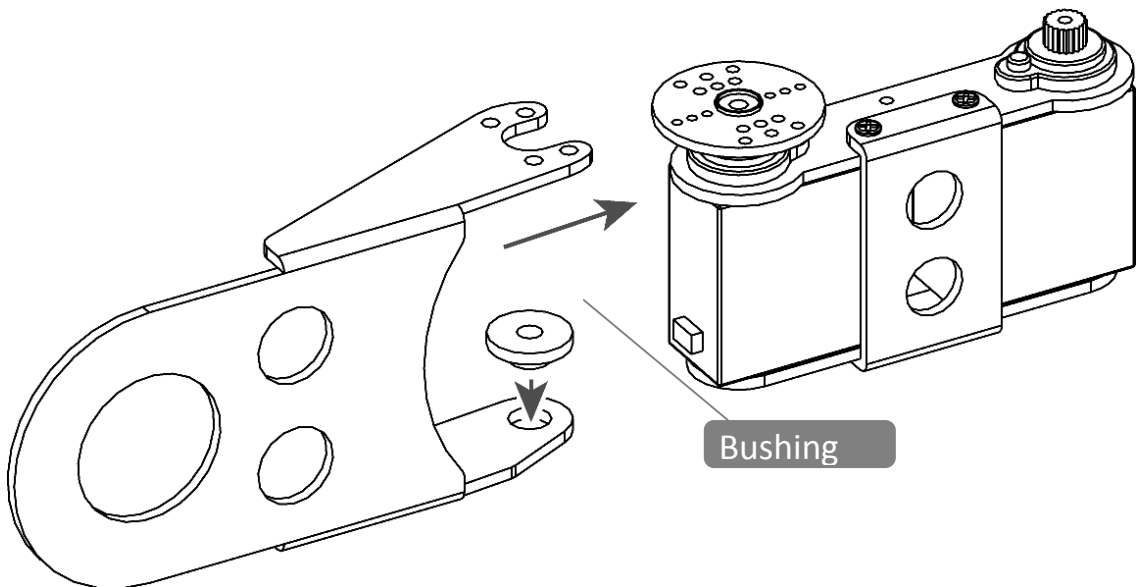


Attaching the CN3-S3

Servo Horn Positioning



5 Attaching the Right Forearm ②

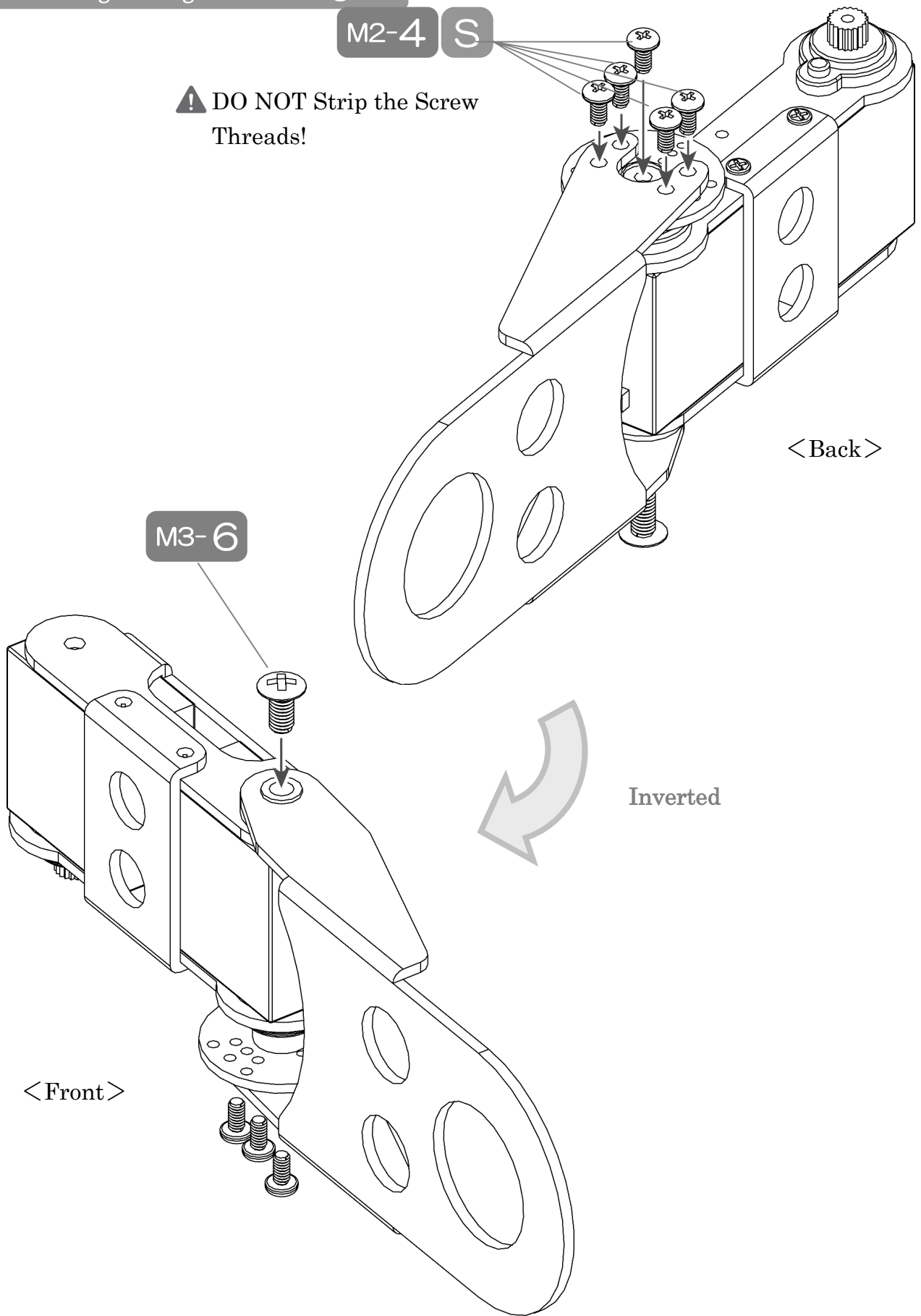


Bushing

6 Attaching the Right Forearm ③

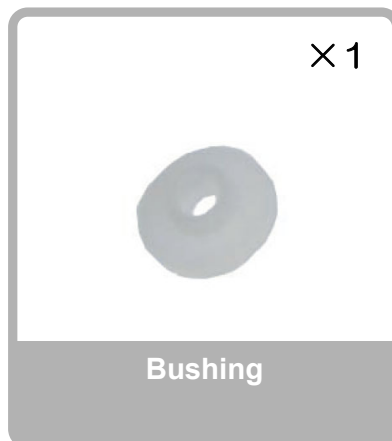
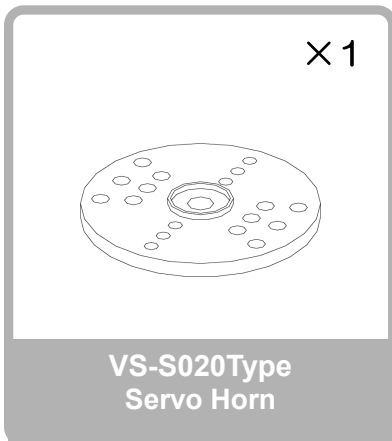
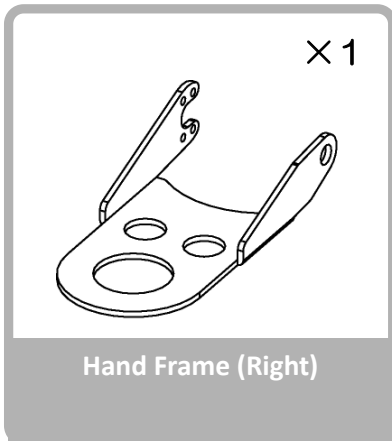
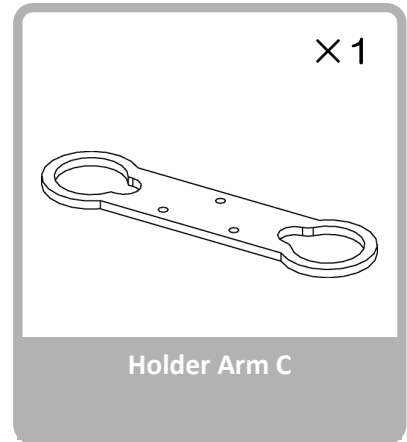
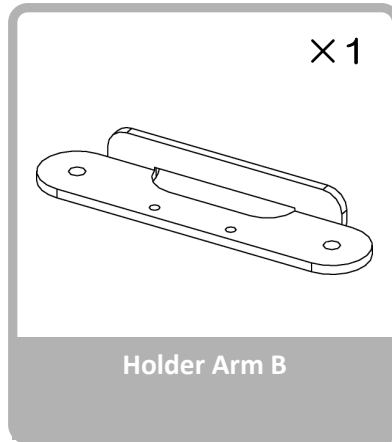
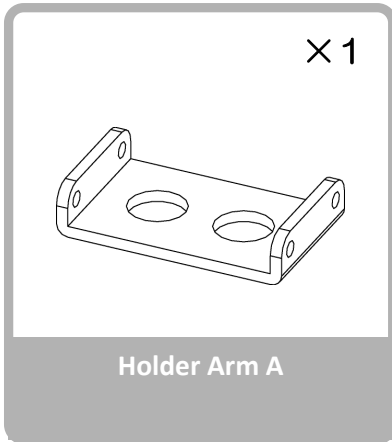
M2-4 S

⚠ DO NOT Strip the Screw Threads!



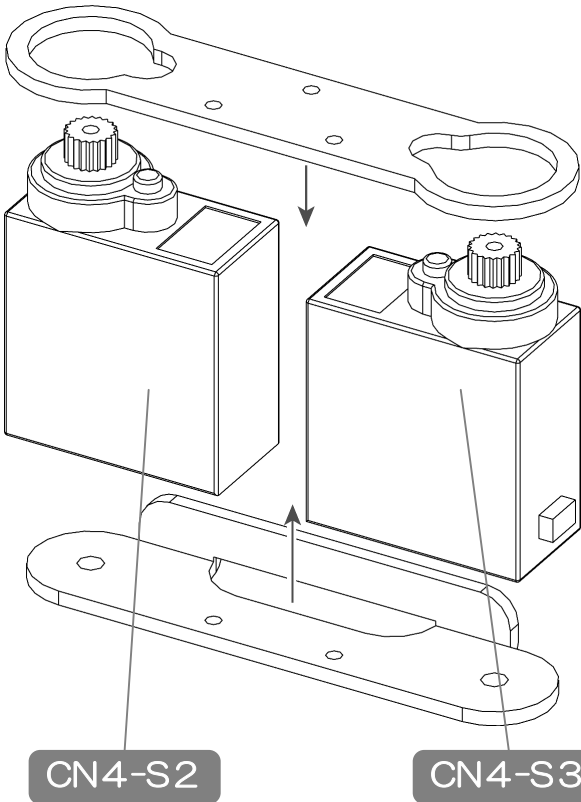
⑤ Left Arm Assembly

Please gather the necessary parts

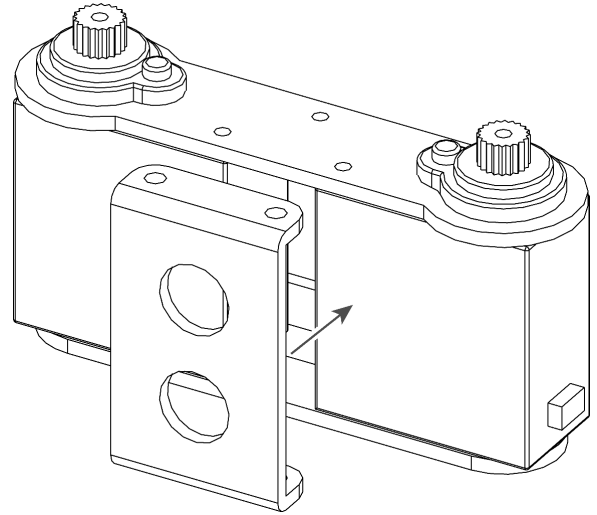


1 Left Arm Block Assembly ①

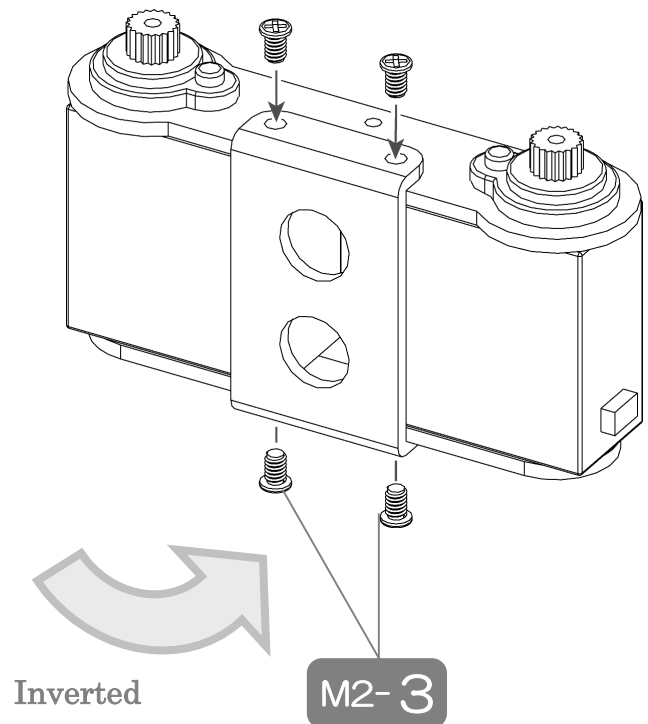
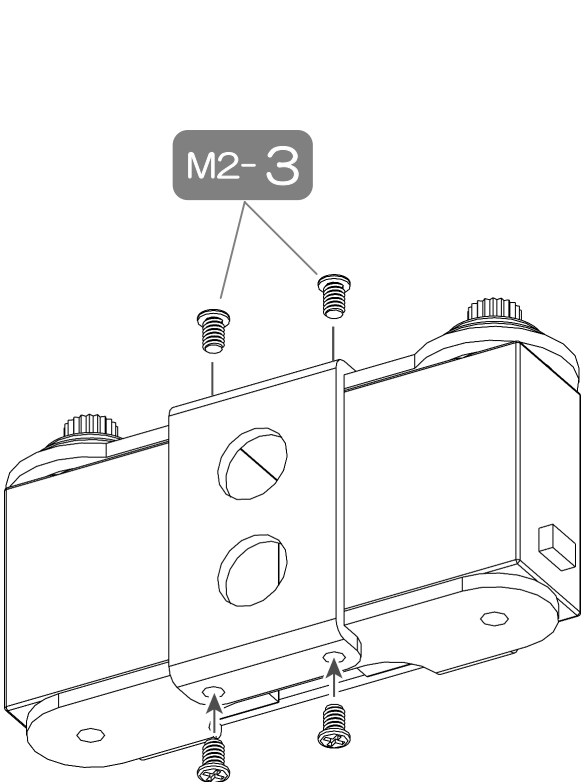
⚠ 向きに注意!



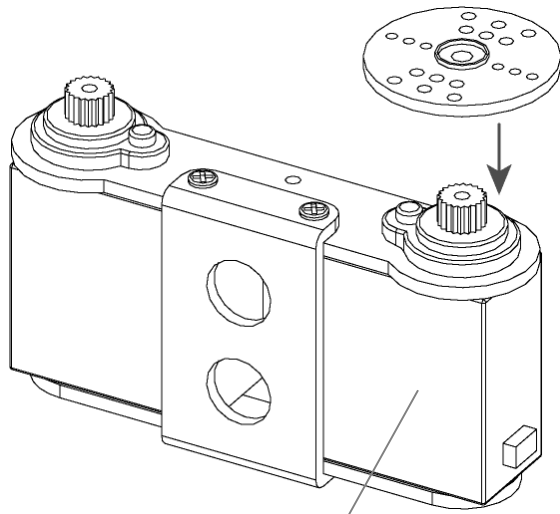
2 Left Arm Block Assembly ②



3 Left Arm Block Assembly③

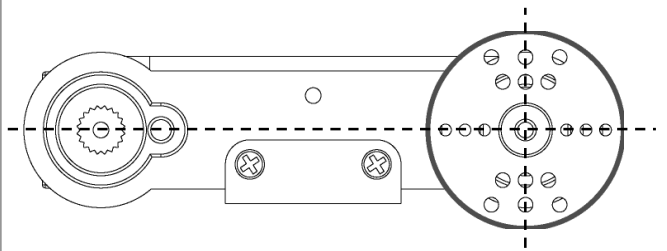


4 Attaching the Right Forearm ①

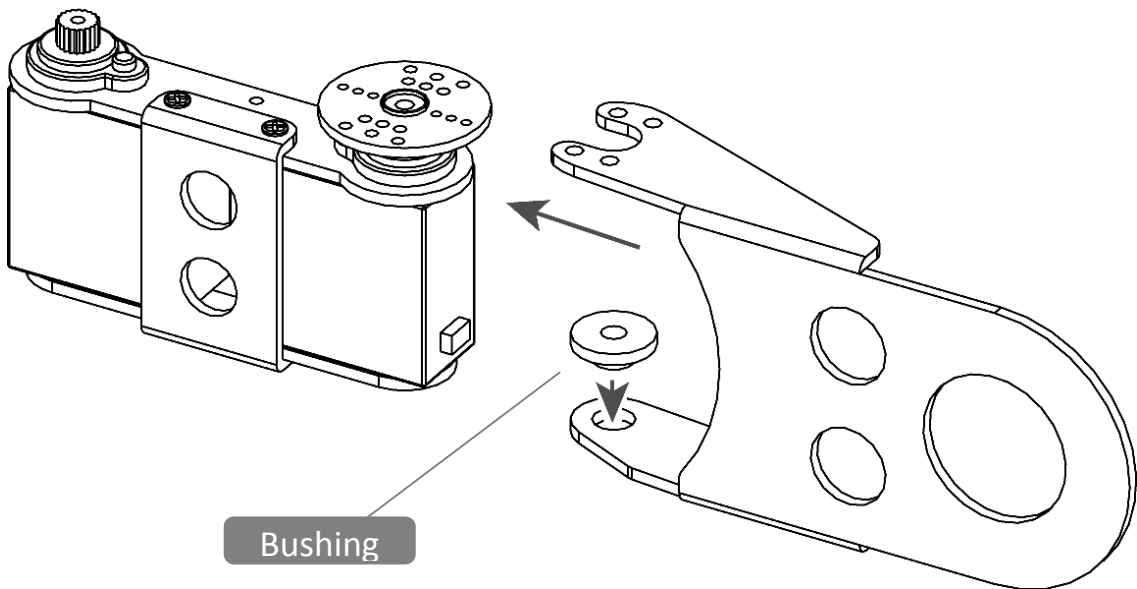


Attaching the CN 3-S 3

Servo Horn Positioning



5 Attaching the Right Forearm ②



Bushing

6 Attaching the Right Forearm ③

M2-4 S

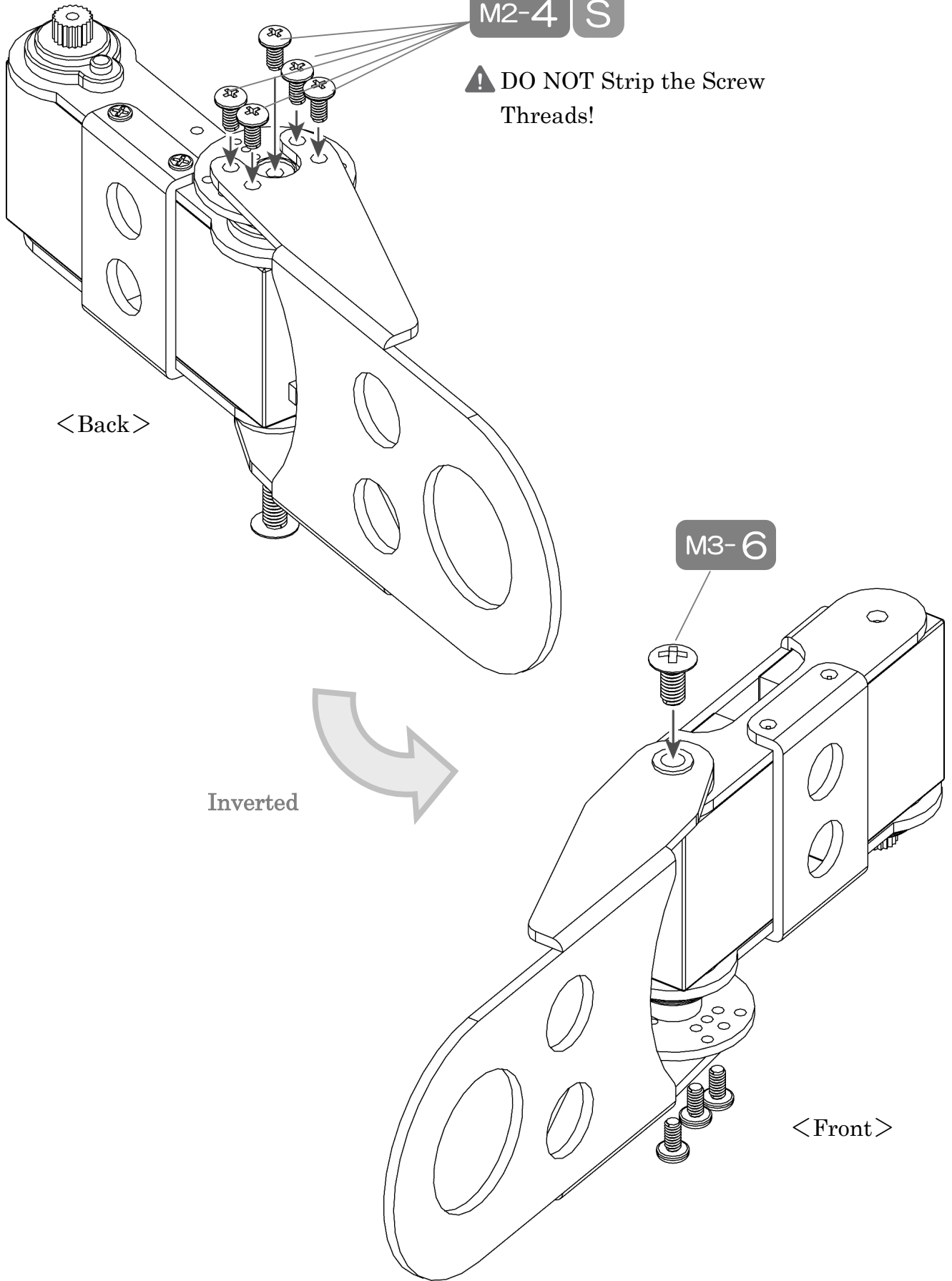
⚠ DO NOT Strip the Screw Threads!

