User Manual: NexBot Servo Drive SD-48

SKU: NXB-DRV-SD-048-A | Version: 1.0 | Brand: NexBot Robotics

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1. Safety Information

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

DANGER: Hazardous voltage present. The drive contains capacitors that can store a lethal charge even after power is removed. Wait at least 5 minutes after disconnecting power before servicing.

WARNING: Unexpected machine motion can cause serious injury or death. Ensure all personnel are clear of the machine's range of motion before enabling the drive or executing motion commands.

WARNING: The Safe Torque Off (STO) function does not provide electrical isolation. Always disconnect and lock out the main 48VDC power supply before performing mechanical work on the motor or driven equipment.

CAUTION: The drive's anodized aluminum heatsink can reach high temperatures during operation, posing a burn risk. Do not touch the drive body until it has had sufficient time to cool.

> **NOTICE:** The NexBot Servo Drive SD-48 contains components sensitive to electrostatic discharge (ESD). Always use proper ESD protection, such as a grounded wrist strap, when handling the drive.

2. Product Overview

NexBot Servo Drive SD-48 (NXB-DRV-SD-048-A) is a single-axis servo drives 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 Servo Drive SD-48 (SKU: NXB-DRV-SD-048-A) is a high-performance, single-axis servo drive designed for precise motion control in industrial automation. It operates on a 48VDC supply and communicates over a PROFINET network, making it ideal for integration into modern robotic cells and automated machinery.

2. Understanding Status Indicators

The front panel of the drive features several LED indicators for quick diagnostics. A solid green 'STATUS' light indicates the drive is powered on and fault-free. A flashing or red light indicates a fault condition, which can be diagnosed via the commissioning software. The 'LINK/ACT' LEDs indicate the status of the PROFINET network connection.

3. Initial Software Configuration

Before the drive can be controlled by a PLC, its PROFINET device name must be set using the NexBot Commissioning Software. Connect to the drive, assign the device name specified in your automation project, and cycle power to the drive for the new name to take effect.

4. Operation

Enabling the Drive

The drive is enabled via commands from the PROFINET controller once all prerequisites are met. This includes a valid 48VDC power supply, a closed STO safety circuit, and the absence of any active faults. The drive will not produce torque at the motor shaft until it is explicitly enabled by the master controller.

Executing Motion Profiles

Motion commands, such as position, velocity, or torque setpoints, are sent from the PLC or motion controller over the PROFINET network. The

SD-48's internal controller processes these commands in real-time to precisely regulate the servo motor's state. Ensure motion profiles are designed to operate within the mechanical limits of the system.

> **Tip:** Use the software's built-in oscilloscope function to trace motion profiles and diagnose tuning or performance issues.

Fault Response and Reset

If the drive detects a fault, such as over-current or excessive position error, it will immediately disable the motor output and report the specific fault code to the controller. After the root cause has been addressed, a fault reset command can be issued over the network to clear the fault and prepare the drive for re-enabling.

Safe Torque Off (STO) Functionality

The STO input provides a safety-rated method for removing torque from the motor without disconnecting main power. When the STO circuit is opened (e.g., by an E-Stop button), the drive's power stage is disabled, preventing the motor from generating torque. This allows for safe access to machinery in certain conditions.

Monitoring Drive Parameters

Key operational data, such as motor current, DC bus voltage, drive temperature, and position feedback, can be monitored in real-time over PROFINET. This data is essential for system diagnostics, performance optimization, and predictive maintenance.

> **Tip:** Set up alarms in your HMI or PLC for critical parameters like drive temperature to preemptively address potential issues.

5. Maintenance Schedule

Interval	Task	Notes
Weekly	Visually inspect the servo drive for any accumulation of dust or debris on the heatsink. Check that status indicators are showing normal operation.	No tools required for this check.
Monthly	Power down the system and clean the drive's heatsink fins using compressed air. Ensure airflow is not obstructed by cables or other components.	Ensure air pressure is low to avoid damaging components. Always wear safety glasses.
Quarterly	With the system powered down and locked out, check the tightness of all power, motor, and ground terminal connections. Vibrations can	Use a calibrated torque screwdriver set to the specifications in the installation manual.

Interval	Task	Notes
	cause connections to loosen over time.	
Annually	Verify the integrity of all connected cables, including motor power, encoder, and PROFINET cables. Look for signs of abrasion, cracking, or damage to connectors.	Replace any cables that show signs of wear and tear.
Annually	Check for and install any firmware updates for the SD-48 drive. Updates may include performance enhancements, new features, and security patches.	Firmware updates are available from the NexBot Robotics support portal. Always back up parameters before updating.
As Needed	Backup the drive's parameter set using the NexBot Commissioning Software, especially after tuning or configuration changes are made.	Store backups in a secure, version-controlled location.

6. Troubleshooting

Symptom	Possible Cause	Solution
Drive does not power on (no LEDs lit)	Missing or incorrect 48VDC power supply.	Verify the 48VDC power supply is on and connected with the correct polarity to the drive's DC+ and DC- terminals. Check for blown fuses in the DC power circuit.
PROFINET communication cannot be established	Incorrect PROFINET device name, IP address conflict, faulty cable, or network configuration issue.	Use the commissioning software to scan the network and set the correct device name. Verify the network cable is securely connected and undamaged. Check for IP address conflicts on the network.
Drive shows an 'Over-Temperature' fault	Blocked ventilation, high ambient temperature, or excessive mechanical load on the motor.	Ensure the drive's heatsink is clean and has adequate clearance for airflow. Verify the ambient temperature is within the specified operating range. Investigate the mechanical system for

Symptom	Possible Cause	Solution
		binding or unexpected friction.
Motor hums or vibrates but does not rotate smoothly	Incorrect motor phase wiring (e.g., U and V swapped) or incorrect motor parameters in the drive configuration.	Power down and swap any two of the three motor phase wires (U, V, W). Verify that the motor parameters configured in the drive match the specifications of the connected motor.
Drive reports a 'Following Error' fault	The actual motor position cannot keep up with the commanded position. This can be caused by poor servo tuning, mechanical binding, or a load that exceeds the motor's capacity.	Check the mechanical system for any obstructions or sources of excessive friction. Re-run the auto-tuning procedure or manually adjust servo gain parameters. Verify the motion profile is not too aggressive for the system.
Drive will not enable and shows an 'STO Active' status	The safety circuit connected to the STO inputs is open.	Check the entire safety circuit, including emergency stop buttons, safety relays, and door switches. Ensure the circuit is closed and providing the required signal to both STO input terminals.
Drive reports an 'Over-Voltage' fault	The motor is regenerating too much energy back to the drive during rapid deceleration, causing the DC bus voltage to rise.	Increase the deceleration time in the motion profile. If not possible, an external braking resistor and regeneration module may be required to dissipate the excess energy.

7. Technical Specifications

Parameter	Value	Unit
Weight	1.1	kg
Material	Anodized Aluminum	
Voltage	48VDC	

Parameter	Value	Unit
IP Rating	IP65	
Country of Origin	US	
Protocol	PROFINET	
Dimensions	142 × 87 × 87 mm	