User Manual: NexBot Safety 322-012 3D Vision Camera 1.2 MP

SKU: NXB-SNS-322-012 | 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: Disconnect and lock out all 24VDC power sources before performing any installation or maintenance. Failure to de-energize equipment can result in severe electric shock.

WARNING: The camera utilizes a structured light projector. Do not stare directly into the projector aperture during operation to avoid potential eye injury.

WARNING: Ensure the camera is securely fastened. The unit weighs 1.4 kg and can cause serious injury or equipment damage if it falls.

CAUTION: The Anodized Aluminum housing acts as a heat sink and may become hot during operation. Allow the unit to cool before handling.

NOTICE: This is an ESD-sensitive device. Always wear a grounded anti-static wrist strap when handling connectors or performing service to prevent damage to internal components.

2. Product Overview

NexBot Safety 322-012 3D Vision Camera 1.2 MP (NXB-SNS-322-012) is a 3d vision cameras used in industrial robotics equipment where category-specific fit, electrical or mechanical compatibility, and predictable serviceability are important to buyers. The product should be understood as the exact component named by its category path, not as a complete robot or a generic service item. It supports installation, replacement, and maintenance workflows in robotic production cells by giving procurement and maintenance teams a clearly defined part class, relevant engineering specifications, and application context that matches the actual hardware being purchased.

3. Getting Started

1. First Power-Up

Upon initial power-up, the NexBot Safety 322-012 will boot and its status LEDs will cycle. By default, it will attempt to obtain an IP address via DHCP. Ensure your configuration laptop is on the same network subnet to allow for initial discovery.

2. Software Installation

Download the latest version of the NexBot Vision Configurator software from the official NexBot Robotics support portal. This application is required for all device setup, calibration, and diagnostic activities. Administrative rights are required for installation.

3. Establishing a Connection

Launch the Vision Configurator software. Use the device discovery tool to find the NXB-SNS-322-012 camera on the network. Connect to the device to begin the guided setup process for network configuration and basic imaging parameters.

4. Operation

Network Configuration

For reliable industrial operation, set a static IP address that conforms to your facility's network plan. Use the Vision Configurator to assign the IP address, subnet mask, and gateway. The device communicates using the EtherNet/IP protocol.

> **Tip:** Document the assigned static IP address on the device housing or in your cell's maintenance log for future reference.

Image Acquisition Settings

Optimize the 3D data quality by adjusting exposure time, gain, and projector brightness. These settings must be tuned for your specific part material, color, and ambient lighting conditions to ensure a dense and accurate point cloud.

Defining a Region of Interest (ROI)

To maximize performance, define a 3D bounding box that covers only the necessary workspace. Processing data exclusively within this ROI reduces network bandwidth and accelerates processing time in the robot controller.

> **Tip:** Make the ROI slightly larger than your largest part to account for variations in part presentation.

Hand-Eye Calibration

Perform an extrinsic, or 'hand-eye', calibration to align the camera's coordinate system with the robot's coordinate system. This critical step translates the camera's vision data into actionable positional data for the robot, ensuring accurate picking or placement.

Job Configuration and PLC Integration

Create and save jobs within the camera that contain specific settings for different parts or tasks. These jobs can be switched remotely by the PLC or robot controller via EtherNet/IP commands, allowing for flexible automation of mixed-part production lines.

5. Maintenance Schedule

Interval	Task	Notes
Weekly	Inspect and clean the camera lens and projector window. Use a soft, lint-free microfiber cloth and an approved optical cleaning solution.	In environments with heavy dust or aerosols, this may be required daily. Do not use abrasive chemicals.
Monthly	Verify the integrity of the mounting bracket and fasteners. Check for any signs of loosening due to machine vibration and re-torque if necessary.	A change in camera position will require recalibration.
Quarterly	Inspect power and EtherNet/IP cables for wear, chafing, or damage, particularly at connection points and along paths with dynamic flexing.	Replace any cable that shows signs of compromised insulation or connector damage.
Annually	Perform a calibration verification check using a certified artifact. This ensures that thermal cycles and vibration have not caused measurement drift.	Recalibrate the system if measured accuracy is outside of the application's required tolerance.
As Needed	Update camera firmware. Check the NexBot Robotics support portal periodically for firmware releases that may offer performance enhancements or new features.	Always back up the current camera configuration before performing a firmware update.

6. Troubleshooting

Symptom	Possible Cause	Solution
Camera power LED is off.		Use a multimeter to confirm 24VDC at the camera's power connector. Check for secure

Symptom	Possible Cause	Solution
	No 24VDC supply, faulty power cable, or reversed polarity.	cable connections and verify correct wiring polarity.
Cannot discover camera in Vision Configurator software.	Network issue, IP address mismatch, or firewall.	Ensure the laptop and camera are on the same network subnet. Ping the camera's IP address. Check for faulty network cables or switch ports. Temporarily disable PC firewall to rule it out as a cause.
Point cloud data is sparse or has holes.	Suboptimal exposure settings, highly reflective or dark surfaces, or ambient light interference.	Adjust exposure time and gain in software. Shield the area from strong external light. For challenging surfaces, consider applying a matte developer spray if permissible.
Robot picks are consistently inaccurate or offset.	Incorrect or outdated hand-eye calibration.	Re-run the entire hand-eye calibration procedure. Ensure the calibration grid is perfectly stationary and the robot positions are taught accurately.
Camera connection drops intermittently.	Damaged Ethernet cable, IP address conflict, or excessive network traffic.	Inspect the Ethernet cable for damage, especially near moving parts. Use a network scanner to check for duplicate IP addresses. Isolate the camera on a dedicated subnet if possible.
Camera housing is excessively hot to the touch.	High ambient temperature or blocked airflow around the camera.	Ensure ambient temperature is within the specified operating range. Verify there is adequate free space around the camera's 180 x 120 x 75 mm body for convective cooling.

7. Technical Specifications

Parameter	Value	Unit
Weight	1.4	kg
Material	Anodized Aluminum 6061-T6	
Voltage	24VDC	
IP Rating	IP67	
Country of Origin	SE	
Protocol	EtherNet/IP	
Dimensions	180 x 120 x 75 mm	