< Back >

Inverted

M3-6

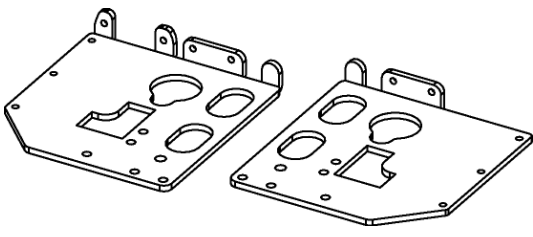
< Front >



⑥Assembling the Torso

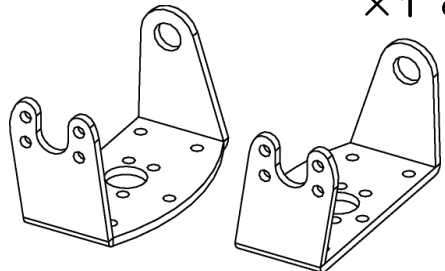
Please gather the necessary items

×1 each



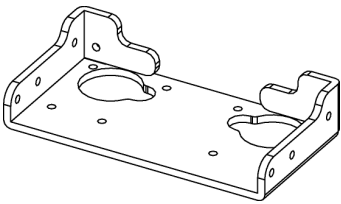
Side Frame

×1 each



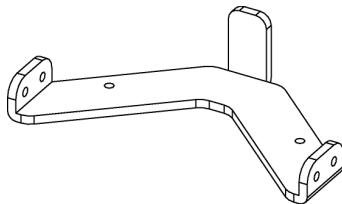
Bracket B

×1



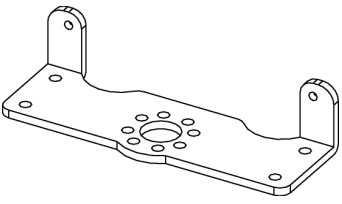
Bottom Frame

×1



Battery Box Frame

×1



Top Frame

×3



※Please prepare the servos with the following seals attached

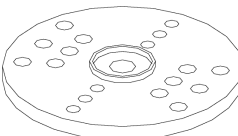
CN3-S1

CN4-S1

CN3-S6


Servo Motor VS-S020

×1



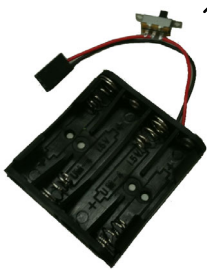
VS-S020Type Servo Horn

×1



CPU Board VS-RC003HV

×1



Battery Terminal

M2-3 ×30



Screw NA M2-3 Course Thread

M2-4 S ×5



Screw NC
M2-4 S Tight



This page explains the procedures for assembling the yaw axis upgrade with the robot. If you are assembling the kit without the yaw axis upgrade, please move to the page and steps listed below.

W/Out Yaw Axis → **Start from Page 51 Step 1**
W/ Yaw Axis → **Start from Page 52 Step 3**

For customers who have purchased the yaw extension set, please prepare the following parts when assembling at the same time.

×2

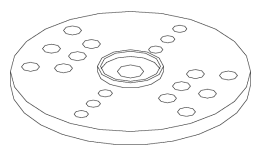


※Please prepare the servos with the following seals attached

CN1-S6 CN2-S6

Servo Motor
VS-S020

×2



VS-S020Type
Servo Horn

M2-3 ×8



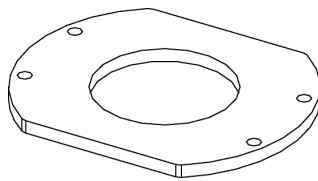
Screw NA
M2-3 Course Thread

M2-4 S ×10



Screw NC
M2-4 S Tight

×2

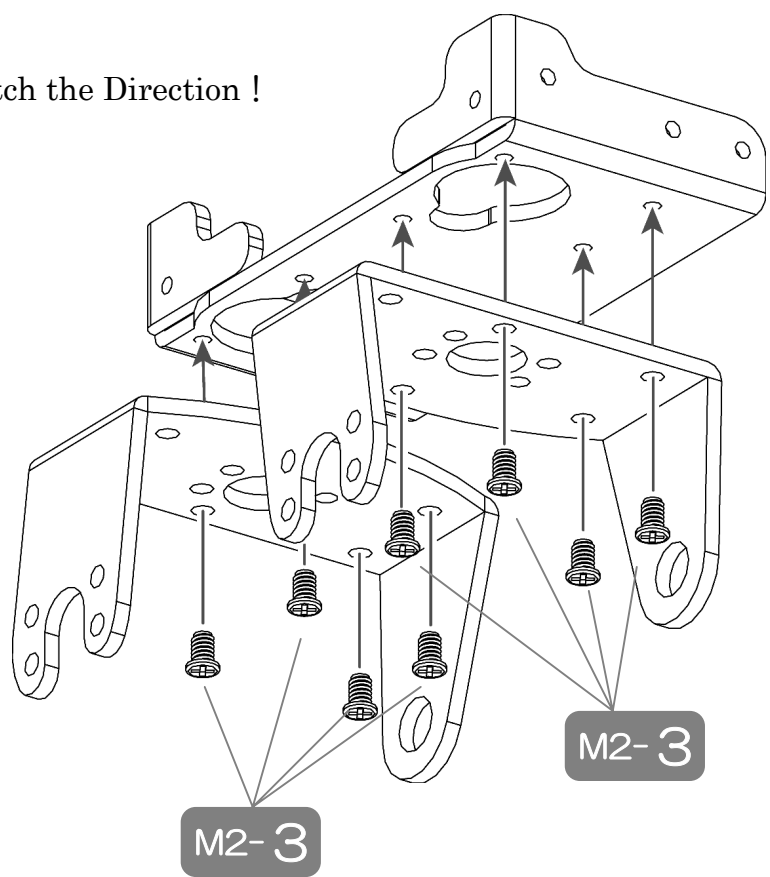


Flat Washer

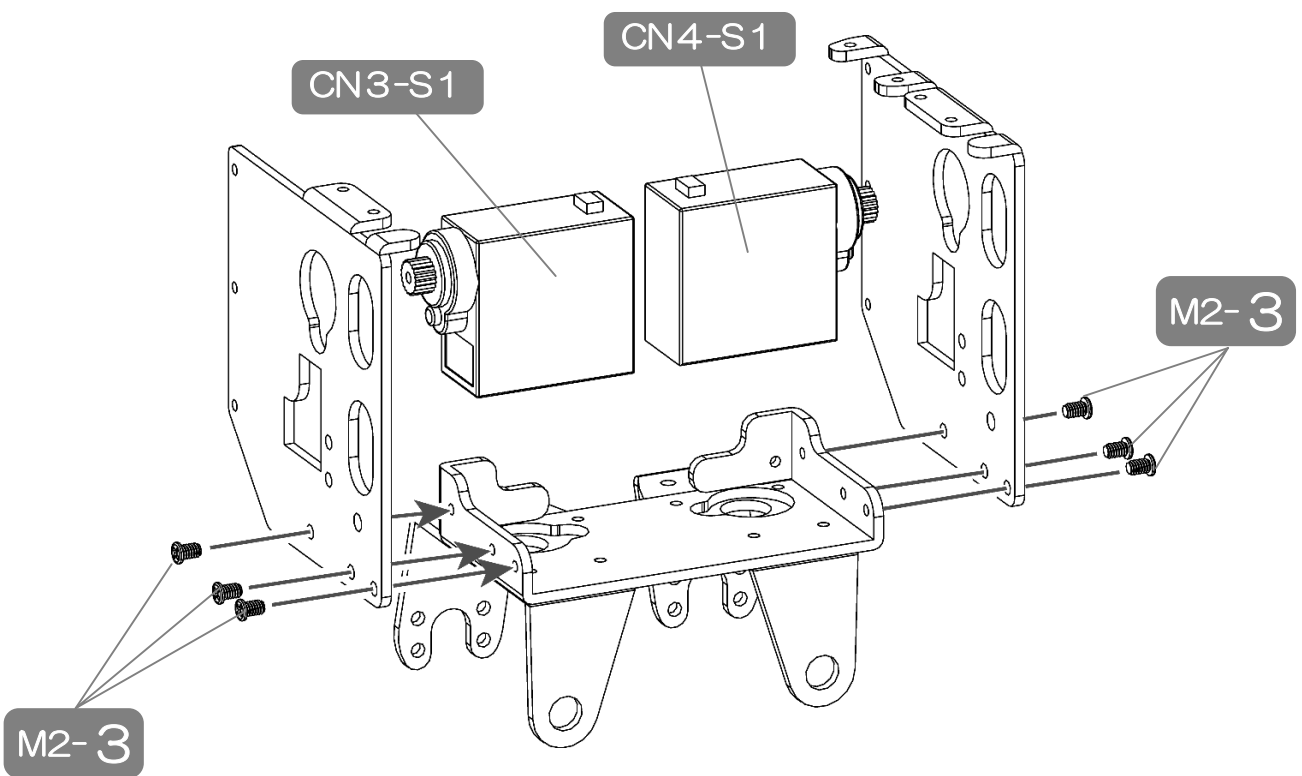
Steps 1 and 2 on this page are for robots without the yaw axis extension.
⚠ When assembling the yaw axis, please skip to page 52 step 3.

1 Mounting Bracket B

⚠ Watch the Direction !



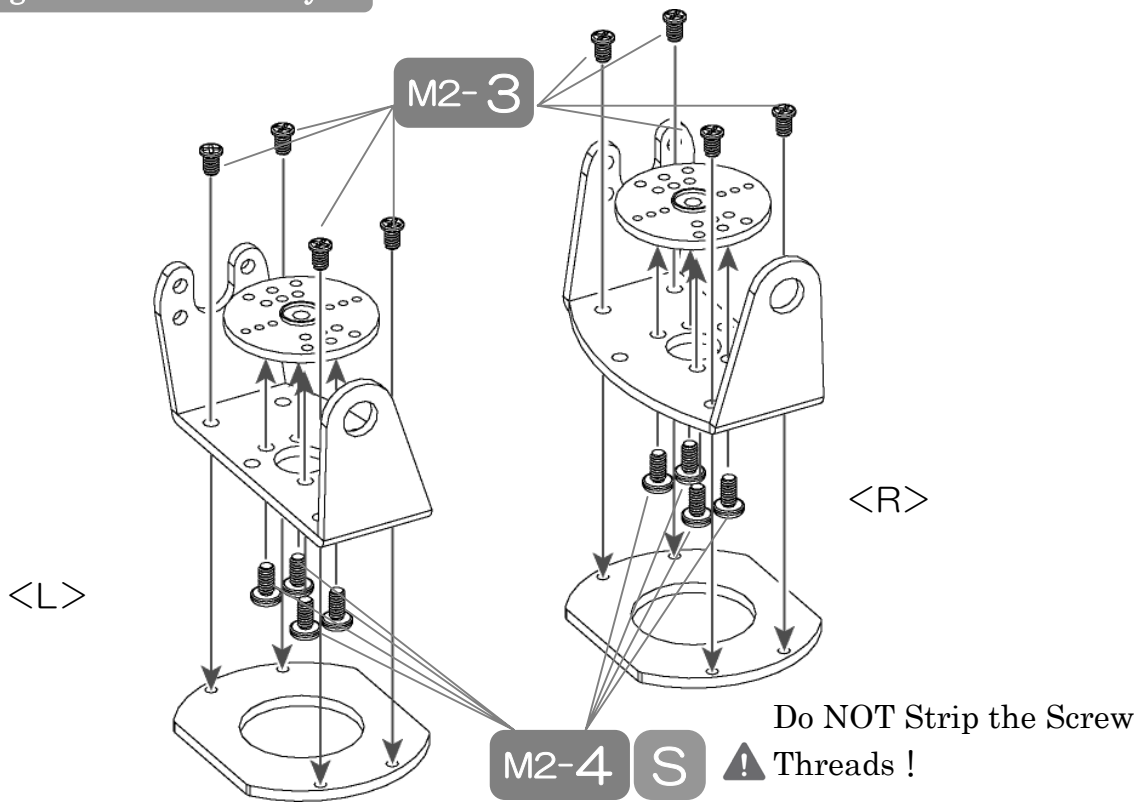
2 Mounting the Arm Pitch Axis



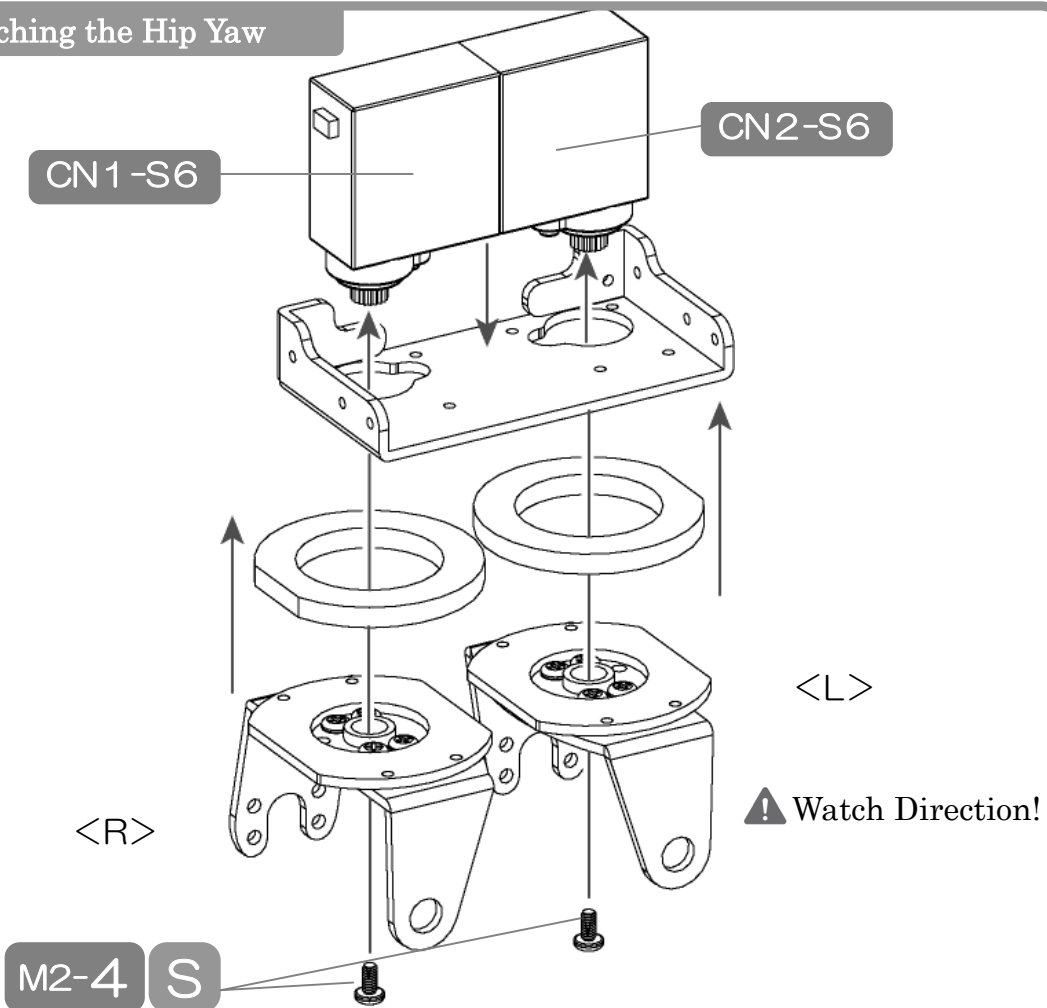
→ 「Move to Step 6: Mounting the Battery Case」

! Steps 3, 4 and 5 outline the procedures for installing the yaw axis extension upgrade. If you do not have the yaw axis extension upgrade, please start from Page 51.

