

User Manual: NexBot Robotics Operator Training Course 911-001

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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 work envelope while it is under power unless specifically instructed by a certified trainer and all safety protocols are active. Unexpected robot motion can cause fatal injury.

WARNING: Always treat a robot as if it is live and capable of motion, even when stopped. Stored energy in pneumatic or electrical systems can cause movement without warning.

WARNING: Do not wear loose clothing, jewelry, or unsecured long hair in the training lab. These items can become entangled in moving machinery, resulting in serious injury.

CAUTION: Always know the location of the nearest Emergency Stop (E-Stop) button for your training cell. Be prepared to press it immediately in any unexpected situation.

NOTICE: Handle the Teach Pendant with care. Dropping the device can cause significant damage and result in costly repairs and training delays. Always use the provided strap.

2. Product Overview

This training course provides operators, technicians, and engineers with the essential skills to safely operate, program, and maintain NexBot Robotics industrial robot systems. Designed for personnel with limited or no prior robotics experience, this comprehensive program combines classroom theory with extensive hands-on practice on live robotic cells, ensuring participants develop real-world proficiency and confidence. The core objective is to empower your team to maximize the uptime and productivity of your automated workcells. The curriculum is structured to build a strong foundational knowledge of robotic automation. Over the course of the intensive 3-day program, students will learn the principles of robot safety, including the setup of safety zones, understanding emergency stop circuits, and adhering to industry best practices for collaborative and industrial applications. A significant portion of the course is dedicated to mastering the teach pendant interface. Participants will gain proficiency in jogging the robot in various coordinate systems (Joint, World, Tool, User), creating and modifying motion programs with different path types, and managing digital input/output (I/O) signals for effective communication with peripheral equipment like grippers and sensors. Key benefits of this training include increased operator efficiency, reduced downtime due to common programming errors, and a significantly improved safety culture within your facility. By understanding the system's capabilities and required routine maintenance procedures, graduates can effectively troubleshoot common operational issues and perform essential preventative checks. The course is conducted by certified NexBot Robotics instructors in a small-group setting, with a maximum of 8 students per class, to guarantee personalized attention and substantial time on the equipment. Each student works with a dedicated training robot to practice creating, editing, and running programs. This operator course is highly relevant for manufacturing environments utilizing robots for applications such as machine tending, advanced pick-and-place, palletizing, automated assembly, and quality inspection. Upon successful completion of the course, which includes both a written examination and a practical programming assessment, participants will receive an official NexBot Robotics Operator Certificate, validating their skills and knowledge. This training is the critical first step towards empowering your team to fully leverage the capabilities of your automation investment and drive operational excellence.

3. Getting Started

1. Course Objectives

Upon successful completion of the NexBot Robotics Operator Training Course 911-001, participants will be able to power up and shut down a robot system, manually jog the robot using various coordinate systems, create and execute basic programs, and perform routine system

backups. The course focuses on building a strong foundation in safe and efficient robot operation.

2. Syllabus Overview

This course is divided into modules covering Robot Safety, Controller and Pendant Familiarization, Motion Control and Programming, I/O Concepts, and System Administration. Each module consists of a classroom theory session followed immediately by a hands-on lab to apply the concepts on a live NexBot robotic cell.

3. The Learning Environment

Training utilizes a blended approach. Theoretical concepts are delivered in a classroom setting or via live virtual instructor, while practical skills are developed in our state-of-the-art training lab. Each lab station is equipped with a NexBot robot, a controller, a teach pendant, and sample fixtures to simulate real-world tasks.

4. Operation

Understanding the Teach Pendant

The Teach Pendant is your primary interface for controlling the robot. This module covers the layout of the pendant, including the E-Stop button, dead-man switch, mode select switch, screen navigation, and keypad functions. You will learn how to enable and disable servo power safely.

Tip: Always hold the Teach Pendant with both hands and use the safety strap. This provides better control and prevents accidental drops.

