



How to build your robot

www.pib.rocks/build

assembly instructions for:

Motor Calibration

pib#4



PRINT

BUILD

DEVELOP

YOUR OWN ROBOT

Important note

In order to use the motors for pib's movement it is important to **calibrate** them before building them into pib.

Pib has two different motors build in, in total **14** and **25** if 2 arms. They can be calibrated in the same way.

For this tutorial you will need the shown parts from the table. Additionally, we suggest to first build **pib's head** and install the **software to the Raspberry Pi** as you will need to use this for the calibration.

You can find the tutorials here:

<https://pib.rocks/build/how-to-build-pibs-head/>

<https://pib.rocks/build/how-to-install-raspberry-pi/>

Non-printable parts

10 x **E07**-MG996R

2 x **E09**-DS225

3 x **E15**-DS5180SSG

1 x **E13**-SPL-82

1 x **E14**-Power_Supply-cable

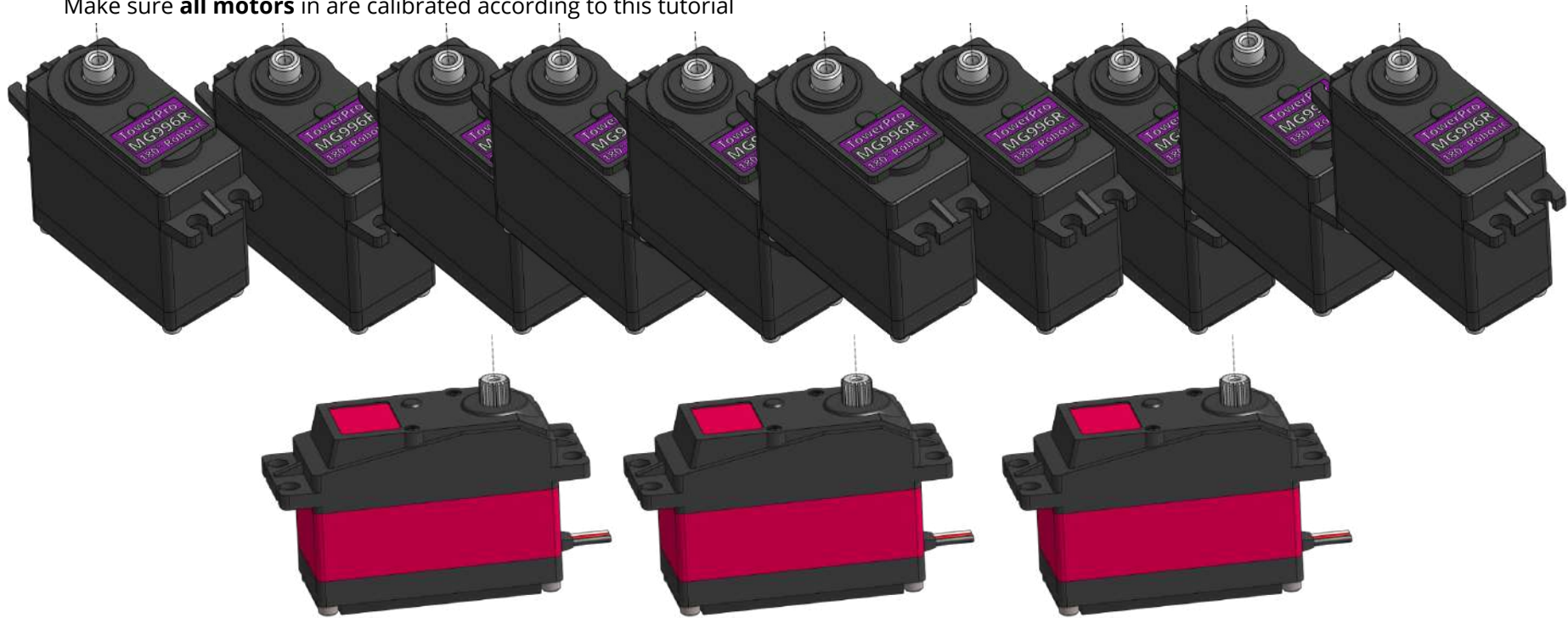
1 x **E03**-TinkerForge ServoBricklet 2.0

