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DF15RMG Tilt Kit (20kg)

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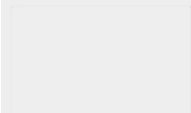
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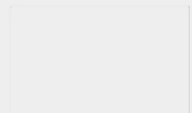
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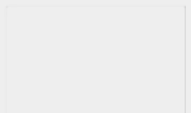
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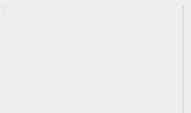
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INTRODUCTION

This is a most powerful standard servo motor from DFRobot so far. A servomotor is a rotary actuator that allows precise control of angular position. This is specifically designed for the robotics application which requires high quality in a variety of the servo features.

The DF15RMG standard servo equips two pairs of the servo shells. One is a standard shell with four M4 mounting holes. And the other one includes a shell with double bearing which is specially designed for the application of the robot arm or the joints. The shells of this kit are thickened to make it stable enough for motion system.

The torque of this servo is about 19kg.cm at 7.4v power supply. Using the Arduino servo library, you could drive this servo motor easily. To reduce the consumption of your microcontroller, this servo has a lock function for the pulse detection. So driving it to a target position just requires one PPM controlling signal.

SPECIFICATION

Mechanical Specification

- Rotation angle range: 170°
- No-load speed:60°/0.16s @7.4v
- Stall torque:19.3kg.cm (7.4v)
- Dynamic torque:15.1kg.cm (7.4v)
- Gear:steel,copper mixed gear
- Assembly method:fastening with double layer 4 screws
- Equip 2 pairs of shells,2 metal servo horns and 2 servo support
- PPM Driven
- Teeth: 25
- Size: 40x40x20 (mm)(1.57x1.57x0.79")
- Horn Diameter: 20mm/0.79"
- Weight: 65g

Electrical Specification

- Working Voltage: 5-7.4v
- Stall current:3A(@8.5V - Limit test)
- PWM Voltage:3V-5V
- PWM Resolution:2us
- PWM driver frequency:50-330hz
- Range of PPM positive pulse width:400us-2550us
- Minimum value of PPM negative pulse width:400us

Cable Definition

- Brown - GND
- Red - VCC
- Orange - Signal(PPM input wire)

DOCUMENTS

- [Servo library](#)
- [Standard mode dimension](#)
- [Robot arm mode dimension](#)

SHIPPING LIST

- DF15RMG Servo x1
- A pair of standard shell x1
- A pair of shell with bearing x1
- M2 self-tapping screws x7
- M3 black round head screws x10
- short U-sharp servo bracket x1
- long U-sharp servo bracket x1

REVIEW

FAQ

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DFRobot

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 n the discussion...



Shane

• 7 months ago • edited

Hi, I got one of these and I'm confused about the PPM width to angle resolution. Does 400us correspond to 0 deg and 2550us corresponds to 170 deg? If so, the resolution become 12 64705882us for 1 degree, which would be absurd to implement. Can DFRobot clarify what pulse width is 0 deg and 170 deg, and what should be the resolution for 1 deg?

 • Reply • Share





Shane → Shane • 7 months ago • Edited

For others who are looking for more accurate information. I found that copying and pasting description from the Chinese version of the DFRobot to Google translate works well.

<https://www.dfrobot.com.cn/>

Mechanical properties

Size: 40mm×20mm×40.5mm

Mass: 65g

Mechanical rotation angle range: 180°

No-load speed: 60°/0.16s (7.4v)

Locked-rotor torque: 19.3kg.cm (7.4v)

Dynamic torque: 15.1kg.cm (7.4v)

Gear: Steel and copper hybrid gear

Protection device: 2 special copper sleeves

Standard metal rudder disc and two steering gear brackets

Electrical characteristics

Power supply voltage: 5v-7.4v

Locked-rotor current: 3A (@8.5V--limit test)

PWM signal voltage: 3v-5v

Electric rotation angle range: 200°

Electrical rotation angle resolution: 2us

PWM signal resolution: 50-330hz

PWM signal positive pulse width range: 400us-2550us

Minimum value of negative pulse width of PWM signal: 400us

^ • Reply • Share



Matt Battistel • a year ago

Hi,

I don't get it - it says in the specs above that the PWM drive frequency is 4 kHz, which means the period is 250 us. Then it says

Range of PPM positive pulse width 400us-2550us

... so the minimum positive pulse length is longer than the total period? How does that make sense? I feel like some of those specs must be wrong, can you please correct me or give the correct specs? Thanks

^ • Reply • Share



DFRobot Support → Matt Battistel • a year ago

Hey Matt,

This is actually a mistake on our part. Thanks for pointing it out. We will fix the product page to reflect the correct information. After checking against the Chinese wiki page it should be PPM signal resolution is 4kHz, not what we have stated above.

