

User Manual: NexBot Vision 222-011 Teach Pendant with 10.1-inch Display

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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: The Emergency Stop button provides a Category 0 stop (uncontrolled). Always be aware of the robot's position and potential momentum to prevent collisions or injury when the E-Stop is activated.

WARNING: Never enter the robot's restricted operating space while it is in Automatic (AUTO) mode, even if it is stationary. Use the pendant for manual operations in Teach (T1) mode only, with all personnel outside the safeguarded space.

WARNING: The 3-position deadman switch is a critical safety device designed to disable motor power if the operator becomes incapacitated. Never tamper with, bypass, or otherwise defeat this switch.

CAUTION: The pendant's IP65 rating is dependent on proper cable connection and the integrity of its seals. Do not expose the unit to high-pressure washdowns or submerge it in liquids.

NOTICE: The NexBot Vision 222-011 is a precision control device. Dropping it or subjecting it to severe impact can damage the display and internal

electronics, potentially compromising safety functions. Always store it in the provided holder.

2. Product Overview

The NexBot Vision 222-011 Teach Pendant is a high-performance human-machine interface (HMI) designed for programming, jogging, and operating NexBot industrial robots. It provides operators and programmers with a direct, intuitive interface for controlling robot motion, editing programs, and monitoring system status in real-time. The pendant is engineered for demanding industrial environments, combining advanced functionality with robust construction. Key to its design is the bright, responsive 10.1-inch full HD (1920x1080) touchscreen, which delivers crisp graphics and ample space for complex programming interfaces and diagnostic displays. This clarity reduces operator fatigue and minimizes errors during intricate setup procedures. The ergonomic, lightweight construction, weighing only 1.2 kg, ensures comfortable handling during extended programming sessions. For durability, the pendant features an impact-resistant polycarbonate composite housing and is sealed to an IP65 rating, protecting it against dust ingress and low-pressure water jets from any direction. Safety is paramount in robot operation, and the 222-011 pendant integrates critical safety features, including a three-position enabling switch and an illuminated, easily accessible Emergency Stop button compliant with international safety standards. This allows operators to safely interact with the robot system during manual operations and teaching tasks. Typical applications include program creation for pick-and-place, machine tending, welding, and assembly operations, as well as system diagnostics and manual jogging. Installation is straightforward, with a secure, quick-connect interface to the main robot control cabinet.

3. Getting Started

1. Powering On and Initialization

The teach pendant is powered directly by the robot controller and will begin its boot sequence as soon as the controller is energized. During startup, the pendant performs a self-check and establishes a secure link with the controller. The main HMI screen will be displayed once initialization is complete.

2. Navigating the Main Interface

The 10.1-inch touchscreen is the primary interface. The top status bar displays critical information like operating mode, active alarms, and robot speed. The central area is used for jogging, programming, and I/O monitoring, while the bottom provides context-sensitive soft keys for common actions.

3. Selecting the Operating Mode

Use the physical key switch to select the desired control mode. T1 is a low-speed manual mode for teaching points. T2 allows for faster manual movement for testing. AUTO mode is for running production programs and disables manual jogging.

4. Enabling Robot Servos

To enable robot movement in T1 or T2 mode, you must first hold the deadman switch on the rear of the pendant in its middle position. Then, press the 'Servo On' button on the HMI. A status indicator will confirm that the robot's motors are energized and ready for motion commands.

4. Operation

Jogging the Robot Manually

Select a jog mode (e.g., Joint, World, Tool) from the HMI. Use the multi-axis joystick to move the robot; each direction corresponds to an axis or direction in the selected coordinate frame. The speed can be adjusted in real-time using the override dial.

Tip: For predictable initial movements, always start in 'Joint' mode to move one robot axis at a time.

Creating and Editing Programs

Navigate to the program editor to write or modify robot routines. Use the on-screen keyboard and command palette to insert motion instructions, logic, and I/O commands. Programs are saved directly to the robot controller's memory.

Teaching and Modifying Positions

Jog the robot to the exact position and orientation you wish to record. In the program editor, select a motion instruction and press the 'Record Position' soft key. This action captures the robot's current coordinates and stores them in the program line.

