



AXIS Q6411-LE Bispectral PTZ Camera

User manual

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Installation

For complete instructions on all installation scenarios as well as safety information, see the installation guide:



Installation guide AXIS Q6411-LE Bispectral PTZ Camera (PDF)



To watch this video, go to the web version of this document.

This video is an example of how to install an AXIS Q6 series PTZ camera. The product used in this video is AXIS Q6315-LE PTZ Camera, but the steps are similar for AXIS Q6411-LE Bispectral PTZ Camera.

Get started

Find the device on the network

To find Axis devices on the network and assign them IP addresses in Windows®, use AXIS IP Utility or AXIS Device Manager. Both applications are free and can be downloaded from axis.com/support.

For more information about how to find and assign IP addresses, go to *How to assign an IP address and access your device*.

Browser support

You can use the device with the following browsers:

	Chrome™	Edge™	Firefox®	Safari®
Windows®	✓	✓	*	*
macOS®	✓	✓	*	*
Linux®	✓	✓	*	*
Other operating systems	*	*	*	*

✓: Recommended

*: Supported with limitations

Open the device's web interface

1. Open a browser and type the IP address or host name of the Axis device.
If you don't know the IP address, use AXIS IP Utility or AXIS Device Manager to find the device on the network.
2. Type the username and password. If you access the device for the first time, you must create an administrator account. See *Create an administrator account*, on page 6.

For descriptions of all features and settings in the web interface of devices with AXIS OS, see *AXIS OS web interface help*.

Create an administrator account

The first time you log in to your device, you must create an administrator account.

1. Enter a username.
2. Enter a password. See *Secure passwords*, on page 7.
3. Re-enter the password.
4. Accept the license agreement.
5. Click **Add account**.

Important

The device has no default account. If you lose the password for your administrator account, you must reset the device. See *Reset to factory default settings*, on page 26.

Secure passwords

Important

Use HTTPS (which is enabled by default) to set your password or other sensitive configurations over the network. HTTPS enables secure and encrypted network connections, thereby protecting sensitive data, such as passwords.

The device password is the primary protection for your data and services. Axis devices do not impose a password policy as they may be used in various types of installations.

To protect your data we strongly recommend that you:

- Use a password with at least 8 characters, preferably created by a password generator.
- Don't expose the password.
- Change the password at a recurring interval, at least once a year.

Make sure that no one has tampered with the device software

To make sure that the device has its original AXIS OS, or to take full control of the device after a security attack:

1. Reset to factory default settings. See *Reset to factory default settings, on page 26*.
After the reset, secure boot guarantees the state of the device.
2. Configure and install the device.

Configure your device

Basic settings

Set the power line frequency

1. Go to **Video > Installation > Power line frequency**.
2. Select a power line frequency and click **Save and restart**.

Adjust the image

This section includes instructions about configuring your device. If you want to learn more about how certain features work, go to *Learn more, on page 17*.

Benefit from IR light in low-light conditions by using night mode

Your camera uses visible light to deliver color images during the day. But as the visible light diminishes, color images become less bright and clear. If you switch to night mode when this happens, the camera uses both visible and near-infrared light to deliver bright and detailed black-and-white images instead. You can set the camera to switch to night mode automatically.

1. Go to **Video > Image > Day-night mode**, and make sure that the **IR-cut filter** is set to **Auto**.
2. To set at what light level you want the camera to switch to night mode, move the **Threshold** slider toward **Bright** or **Dark**.
3. To use the built-in IR light when the camera is in night mode, turn on **Allow illumination** and **Synchronize illumination**.

Note

If you set the switch to night mode to occur when it's brighter, the image remains sharper as there is less low-light noise. If you set the switch to occur when it's darker, the image colors are maintained for longer, but there is more image blur due to low-light noise.

Reduce noise in low-light conditions

Note

Low-light settings are only available for the visual channel.

To reduce noise in low-light conditions, you can adjust one or more of the following settings:

- Adjust the trade-off between noise and motion blur. Go to **Video > Image > Exposure** and move the **Blur-noise trade-off** slider toward **Low noise**.

Note

A high max shutter value can result in motion blur.

- To slow down the shutter speed, set max shutter to the highest possible value.
- If there is an **Aperture** slider, move it towards **Open**.

