FireCatcher®

v 3.02.00

USER- & INSTALLATION MANUAL

Copyright Notice

Table of Contents

Safety instructions

Definition of symbols

HAZARD STATEMENTS

Danger:	Indicates a hazardous situation which, if not avoided, *will* result in serious injury or death.
Warning:	Indicates a hazardous situation which, if not avoided, *could* result in serious injury or death.
Caution:	Indicates a hazardous situation which, if not avoided, *might* result in moderate or minor injury.
Notice:	Indicates a situation which, if not avoided, might result in property damage or in an undesirable result or state.

OTHERS

Information:	Indicates a shortcut or any other useful indication.
Attention:	Indicates an element which requires extra attention, not necessarily a hazard

Safety information

Attention:

- Please read this document carefully before installing, using, or interacting with the FireCatcher software or products running this software.
- This document must be kept for future reference.

Introduction

About this manual

This manual describes the installation and usage of Araani's FireCatcher software.
Please read this document carefully before installing, using, or interacting with the FireCatcher software or products running this software.
The manual expects the reader to have some basic knowledge about video surveillance and the use of cameras.
Please refer to the camera documentation for any information that is related to the use, installation, or restrictions of the camera on which this software is or will be installed.

Liability

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Contact and support

Should you require any technical assistance, please contact your Araani reseller. If your questions cannot be answered immediately, your reseller will forward your queries through the appropriate channels to ensure a rapid response.
If you are a reseller, please contact your direct contact person, or contact our support staff via support@araani.com.

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Product description

Overview

FireCatcher is an intelligent video fire detection solution, that will trigger an alarm if it sees smoke or flames.

FireCatcher is an edge-based video analytics software that runs on an Axis® camera.

FireCatcher analyses the image real-time for any indication of smoke or flames. When detected, it generates an alarm that can be:

- Processed as an input to the fire alarm control panel to generate audible and/or visual alarms.
- Overlaid on the streaming video as a text label as well as a dynamic zone border, highlighting the location of the alarm in the field of view.

FireCatcher is typically used in situations where traditional fire detection fails because of too slow detection or too many unwanted alarms.

How to install FireCatcher

System requirements

CAMERA REQUIREMENTS

The FireCatcher software is intended for and extensively tested on the Axis® P1375(-E) and Q1615 MkIII(-E)camera models. These cameras have a high-performance video processing chipset that is designed to support smart video processing applications. These cameras provide high resolution (1920 x 1080) and have a high light sensitivity that allows to operate in harsh environments. Use the latest long-term support firmware that is qualified by Araani for use with FireCatcher.
These cameras have following characteristics:

- **Models:** Axis® P1375(-E) or Q1615 MkIII(-E).
- **Chipset**: Artpec-7.
- **Firmware**: Latest qualified Axis® LTS (= long-term support) firmware.
  Firmware can be downloaded at https://www.axis.com/support/firmware.
  Refer to your camera manual on how to install firmware on the device or follow the steps under Camera firmware.
- **Resolution**: 1920 x 1080.
- **Lens:** CS 2,8-8 mm F1,2 P-Iris.
- **Aspect ratio**: 16:9 or 19:6 (*)
- **Dynamic range**: Wide Dynamic Range (WDR).

Notice: Check the FireCatcher release notes to verify what Axis software versions are compatible with your FireCatcher software version. Using an incompatible or untested version may result in malfunction, errors or detection performance issues.

(*) **Attention:** After changing the aspect ratio, a restart of the FireCatcher software is required.

AXIS® STREAMING LIMITATIONS

In setting up your system, pay attention to the fact that total streaming video capacity of an Axis® camera may be limited. For Araani analytics to work properly, the camera should be capable of delivering an application-specific video stream at HD (1920 x 1080) resolution. In combination with other video streams for recording, visualization, etc., the total computational capacity of the camera could be exceeded which will result in failure of the analytics.

The amount and complexity of video streams that can be delivered simultaneously by an Axis camera is limited by the performance of the processor. The computational load of a stream is expressed in megapixels per second (mps) and is calculated using the following formula:

P_{stream} = horizontal resolution (pixels) x vertical resolution (pixels) x frame rate (fps = frames per second) /1.000.000

The total streaming capacity is obtained by adding the load of all unique streams. Only unique streams are counted for as requesting twice the same video stream (same resolution, frame rate, encoding type, compression, etc.) from a camera does not require separate encoding and as such does not increase the computational requirements.

$P_{CPU} = \Sigma$ unique P_{stream}

Araani fire detection analytics requires a stream of 1920 x 1080 at 12 frames per second, thus:

P_{Araani} = 1920 x 1080 x 12 = 24,9 mps

This stream should be considered when calculating the total load.

The streaming load is practically independent of the encoding type (H264 versus H265).

The maximum capacity for a camera depends on the type of processor. Currently, two generations of processor are common in the Axis offering, named ARTPEC-6 and ARTPEC-7. These are the limits for both processor types:

- ARTPEC-6 maximum total streaming capacity = approximately 310 mps
- ARTPEC-7 maximum total streaming capacity = approximately 367 mps

In case of doubt, contact your supplier to know what processor type is used in your cameras.

As video stream compression is occurring in a dedicated part of the CPU, these limits are practically independent of other processor activities such as image optimization, mirroring or ACAP-based analytics.

For proper functioning of Araani fire detection analytics, make sure the total stream demand - including the required analytics stream - does not exceed this limit and preferably add some margin. If that limit is exceeded, the camera will lower the frame rate on ALL streams and as a result, Araani analytics will no longer work and report a fault.

Example: A 4K CCTV system requires one high resolution stream for visualization and one HD resolution stream for recording.

Stream role	Resolution	P_{stream}
Visualization	3840 x 2160 @ 25 fps	207,4 mps
Recording	1920 x 1080 @ 25 fps	51,8 mps
Araani analytics	1920 x 1080 @ 12 fps	24,9 mps
Total		284,1 mps

The total load in this example is well below the limit of both processor types, so this will work fine. Adding another HD recording stream with different settings for example would exceed the maximum performance of an ARTPEC-6 based camera and analytics will fail to run on such combination.

Notice: For performance reasons:

- Do not exceed streaming limits of the processor!
- Do not use SD card recording with FireCatcher!

Both can lead to malfunction of the detection.

ENVIRONMENTAL REQUIREMENTS

The sensitivity and performance of the FireCatcher system are impacted partially by the environment it is operating in. Consider these basic guidelines with each installation for optimal performance:

Light:
For smoke detection, there should be sufficient light 24/7 in the entire field of view.
As a general guideline, smoke detection requires an illuminance of at least 5 lux.
Flame detection does not require light (= 0 lux). It can operate in a completely dark environment.

Dark / bright spots:
Avoid the combination of very dark and extremely bright spots in the field of view. This will stress the dynamic range of the camera and make the image quality unstable, resulting in an overall darker image.
For indoor cameras:

- Do not point the camera to exterior windows or portals.
- Avoid the presence of direct light sources in the field of view. If this cannot be avoided, adjust the detection zone to mask these areas out.

For outdoor cameras:

- Avoid east or west orientation, where the sun gets low and potentially may blind the camera.

- Avoid having horizon in the field of view of the camera at all.

Contrast:
There should be sufficient contrast in the field of view. Do not point the camera to white walls or large areas without contrast.

Sun:
Avoid direct sunlight or bright reflections of the sun falling straight into the lens.

False triggers:
Avoid sources of dust, damp, or smoke (e.g., from operating machines) in the field of view during normal operation. These could lead to recurring false detections.

Outdoor:
Outdoor conditions are more susceptible to false alarms. For outdoor applications, try to control and stabilize environmental conditions as much as possible e.g., protecting the scene from varying weather conditions, apply stable lighting conditions, apply or extend a weather shield extension, etc.

To further optimize the detection or to avoid false triggering of alarms e.g., due to very dynamic or badly illuminated zones in the field of view, the detection can be restricted to certain zones in the field of view. These zones can be drawn in the app configuration screen in the browser itself, see section Configuring detection zones.
By default, the detection area is the whole field of view. If detection zones are defined, this will override the default and detection will only occur only in the defined zones.

Adjust the sensitivity parameters of FireCatcher if problems persist.

Camera positioning

SITE ASSESSMENT

To maximize protection, it is recommended to perform a site survey before installing cameras with FireCatcher. This allows you to identify risk areas and take those into account when positioning new cameras.

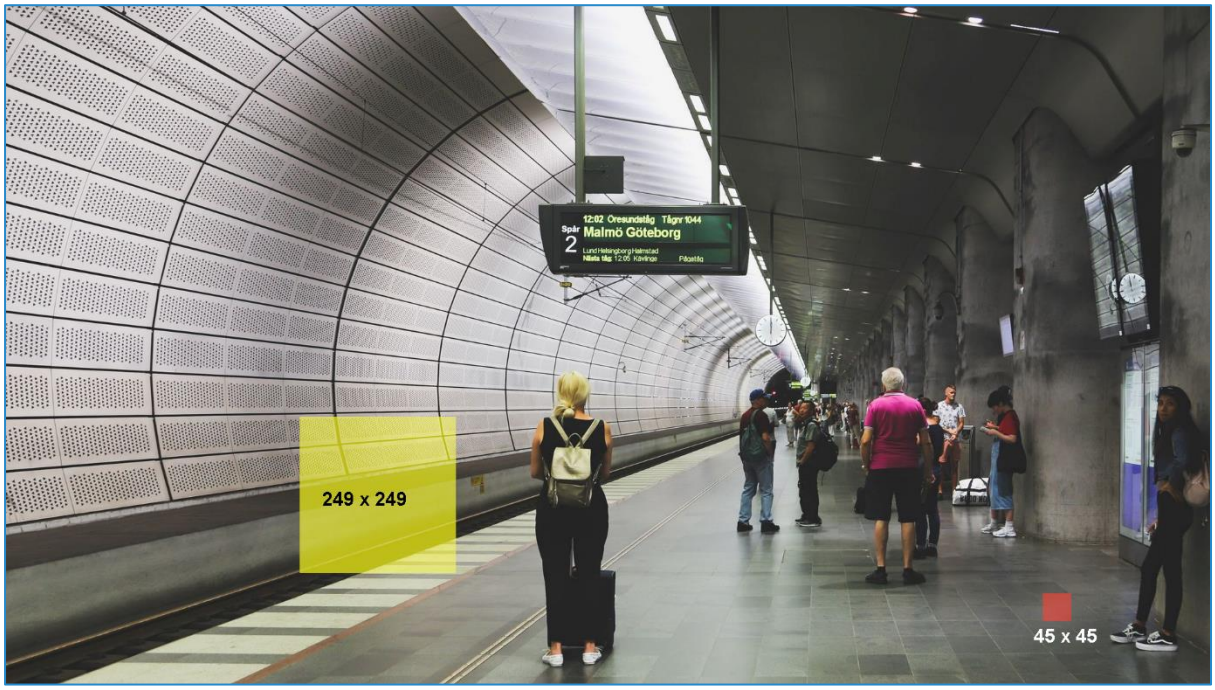
- Define the hot spots:
  What is the type of risk? Can the fire start at any location in the field of view or is there a specific risk related to machinery or a critical part in the scene?
- For smoke detection, estimate the smoke flow:
  Estimate where smoke may flow in case of an incident. Based on this estimation, preferably select a camera position that will visualize the smoke in the fastest and largest way. Focus on where the smoke will flow, rather than the risk area.
  Will smoke ascend to the ceiling or will there be stratification?
  Will smoke be dispersed over the whole area by ventilation or forced air flow?
- System redundancy:
  To guarantee full coverage on very large areas, multiple cameras will be needed. To avoid blind spots, make sure the field of views of the cameras overlap with a minimum of 20%.

CAMERA POSITION / FIELD OF VIEW

Based on the site assessment, preferably select a camera position that maximizes the visualization of potential smoke or flames.

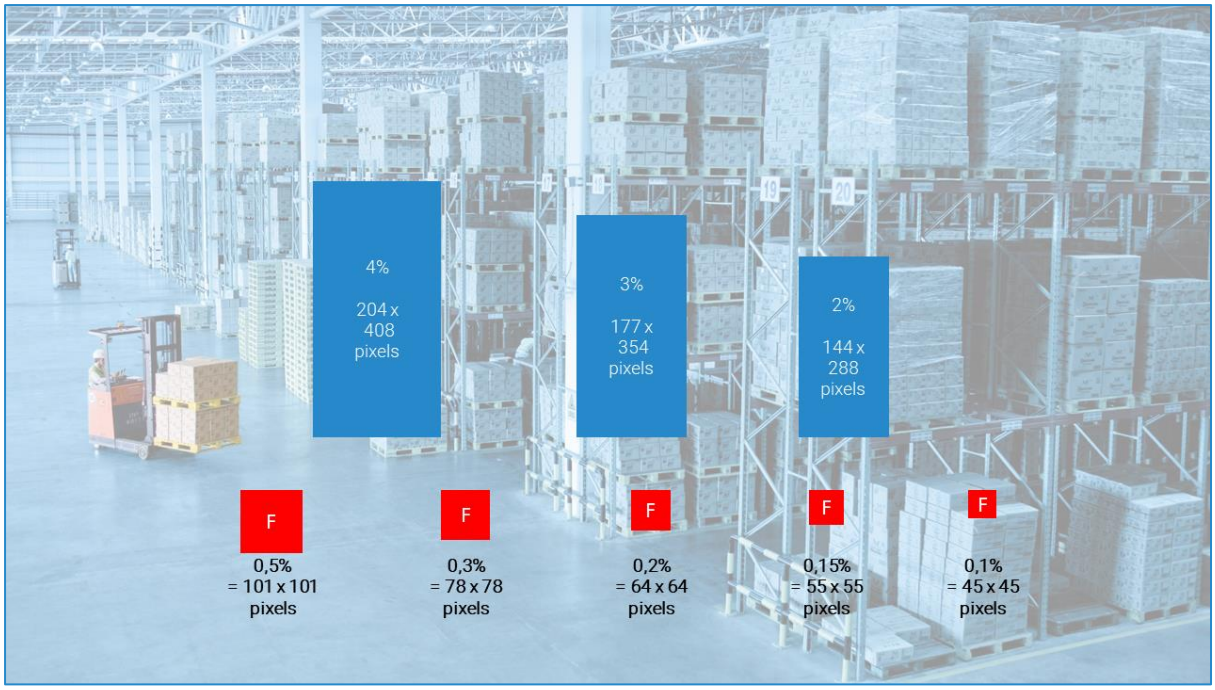
- With default settings, the FireCatcher algorithm will trigger alarm when **smoke** covers approximately 3**% of the field of view during 5 seconds** at the same location in the field of view.
- With default settings, the FireCatcher algorithm will trigger alarm when the **flame** size exceeds **0.1% of the field of view** and the flame is detected for at least **20 seconds** at the same location in the field of view.

