

Synology Camera BC800Z Smoke Detection Administrator's Guide

Synology

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Introduction

The Synology Camera BC800Z provides a video-based smoke detection feature that identifies smoke in both indoor and outdoor environments. Unlike traditional ceiling-mounted smoke detectors that require smoke to reach the device before triggering, this video-based function directly identifies the smoke source, enabling faster detection and response.

This guide is designed to help you configure your camera effectively, ensuring optimal detection results. For best results, please follow the listed points as closely as possible.

Important notice

The smoke detection feature of the Synology BC800Z is not fire safety equipment and does not replace certified smoke detection systems. Users must continue using certified smoke detection devices to meet regulatory and safety requirements.

Camera Quick Installation

Check installation environment

Camera placement

- Ensure the camera has a clear, unobstructed view of the entire area you want to protect.
- Mount cameras high enough to prevent accidental contact from foot traffic, yet low enough to remain accessible for maintenance.
- Position the camera to monitor high-risk fire zones (e.g., flammable materials, machinery, or workstations) to enable early detection of smoke plumes rising from these areas.
- Avoid mounting cameras behind obstructions like columns, equipment, or storage racks. Always verify the final field of view after installation.
- Ensure that no objects, such as signs, ducts, lights, or equipment, block the camera's view.
- If using multiple cameras, arrange them so their coverage areas slightly overlap to eliminate blind spots and ensures reliable, redundant coverage.

Environmental requirements

- Ensure sufficient contrast between the background and smoke for clear visibility
- Maintain consistent visibility in areas with changing or low light since detection relies on the camera's ability to clearly see smoke patterns. If lighting is insufficient, use supplemental white LED lighting to ensure adequate illumination.
- Minimize reflections from mirrors, glass, water, or shiny surfaces by adjusting lighting or camera angles, or using anti-glare treatments. You can also fine-tune the detection threshold to achieve better detection performance.

Impact of background on smoke visibility

Evaluate the background in your camera's field of view. Smoke must stand out visibly from walls, equipment, and other surfaces for reliable detection.

High smoke-to-background contrast



Low smoke-to-background contrast



Detection Mechanisms and Configuration

Triggering mechanism

Synology's smoke detection identifies two types of smoke: distinct smoke plumes with visible plumes or dense shapes, and ambient smoke that spreads rapidly or drifts from outside the camera view without a clear shape or direction. This ensures effective detection of common smoke patterns.

Note:

- Avoid using smoke detection in IR mode, as recognition accuracy may be affected. If night mode is required, use the white LED instead.
- Avoid frequent camera movement or optical zoom adjustments during smoke detection operation, as these actions may affect detection accuracy and performance.
- License plate recognition cannot be utilized in conjunction with smoke detection.

Distinct smoke plumes

- An event is triggered when smoke originates within the frame and has distinct visible plumes or dense shapes.
- The smoke must occupy at least 5% of the frame and remain visible for at least 2 seconds.