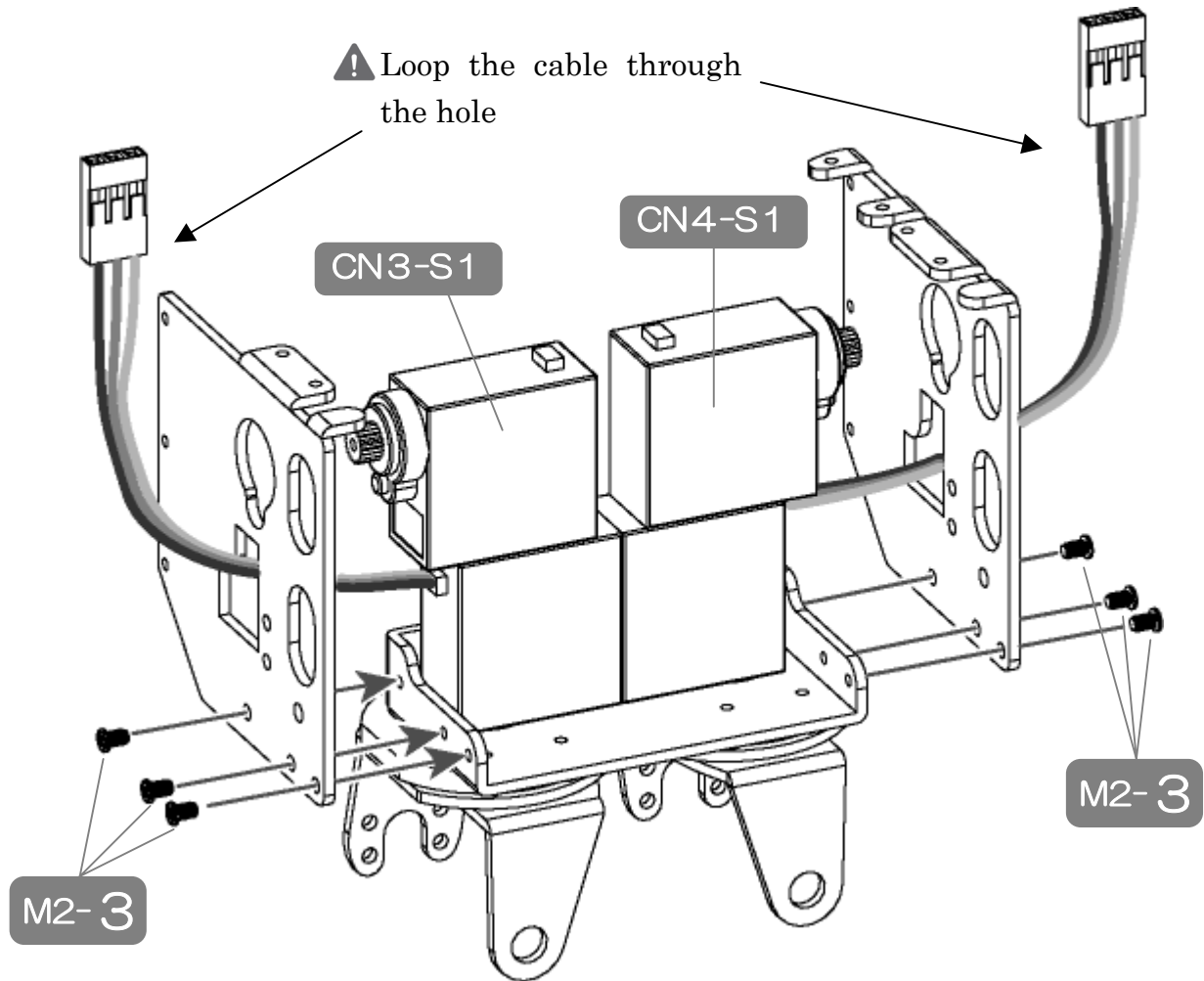
3 Thigh Bracket Assembly



4 Attaching the Hip Yaw

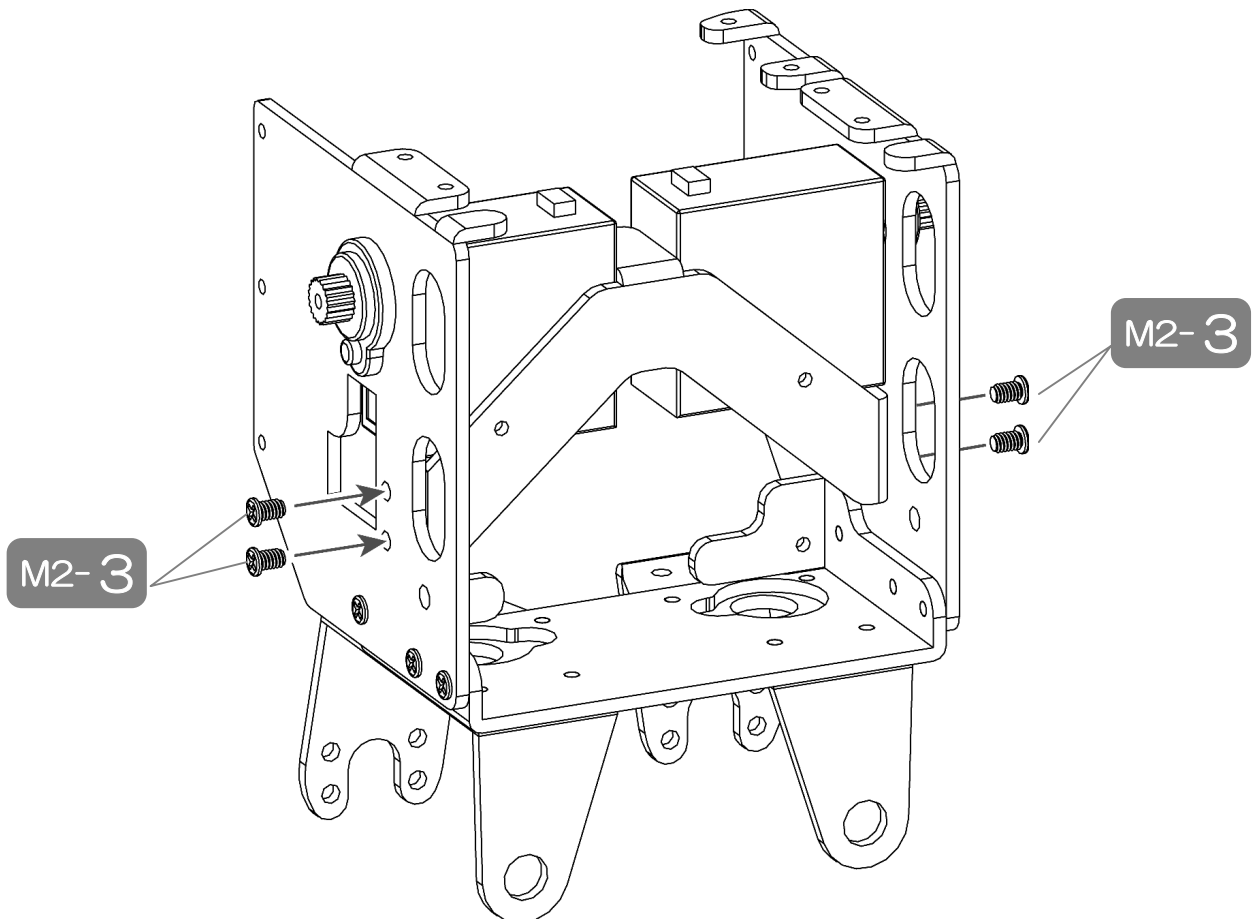
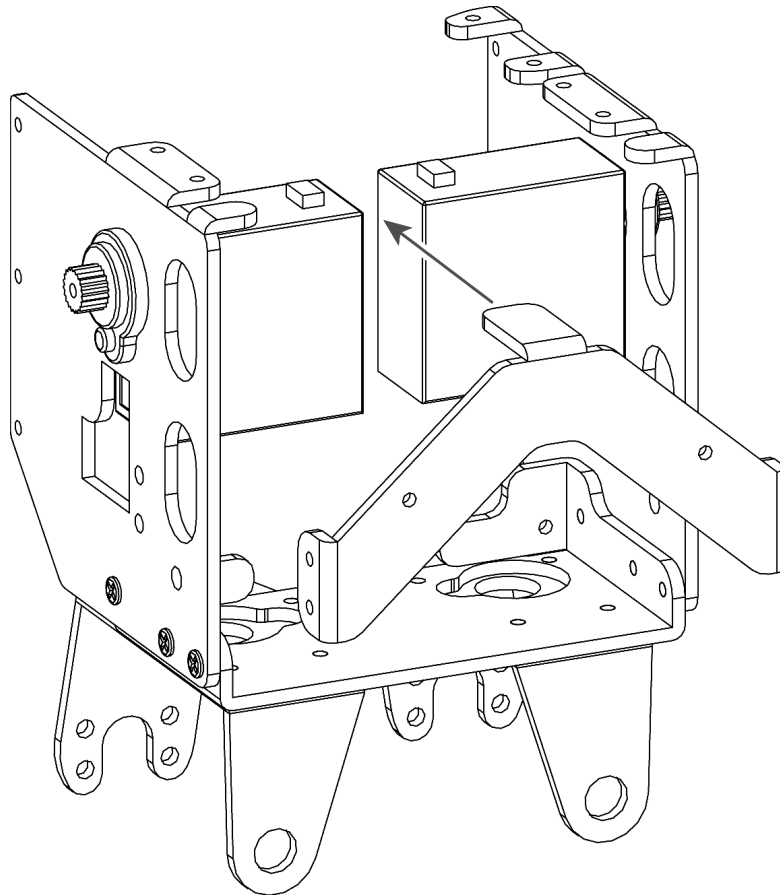


5 Mounting Arm Pitch Axis

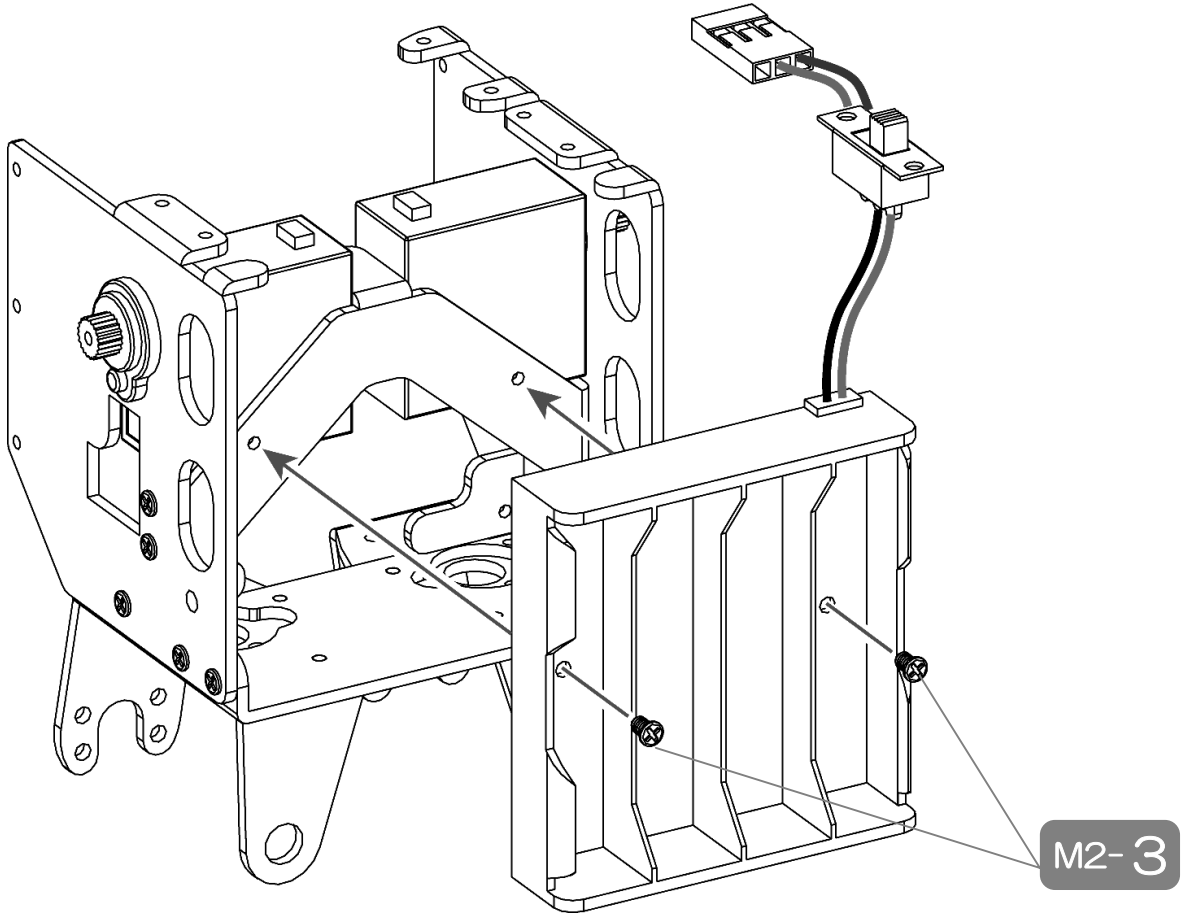


→ 「Move to Step 6: Mounting the Battery Case」

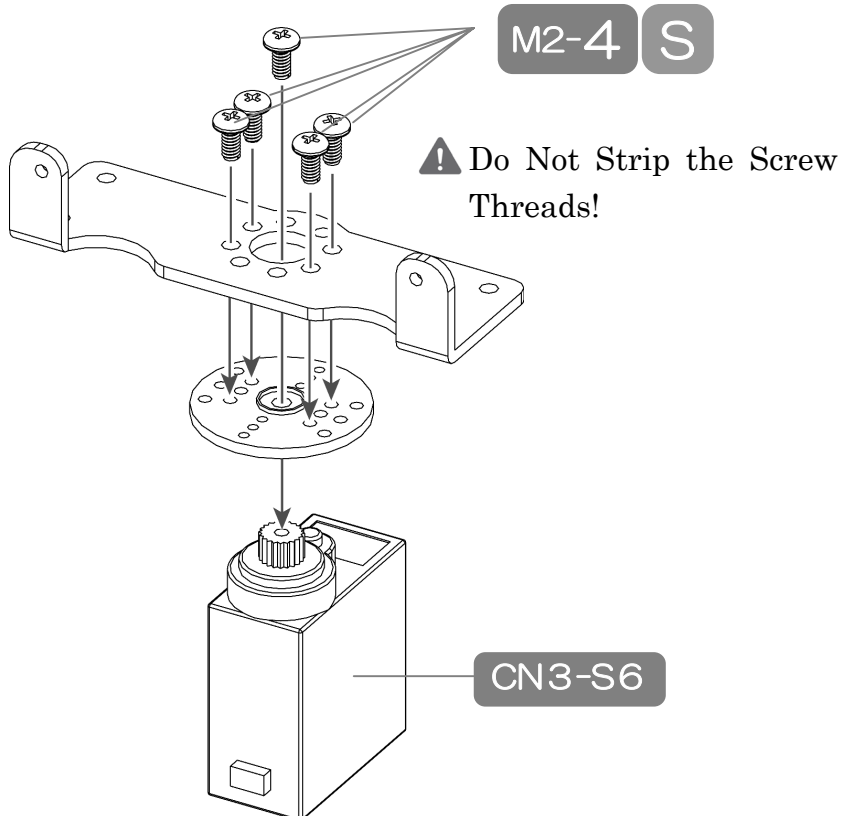
6 Mounting the Battery Case



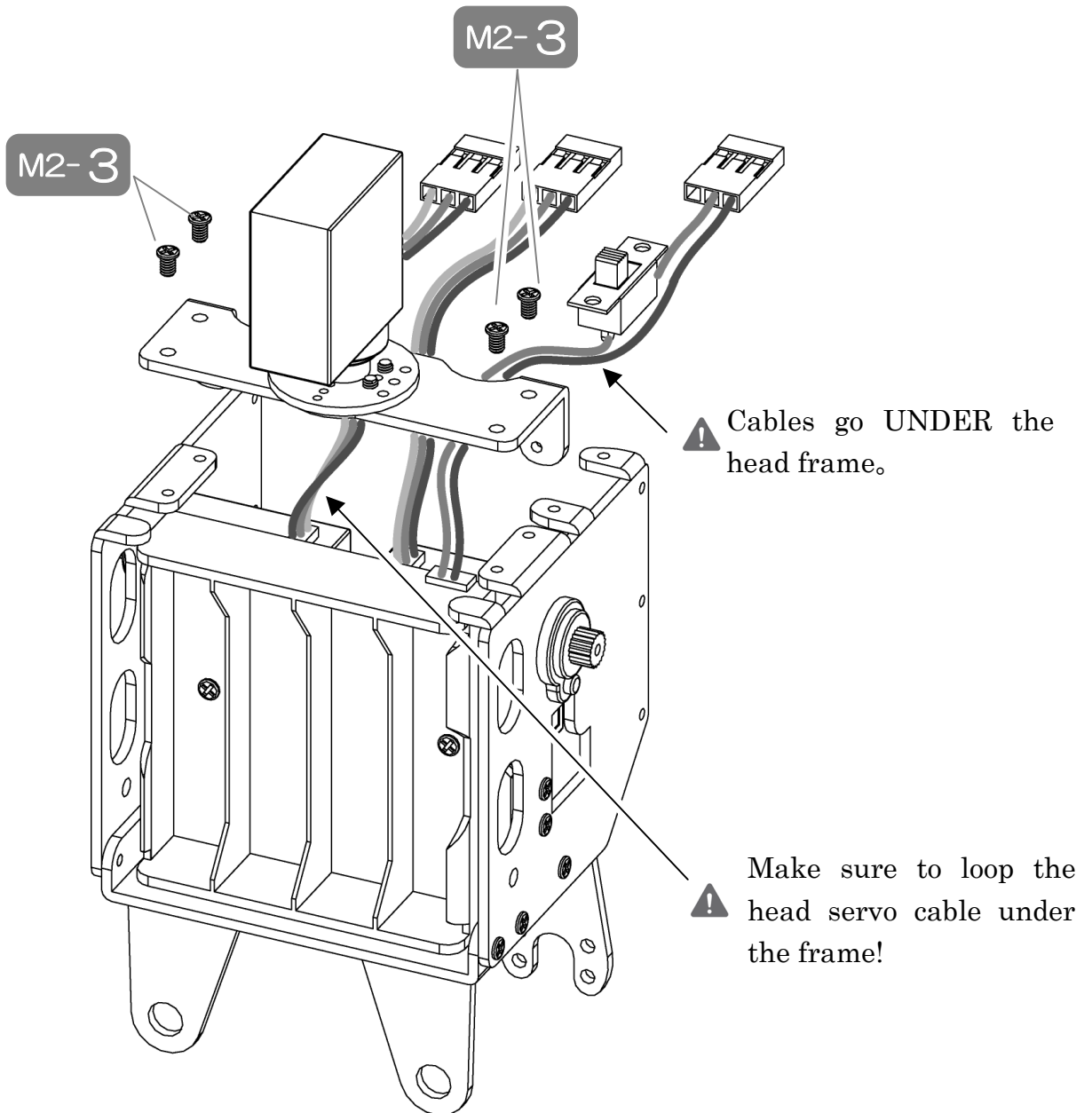
7 Mounting the Battery Case



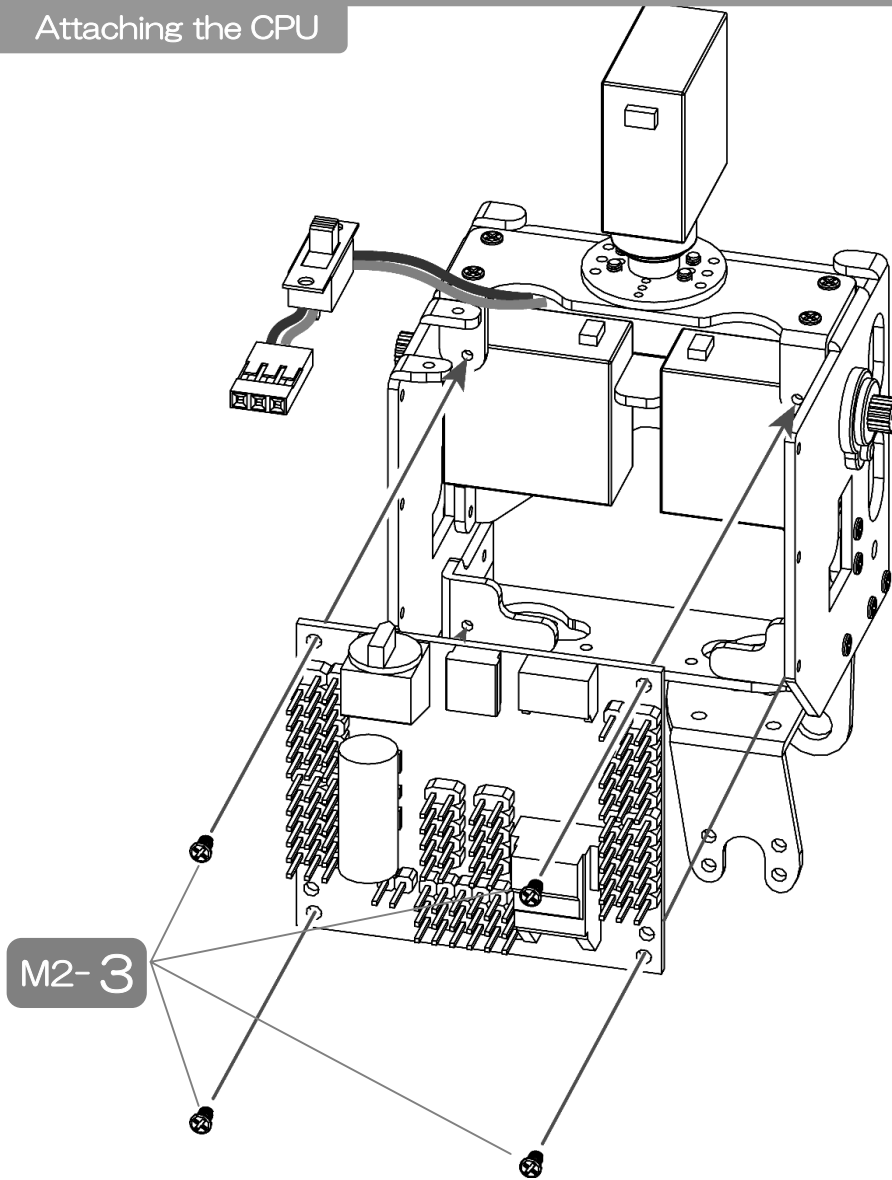
8 Head Assembly



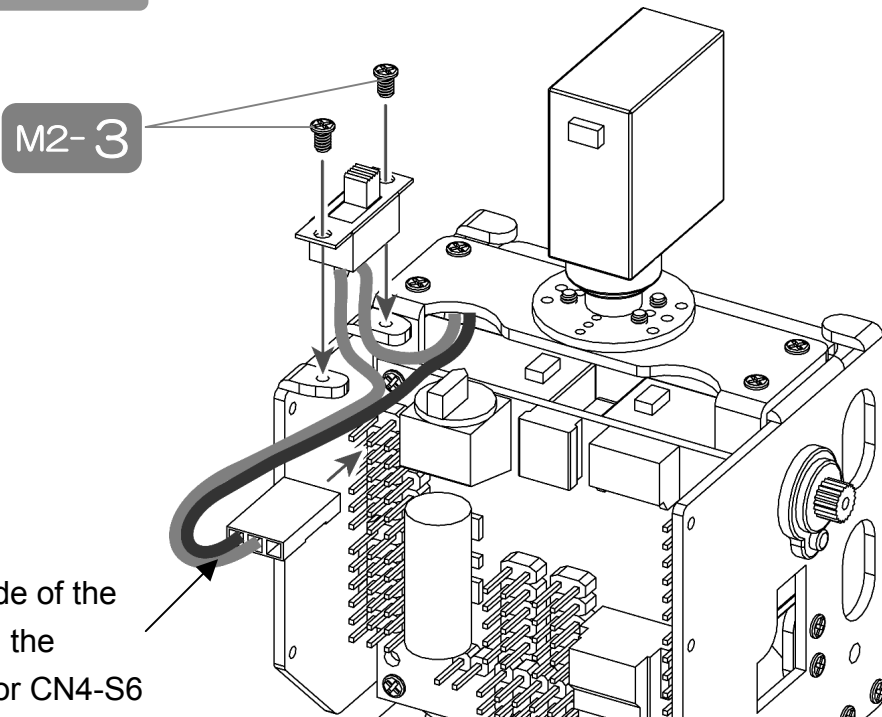
9 Head Assembly



1 0 Attaching the CPU



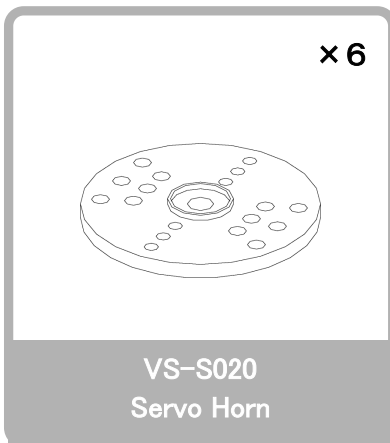
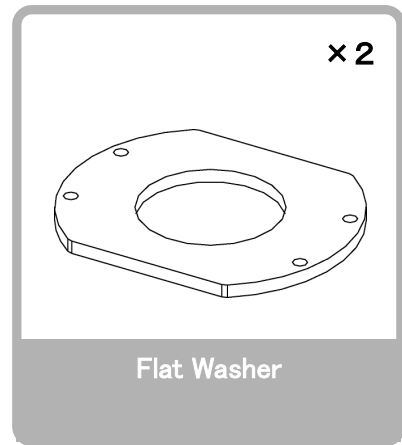
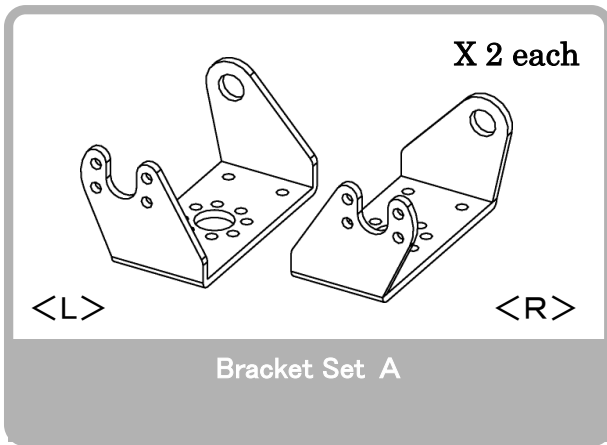
1 1 Attaching the Power Switch



