User Manual: NexBot Vision LA013-003 6-Axis Robot Arm 120kg Payload

SKU: NXB-ROB-LA013-003 | 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: Hazardous voltage is present inside the robot and controller cabinets. Disconnect and lock out all power sources before opening panels or performing service. Failure to do so will result in severe injury or death.

WARNING: The robot can move unexpectedly at high speed and with great force, even at low speeds in manual mode. Always remain outside the safety-fenced work envelope when the robot is in automatic mode.

WARNING: The robot arm creates powerful pinch and crush points. Keep all body parts, clothing, and tools away from the robot's joints during operation.

> **CAUTION:** The robot's IP67 rating requires all connector caps and seals to be properly installed. Failure to secure connections can lead to damage from dust or water ingress.

> **NOTICE:** Modifications to the robot's hardware or software not explicitly authorized by NexBot Robotics will void the warranty and may lead to unpredictable behavior.

2. Product Overview

The NexBot Vision LA013-003 is a versatile 6-axis articulated robot arm engineered for high-payload applications in demanding industrial environments. With a substantial payload capacity of 120 kg, this robot arm is built to handle heavy workpieces and tooling with ease, making it an ideal solution for material handling, machine tending, and loading/unloading large parts. Its extended horizontal reach of 2,650 mm creates a large, flexible work envelope, allowing it to service multiple stations, access points within large machinery, or stack pallets to significant heights without repositioning. This combination of strength and reach directly translates to increased throughput and operational efficiency in your production line. The LA013-003 features a six-axis design that provides exceptional dexterity for complex movements and tool orientations. This flexibility is critical for intricate processes such as path-following for dispensing, spot welding, or complex assembly tasks. Coupled with a high position repeatability of ±0.05 mm, the robot ensures that every cycle is performed with precision, leading to consistent product quality and reduced waste. The robust construction of the arm minimizes vibration and deflection even during high-speed movements, further contributing to its accuracy. Designed for reliability and long service life, the robot arm is constructed from high-strength materials and features an IP67 rating, providing complete protection against dust ingress and water immersion. This makes it suitable for deployment in harsh manufacturing settings, including those with exposure to coolants, particulates, or washdown procedures. Integration into existing automation systems is streamlined through compatibility with NexBot Robotics controllers and standard communication interfaces. The arm's mounting base is designed for straightforward installation, reducing setup time and costs. The NexBot Vision LA013-003 robot arm is a powerful and reliable automation tool, delivering the payload, reach, and precision required for challenging industrial applications.

3. Getting Started

1. Power-Up Sequence

To begin operation, first ensure the main electrical disconnect is switched on. Then, turn the key or press the power button on the robot controller. The system will undergo a self-test and boot sequence, which may take up to 60 seconds.

2. Understanding the Teach Pendant

The teach pendant is the primary interface for controlling the robot. It allows you to switch between manual (T1) and automatic (AUTO) modes, jog the axes, create and edit programs, and monitor system status.

Familiarize yourself with the enable switch, E-stop button, and coordinate system selection keys.

3. Homing the Robot

Before any programmed operation, the robot must be 'homed' or 'mastered' to establish a known reference position for all axes. This is typically done once after setup or if the robot loses its position. Follow the on-screen procedure on the teach pendant to perform the homing routine.

4. Loading a Program

Robot programs can be loaded from internal memory or a network location. Use the file navigation menu on the teach pendant to select the desired program and load it into the active memory. Always verify you have loaded the correct program for the intended task.

4. Operation

Manual Jogging (T1 Mode)

In T1 mode, you can move the robot manually using the joystick or axis keys on the teach pendant. This mode is used for teaching points, fine-tuning positions, and recovery. Movement speed is restricted for operator safety.

> **Tip:** Use the 'JOINT' coordinate system for moving individual axes and the 'WORLD' or 'TOOL' coordinate system for linear movements.

Defining a Tool Center Point (TCP)

The TCP defines the focal point of your end-of-arm tooling. Accurately defining the TCP is critical for precise linear and orientation movements. Use the built-in TCP calibration wizard to define the X, Y, and Z offsets from the robot's J6 mounting flange.

> **Tip:** For complex tools, define multiple TCPs. For example, a gripper might have one TCP at the center of the grip and another at a tip used for probing.

