

User Manual: NexBot Drives 341-006 Thermal Camera

SKU: NXB-SNS-341-006 | Version: 1.0 | Brand: NexBot Robotics

Table of Contents

1. Safety Information
2. Product Overview
3. Getting Started
4. Operation
5. Maintenance
6. Troubleshooting
7. Technical Specifications

1. Safety Information

READ ALL SAFETY INSTRUCTIONS BEFORE OPERATION. Failure to follow safety procedures may result in serious injury or equipment damage.

DANGER: Risk of electric shock. The device operates on 24VDC. Ensure power is disconnected before handling connections. Only qualified personnel should perform installation and service.

WARNING: The camera housing is a heat sink and can reach elevated temperatures during operation. Avoid direct skin contact to prevent burns.

WARNING: Never point the camera lens directly at the sun, laser sources, or arc welding processes. Direct exposure to high-intensity thermal sources can cause permanent damage to the microbolometer sensor.

CAUTION: The germanium lens is fragile and sensitive to scratches. Handle with care and only clean using approved methods and materials.

NOTICE: This is an ESD-sensitive device. Always use proper electrostatic discharge precautions, such as a grounded wrist strap, when handling the camera or its connectors.

2. Product Overview

The NexBot Drives 341-006 is a ruggedized thermal imaging camera designed for seamless integration with industrial robotic systems, providing critical non-contact temperature data for process control and quality assurance. This camera equips automated cells with the ability to see and quantify heat, enabling a wide range of applications from electronics inspection to weld monitoring. **Key Features & Benefits:** The core of the 341-006 is its high-resolution 640x480 uncooled microbolometer, which delivers detailed thermal images for accurate analysis. This high pixel count is crucial for detecting small thermal anomalies and precisely measuring temperature across a wide surface area. With a thermal sensitivity of <50 mK, the camera can distinguish between very subtle temperature differences, which is essential for identifying early-stage defects or process deviations. The camera operates over a broad temperature range of -20°C to 550°C, making it suitable for both low-temperature material handling and high-temperature manufacturing processes. Its 30 Hz frame rate ensures that thermal data is captured effectively even on moving production lines, preventing motion blur and data loss. **Applications in Robotics:** In robotic applications, this thermal camera is invaluable for tasks such as monitoring the temperature of injection molded parts upon ejection, verifying the integrity of adhesive curing processes, or performing automated quality inspection on circuit boards to find hot spots indicating potential failures. It can also be used in automated welding cells to monitor bead temperature in real-time, ensuring consistent quality and strength. The rugged, IP67-rated aluminum housing protects the internal components from dust, water, and vibration commonly found in industrial environments. **Installation & Integration:** The 341-006 camera features a standard mounting interface for easy attachment to robot end-of-arm tooling. Communication is handled via the GigE Vision protocol, providing reliable, high-speed data transfer over standard Ethernet cabling. It operates on a common 24VDC power supply, simplifying integration into existing electrical cabinets.

3. Getting Started

1. Software Installation

Install the NexBot Vision Suite from the provided media or download the latest version from the NexBot support portal. The installer will guide you through the setup process, including the installation of necessary GigE Vision drivers for your network interface card.

2. First Connection

After physical installation, launch the NexBot Vision Suite. The software will automatically scan the network for compatible devices. Select the NXB-SNS-341-006 from the device list and click 'Connect' to begin streaming thermal data.

3. Understanding the Live View

The main interface displays the live thermal feed from the camera. Use the toolbar to select different color palettes (e.g., Iron, Rainbow, Grayscale) to visualize heat patterns and use the digital zoom to inspect areas of interest more closely.

4. Setting Basic Parameters

For accurate temperature measurement, navigate to the 'Measurement Settings' panel. Adjust the 'Emissivity' to match your target material and set the 'Distance' to reflect the distance from the camera to the target surface.

4. Operation

Using Measurement Tools

Quantify thermal data using on-screen tools. Place spot meters for single-point readings, draw line profiles to see temperature gradients, or define rectangular areas to automatically track the minimum, maximum, and average temperatures within a region.

