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› DIYmall RDS51150 High-Torque Robotic Digital Servo 270 Degree User Manual

DIYmall RDS51150

DIYmall RDS51150 High-Torque Robotic Digital Servo 270 Degree User Manual

Model: RDS51150 | Brand: DIYmall

[Overview](#) [Package Contents](#) [Specifications](#) [Setup & Installation](#) [Operation](#) [Maintenance](#) [Troubleshooting](#) [Support](#)

1. OVERVIEW

The DIYmall RDS51150 is a high-performance digital servo designed for robotic applications requiring significant torque and precise control. Featuring a robust metal gear construction, double-shaft design, and waterproof capabilities, this servo is suitable for demanding environments. It operates within a 9-12.6V range and offers a 270-degree rotation angle, controlled via standard PWM signals.



Electrical Specification				Control Specification	
Operating Voltage	10V	12V	12.6V	Control System	PWM(Pulse width modification)
Idle current(at stopped)	4mA	5mA	6mA	Pulse width range	500 ~ 2500μsec
Operating speed (at no load)	0.24 sec/60°	0.21 sec/60°	0.19 sec/60°	Neutral position	1500μsec
Stall torque (at locked)	150 kg-cm	165 kg-cm	173 kg-cm	Running degree	180° or 270° (when 500 ~ 2500 μ sec)
Stall current (at locked)	7.4A	8.0A	8.3A	Dead band width	3 μsec
				Operating frequency	50-330Hz
				Rotating direction	Counterclockwise (when 500 ~ 2500 μsec)

Figure 2: Contents of the RDS51150 package, including the servo and various mounting hardware.

3. SPECIFICATIONS

Detailed technical specifications for the RDS51150 servo are provided below:

Environmental Conditions

- **Storage Temperature Range:** -30°C to 80°C
- **Operating Temperature Range:** -15°C to 70°C
- **Operating Voltage Range:** 9V to 12.6V

Mechanical Specifications

- **Size:** 65 x 30 x 48 mm (2.56 x 1.18 x 1.89 inches)
- **Weight:** Approx. 265g (8.8 ounces)
- **Gear Type:** Metal Gear

- **Bearing:** Double Bearing
- **Connector Wire:** 300 ± 5mm
- **Motor:** 3-pole(s)

Metal gear



Top Cover



JR-3pin connector



Core motor



Base Cover



Figure 3: View of the robust metal gear system within the RDS51150 servo.

Wide compatibility



Figure 4: Detailed dimensions of the RDS51150 servo and its compatible mounting brackets.

Electrical Specifications

Parameter	10V	12V	12.6V
Idle Current (at stopped)	4mA	5mA	6mA
Operating Speed (at no load)	0.24 sec/60°	0.21 sec/60°	0.19 sec/60°
Stall Torque (at locked)	150 kg.cm	165 kg.cm	173 kg.cm
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Control Specifications

- **Control System:** PWM (Pulse Width Modulation)
- **Pulse Width Range:** 500µsec to 2500µsec

- **Neutral Position:** 1500µsec
- **Running Degree:** 270° (when 500µsec to 2500µsec)
- **Dead Band Width:** 3µsec
- **Operating Frequency:** 50-330Hz
- **Rotating Direction:** Counterclockwise (when 500µsec to 2500µsec)

4. SETUP & INSTALLATION

Follow these steps to properly set up and install your RDS51150 servo:

1. **Mounting the Servo:** Use the provided mounting brackets and screws to securely attach the servo to your robot or application frame. Ensure the servo is firmly fixed to prevent movement during operation. Refer to Figure 4 for dimensions and bracket configurations.
2. **Attaching Servo Horns:** Select the appropriate servo horn for your application from the included accessories. Attach it to the servo's output shaft using the provided screw.
3. **Connecting the Wiring:** The servo uses a standard JR-3pin connector. Connect it to your control board or receiver. The pinout is typically:
 - **Brown:** Ground (GND)
 - **Red:** Power (VCC, 9-12.6V)
 - **Orange/White:** Signal (PWM)

Ensure correct polarity to avoid damage. Refer to Figure 6 for connector details and PWM signal interpretation.