Smoke with distinct plumes



Smoke with indistinct plumes



Ambient smoke

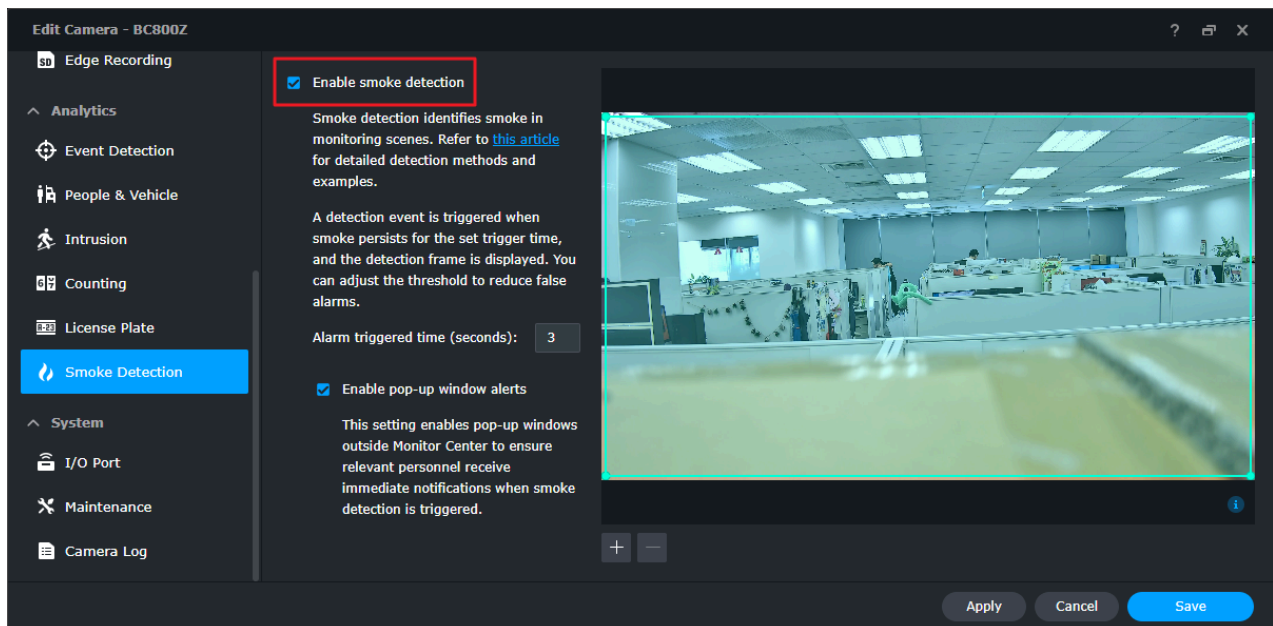
- An event is triggered by analyzing changes in overall image clarity, as the image becomes blurred due to the presence of smoke.
- Ambient smoke is defined as smoke that is quickly dispersed or drifts from outside the detection zone.

- If ambient smoke or distinct smoke plumes are continuously detected for two minutes, ambient smoke detection pauses and the clarity baseline is recalibrated.



Configure detection settings

Smoke detection settings can be configured by going to **IP Camera** > *select your Synology Camera BC800Z* > **Edit** > **Edit** > **Smoke Detection**.



Set trigger time

The trigger time defines how long smoke plumes or ambient smoke must be continuously detected before triggering a smoke detection event. When triggered, a detection box appears in the **Monitor**

Center. Users can adjust the trigger time to fine-tune sensitivity for different environments. In areas prone to false alarms, setting a longer trigger time is recommended.

