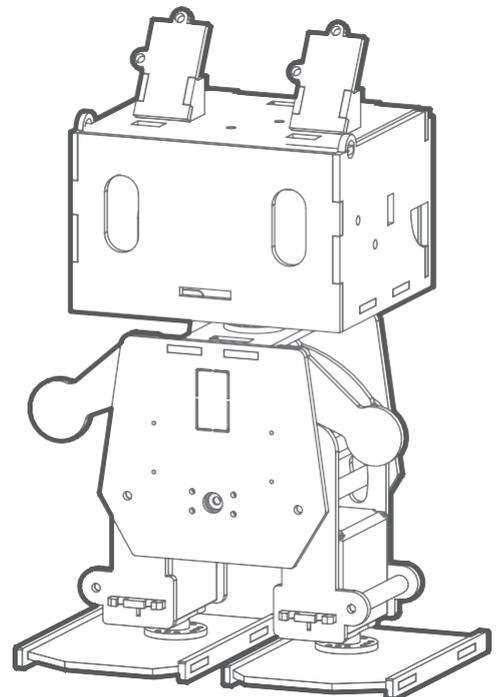


# ***Piccorobo*** **IoT**

Pre-assembled version manual

Ver.1.0



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## Introduction

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Thank you for purchasing Piccorobo IoT assembled version," Thank you". This manual describes how to use the robot. Please read this manual and use robot carefully.

·Please note, personal computer (PC) is necessary for operating this robot so this manual and other related documentary instruction assume that users are familiar with at least basic level of operating knowledge about PC. Therefore, any questions related to PC and or Wi-Fi devices themselves are out of support.

·This product does not include battery and charger. Please buy Ni-MH AAA battery and its charger by yourself

This product is supposed to be operated under connection to Wi-Fi. You can also operate it out of Wi-Fi but this will cause a part of function and sketch come to be failure.

※Please note that specification might be changed without notice due to outcome of improvement.

## Cautions

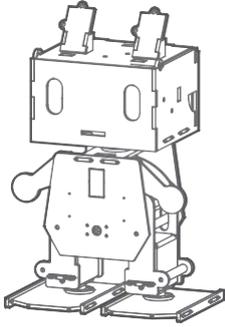
---

- Please make sure to keep out of the little child when use or assemble this product. Besides, please pay attention not to let the little child swallow small parts by any occasion.
- This product is not a toy. Please make sure to keep an eye on the site when the child touch or use this robot.
- Do not use or store this product under a high humidity environment or place otherwise unexpected condensation may occur.
- Please make sure to handle this product with any tools carefully..
- Do not disassemble or remodel servo motors as well as PCB because they are precision equipment so some failure, electric shock and fire are presumed.
- Do not place conductive things on the PCB because there is a risk of short, broken and fire of battery and circuit.
  - This robot might cause some unexpected behavior during the adjustment. For avoiding any possible bodily injury and property damage due to falling of this product, please keep enough space when handling it. Meanwhile, please mind your finger during every operation with the robot..
- When you join the connector to the PCB, check pin assignment carefully. It is risky if you make a wrong connection.
- Please mind any possible pinching of cables because disconnection and short are concerned.
- When disconnect the cables, please pull the portion of plug or connector. If you disconnect and reconnect by pulling the cord part, some unexpected electric shock and or fire might be caused by disconnection and short-circuit.

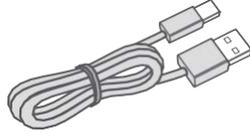
## Contents

Please refer to the check number

① robot bodyx1



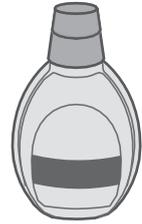
② USB cable (A to microB)x1



③ Part of the MDF (used for the optional accessories)



④ woodworking bond (used for optional accessories)x1



⑤ M3 screwx10(used for optional accessories)



⑥ M3 nutx10 (used for optional accessories)



⑦ M2 screwx4(used for optional accessories)

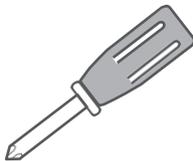


※ Screws and nuts those used for the optional accessories are necessary by installation of the separate sensor, please make sure to keep them safety.

