

User Manual: NexBot Robotics LA013-010 6-Axis Robot Arm 120kg Payload

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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: Never enter the robot's safeguarded space while it is in automatic mode. Unpredictable high-speed motion can cause severe injury or death.

WARNING: The LA013-010 operates on lethal 480VAC power. All electrical service must be performed by certified personnel only after the system is de-energized and locked out.

WARNING: Do not exceed the 120 kg maximum payload. Overloading the arm can cause accelerated wear, motor failure, and create a dropped load hazard.

CAUTION: During operation, gearbox and motor surfaces can reach high temperatures. Avoid direct skin contact to prevent burns.

NOTICE: This equipment is sensitive to electrostatic discharge (ESD). Always use an ESD wrist strap when accessing the controller's internal electronics.

2. Product Overview

The NexBot Robotics LA013-010 is a high-performance, six-axis articulated robot arm engineered for demanding industrial tasks requiring significant payload capacity and extensive reach. This robot is specifically designed to enhance productivity and reliability in heavy-duty automation cells. Its robust construction ensures dependable operation in challenging manufacturing environments, from foundries to automotive assembly lines. The primary benefit of the LA013-010 is its substantial 120 kg payload capacity, which allows it to handle large workpieces, heavy tooling, and complex end-of-arm fixtures with ease. This capability makes it an ideal solution for machine tending of large CNCs, transferring engine blocks, or palletizing full layers of product. The arm's six degrees of freedom provide maximum dexterity, enabling it to follow complex paths and orient tools precisely, even in constrained spaces. Combined with an impressive horizontal reach of 2655 mm, this robot arm can service a large work envelope, increasing operational flexibility. Key to its performance is a position repeatability of ± 0.05 mm, which guarantees that processes like spot welding, material dispensing, and component assembly are performed with consistent accuracy, reducing defects and improving final product quality. The internally routed cabling and hosing minimize interference and wear, simplifying installation and reducing maintenance downtime. The sealed joints and IP67-rated body protect internal components from dust and liquids, making the arm suitable for harsh industrial settings. Typical applications for the LA013-010 robot include: - High-payload material handling - Palletizing and depalletizing - Automotive body shop operations - Large-format machine tending - Die casting and foundry automation

3. Getting Started

1. Controller and Teach Pendant Overview

The system consists of the LA013-010 robot arm and its corresponding controller cabinet. The primary interface for direct control, programming, and diagnostics is the handheld teach pendant, which features a touchscreen, axis jog keys, and an emergency stop button.

2. Power-Up and Initialization

To start the robot, first ensure the main disconnect on the controller is ON. Press the 'POWER ON' button and wait for the system to boot. On the teach pendant, enable motor power by pressing the 'MOTORS ON' button after clearing any initial faults.

3. Manual Jogging

With motors on and the key switch in T1 (manual) mode, you can move the robot. Select a coordinate system (e.g., JOINT, WORLD) and use the joystick or directional keys to jog each of the 6 axes. The jog speed is safely limited in T1 mode.

4. Creating a Simple Program

A program is a sequence of points. Jog the robot to a desired location, then press 'Record Point' on the teach pendant. Repeat this process to define a path, specifying the motion type (Linear, Joint, Circular) between points.

4. Operation

Defining Tool Center Point (TCP)

Accurate TCP definition is critical for precision. The controller software includes a guided 4-point or 6-point teaching wizard to automatically calculate the tool's dimensions. This ensures that when you program a linear move, the tip of the tool follows the correct path.

Tip: Always re-run the TCP setup wizard after modifying or replacing the end-of-arm tooling to maintain accuracy.

Setting Payload Data

For optimal motion control and to protect the hardware, you must define the mass properties of your payload. Enter the weight (up to 120 kg), center of gravity coordinates, and moments of inertia for your tooling and workpiece in the payload settings menu.

Tip: Use the 'Payload Estimation' feature for simple geometries if precise inertia data is unavailable.

Running in Automatic Mode

To run a program in production, switch the controller key to 'AUTO' mode. The program can then be started and stopped via signals from a master PLC over PROFINET or an external operator panel. All safety gates must be closed for automatic operation.