Attach the black side of the servo cable toward the outside of connector CN4-S6

⑦ Arm & Leg Mounting

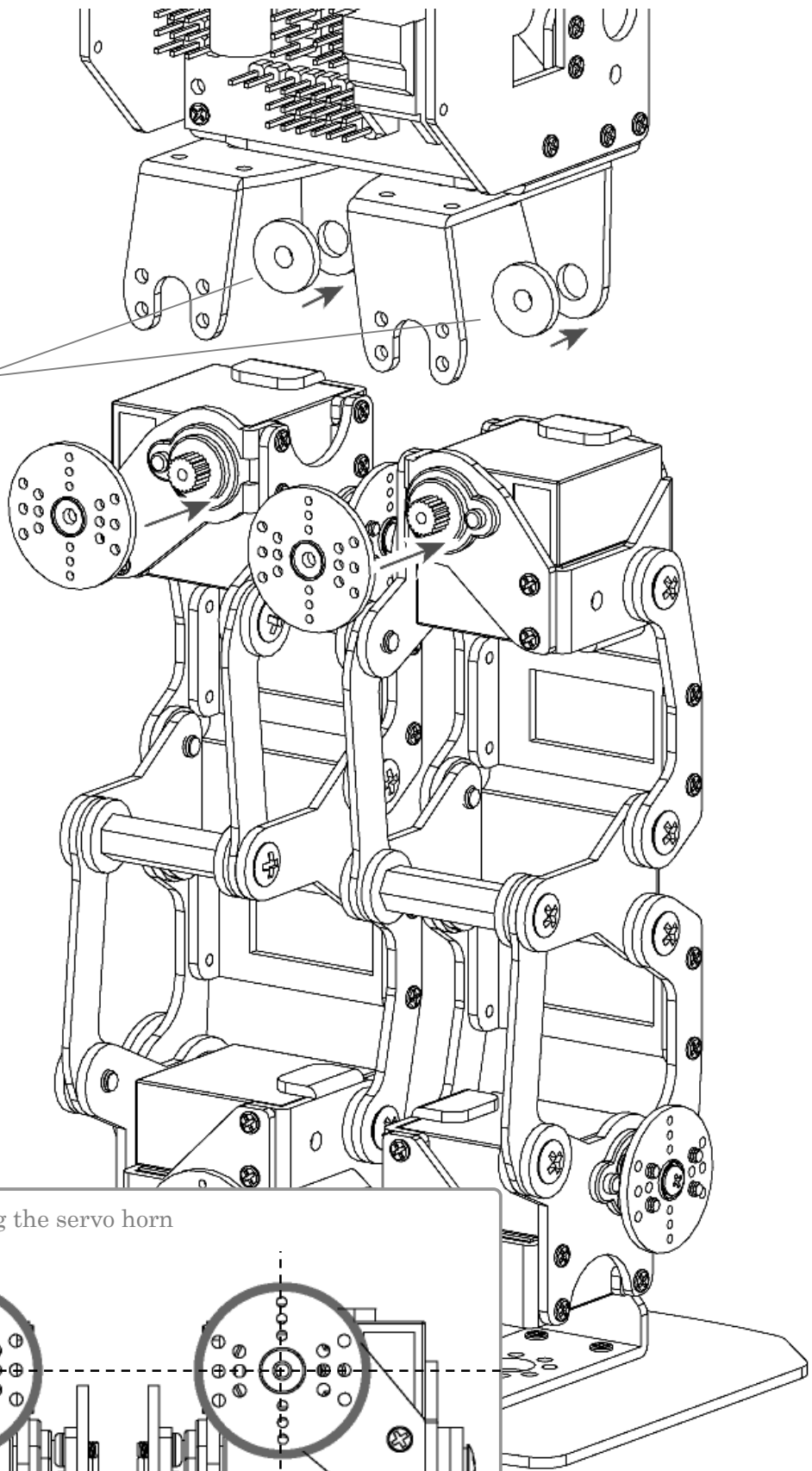
Please gather the necessary parts



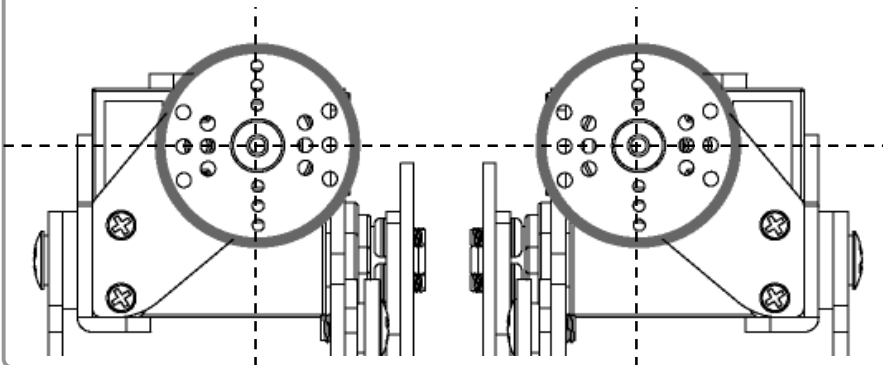
1 Attaching ① Leg

< Back >

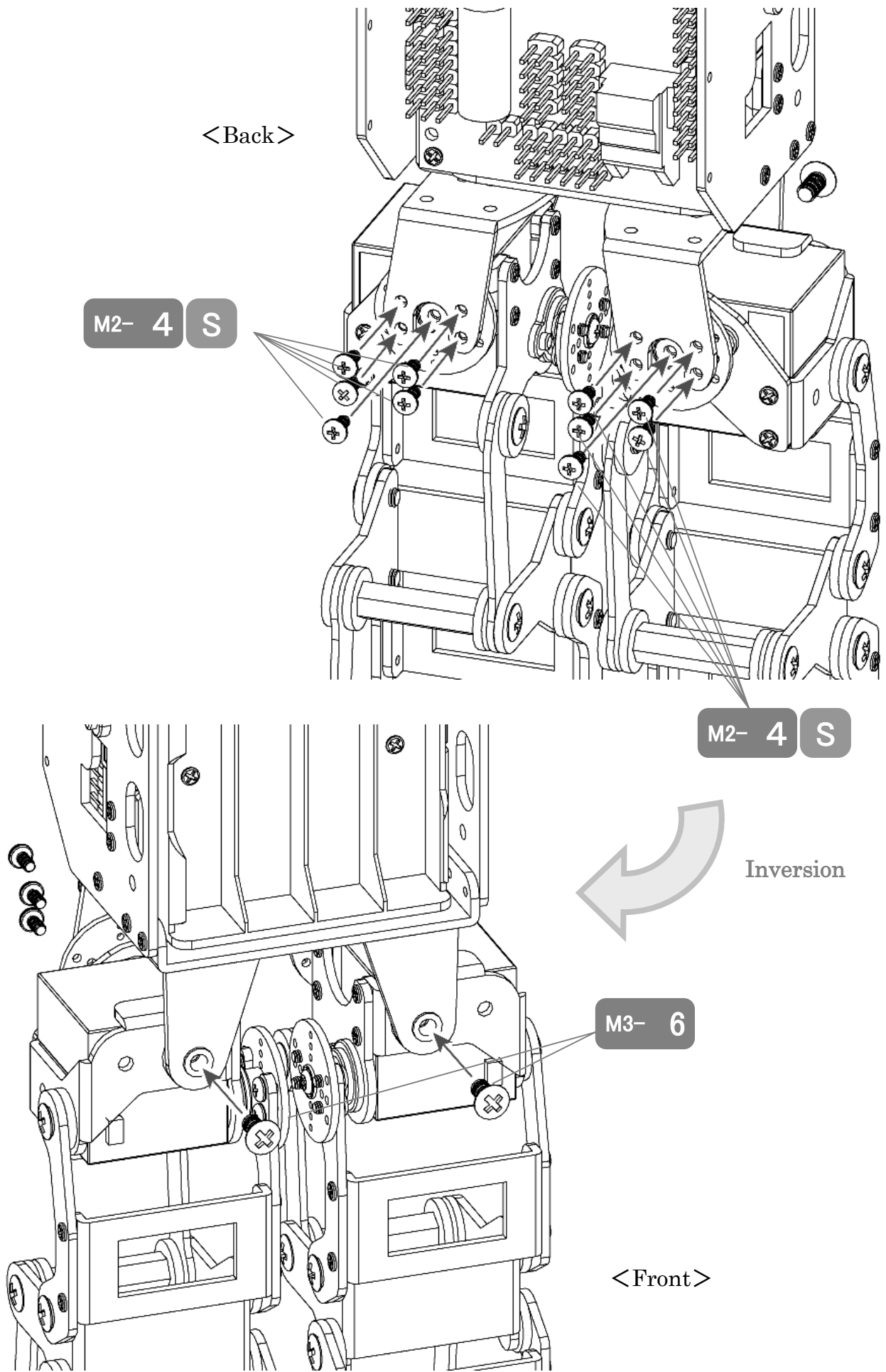
Bushing



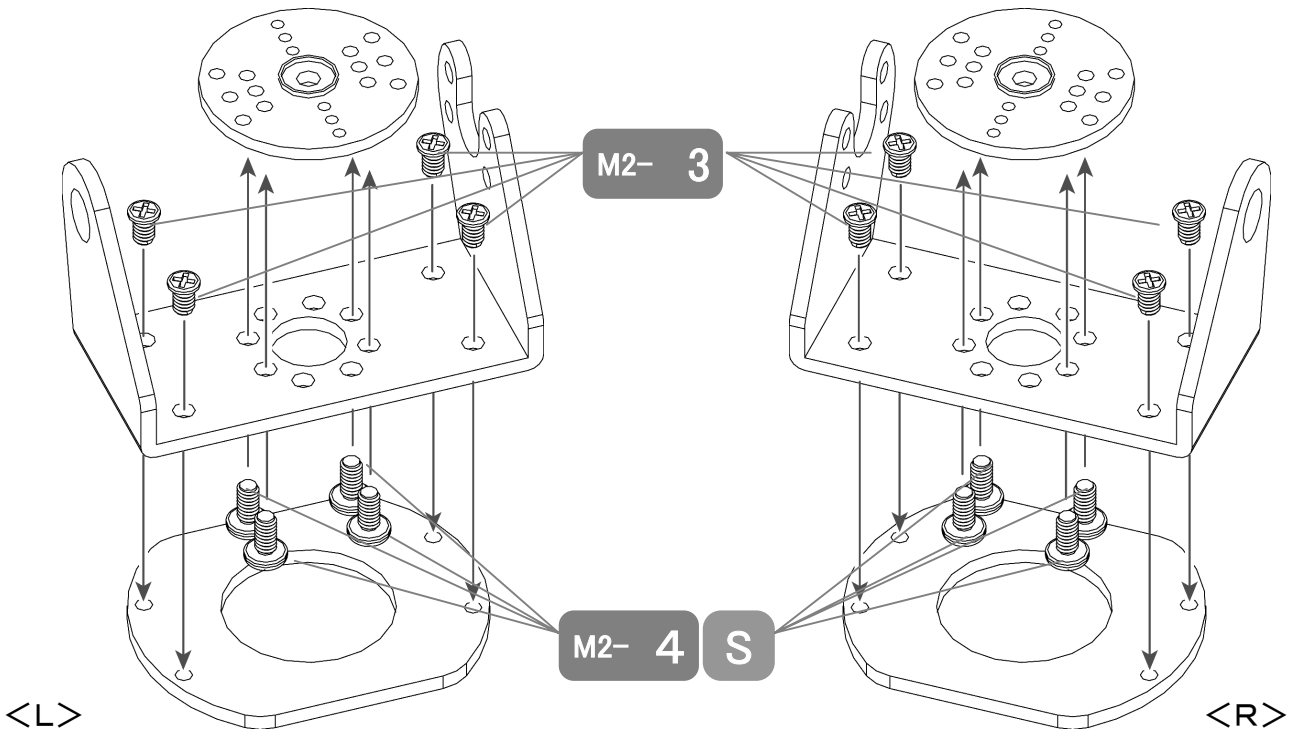
Direction for attaching the servo horn



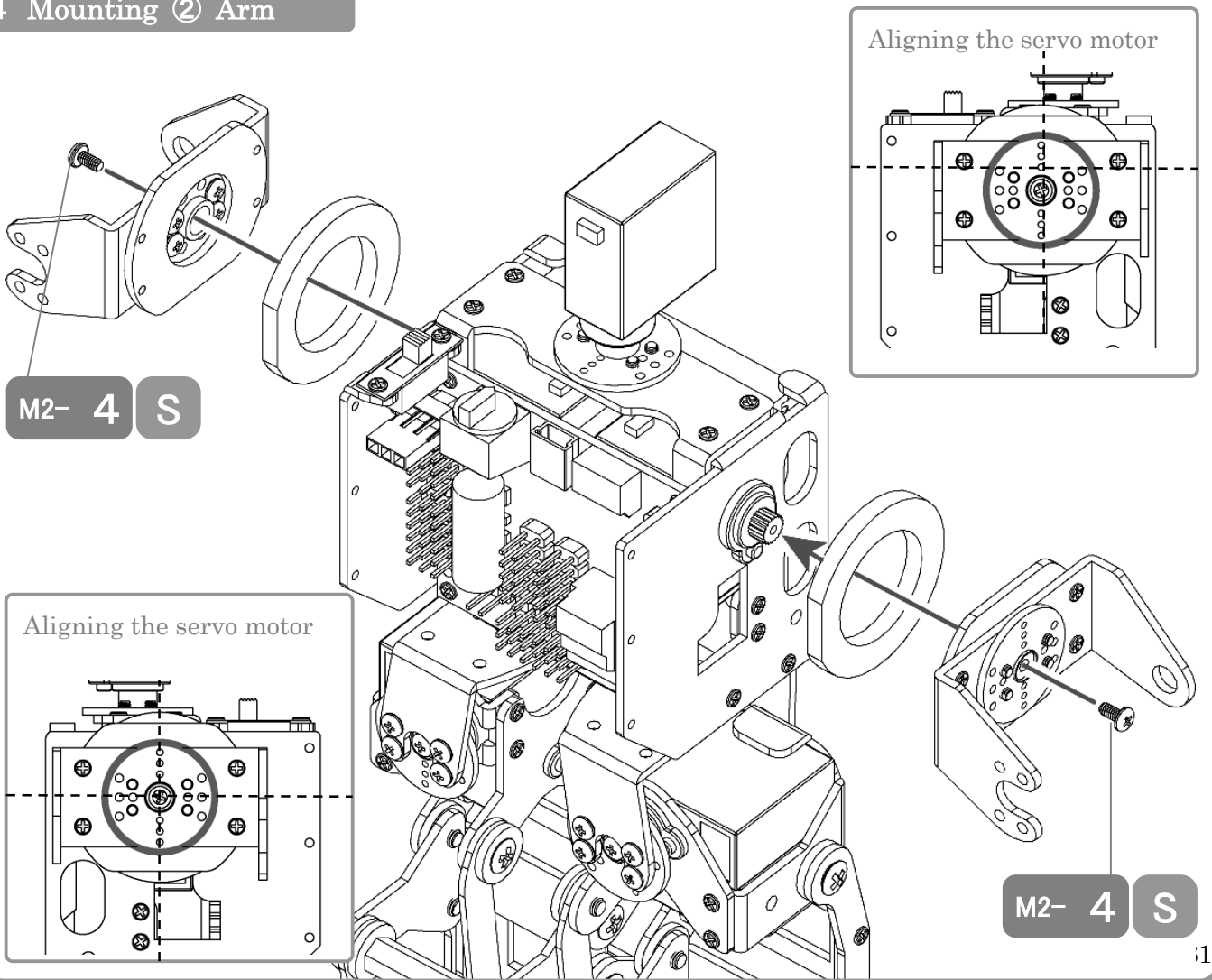
2 Attaching ② Leg



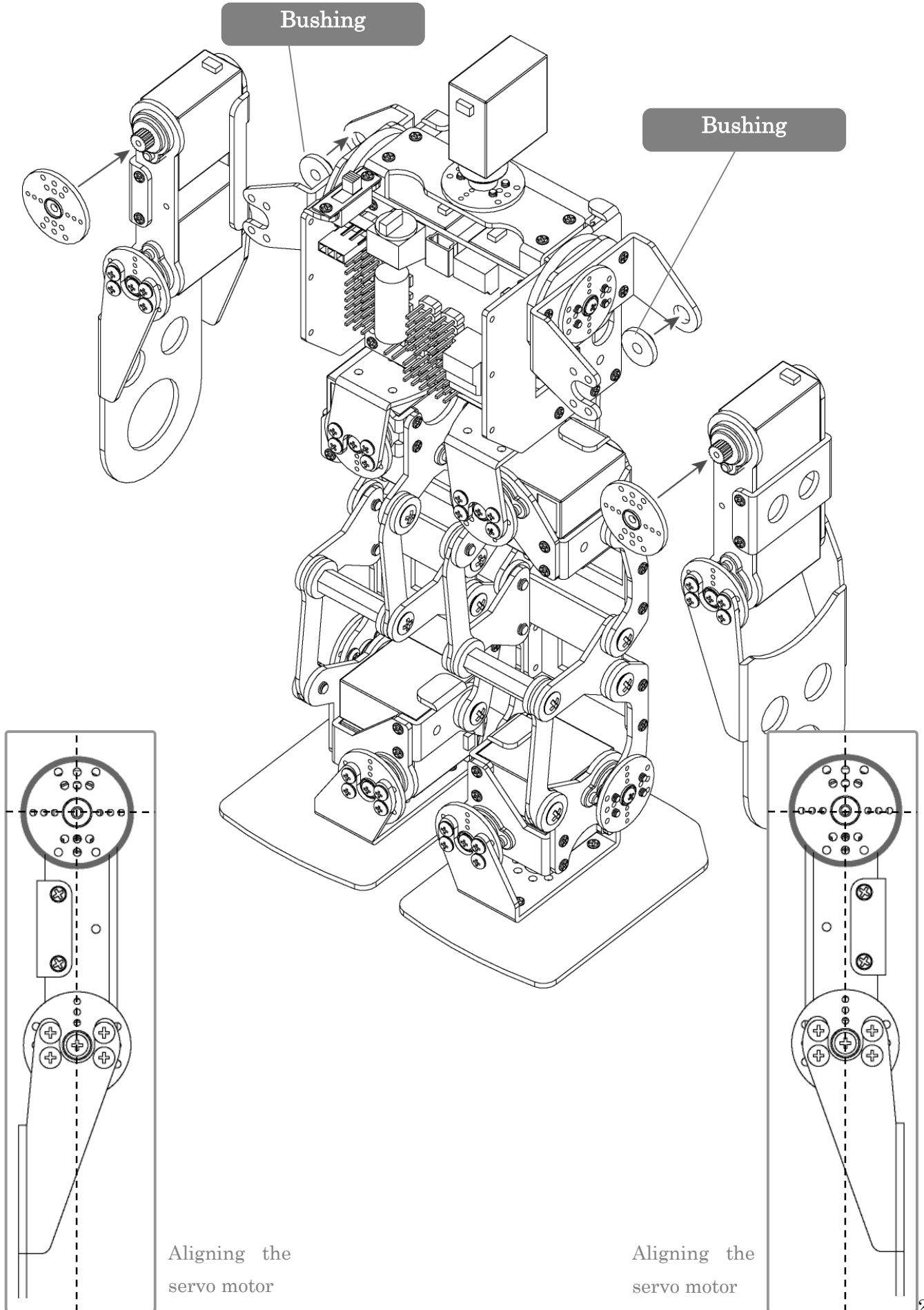
3 Mounting ① Arm



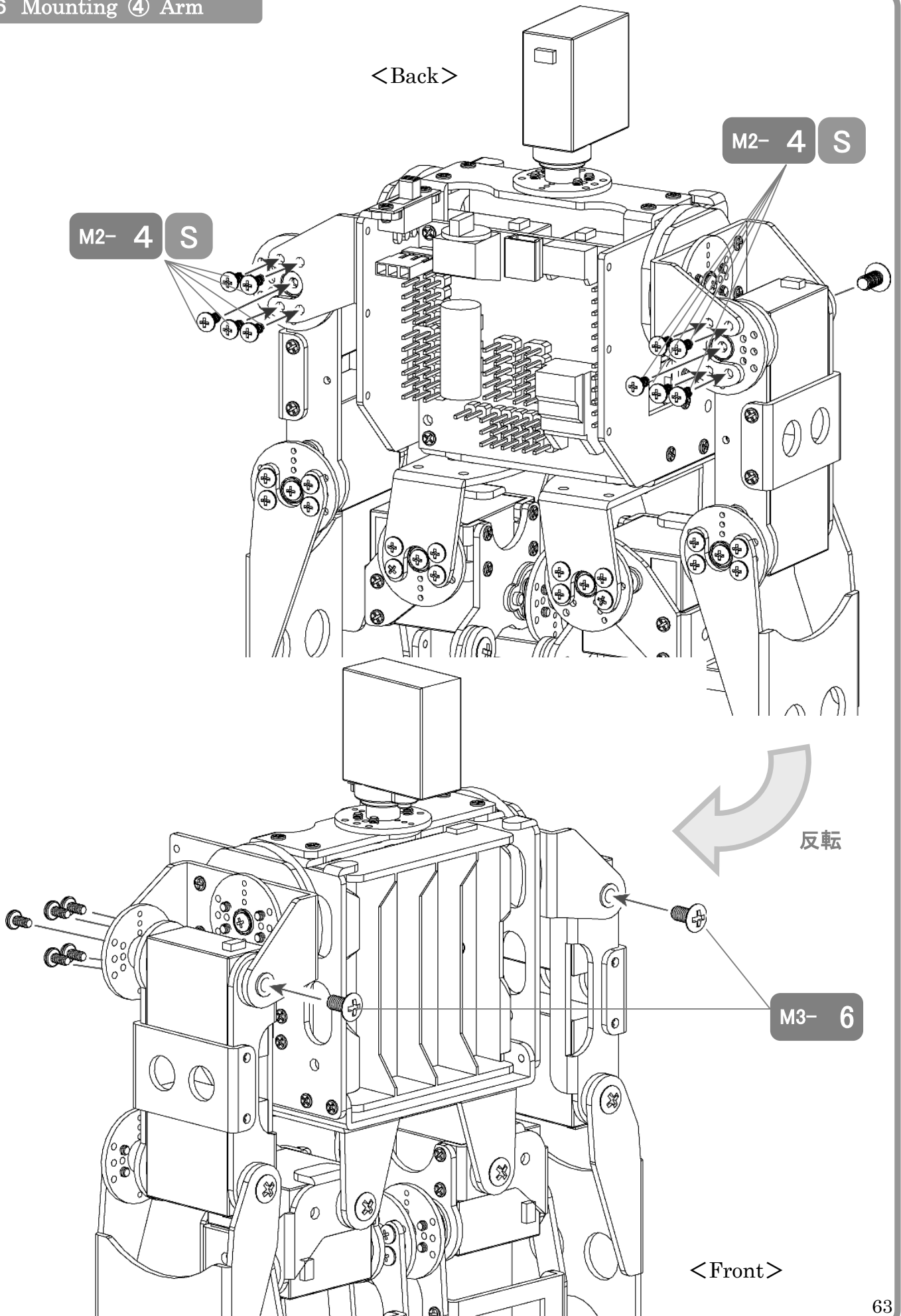
4 Mounting ② Arm



5 Arm ③ Mounting



6 Mounting ④ Arm



⑧ Securing the Wires

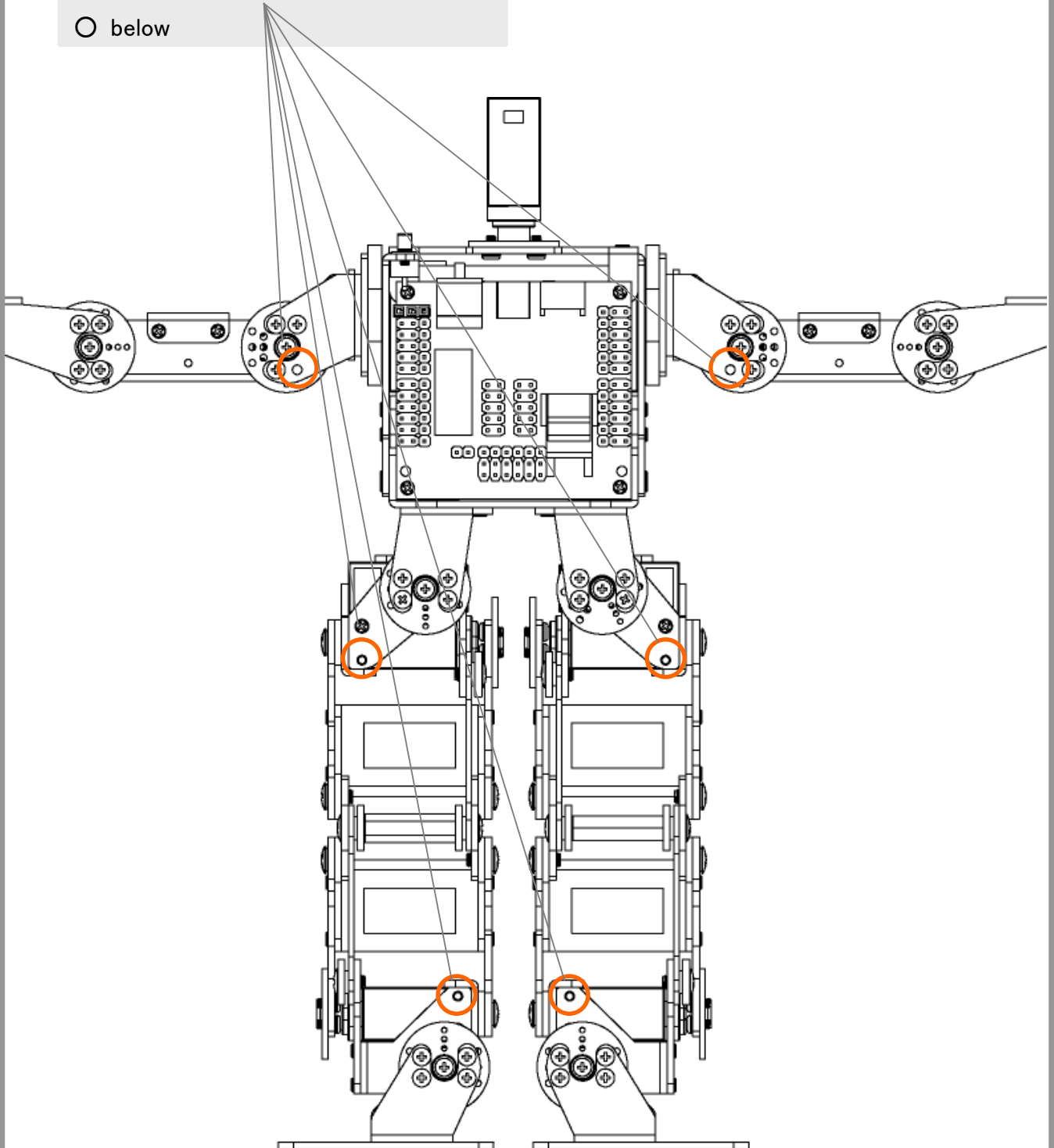
It is important to properly secure the wires after assembly in order to prevent unnecessary accidents from wire tangling and snagging.

Please gather the necessary parts

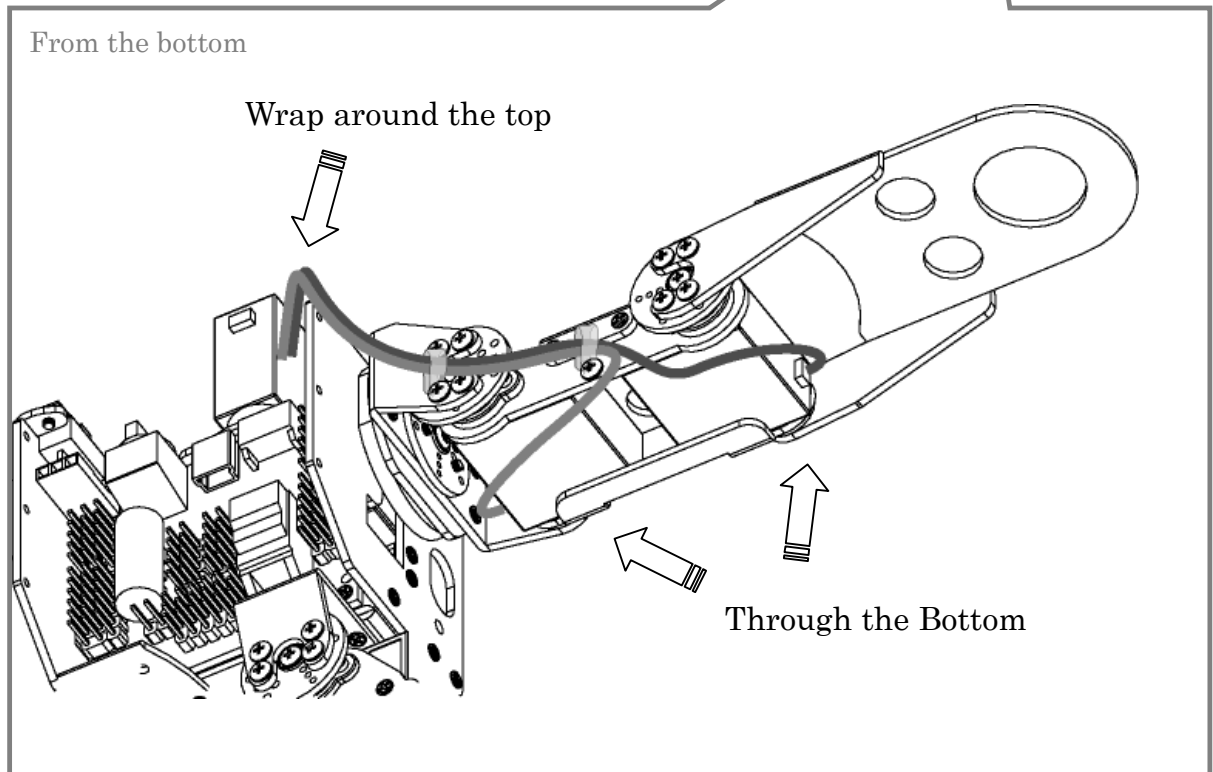
