

# User Manual: NexBot Robotics 212-005 SIL 3 Safety Controller

SKU: NXB-CTL-212-005 | 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:** Isolate all hazardous energy before servicing NexBot Robotics 212-005 SIL 3 Safety Controller; stored electrical or mechanical energy may remain present after shutdown.

**WARNING:** Operate NXB-CTL-212-005 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 212-005 Safety Controller is a dedicated safety-rated processing unit designed to monitor and manage all safety-related functions within

an automated robotic cell. This controller serves as the core of your system's safety architecture, ensuring rapid and reliable response to any hazardous conditions to protect both personnel and equipment. Its primary function is to process inputs from safety devices such as emergency stop buttons, light curtains, and safety gate switches, and in turn, control safety-related outputs to bring the robotic system to a safe state. Key features include certification to SIL 3 (IEC 62061) and Performance Level 'e' (ISO 13849-1), providing a high level of functional safety assurance required for modern industrial applications. The unit is built on a dual-channel, redundant architecture, which ensures that a single fault in any safety circuit does not lead to a loss of the safety function. With a rapid response time of under 10 ms, the controller can initiate a safe stop command almost instantaneously upon detection of a safety breach. This controller is equipped with 24 configurable digital safety inputs and 8 safety outputs, offering substantial flexibility for integrating a wide range of safety devices. Communication is streamlined via its integrated EtherCAT FSoE (FailSafe over EtherCAT) interface, which simplifies wiring and allows for seamless integration with the primary robot controller and other networked devices. The 212-005 is ideal for applications including robotic welding, automated assembly, high-speed pick-and-place, and collaborative workspaces where robust safety monitoring is paramount. Installation is straightforward, with a compact design intended for standard DIN rail mounting inside the main control cabinet. Configuration is performed through our intuitive safety programming software, allowing for logical function block programming to tailor the safety logic to specific application needs.

## **3. Getting Started**

### **1. Confirm product identity**

Verify the installed item is NexBot Robotics 212-005 SIL 3 Safety Controller with SKU NXB-CTL-212-005. 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 212-005 SIL 3 Safety Controller 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 EtherCAT FSoE 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 212-005 SIL 3 Safety Controller 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 reseal 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	Inspect physical connections, confirm interface settings, and

Symptom	Possible Cause	Solution
	interface mismatch on EtherCAT FSoE.	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-50, 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	ABS/Polycarbonate Blend	
Voltage	24VDC	
IP Rating	IP20	
Country of Origin	SE	
Protocol	EtherCAT FSoE	
Dimensions	150 x 110 x 75 mm	