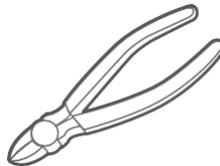
## Tools Required

This is used to change extensions or set of Piccorobo IoT. Please

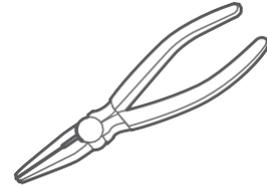
Plus driver No. 0, No. 1, No.2



Nippers



Radio



The following tools are used for expanding and modifying Piccorobo IoT. Please prepare by yourself.

First, you need to set up to make VS-RC202(the board) can be used with PC. Please refer to VS-RC202 manual for detailed instruction of set up.

■ VS-RC202 Manual

[https://www.vstone.co.jp/products/vs\\_rc202/download.html](https://www.vstone.co.jp/products/vs_rc202/download.html)

After finishing software set up, connect the board to your PC via USB port and following instruction as below to write sketch for adjusting axis of servo motors.

(Choose VS-RC202 sample sketch “vs-rc202\_set\_home\_position”)



Follow sequences as indicated below to write program into the board and you may succeeding in controlling the robot gradually.

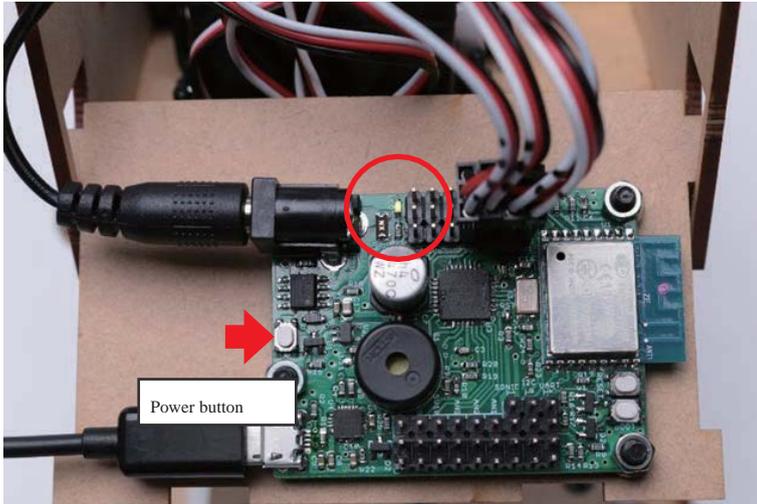
Note, an environment for accessing Wi-Fi will be necessary after you completed all following sequences..

Please keep a note of the SSID and password for the Wi-Fi router you want the robot to connect to in advance.

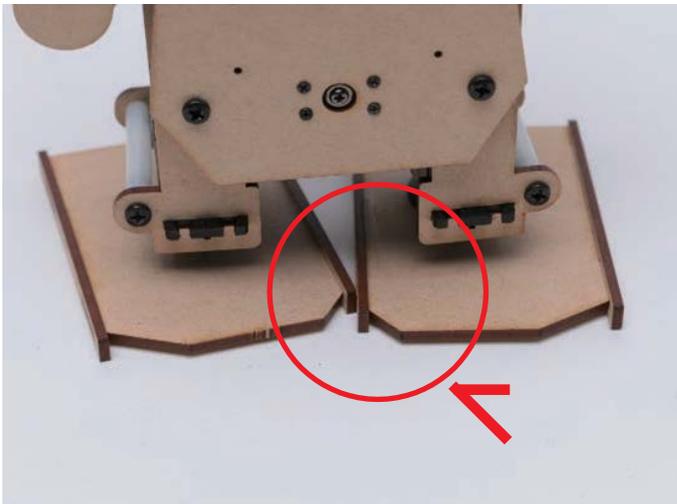
※Please use the 2.4GHz band.

### A) Power ON

Open the cover of the robot head and set Ni-MH AA battery in the battery box and connect DC plug into DC jack of the board. And then connect the board to your PC via USB, board will turn on and led will light.



In case of the power is ON, if the feet touch each other or spacer links hit the edge of the hole as shown below, take off the DC plug immediately. If you neglect such reaction, some damage to the servo motor might be caused.



If the feet touch each other or spacer links hit the edge of the hole, the servo horn is determined to be misaligned. Please reattach servo horn to the axis of the servo motor. Little misalign is no problem but please just make sure that feet do not touch each other as well as spacer links do not hit the edge of the hole

If the servo horn has been misaligned, please follow sequence as below to reattach it to the axis..