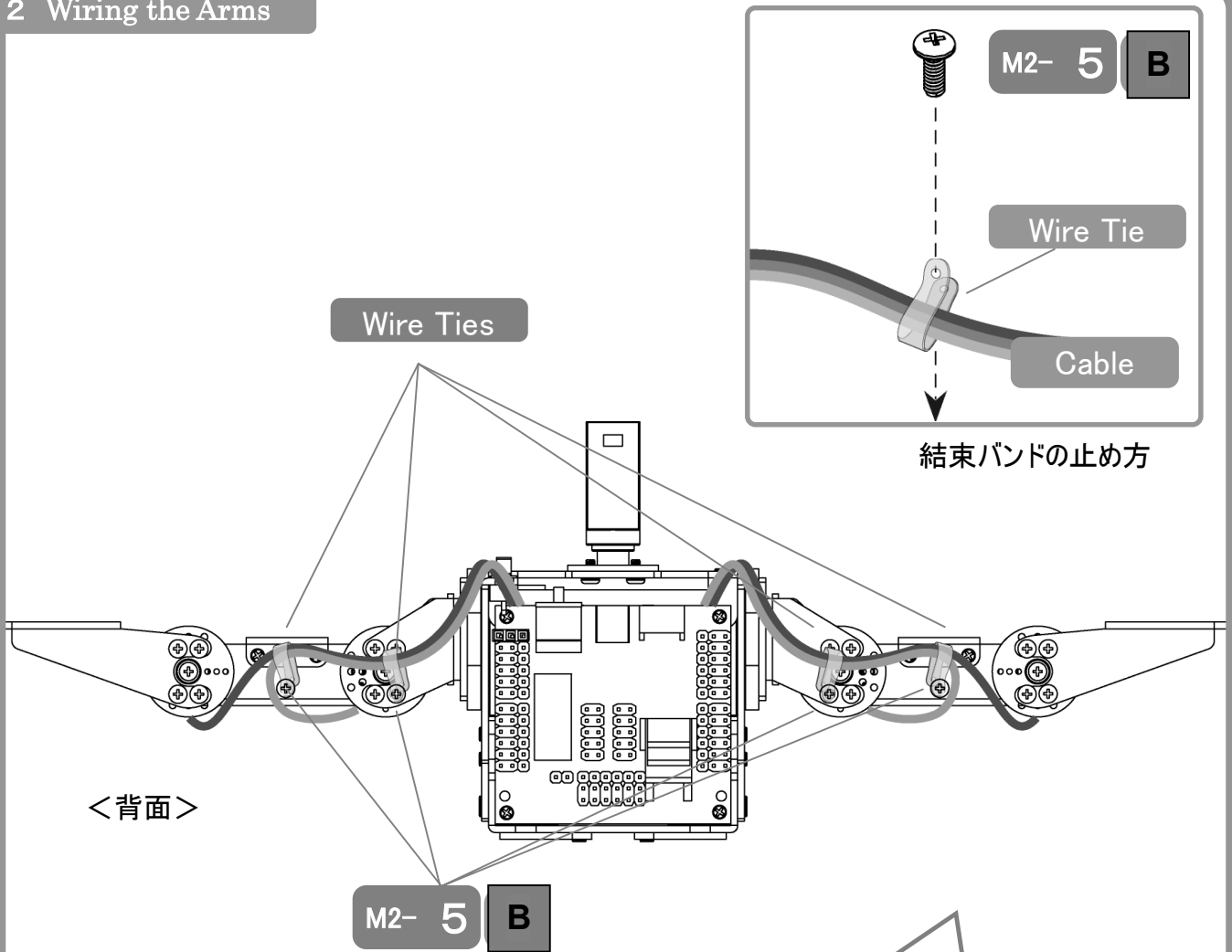


1 Fastening the Screws

Attached the screws the areas in the
○ below

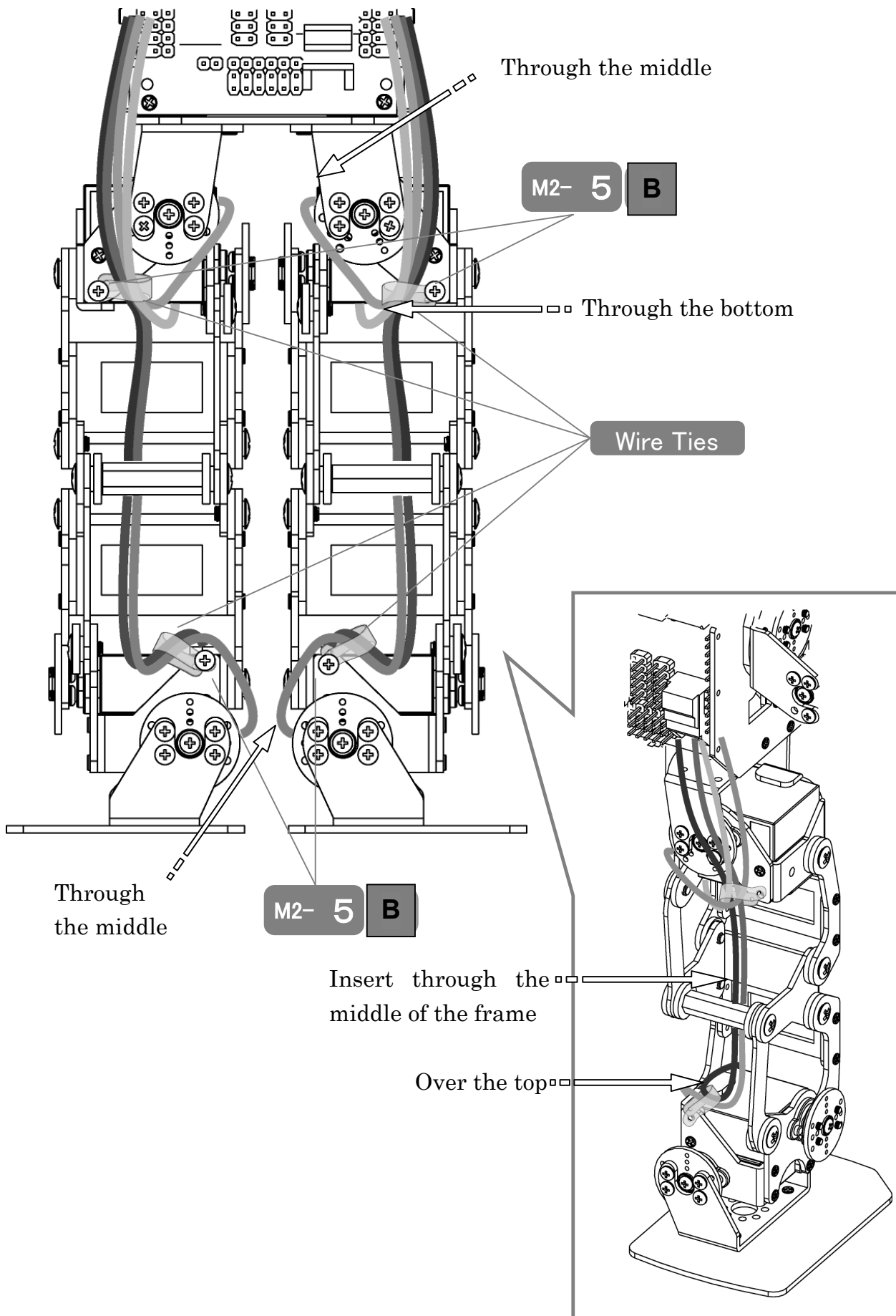


2 Wiring the Arms



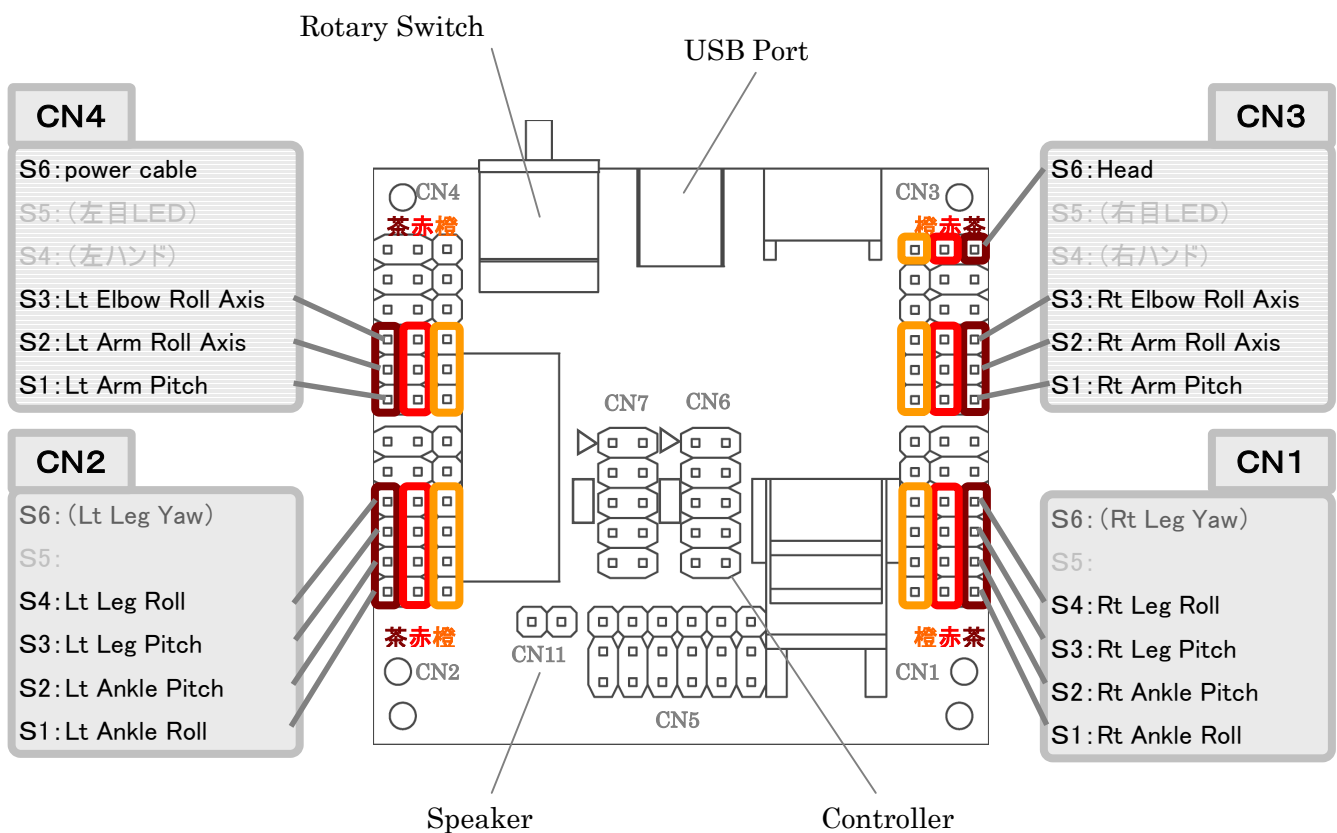
3 Wiring the Legs

< Back >



4 Cable Connection to CPU

Connect all of the servo cables to the CPU board as shown



⚠ **Connect the cable with the BROWN or BLACK lead facing OUT.**

⚠ Incorrectly connecting the cables may lead to problems with the robot.

<Connector Discription>

CN1~5 : Servo Motors、Power、VS-LED1

CN6 : Controller

CN7 : IXPBUS (External devices, expansion board)

CN11 : Speaker Connector

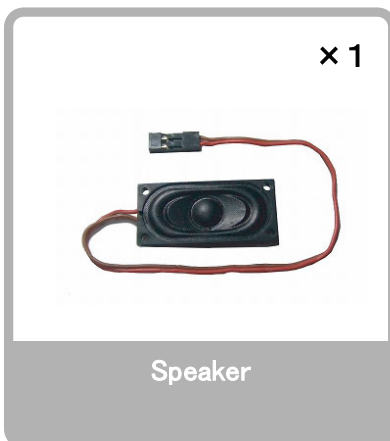
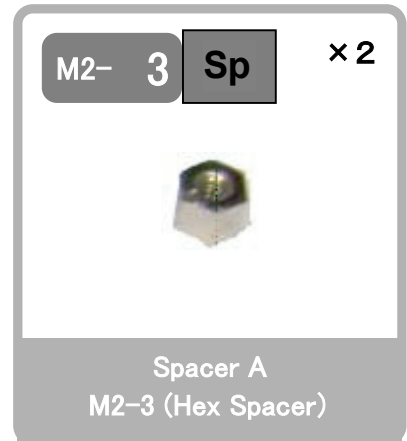
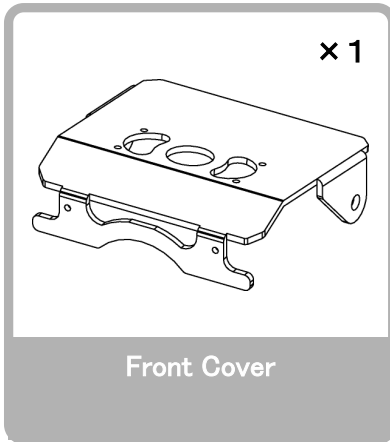
<Connector Orientation>

Please use the following directions for connecting the cables listed below.