1 x **Bricklet cable**

10 cm (red-black) **power cable**

Step 0

Make sure **all motors** in are calibrated according to this tutorial



Step 1a



1



Connect output jack of **E14 power supply** into **E20 power jack**, Cut 10 cms from red and black wires, strip both ends insert **wires** on the other side of the jack



Step 1b

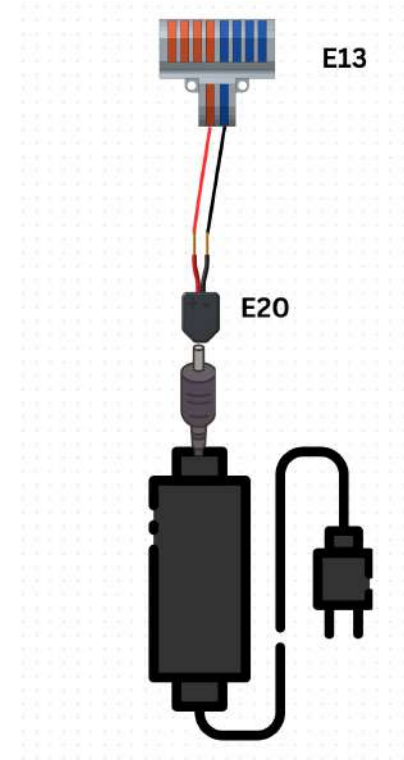
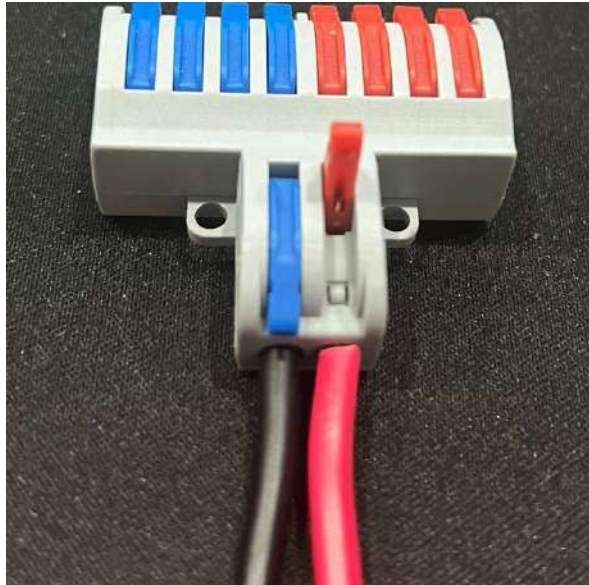


Pull the red and blue switches in **E13** (T-Connector), insert wires coming out of power supply jack and then close them.



Make sure to place the wires in the correct switches:

- ✓ **Red** wire to **red** switch
- ✓ **Black** wire to **blue** switch



Step 2

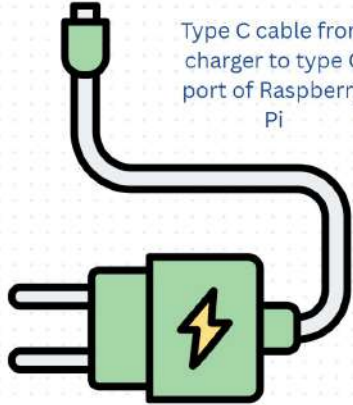
Connect the raspberry pi power supply with the type-C connector to type-C port in raspberry Pi

1

E01 - Raspberry Pi 5



Type C cable from
charger to type C
port of Raspberry
Pi



E16 - Raspberry Pi power brick 5V



Wire is highlighted in **yellow**
but its original color is **black**

Step 3a

Cut **10 cm** of the red-black **power cable** and insert them to the **E03 TinkerForge ServoBricklet**.