^ • Reply • Share



Matt Battistel → DFRobot Support • a year ago

Thanks for clarifying that! So the PWM drive frequency should be 50 Hz (equivalent to 20 ms period), is that right? Also what's the meaning of PPM here? Parts Per Million?

^ • Reply • Share



DFRobot Support → Matt Battistel • a year ago

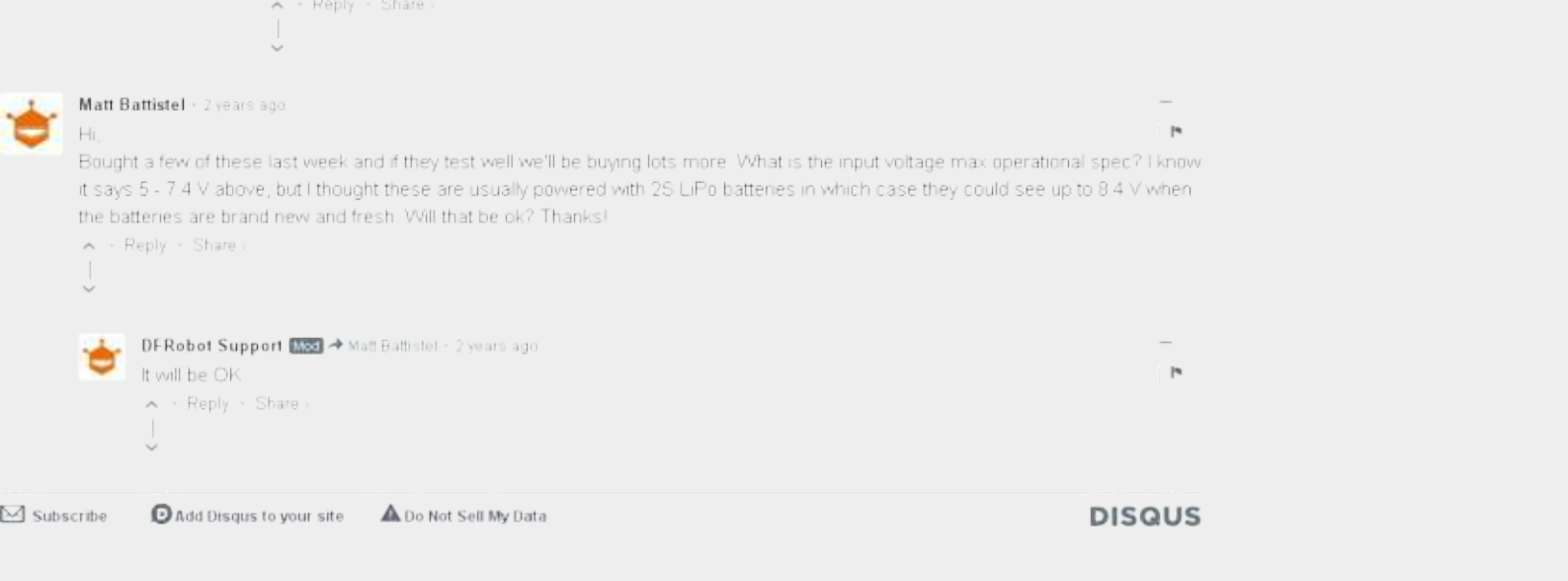
The intersection of "PPM" and "PWM" is the phase. They have essential differences.

1. PPM = pulse position modulation, using a modulation signal to control the relative position (ie phase) of each pulse in the pulse sequence, so that the relative position of each pulse changes with the modulation signal. At this point, the amplitude and width of the pulse in the pulse sequence remain unchanged. The main characteristic parameters of PPM: phase

2. PWM = pulse width modulation, using a modulated signal to control the width of each pulse in the pulse sequence such that the duration of each pulse is proportional to the instantaneous modulated signal value. Main characteristic parameters of PWM: frequency, duty cycle, phase

3. The principle of PWM changing the state of the motor is: the effective value of the output voltage of the PWM is closely related to the duty cycle. The calculation formula is: $V_o = V_{cc} \cdot r$, r = duty cycle, such as the duty ratio is 20%, $V_{cc} = 5V$, the effective value of the output voltage is 1V, the running speed of the DC motor is completely different under different voltages. Basically, the larger the duty ratio, the faster the speed. If it is 100%, the VCC is the rated voltage, the motor will Run at full speed.

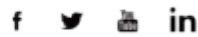
4. PWM refers to pulse width modulation. In the narrow sense, it is the positive pulse width in the servo signal, which is the high level width to indicate the control amount. PPM is the interval modulation between pulse and pulse. In the narrow sense, for the remote control output or the receiver output, the interval between the rising edges of the two pulses indicates the amount of control. In the tradition of remote control devices, PWM is usually a single channel control, while PPM is based on frame. Each pulse interval in the frame represents the control amount of one channel, and then there is a long low power between the two frames. Flat, this signal was used for synchronization as a division between frames and frames.



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