

WP5335 Servo

Overview

Introduction

The WP5335 is a high-performance PWM-controlled digital servo with a compact form factor that is reliable and durable. The servo has a fast response speed and a high torque output with a stall torque of up to 35kg.cm. In terms of control, the servo adopts the control signal of pulse width modulation, which can achieve an angle control range of 180°. Its internal control system uses a digital comparator architecture to ensure precise angle control and stable performance. At the same time, the servo is also equipped with an electronic protection function, which can automatically output protection torque during stalling, effectively protecting the safe operation of the servo and the system. WP5335 is suitable for robots, robotic arms, RC vehicles, remote control engineering models, and other application scenarios that require high performance and durability.

Features

- **High Torque Output:** With 7.4V operating voltage, the stall torque can reach 35kg.cm
- **Copper-Aluminum Gears, Dual Ball Bearings:** Adopts a combination of copper and aluminum teeth, and the gear shaft is thickened to 2.0. Optimized center distance, double ball bearing design, longer life.
- **Digital Comparator:** With a digital comparator control system, it realizes precise angle control and positioning to ensure accurate and stable movement.
- **High Flexibility:** With a 180° rotation angle and adjustable control parameters, it can adapt to various needs.

Specifications

WP5335 Parameters					
Electrical parameters	Operating voltage range	4V-8.4V	Mechanical specifications	Dimensions	55*20*43(mm)
	No-load speed	0.192sec/60° (52RPM)@7.4V		Mechanism limit angle	Unlimited
	No-load current	180mA@7.4V		Bearing type	Ball bearing
	Stall torque	35kg.cm@7.4V		Weight	67±1g
	Stall current	3.9A@7.4V		Output shaft	25T/5.9mm
	Static current	6mA@7.4V		Reduction ratio	1/356
	Rated load	11.8kg.cm@7.4V		Gear backlash	≤0.5°
	Rated current	1200mA@7.4V		Linkage play	0°
	Kt constant	10kg.cm/A		Angle sensor	Carbon film potentiometer

Pinout Definition

Name	Color	Description
GND	Brown	Power Negative
VCC	Red	Power Positive (4-8.4V)
Signal	Yellow	PWM control signal input

Control Features

- Control signal: PWM
- Control system type: Digital comparator
- Operating angle: 180°
- Bilateral angle difference: $\leq 1^\circ$
- Centering Deviation: $\leq 1^\circ$
- Neutral position: 1500μsec
- Dead band width: $\leq 4\mu\text{sec}$
- Pulse width range: 500→2500μsec

Working with Raspberry Pi

You can use the [Servo Driver HAT](#) in conjunction with a Raspberry Pi to drive the WP5335 PWM servo.