For a camera with 1920 x 1080 resolution, 2% is a zone of 249 x 249 pixels and 0,1% is a zone of 45 x 45 pixels. As a result: the smaller the field of view, the higher the sensitivity; and the further away from the camera, the lower the sensitivity.



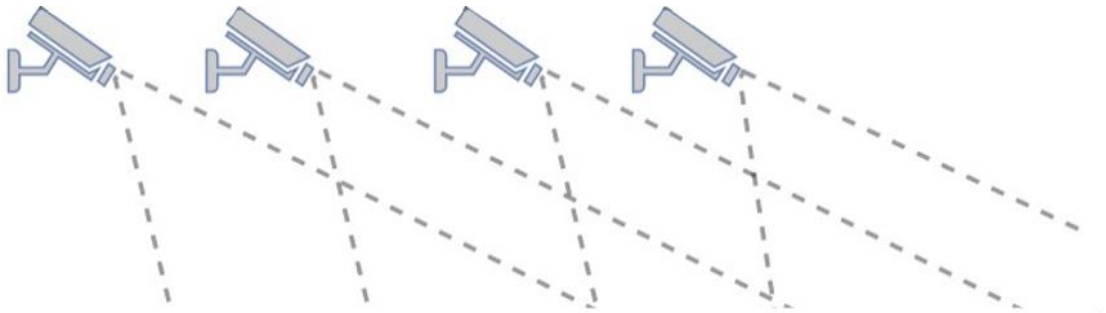
The minimum required coverage for smoke to be detected depends on the “smoke alarm minimum coverage” setting. The minimum required size for a flame to be detected depends on the “minimum flame size” setting.

Below is a graphical representation of smoke and flame detection threshold for some common coverage settings on a 1920 x 1080 image, assuming a 1:3 aspect ratio of smoke clouds.

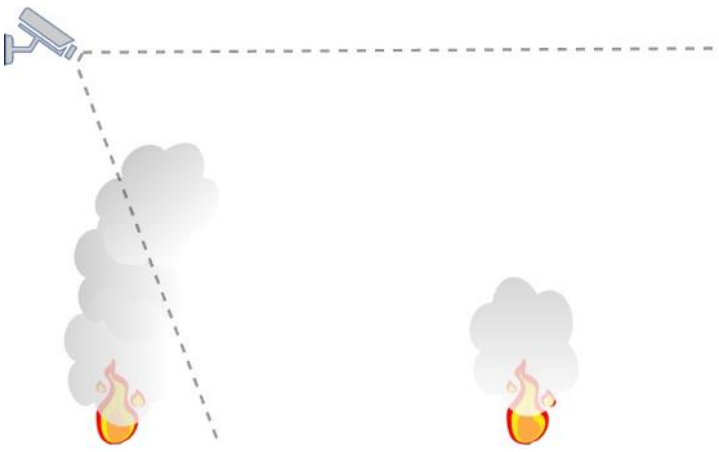


Adjust the zoom / focus of the camera lens according to the Axis® focus procedure as described in the camera manual. Do not forget to tighten the screws after setting up the focus and zoom to ensure they stay fixed.

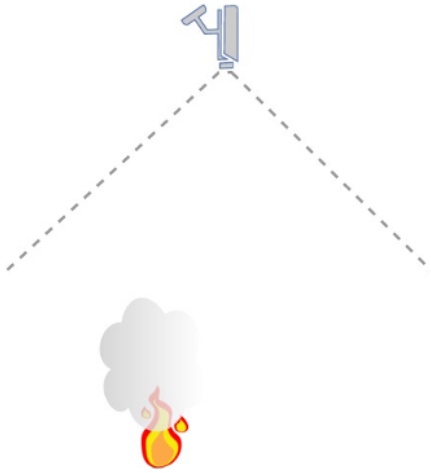
Also consider the environmental requirements described above when positioning the camera and adjusting the field of view. In large areas, you may consider providing redundant coverage by adjacent cameras.



Recommended field of view for low (= height < 16m) camera positions:



Recommended field of view for high camera positions: This allows the camera to properly see stratified layers of smoke, a typical phenomenon in high-ceiling spaces.



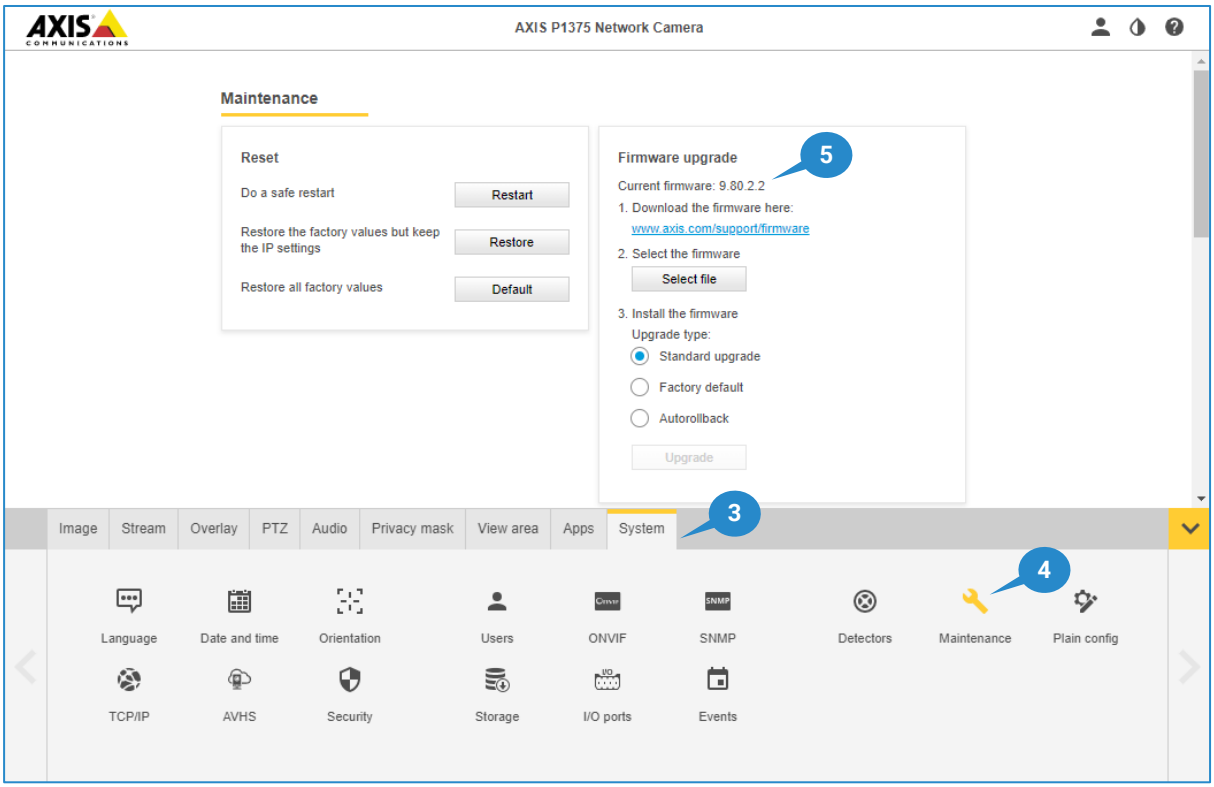
Information: Axis® provides a lens calculator tool on their website that assists in determining the field of view, based on lens type and focal length, mounting height, and distance in the scene.

Camera configuration

CAMERA FIRMWARE

Before installing FireCatcher software, verify that your camera has the latest Araani-qualified Long-term Support (LTS) firmware from Axis. To verify the firmware version of your camera, perform the following steps:

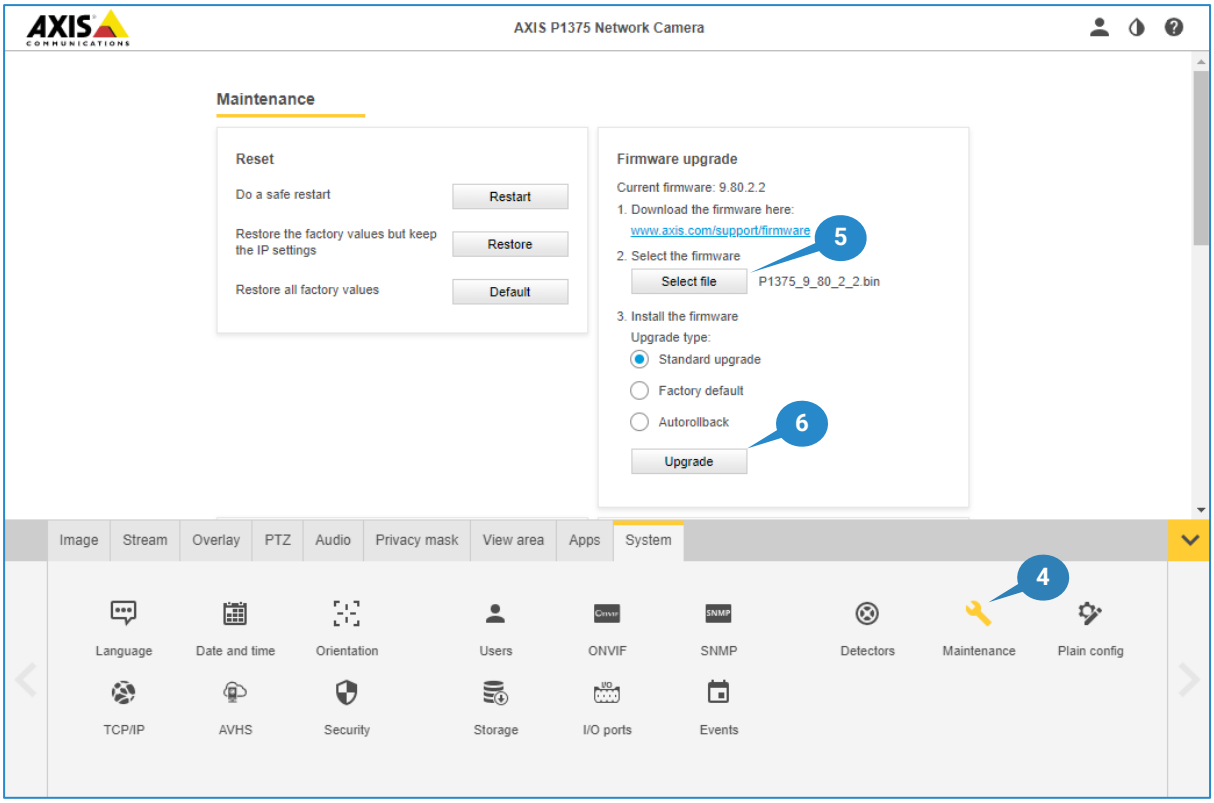
1. Connect with a laptop, tablet, or smart phone to your camera, using your internet browser software and login to the camera webpage.
   Refer to the camera user manual on how to do this.
2. Open the settings window by clicking the “settings” button in the bottom right of the camera webpage.
3. Select the “System” tab in the control panel.
4. Select “Maintenance” in the control panel.
5. The current firmware version is displayed in the Firmware upgrade section of the maintenance screen, as indicated in the screenshot below.



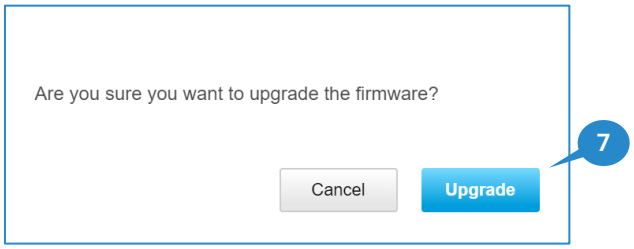
If the version is not compliant to the camera requirements for FireCatcher, you can download the required firmware from https://www.axis.com/support/firmware.

Follow these steps to upgrade the firmware version of your camera:

1. Connect with a laptop, tablet, or smart phone to your camera, using your internet browser software and login to the camera webpage.
   Refer to the camera user manual on how to do this.
2. Open the settings window by clicking the “settings” button in the bottom right of the camera webpage.
3. Select the “System” tab in the control panel.
4. Select “Maintenance” in the control panel.
5. Select “Select file” and browse for the new downloaded firmware file.
6. Select “Upgrade”.



7. Confirm the upgrade by selecting “Upgrade”.



8. The camera will start uploading firmware, updating the system and finally reboot. This may take a few minutes.
9. Verify if the camera is properly upgraded by checking the version again in the maintenance menu.

Notice: In case the new (qualified LTS) firmware is a lower revision than the one that was installed, it is recommended to perform a factory restore (keeping IP-address/network information) after firmware downgrade to make sure that all settings are configured in a valid way.

CAMERA CONFIGURATION

For optimized smoke and flame detection performance, the camera should be configured with following recommended settings (mandatory settings are followed by mandatory):

- Image
  - Wide dynamic range
    - WDR: recommended OFF to avoid image artefacts.
      Only use when required (e.g. environment with non-uniform lighting) and no artefacts are generated by WDR.
    - Local contrast: 50
    - Tone mapping: max 30 (mandatory)[1]
  - White balance:
    - Light environment: Automatic
  - Day and night:
    - IR-cut filter: ON (mandatory)

      ⚠ Notice: When the IR-cut filter is on AUTO, the camera will switch to infrared mode when the light level is too low. This will disable the flame detection as for flame detection a colour image is required.
    - Threshold: Free to choose.
  - Exposure:
    - Exposure mode: Automatic (mandatory)
    - Exposure zone: Automatic
    - Maximum shutter: 1/15s (mandatory)[1]
    - Maximum gain: max 21 dB (mandatory)[1]
    - P-Iris lens: make sure to select the correct lens.
    - Blur-noise trade-off: Middle between 'low noise' and 'low motion blur'
    - Lock aperture: ON (mandatory)
    - Target aperture: Middle between 'open' and 'closed'
    - Exposure level: 50
    - Defog: OFF (mandatory)
  - Image correction:
    - Barrel distortion correction (BDC): only if necessary
    - Electronic image stabilization (EIS): only if necessary
  - Capture mode: 1080p @ 25/30 fps (WDR) (exact description may differ, make sure that the aspect ratio is 16:9 and WDR is included)
- Stream
  - General:
    - Resolution: always select a 16:9 or 9:16 resolution (mandatory)
    - Frame rate:
      - 12 fps preferred.
      - Do not set to 0.
    - Compression: 50
  - H.264 and H.265 encoding:
    - Free to choose
  - Audio:
    - Free to choose

[1] If in low-light conditions the image does not reach the required image quality, please adjust in this order: 1. shutter time 2. gain 3. tone mapping. A higher shutter time may cause more motion blur, but this does not affect the detection. A higher gain will cause more noise in the image which may interfere with the detection algorithm. A higher tone mapping value will affect the color appearance and will influence the flame detection.