Set detection area

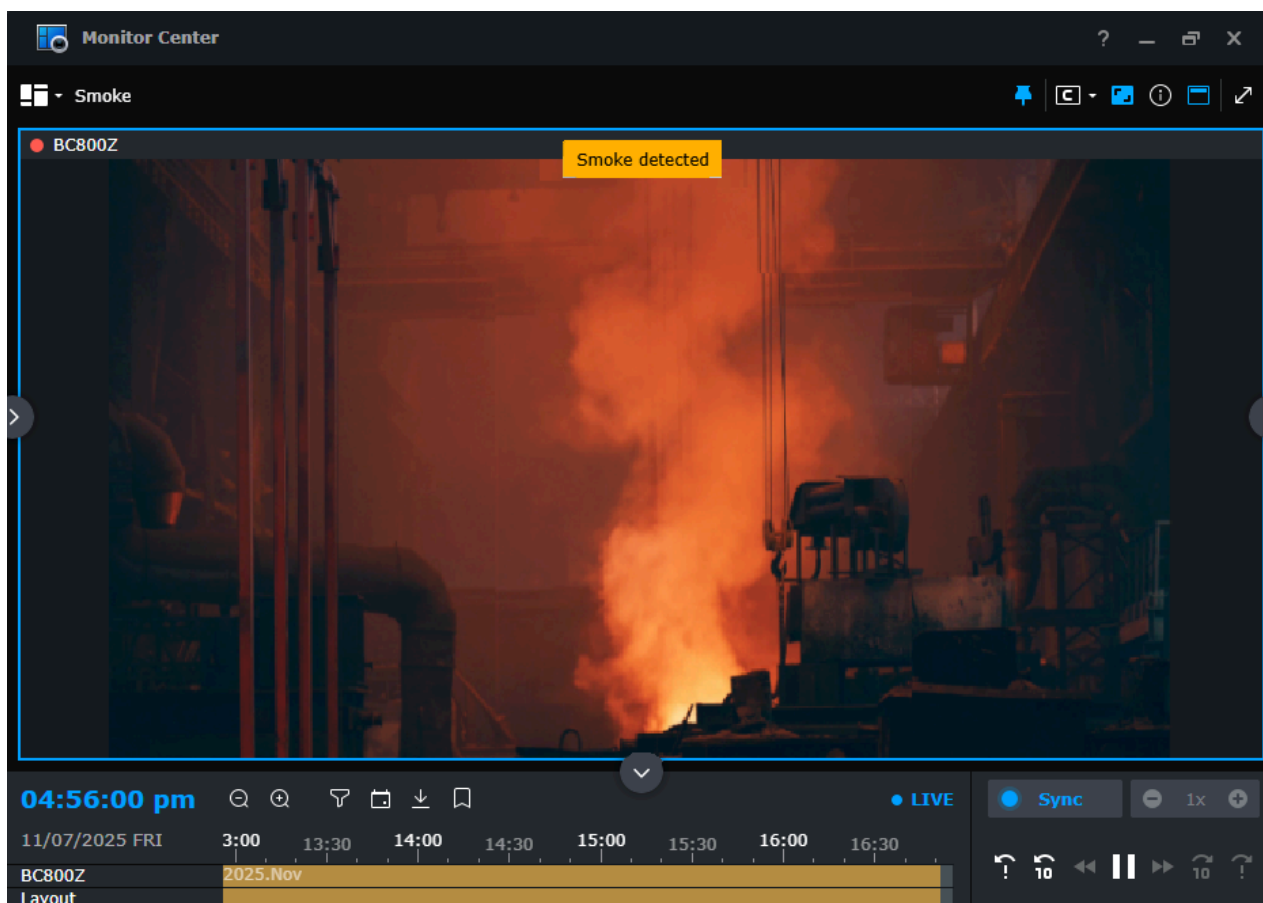
This setting applies only to distinct smoke plume detection and helps exclude areas prone to false detections, improving overall accuracy. Ambient smoke detection analyzes full-frame clarity changes and is not affected by detection area settings.