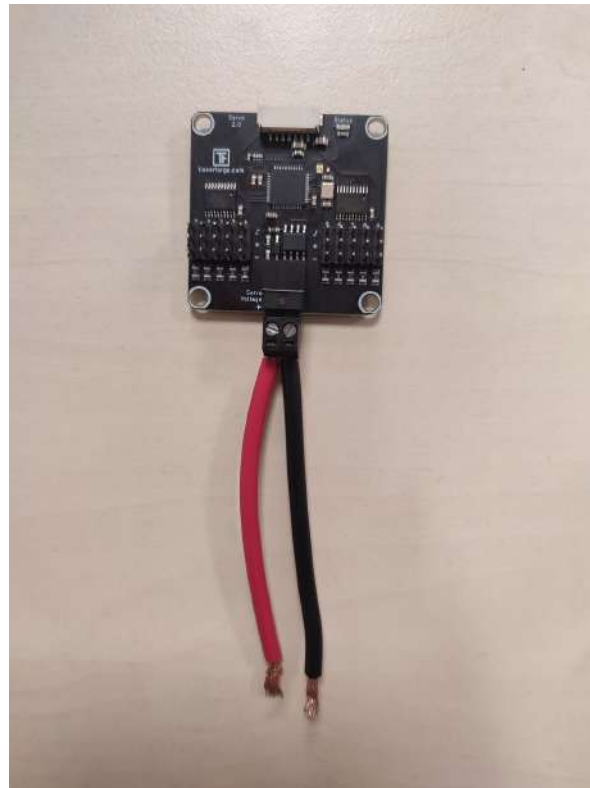


1



Make sure to place the wires in the correct switches:

- ✓ **Red** wire to **+ Symbol** (left spot)
- ✓ **Black** wire to **- Symbol** (right spot)



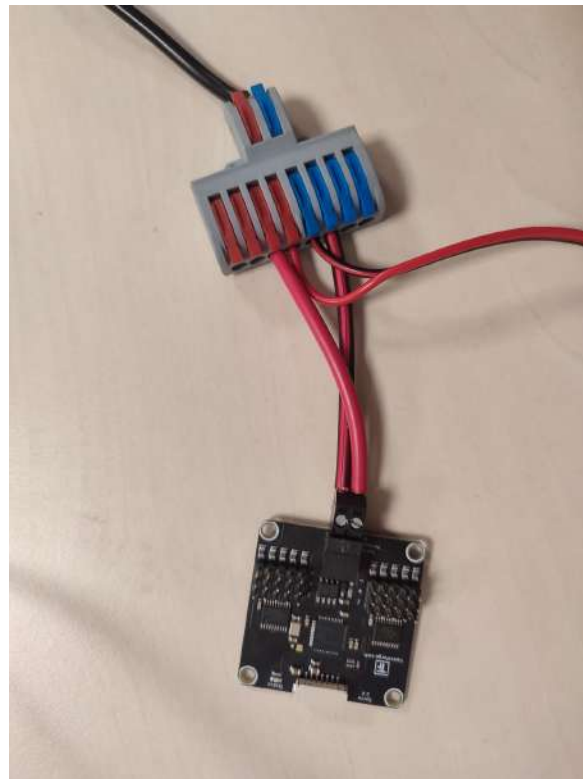
Step 3b

Now you can insert the cables to the T-Connector.



Make sure to place the wires in the correct switches:

- ✓ **Red** wire to **red** switch
- ✓ **Black** wire to **blue** switch



Step 4



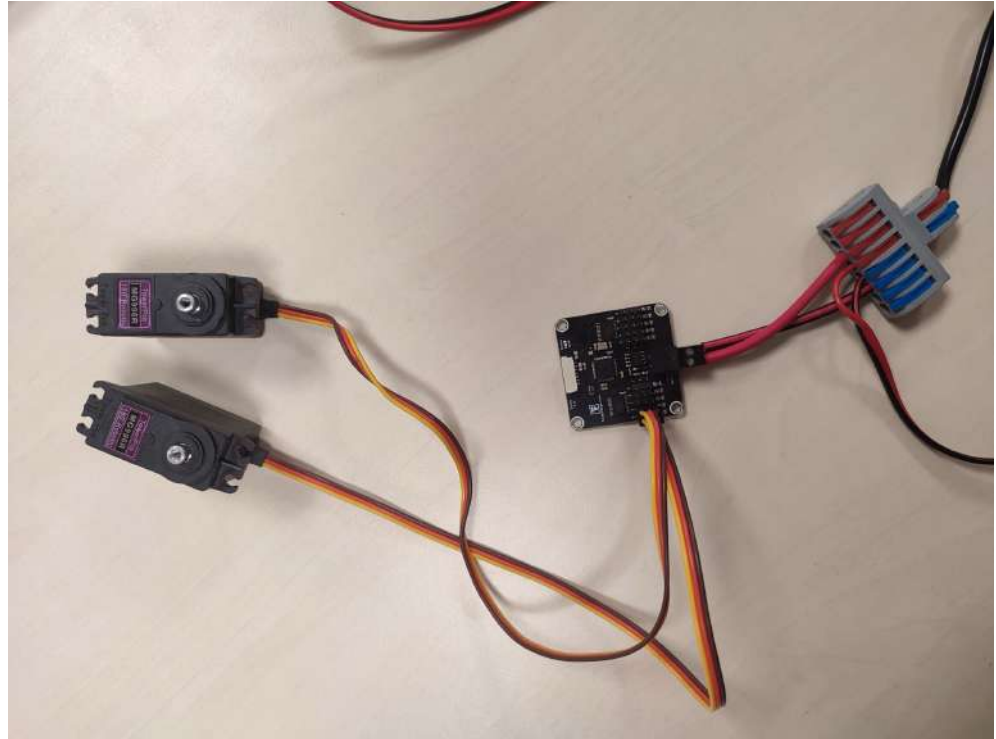
Now, we can connect the motors to the ServoBricklet.

Please note that only 2 motors are connected for illustration but you should calibrate all motors, You can add 10 motors at the same time - there are 10 slots for motors on the ServoBricklet



It is also important to have the correct orientation here:

- ✓ **Yellow** cable to **S Symbol**
- ✓ **Orange** cable to **+ Symbol**
- ✓ **Brown** cable to **- Symbol**



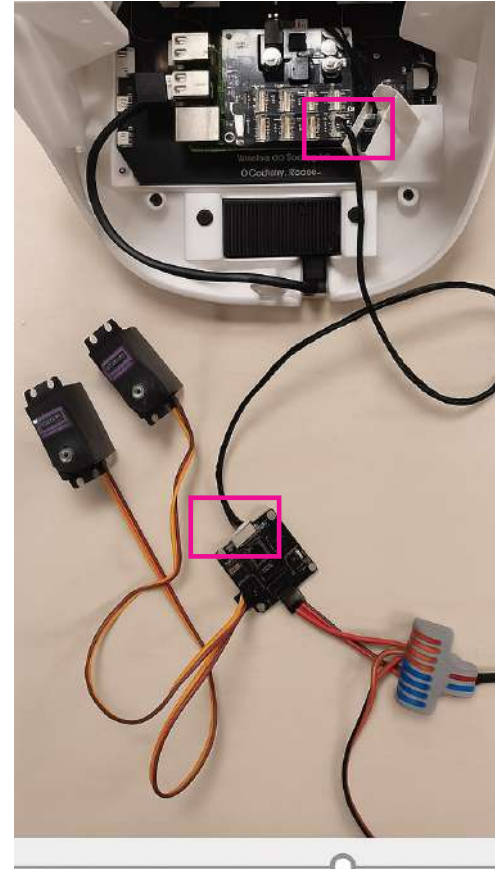
Step 5

Connect the **bricklet cable** to the **TinkerForge HAT** in the head and then to the **TinkerForge ServoBricklet**.

