

User Manual: NexBot Drives MAG414-014 Magnetic Gripper

SKU: NXB-GEN-MAG414-014 | 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: RISK OF ELECTRIC SHOCK. Disconnect and lockout all power before performing service or maintenance. The device operates on 24VDC, but may be connected to systems with higher voltages.

WARNING: STRONG MAGNETIC FIELD. This device generates a powerful magnetic field when active. Keep a safe distance from medical implants (e.g., pacemakers), magnetic storage media (e.g., hard drives, credit cards), and sensitive electronic equipment.

WARNING: UNEXPECTED MOTION HAZARD. The gripper is part of a robotic system. Ensure all personnel are clear of the robot's work envelope before activating the system or the gripper.

CAUTION: PINCH HAZARD. Keep hands and fingers away from the gripper's magnetic face and the workpiece during operation to avoid being pinched between the workpiece and another surface.

NOTICE: The internal electronics are sensitive to electrostatic discharge (ESD). Use proper ESD protection, such as an ESD wrist strap, when handling connectors or performing maintenance.

2. Product Overview

NexBot Drives MAG414-014 Magnetic Gripper (NXB-GEN-MAG414-014) is a magnetic grippers 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 MAG414-014 is an intelligent magnetic gripper designed for End-of-Arm Tooling in automated applications. It uses an electromagnet to securely grip and release ferromagnetic workpieces. All control and diagnostic feedback are managed through its integrated IO-Link communication protocol.

2. IO-Link Integration

This gripper is an IO-Link device and requires connection to an IO-Link master to function. Before operation, you must download the IODD file for the NXB-GEN-MAG414-014 and import it into your IO-Link master's configuration software. This file describes the device's parameters, process data, and diagnostic capabilities.

3. Payload and Motion Planning

The MAG414-014 has a static weight of 1.8 kg, which must be factored into the robot's total payload calculation. The gripper's holding force is dependent on the workpiece material, thickness, and surface condition. Robot motion paths should be programmed with smooth acceleration and deceleration profiles to prevent the workpiece from shifting or detaching.

4. Operation

Activating and Deactivating the Magnet

The gripper is controlled by writing to the process data output byte via the IO-Link master. A specific bit pattern energizes the electromagnet to grip a part, while another pattern de-energizes it for release. Refer to the IODD documentation for the exact command structure.

Tip: For thin metal sheets prone to sticking from residual magnetism, program a brief reverse-polarity pulse if supported by your IO-Link master's command set. This helps ensure a clean release.

Using Part Presence Detection

The MAG414-014 includes an integrated sensor to confirm that a workpiece is securely gripped. This status is continuously reported in the IO-Link process data

input. Your automation program should always check this feedback bit to verify a successful grip before executing the next robot motion.

Interpreting Diagnostic Data

The gripper provides diagnostic information such as internal temperature, cycle count, and operating voltage via IO-Link's acyclic (on-demand) data channel. Regularly polling this data can help predict maintenance needs and troubleshoot issues before they cause downtime.

Tip: Set alarms in your PLC or HMI for key diagnostic thresholds, such as an over-temperature warning, to alert operators to potential problems.

Handling Different Workpieces

The gripping performance is highly dependent on the workpiece's properties, including material (must be ferromagnetic), flatness, and surface coating. An air gap between the gripper face and the part, caused by debris or an uneven surface, will significantly reduce the holding force.

IP67 Rating Usage

The gripper is rated IP67, making it dust-tight and protected against temporary immersion in water. To maintain this rating, ensure that all connectors are securely tightened and that cable jackets are not compromised. The device is suitable for environments with cutting fluids or washdown procedures, but is not intended for continuous submersion.

5. Maintenance Schedule

Interval	Task	Notes
Daily	Visually inspect the gripper housing and cables for any signs of physical damage, wear, or fluid leaks.	Perform this check at the beginning of each shift.
Weekly	Clean the magnetic gripping face with a clean, dry, lint-free cloth to remove any accumulated metallic dust or debris.	A clean surface is critical for achieving maximum holding force.
Monthly	Check the security of the M12 power and IO-Link connectors. Ensure they are fully tightened and have not vibrated loose.	Loose connections can cause intermittent faults and compromise the IP67 seal.
Quarterly	Verify the torque of the main mounting bolts. Re-torque to 14 Nm if necessary.	Use a calibrated torque wrench for this task.
Annually	Using the IO-Link master software, read the diagnostic data to check the total cycle count and monitor for any fault history.	Archive this data to track long-term performance trends.
As Needed	Clean the anodized aluminum housing using a soft cloth and a	Avoid using abrasive materials or harsh

Interval	Task	Notes
	mild, non-corrosive cleaning agent.	solvents that could damage the finish.

6. Troubleshooting

Symptom	Possible Cause	Solution
Gripper will not activate; status LED is off.	No 24VDC power is being supplied to the gripper.	Check the 24VDC power source, fuses, and cabling. Use a multimeter to verify voltage at the gripper's M12 power connector.
Gripper will not activate; status LED is on.	IO-Link communication error or incorrect command being sent from the PLC.	Verify IO-Link connection at the master and gripper. Check PLC logic to ensure the correct activation bit is being written to the process data output.
Gripper fails to pick up a known good workpiece.	Debris on the gripper face creating an air gap, or internal hardware fault.	De-energize and clean the gripper face. If the problem persists, check IO-Link diagnostics for over-temperature or other internal faults.
Gripper drops parts during robot motion.	Robot acceleration/ deceleration exceeds the gripper's holding force for the specific part. Intermittent power or communication loss.	Reduce robot speeds and smooth motion paths in the program. Check all power and IO-Link cables and connectors for intermittent connections.
Gripper does not release the workpiece (especially thin sheets).	Residual magnetism in the workpiece or gripper core.	Ensure the de-energize command is being sent correctly. If possible, program a brief reverse-current pulse to counteract residual magnetism.
IO-Link master reports 'Device Not Found' or a communication fault.	Incorrect IODD file, faulty cable, or incorrect port configuration on the master.	Ensure the correct IODD file for NXB-GEN-MAG414-014 is loaded. Swap the cable with a known good one. Verify the master port is configured for IO-Link operation.
Part presence sensor provides unreliable readings.	Metallic dust or debris on the sensor face, or incorrect sensor parameter settings.	Clean the gripper face thoroughly. Connect via IO-Link software to check and adjust sensor sensitivity or threshold parameters if available.
	Exceeding the recommended duty cycle, high ambient	Check the application's cycle time against the gripper's specifications.

Symptom	Possible Cause	Solution
Gripper feels excessively hot to the touch.	temperature, or an internal short.	Improve air circulation around the gripper. If overheating persists at a normal duty cycle, remove from service and contact support.

7. Technical Specifications

Parameter	Value	Unit
Weight	1.8	kg
Material	Anodized Aluminum 6061-T6	
Voltage	24VDC	
IP Rating	IP67	
Country of Origin	KR	
Protocol	IO-Link	
Dimensions	115 x 115 x 75 mm	
Torque	14 Nm	