Tip: Use the 'Touch Up' function to make minor adjustments to a previously recorded point without having to re-record it completely.

Monitoring System I/O

The I/O monitoring screen provides a live view of all digital and analog inputs and outputs connected to the robot controller. This is essential for debugging program logic and verifying communication with external equipment like sensors, grippers, and PLCs.

Performing a Program Test Run

In T1 mode, you can safely test a program at reduced speed. Use the 'Step' function to execute one line at a time, or use the 'Continuous' run option to execute the full program while holding the deadman switch. This allows for path verification before running at full production speed.

5. Maintenance Schedule

Interval	Task	Notes
Daily	Visually inspect the pendant housing, screen, and cable for any signs of physical damage such as cracks, deep scratches, or cuts. Ensure the E-Stop button is not damaged.	Remove the unit from service immediately if significant damage is found.
Weekly	Clean the touchscreen display using a soft, lint-free cloth and a cleaning solution approved for electronics. Wipe down the polycarbonate composite housing to remove dirt and grime.	Do not spray cleaning solution directly onto the screen; apply it to the cloth first.

Interval	Task	Notes
Monthly	Perform a functional test of the Emergency Stop button and the 3-position deadman switch. Verify that each device correctly triggers a safety stop condition in the robot controller.	Log the results of this safety check in the machine's maintenance records.
Quarterly	Inspect the cable strain relief at both the pendant and controller ends. Ensure they are secure and preventing the cable from bending at a sharp angle.	Loose strain relief is a leading cause of intermittent connection faults.
Annually	Examine the integrity of the pendant's case seals and the cable connector gasket. Check for signs of hardening, cracking, or degradation to ensure the IP65 rating is maintained.	This is critical in environments with exposure to fluids or fine particulates.
As Needed	Replace the disposable screen protector if it becomes excessively scratched, peeled, or opaque, as this can impair touchscreen visibility and responsiveness.	Use only official NexBot Robotics replacement screen protectors.

6. Troubleshooting

Symptom	Possible Cause	Solution
Pendant screen is blank, controller is powered on.	Loose or damaged pendant cable; internal pendant fault.	Power down the controller, then disconnect and reconnect the pendant cable, ensuring the locking mechanism engages. Inspect the cable for damage. If the issue persists, the pendant may require service.
Touchscreen is not responding or is inaccurate.	Screen is dirty, has a non-approved screen protector, or requires calibration.	Clean the screen thoroughly. If the issue continues, perform the touchscreen calibration routine found in the HMI's system settings menu.
Error message: 'Deadman Switch Fault'.	The deadman switch is not being held in its center-enabling position, or the switch is faulty.	Ensure you are holding the switch in its middle position. Release and re-engage the switch. If the fault does not clear, the pendant needs to be serviced.
Cannot enable servo power; 'Servo On' button is unresponsive.	An active safety fault is present (e.g., E-Stop, fence open).	Check for and reset any active E-Stops on the pendant or controller. Check the HMI's alarm screen to identify and clear any other active safety circuit faults.

Symptom	Possible Cause	Solution
Joystick movement is erratic or does not match input.	Joystick requires recalibration or is mechanically faulty.	Run the joystick calibration routine from the system settings menu. If the problem persists, the joystick assembly may be damaged and the pendant requires repair.
An intermittent 'Communication Lost' alarm appears.	The pendant cable has an internal break or the connector pins are contaminated.	Inspect the entire length of the cable for physical damage, especially near the connectors. Power down and clean the connector pins with contact cleaner. Replace the cable if damage is found.
Display is very dim or flickers.	Pendant backlight is failing or there is an unstable 24VDC supply.	With a multimeter, verify a stable 24VDC supply at the controller's HMI port. If the power supply is stable, the pendant's backlight has reached its end-of-life and the unit needs to be serviced.

7. Technical Specifications

Parameter	Value	Unit
Weight	1.2	kg
Material	Impact-Resistant Polycarbonate Composite	
Voltage	24VDC	
IP Rating	IP65	
Country of Origin	JP	
Dimensions	305 × 210 × 55 mm	