Enable pop-up alerts

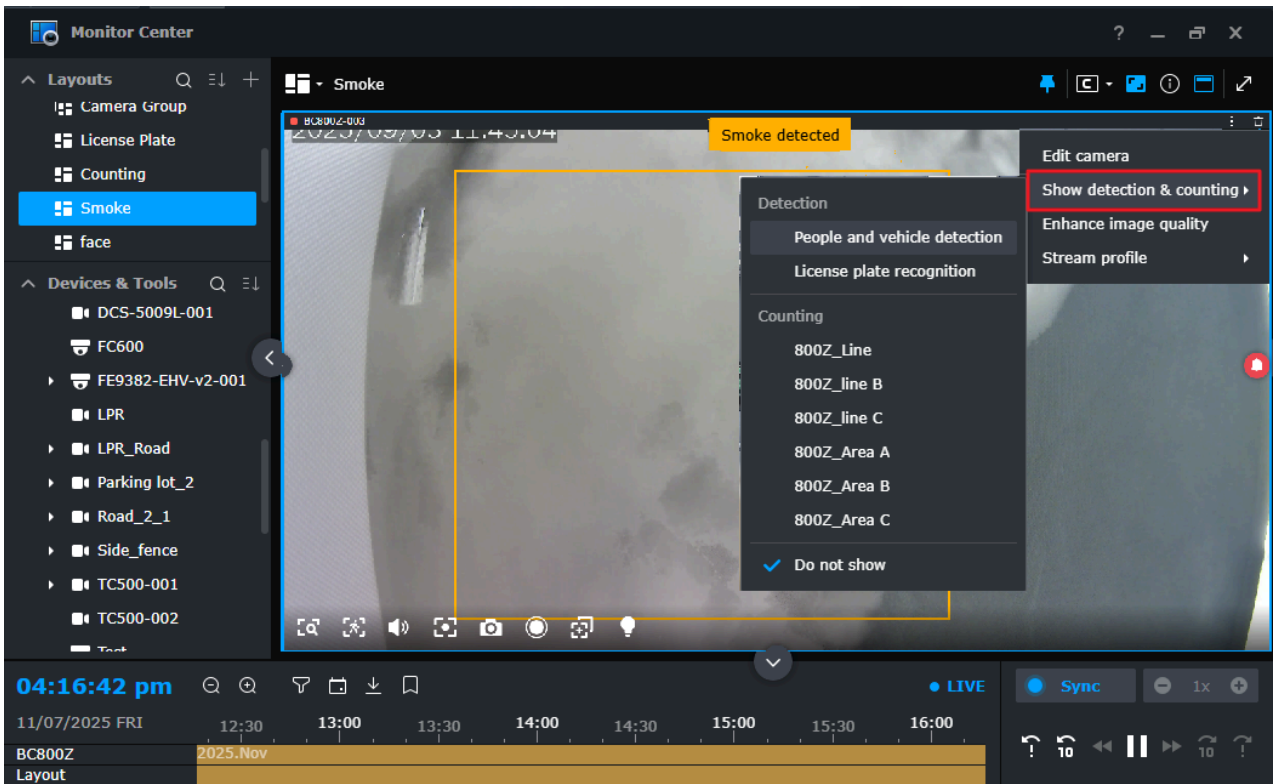
When enabled, this feature displays a pop-up window outside the Monitor Center to ensure relevant personnel receive real-time smoke detection alerts.

