User Manual: NexBot Robotics 212-010 Safety Controller SIL3/PLe

SKU: NXB-CTL-212-010 | Version: 1.0 | Brand: NexBot Robotics

Table of Contents

1. Safety Information
2. Product Overview
3. Getting Started
4. Operation
5. Maintenance
6. Troubleshooting
7. Technical Specifications

1. Safety Information

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

DANGER: Isolate all hazardous energy before servicing NexBot Robotics 212-010 Safety Controller SIL3/PLe; stored electrical or mechanical energy may remain present after shutdown.

WARNING: Operate NXB-CTL-212-010 only within its intended Controllers & Software > Robot Controllers > Safety Controllers duty profile and published specification limits.

CAUTION: Use only approved tools, mating parts, and installation hardware to prevent premature wear or unsafe operation.

NOTICE: Protect the product from contamination, impact, and environmental exposure beyond IP20 during installation and service.

2. Product Overview

The NexBot Robotics 212-010 is a dedicated safety controller designed to manage and monitor all safety-related functions within an industrial robot system, ensuring

compliance and operator protection. This controller serves as the core of a robot's safety system, processing inputs from devices like emergency stop buttons, light curtains, and safety mats to execute a safe stop condition reliably. Engineered to meet stringent international standards, the 212-010 controller is certified for SIL 3 (IEC 62061) and Performance Level 'e' (PLe, ISO 13849-1). This high level of certification provides confidence that critical safety functions will perform as expected, even in the event of a component failure. The unit features 8 dual-channel safety inputs, 4 safety outputs (OSSD pairs), and 4 standard outputs for status indication, offering flexible integration for a wide range of safety device configurations. Its fast processing architecture ensures a system response time of less than 10 ms, which is critical for minimizing stopping distances and preventing incidents in high-speed applications. Key applications for this safety controller include safeguarding robotic cells used for machine tending, automated assembly, high-speed pick-and-place, and robotic welding. By centralizing safety logic, it simplifies the overall system architecture and reduces wiring complexity compared to using multiple safety relays. Configuration is performed through our intuitive NexBot SafetyLogic software via a standard USB-C connection, allowing users to define safety zones, create logic for muting functions, and diagnose the system efficiently. The controller is housed in a compact, DIN rail-mountable enclosure for easy installation within the main robot control cabinet. Its robust design and adherence to the highest safety standards make it an essential component for any modern robotic automation project where human-robot collaboration or interaction is a factor.

3. Getting Started

1. Confirm product identity

Verify the installed item is NexBot Robotics 212-010 Safety Controller SIL3/PLe with SKU NXB-CTL-212-010. Cross-check the unit against project documentation before applying power or connecting it to the host system.

2. Review operating context

Understand how the product is used within the Controllers & Software > Robot Controllers > Safety Controllers workflow, including any upstream and downstream dependencies, service intervals, and operator responsibilities.

3. Complete initial startup

Power up the unit under controlled conditions, observe indicator states, and verify the product initializes cleanly with the expected 24VDC operating setup.

4. Operation

Normal operation

Run NexBot Robotics 212-010 Safety Controller SIL3/PLe within the documented workload, environmental, and service conditions. Track alarms, unusual noise, heat, or vibration so corrective action can be scheduled before unplanned downtime occurs.

Interface and controls

Use the supported electrical and control interfaces to commission, monitor, and troubleshoot the device. Validate all signal mappings and control behavior after maintenance or part replacement, especially where EtherNet/IP with CIP Safety communication is required.

> **Tip:** Capture a baseline of healthy status indicators after commissioning so later diagnostics can be compared quickly.

Load and application limits

Keep the product within the published ratings for speed, force, load, and environmental exposure. Where applicable, confirm mounting, routing, and attached tooling do not compromise access, cooling, or serviceability.

Change management

Whenever hardware, firmware, wiring, or connected tooling changes, repeat the relevant verification and commissioning checks before returning the equipment to production service.

> **Tip:** Update maintenance records immediately after any wiring, parameter, or parts change.

5. Maintenance Schedule

Interval	Task	Notes
Daily	Inspect NexBot Robotics 212-010 Safety Controller SIL3/PLe for visible wear, damage, contamination, loose hardware, and abnormal status indicators.	Record any abnormalities before the next production cycle begins.
Monthly	Verify mounting integrity, connector condition, and cable routing or strain relief points.	Retorque or reseat hardware only to the documented service specification.
Quarterly	Review diagnostic logs, event history, and operational trends for early signs of degradation.	Escalate recurring warnings before they develop into hard faults.
Annually	Perform a full service inspection covering mechanical condition, electrical connections, and functional verification.	Coordinate annual service with planned downtime to minimize production disruption.

6. Troubleshooting

Symptom	Possible Cause	Solution
Unit does not initialize or remain ready	Incoming supply, controls wiring, or commissioning parameters do not match the documented 24VDC configuration.	Verify power quality, wiring continuity, protective devices, and startup parameters before restarting the unit.
Intermittent communication or status loss	Loose connectors, damaged cabling, or interface mismatch on	Inspect physical connections, confirm interface settings, and

Symptom	Possible Cause	Solution
	EtherNet/IP with CIP Safety.	replace damaged cables or connectors as needed.
Unexpected wear, vibration, or overheating	Mechanical loading, contamination, misalignment, or duty cycle exceeds the intended application conditions.	Inspect the installation, restore proper alignment and cooling, and verify the product is being used within its published operating limits.
Connected equipment performance is inconsistent	The installed product is not configured correctly for the host system or compatible robot series (R-20, R-100, C-10).	Validate the configuration, confirm compatibility, and rerun the functional verification procedure after any corrections.

7. Technical Specifications

Parameter	Value	Unit
Weight	0.8	kg
Material	Polycarbonate	
Voltage	24VDC	
IP Rating	IP20	
Country of Origin	KR	
Protocol	EtherNet/IP with CIP Safety	
Dimensions	150 x 110 x 50 mm	