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## MKS DS95

# MKS DS95 Titanium Gear High Torque Micro Digital Helicopter Cyclic Servo User Manual

## INTRODUCTION

This manual provides essential information for the proper setup, operation, and maintenance of your MKS DS95 Titanium Gear High Torque Micro Digital Helicopter Cyclic Servo. The DS95 is engineered for high performance in helicopter cyclic applications, featuring a durable chrome/titanium alloy gear train and robust aluminum casing for reliability and precision.



Image: MKS DS95 Servo in its retail packaging. The packaging displays the MKS logo, "DS95", and "LORD OF SERVO" branding, indicating a high-performance product.

## SETUP AND INSTALLATION

Proper installation is crucial for optimal servo performance and longevity. Follow these steps carefully:

- Mounting:** Securely mount the DS95 servo in your helicopter's cyclic position using appropriate servo mounts and hardware. Ensure there is no binding or excessive force on the servo case during mounting.
- Horn Attachment:** Select a suitable servo horn (e.g., the included white servo arms) that provides the desired throw and mechanical advantage for your application. Attach the horn to the servo spline, ensuring it is centered before tightening the retaining screw.
- Wiring:** Connect the servo's three-wire connector to the appropriate channel on your receiver or flight controller. Ensure correct polarity: typically, brown/black for ground, red for positive voltage, and orange/yellow/white for signal.
- Power Supply:** The DS95 operates within a voltage range of 4.8V to 6.0V DC. Ensure your power supply (receiver battery or BEC) provides stable voltage within this range.
- Initial Centering:** Before connecting linkages, power on your receiver and transmitter. Ensure the servo centers correctly. Adjust sub-trim on your transmitter if necessary to achieve perfect center.
- Linkage Connection:** Connect the helicopter's cyclic linkages to the servo horn. Ensure smooth, free movement throughout the entire range of motion without any binding.



Image: Two white servo arms and mounting screws. These accessories are typically used to connect the servo's rotational output to the control surfaces of a model.

## OPERATING INSTRUCTIONS

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The MKS DS95 is a high-performance digital servo designed for precise control. Observe the following guidelines during operation:

- **Control System:** The servo operates with a +Pulse Width Control system, with a working frequency of 1500µs / 333Hz.
- **Pulse Range:** The required pulse range from your receiver (RX) is 850µs to 2150µs, with a 3.0V to 5.0V peak-to-peak square wave.
- **Voltage Monitoring:** Always ensure your power source remains within the specified operating voltage range (4.8V-6.0V DC) to prevent damage or erratic behavior.
- **Environmental Conditions:** Operate the servo within the specified operating temperature range of -10°C to +60°C. Avoid extreme temperatures or excessive moisture.
- **Avoid Overloading:** Do not attempt to force the servo past its mechanical limits or apply excessive external force, as this can damage the gears or motor.

## MAINTENANCE

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Regular maintenance ensures the longevity and reliable performance of your DS95 servo:

- **Cleaning:** Keep the servo clean and free from dust, dirt, and debris. Use a soft, dry cloth to wipe the exterior. Avoid using solvents or harsh chemicals.
- **Gear Inspection:** Periodically inspect the servo gears for any signs of wear, damage, or foreign objects. While the chrome-titanium alloy gears are highly durable, extreme impacts can cause damage.
- **Wiring Check:** Regularly check all wiring and connections for fraying, cuts, or loose contacts. Secure any loose connections.
- **Lubrication:** The servo's internal gears are pre-lubricated. Avoid applying additional lubricants unless specifically recommended by MKS for a particular repair or maintenance procedure.
- **Storage:** When not in use, store the servo in a dry, cool environment, away from direct sunlight and extreme temperatures.

## TROUBLESHOOTING

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If you encounter issues with your MKS DS95 servo, refer to the following common problems and solutions:

Problem	Possible Cause	Solution
Servo not responding	No power, incorrect wiring, faulty receiver/flight controller, damaged servo.	Check power supply and connections. Verify wiring polarity. Test with a different receiver channel or servo tester. Inspect for physical damage.
Erratic movement or twitching	Interference, low voltage, loose connections, damaged potentiometer.	Ensure proper radio frequency management. Check battery voltage. Secure all connections. If problem persists, servo may require service.
Servo hums but doesn't move	Mechanical binding, stripped gears, motor issue.	Disconnect linkages and check for free movement. Inspect gears for damage. If gears are intact and free, the motor may be faulty.

Problem	Possible Cause	Solution
Reduced torque or speed	Low voltage, excessive load, wear on gears.	Verify power supply voltage. Reduce mechanical load if possible. Inspect gears for wear.

## SPECIFICATIONS

Detailed technical specifications for the MKS DS95 servo:

- **Dead band:** 0.001ms (Default)
- **Control System:** +Pulse Width Control
- **Working frequency:** 1500µs / 333Hz
- **Data (Required Pulse):** 850µs ~ 2150µs (3.0V~5.0V Peak to Peak Square Wave)
- **Operating Voltage:** 4.8V ~ 6.0V DC
- **Operating Temperature Range:** -10°C to +60°C
- **Operating Speed (4.8V):** 0.066 sec/60° (no load)
- **Operating Speed (6V):** 0.053 sec/60° (no load)
- **Stall Torque (4.8V):** 33.88 oz/in (2.44 kg-cm)
- **Stall Torque (6V):** 42.36 oz/in (3.05 kg-cm)
- **360° Modifiable:** YES
- **Motor Type:** Coreless Motor
- **Potentiometer Drive:** Direct Drive
- **Driver Type:** FET
- **Bearing Type:** Dual Ball Bearings
- **Gear Type:** Chrome-Titanium alloy gear
- **Programmable:** NO
- **Connector Wire Length:** 20.0cm (7.86")
- **Dimensions:** 23 x 12 x 27.25mm (0.9 x 0.47 x 1.07")
- **Weight:** 21.21g (0.74oz)

## WARRANTY AND SUPPORT

For warranty information or technical support, please refer to the official MKS website or contact your authorized MKS dealer. Specific warranty terms may vary by region and retailer. Always retain your proof of purchase for warranty claims.