Tip: For dynamic scenes, increase the measurement tool's update rate in the settings, but be aware this may slightly increase host PC CPU usage.

Configuring Temperature Alarms

Create automated monitoring routines by setting temperature alarms. An alarm can be configured on any measurement tool to trigger a software event or a digital output when a temperature crosses a defined threshold, ideal for process control.

Image and Data Recording

Capture critical data for analysis and record-keeping. The software allows you to save single thermal snapshots (radiometric JPEGs), record full thermal video sequences, or log temperature data over time to a CSV file.

Non-Uniformity Correction (NUC)

The camera periodically performs an internal calibration called a NUC to ensure a clear, uniform image. This is heard as a faint click and a momentary freeze of the image. A manual NUC can also be triggered from the software if image quality appears degraded.

Tip: In highly dynamic thermal scenes, you may want to disable the automatic NUC and trigger it manually during stable process moments to avoid missing a critical event.

Focus Adjustment

The NexBot Drives 341-006 features a manual focus lens. For the sharpest image, place a thermally distinct object at your target working distance and carefully rotate the lens focus ring until the edges of the object appear crisp in the live view.

5. Maintenance Schedule

Interval	Task	Notes
Weekly	Inspect the camera lens for dust, debris, or smudges that could affect image quality and measurement accuracy.	If cleaning is needed, use a soft, lint-free cloth with a small amount of 99% isopropyl alcohol. Never use abrasive materials.
Monthly	Visually inspect power and data cables for signs of wear, abrasion, or damage, especially at connection points and areas of high flex.	Ensure all locking rings on connectors are still tight.

Interval	Task	Notes
Quarterly	Verify the integrity of the camera's mounting hardware. Check that all bolts are tightened to the correct torque specification and have not loosened due to operational vibration.	This is especially critical for cameras mounted on robot end-effectors.
Annually	Backup the camera's configuration files from the NexBot Vision Suite.	This ensures a quick recovery in case of system failure or camera replacement.
Annually	Perform a measurement verification check using a certified black body calibration source.	This is recommended for applications requiring high-accuracy, traceable temperature measurements.
As Needed	Update the camera firmware and NexBot Vision Suite software to the latest stable versions.	Check the NexBot support portal for release notes on new features and bug fixes.

6. Troubleshooting

Symptom	Possible Cause	Solution
Camera is not detected in software.	Power failure, incorrect network settings, or faulty cable.	Check the camera's status LED. Verify the host PC's IP address is on the same subnet as the camera. Test with a different Ethernet cable and port.
Video stream is choppy or freezes.	Network congestion, high CPU load on host PC, or incorrect NIC settings.	Ensure the camera is on a dedicated network switch or port. Close unnecessary applications on the host PC. Confirm Jumbo Frames are enabled on the NIC.
Temperature readings are consistently high or low.	Incorrect emissivity, background temperature, or distance settings.	Verify the emissivity value in the software matches the target material's properties. Ensure other radiometric parameters are correctly configured for the environment.
Image is blurry.	The lens is out of focus or the lens is dirty.	Perform a manual focus adjustment at the correct working distance. If the issue persists, carefully clean the lens according to maintenance procedures.
Image has a fixed pattern of	Sensor pixel defect.	Use the software's dead pixel correction tool to map out and conceal the defective pixels. If a

Symptom	Possible Cause	Solution
dead or bright pixels.		large cluster appears, contact NexBot support.
Camera status LED is flashing an error code.	Internal fault or over-temperature condition.	Consult the full technical manual for a list of error codes. Ensure ambient temperature is within the camera's operating range and that there is adequate airflow around the housing.
Cannot connect to camera after changing its IP address.	The new IP address is on a different subnet than the host PC, or an IP conflict exists.	Temporarily change the host PC's IP address to be on the same subnet as the camera's new address. Use the NexBot Vision Suite to reconfigure the camera's IP or resolve the network conflict.

7. Technical Specifications

Parameter	Value	Unit
Weight	0.45	kg
Material	Anodized Aluminum 6061-T6	
Voltage	24VDC	
IP Rating	IP67	
Country of Origin	CH	
Protocol	GigE Vision	
Dimensions	95 x 55 x 50 mm	