Power Supply Description

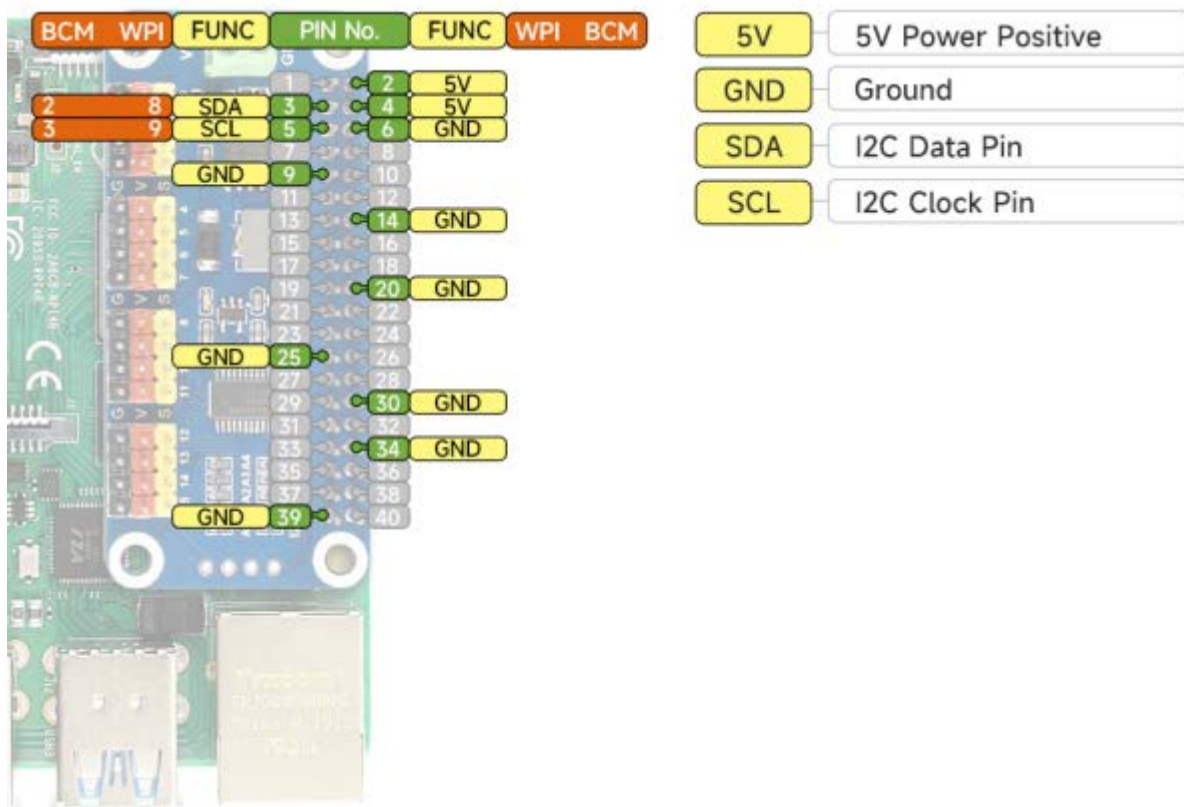
- Connect the battery to the extension board and servo through the green terminal (VIN and GND) on the right. The input voltage range of this terminal is 6~12V. The input voltage is regulated by the onboard 5V voltage regulator to provide a 5V power supply to the servo, with a maximum output current of 3A.

- Please use independent power supply for Raspberry Pi and do not reverse power supply from the servo expansion board to Raspberry Pi, as such power supply is unsafe.

Note: If connecting a high-power servo, there may be insufficient power supply because the entire board is powered by 5V. This 5V powers both the Raspberry Pi and the servo. If the power is too high, it can lower the Raspberry Pi's 5V power supply, causing under-voltage and a reboot of the Raspberry Pi. Remove the on-board 0R resistor and connect the right-side green VIN terminal to an external power source (6-12V).

Hardware Connection

According to the figure below, the 40PIN interface of the Servo Driver HAT is defined as follows:



- **Connection between Servo Driver HAT and Raspberry Pi**

Servo extension board pins	Raspberry Pi pins	Description
VCC	3.3V or 5V	Expansion board power supply (3.3V recommended)
GND	GND	Shared ground
SDA	SDA (GPIO2)	I2C data pin
SCL	SCL (GPIO3)	I2C clock pin