FireCatcher installation

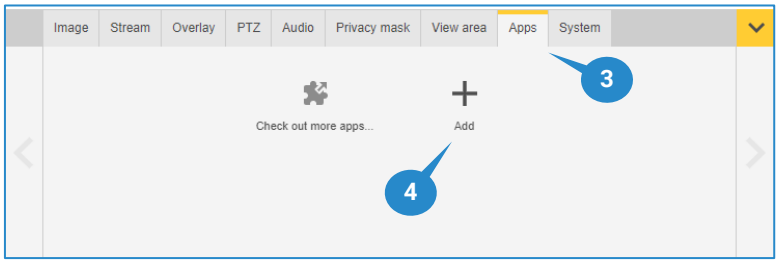
The FireCatcher software comes as an ACAP (Axis® Camera Application Platform) compatible package. The ACAP platform allows Axis® Development Partners (ADP) to build smart applications that run on Axis® cameras. FireCatcher comes in the form of a single file with .eap extension. Installing the software on an Axis® camera involves uploading the file to the camera, activating the appropriate license, and potentially configuring the application parameters.

⚠ **Caution:** To avoid performance issues, no other ACAP application should be active while using FireCatcher.

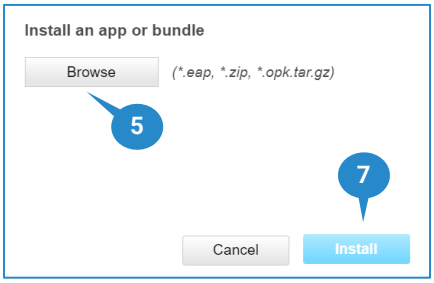
INSTALLING THE FIRECATCHER ACAP

To install the FireCatcher, perform the following steps:

1. Connect with a laptop, tablet, or smart phone to your camera, using your internet browser software and login to the camera webpage. Refer to the camera user manual on how to do this.
2. Open the settings window by clicking the “settings” button in the bottom right of the camera webpage.
3. Select the “Apps” tab in the control panel.
4. Select “Add”.



5. Select “Browse” to browse your local storage for the ACAP file.
6. Select FireCatcher_Vx.xx.xx.eap.
7. Select Install.



8. The application will start installing. This may take a few minutes.
   After successful installation, the FireCatcher application should be visible in the “Apps” tab.

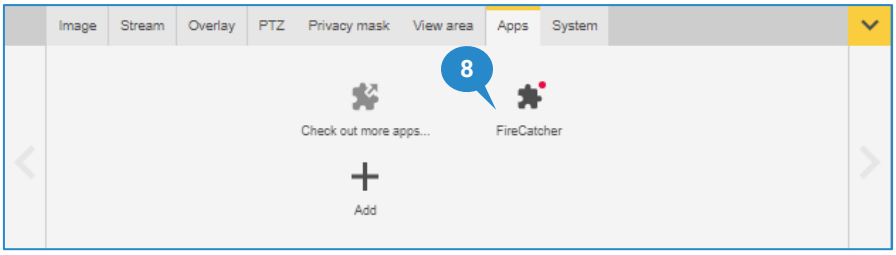


Image
Stream
Overlay
PTZ
Privacy mask
View area
Apps
System
8
Check out more apps...
FireCatcher
Add

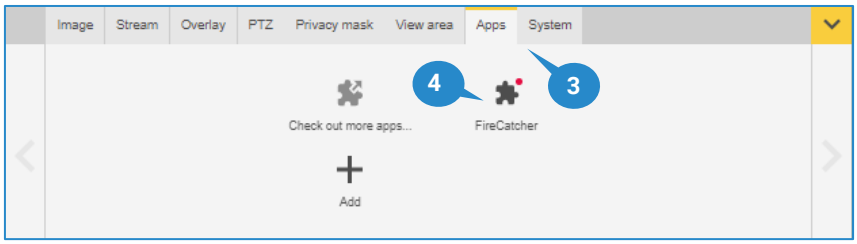
ACTIVATING A FIRECATCHER LICENSE

With the purchase of FireCatcher, a **license activation code** is provided. This code is valid for a number of FireCatcher installations, as purchased.

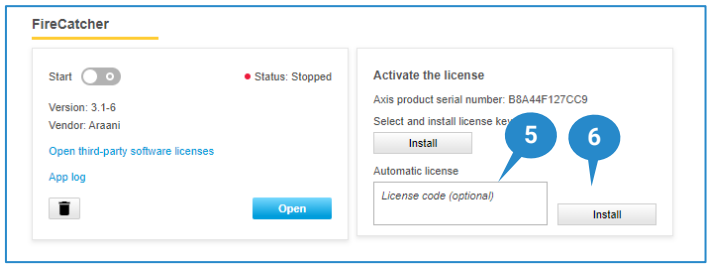
Case 1: the camera is connected to the internet

Perform the steps below to activate the FireCatcher app directly on the camera.

1. Connect to your camera, using your internet browser software and login to the camera webpage. Refer to the camera user manual on how to do this.
2. Open the settings window by clicking the “settings” button in the bottom right of the camera webpage.
3. Select the “Apps” tab in the control panel.
4. Select the FireCatcher app.



5. The license activation code can be directly entered in “Automatic license” field.
6. Select “Install”
   The camera will connect to the Axis® licensing system. A license for this camera will be created and automatically installed on the device. The camera will be registered in the Axis® licensing system as being licensed, and the license will be linked to your license activation code and your camera.

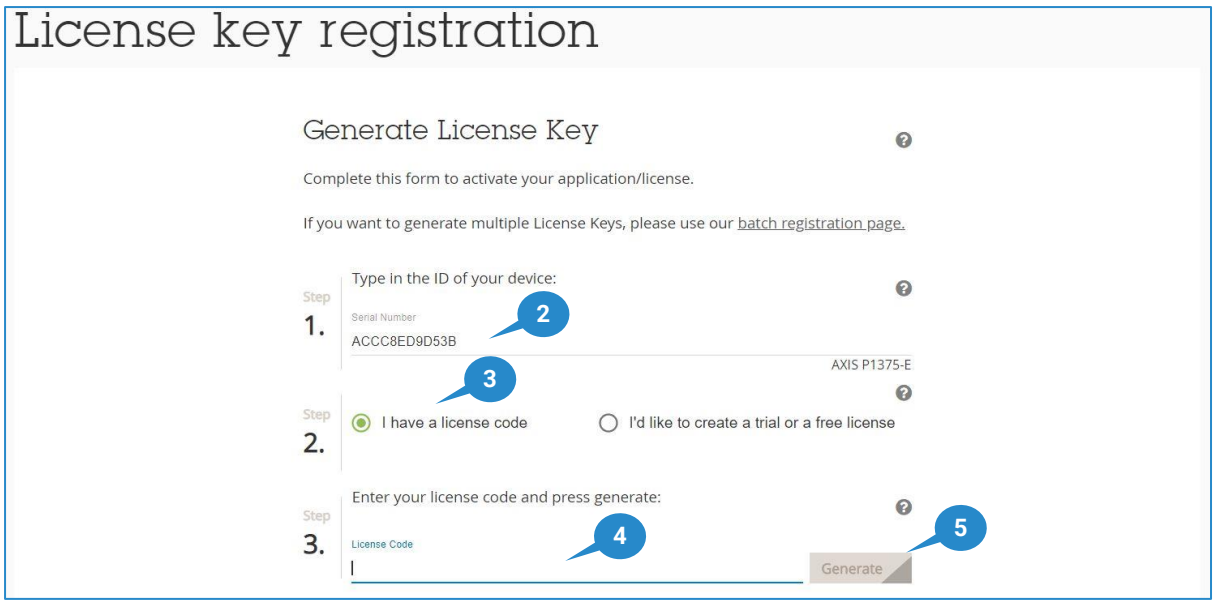


Case 2: the camera has no internet connectivity

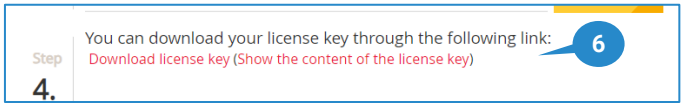
When the camera on which the FireCatcher application is installed has no direct internet connection, a license key must be generated upfront on a computer with internet connection.

To create the license key, perform the steps below.

1. Using your internet browser, connect to https://www.axis.com/products/camera-applications/license-key-registration#/registration.
2. Fill in the serial number of your camera. The serial number can be found in the “Activate the license” box as shown above or on a sticker on your camera housing, indicated by “S/N”.
3. Select “I have a license code”.
4. Fill in the license activation code, received with your purchase.
5. Click “Generate”.

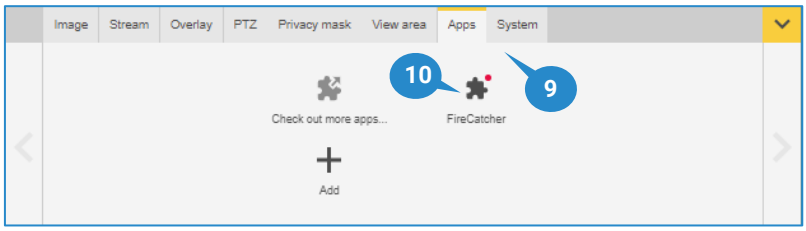


6. A message will appear from which you can download the license key to your local storage.

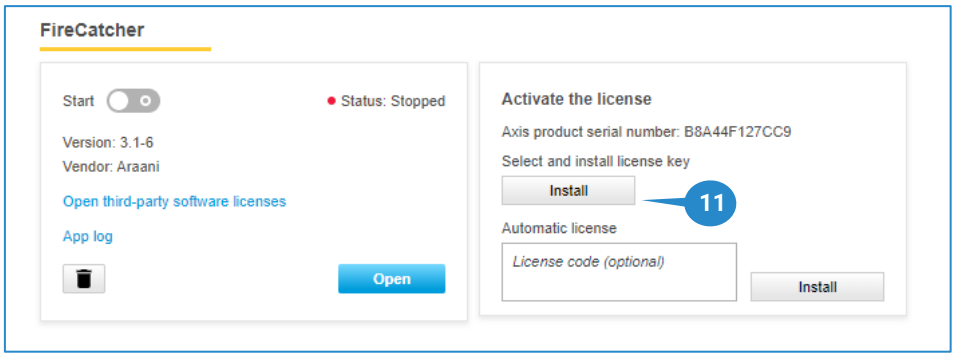


The license key, created in previous steps can now be uploaded and installed on the camera to activate the FireCatcher app. Follow steps below to activate the app:

7. Connect to your camera, using your internet browser software and login to the camera webpage. Refer to the camera user manual on how to do this.
8. Open the settings window by clicking the “settings” button in the bottom right of the camera webpage.
9. Select the “Apps” tab in the control panel.
10. Select the FireCatcher app.

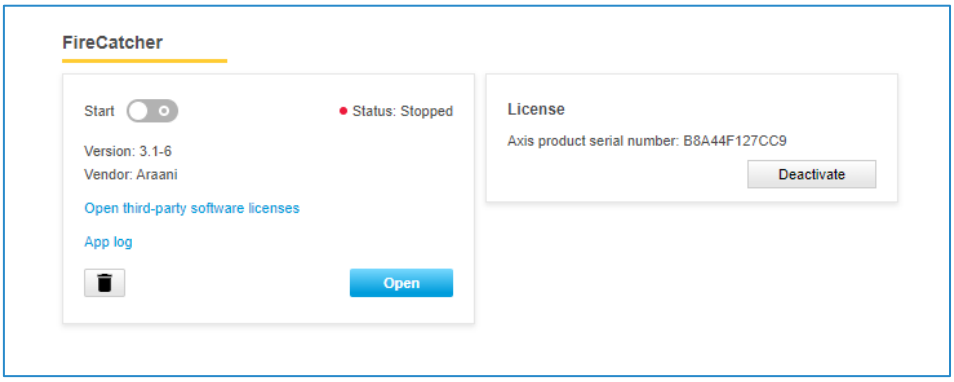


11. Select “Install” in the “Activate the license” box



12. Browse your storage for the file, downloaded in step 6.

13. When installed correctly with a valid license key, following screen should appear:



ACTIVATE A TRIAL LICENSE FOR FIRECATCHER

If you prefer to try out FireCatcher before purchasing, follow the same steps as in Activating a FireCatcher license case 2. In step 3, select "I'd like to create a trial or a free license". Provide a valid e-mail address if requested. Proceed with the rest of the procedure.

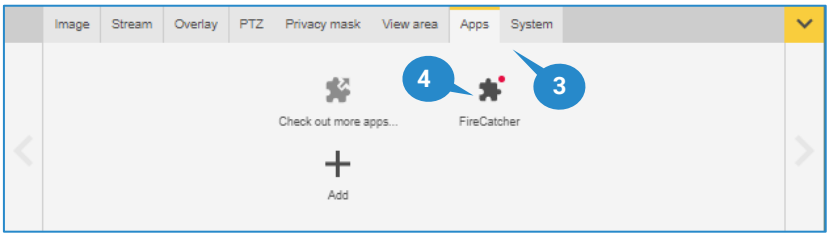
How to use FireCatcher

Starting / stopping FireCatcher

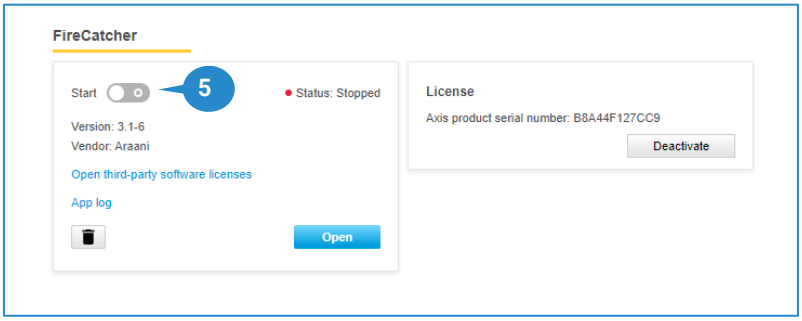
STARTING FIRECATCHER

After installation, FireCatcher needs to be started manually. To do so, follow the steps below.

1. Connect to your camera, using your internet browser software and login to the camera webpage. Refer to the camera user manual on how to do this.
2. Open the settings window by clicking the “settings” button in the bottom right of the camera webpage.
3. Select the “Apps” tab in the control panel.
4. Select the FireCatcher app.



5. Click the start switch to start the application.



START-UP BEHAVIOUR

At start-up, FireCatcher needs to learn the background of the scene. This takes maximum 5 minutes. During this period, FireCatcher is not fully operational yet. The default start-up state however is “Operational”-mode. The reason for this default behaviour is to prevent FireCatcher to trigger a “Fault Signal” immediately after an upgrade. Within a maximum of **5 minutes**, FireCatcher will either remain in this condition, or go to “Fault Signal” condition.