Creating a Basic Program

A program is a sequence of taught points and instructions. In T1 mode, move the robot to a desired position and record the point. Add instructions like 'grip', 'wait', or 'set output' between points to build a complete automation sequence.

Running in Automatic Mode

Automatic mode allows the robot to execute the loaded program at full speed. Before switching to AUTO, ensure all personnel have exited the safety cell, and all safety gates are closed. Select the program, reset any alarms, and initiate the cycle start from the PLC or operator panel.

Payload Configuration

To ensure optimal performance and longevity, you must configure the robot's payload settings to match the weight and center of gravity of your end-of-arm tooling and workpiece. The system uses this data to optimize motor dynamics and prevent excessive wear. This setting is found in the system configuration menu.

> **Tip:** Update payload schedules in your program if the robot handles parts of different weights during its cycle.

5. Maintenance Schedule

Interval	Task	Notes
Daily	Visually inspect the robot arm, cables, and controller for any signs of damage, leaks, or loose connections. Check the area for any new obstructions.	This should be part of a pre-shift checklist for the operator.
Weekly	Clean the robot arm and controller vents of dust and debris. Test the functionality of the teach pendant enable switch and E-stop button.	Use only approved cleaning agents that will not damage seals or plastic components.
Monthly	Check the tightness of the robot's mounting bolts and the end-of-arm tooling bolts. Listen for any unusual noise from the axis drive units during manual movement.	Do not re-torque bolts unless they are found to be loose.
Quarterly	Inspect the main umbilical and teach pendant cables for signs of abrasion, pinching, or wear. Verify the functionality of all safety interlocks and light curtains.	Pay close attention to cable sections that flex repeatedly during operation.
Annually	Replace the grease in the J1 and J2 axis gearboxes as per the service manual. Check repeatability using a calibration fixture to detect any mechanical wear.	This task should be performed by a NexBot-certified technician.
Every 3 Years	Replace the backup batteries inside the robot controller and at the base of the robot arm. These batteries maintain the encoder positions when main power is off.	Failure to replace batteries will result in the loss of mastering data and require a full re-calibration.

6. Troubleshooting

Symptom	Possible Cause	Solution
Robot will not power on; no lights on controller.	No incoming power or main breaker is tripped.	Verify the main power disconnect is on. Check the facility circuit breaker. Use a multimeter to confirm 400-480VAC is present at the controller input terminals.
E-stop alarm is active and cannot be cleared.	An E-stop button is pressed, or there is a fault in the safety circuit wiring.	Check all E-stop buttons on the teach pendant, controller, and safety fence. If all are released, inspect safety circuit wiring for damage or loose connections.
Motion Fault' or 'Servo Lag' error on one axis.	The axis is physically obstructed, the motor brake is stuck, or there is an issue with the motor drive.	Check for any physical obstructions or collisions. Manually release the brake (with power off) to see if the axis moves freely. If the issue persists, contact NexBot support.
Robot position is not accurate (drifts over time).	Robot mastering has been lost, TCP is incorrect, or there is mechanical looseness.	Verify the TCP calibration. Check for any loose mounting bolts on the base or end-of-arm tooling. If the problem continues, the robot may need to be re-mastered.
PROFINET communication fault.	Network cable is disconnected/ damaged, IP address conflict, or incorrect device name.	Check the physical network cable and its connection at the controller and network switch. Verify the robot's IP settings do not conflict with another device on the network. Ensure the device name matches the configuration in the PLC project.
Cannot switch to automatic mode.	Safety gate is open, teach pendant is enabled, or a fault is active.	Ensure all safety gates are closed and locked. Turn the key on the teach pendant to 'OFF' and disable the enable switch. Clear all active faults from the alarm screen.

Symptom	Possible Cause	Solution
Payload Overload' alarm.	The robot is attempting to lift a weight exceeding the 120 kg limit, or the payload settings are configured incorrectly.	Verify the weight of the part and tooling. Check the payload schedule settings in the robot configuration and ensure they accurately reflect the mass and center of gravity of the load.

7. Technical Specifications

Parameter	Value	Unit
Weight	1050.0	kg
Material	High-strength cast aluminum alloy	
Voltage	400-480VAC 3-Phase	
IP Rating	IP67	
Country of Origin	US	
Protocol	PROFINET	
Reach	2650 mm	
Payload	120 kg	
Axes	6	
Repeatability	±0.05 mm	