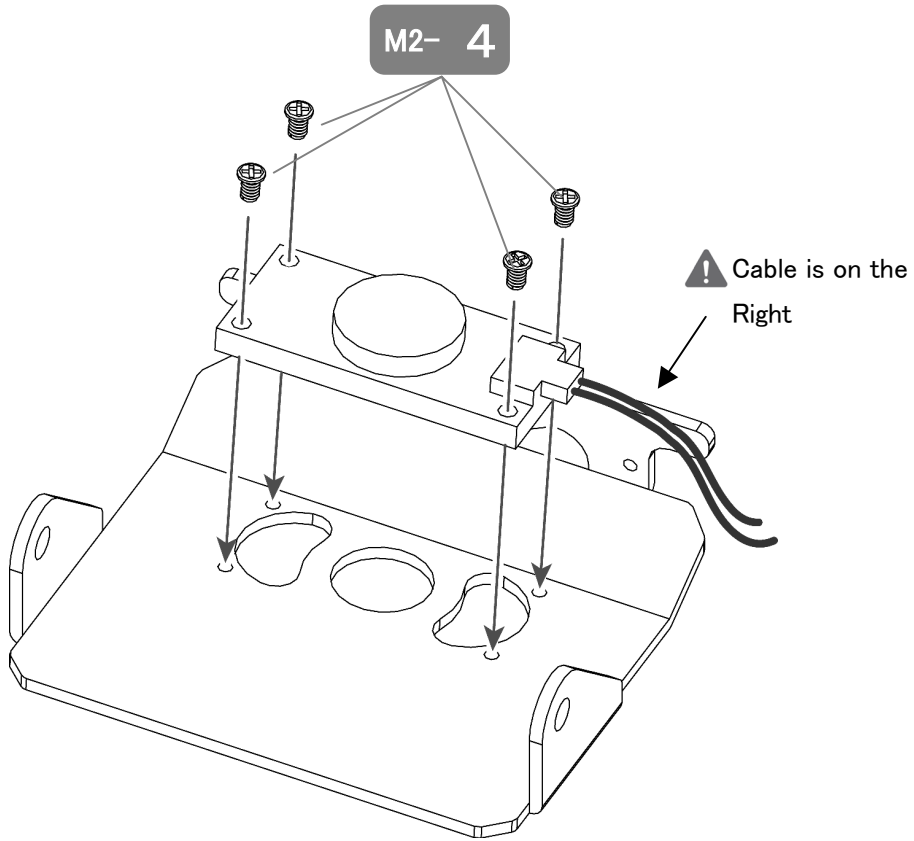
- Servo Motors : Connect with the brown or black cable facing out from the CPU board.
- Controller、IXPBUS : Connect the Δ symbol on the connector with the Δ symbol in the figure. Usually, Δ aligns with Pin 1.
- Speaker : No polarity. Connect anyway you choose.
- VS-LED1 : Connect with the brown or black cable facing out from the CPU board.

⑨ Securing the Front and Back Covers

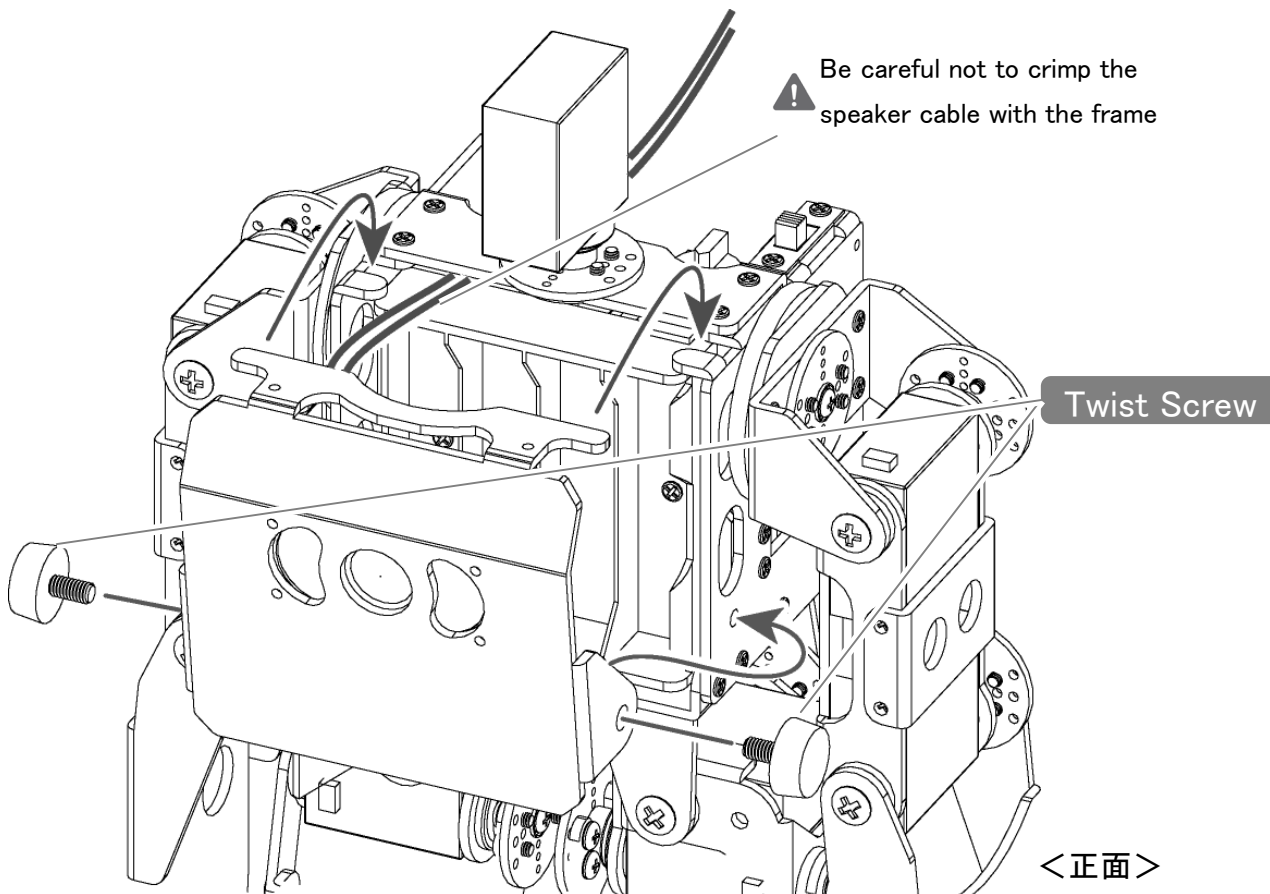
Please gather all the necessary parts



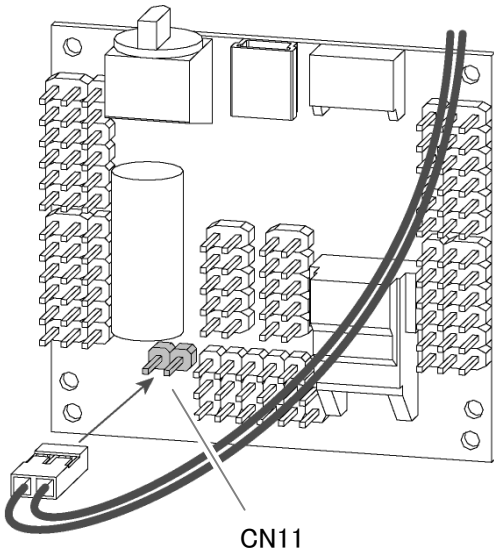
1 Attaching the Speaker



2 Attaching the Front Cover

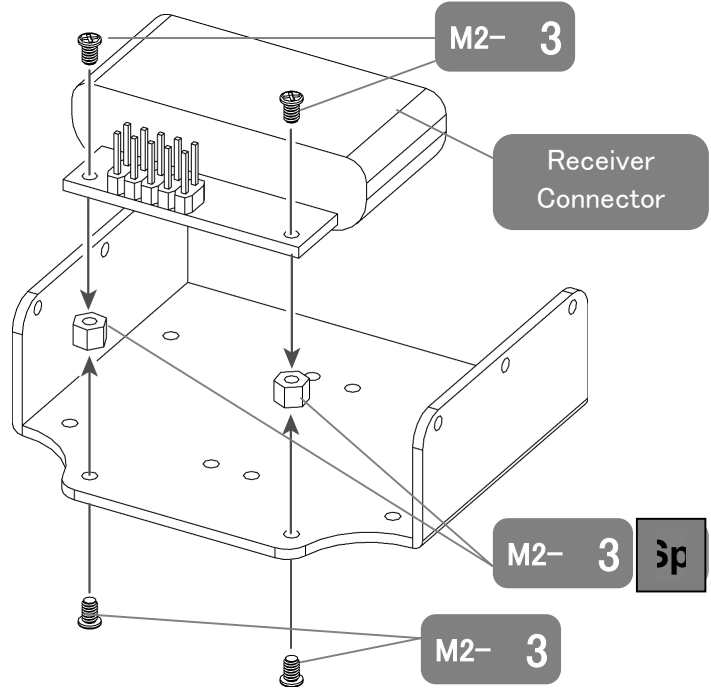


3 Speaker Connection

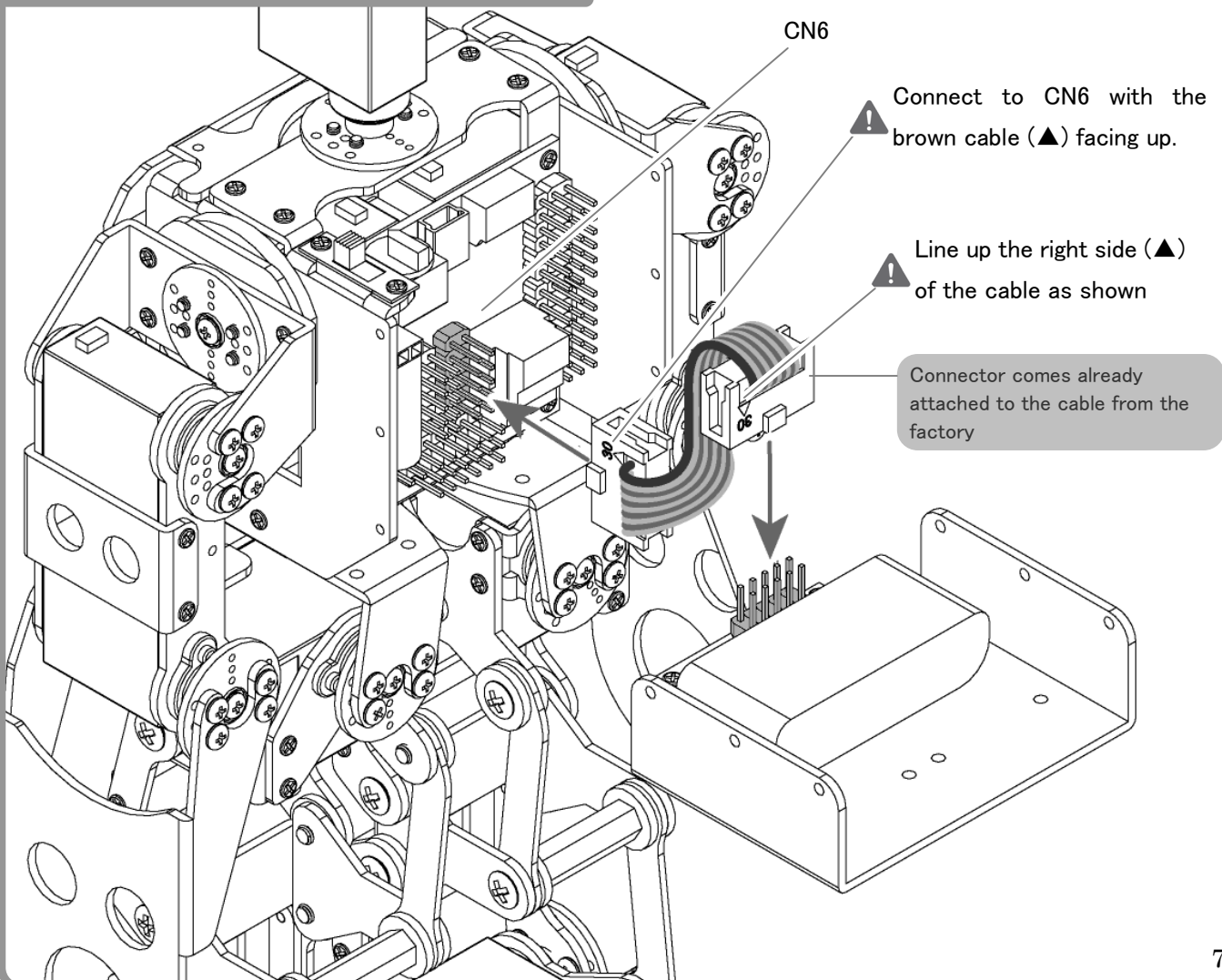


Connect the speaker cable to CN11.
There is no polarity for direction.

4 Attaching the Receiver Connector



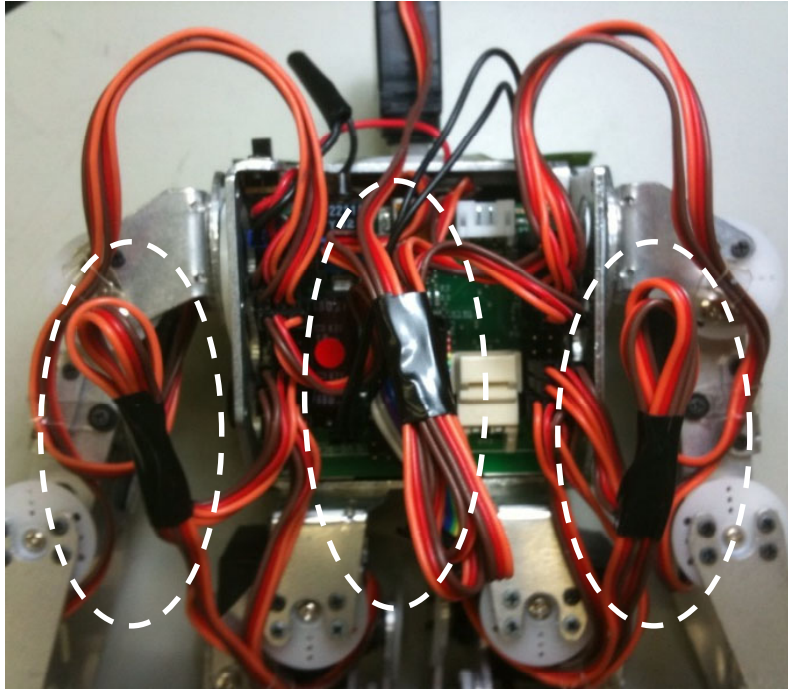
5 Connecting the Receiver IXPUS Cable



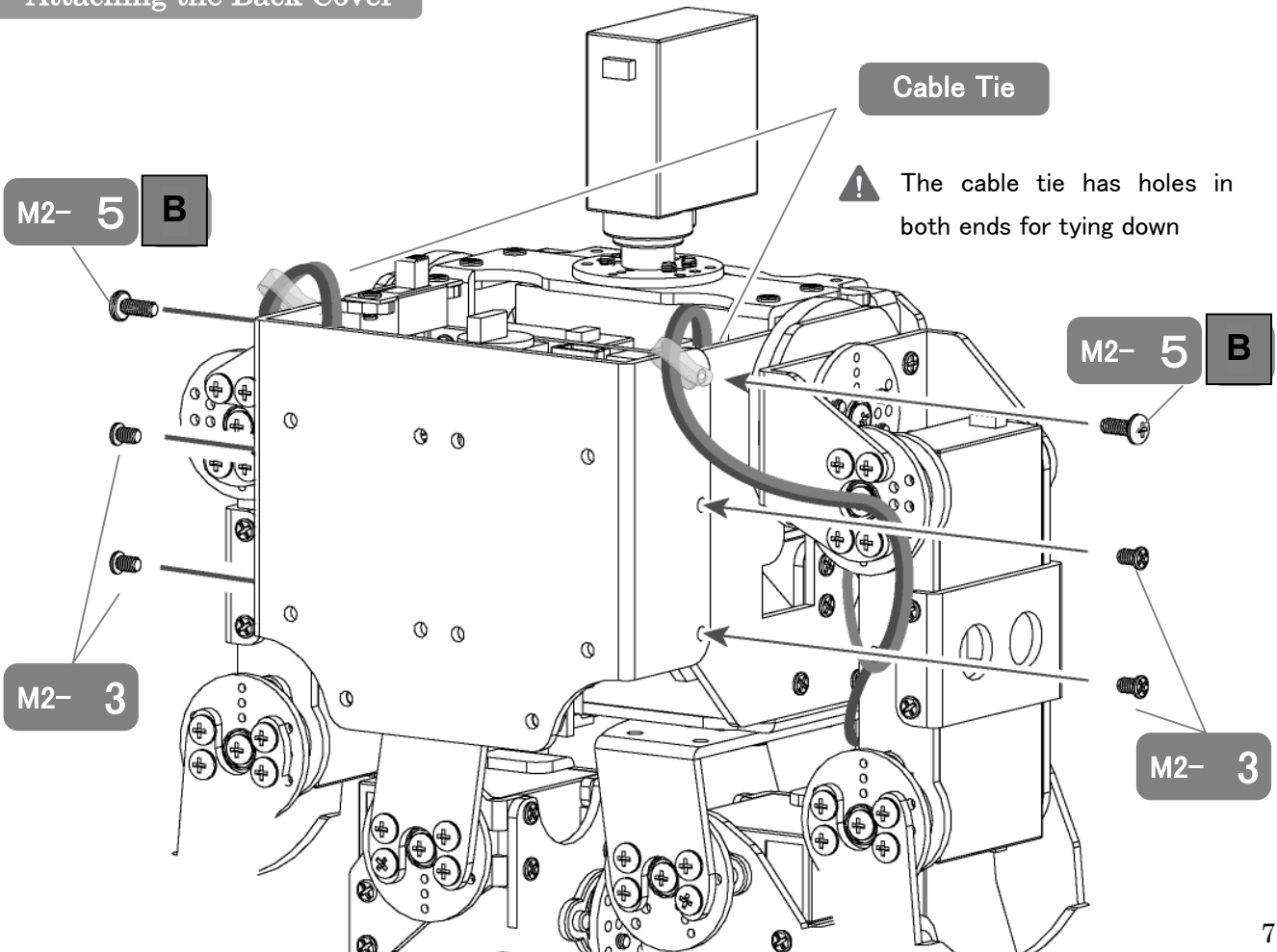
6 Wiring Together

Taping down the excess cable.

※Taping is not required, however it makes covering the back of the robot easier.




7 Attaching the Back Cover



4. Servo Motor Position Correction

If you turn the robot's servo motors ON immediately after assembly, the limbs will move into an awkward posture and the robot will not move correctly. Please correct the position of the servo motor according to the following steps

1 PCと接続する

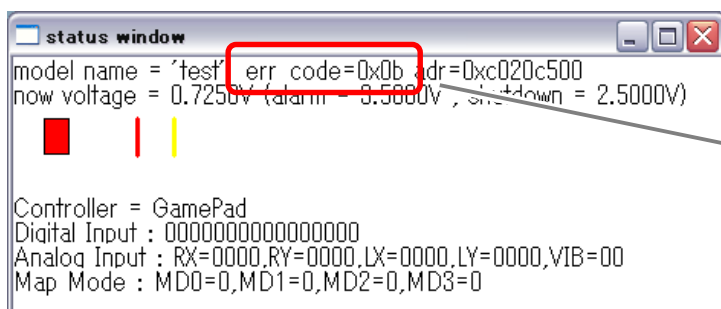
1. Remove the front cover of the robot to insert a nickel-metal hydride rechargeable battery
2. Connect the robot's CPU board to the PC with the USB cable.
3. Open RobovieMaker2 on the PC
4. Click the  button to link the software with the CPU board.



通信ボタン

⑤ Confirm the 「status window」 error code is 「0x0b」

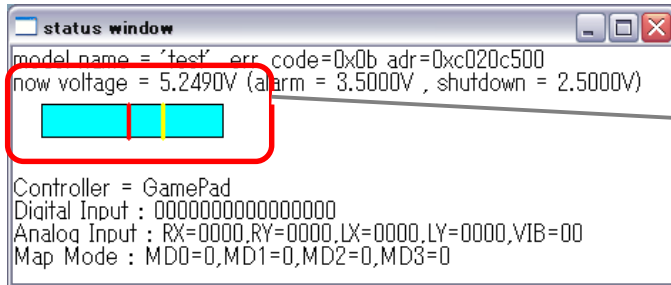
※When the 「VS-IX001」gyro/accelerometer chip is connected, the error code will be 「0x00」
If the error reads anything other than 「0x00, 0x0b」, you may have some kind of problem. Please refer to the RobovieMaker2 reference manual.



Confirm the error code is 「0x0b」


2 Checking the Servos

Turn on the robot's power switch. At this time, please check the 5v voltage as indicated below. If you experience a low voltage (3v, etc.), there may be a problem with battery, the battery connection or the servo motors may be improperly connected. Please switch off immediately



Check that you have 5v in the window

Press the  button to apply power to the servo motors.

If, at the moment you push the button and the servo motors go into an unnatural pose, immediately push the  button to turn OFF the servo motors, as you may damage the motors.



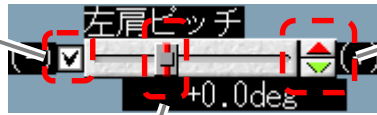
Servo Motor ON/OFF Button

3 About the Slider

Specify the angle of the servo motor to change the value of the slider.

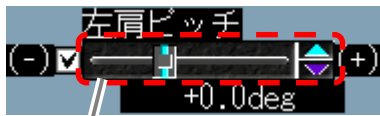


Turn ON/OFF the servo motor by checking or unchecking the box. Check in the box is live power.