If the FireCatcher application goes to fault condition after starting up, this can be due to:

- Not enough background contrast.
- Scene too dark: the light level is less than the minimum light level.

In both cases, review the installation of your camera, taking into account the requirements and recommendations in Environment requirements and Camera Position / Field of view.

STOPPING THE FIRECATCHER APP

To stop the FireCatcher app, perform the same steps as Starting the FireCatcher app. When clicking the switch in step 5, the application will be stopped.

Configuring FireCatcher detection

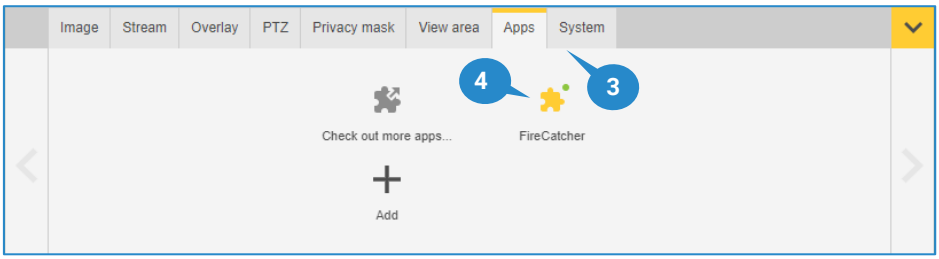
Notice: changing detection settings may affect detection performance. Only change from default settings if needed.

In most cases, default settings of FireCatcher will work fine. If detection is not satisfactory or if too many false alarms occur, you may want to change some of these settings.

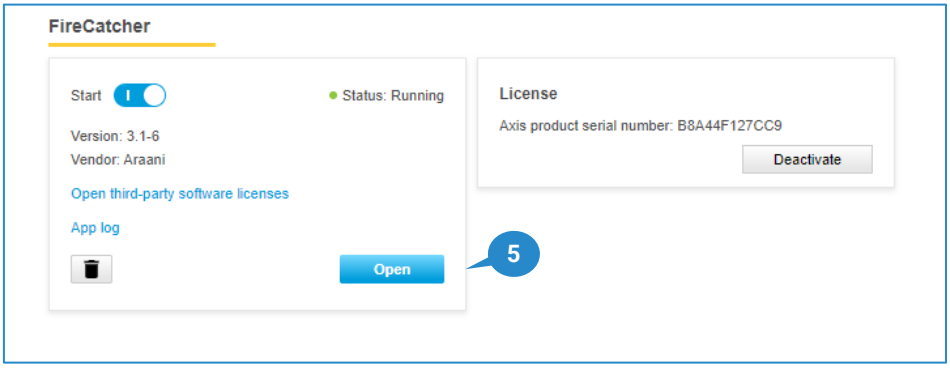
Accessing FireCatcher configuration

To access the settings of your detection app on the camera, proceed with steps below.

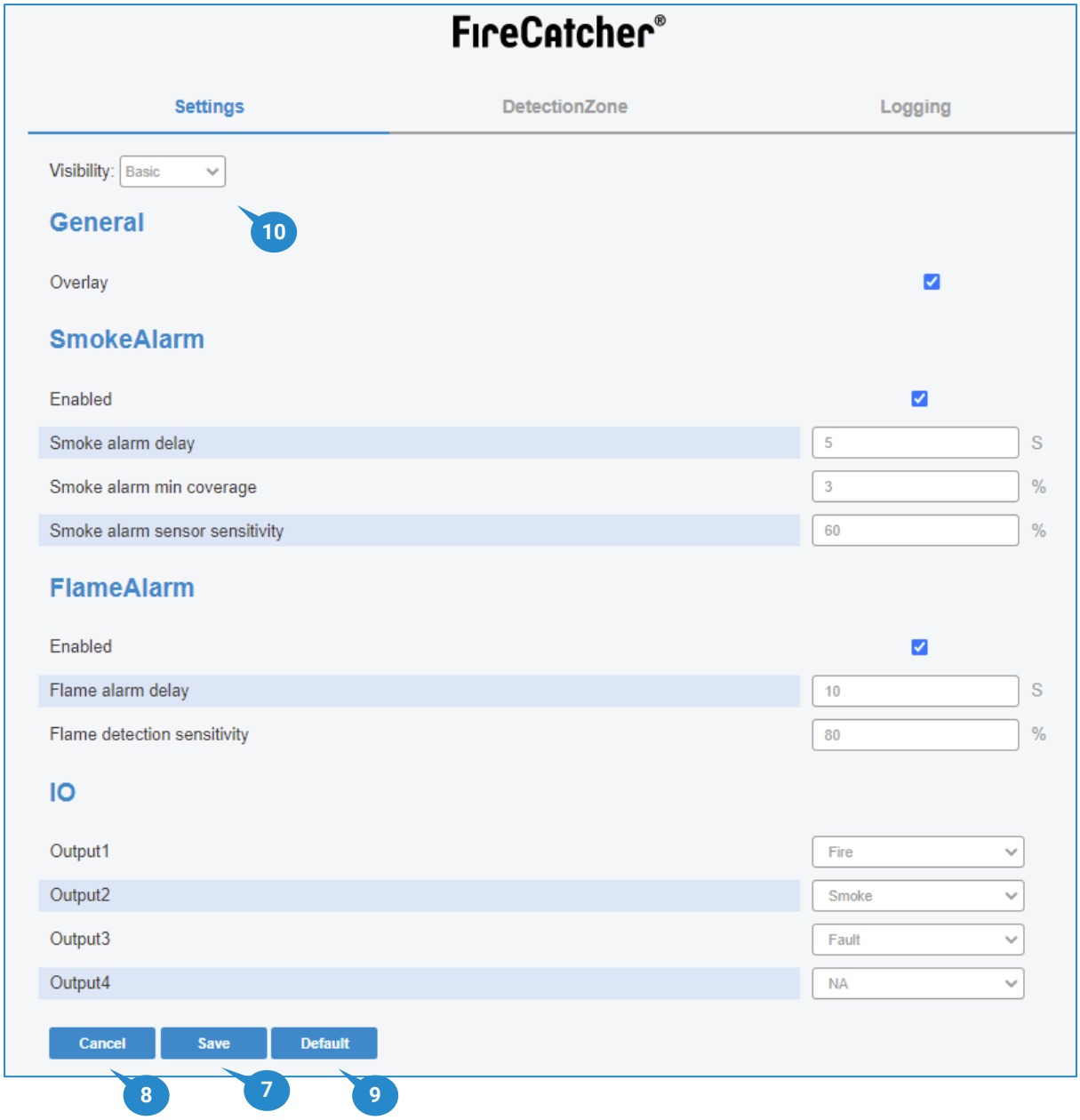
1. Connect to your camera, using your internet browser software and login to the camera webpage. Refer to the camera user manual on how to do this.
2. Open the settings window by clicking the “settings” button in the bottom right of the camera webpage.
3. Select the “Apps” tab in the control panel.
4. Select the FireCatcher app.



5. Make sure the application is running, otherwise start FireCatcher. Select “Open”.



6. A new browser window will appear that contains the basic settings to configure FireCatcher.

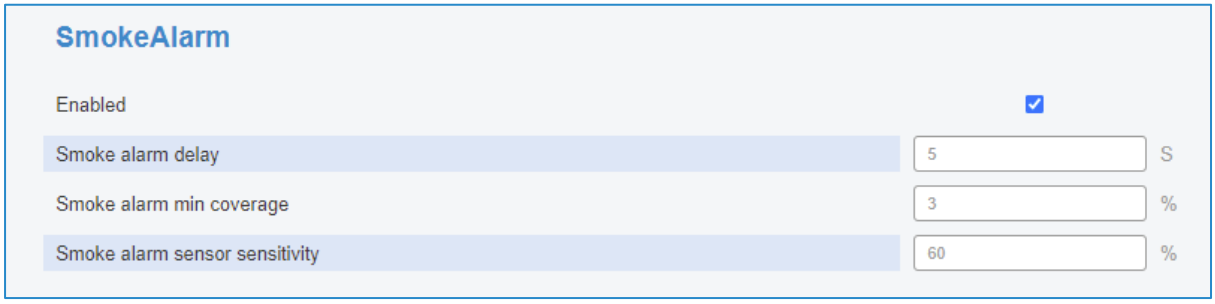


Refer to next sections for detailed information on all available settings. Note that IO settings section is only available on installations with appropriate license.
When settings are changed, an asterisk will appear in the tab header of the configuration page. This indicates that the modifications are not saved yet. When trying to leave the page without saving, a pop-up warning will appear.

7. Select “Save” to register the new settings in the app.
8. “Load” can be used when changes to the settings have been done (but not saved) and one wants to return to the setting as is in the camera.
9. “Default” can be used to reset all settings to default value.
10. The visibility selector allows to select between Basic and Advanced settings. The advanced setting allows to finetune the detection when basic settings are not satisfactory.

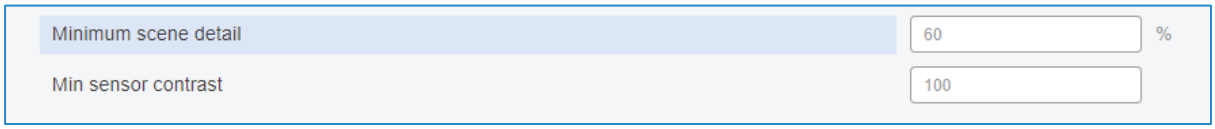
Basic configuration of smoke detection

The smoke detection algorithm detects the presence of smoke in the image. The following settings are available to control the algorithm behaviour:



Name	Range	Unit	Default value	Meaning
Enabled	on - off		on	Enable or disable smoke detection.
Smoke alarm delay	2 - 120	Seconds	5	If the alarm condition is continuously present during this time, an alarm is generated.
Smoke alarm min coverage	2 - 30	%	3	Percentage of the field of view that needs to meet the requirements for alarm before an alarm is reported. The higher the value, the less sensitive detection. E.g.: 2% of a 1920 x 1080 image is an area of 204 x 204 pixels.
Smoke alarm sensor sensitivity	10 - 90	%	60	Sensitivity of the sensor to alarm. The higher the value, the more sensitive detection, but more risk on unwanted alarms.

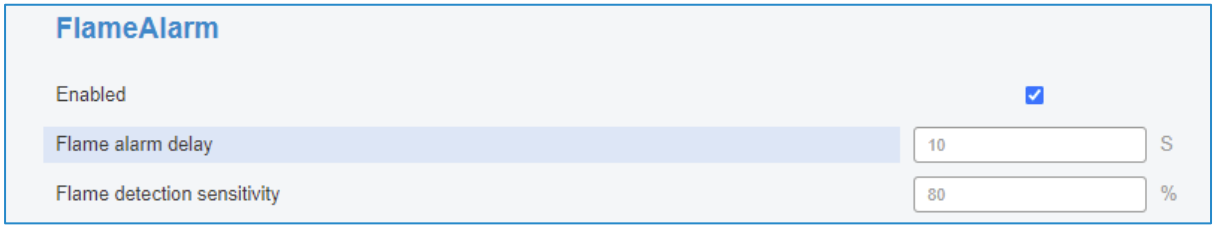
Advanced configuration of smoke detection



Name	Range	Unit	Default value	Meaning
Minimum scene detail	50 - 70	%	60	Minimum percentage of the background that needs enough contrast to allow proper functioning of the analytics.
Min sensor contrast	60 - 200		100	Minimum contrast on a sensor before it is valid. Increase this value from 100 to 110 in case of unwanted alarms due to large low-contrast parts with slow light changes in the field of view.

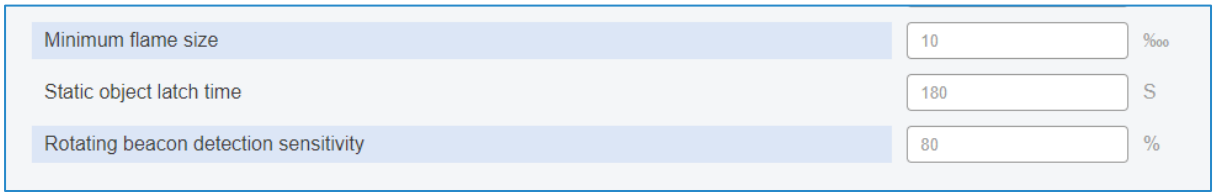
Basic configuration of flame detection

The flame detection algorithm detects presence of flames in the image. The following settings are available to control the algorithm behaviour:



Name	Range	Unit	Default value	Meaning
Enabled	on - off		on	Enable or disable flame detection.
Flame alarm delay	3 - 120	Seconds	10	The minimum duration that a flame must be detected before raising flame alarm.
Flame detection sensitivity	50 - 100	%	80	Sensitivity of the flame detector. The higher the value, the more sensitive the detection, but the higher the risk of unwanted alarms.

Advanced configuration of flame detection

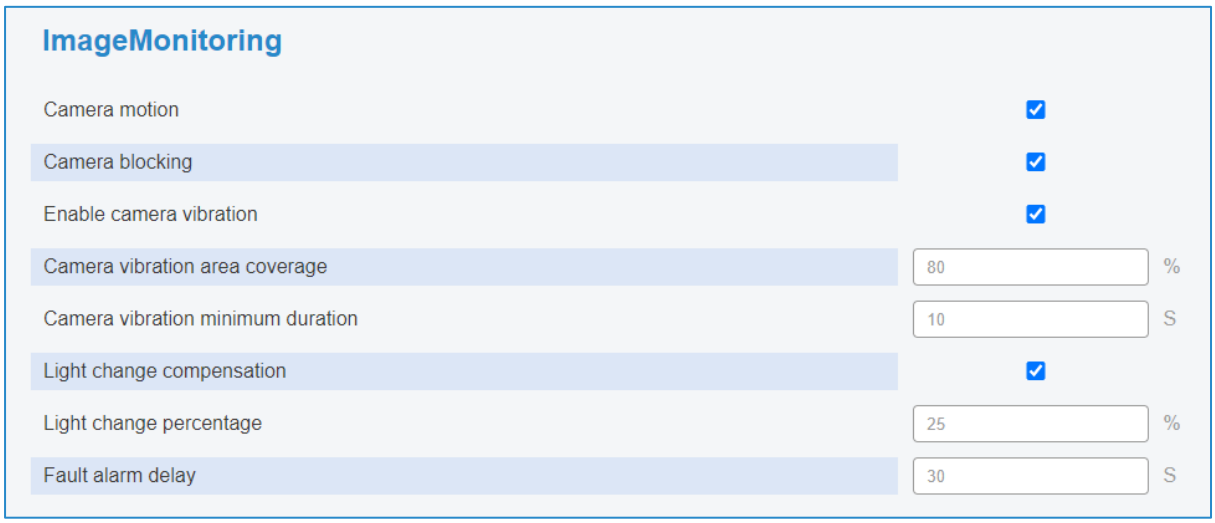


Name	Range	Unit	Default value	Meaning
Minimum flame size	1 - 100	‰	10	Minimum size of a flame to be detected (expressed in per myriad of the field of view). E.g.: 10‰ of a 1920 x 1080 image is an area of 45 x 45 pixels.
Static object latch time	3 - 600	Seconds	180	Time that a detected candidate for flame will be inhibited to raise an alarm after being static for one second. As flames are very dynamic, this should cause more static bright phenomena to be excluded.
Rotating beacon detection sensitivity	0 - 100	%	80	Sensitivity of the rotating beacon detector. The rotating beacon detector suppresses unwanted flame alarms caused by rotating beacons. The higher the more sensitive, set to zero to disable.