View detection in Monitor Center

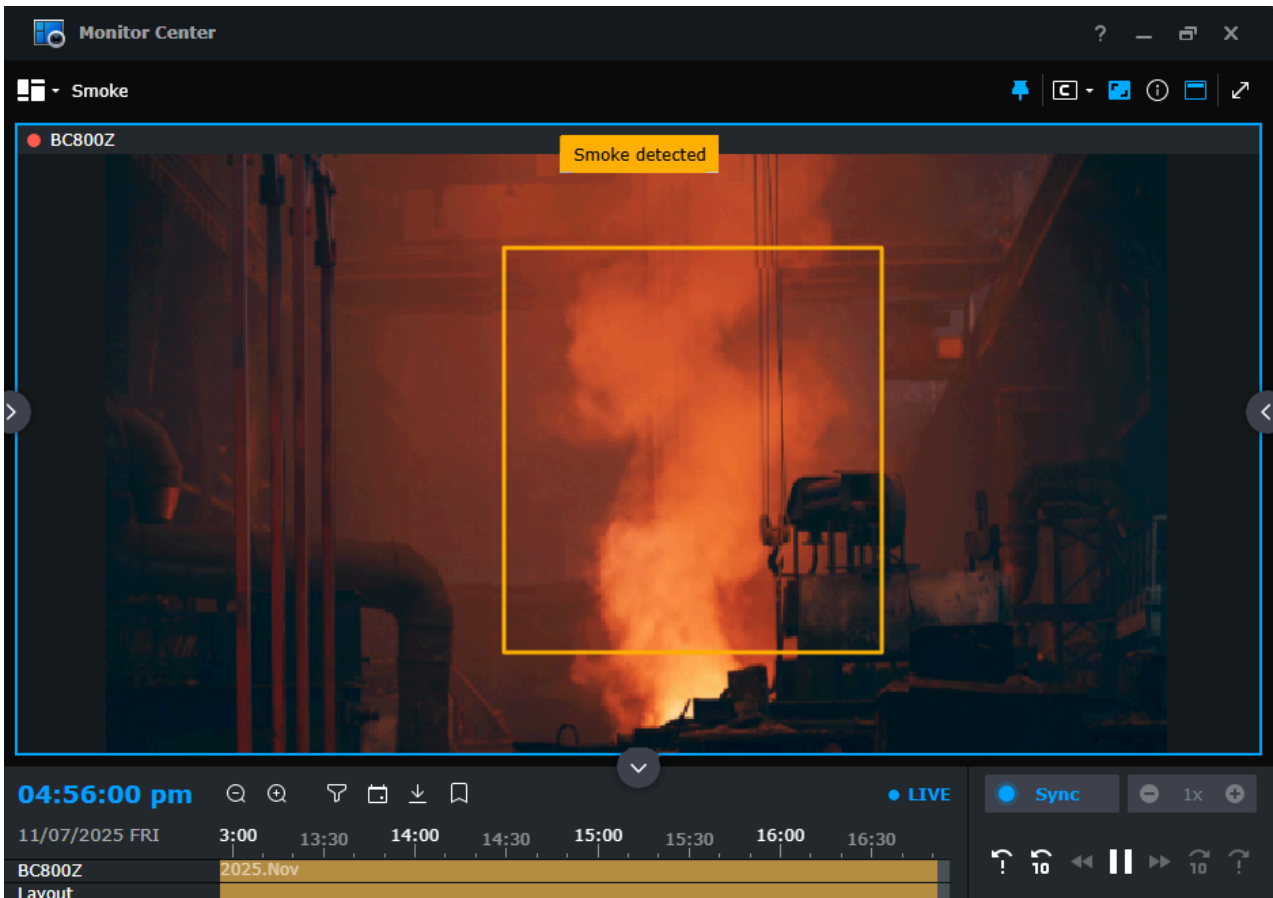
By default, when smoke is detected (regardless of smoke type), a "Smoke detected" message is displayed.



