

User Manual: NexBot Vision 643-003

Linear Rail Track 3m

SKU: NXB-GEN-643-003 | 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: HIGH VOLTAGE: This equipment operates on 480VAC. Disconnect, lock out, and tag out all power sources before servicing. Failure to do so will result in severe injury or death.

WARNING: CRUSHING HAZARD: The moving carriage and robot present a significant crushing hazard. Maintain a safe distance during operation and ensure all safety guards are in place.

WARNING: UNEXPECTED MOTION: The track can move at high speed without warning as part of a program. Never enter the robot cell while the system is in an active or automatic mode.

CAUTION: Do not exceed the maximum specified payload of 300 kg. Overloading the track can lead to motor failure, mechanical damage, and loss of positioning accuracy.

NOTICE: The NexBot Vision 643-003 is rated IP54. It is protected against dust ingress and splashing water, but not against high-pressure jets or submersion. Install accordingly.

2. Product Overview

NexBot Vision 643-003 Linear Rail Track 3m (NXB-GEN-643-003) is a linear rails & tracks 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 Vision 643-003 is a high-precision, single-axis linear rail designed to extend the working envelope of an industrial robot. It features a hardened steel V-rail for durability, a 3000 mm travel distance, and communicates via the EtherCAT protocol for seamless integration with your existing NexBot Robotics controller.

2. System Integration

This linear track functions as an external axis (Axis 7) for a compatible robot system. It must be configured in the robot controller software using the provided ESI (EtherCAT Slave Information) file. Once configured, its motion can be coordinated with the robot's motion.

3. Initial Homing (Referencing)

Before any programmed operation can occur, the track must be homed. This procedure moves the carriage to a known, fixed position using a reference switch, establishing a zero point for all subsequent movements. The homing sequence should be initiated from the robot teach pendant.

4. Operation

Manual Jogging

The track can be moved manually using the jog controls on the robot's teach pendant. Select the external axis corresponding to the track and use the directional buttons to move the carriage forward and backward. Always use a slow speed setting when jogging near obstacles or personnel.

Tip: Use 'Joint' jogging mode to move only the track, and 'World' or 'Tool' frame jogging to move the robot and track in a coordinated fashion.

Programming Motion

In a robot program, the track's position is defined as another coordinate value within a target point. Motion instructions (Linear, Joint) will move the track and robot simultaneously to the taught positions. Ensure software limits are set to prevent programmed moves from causing collisions.

Payload and Dynamics

The specified 300 kg payload includes the robot, end-of-arm tooling, and any workpiece being carried. Ensure your robot controller's payload settings are correctly configured to account for this mass. Incorrect settings can affect acceleration and deceleration profiles, potentially causing overshoots or motor faults.

Tip: For optimal performance, keep the center of gravity of the combined robot and payload as low and as close to the center of the carriage as possible.

Understanding Status Indicators

The track's servo drive includes LED status indicators for power, run state, and error conditions. A solid green light typically indicates normal operation, while a flashing or solid red light indicates a fault. Refer to the drive's specific manual for a complete list of fault codes.

5. Maintenance Schedule

Interval	Task	Notes
Daily	Visually inspect the V-rail and carriage path for any debris, foreign objects, or fluid contamination.	Perform this check before the start of each shift. Clear any obstructions immediately.
Weekly	Check the cable management carrier for signs of wear, damage, or binding. Ensure all cables are secure within the carrier.	Pay close attention to the points where the carrier flexes most.
Monthly	Clean the hardened steel V-rails with a lint-free cloth. Apply a thin film of NexBot-approved V-rail lubricant.	Do not use generic grease, as it can attract contaminants and cause premature wear.
Quarterly	Inspect the drive belt for proper tension and signs of cracking or fraying. Adjust tension if necessary.	An improperly tensioned belt can cause backlash and positioning errors.
Annually	Verify the torque on the floor anchor bolts and the robot mounting bolts. Re-torque to specification if they have loosened.	Vibration during operation can cause fasteners to loosen over time.
Annually	Inspect the servo motor and gearbox seals for any signs of oil leaks. Listen for any increase in audible noise from the drive system.	Contact NexBot support if leaks or unusual noises are detected.

6. Troubleshooting

Symptom	Possible Cause	Solution
Excessive noise or vibration during movement	Debris on the V-rails or worn roller bearings.	Power down and lock out the system. Clean the V-rails thoroughly. Inspect rollers for flat spots or damage and replace if necessary.
Positioning is not accurate (fails to meet ± 0.05 mm repeatability)	Loose drive belt, loose motor coupling, or floor anchor bolts have loosened.	Check and adjust drive belt tension. Verify motor coupling set screws are tight. Re-torque all anchor bolts to specification.
Track fails to move, and servo drive shows a 'Following Error' fault	A physical obstruction is preventing movement, or the payload exceeds motor capacity.	Inspect the full length of the track for any obstructions. Verify the total payload (robot + tooling + part) is under the 300 kg limit.
Robot controller reports 'EtherCAT Communication Lost'	EtherCAT cable is damaged, unplugged, or there is a network configuration issue.	Inspect the EtherCAT cable at both the controller and track ends. Test the cable with a network tester. Verify the track's node address in the controller software.
Track does not stop at the end of its travel	End-of-travel limit switch is faulty, disconnected, or misaligned.	Manually move the carriage to the switch and verify its mechanical actuation and electrical signal using the controller's I/O monitor. Adjust or replace the switch if faulty.
Homing procedure fails	The homing sensor is dirty, damaged, or the carriage is not positioned correctly to start the sequence.	Clean the homing sensor and its target. Check sensor wiring. Manually jog the carriage away from the home position and re-initiate the homing sequence.

7. Technical Specifications

Parameter	Value	Unit
Weight	450.0	kg
Material	Hardened Steel V-Rail on Structural Steel Frame	
Voltage	480VAC	
IP Rating	IP54	
Country of Origin	IT	

Parameter	Value	Unit
Protocol	EtherCAT	
Dimensions	3250 x 550 x 310 mm (3000 mm travel)	
Payload	300 kg	
Axes	1	
Repeatability	±0.05 mm	