Advanced configuration: image monitoring

The image monitoring algorithm is protecting detection from tampering. When enabled, it can detect when the camera is moving, vibrating or if the image is blurred or completely blocked for any reason. The algorithm also allows to compensate for abrupt changes in external light conditions.

The following settings are available to control the algorithm behaviour:

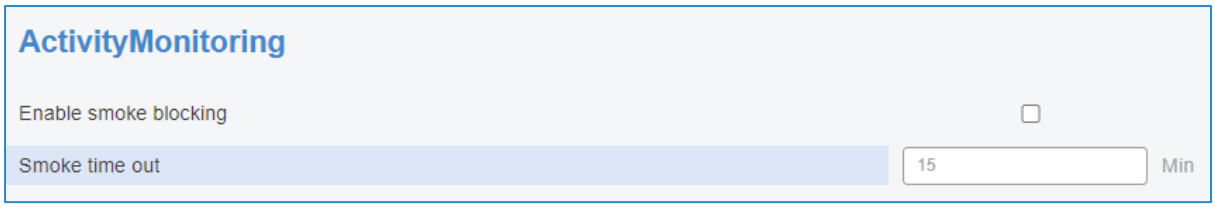


Name	Range	Unit	Default value	Meaning
Camera motion	on - off		on	Generate a fault signal on a fast rotation of the camera.
Camera blocking	on - off		on	Generate a fault signal on a blurred or blocked image.
Enable camera vibration	on - off		on	Enable/disable camera vibration detection. This will cause the detection algorithms to adapt sensitivity but will not generate any fault.
Camera vibration area coverage	10 - 100	%	80	Percentage of the detection zone that needs to meet the requirements for camera vibration.
Camera vibration minimum duration	5 - 60	Seconds	10	Minimum duration of the camera vibration conditions before this condition is set.
Light change compensation	on - off		on	Activate robustness to light changes.
Light change percentage	20 - 50	%	25	The minimum part of the field of view that needs to be affected by abrupt light change before light change compensation is triggered.
Fault alarm delay	5 - 180	Seconds	30	Minimum duration of fault alarm before it is reported.

Advanced configuration: activity monitoring

The activity monitoring algorithm allows to detect activity (motion) in the image and suspend smoke detection until activity has stopped for a predetermined period. This generates “SUPERVISORY” state. This can be used e.g. to

automatically suspend detection during e.g. bulldozer activity. This will avoid false detection in areas where a lot of dust is generated during work time. Note that flame detection remains active during this period (if enabled).



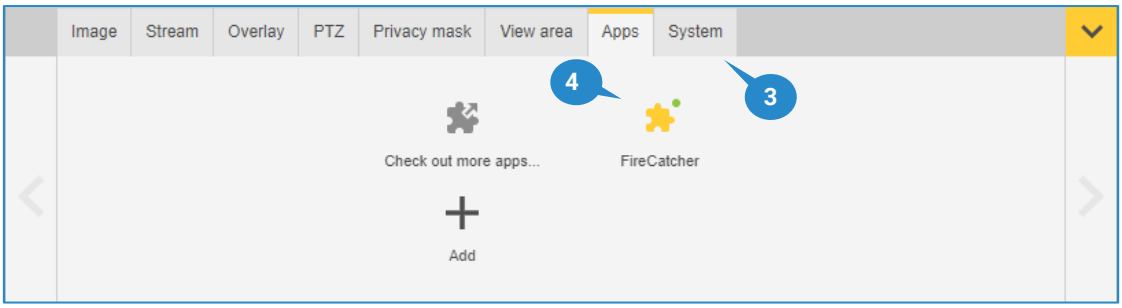
Name	Range	Unit	Default value	Meaning
Enable smoke blocking	on - off		Off	Block Smoke Detection when activity is detected.
Smoke time out	1 - 90	Minutes	15	Block Smoke detection for this value of minutes after activity detection.

Configuring detection zones

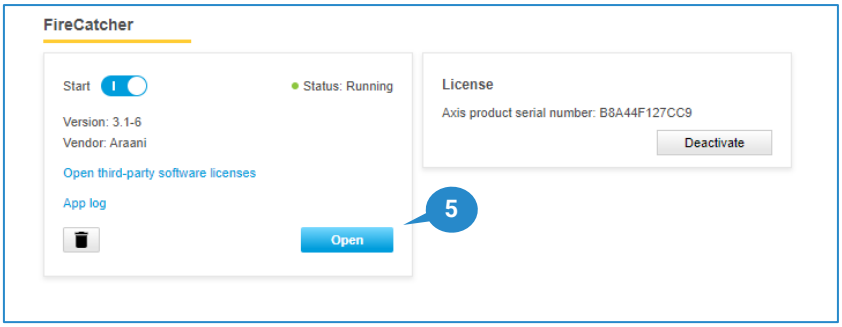
To further optimize the detection or to avoid false triggering of alarms, e.g., due to very dynamic or badly illuminated zones in the field of view, the detection can be restricted to certain zones in the field of view. These zones can be drawn in the app configuration screen in the browser itself.
By default, the detection area is the whole field of view. If detection zones are defined, this will override the default and detection will only occur only in the defined zones.

To define detection zones, perform following steps:

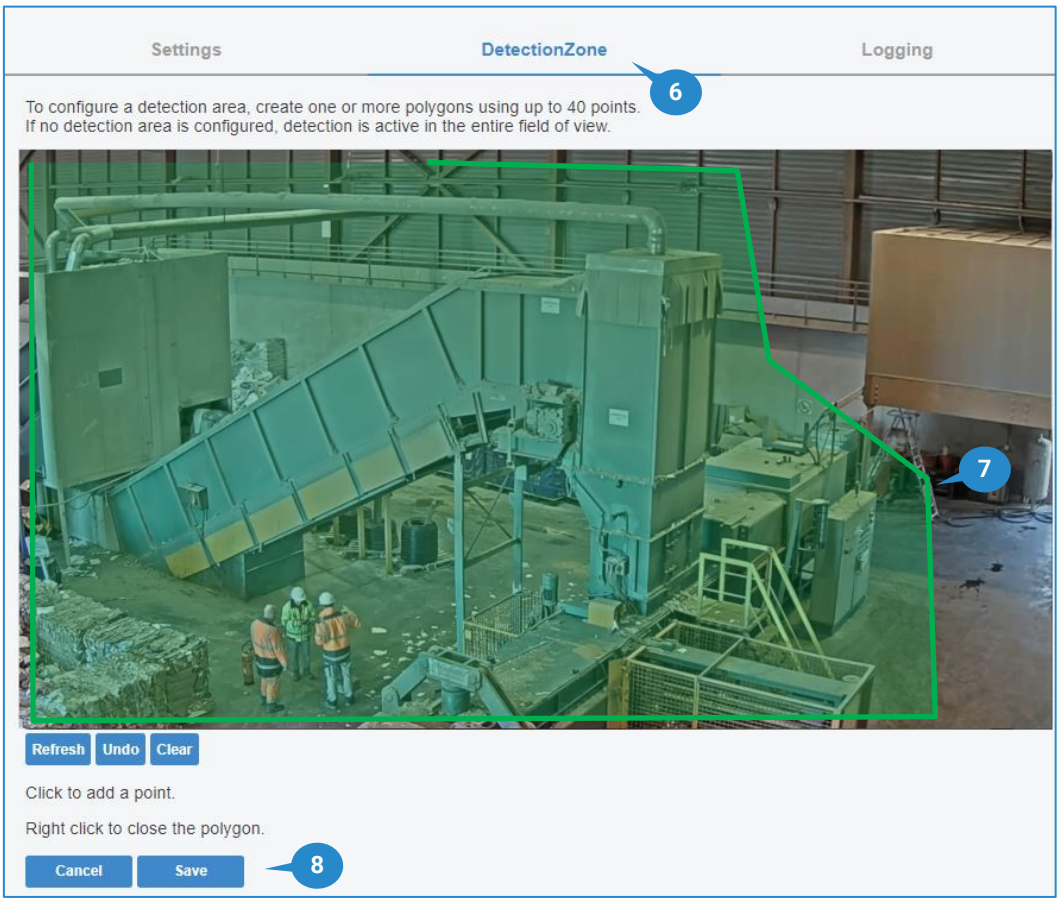
1. Connect to your camera, using your internet browser software and login to the camera webpage. Refer to the camera user manual on how to do this.
2. Open the settings window by clicking the “settings” button in the bottom right of the camera webpage.
3. Select the “Apps” tab in the control panel.
4. Select the FireCatcher app.



5. Make sure the application is running, otherwise start FireCatcher. Select “Open”



6. A new browser window will appear that contains all available settings to configure FireCatcher. Select the “DetectionZone” tab.
7. To draw a polygon detection zone on the visual image:
    a. Left click in the image to add a point.
    b. Right click to close the polygon (you need at least 3 points).
    c. Select “Undo” to undo the last action. Multiple actions can be undone.
    d. Select “Clear” to clear all drawn zones.
    e. Select “Refresh” to refresh the picture with the current live camera image.



8. Select “Save” to save the configuration of detection zones.

Up to 40 points can be used to draw the detection zones. The area of an individual zone must be at least 2% of the full image. The sum of the detection zones must be at least cover 25% of the full image. If smaller zones are drawn, a warning pop-up box will appear. Zones may overlap. For detection, the aggregated area is considered.

Configuring display options

To visualize FireCatcher alarms inside the video stream, two options are available:

- Adding text overlay to the video that displays the FireCatcher status.
- Enabling overlay in the application to dynamically draw red bounding boxes around the incident zone.

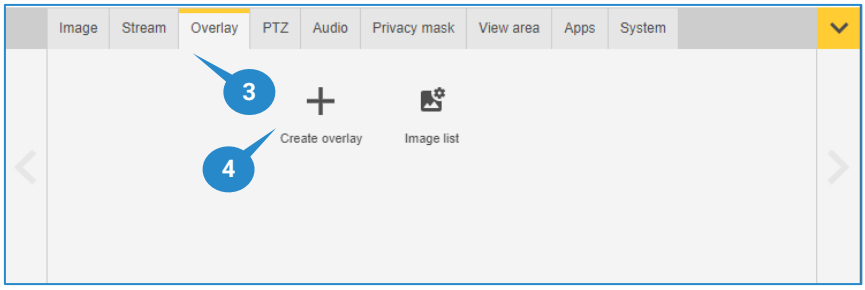
VIEW FIRECATCHER STATUS

The FireCatcher app status is one of following:

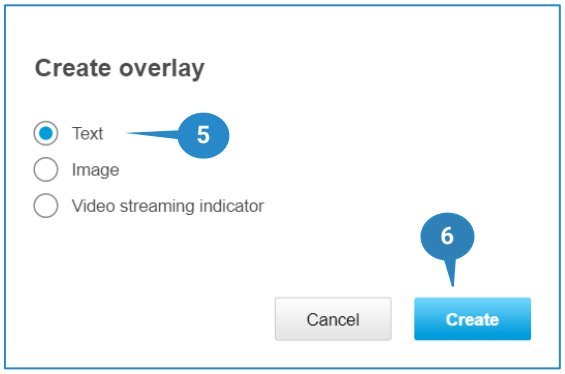
- OPERATIONAL: the app is running; no incident is detected, and detection conditions are ok.
- FAULT: any condition that prohibits detection from working e.g. contrast or light level are not sufficient for proper smoke detection, camera image is blocked.
- ALARM: an incident condition is raised, either smoke and/or flame is detected.
- RECALIBRATING: learning background after starting up, reset or reconfiguring.

This status can be visualized in the video stream by using the Axis® camera overlay capabilities. To visualize the FireCatcher status on screen, follow these steps:

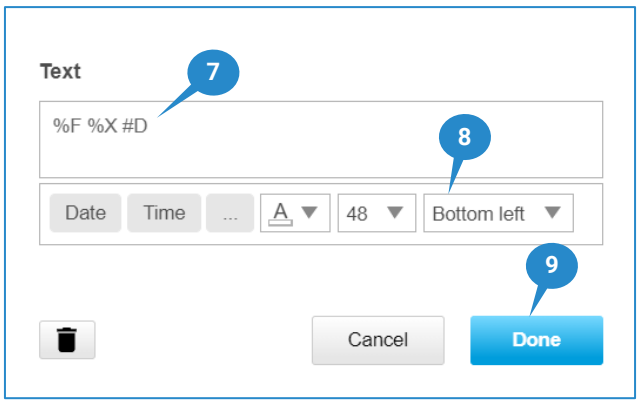
1. Connect to your camera, using your internet browser software and login to the camera webpage. Refer to the camera user manual on how to do this.
2. Open the settings window by clicking the “settings” button in the bottom right of the camera webpage.
3. Select the “Overlay” tab in the control panel.
4. Select “Create overlay”.



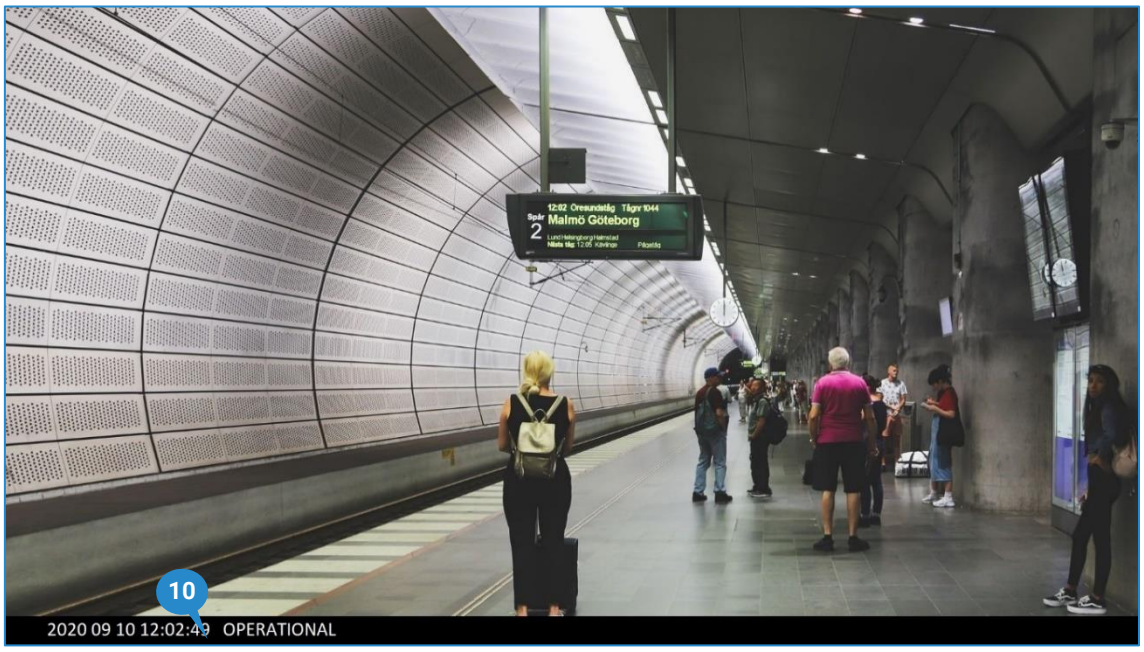
5. Select “Text”.
6. Select “Create”.