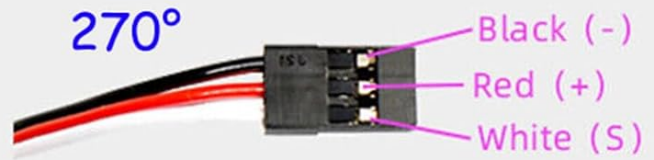
4. **Power Supply:** Connect a stable power supply within the 9V to 12.6V range. A 12.6V supply is recommended for optimal performance. Ensure your power supply can deliver the required stall current (up to 8.3A at 12.6V) to prevent brownouts or damage.

► Connector: JR-3pin-2.54mm

180°



270°



► Communication Interface: PWM

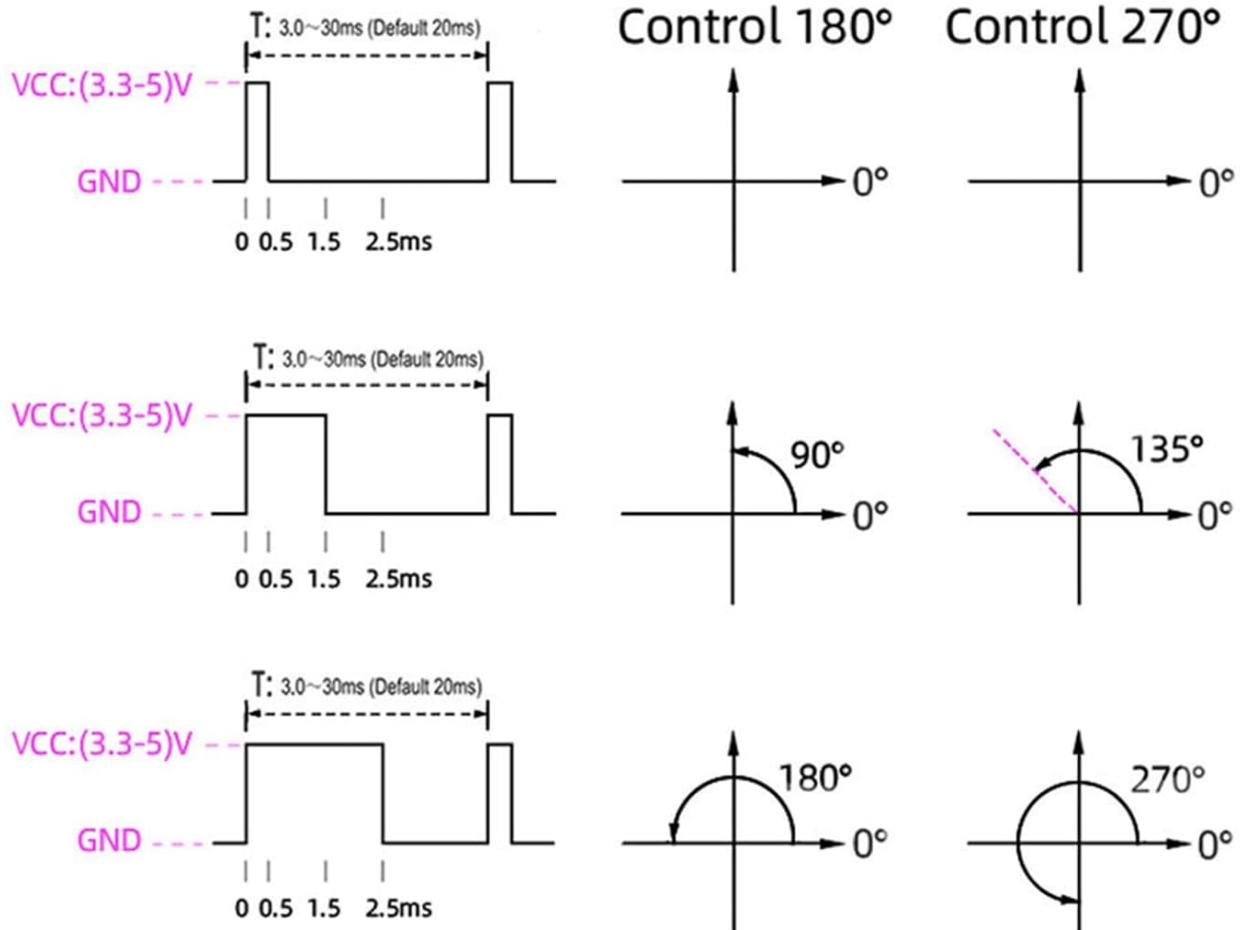


Figure 5: Close-up view of the servo's internal components and the JR-3pin connector.

5. OPERATION

The RDS51150 servo is controlled using Pulse Width Modulation (PWM) signals. The servo's position is determined by the width of the incoming pulse.

- **Pulse Width Range:** The servo responds to pulse widths between 500µsec and 2500µsec.
- **Position Mapping (270°):**
 - **500µsec:** Corresponds to 0° position.
 - **1500µsec:** Corresponds to the neutral position (approximately 135° for 270° rotation).
 - **2500µsec:** Corresponds to 270° position.
- **Rotating Direction:** The servo rotates counterclockwise when the pulse width increases from 500µsec to 2500µsec.
- **Operating Frequency:** The recommended operating frequency for the PWM signal is 50-330Hz.