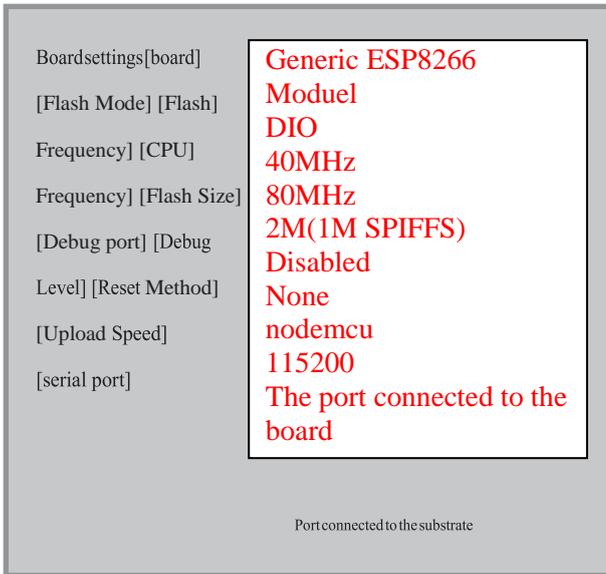
- ① Turn off the power of the board and remove the servo horn from the axis of the servo motor.
- ② Turn on the power of the board after removing the servo horn (servo motor axis will be home position).
- ③ When power is on, reattach the servo horn to the axis of the servo motor (Do not tighten the screw).
- ④ After turning off the power of the board, screw the servo horn.

It is OK, if no parts interfere with each other when power is ON. Go to next page.

## B) Board configuration on Arduino IDE

01. Start Arduino IDE, select the Tools> Board> Generic ESP8266 on menu bar, and select other settings as below.

※ Depending on your environment, it is possible that different information may be displayed.



