

# Robot-Arm-Assembly-Kit

## Calibration

Robot 02



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## 1. Introduction & general informations

Dear customer,

to ensure you a perfect product, it is necessary to calibrate the servo-motors in their position before you assemble them.

This is necessary due to its technical construction. The motors are limited in their operating angle. Therefore it is necessary to define a preset position before you assemble the motors into the robot arm. This ensures that you can use the maximum range of motion and avoids unexpected problems

## 2. Connecting the motors & using the right values

For a perfect servo-motor calibration, these should be positioned on a value of 1500.

The working angle of the last servo (the claw) has a small deviation from the working angle of the other motors.

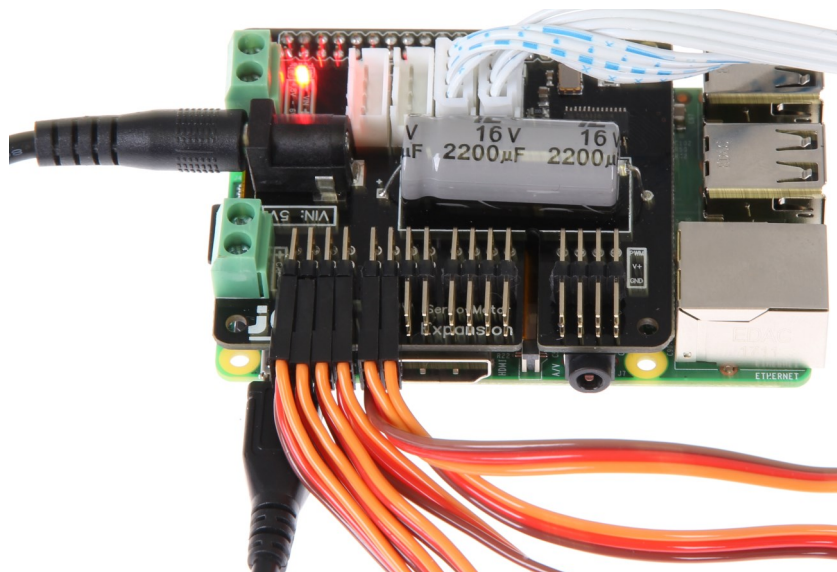
Therefore this motor should be set to 1600.

Connect the motors to the channels 0-4 of the motor-control-unit.

The claw-motor should be connected to channel 5.

Connect all motors to the control unit as seen in the image below.

**Warning!** You should only connect the motors when there is a controller-joystick-unit connected to the device to avoid unexpected movements.



### 3. Code to calibrate the motors

You can calibrate the motors with the following code.

Please note that you need to connect the motor, which you are going to use for the claw, to channel 5. Read the previous chapter for more information.

This code requires the installation of our modified library.

If you haven't installed it yet, you can download the library [here](#).

Beforehand, execute the following commands to install the dependencies.

```
sudo apt-get install python3-pip
```

```
sudo pip3 install smbus
```

Copy now the folder to your Raspberry Pi, navigate into the folder and install the library with the following command:

```
sudo python3 setup.py install
```

Now you need to create a new file with the following command:

```
sudo nano calibrate.py
```

You can now write the code from the next page to the file.

```
from __future__ import division
import time
import Adafruit_PCA9685

# Initialise with alternative address
pwm = Adafruit_PCA9685.PCA9685(address=0x41)

# define the minimum & maximum pulselength
servo_min = 150 # Minimum pulselength
servo_max = 600 # Maximum pulselength

# Helper-function
def set_servo_pulse(channel, pulse):
    pulse_length = 1000000
    pulse_length /= 50
    print('{0}us per period'.format(pulse_length))
    pulse_length /= 4096
    print('{0}us per bit'.format(pulse_length))
    pulse *= 1000
    print(pulse_length)
    pulse /= pulse_length
    print(pulse)
    pulse = round(pulse)
    print(pulse)
    pulse = int(pulse)
    print (pulse)
    pwm.set_pwm(channel, 0, pulse)

# set frequency to 50 MHz
pwm.set_pwm_freq(50)

# Set Servo 0-4 to position 1500
# Set Servo 5 to position 1600
set_servo_pulse(0,1.5)
time.sleep(1.5)
set_servo_pulse(1,1.5)
time.sleep(1.5)
set_servo_pulse(2,1.5)
time.sleep(1.5)
set_servo_pulse(3,1.5)
time.sleep(1.5)
set_servo_pulse(4,1.5)
time.sleep(1.5)
set_servo_pulse(5,1.5)
time.sleep(1.5)
```

You can save the file with the combination **CTRL+O** and leave it with **CTRL+X**.

Start the calibration with the following command:

```
sudo python3 calibrate.py
```

#### 4. Easy calibration with the calibration tool



You can also use the calibration tool which is sold separately.

With this device, you can calibrate your motors easily and quickly without connecting them to your Raspberry Pi.

## 7. Service & Contact

**We also support you after your purchase.**

If there are any questions left or if you encounter any problems, please feel free to contact us by mail, phone or our ticket-supportsystem.

**E-Mail:** [service@joy-it.net](mailto:service@joy-it.net)

**Ticket-System:** <http://support.joy-it.net>

**Phone:** +49 (0)2845 98469 – 66 (11- 18 Uhr an Werktagen)

For more informations, visit our website

**[www.joy-it.net](http://www.joy-it.net)**

Find latest downloads at

<http://downloads.joy-it.net>

## Declaration of conformity

As manufacturer we, the Joy-IT Europe GmbH, declare that our product Robot02 matches the essential requirements during the intended use:

EMV-Richtlinie 2014/30/EU RoHS-Richtlinie 2011/65/EU

You can request the detailed declaration of conformity at the following address:  
JOY-IT Europe GmbH , Pascalstr. 8, D-47506 Neukirchen-Vluyn or by mail [service@joy-it.net](mailto:service@joy-it.net)

13.07.2017 Yue Yang director



Warning. This declaration of conformity only applies for our delivered components of the kit. The motors keep the conditions of the EMV guideline during the use of the declared voltage. By adding own parts, you become the manufacturer and need to ensure that your device matches the regulations.