Please note that the Tinkerforge Hat doesn't need extra power connection it is only connected via GPIO as in head tutorial

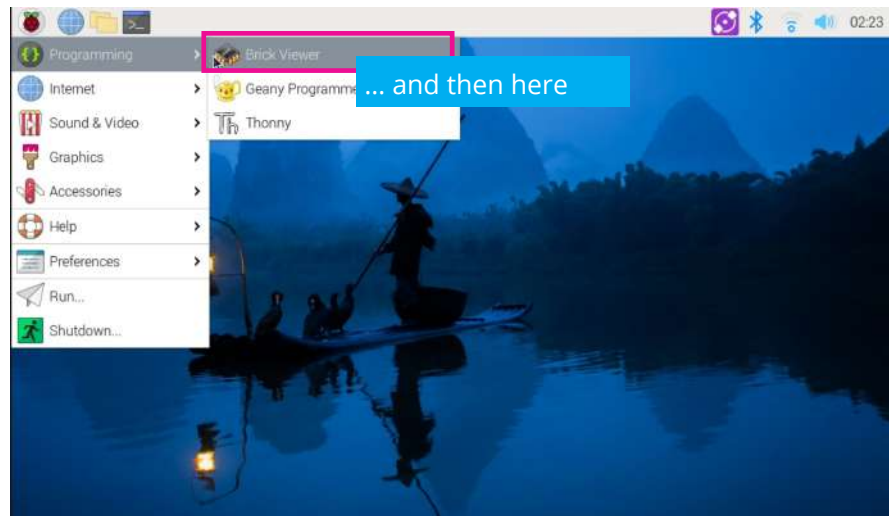
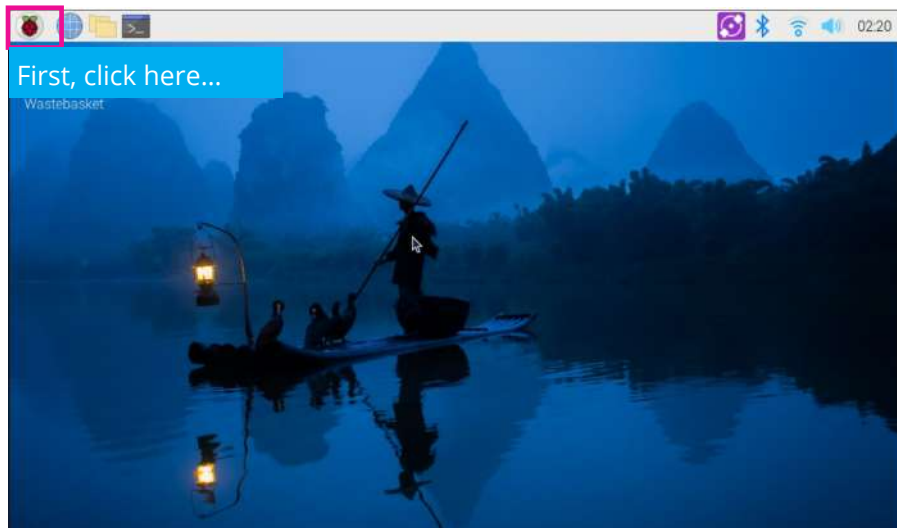