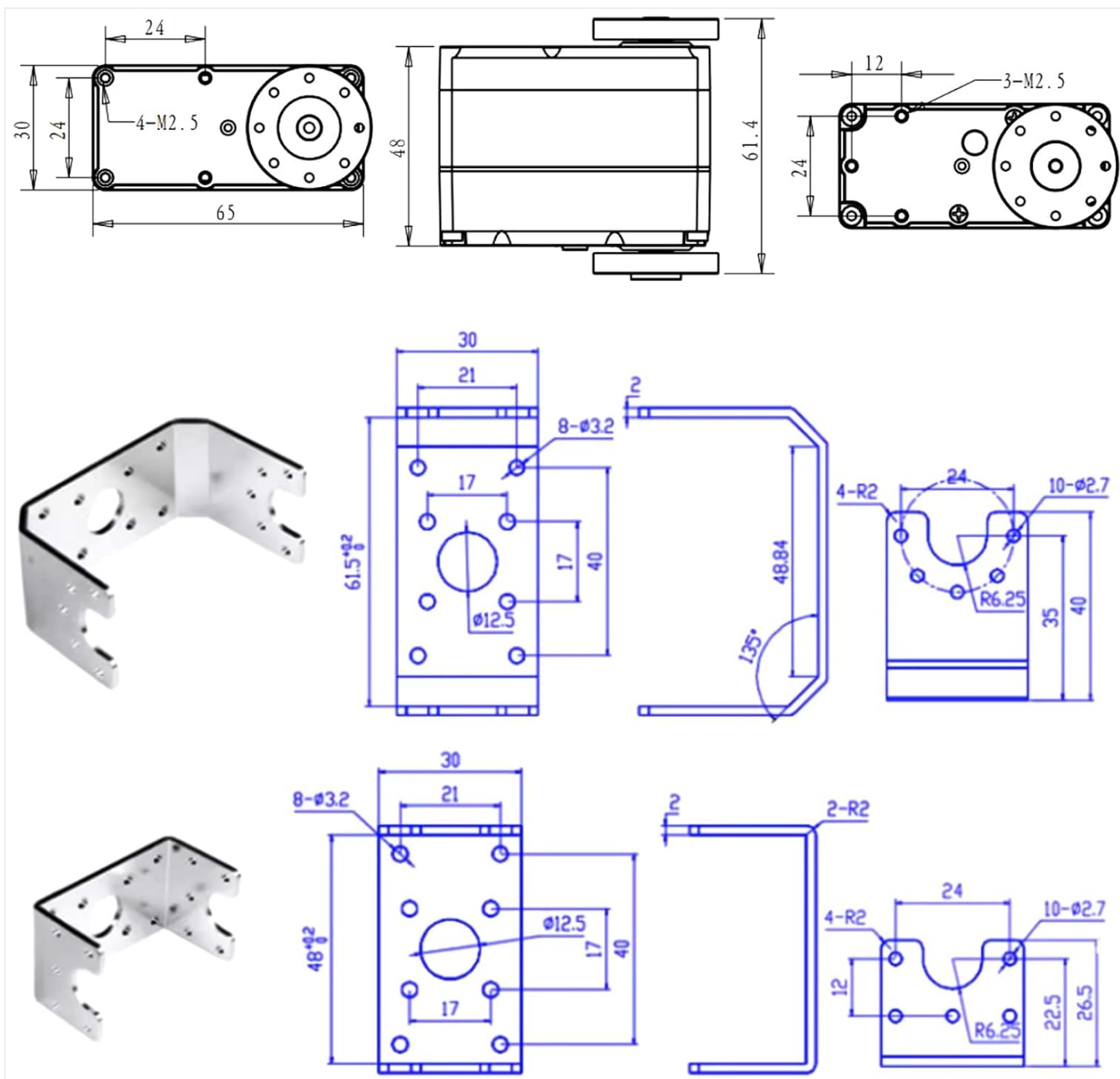


Figure 6: Diagram illustrating the JR-3pin connector pinout and PWM signal interpretation for 180° and 270° control.

Demonstration Videos

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Video 1: This video demonstrates the general movement and capabilities of the 150KG Double-Shaft servo with 270-degree rotation.

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Video 2: This video illustrates the testing of the 150KG Double-Shaft servo, demonstrating its response to pulse width changes for precise control.

6. MAINTENANCE

Proper maintenance ensures the longevity and reliable performance of your servo:

- **Keep Clean:** Regularly clean the exterior of the servo to prevent dust and debris accumulation, especially around moving parts and the output shaft.
- **Check Connections:** Periodically inspect all electrical connections for looseness or damage. Secure any loose connections.
- **Avoid Overloading:** Do not exceed the specified stall torque. Continuous overloading can lead to overheating and permanent damage to the motor or gears.
- **Water Resistance:** The servo is designed to be waterproof, offering protection against splashes and light moisture. However, it is **not** designed for underwater operation. Avoid submerging the servo.
- **Storage:** Store the servo within the recommended storage temperature range (-30°C to 80°C) in a dry environment.

7. TROUBLESHOOTING