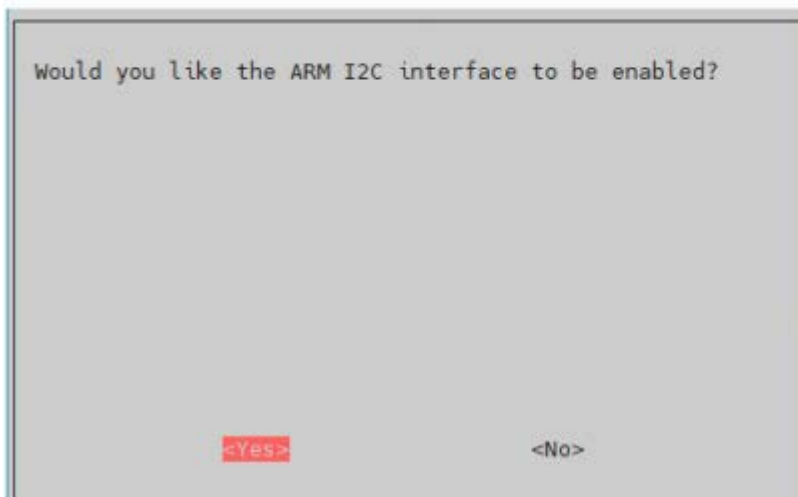
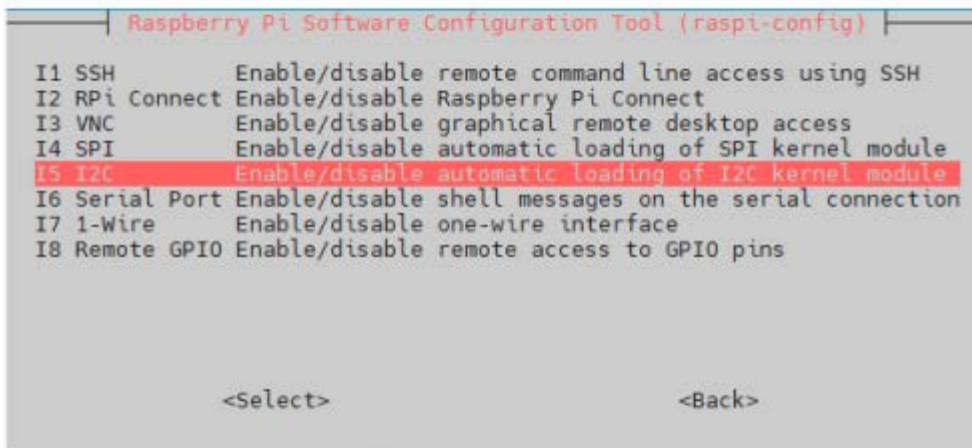
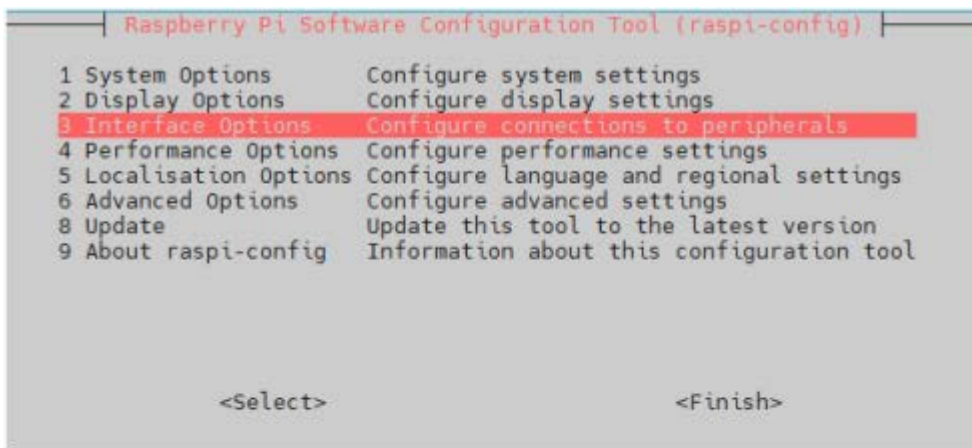
Software Configuration

Enable I2C Interface

Open the Raspberry Pi terminal and input the following command to enter the configuration interface:

```
sudo raspi-config
```

Select "Interface Options" -> "I2C" -> "Yes" to enable the I2C interface



After startup, enter the following command to restart the Raspberry Pi:

```
sudo reboot
```

Python Demo

1. Download the demo and unzip it

```
sudo apt-get install p7zip-full
Wget https://files.waveshare.com/wiki/common/Servo_Driver_HAT.7z
7zr x Servo_Driver_HAT.7z -r -o./Servo_Driver_HAT
sudo chmod 777 -R Servo_Driver_HAT
cd Servo_Driver_HAT/Raspberry\ Pi/
```

2. Run test demo

```
#If it is python2
cd python/
sudo python PCA9685.py
#If it is python3
cd python3/
sudo python3 PCA9685.py
```

Result: The servo is connected to channel 0, and the servo of channel 0 rotates from 0° to 180°, then from 180° to 0°, and the cycle is repeated.