7. In the pop-up window that appears, one can create a custom overlay text by using codes. Add #D to the overlay definition to add the FireCatcher status. This can be combined with other custom fields such as date (%F) and time (%X) in the example below. Refer to your camera manual for all available options.
8. In the dropdown box, select the location where you want the overlay to appear in the image. This should always be bottom left or bottom right, to not influence the detection. Font, colour and size are customizable.
9. Select “Done”.



10. An overlay text bar will now appear in the video with the selected options, including the FireCatcher status.

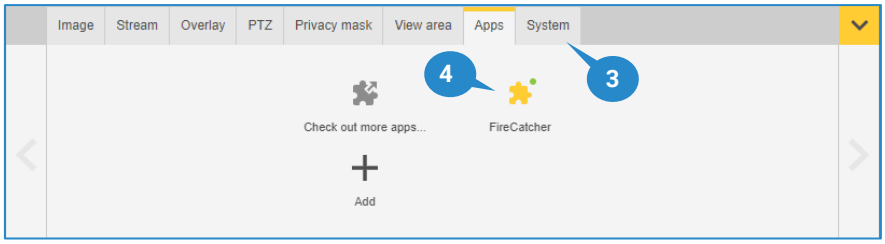


Notice: It is recommended to keep the overlay in the bottom left of the image. This zone will be ignored by the algorithms.

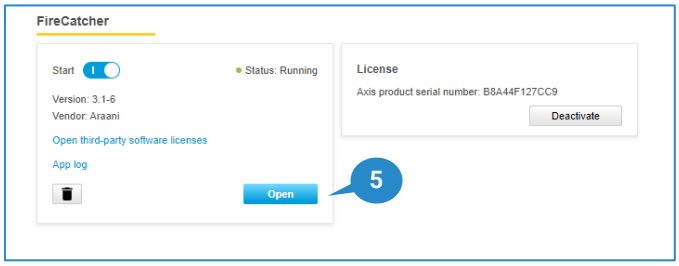
VIEW DETECTION BOUNDING BOX

When smoke or flame is detected, the app can draw a bounding bow around the detected incident in the video stream. This box dynamically changes as the incident zone grows or shrinks. To enable the drawing of this bounding box, it must be enabled in the FireCatcher configuration. Follow steps below to do this:

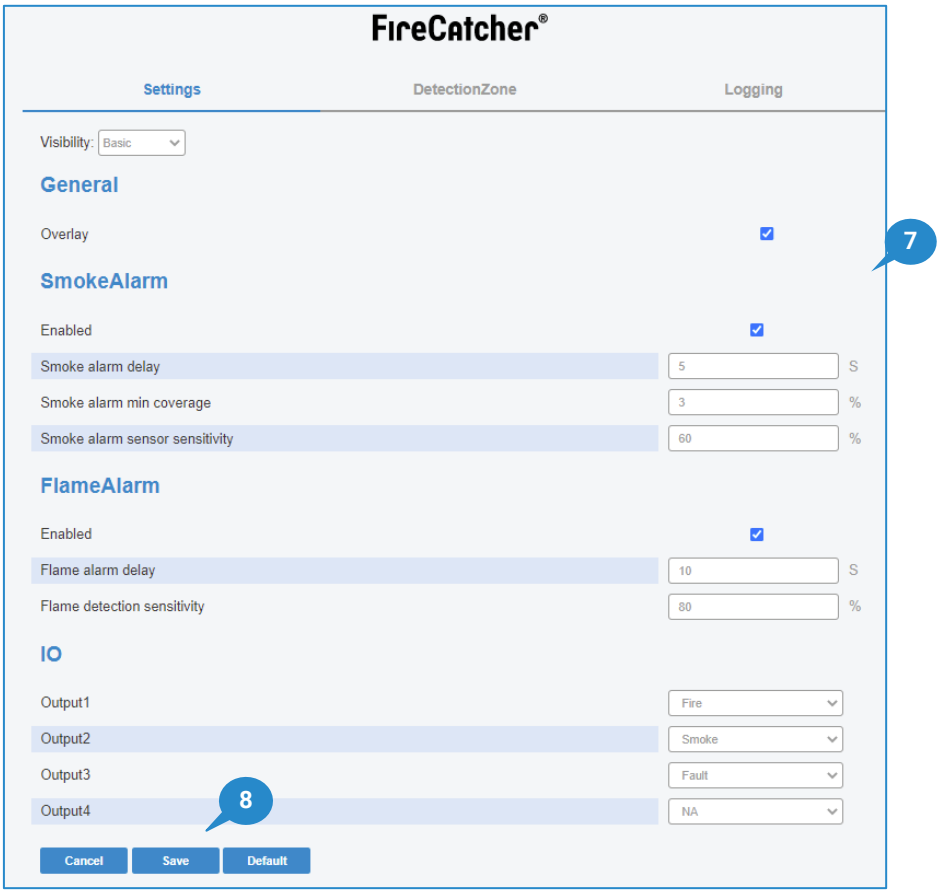
1. Connect to your camera, using your internet browser software and login to the camera webpage. Refer to the camera user manual on how to do this.
2. Open the settings window by clicking the “settings” button in the bottom right of the camera webpage.
3. Select the “Apps” tab in the control panel.
4. Select the FireCatcher app.



5. Make sure the application is running, otherwise start FireCatcher.
   Select “Open”.



6. A new browser window will appear that contains all available settings to configure FireCatcher.
7. Select “Overlay” to enable the bounding box in the streaming image.



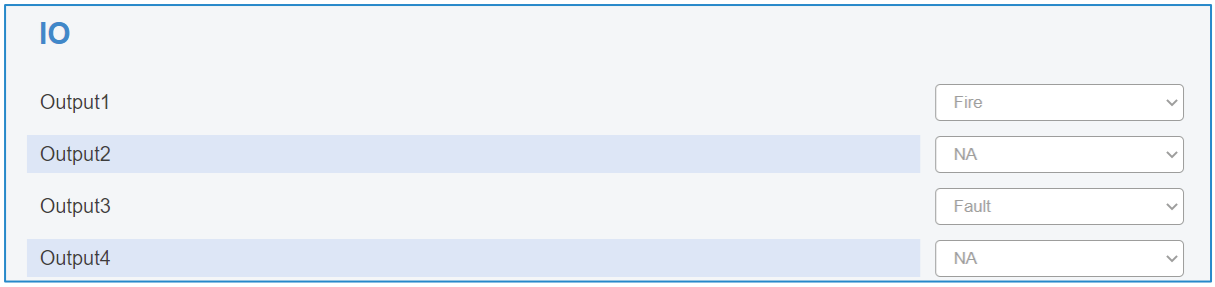
8. Select “Save” to register the new settings in the app.
9. A bounding box will now appear on the image when an incident is detected.

Configuring the (optional) digital output

FireCatcher allows to control an optional external I/O module. If this feature is enabled in your license, additional settings become available to define the behaviour of the four physical output signals.

Basic I/O configuration

The basic I/O configuration allows to assign alarms and statuses to specific outputs.



Name	Options	Default value	Meaning
Output1	Fire Smoke Flame	Fire	Each of these settings allows to assign a function to the associated output signal on the I/O module. Following options can be assigned, depending on the output number: • Smoke: will activate the output when a smoke alarm is occurring. • Flame: will activate the output when a flame alarm is occurring. • Fire: will activate the output when either a smoke alarm or a flame alarm or both are occurring. • Fault: will activate the output when a fault is occurring. • Supervisory: smoke detection temporarily disabled due to motion detection or by external cgi command. • NA: not assigned.
Output2	Fire Smoke Flame Supervisory NA	NA	
Output3	Fault	Fault	
Output4	Fire Smoke Flame Fault Supervisory NA	NA	

Note that “activation” in the table above is considered as opening the related output contact:

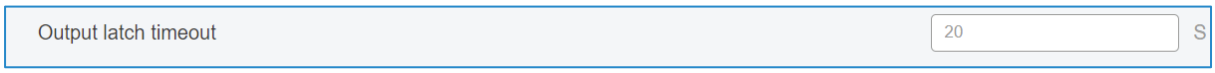
- Outputs are normally closed when assigned to smoke, flame or fire alarm. An alarm will actually open the contact.
- Output 3 is always assigned to fault alarm and this output is normally closed. A fault will actually open the contact.
- Outputs that are not assigned (NA) are always open.

In default mode, the assigned output contacts are opened for a duration of 20 seconds when activated and then returned to closed state. This called “no-latch-mode”. The latch behavior and timing can be controlled in the advanced configuration.

This behavior is consistent with most Fire Alarm Control Panels.

Advanced I/O configuration

In advanced configuration mode, an additional setting becomes available to control the opening / closing behavior of the I/O contacts when activated.



Name	Range	Unit	Default value	Meaning
Output latch timeout	0 - 120	Seconds	20	The setting controls the behaviour of the I/O contacts when activated: 0: I/O contacts are opened when the assigned status or alarm occurs and remain open until that status changes back or the alar is finished. 1-120: when activated, the I/O contacts open for the set time and automatically close again after that time. This is called “latch mode”

How to test FireCatcher

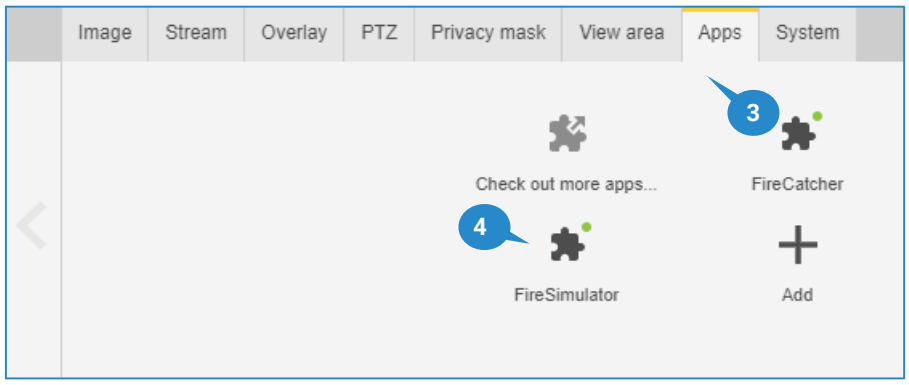
Testing connectivity: FireSimulator

To test connectivity, alarm propagation and optional I/O, Araani provides a separate ACAP application, called FireSimulator. FireSimulator allows to:

- Force the status of detection: operational, fault, smoke alarm or flame alarm.
- Assign a function to any of the four output signals of the optional I/O module.

INSTALLING FIRESIMULATOR

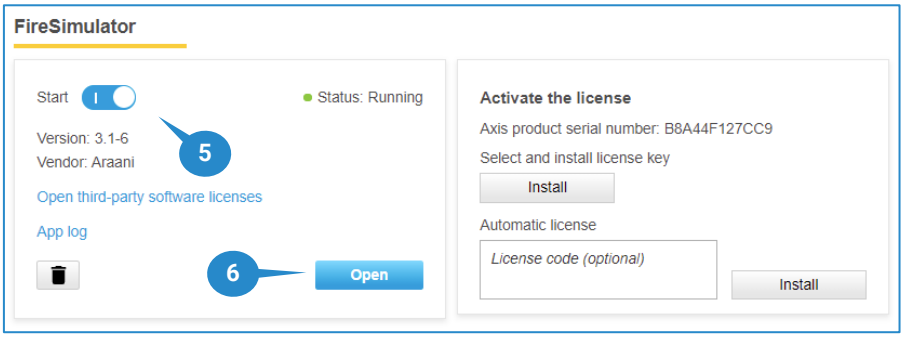
The FireSimulator ACAP can be installed in the same way as the FireCatcher application was installed. See FireCatcher installation for the installation steps. The application file is called FireSimulator_Vx.xx.xx_armv7hf.eap. There is no license code associated with FireSimulator so no need to activate a license. When properly installed, the FireSimulator application appears under the Apps tab in the camera setup interface, next to the FireCatcher application .



STARTING FIRESIMULATOR

To start the FireSimulator app:

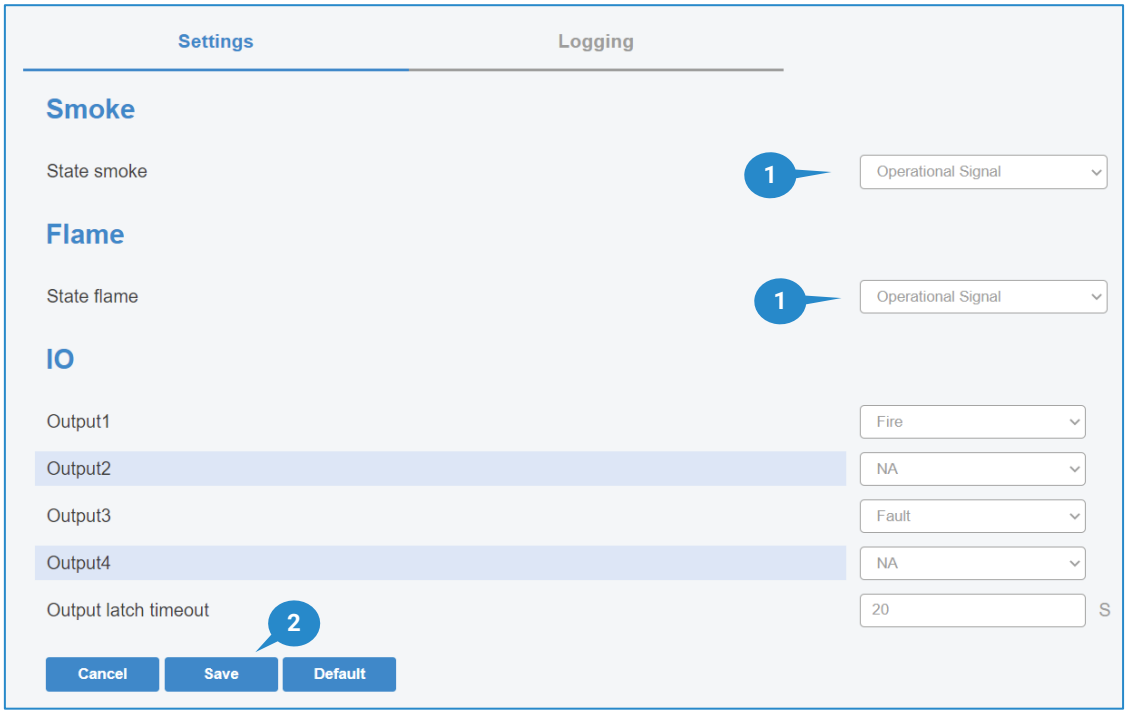
1. Connect to your camera, using your internet browser software and login to the camera webpage. Refer to the camera user manual on how to do this.
2. Open the settings window by clicking the “settings” button in the bottom right of the camera webpage.
3. Select the “Apps” tab in the control panel.
4. Select the FireSimulator app.
5. Click the start switch to start the application.
6. Click the “Open” button to access the FireSimulator controls. A new browser tab should appear with the application configuration controls.



