User Manual: NexBot Drives STP113-006 Stepper Motor

SKU: NXB-SRV-STP113-006 | Version: 1.0 | Brand: NexBot Robotics

Table of Contents

1. Safety Information

READ ALL SAFETY INSTRUCTIONS BEFORE OPERATION. Failure to follow safety procedures may result in serious injury or equipment damage.

DANGER: ELECTRICAL SHOCK HAZARD. Disconnect and lock out all power sources before installation or servicing. The motor and driver can hold a charge even after power is removed.

WARNING: UNEXPECTED MOTION. The motor may move unexpectedly upon power-up or during operation. Keep hands, clothing, and tools clear of the motor and connected mechanisms at all times.

CAUTION: HOT SURFACE. During operation, the motor body can reach temperatures hot enough to cause burns. Allow the motor to cool completely before handling.

NOTICE: The NexBot Drives STP113-006 is an electrostatic-sensitive device. Failure to use proper ESD handling procedures may result in damage to the internal components.

> **NOTICE:** Do not exceed the specified 24VDC input voltage. Over-voltage can cause permanent damage to the motor windings.

2. Product Overview

NexBot Drives STP113-006 Stepper Motor (NXB-SRV-STP113-006) is a stepper motors used in industrial robotics equipment where category-specific fit, electrical or mechanical compatibility, and predictable serviceability are important to buyers. The product should be understood as the exact component named by its category path, not as a complete robot or a generic service item. It supports installation, replacement, and maintenance workflows in robotic production cells by giving procurement and maintenance teams a clearly defined part class, relevant engineering specifications, and application context that matches the actual hardware being purchased.

3. Getting Started

1. Product Overview

The NexBot Drives STP113-006 is a NEMA 23 frame stepper motor designed for precision motion control in industrial automation. It features a holding torque of 1.9 Nm, operates on 24VDC power, and is housed in a durable, IP54-rated anodized aluminum body measuring 57 x 57 x 76 mm.

2. System Requirements

To operate the STP113-006, you will need a compatible stepper motor driver capable of providing the required phase current, a stable 24VDC power supply, and a motion controller or pulse generator (e.g., PLC, microcontroller) to send step and direction signals.

3. Initial Configuration

Before operation, configure your stepper driver's current limiting settings to match the motor's specifications. It is also recommended to select a suitable microstepping setting (e.g., 1/8, 1/16) on the driver to achieve the desired motion smoothness and resolution.

4. Operation

Torque and Speed Characteristics

The STP113-006 provides a holding torque of 1.9 Nm when stationary. The available torque will decrease as the motor's speed increases. Consult the motor's torque-speed curve in the full datasheet to ensure it meets the performance requirements of your application.

> **Tip:** Operating the motor at lower speeds will maximize available torque. If stalling occurs at high speeds, consider reducing the acceleration rate or changing the gear ratio.

Thermal Management

The motor generates heat during operation, which is normal. The anodized aluminum body is designed to dissipate heat, but ensure adequate airflow around the motor. In high-duty-cycle applications, mounting the motor to a metal frame or heatsink will improve thermal performance.

Understanding IP54 Rating

The IP54 rating indicates the motor is protected against dust ingress and splashing water from any direction. This makes it suitable for many industrial environments, but it is not designed for submersion or exposure to high-pressure water jets.

> **Tip:** When cleaning machinery, shield the motor from direct high-pressure spray to maintain the integrity of its seals.

Resonance and Damping

Stepper motors can experience resonance at certain speeds, leading to increased vibration and potential loss of steps. If this occurs, you can often mitigate it by changing the microstepping setting, adjusting the speed, or adding a mechanical damper to the motor shaft.

5. Maintenance Schedule

Interval	Task	Notes
Weekly	Perform a visual inspection of the motor for any signs of physical damage, loose connections, or accumulation of debris.	Listen for any changes in operational noise, such as grinding or whining.
Monthly	Clean the exterior of the motor housing. Use a soft cloth, lightly dampened with a mild cleaning solution if necessary, to wipe away dust and grime.	This ensures optimal heat dissipation from the anodized aluminum body.
Quarterly	With power locked out, check the tightness of all mounting screws and electrical connections at the terminal block.	Vibration can cause connections to loosen over time.
Annually	Inspect the motor shaft coupling for signs of wear, fatigue, or misalignment. Replace the coupler if necessary.	A worn coupler can introduce positioning errors and excess vibration.
Annually	Verify the integrity of the motor cable insulation, especially at points of flex or potential abrasion.	Replace any cables that show signs of cracking or wear.
As Needed	Check motor for overheating. If the motor body is too hot to touch comfortably for more than a few seconds, investigate the cause (e.g., excessive current, high ambient temperature, mechanical binding).	Consistent overheating can significantly shorten motor life.

6. Troubleshooting

Symptom	Possible Cause	Solution
Motor does not turn and makes no noise.	No power to the motor driver; incorrect or loose wiring.	Verify the 24VDC power supply is on. Check all wiring between the power supply, driver, and motor. Ensure the driver's 'Enable' signal is active.
Motor hums or vibrates but does not turn.	Incorrect phase wiring (e.g., one phase reversed); mechanical load is too high (jammed).	Power down and verify the motor wiring (A+/A-, B+/B-). Disconnect the load from the motor shaft to see if the motor turns freely.
Motor stalls or skips steps during operation.	Insufficient current from the driver; acceleration/deceleration is too aggressive; mechanical load exceeds the motor's torque at that speed.	Increase the current setting on the driver (do not exceed motor rating). Reduce the acceleration rate in the motion controller. Re-evaluate the load or consider a gearbox.
Motor runs in the wrong direction.	Direction signal logic is inverted; one motor phase is wired in reverse (e.g., A+ and A- are swapped).	Invert the 'Direction' signal in the motion controller's software. Alternatively, power down and swap the two wires for one of the motor phases (e.g., swap A+ and A-).
Excessive motor vibration or noise.	Operating at a natural resonance frequency; mechanical misalignment; loose mounting.	Change the operating speed to move out of the resonance band. Increase the microstepping resolution on the driver. Check and tighten all mounting screws and shaft coupling.
Motor overheats quickly.	Driver current setting is too high; insufficient ventilation; continuous high-load operation.	Reduce the driver current setting to match the motor's specification. Ensure adequate airflow around the motor. Consider adding a heatsink or fan for demanding applications.
Poor positioning accuracy.	Skipped steps due to high load or acceleration; mechanical backlash in the system; coupler slipping.	Address the cause of skipped steps (see above). Check for and reduce mechanical backlash in gears or belts. Inspect and tighten the shaft coupler.

7. Technical Specifications

Parameter	Value	Unit
Weight	1.1	kg
Material	Anodized Aluminum	
Voltage	24VDC	
IP Rating	IP54	
Country of Origin	SE	
Dimensions	57 x 57 x 76 mm	
Torque	1.9 Nm	