User Manual: NexBot Drives 921-002 Preventive Maintenance Plan

SKU: NXB-KIT-921-002 | 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 in robot controllers and drive systems. Always perform full Lockout, Tagout, and Tryout (LOTO) procedures and verify zero energy state with a calibrated multimeter before beginning any hands-on lab work.

WARNING: Unexpected robot motion can cause severe injury or death. Always remain outside the robot's work envelope during restart and motion validation tests unless explicitly instructed otherwise by the certified instructor.

WARNING: Improperly torqued fasteners on a servo motor can lead to catastrophic failure. Always use a calibrated torque wrench and follow the sequence specified in the training materials.

CAUTION: Servo motors and drive components can have hot surfaces during and after operation. Allow components to cool to a safe temperature before handling.

NOTICE: The training procedures covered in the NexBot Drives 921-002 Preventive Maintenance Plan are specific to NexBot equipment. Do not attempt to apply these exact procedures to other manufacturers' equipment without proper training and documentation.

2. Product Overview

NexBot Drives 921-002 Preventive Maintenance Plan (NXB-KIT-921-002) is a instructor-led training course for robotics maintenance teams responsible for servo motor replacement, post-service verification, and safe restart procedures. The course covers lockout and isolation checks, removal and installation sequence, encoder and cabling inspection, alignment and torque verification, fault reset workflow, and final motion validation steps used in industrial robot service operations. Training materials are organized as structured lessons with guided walkthroughs, technician checklists, and repeatable assessment criteria so plants can standardize how maintenance work is executed across shifts and sites. It is suited to maintenance technicians, service supervisors, and field support teams that need accurate, process-driven instruction rather than generic awareness content.

3. Getting Started

1. Course Overview

Welcome to the NexBot Drives 921-002 Preventive Maintenance Plan. This course is designed to provide maintenance personnel with the skills and knowledge required to safely and efficiently replace servo motors on NexBot industrial robots. The curriculum blends online theory with instructor-led, hands-on practice.

2. Learning Objectives

Upon successful completion of this course, you will be able to perform a complete lockout and isolation check, correctly execute the motor removal and installation sequence, and validate the robot's functionality post-service. You will also be proficient in inspecting encoders, verifying alignment, and resetting common faults related to motor replacement.

3. Using the Training Portal

The NexBot Technical Training Portal is your hub for all course-related activities. Here you can access pre-work modules, download reference materials, view your course schedule, and retrieve your certificate upon completion. Please familiarize yourself with the portal dashboard before the first session.

4. Operation

Module 1: Lockout and Isolation Checks

This module covers the critical first step in any maintenance procedure: ensuring the robot is in a zero-energy state. We will review company-specific LOTO policies and demonstrate the NexBot-approved procedure for verifying that all electrical, pneumatic, and hydraulic energy sources are isolated.

> **Tip:** Always perform a 'Tryout' by attempting to start the machine after applying locks and tags. This is the only way to be certain that energy isolation was successful.

Module 2: Removal and Installation Sequence

Learn the precise, step-by-step process for removing the existing servo motor and installing the replacement. This section emphasizes proper handling of components, managing cabling, and using correct mechanical techniques to prevent damage to the robot or the new motor.

> **Tip:** Keep all fasteners organized during removal. Using a magnetic tray or labeled containers can prevent confusion during reassembly.

Module 3: Encoder and Cabling Inspection

A successful motor replacement depends on the integrity of its feedback and power systems. This module teaches you how to inspect encoder couplings for wear, check cables for frays or damage, and ensure all connectors are clean and securely seated before powering on the system.

Module 4: Alignment and Torque Verification

Proper alignment and torque are essential for robot accuracy and longevity. Participants will use specialized tools to verify motor alignment and will practice using a calibrated torque wrench to secure all mounting bolts in the correct pattern and to the proper specification.

> **Tip:** Always tighten bolts in a star or crisscross pattern to ensure even pressure distribution across the mounting flange.

Module 5: Fault Reset and Motion Validation

After the hardware is installed, the system must be safely restarted and validated. This module covers the standard workflow for clearing post-maintenance faults from the controller, followed by a series of slow, controlled motion tests to confirm the robot operates as expected.

5. Maintenance Schedule

Interval	Task	Notes
Quarterly	Review the digital course manual and key procedural checklists.	Focus on the safety and LOTO sections to keep critical safety knowledge fresh.
Semi-Annually	Perform a supervised servo motor replacement on-site with a senior technician.	This practical application helps retain hands-on skills and reinforces correct procedures.
Annually	Complete the online refresher module available on the NexBot Training Portal.	The refresher module covers any updates to procedures or best practices.
Every 2 Years	Attend a recertification course.	Recertification is required to maintain an active status for performing this maintenance task under the NexBot service program.
As Needed	Consult the post-course reference materials before performing any unfamiliar or non-routine motor service.	Never rely solely on memory for critical maintenance tasks. Always refer to the official documentation.

6. Troubleshooting

Symptom	Possible Cause	Solution
Cannot access online pre-work modules on the training portal.	Incorrect login credentials, expired registration link, or corporate firewall blocking the portal.	Verify you are using the correct email and password. If the issue persists, contact your training coordinator to have the registration link re-sent. Check with your IT department to ensure '*.nexbot-robotics.com' is whitelisted.
Participant is not permitted into the hands-on lab session.	Failure to complete the mandatory online prerequisite modules or absence during the safety briefing.	The participant must complete all required online content. If the safety briefing was missed, they cannot continue with the lab and must be rescheduled for a future session.

Symptom	Possible Cause	Solution
During the lab, the robot controller shows a new fault code immediately after motor installation.	An encoder cable is not fully seated, power cables are swapped, or the encoder was damaged during installation.	With the system powered down and locked out, re-verify all cable connections are secure. Visually inspect the encoder and cable pins for damage. Consult with the instructor to diagnose the specific fault code.
The robot exhibits jerky motion or position errors during the post-service motion validation.	Incorrect motor alignment, loose mounting bolts, or an incorrect motor configuration file loaded.	Review the alignment and torque verification procedures. Ensure all fasteners are torqued to spec. Work with the instructor to verify the correct system parameters are active in the controller.
Certificate of Completion is not available on the training portal after the course.	The final assessment has not been marked as complete by the instructor, or there is an administrative processing delay.	Confirm with the instructor that your assessment was successfully submitted and graded. If so, contact the NexBot Training Coordinator to inquire about the status of your certificate.
A tool required in the lab (e.g., torque wrench) is not functioning correctly.	Tool is out of calibration, damaged, or has a dead battery.	Immediately stop work and notify the instructor. Do not use suspect tooling. The instructor will provide a properly calibrated and functional replacement.

7. Technical Specifications

Parameter	Value	Unit
Country of Origin	JP	