Click the top half and bottom half of the spin button to fine-tune the angle of the servo motor

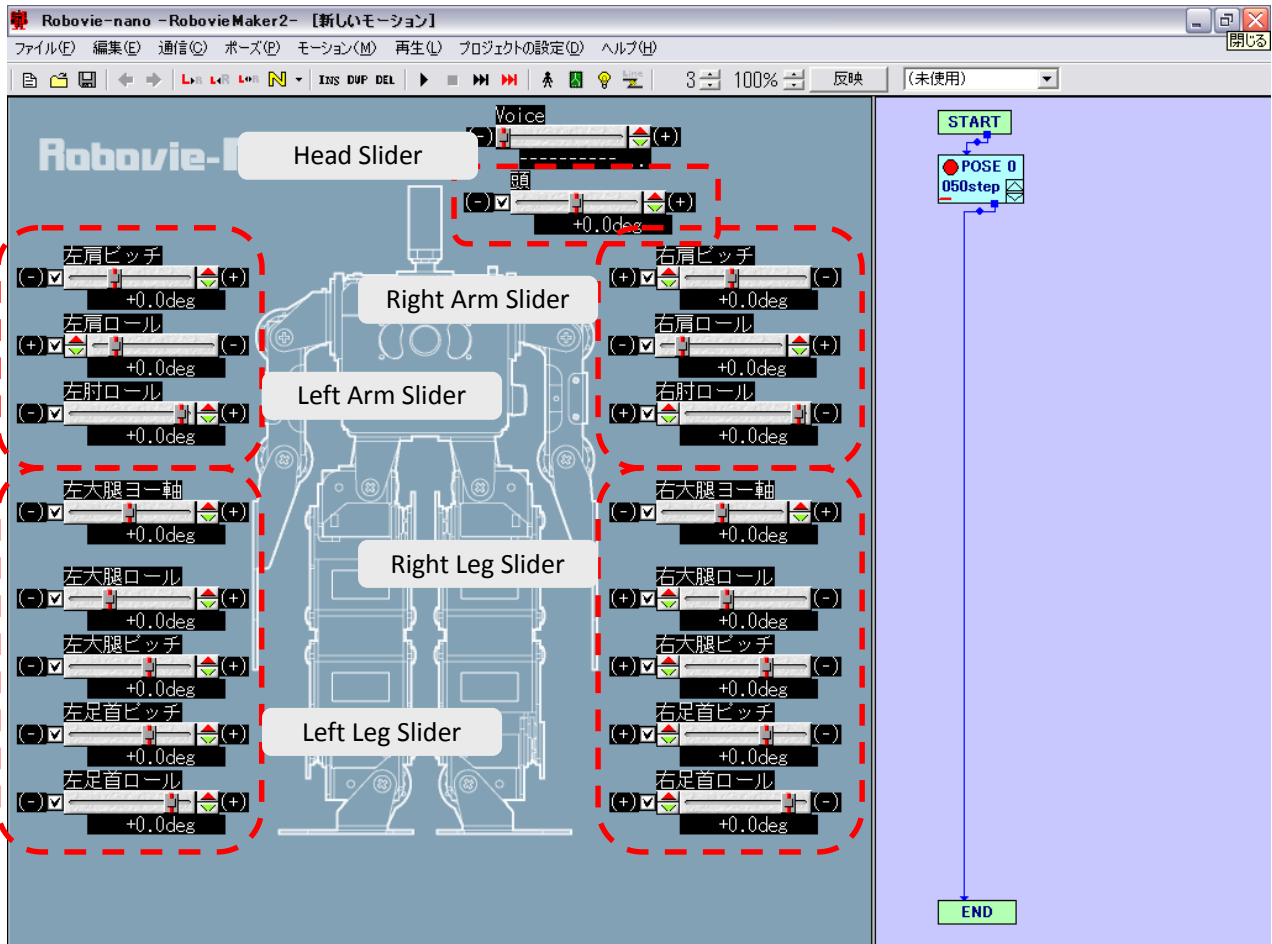
By moving the slider left or right, you can change the angle of the servo motor.



You can change the state of the slider by clicking on the bar and dragging it left or right with your mouse, or clicking on the slider background and scrolling the bar with the mouse wheel.

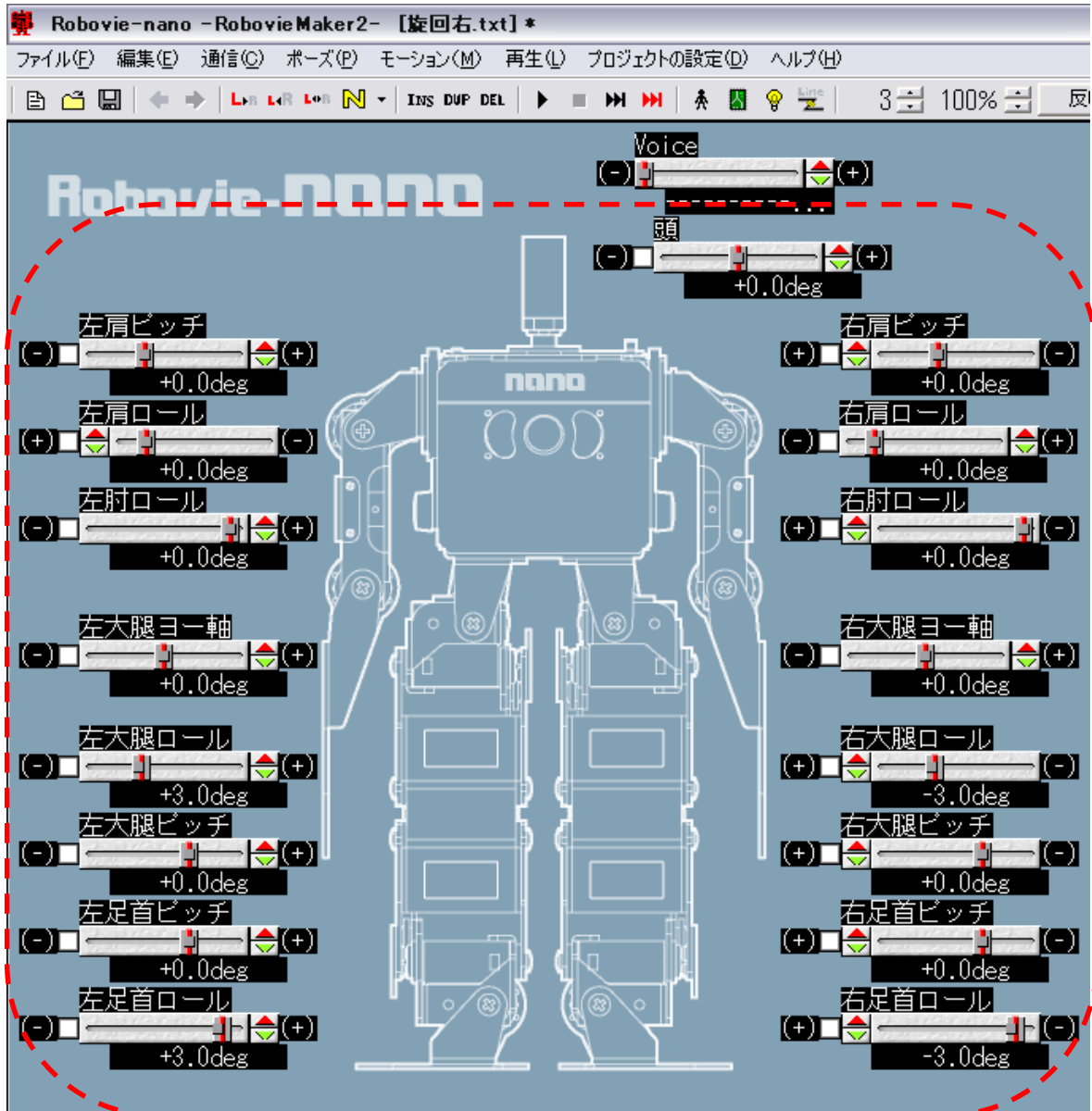
Background will turn black with the slider is active


Pose sliders will appear as shown in the image below.



4 Power the Servo Motors One at a Time

Uncheck all of the boxes to remove power from the servo motors



Push the  button on the software to confirm no moving servos.

※Even if you turn the robot ON, the servos will not have power.



Servo ON/OFF Button

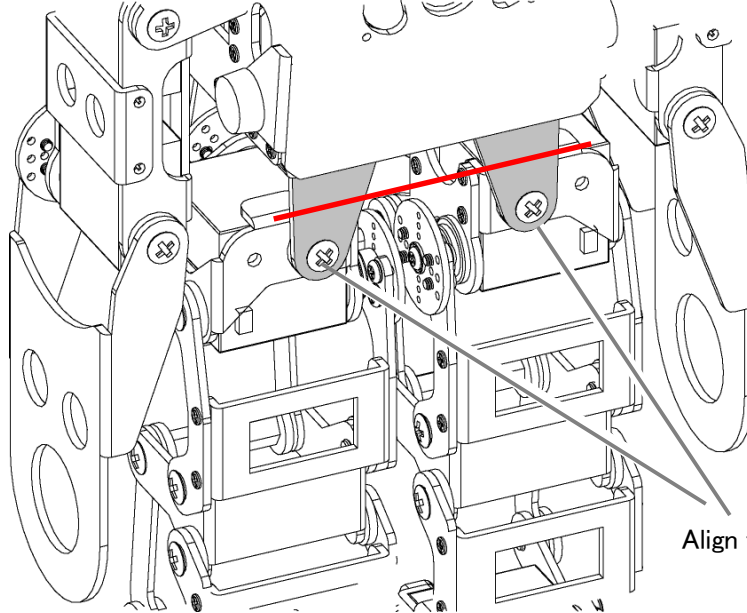
5 Leg Yaw

Please continue only if you have purchased a yaw extension kit for your robot.

「Place a check in the LEFT and RIGHT yaw access boxes and click the servo motor power button.



As shown below, "yaw left thigh", "yaw right thigh," lets you adjust the angle of the servo.



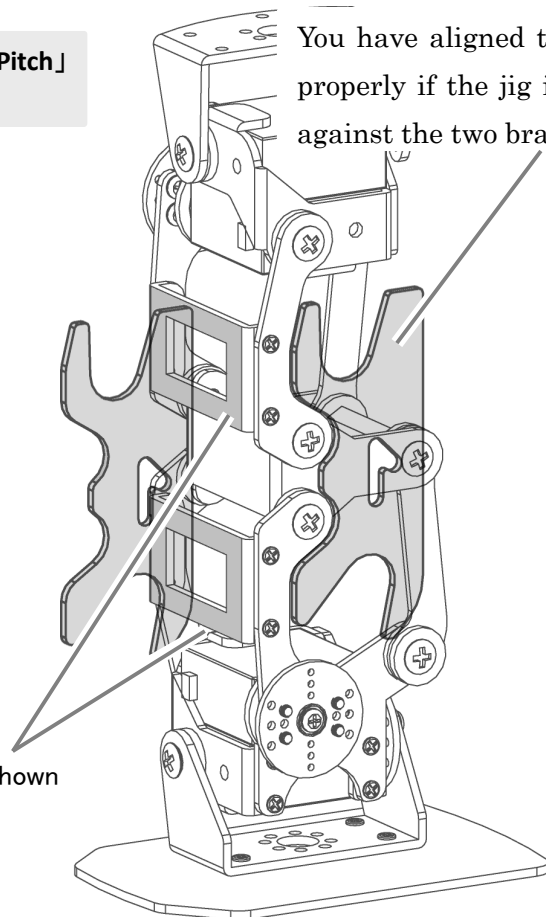
Align the two sides as shown.

6 Left leg pitch axis

Place a check in the 「Left Leg Pitch」, 「Left Ankle Pitch」 boxes and push the servo motor power button.



Use the provided jig as shown to adjust the initial position of the servos.



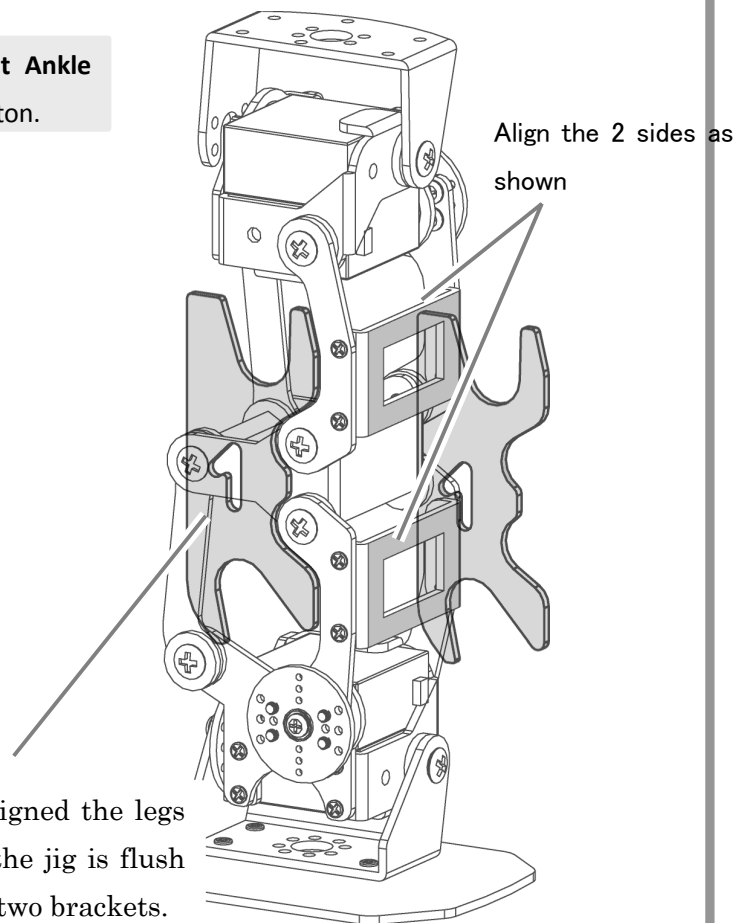
Align the 2 sides as shown

7 Pitch right leg axis

Place a check in the 「Right Leg Pitch」, 「Right Ankle Pitch」 boxes and push the servo motor power button.

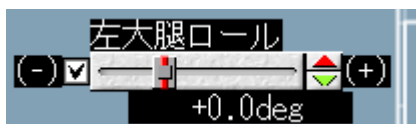


Use the provided jig as shown to adjust the initial position of the servos on the right leg.



8 left leg and roll axis

Place a check in the 「Left Leg Roll」 box and push the servo motor power button.



As shown on the right, using a jig for adjusting the initial position lets you set the proper angle

Place a check in the 「Left Ankle Roll」 box and push the servo motor power button.



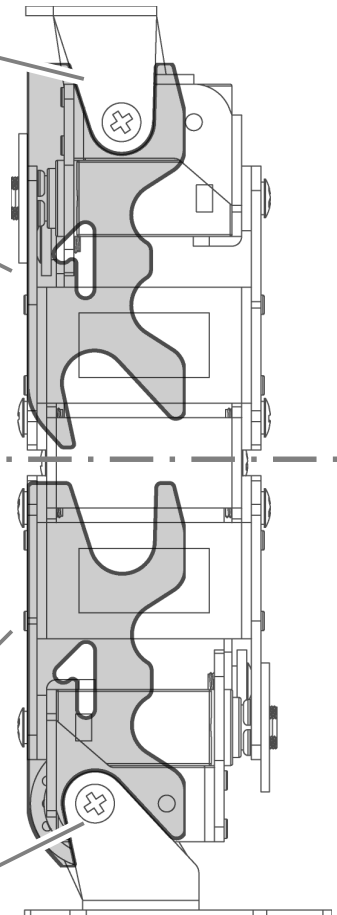
As shown on the right, using a jig for adjusting the initial position lets you set the proper angle.

Apply the jig to the bracket without any gaps

Adjust the servos to be parallel with the jig, as shown.

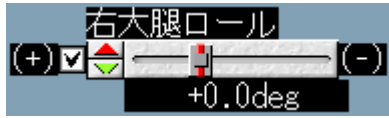
Adjust the servos to be parallel with the jig, as shown

Apply the jig to the bracket without any gaps



9 Right leg and roll axis

Place a check in the 「Right Leg Roll」box and push the servo motor power button.



As shown on the right, using a jig for adjusting the initial position lets you set the proper angle

Place a check in the 「Right Ankle Roll」box and push the servo motor power button.



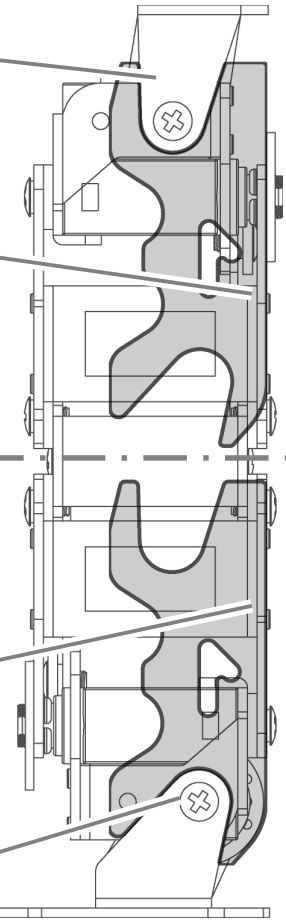
As shown on the right, using a jig for adjusting the initial position lets you set the proper angle.

Apply the jig to the bracket without any gaps

Adjust the servos to be parallel with the jig, as shown

Adjust the servos to be parallel with the jig, as shown

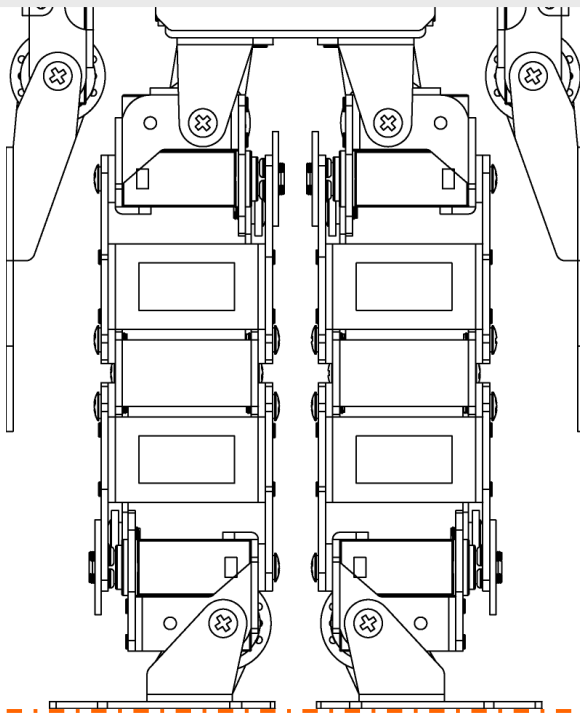
Apply the jig to the bracket without any gaps



10 Check the roll axis

Make sure the alignment of the LEFT and RIGHT feet are as shown below.

If not, tweak the positions of each leg with the sliders until you achieve alignment like the image below.



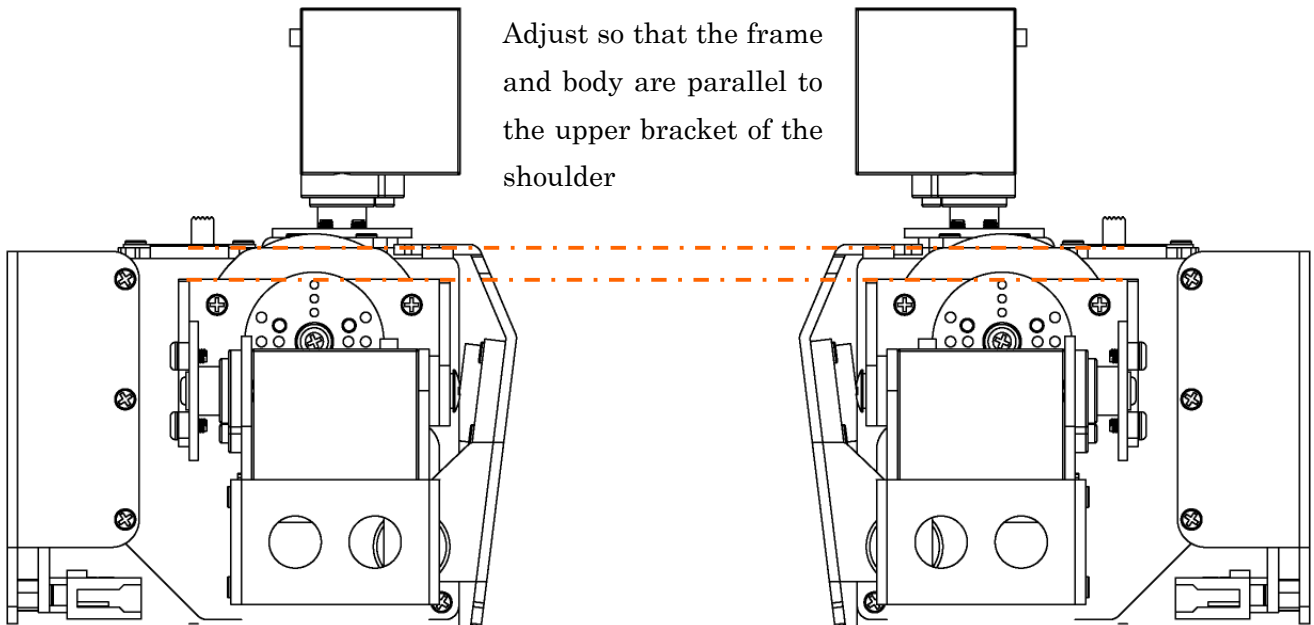
Make sure both the left and right legs are straight.

11 Shoulder Pitch Correction

Place a check in the 「LEFT Shoulder Pitch」 and 「Right Shoulder Pitch」 boxes then click the servo power button



Align the 「LEFT Shoulder Pitch」 and 「Right Shoulder Pitch」 as shown below.