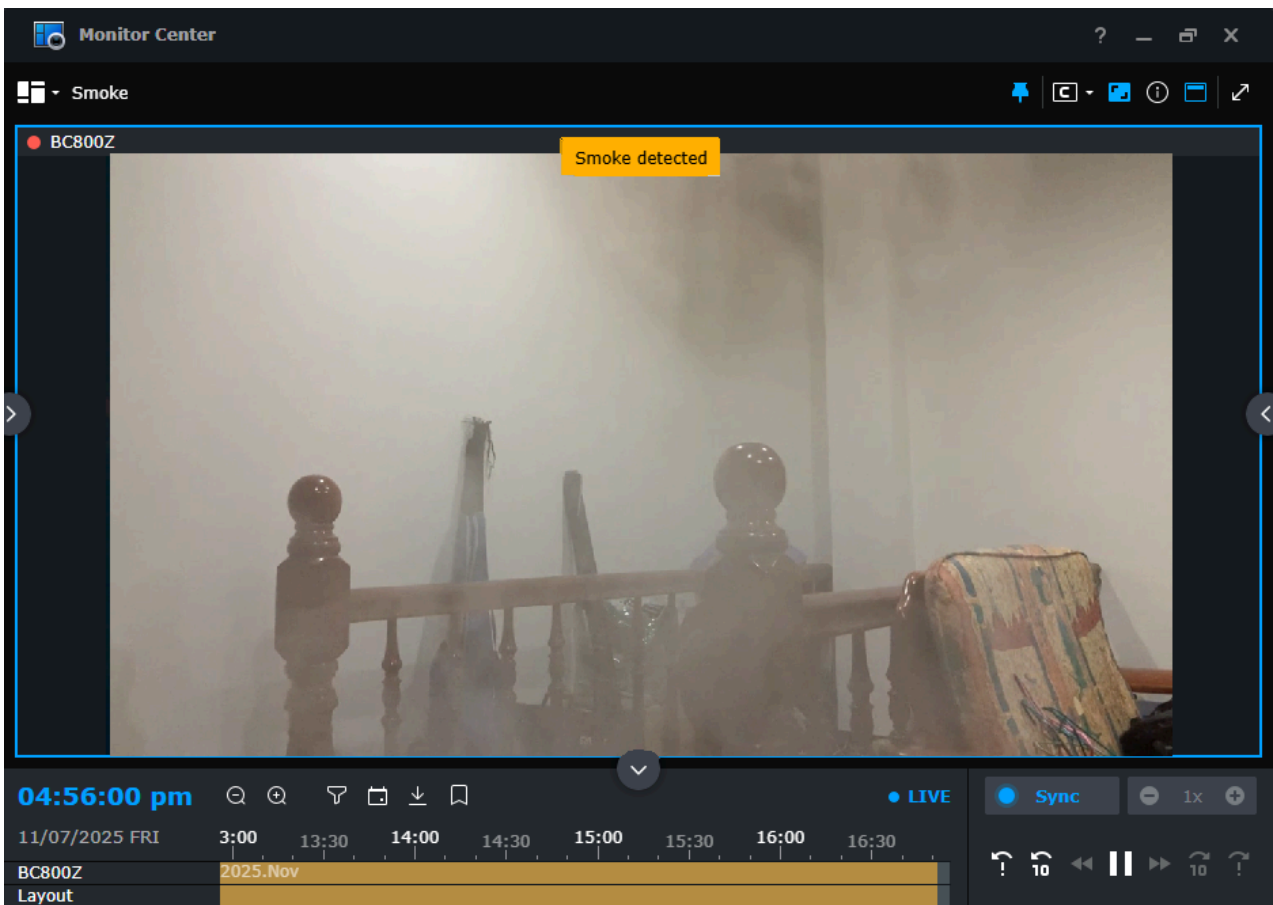
However, if additional options under **Show detection and counting** are selected (set to **Do not show** by default), both a smoke detection message and a detection frame are displayed.



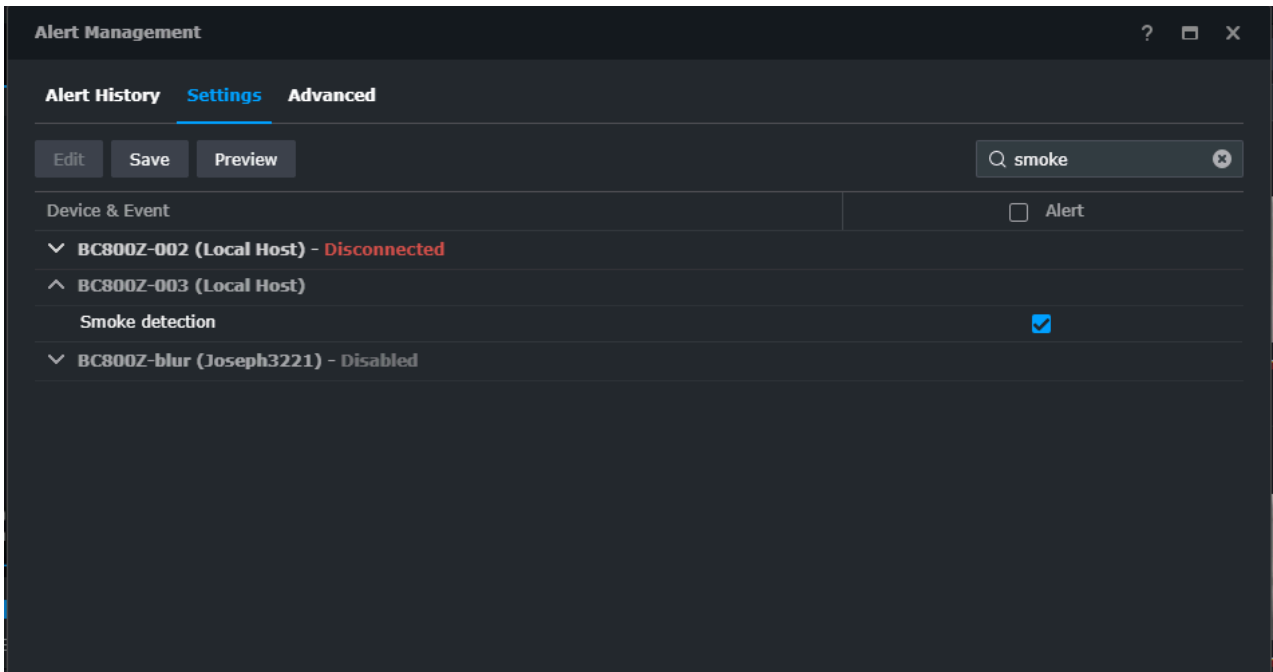
If distinct smoke plumes are detected, both a 'Smoke detected' message and a detection frame will be displayed.



