STEPPERONLINE ISV57T

STEPPERONLINE NEMA 23 Integrated Easy Servo Motor ISV57T User Manual

Model: ISV57T

1. INTRODUCTION

This manual provides essential information for the proper installation, operation, and maintenance of your STEPPERONLINE NEMA 23 Integrated Easy Servo Motor, model ISV57T. This integrated servo motor combines a brushless DC servo motor with a high-performance driver, offering precise control for various automation applications such as 3D printers, CNC machines, carving machines, and dispensers. Please read this manual thoroughly before using the product to ensure safe and efficient operation.

2. SAFETY INFORMATION

Always observe the following safety precautions to prevent injury to personnel and damage to the equipment:

- **Electrical Safety:** Ensure the power supply voltage is within the specified range (20-50VDC). Disconnect power before making any electrical connections or disconnections. Improper wiring can cause electric shock or damage to the motor and driver.
- **Grounding:** Ensure the motor and associated equipment are properly grounded to prevent electrical hazards.
- **Temperature:** The motor and driver can become hot during operation. Avoid touching them directly to prevent burns. Ensure adequate ventilation to prevent overheating.
- **Mechanical Safety:** Moving parts can cause injury. Ensure all mechanical components are securely mounted and guarded if necessary. Do not operate the motor with loose connections.
- **Environment:** Operate the motor in a clean, dry environment, free from corrosive gases, flammable materials, and excessive dust.

3. PRODUCT OVERVIEW

The STEPPERONLINE ISV57T is an integrated easy servo motor designed for high-performance applications. It features high torque, long life, low temperature rise, and low noise operation. The integrated design simplifies wiring and reduces overall system complexity.

Figure 3.1: Side view of the ISV57T motor, showing the integrated driver unit.

Figure 3.2: Angled view highlighting the DIP switches for configuration.

Figure 3.3: Rear view of the motor, showing the DIP switch panel and cooling fins.

Figure 3.4: Front view displaying the motor shaft and mounting holes.

4. SETUP

4.1 Mechanical Installation

Mount the ISV57T motor securely to a rigid surface using appropriate fasteners. Ensure proper alignment with the load to prevent undue stress on the motor shaft and bearings. Refer to the dimensional drawing for mounting hole patterns and shaft dimensions.

Figure 4.1: Dimensional drawing with key measurements for mounting.

4.2 Electrical Connections

The ISV57T motor utilizes several connectors for control signals, power, and communication. Ensure all connections are firm and correct before applying power.

Figure 4.2: Included connector blocks for wiring.

4.2.1 Control Signal Connector

This connector handles pulse, direction, and alarm signals.

Figure 4.3: Pinout details for Control Signal, Power, and RS232 Connectors.

Control Signal Connector Pinout

Pin	Name	I/O	Description
1	PUL+	I	Pulse signal: Pulse active at rising edge; 4-5V when PUL-HIGH, 0-0.5V when PUL-LOW. Minimal pulse width of 2.5µs. It's recommended duty cycle 50%. Add a resistor for current-limiting at +12V or +24V input logic voltage (1K for +12V, 2K for +24V).
2	PUL-	I	
3	DIR+	I	DIR signal: Pulse active at rising edge; 4-5V when PUL-HIGH, 0-0.5V when PUL-LOW. The low/high voltage levels represent two directions of motor rotation. Add a resistor for current-limiting at +12V or +24V input logic voltage (1K for +12V, 2K for +24V). The DIR signal must be at least 5µs in advance of PUL signal.
4	DIR-	I	

Pin	Name	I/O	Description
5	ALM+	O	Alarm Signal: OC output signal, activated when one of the following protection is activated: over-voltage and over current error. They can sink or source MAX 50mA current at 24V. By default, the impedance between ALM+ and ALM- is low for normal operation and becomes high ALM- O when any protection is activated. The active impedance of alarm signal is software configurable.
6	ALM-	O	

4.2.2 Power Connector

Connect the DC power supply to these terminals. A 24-36VDC power supply is recommended.

Power Connector Pinout

Pin	Name	I/O	Description
1	+Vdc	I	Power Supply Input (Positive) 24-36VDC recommended. Please leave reasonable reservation for voltage fluctuation and back-EMF during deceleration.
2	GND	GND	Power Ground (Negative)

4.2.3 RS232 Communication Connector

This connector is used for communication, typically for tuning software. Do not connect it to a PC's serial port directly without proper interface.