Use slot A



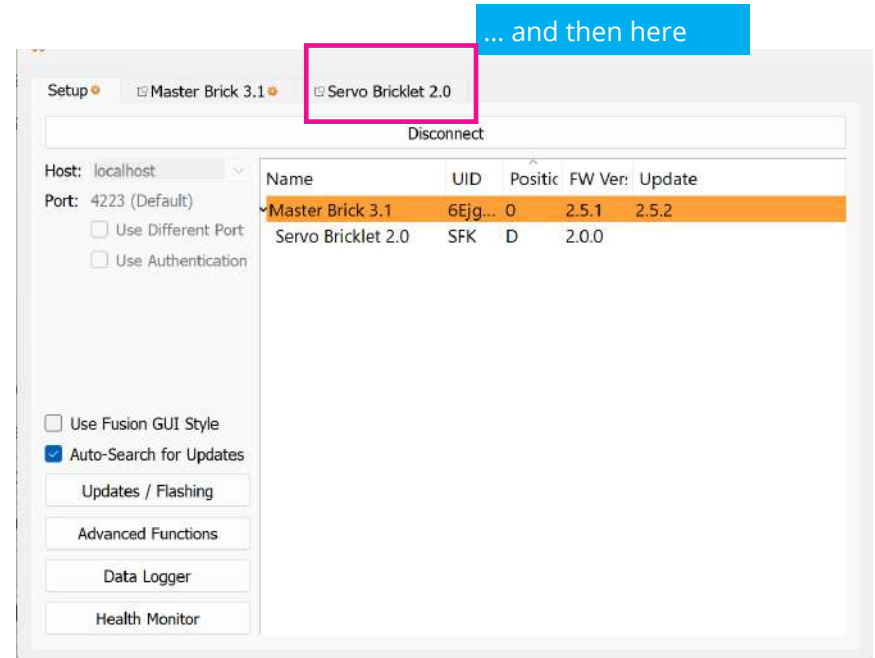
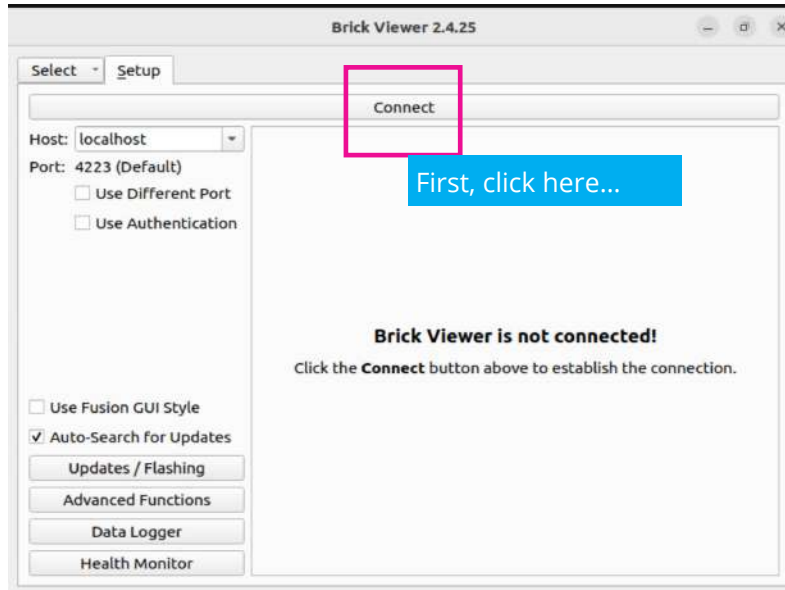
Step 6

Plug the power cable into the power supply and start Raspberry Pi OS. - **turn on pi**
Open the **Brick viewer** application.



Step 7

Click "**Connect**" and navigate to the tab "**Servo Bricklet 2.0**"



Step 8



Select "**All Servos**" and change the values as shown.

Other values are not important and do not need to be changed.

You will hear a sound from the motors once you changed the values – that is the calibration! The motors have switched to a 0-Position!

Select "All Servos"

Click on enable to power motors

Setup Master Brick 3.1 Servo Bricklet 2.0

UID: SyW FW Version: 2.0.0 Update Timeouts: 0 Status LED: Show Status Reset More

All Servos Enable

Current Consumption:

Pulse Width min/max (µs): 700 / 2500

Degree min/max (°/100): -9000 / 9000

Position (°/100) Velocity (°/100s) Acceleration (°/100s²) Deceleration (°/100s²) Period (µs)