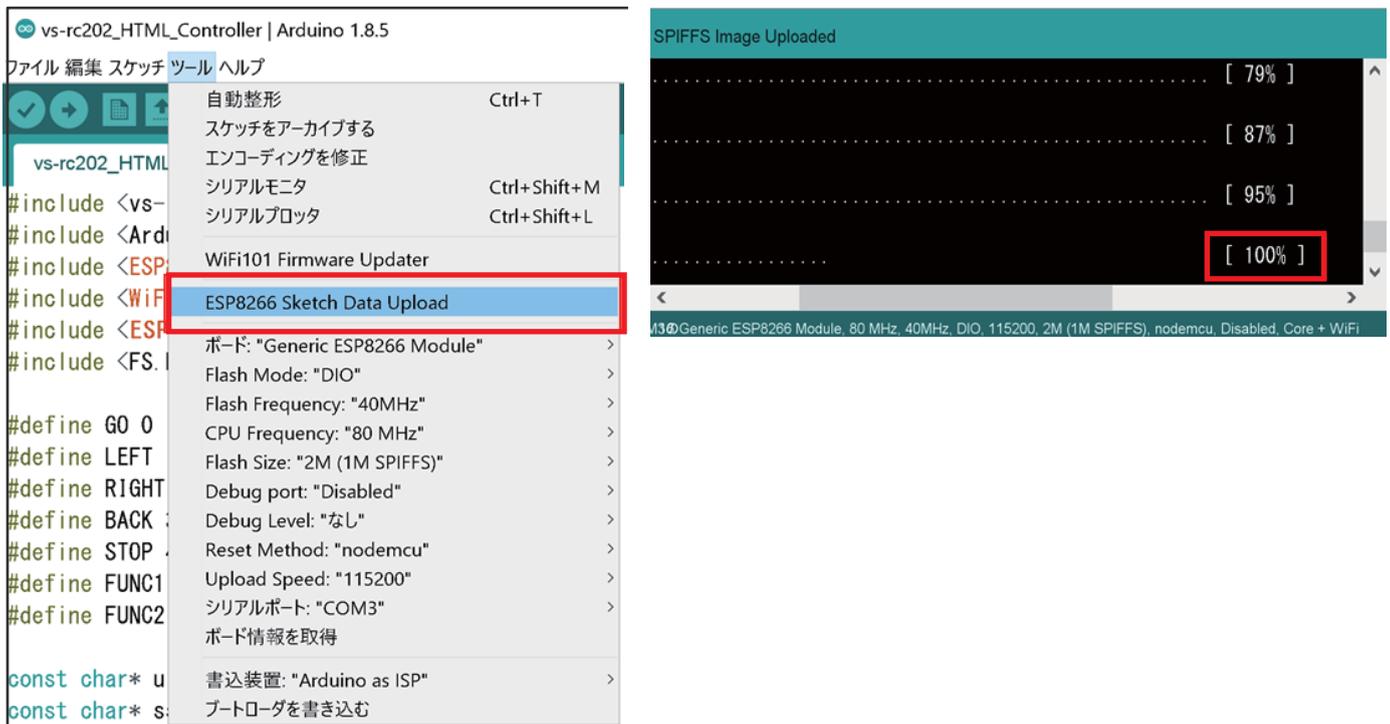
### C) Sketch uploading

Connected the board with your PC via USB and start Arduino IDE.

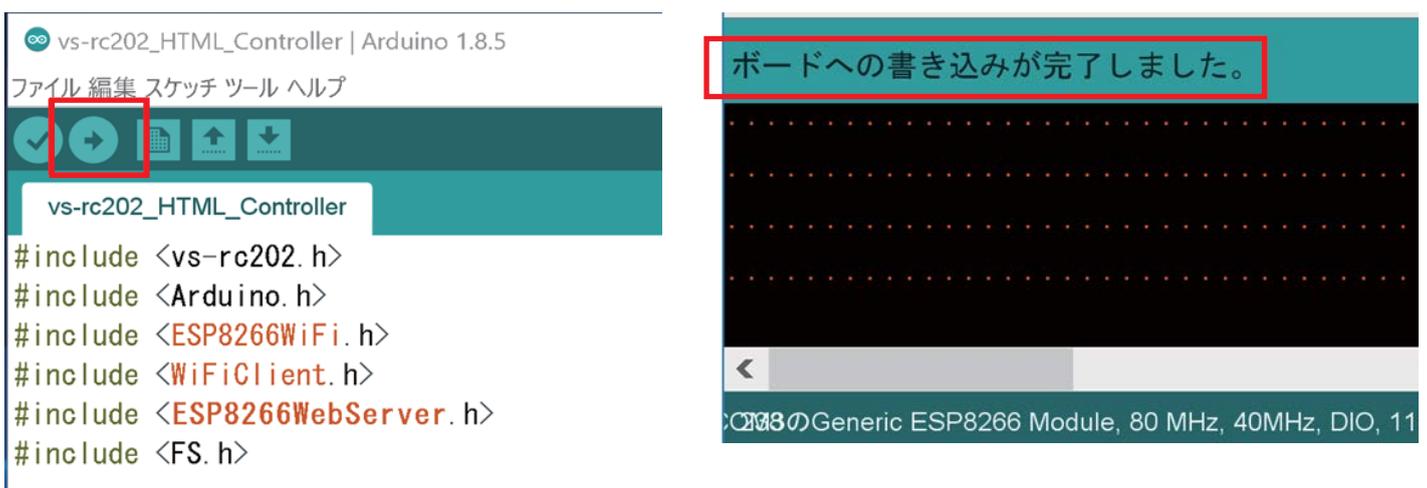
Select Files> sample sketch> VS-RC202> vs-rc202\_HTML\_Controller on menu bar and open sketch. And then select Tools> ESP8266 Sketch Data Upload and. After a while, you can see [ 100% ] on Arduino IDE prompt and it means file upload finished.

If ESP8266 Sketch Data Upload does not display, software setting has not been finished so please complete the initial settings by referring to the "software set up" on VS-RC202 Instruction Manual.

In this section, install HTML file which is displayed on smart phone in VS-RC202. When you want to install some files except of sketch, use this function. If you want to know about detail, please refer to the VS-RC202 manual.



Next, upload sketch in the board. Click arrow button. If sketch is written to the board successfully, the message "Done uploading" would be displayed. If error message is displayed, check the board settings and port selection.



It takes for a while to upload sketch. Do not unplug USB cable until the message "Done uploading" is displayed.