USING FIRESIMULATOR TO VERIFY STATUS PROPAGATION

The FireSimulator configuration page allows to force the status of the detection algorithms as follows:

1. Select the desired state to be tested from either the smoke or flame algorithm.
2. Click "Save" to apply the status.



The options and impact of the selected status are shown in this table:

Algorithm	State	Result
Smoke	Smoke alarm	All previous alarms are deactivated. Smoke alarm is generated. Fire alarm is generated. All outputs that are assigned smoke or fire are activated (= contacts opened).
Smoke	Fault signal	All previous alarms are deactivated. Fault alarm is generated. All outputs that are assigned fault are activated (= contacts opened).
Smoke	Operational signal	All previous alarms are deactivated.
Smoke	Supervisory	Smoke detection is disabled. Flame and fire alarm can still be active. Supervisory output is activated.
Flame	Flame alarm	All previous alarms are deactivated. Flame alarm is generated. Fire alarm is generated. All outputs that are assigned flame or fire are activated (= contacts opened).

Flame	Fault signal	All previous alarms are deactivated. Fault alarm is generated. All outputs that are assigned fault are activated (= contacts opened).
Flame	Operational signal	All previous alarms are deactivated.
Flame	Supervisory	Smoke detection is disabled. Flame and fire alarm can still be active. Supervisory output is activated.

Note that FireSimulator also allows to configure the I/O settings. See Configuring the (optional) digital output on how to use these. Be sure to reset all of these to the intended function after changing any assignment.

Testing detection with test fire and smoke

SAFETY PRECAUTIONS

Danger: Make sure to respect all safety precautions imposed in the location where the test will be performed.

Danger: Before and while conducting tests, consider all safety precautions below.

- Wear personal protective equipment:
  - Fireproof gloves.
  - Eye protection.
- Use demarcation material to secure the test zone:
  - Cones.
  - Safety ribbon.
- Fire safety:
  - Assure the proximity of a fire extinguisher.

Attention: Besides the functionality test described below, always refer to your region-specific test norms to comply with local regulations; e.g. EN54, NFPA .

REQUIRED MATERIALS

SMOKE SIMULATION

To perform a smoke test, try to simulate smoke in a safe way. You can choose from different options to simulate smoke:

- **Smoke pellets**. Make sure the volume of smoke is at least 24m³ in total, use multiple pellets if necessary (to find a local supplier, google: smoke tablets 24m³).
  Accessories:
  - a metal, fireproof cup, or bucket to put the tablets in.
  - a long nose lighter.
- **Smoke machine**. Make sure to use a powerful smoke machine that has capacity of 60 seconds or more of continuous smoke.
  Required:
  - power connection.

- smoke machine liquid.

- **Other**: be aware of fire hazards before using other ways to test FireCatcher smoke recognition.

FLAME SIMULATION

To perform a flame test, try to simulate flames in a safe way with. You can choose from different options to simulate flames:

- **Flame video**. Use a fireplace video to simulate flames on a screen/laptop/tablet, this type of video can be easily found on YouTube or other video-sharing platforms. Select a video where the flames are present in most of the screen, e.g.:

- **Chemical solvents** or other types of combustibles can be used to create flames, but this is not recommended. This method requires expertise. Do not do this if you are not a fire safety specialist.

- **Other**: be aware of fire hazards before using other ways to test FireCatcher flame recognition.

TEST ZONE SETUP

Select a safe indoor area to perform the fire tests. For best result, position the test fire in the middle of the field of view.

Pay attention to following issues:

- Smoke:
  - Anticipate on where the smoke will travel (due to airflow, wind, air-conditioning, open doors…) and make sure to position the test fire in such a way that the smoke remains in the camera field of view for a maximum amount of time.
- Flame:

    - When using a fireplace video:
        - Make sure the size of the simulated flame is larger than 0.1% of the field of view, and less than 33% of the image.
        - Make sure that the screen is perpendicularly oriented towards the camera, to have a proper/clear view off the video.
        - Avoid reflections on the screen.
        - Set the screen to maximum brightness. FireCatcher is looking for light intensity. Screen brightness can never compete with sunlight or bright lamps. Try to avoid these interferences in the field of view during the test or create a detection zone excluding these disturbing factors.
- Described testing methods may not be suitable for outdoor testing. Weather conditions may negatively affect dispersion of generated smoke and outdoor light will interfere with video screens.
- Make sure the site responsible is informed about the tests and you have the authorization to perform the tests.
- Make sure existing smoke alarms are disabled or generated alarms are properly managed and/or inform site safety responsible before conducting tests

SENSITIVITY VERSUS SIZE

Refer to Camera Position / Field of view chapter for a proper understanding of required smoke and flame sizes before conducting tests.

TEST PROTOCOL

Step	Action	Check
1.	Install and configure the camera according the FireCatcher manual. Do not forget to check if the camera is compatible and the firmware is supported.	
2.	Activate overlay text and bounding boxes to display the FireCatcher status (see FireCatcher manual to enable this).	
3.	Make sure the site responsible is informed on the tests and you have the authorization to perform the tests. .	
4.	Make sure the alarms the test will generate are managed and will not be escalated.	
5.	Put the test fire in the test fire position as described in 'Test fire position' and place the demarcation.	
6.	Make sure that the test fire has enough fuel to generate smoke during at least x seconds with a coverage of at least x% (see table Sensitivity vs size) at the same location in the field of view. Avoid entering the field of view for refuelling during the test.	
7.	Make sure FireCatcher is running (Operational) and had at least **5 minutes of learning time** on the field of view if you restarted the camera or the application.	
8.	Keep the field of view stable and avoid disturbance from vehicles, door/windows opening/closing, sudden light changes, people walking in the field of view…	
9.	After 5 minutes of a stable field of view, start the test fire, ideally without entering the field of view. If this is impossible try to have only 1 person entering the field of view.	
10.	FireCatcher should detect the smoke/flame and will display this via overlay text and bounding boxes.	

Maintenance and troubleshooting

CAMERA MAINTENANCE

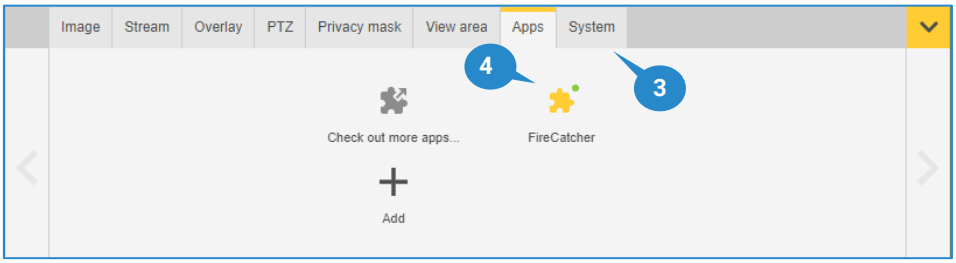
For consistent performance of FireCatcher, periodic maintenance of the camera is necessary.
The time intervals of this maintenance strongly depend on environmental elements such as dust, pollution …
By default, a maintenance procedure should include these steps in the correct order:

1. Stop FireCatcher.
2. Clean lens and/or window of housing (clean the rest of the camera if necessary).
3. Re-focus lens.
4. Control field of view and make sure it is identical to the original field of view.
5. Update the camera firmware if available and if approved by Araani (check camera settings consistency after upgrade).
6. Update FireCatcher software.
7. Start FireCatcher software and check if FireCatcher is still in Operational state after the learning period of 5 minutes.

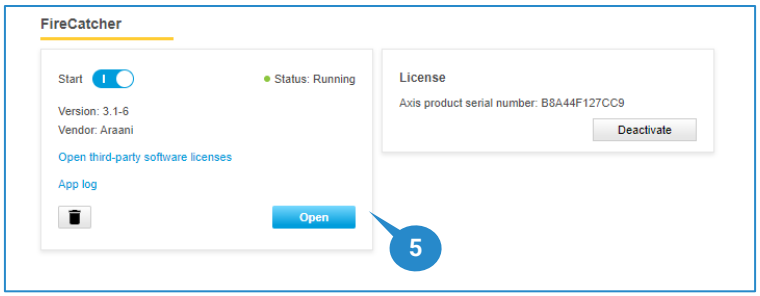
RETRIEVING DIAGNOSTICS INFORMATION

In case of problems with the FireCatcher detection, your support contact may request you to retrieve the logging information from the app. When contacting support services, it is advised to include this information by default in the problem report. Follow steps below to retrieve this diagnostics information.

1. Connect to your camera, using your internet browser software and login to the camera webpage. Refer to the camera user manual on how to do this.
2. Open the settings window by clicking the “settings” button in the bottom right of the camera webpage.
3. Select the “Apps” tab in the control panel.
4. Select the FireCatcher app.



5. Select “Open”



6. A new browser window will appear that contains all available settings to configure FireCatcher. Select the “Logging” tab to access the diagnostics page.
7. To view the logging information of the application, select “View”.
8. To download the logging information of the application, select “Download”.
   A text file will be created with extension ‘.log’ that contains all available logging information. This file can be sent to your support contact for diagnosis and troubleshooting.

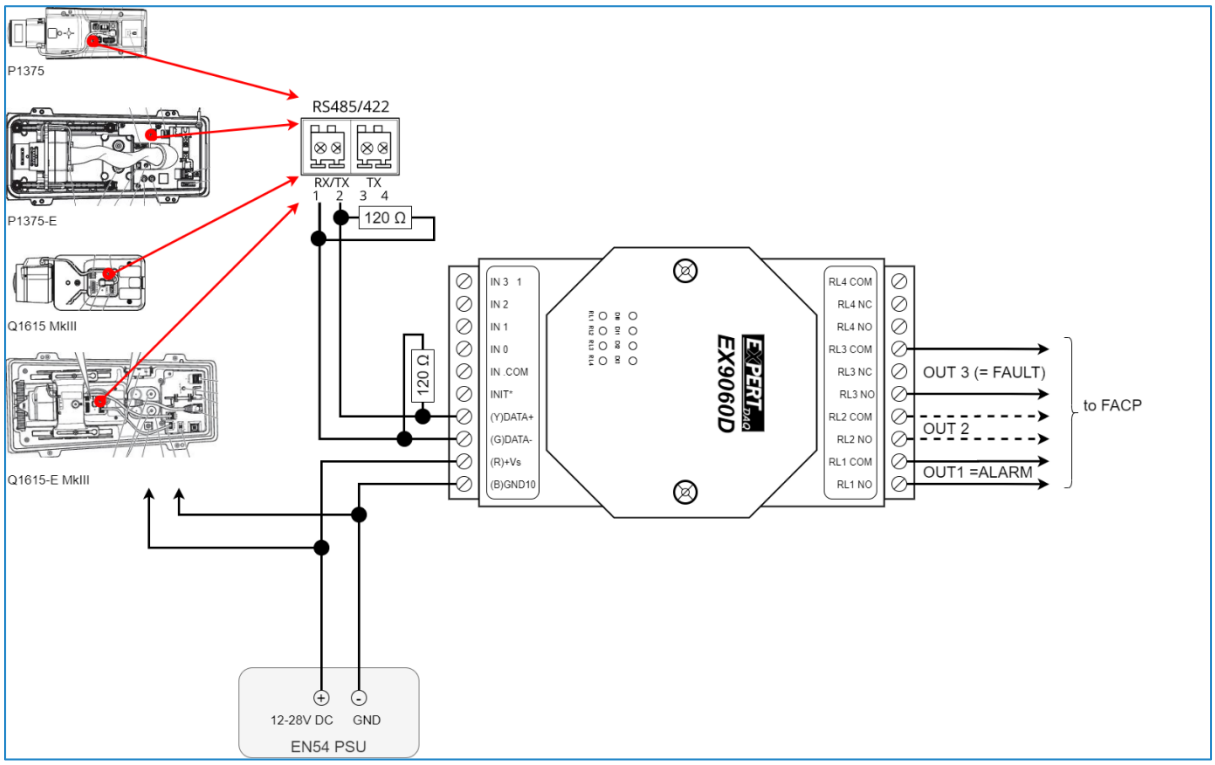
Addendum: integrating the ExpertDAQ EX9060D

FireCatcher can support external connection to a Fire Alarm Control Panel via the ExpertDAQ EX9060D I/O module. FireCatcher communicates to the module over a two-wire RS-485 link. Follow the guidelines below to set up this connection.

Connecting the module to the camera

Connect the ExpertDAQ EX9060D to the camera as illustrated below. Follow these guidelines:

- Connect power to the ExpertDAQ module.
  - Use an EN-54 compliant power supply.
  - 10-28 V DC is suitable for both the module and the cameras. In any case, the GND should be common for camera and I/O module.
- Connect the camera RS-485 connector to the module RS-485 terminals.
  - Use shielded cable that complies to local fire safety requirements.
  - Maximum length = 20 m.
  - Pay attention to the polarization of the link!
  - Apply correct termination on both sides of the link.



Connecting the module to the FACP

Refer to your FACP manual to verify capabilities and for instructions on how to connect the alarm and fault signal. This may require the use of resistors on the outputs to distinguish between alarm(s) and fault status.