If ambient smoke is detected, only a 'Smoke detected' message will appear.



If smoke detection alerts are deactivated in **Alert Management > Settings**, no smoke detection frames and messages appear.



Frequently Asked Questions

How accurate is smoke detection?

Smoke detection accuracy is evaluated using a dedicated test dataset containing a balanced mix of videos with and without visible smoke. This allows for rigorous testing under both smoke-present and smoke-absent conditions.

In development testing, the system achieved a 95% recall rate (successfully identifying smoke when it was present) and a 90% overall precision (maintaining a low rate of false alarms).

Actual performance may vary depending on your specific environment, including lighting, camera placement, background "noise," and weather conditions.

Will fog be falsely detected as smoke?

Fog and smoke can be difficult to distinguish. The system is specifically trained to minimize this error. Fog was included in our negative test dataset, helping the AI learn to distinguish between the two based on typical movement and dispersion patterns (fog is often slower and less "plume-like" than smoke).

While this significantly reduces false positives, edge cases can still occur. Unusually dense fog, fog moving rapidly in high wind, or a mix of fog and other particles might trigger an alarm. In these instances, false positives can often be mitigated by adjusting the detection sensitivity or reconfiguring the detection zone.

Will changing the camera position or zoom affect smoke detection?

Yes. The smoke detection algorithm functions by learning the normal state of a stable, consistent scene. Repositioning, panning, tilting, or optically zooming the camera fundamentally changes the scene being monitored.

While the system is designed to filter some sudden scene changes, any adjustment to the camera's field of view after setup will negatively impact detection accuracy and cannot be fully compensated for. Avoid moving the camera or adjusting optical zoom while smoke detection is enabled.

Will environmental changes, such as darkness or rain, affect smoke detection?

Yes, environmental changes can affect smoke detection performance, but the system includes features to mitigate these effects. Darkness, for example, limits the camera's ability to see smoke clearly. Adequate supplemental white light is required for reliable detection in low-light conditions.

To handle gradual changes, such as at dawn or dusk, the system continuously monitors image clarity and adapts to maintain accuracy. For other conditions like rain, the system's training dataset includes negative samples of adverse weather to help reduce false detections.

Can smoke detection detect smoke other than white smoke?

Yes. Synology's training dataset covers common smoke types, including white, gray, and black smoke.

Can smoke detection work in night mode?

No, IR LED in night mode can reduce smoke detection accuracy. For reliable detection at night, switch to white LED lighting.

Appendix

Disclaimer

The smoke detection feature in the Synology BC800Z is a video analytics tool designed to supplement traditional fire safety systems by identifying visible smoke in surveillance footage. This device is not fire safety equipment and lacks certification under fire detection standards such as EN54 or FM Approval. It must not be relied upon as the sole method for smoke or fire detection, especially in safety-critical or regulated environments.

Synology makes no guarantees that this feature will detect all instances of smoke or prevent fire-related damage, loss, or injury. Users remain fully responsible for ensuring adequate and compliant fire safety measures are in place. Use of this feature is at the user's own risk.