If you encounter issues with your RDS51150 servo, refer to the following troubleshooting tips:

- **Servo Not Responding:**
 - Check power supply connections and ensure the voltage is within the 9V-12.6V range.
 - Verify the signal wire connection to your control board.
 - Confirm that the PWM signal is being generated correctly and within the 500µsec-2500µsec range.
 - Ensure the power supply can provide sufficient current, especially during initial movement or under load.
- **Erratic Movement or Jitter:**
 - Check for electrical noise in the signal line. Ensure proper grounding.
 - Verify the stability of your power supply.
 - Ensure the PWM signal frequency is within the 50-330Hz range and consistent.
 - Check for mechanical binding or obstructions preventing smooth movement.
- **Insufficient Torque:**
 - Ensure the operating voltage is at the higher end of the recommended range (e.g., 12.6V) for maximum torque.
 - Verify that the load on the servo does not exceed its specified stall torque.
 - Check for any mechanical inefficiencies in your system that might increase the required torque.
- **Overheating:**
 - Reduce the load on the servo.
 - Ensure adequate ventilation around the servo.
 - Avoid continuous operation at or near stall conditions.

8. WARRANTY AND SUPPORT

For warranty information or technical support, please contact the seller or manufacturer directly. Keep your purchase receipt as proof of purchase.

Manufacturer: DIYmall

Amazon Store: [Visit DIYmall Store on Amazon](#)