Using PROFINET for System Integration

The LA013-010 acts as a PROFINET IO device, allowing seamless integration with a plant-wide control system. Configure digital and group I/O signals to synchronize the robot's actions with upstream and downstream equipment like conveyors and CNC machines.

Fault Handling and Recovery

When a fault occurs, the robot stops, and an alarm is displayed on the teach pendant. To recover, identify and resolve the root cause described in the alarm message, then press the 'RESET' button to clear the fault before resuming operation.

5. Maintenance Schedule

Interval	Task	Notes
Daily	Visually inspect the robot arm, controller, and cabling for any signs of damage, leaks, or loose connections. Check that the work area is clear of debris.	Perform this inspection before the start of the first shift.
Weekly	Listen for any unusual noises or vibrations from the axes during a slow-speed motion test. Clean the teach pendant screen and casing.	Document any changes in operational noise for trend analysis.

Interval	Task	Notes
Quarterly	Clean the controller cabinet air filters to ensure proper cooling of electronics. Verify the functionality of all E-Stop buttons.	Clogged filters are a leading cause of premature electronic failure.
Annually (or 4,000 hours)	Replace the absolute encoder backup batteries located in the robot base. This prevents the loss of mastering data.	This procedure must be performed while main power is applied to the controller to avoid data loss.
Annually (or 4,000 hours)	Check and replenish grease for axes J1, J2, and J3. Use only NexBot-specified lubricant.	Refer to the service manual for specific grease port locations and quantities.
Every 10,000 hours	Perform a comprehensive inspection and re-tensioning of all timing belts and harmonic drives.	This task should be performed by a NexBot-certified service technician.
Every 20,000 hours	Complete replacement of grease in all 6 axis gearboxes and inspection of internal wiring harnesses.	This is a major service interval requiring specialized tools and procedures.

6. Troubleshooting

Symptom	Possible Cause	Solution
Robot will not power on; no indicators on controller.	No incoming 480VAC power, or main breaker is tripped.	Verify the external power disconnect is engaged. Check and reset the main circuit breaker inside the controller cabinet.
Positioning is inaccurate, not meeting ± 0.05 mm repeatability.	TCP is defined incorrectly, payload data is wrong, or base mounting bolts are loose.	Re-run the TCP teaching wizard. Verify payload mass and CoG settings are accurate. Re-torque the M24 base anchor bolts.
Alarm: 'Servo Lag Fault' on a specific axis.	The axis is physically obstructed, the motor brake is not releasing, or the payload exceeds the 120 kg limit.	Check the work envelope for obstructions. Listen for an audible click from the brake when motors are enabled. Verify the actual payload weight.
Alarm: 'Mastering Data Lost'.	Encoder backup batteries are depleted and controller power was cycled.	Replace the encoder backup batteries immediately. Perform the full 6-axis mastering procedure to re-establish the robot's home position.
	Ethernet cable is disconnected/	Inspect the PROFINET cable at the controller and

Symptom	Possible Cause	Solution
Alarm: 'PROFINET Communication Failure'.	damaged, or network configuration mismatch (IP address, device name).	network switch. Use the teach pendant to verify the robot's network settings match the PLC project.
Robot moves much slower than programmed speed in AUTO mode.	The global speed override on the teach pendant is set below 100%, or a PLC signal is forcing a reduced speed.	Check the override setting on the teach pendant's run screen and set it to 100%. Monitor the PLC logic to ensure no speed reduction inputs are active.
Alarm: 'Overtravel Limit'.	A programmed point is outside the robot's physical or software-defined motion range.	In T1 mode, jog the offending axis in the opposite direction to move it off the limit switch. Edit the program point to be within the valid working envelope.
Gripper or other end-effector fails to actuate.	No pneumatic/electric supply to EOAT, or incorrect I/O signal mapping.	Check air lines and electrical connections to the tool. Manually force the output signal from the teach pendant's I/O screen to verify robot output and tool functionality independently.

7. Technical Specifications

Parameter	Value	Unit
Weight	1280.0	kg
Material	Cast Iron and Aluminum Alloy	
Voltage	480VAC	
IP Rating	IP67	
Country of Origin	KR	
Protocol	PROFINET	
Dimensions	850 x 750 x 1200 mm	
Reach	2655 mm	
Payload	120 kg	
Axes	6	
Repeatability	±0.05 mm	