## D) Wi-Fi settings and servo motor adjusting

After checking sketch uploading has been done, Set up Wi-Fi configuration. You can find the line to describe SSID and password of your Wi-Fi router near the top of the sketch. Please write SSID and password of the Wi-Fi router.

```
vs-rc202_HTML_Controller | Arduino 1.8.5
ファイル 編集 スケッチ ツール ヘルプ
vs-rc202_HTML_Controller
#define FUNC1 5
#define FUNC2 6
const char* ui_path = "/index.html";
const char* ssid = "SSID";
const char* password = "password";
#define BUF_SIZE 10240
uint8_t buf[BUF_SIZE];
int led_onoff_flag = 0;
```

Then set the offset to correct the deviation of the servo horn. There is a function called "setServoOffset ()" to the 236 line in the sketch. By setting the initial position to the second argument of this function and adjust the deviation. The range of the second argument is -500 ~ 500.

[Example]

- setServoOffset (1, 100) // Set offset 100 to SV1(left foot)
- setServoOffset (2, 100) // Set offset 100 to SV2(right foot)
- setServoOffset (3, -50) // Set offset -50 to SV3(center)
- setServoOffset (4, 50) // Set offset 50 to SV3(head)

```
vs-rc202_HTML_Controller | Arduino 1.8.5
ファイル 編集 スケッチ ツール ヘルプ
vs-rc202_HTML_Controller
//SV9 and SV10 LED mode
servoEnable (9, 1); //Enable SV9 PWM
servoEnable (10, 1); //Enable SV10 PWM
setLedMode (9, 1); //Set SV9 LED mode
setLedMode (10, 1); //Set SV10 LED mode

//Offset
setServoOffset (1, 0);
setServoOffset (2, 0);
setServoOffset (3, 0);
setServoOffset (4, 0);
```

After describing the offset, upload sketch again. When upload is done, offset will be reflected. Change offset gradually (20 ~ 60 degrees) and modify to make robot stands straight.

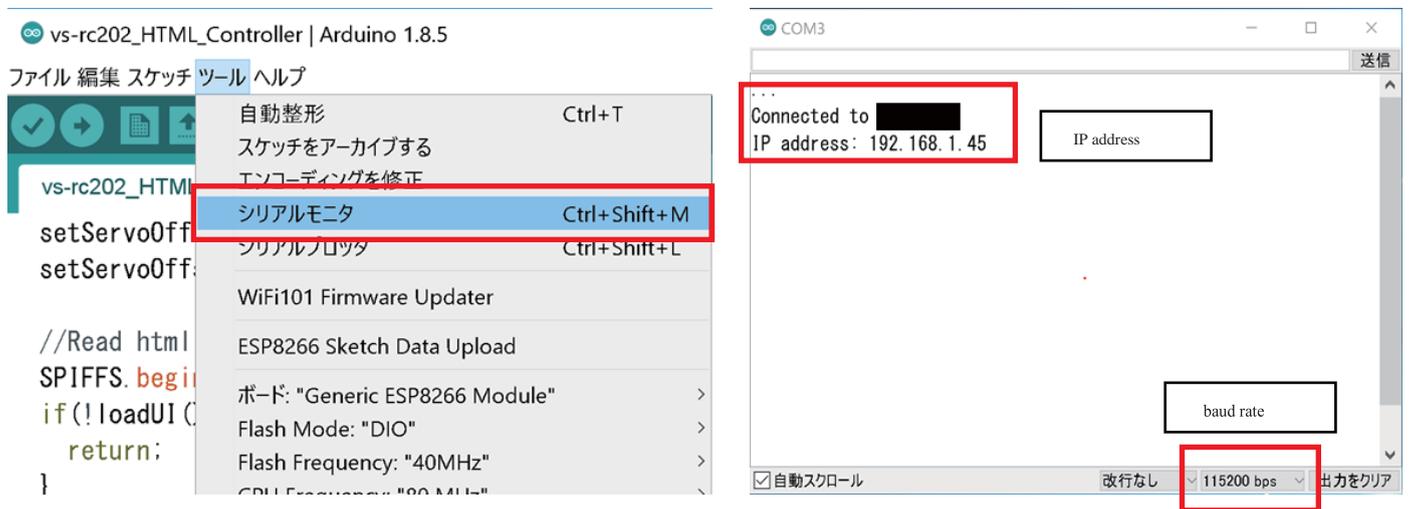
Since the axis of the servo motor is little bit loose, there is a possibility that cannot be modified straight. So just adjust that robot stands roughly straight. It is enough to walk.