Jogging the Robot

Manual robot movement, or jogging, is a fundamental skill for teaching points and recovering from errors. This section provides extensive practice in jogging the robot in different coordinate systems, including Joint, World, Tool, and User frames. Understanding which frame to use for a specific task is key to efficient programming.

Tip: When starting, always use a slow jog speed (e.g., 10%) until you are comfortable with the robot's direction of movement in each coordinate system.

Creating a Basic Program

Learn the fundamentals of creating a motion program. This involves defining tool and user frames, teaching points in space, and selecting motion types (Joint, Linear, Circular) between those points. The lab exercise guides you through creating, testing, and running a simple pick-and-place routine.

Working with Digital I/O

Industrial robots must interact with other equipment. This module explains how to monitor digital input signals (like sensors) and control

digital output signals (like grippers or clamps). You will learn to add I/O instructions to your programs to make decisions and interact with peripheral devices.

Tip: Before testing I/O in a program, always check the I/O status screen to manually toggle outputs and confirm wiring and device functionality.

System Backup and File Management

Protecting your work is critical. This section covers the procedures for backing up robot programs and system configuration files to a USB drive or network location. You will also learn how to load existing programs and manage files on the robot controller.

5. Maintenance Schedule

Interval	Task	Notes
Monthly	Review the core safety procedures for robot operation learned in the course. Re-read the safety chapter of the robot's operator manual.	Focus on lockout/tagout procedures and the proper use of the E-stop and dead-man switches.
Quarterly	Log into the NexBot LMS and complete one of the available skill-refresher micro-learning modules.	These short modules cover specific topics like coordinate systems or advanced motion instructions.
Quarterly	Perform a supervised dry run of a basic program on a live robot. Practice jogging, executing a program step-by-step, and performing a system backup.	This hands-on practice is crucial for skill retention. Always have a certified supervisor present.
Annually	Review the course materials and notes taken during the 911-001 training.	Pay special attention to areas you found challenging to ensure concepts remain fresh.
Annually	Consider enrolling in an advanced training course, such as Maintenance or Advanced Programming, to build upon the foundational skills from this course.	Continuous learning is key to becoming a robotics expert.

6. Troubleshooting

Symptom	Possible Cause	Solution
The robot does not move when I try to jog it.	Multiple potential causes: Servo power is not enabled, the dead-man switch is not engaged correctly, an E-stop is active, or a fault condition exists.	Check the teach pendant screen for active faults. Ensure the mode switch is in T1 or T2, gently squeeze the dead-man switch to its middle position, and press the servo power-on button. Verify all E-stops are released.
My program stops with a 'Singularity' error.	The robot's wrist axes (typically joints 4 and 6) have become aligned during a linear move, causing an inability to calculate the correct orientation.	Slightly change the position or orientation of the point causing the error. If possible, use a Joint move instead of a Linear move through the singularity zone.
I cannot access the online course materials in the LMS.	Incorrect login credentials, expired session, or browser cache issues.	Log out and log back in to the NexBot LMS. Clear your browser's cache and cookies. If the problem persists, use the 'Forgot Password' link or contact the training administrator.
The robot moves in an unexpected direction when jogging in World frame.	The operator is not oriented correctly relative to the robot's World frame, leading to confusion between X, Y, and Z directions.	Stand in the designated operator position defined during system setup. Refer to the World frame diagram in the course material. Start with very slow jog speeds.
Program gives an 'Out of Reach' or 'Limit' error.	The program is trying to send the robot to a point that is outside its physical work envelope or violates a configured axis limit.	Jog the robot manually to the desired position. If you can't reach it, the point is physically unreachable. Re-teach the point to a location within the robot's working range.
The gripper does not open or close when commanded in the program.	The digital output is not correctly mapped, the I/O instruction is wrong, or there is an issue with the physical gripper (air supply, wiring).	Go to the I/O screen and manually force the output for the gripper. If it works, the problem is in the program logic. If it doesn't, check the physical connections and air supply to the gripper.

7. Technical Specifications

Parameter	Value	Unit
Country of Origin	IT	