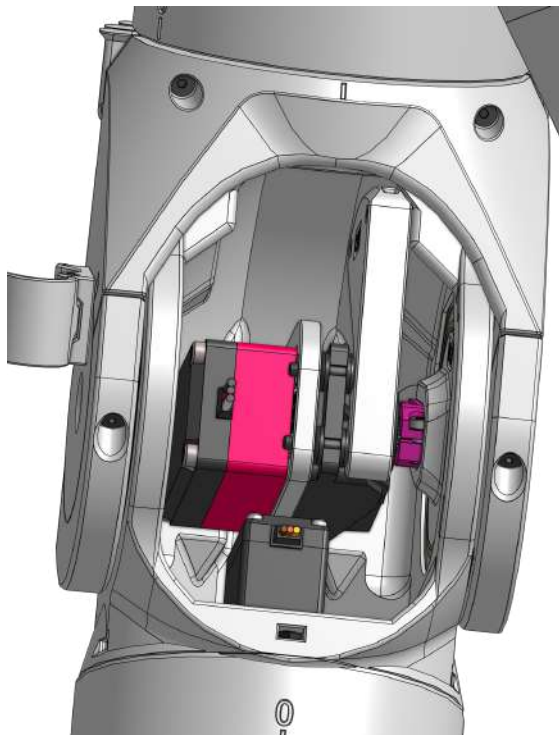
0 100000 50000 50000 19500

Input Voltage: 0V

Ena	Pos	Vel	Cur
0	On		
1	On		
2	On		
3	On		
4	On		
5	On		
6	On		
7	On		
8	On		
9	On		

Step 8

For 1 **E15-DS5180SSG** that will be used in elbow, set it to **5500** not to **0** position
(if you are using a 2 arm pib you will need to calibrate 2 of these motors)



Click on enable to power motors

Brick Viewer 2.4.22

Setup Master Brick 3.1 Servo Bricklet 2.0

UID: SyW FW Version: 2.0.0 Update Timeouts: 0 Status LED: Show Status Reset More

Servo 8 Enable

Current Consumption: 0mA

Pulse Width min/max (µs): 700 / 2500

Degree min/max (°/100): -9000 / 9000

Position (°/100) Velocity (°/100s) Acceleration (°/100s²) Deceleration (°/100s²) Period (µs)

5500 100000 50000 50000 19500

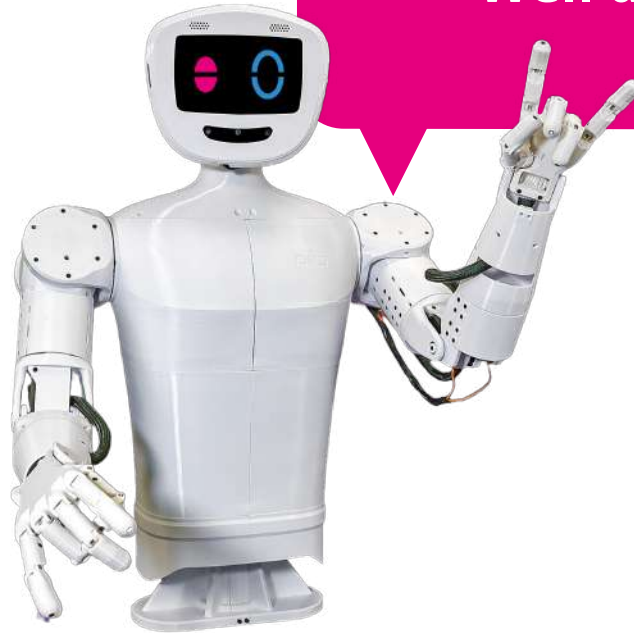
Input Voltage: 0V

Ena	Pos	Vel	Cur
0	Off		
1	Off		
2	Off		
3	Off		
4	Off		
5	Off		
6	Off		
7	Off		
8	On		
9	Off		

Congratulations

Remove the calibrated motors,
connect the remaining motors
and repeat step 6-8, until you have
calibrated **all motors**

Once finished, you can disassemble most
parts as you will need the T-Connector,
bricklet cable, motors and so on
in the other tutorials.



Well done!

Do you need support?

Or do you need our pib.Box with all non-printable parts?

Or maybe you have some new ideas and improvements?

Please contact us.



team@pib.rocks

Send us an email.



discord.com/invite/GRdpyeDu7P

Join us on Discord.



shop.pib.rocks

Order non-printable parts for pib.