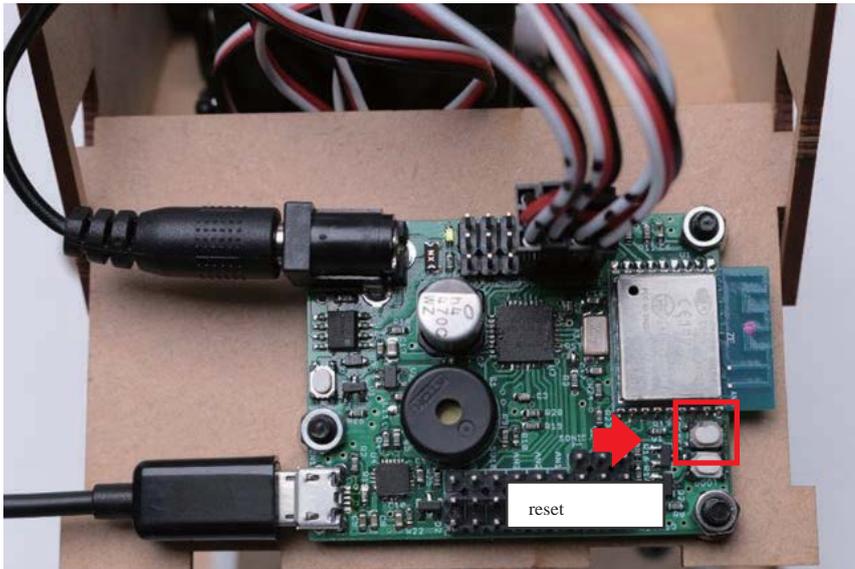
## E) Control robot with PC and smart phone

When you have finished the adjustment of the offset, let's try to move the robot. Open serial-monitor during connecting the board with your PC via USB cable. Select tools>serial monitor on Arduino IDE. If error message "espcomm\_upload\_mem failed" is displayed, it may be that port selection is wrong or USB cable is not connected to the PC.

Set the baud rate of the serial-monitor to 115200. When the SSID and password has been set successfully, IP address which assigned from the Wi-Fi LAN router would be displayed on serial-monitor as below.

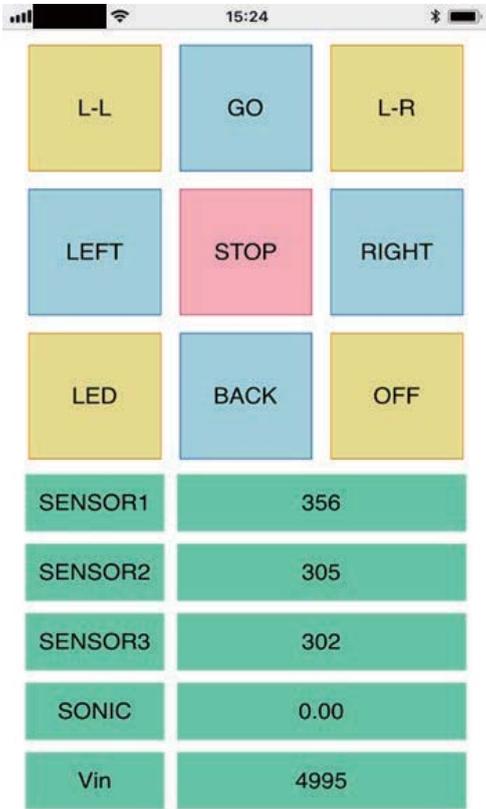


When nothing is displayed on the serial monitor, please press the reset button on the board.



Connect smartphone (or PC) to the Wi-Fi router which the robot is connected to and launch the browser. And then Enter IP address displayed on the serial monitor in the URL field and go to the robot controller page. If you connected your device to the Wi-Fi router successfully, you will see the page as below. If the page is not displayed, please check and verify whether any miss typing with IP address or power of robot might be not on.

Once the HTML is displayed properly, unplug the USB cable from the board and close the head of the robot. After the second time the board will get IP address automatically even though disconnected with the PC. If you cannot open the robot controller page, it is possible that the IP address assigned to the board by the Wi-Fi router has been changed. In the case, check the new IP address on serial monitor again.