RS232 Communication Connector Pinout

Pin	Name	I/O	Description
1	+5V	O	+5V power output (Note: Do not connect it to PC's serial port)
2	TxD	O	RS232 transmit.
3	GND	I	Ground.
4	RxD	I	RS232 receive
5	NC	-	Not connected

4.3 DIP Switch Settings

The integrated driver features DIP switches (S1-S6) for configuring microstep resolution, stiffness, and initial motor direction. Refer to the following table for settings.

Figure 4.4: DIP switch configuration for ISV57T.

4.3.1 Pulse/Rev (Microstep) Settings (S1-S3)

Microstep Resolution Settings

Pulse/rev	S1	S2	S3
Pr0.08	off	off	off
1600	on	off	off
2000	off	on	off
3200	on	on	off
4000	off	off	on

Pulse/rev	S1	S2	S3
5000	on	off	on
6400	off	on	on
8000	on	on	on

4.3.2 Stiffness Setting (S4-S5)

Stiffness Settings

Stiffness	S4	S5
Pr0.03	off	off
72	on	off
71	off	on
70	on	on

4.3.3 Motor Direction (S6)

The DIP switch S6 is used to change the initial direction of the motor (offline), not as a real-time operation to modify the direction. Online modification of the motor direction is via the DIR signal.

Motor Direction Setting

S6	Direction
off	CCW
on	CW

5. OPERATING

Once the motor is mechanically installed and electrically connected, and DIP switches are configured, the motor is ready for operation. The ISV57T operates based on pulse and direction signals from a controller (e.g., CNC controller, PLC, microcontroller).

- **Power On:** Apply the specified DC voltage (20-50VDC) to the power connector. The motor will initialize.

- **Control Signals:** Send pulse signals to the PUL+ and PUL- inputs to command motor movement. The DIR+ and DIR- inputs control the direction of rotation.

- **Tuning Software:** For optimal performance and advanced configuration, it is recommended to use the dedicated tuning software. Please contact STEPPERONLINE for access to this software.

- **Alarm Monitoring:** Monitor the ALM+ and ALM- outputs for any fault conditions. An active alarm signal indicates an over-voltage or over-current error.

6. MAINTENANCE

The STEPPERONLINE ISV57T motor is designed for long-term, reliable operation with minimal maintenance. However, periodic checks can help ensure its longevity and performance:

- **Cleaning:** Keep the motor and driver free from dust, debris, and moisture. Use a soft, dry cloth for cleaning. Avoid using solvents or abrasive cleaners.

- **Connections:** Periodically check all electrical connections for tightness and signs of corrosion. Loose connections can lead to intermittent operation or damage.

- **Ventilation:** Ensure that the motor's cooling fins are not obstructed to allow for proper heat dissipation.
- **Environmental Conditions:** Verify that the operating environment remains within the specified temperature and humidity ranges.

7. TROUBLESHOOTING

This section provides solutions to common issues you might encounter.

- **Motor Not Moving:**
  - Check power supply voltage and polarity.
  - Verify control signal connections (PUL, DIR).
  - Ensure the controller is sending valid pulse and direction signals.
  - Check for active alarm signals (ALM+ / ALM-).

- **Motor Vibrates or Makes Noise:**
  - Check for mechanical binding or misalignment with the load.
  - Verify DIP switch settings for microstep resolution and stiffness.
  - Ensure the power supply is stable and can provide sufficient current.

- **Motor Overheats:**
  - Check for obstructions to cooling fins.
  - Ensure the motor is not overloaded.
  - Verify ambient temperature is within operating limits.

- **Inaccurate Positioning:**
  - Check for mechanical backlash in the system.
  - Verify pulse signal integrity and frequency.
  - Consider using the tuning software for fine-tuning parameters.

8. SPECIFICATIONS

8.1 Motor Specifications

- **Rated Power:** 180 W
- **Rated Torque:** 0.6 Nm (84.98 oz.in)
- **Rated Speed:** 3000 RPM
- **Rated Voltage:** 36 VDC (Operating range 20-50VDC)
- **Frame Size:** NEMA 23
- **Material:** Metal

8.2 Driver Specifications

- **Power Input:** 20-50 VDC
- **Output Peak Current:** 0-6 A

8.3 Physical Specifications

- **Item Weight:** Approximately 3.91 pounds (1.77 kg)
- **Package Dimensions:** 10 x 5.04 x 3.62 inches (25.4 x 12.8 x 9.2 cm)

9. Warranty and Support

For warranty information, technical support, or to obtain the tuning software, please contact STEPPERONLINE directly through their official website or authorized distributors. Ensure you have your product model (ISV57T) and purchase details available when seeking support.