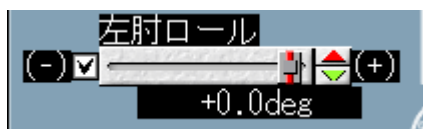
12 Left Arm "Shoulder" Roll Axis

Place a check in the 「Left Arm Roll」box and push the servo motor power button

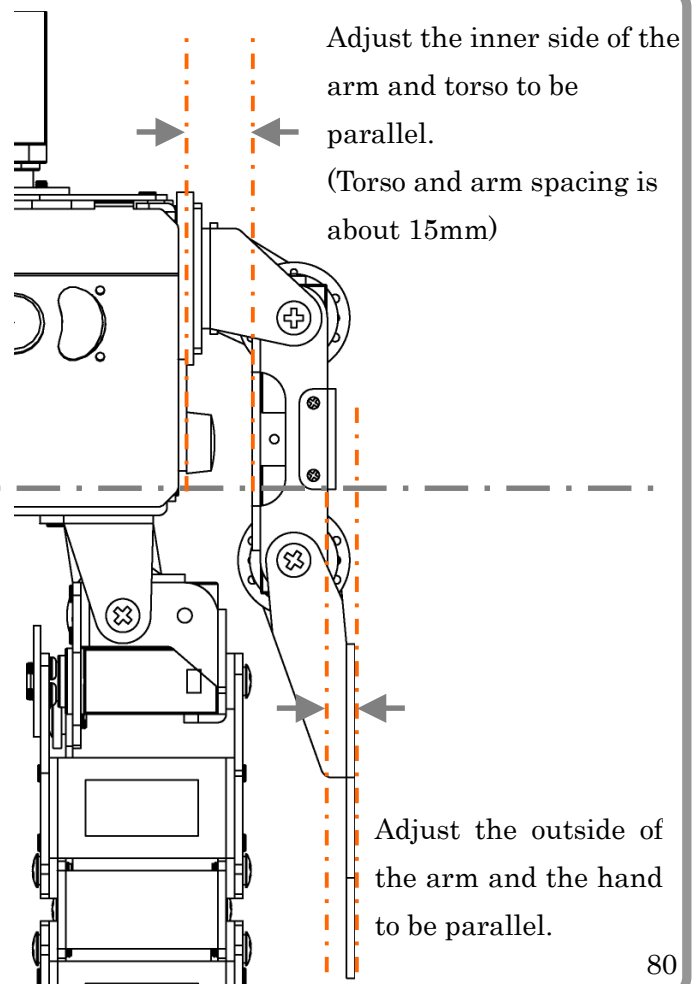


Adjust the shoulder roll as shown on the image to the right

Place a check in the 「Left Elbow Roll」box and push the servo motor power button

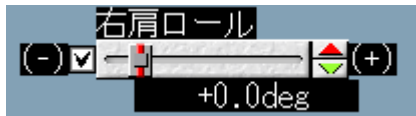


Adjust the elbow roll as shown on the image to the right



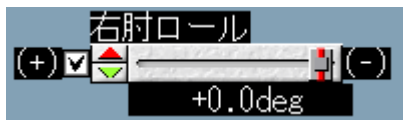
13 Right Arm "Shoulder" Roll Axis

Place a check in the 「Right Arm Roll」box and push the servo motor power button



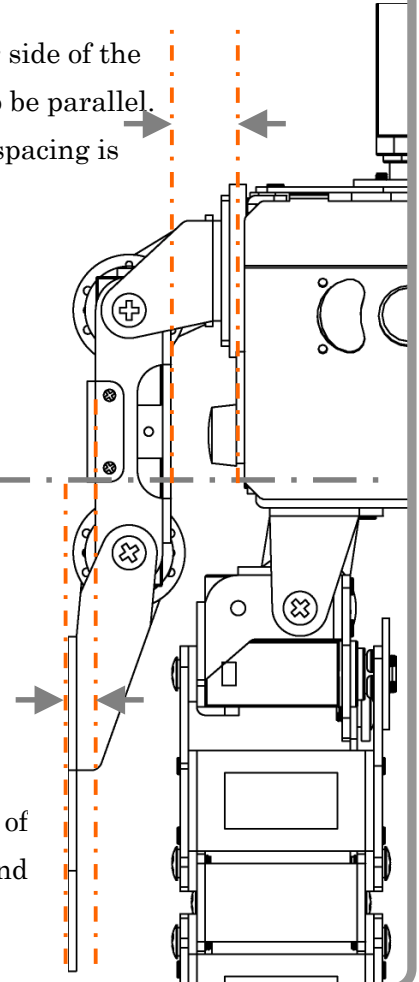
Adjust the shoulder roll as shown on the image to the right

Place a check in the 「Right Elbow Roll」box and push the servo motor power button



Adjust the elbow roll as shown on the image to the right

Adjust the inner side of the arm and torso to be parallel. (Torso and arm spacing is about 15mm)



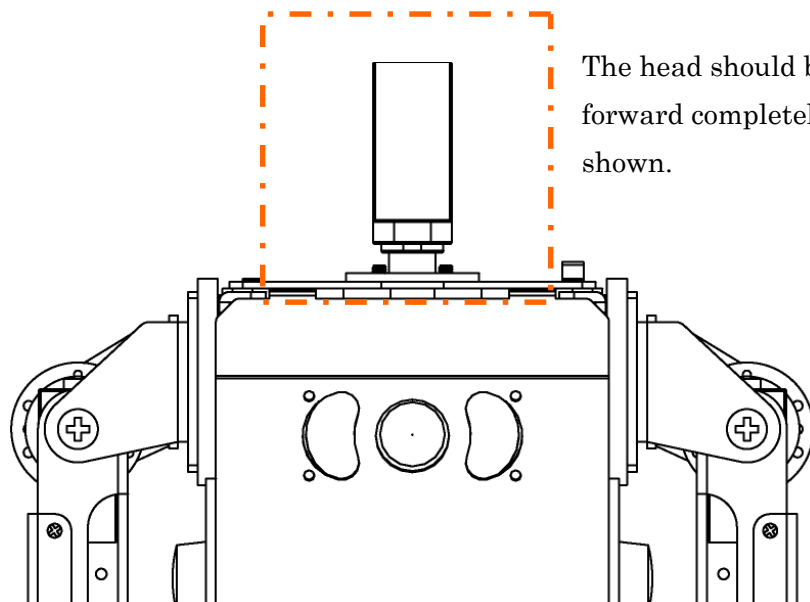
Adjust the outside of the arm and the hand to be parallel.

14 Head Yaw Axis

Place a check in the 「head yaw」 box and click the servo motor power button




Adjust the head yaw as shown on the image below.



The head should be looking forward completely as shown.

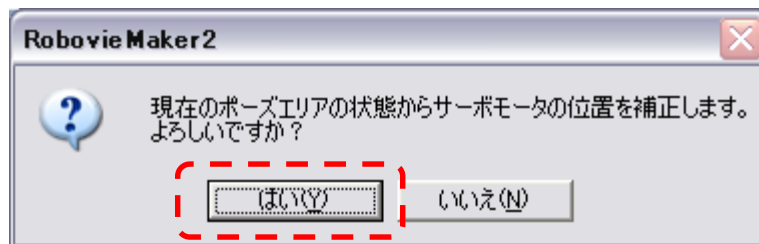
15 Servo Initial Position Adjustment

After all the servo motors have been configured click the  button.

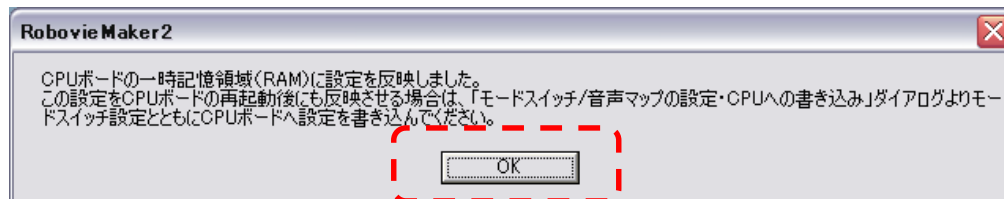



Servo initial configuration button

After clicking the  button, the following dialogue will appear. Click Yes.



The writes the configuration to the RAM (temporary memory). Click OK.

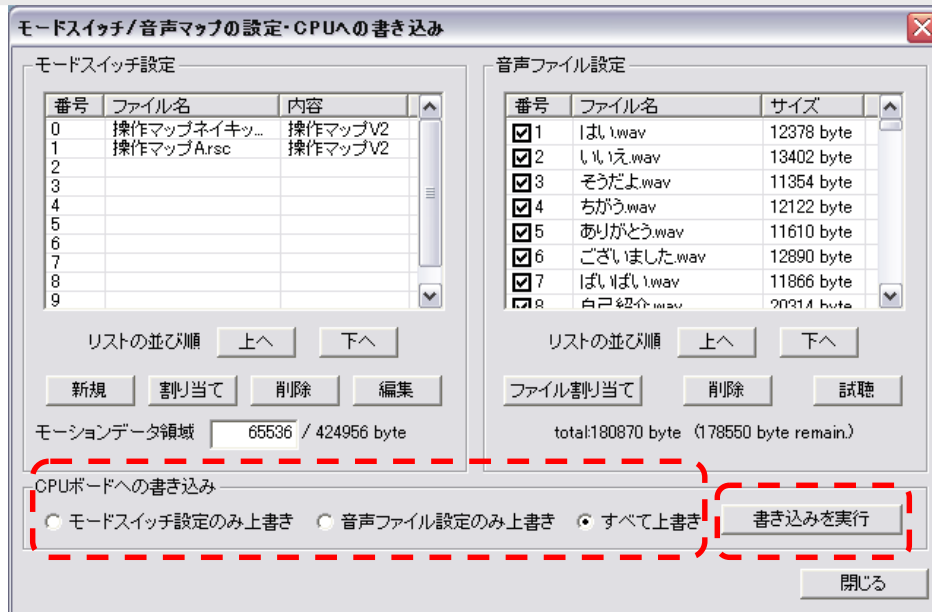


Since the settings have only been written to the RAM at this time, all settings will be lost once power is disconnected. To finalize, press the  button to write the settings to the CPU's ROM.



Mode Switch/ Audio Settings Write button

In the CPU Write Settings Dialogue Window, click "Overwrite all" and select "Run" to begin the write press.



Once the files have been written to the CPU board your robot assembly is complete.

5. Gamepad Operations

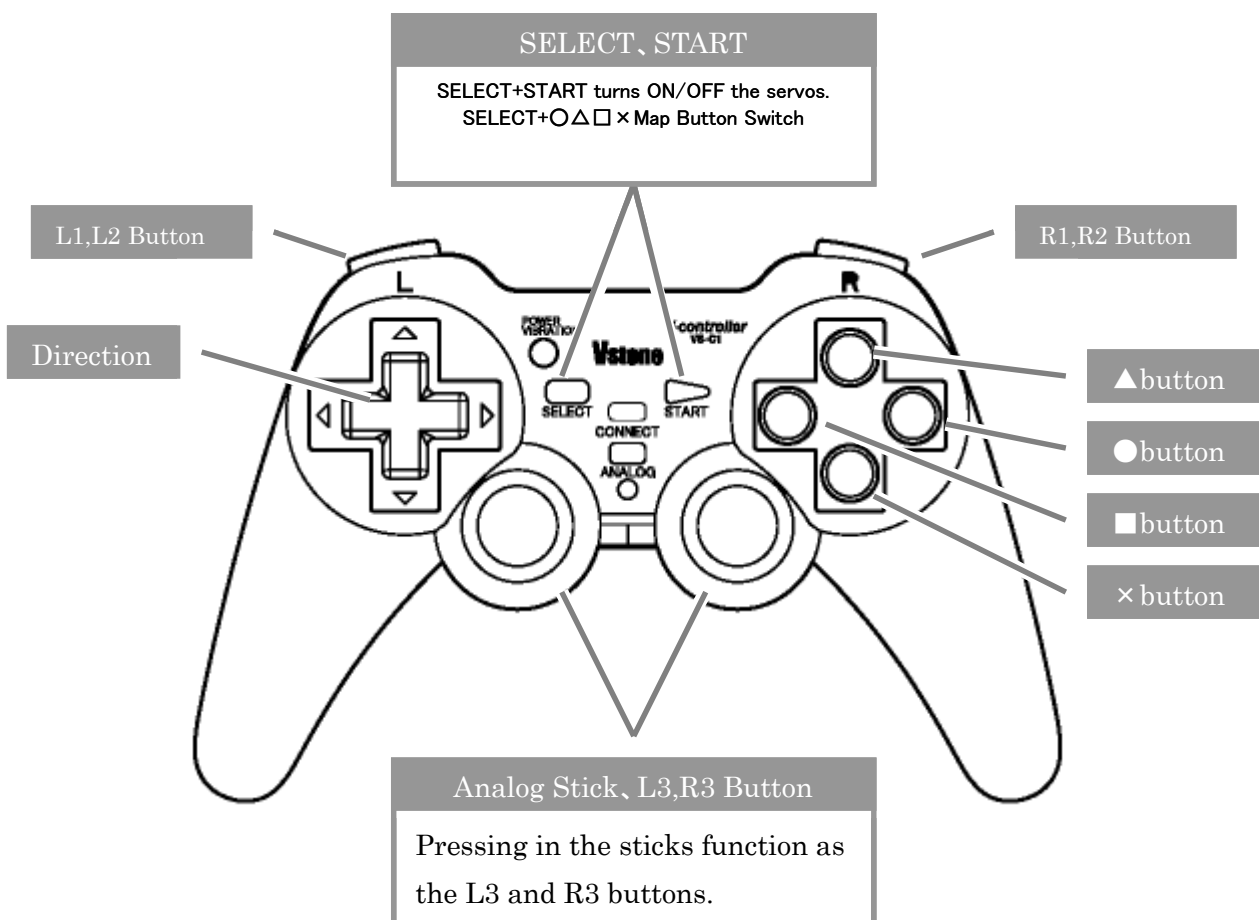
Motion files for operating the robot are uploaded to the CPU board by default when the initial settings are written. You can control the robot with the PS2 wireless remote controller if a receiver is connected.

At this time, the only controller supported is the wireless robot gamepad controller "VS-C1", manufactured by Hori "Vibration Wireless Anaheim 2 TURBO". If you want to connect with the game pad, please attach the connector and associated receiver to the inside of the robot's body. Please see the assembly manual.

1 Button

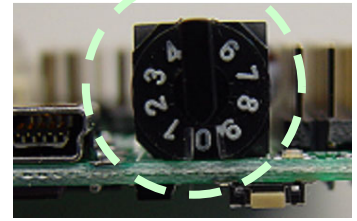
The function of the game pad buttons are as follows. To apply power ON to the robot, first press and hold the SELECT button then press the START button.

※ This will not activate the robot when the USB cable is connected



2 Mode Switch

The board has a CPU mode switch as shown on the right. This is intended to change the mode of operation for various demonstration maps and auto-run routines. With the map and auto demo, you can register up to 10 operations. Robovie-nano is written in the following modes by default as shown below:



0: Basic (Plain) Control Map

Control maps in this mode should not have any optional parts.

1: External Robot Control Map

This is used for operations when robot is wearing the suit.

2: Yaw Axis Control Map

This map contains the motion files to use with the yaw axis version of the robot.

3: Gyro Sensor Control Map

This map is used when the 「VS-IX001」 gyro/accelerometer chip is installed. With the gyro, walking is more stable and the robot will use the accelerometer to detect when it has fallen over and automatically stand back up.

4~8 (Not Used)

9: Auto Demonstration Self Introduction

Servo motors will automatically power ON and begin self introduction.
Servo motors will automatically power OFF once finished.

2 Selecting the Maps

The controller can switch the map manually during the operation. In other words, you can get the same button to behave differently and have a completely different function. The standard configuration is equipped with the following three maps from the controller SELECT button + Δ \circ \times . The operator can switch between maps by pressing any one of button configurations above.

Basic Operation SELECT + \blacktriangle

Basic motions and behaviors such as bowing, self introduction, cart wheels and walking have all been programmed into this map by default.

Soccer SELECT + \bullet

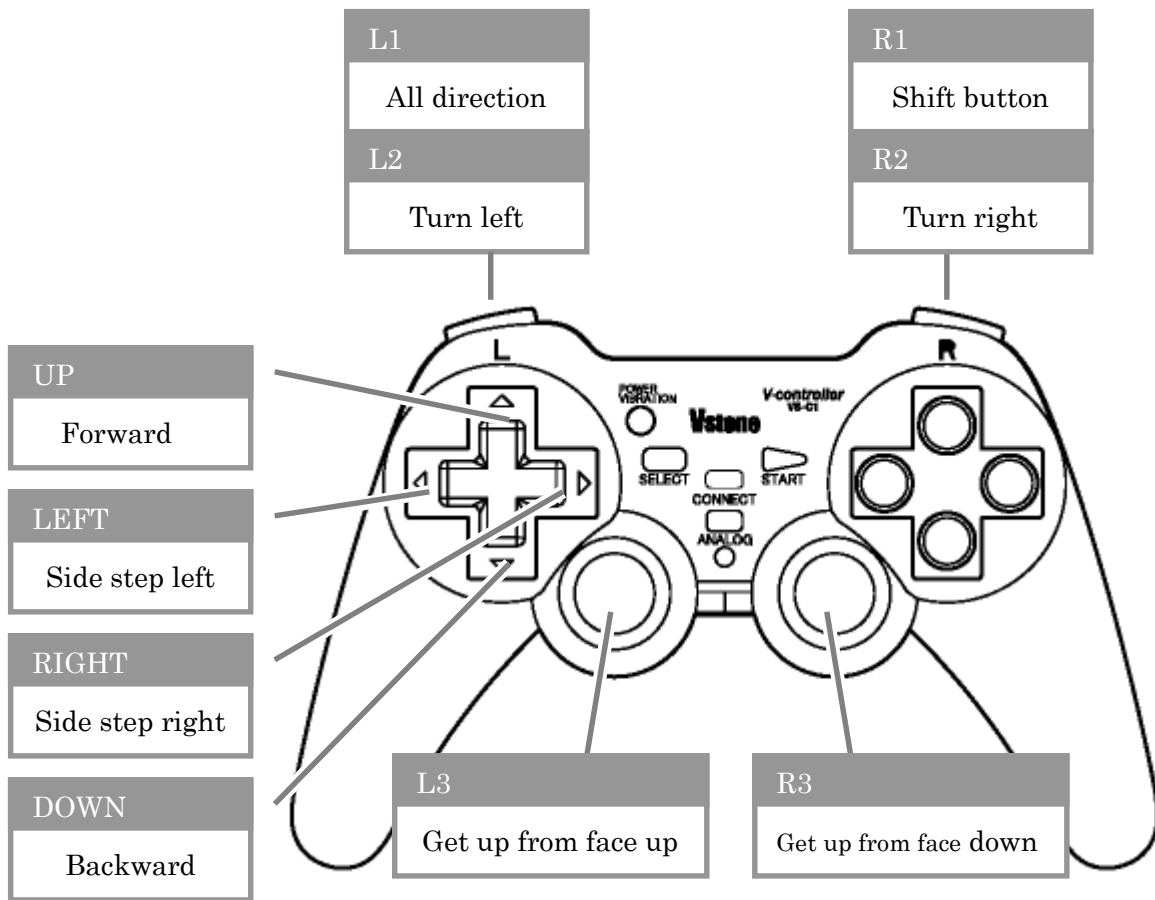
Shoot, kick and goal keeper functions have all been programmed into this map.

Battle SELECT + \blacksquare

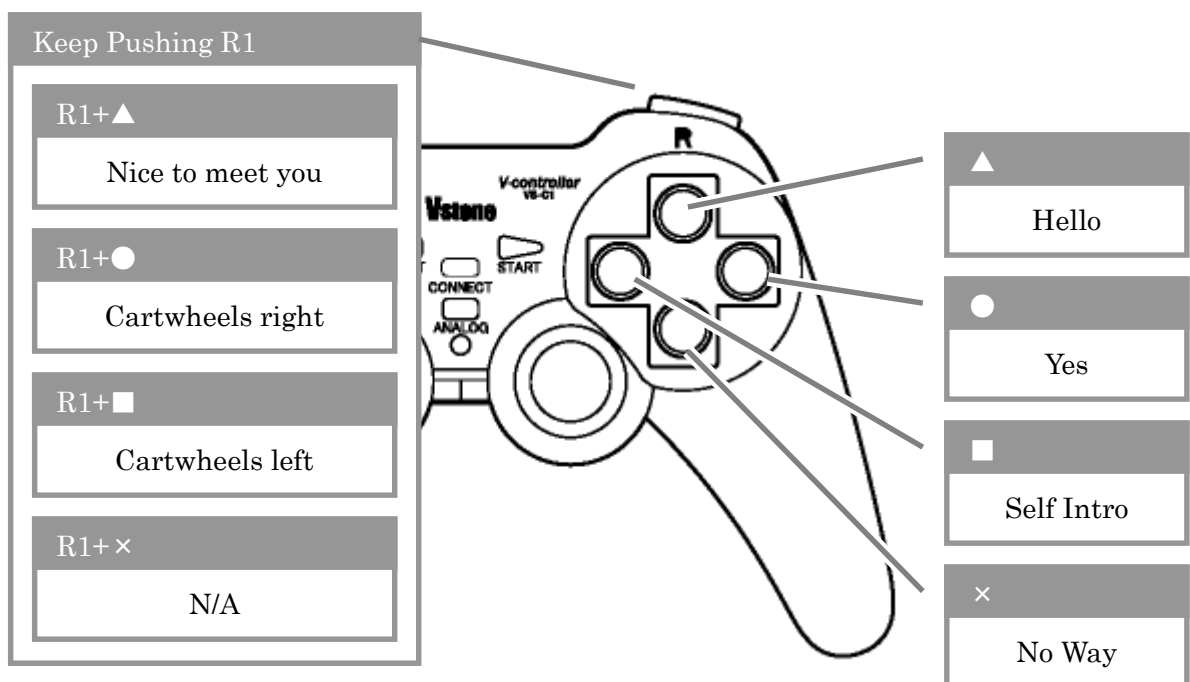
Punching, throwing, takedowns and other defensive features are included.

3 Always Common Buttons (motions)

These buttons have the same functionality in all default control maps



3 Primary Modes SELECT + ▲



4 Soccer SELECT + ●

While pushing R1 button

R1+▲	Walk forward slightly
R1+●	Keeper save right
R1+■	Keeper save left
R1+×	Keeper save middle

▲	Forward little
●	Shoot right
■	Shoot left
×	N/A

5 Battle Mode SELECT + ■

While Holding R1 Button

R1+▲	Punch
R1+●	Punch (right)
R1+■	Punch (left)
R1+×	Defend

▲	Front Punch
●	Right Punch
■	Left Punch
×	Defend