Operation	
method[LL]	Turn around the left
[LR]	Turn around the right
[GO]	Advance Left
[LEFT]	
[RIGHT]	
[BACK]	
[STOP]	
[LED]	
[OFF]	
[SENSOR1]	
[SENSOR2]	
[SENSOR3]	
[SONIC]	
[Vin]	

**Functions**

[L-L] See the left side

[L-R] See the right side

[GO] Go forward

[LEFT] Turn to the left

[RIGHT] Turn to the right

[BACK] Go back

[STOP] Stop

[LED] LED ON/OFF (SV9,10)

[OFF] Power OFF

[SENSOR1] Display the value of AN1

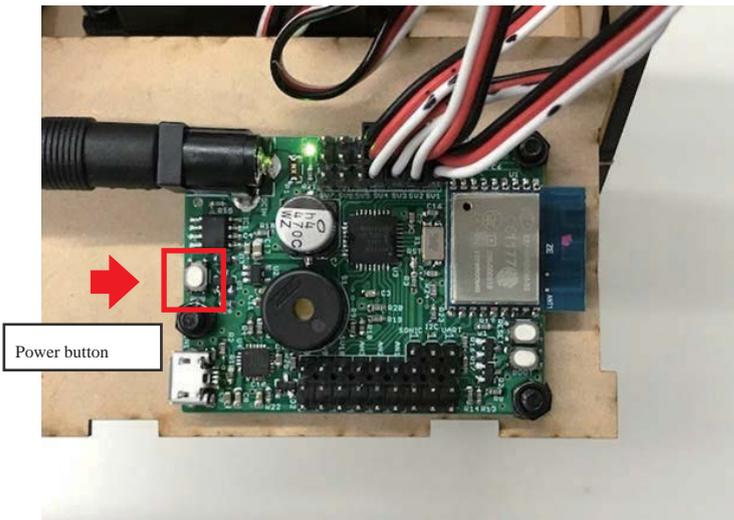
[SENSOR2] Display the value of AN2

[SENSOR3] Display the value of AN3

[SONIC] Display the value of ultrasonic sensor

[Vin] Display the current supply power voltage[mV]

If you try to turn off the power of the robot manually, press button for more than 3 seconds and release it. However, power won't be off as long as the robot keeps connecting with a USB cable which please note.



## 04 Further practice

After you learn basic usage of the Piccorobo IoT, let's learn the advanced programming with reference to the VS-RC202 manual.

You can download the manual from the following URL.

And you can also download the robot example using VS-RC202. Check it.

[https://www.vstone.co.jp/products/vs\\_rc202/download.html](https://www.vstone.co.jp/products/vs_rc202/download.html)

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## 05 FAQ

- Cannot find Generic ESP8266 Module from board manager in the Arduino IDE.

→ Install the configuration file of ESP8266 in accordance with instruction as on P16 of the VS-RC202 manual.

- Cannot upload sketch to board with the Arduino IDE.

→ It is possible that board selection or com port selection is wrong or USB cable is not connected.

- Robot controller page is not displayed on browser.

→ Make sure that SSID and password of the Wi-Fi router in the sketch and IP address in URL field you entered are correct. (Note) <http://> might be needed to enter prior to IP address by some browser.

- Settings of router and IP address are correct but the robot controller page is not displayed on browser.

→ You might have forgotten to upload the HMTL file to the board. Upload the HTML file in accordance with instruction on P18 of the VS-RC202 manual.

- Servo motor does not work properly.

→ There is a possibility that you mistook the order of the servo motor pin connection to the board. Turn off the power immediately and check the order of the servo motor pin connection.

- Abnormal noise from the servo motor.

→ There is a possibility that the servo motor is locked or is under a condition of heavy load. Turn off the power immediately and check the course of the loading like if feet touching each other.

- Response of the robot is bad.

→ When you operate the robot with browser, some delay might occur because of a weak wireless communication environment or something like interfering data is transferring.

- The robot turns off suddenly.

→ The board automatically turns off its power for safety when battery voltage falling down less than a predetermined voltage or the board is under big electrical load because of connecting many servo motors and or motor might be locked..