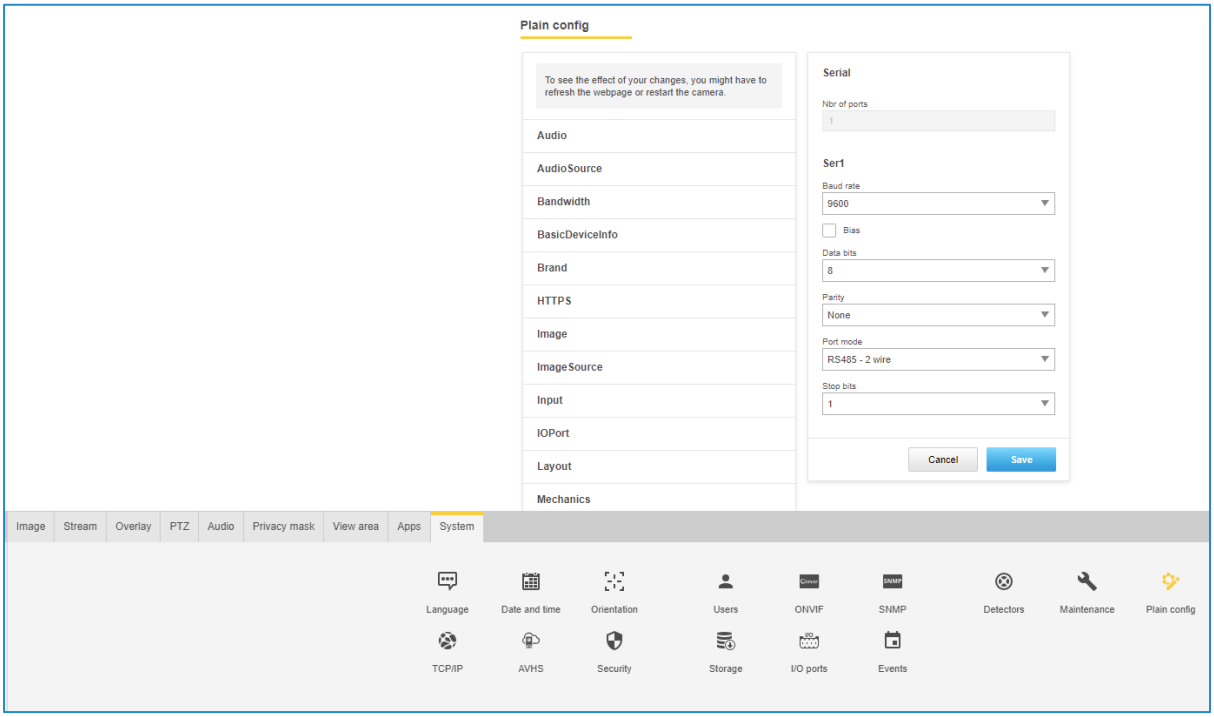
Configuring the camera serial communication

Configure the camera serial port settings as follows:

- Baud rate = 9600
- Number of data bits = 8
- Parity = none

- Number of stop bits = 1
- Port mode = 2-wire RS-485

Depending on your camera model, this may require using the plain config menu.



Addendum: Araani Application EULA

This End User License Agreement ("**EULA**") between you, the End User (as defined below), and Araani NV, a registered company with company number 0505.774.826 and registered office at Luipaardstraat 12; 8500 Kortrijk in Belgium ("**Araani**"), sets forth the terms and conditions under which Araani shall provide the End User with a license to the Application (as defined below), as well as the manner in which the End User should (not) use the Application.

Please note that this EULA may be updated from time to time. The latest version shall always be available on Araani's Website and on the Application. Araani shall send the End User a notification in the Application when an update of the EULA is available. The new version enters into effect when the End-User receives the notification.

1. DEFINITIONS

Application	FireCatcher application, including any updates, upgrades, enhancements, modifications or new versions made available by Araani to (the) End User(s).
Application Documentation	All written materials, binders, user manuals and other documentation/materials supplied by Araani and related to use of the Application.
FireCatcher	Araani's non-certified FireCatcher, which is an intelligent camera, that will trigger an alarm if fire (smoke or flame) is detected
EULA	This End User License Agreement which includes (i) the conditions under which the End User shall obtain a license to the Application; and (ii) the manner in which said license/Application should or should not be used by the End User.
End User	The person or legal entity that installs and uses the Application, including its employees or any authorized person acting on its behalf.
External Services	Third party software or hardware to which the Application may have access or with which it may communicate.
Intellectual Property Rights	Any and all of Araani's rights to patents, design, utility models, trademarks, trade names, know-how, trade secrets, copyrights, photography rights and other industrial and intellectual property rights relating to the Application, whether registered or not.
License Fee	Amounts due by the End User for obtaining and using a license to the Application.
Privacy Legislation	(i) the General Data Protection Regulation of 27 April 2016 ("the Regulation of the European Parliament and of the Council on the protection of individuals with regard to the processing of personal data and on the free movement of such data and repealing Directive 95/46/EC"), including all future changes and amendments thereof; and/or (ii) all similar national data protection laws that are applicable to the processing of personal data within the scope of this EULA.
Supplier(s)	Araani authorized vendor(s) of the Application or of a hardware device equipped with the Application.
Trial license	The temporary installation and use of the Application in order to evaluate the performance, quality and suitability of the Application.
Website	Araani's official website: https://www.araani.com.

2. SCOPE OF LICENSE

2.1 Standard license to Application

2.1.1 Subject to approval to and compliance with this EULA, Araani grants, for the duration of this EULA (*cfr.* **Article 3**), the End User a limited, personal, non-commercial and non-transferable license to (i) use the Application and/or (ii), install this Application on a hardware device that it owns or controls (where applicable).

2.1.2 The number of allowed installations and uses depends on the type of license:

- ✓ A **single instance license** allows the End User to use and/or install the Application on one (1) hardware device.
- ✓ A **bulk license** allows the End User to use/and or install the Application on the number of hardware devices as described in the order.

2.1.3 The terms of this EULA shall govern the Application as well as any standard upgrades, updates, enhancements or other modifications to the Application provided by Araani, unless such upgrade, update, enhancement or other modification is accompanied by a new or customized End User License Agreement.

2.2 Trial license

2.2.1 Trial licenses are available to the End User for the Application with a limited activation period. Continued use of the Application beyond said activation period requires the purchase of a standard license to the Application.

2.2.2 The terms described in this EULA apply both to standard and to Trial licenses.

2.2.3 By installing the Application with Trial license, the End User automatically acknowledges the Intellectual Property Rights of Araani (*cfr.* **Article 6**).

2.3 Non-transferable

2.3.1 The End User acknowledges that both the standard license (*cfr*. **Article 2.1**) and the Trial license (*cfr.* **Article 2.2**) are non-transferrable. This means that the End User may not / cannot:

- ✓ transfer such licenses to any third parties, including its affiliates. Accordingly, any third party / parties requiring the Application must request their own copy of the license;
- ✓ move licenses to other hardware devices. An activated license is linked to the unique serial number of a specific hardware device and therefore cannot be installed again on other pieces of (a) hardware device(s). Such action requires the purchase of a new license or is subject to a service contract, e.g. in case of hardware failure (provided that this hardware is (still) covered by the warranty);
- ✓ distribute or make the Application available over a network where it could be accessed or downloaded by third parties.

3. DURATION

3.1 This EULA applies for the duration of the use of the Application by the End User, unless terminated in accordance with **Article 9**, and takes effect from the moment that the Application is used on the intended hardware device.

4. CONDITIONS OF USE

4.1 Acceptable use of the Application

4.1.1 The End User hereby agrees to use the Application in accordance with certain restrictions and conditions. In particular, the End User shall not use the Application in a manner that Araani believes:

- ✓ copies (part of) the Application in any way shape or form (except as permitted by this EULA);
- ✓ reverse-engineers, disassembles or otherwise attempts to derive the source code of the Application;

- ✓ modifies, alters, tempers with, or otherwise creates derivative works of the Application;
- ✓ transfers the license to the Application to a third party in violation with **Article 2.3** of this EULA;
- ✓ violates Privacy Legislation;
- ✓ violates or otherwise encroaches on the rights of Araani or others, including, but not limited to, infringing or misappropriating any privacy, human, intellectual property, proprietary right;
- ✓ advocates or induces illegal activity;
- ✓ interferes with or adversely affects the Application or use of the Application by other End Users;
- ✓ is in general to be considered abnormal use of the Application.

4.1.2 The End User commits itself to:

- ✓ apply all reasonable techniques, practices and/or technology (e.g. use of strong passwords that are regularly changed) to prevent unauthorized use of the Application by a third party;
- ✓ always use the latest, updated version of the Application as (and if) made available by Araani (cfr. **Article 7.1**);
- ✓ notify any malfunction or disruption (due to, for example, bugs or malicious code) of the Application to the Supplier of which the End User bought the license).

4.2 Legal disclaimer

4.2.1 The End User recognizes that it is aware that fire safety is subject to strict standards and regulations. Accordingly, the End User acknowledges that the Application may never replace a mandatory fire detector. For such function, Araani refers to its certified solutions. Fire indications by the Application should only be raised after human verification.

4.2.2 The Application should in all cases be used by the End User only for the purpose for which it is intended, taking into account the specifications indicated above.

4.2.3 In no event can Araani or its affiliates be held accountable for any – direct or indirect – damages for loss or damage of property, death or personal injury to any person caused by (the non-detection of) fires, or related occurrence.

5. DATA PROTECTION

5.1 In principle, access to / the use of the Application by the End User does not automatically result in the processing by Araani of personal data. However, Araani may receive and process the personal data of an End User in the event it is requested by a Supplier to provide second line support;

5.2 In such case, Araani shall process such personal data of the End User in accordance with Privacy Legislation and with the Araani privacy policy as published on the Website: https://www.araani.com/en/standalone-pages/privacy-policy/.

6. INTELLECTUAL PROPERTY RIGHTS

6.1 The End User acknowledges that Araani is and remains the sole owner of all Intellectual Property Rights related to the Application, developed by Araani itself (or by a third party for the benefit

of Araani). Nothing in this EULA shall be construed as to limit Araani's right, title and interest in the Application.

6.2 Araani warrants that the Application does not infringe upon the intellectual property rights of any third parties. If a third party (successfully) claims that the Application infringes upon its intellectual property rights, Araani shall obtain the right to use the third-party software or will amend or replace it so as to allow the End User to lawfully use it.

7. WARRANTY

7.1 Compatibility

7.1.1 Araani warrants for one (1) year that the Application shall run on compatible hardware devices and that the Application shall perform substantially as described in the Application Documentation.

7.2 Software maintenance and updates

7.2.1 During the first year of the license, Araani shall (proactively) take all commercially and technically reasonable measures to ensure that the Application is error/defect-free and free of malicious code. To that effect, Araani shall to its best abilities make sure that the Application is regularly updated and shall perform software maintenances if required. Beyond said first year, Araani shall only be required to proactively update the Application to fix severe bugs or other malicious code that make it impossible or seriously prevent the use of the Application (in general or by a specific End User).

7.2.2 The End User acknowledges that the aforementioned is subject to its own efforts to:

- ✓ notify any bugs of or other errors in the Application to the Supplier; and
- ✓ use, at all times, the latest (updated) version(s) of the Applications, if made available to the End User.

7.3 Exemptions

7.3.1 Araani shall not warrant:

- ✓ that the Application shall work on every hardware device and on future versions and upgrades of such hardware device, given the ever evolving and changing nature of technology;
- ✓ that all defects in the Application shall be corrected;
- ✓ the compensation for damage caused by an alteration or a modification made by the End User or another non-authorized person, or the correction or reparation of any malfunction caused by such alteration/modification;
- ✓ the correction or reparation of a malfunction caused by (non-limited) **(i)** the improper use or installation of the Application in violation with **Article 4.1.1**; **(ii)** negligence of the End User or any other breach of its commitments under **Article 4.1.2**; or **(iii)** a power surge or failure at the End User's location.

7.3.2 Araani is not responsible for examining or maintaining the compliance of external hardware devices, in which the Application is installed and shall not warrant the compensation of any damage or the correction of any malfunction of the Application caused by such external hardware device.

7.3.3 If national law applicable to the use of the Application provide that certain warranties cannot be excluded or can only be excluded to a limited extent, this EULA shall be interpreted in accordance with such national law provisions.

8. LIMITATION OF LIABILITY

8.1 Araani's liability

8.1.1 Araani's total liability to the End User for all claims relating to this EULA or the use of the Application shall not exceed the License Fee.

8.2 Exemption for indirect damages

8.2.1 Araani shall not be liable for any incidental, special, indirect, or consequential damages whatsoever, such as, but not limited to: damages for loss of property, loss of profits, loss of revenue, loss of data, business interruption, reputational damage, (legal) advisory fees, etc.

8.3 Misuse of the Application

8.3.1 The End User recognizes that the Application cannot be considered as a (substitute for a) smoke detector. Accordingly, Araani cannot be held liable by any person for any damages for loss or damage of property, death or personal injury to any person caused by (the non-detection of) fire or related occurrence.

8.4 Wilful misconduct, gross negligence, personal injury or death

8.4.1 The limitations of liability set forth in this **Article 8** shall not apply to damages caused by wilful misconduct or gross negligence, personal injury or death attributable to Araani or the Application.

9. TERMINATION

9.1. Breach of any of the terms of this EULA by the End User shall result in the immediate revocation of the standard or Trial license. In such case, the End User shall not be entitled to a refund of the License Fee.

9.2. Upon termination (for whatsoever reason), the End User is obliged to destroy all copies of the Application and associated license files, including backup or archival copies on external storage, and uninstall the Application from all hardware devices it owns or controls.

10. EXTERNAL SERVICES

10.1. The End User agrees to use External Services at its sole risk. Araani is not responsible for examining or evaluating the content or accuracy of any External Services, and shall not be liable for any such External Services.

10.2. The End User shall not use the External Services in any manner that is inconsistent with the terms of this EULA or that infringes the Intellectual Property Rights of Araani or any third party.

10.3. External Services may not be available in the End User's languages and may not be appropriate or available for use in any particular location. To the extent the End User chooses to use such External Services, it is solely responsible for compliance with any applicable laws.

10.4. Araani reserves the right to change, suspend, remove, disable or impose access restrictions or limits on any External Services at any time, in which case it shall reasonably notify the End User thereof.

11. MISCELLANEOUS

11.1. End User acknowledges that it has fully read and understood all terms within this EULA.

11.2. This EULA supersedes any other agreement (oral or written) between Araani and the End User with the same scope. The aforementioned does not apply to customized End User License Agreement between the End User and Araani.

11.3. No deviation from this EULA shall be accepted, without prior consent of Araani.

12. GOVERNING LAW AND DISPUTE RESOLUTION

12.1. This EULA and all relations, disputes, claims and other matters arising hereunder (including non-contractual disputes or claims) shall be governed exclusively by, and construed exclusively in accordance with, the laws of Belgium, without regard to conflicts of law provisions.

12.2. The competent courts located in Kortrijk, Belgium shall have exclusive jurisdiction to adjudicate any dispute or claim arising out of or relating to this EULA (including non-contractual disputes or claims).