diymore MG996R

diymore MG996R Metal Gear Digital Servo Motor Instruction Manual

Model: MG996R

1. Introduction

Thank you for choosing the diymore MG996R Metal Gear Digital Servo Motor. This manual provides essential information for the proper installation, operation, and maintenance of your servo motor. Please read this manual thoroughly before use to ensure optimal performance and longevity of the product. The MG996R is an upgraded digital servo designed for various applications including RC models, robotics, and DIY projects, offering improved speed, torque, and accuracy.

2. Product Overview

2.1 Key Features

- **Enhanced Performance:** Updated from SG90 and MG90S micro servo motors, offering increased speed, tension, and accuracy.
- **Wide Compatibility:** Compatible with most standard receiver connectors, including Futaba, Hitec, Sanwa, and GWS.
- **High Torque & Speed:** Torque at 0.18sec/60 degrees (4.8V no load) and 0.15sec/60 degrees (6.0V no load).
- **180° Running Angle:** Provides a broad range of motion for diverse applications.
- **Durable Construction:** Features metal gears for stability and shock resistance.
- **Stable Operation:** Designed for stable current and voltage to extend service life.
- **Easy Connection:** Connector wire length of 300mm (PWM 500-2500µs).
- **Versatile Applications:** Ideal for robots, mechanical arms, climbing cars, remote control toys, and various smart DIY projects.

2.2 Product Components

Image: diymore MG996R Metal Gear Digital Servo Motor with included accessories.

The MG996R servo motor comes with various servo horns and mounting hardware to suit different application needs. These accessories allow for flexible integration into your projects.

3. Package Contents

Each diymore MG996R Metal Gear Digital Servo Motor package typically includes:

- MG996R Digital Servo Motor
- Assorted Servo Horns (e.g., cross, star, single arm)
- Mounting Screws
- Rubber Grommets
- Brass Eyelets

Image: A typical package containing multiple MG996R servo motors and their respective accessory kits.

4. Setup and Installation

4.1 Wiring Diagram

The MG996R servo motor uses a standard 3-wire connector. Ensure correct polarity when connecting to your receiver or control board.

Image: MG996R servo dimensions and wiring color code: Yellow (Signal), Red (Positive), Brown (Negative).

- **Yellow/Orange Wire:** Signal (PWM input)
- **Red Wire:** Positive Power Supply (VCC)
- **Brown/Black Wire:** Negative Power Supply (GND)

4.2 Mounting the Servo

1. Identify a suitable mounting location on your model or project that allows for the servo's full range of motion without obstruction.
2. Use the provided mounting screws, rubber grommets, and brass eyelets. The rubber grommets help reduce vibration and protect the servo from shock.
3. Securely fasten the servo using the screws, ensuring it is firmly in place but not overtightened, which could damage the servo casing or mounting tabs.

4.3 Attaching Servo Horns

1. Select the appropriate servo horn for your application.
2. Align the servo horn with the splined output shaft of the servo.
3. Gently press the horn onto the shaft.
4. Secure the horn with the small screw provided, inserting it through the center of the horn into the servo shaft.

5. Operating Instructions

The MG996R is a digital servo controlled by Pulse Width Modulation (PWM) signals. The pulse width determines the position of the servo arm.

- **Standard PWM Range:** Typically, a pulse width of 1000µs corresponds to one end of the servo's travel (e.g., 0 degrees), 1500µs to the center (e.g., 90 degrees), and 2000µs to the other end (e.g., 180 degrees).
- **Operating Voltage:** The servo operates within a voltage range of 4.8V to 7.2V. Ensure your power supply is within this range.
- **External Adapter:** For optimal performance and to prevent damage to your receiver, it is recommended to power the servo through an external adapter, especially when using multiple servos or high-current applications.

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Video: Demonstration of the MG996R servo motor's operation in an RC car, showing its response to control inputs for throttle and steering.

When integrating the servo into your system, ensure that the control signals from your microcontroller or RC receiver are correctly configured to match the servo's expected PWM range for desired angular movement.

6. Maintenance

To ensure the long-term reliability and performance of your MG996R servo motor, follow these maintenance guidelines:

- **Keep Clean:** Regularly clean the servo's exterior to prevent dust and debris from entering the internal mechanisms.
- **Avoid Overloading:** Do not exceed the specified torque limits, as this can damage the gears and motor.
- **Check Wiring:** Periodically inspect the wiring for any signs of wear, fraying, or loose connections.
- **Lubrication:** The metal gears are pre-lubricated. Avoid applying excessive or incorrect lubricants, which can attract dirt.
- **Storage:** Store the servo in a dry, cool environment away from direct sunlight and extreme temperatures.

7. Troubleshooting

If you encounter issues with your MG996R servo motor, refer to the following troubleshooting tips:

- **Servo Not Responding:**
  - Check power supply: Ensure the servo is receiving adequate voltage (4.8V-7.2V) and current.
  - Verify wiring: Confirm that the signal, positive, and negative wires are connected correctly and securely.
  - Test control signal: Use a servo tester or oscilloscope to verify that a valid PWM signal is being sent to the servo.
- **Erratic Movement or Jitter:**
  - Power supply issues: Insufficient current or voltage can cause erratic behavior. Consider an

external power source.
    - Signal interference: Ensure the signal wire is not running parallel to high-current wires.
    - Mechanical binding: Check for any physical obstructions preventing smooth movement of the servo arm.
- **Servo Overheating:**
    - Overload: The servo may be trying to move a load that is too heavy or encountering resistance. Reduce the load or adjust the mechanical linkage.
    - Continuous stall: Avoid situations where the servo is continuously trying to hold a position against a strong force.
- **Noisy Operation:**
    - Normal for digital servos: Digital servos often produce a slight buzzing sound, which is normal due to their high refresh rate.
    - Gear damage: If the noise is excessive or grinding, inspect the metal gears for damage.

8. Specifications

Image: Close-up view of the MG996R servo's internal metal gears.

Specification	Value
Model	MG996R
Dimensions	40 x 19 x 43 mm (1.59 x 0.78 x 1.56 inches)
Weight	55g (1.94 oz)
Operating Speed (4.8V)	0.18 sec/60 degrees (no load)
Operating Speed (6.0V)	0.15 sec/60 degrees (no load)
Stall Torque (4.8V)	13 kg-cm (180.5 oz-in)
Stall Torque (6.0V)	15 kg-cm (208.3 oz-in)
Operating Voltage	4.8V - 7.2V
Gear Type	All Metal Gears

Specification	Value
Connector Wire Length	300mm (11.81 inches)
PWM Range	500-2500µs
Running Angle	180°
Manufacturer	diymore

9. Warranty and Support

diymore products are manufactured to high-quality standards. For any technical support or warranty inquiries, please refer to the retailer where you purchased the product or visit the official diymore website for contact information. Please retain your proof of purchase for warranty claims.