Handle scenes with strong backlight

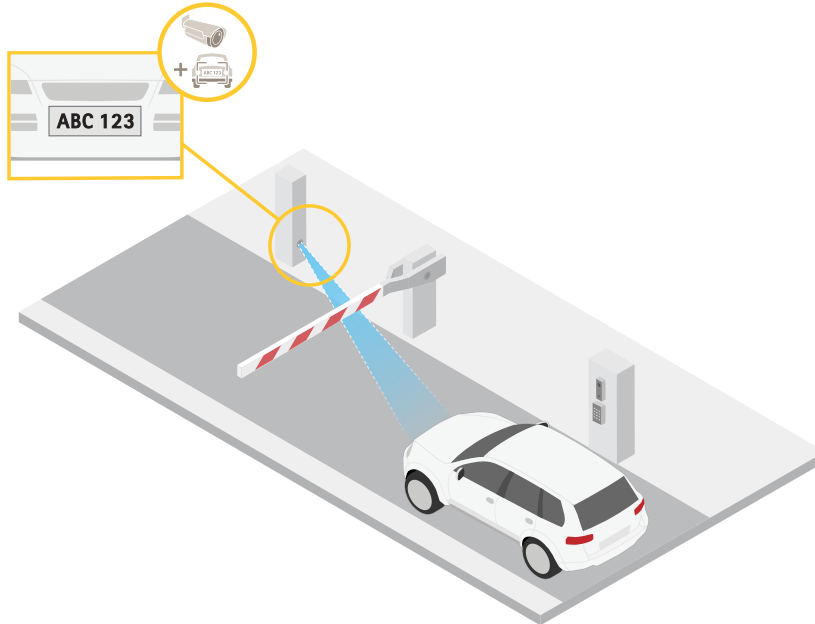
Dynamic range is the difference in light levels in an image. In some cases the difference between the darkest and the brightest areas can be significant. The result is often an image where either the dark or the bright areas are visible. Wide dynamic range (WDR) makes both dark and bright areas of the image visible.

1. Go to **Video > Image > Wide dynamic range**.
2. Use the **Local contrast** slider to adjust the amount of WDR.
3. Use the **Tone mapping** slider to adjust the amount of WDR.
4. If you still have problems, go to **Exposure** and adjust the **Exposure zone** to cover the area of interest.

Find out more about WDR and how to use it at axis.com/solutions/wide-dynamic-range-wdr.

Verify the pixel resolution

To verify that a defined part of the image contains enough pixels to, for example, recognize license plates, you can use the pixel counter.



1. Go to **Video > Image**.
2. Click .
3. Click  for **Pixel counter**.
4. In the camera's live view, adjust the size and position of the rectangle around the area of interest, for example where you expect license plates to appear.
5. You can see the number of pixels for each of the rectangle's sides, and decide if the values are enough for your needs.

Hide parts of the image with privacy masks

You can create one or several privacy masks to hide parts of the image.

1. Go to **Video > Privacy masks**.
2. Click .
3. Click the new mask and type a name.
4. Adjust the size and placement of the privacy mask according to your needs.
5. To change the color for all privacy masks, click **Privacy masks** and select a color.

See also *Privacy masks*, on page 18

Show an image overlay

You can add an image as an overlay in the video stream.

1. Go to **Video > Overlays**.
2. Click **Manage images**.

3. Upload or drag and drop an image.
4. Click **Upload**.
5. Select **Image** from the drop-down list and click .
6. Select the image and a position. You can also drag the overlay image in the live view to change the position.

Show a text overlay

You can add a text field as an overlay in the video stream. This is useful for example when you want to display the date, time or a company name in the video stream.

1. Go to **Video > Overlays**.
2. Select **Text** and click .
3. Type the text you want to display, or select modifiers to show for example the current date.
4. Select a position. You can also click-and-drag the overlay in the live view to change the position.

Show the pan or tilt position as a text overlay

You can show the pan or tilt position as an overlay in the image.

1. Go to **Video > Overlays** and click .
2. In the text field, type #x to show the pan position.
Type #y to show the tilt position.
3. Choose appearance, text size, and alignment.
4. The current pan and tilt positions show up in the live view image and in the recording.

Add street names and compass direction to the image

Note

The preset positions and compass direction will be visible in the compass field in all video streams and recordings.

To activate the compass:

1. Go to **PTZ > Orientation aid**.
2. Turn on **Orientation aid**.
3. Position the camera view at north with the crosshair. Click **Set north**.

To add a preset position to show in the compass field:

1. Go to **PTZ > Preset positions**.
2. Use the crosshair to position the view where you want to add a preset position.
3. Click  **Add preset position** to create a new preset position.

Adjust the camera view (PTZ)

To learn more about different pan, tilt, and zoom settings, see *Pan, tilt, and zoom (PTZ)*, on page 19.

1. Go to **PTZ > Limits**.
2. Set the limits as needed.

Create a recorded guard tour

1. Go to **PTZ > Guard tours**.
2. Click  **Guard tour**.
3. Select **Recorded** and click **Create**.
4. Enter a name for the guard tour and specify the pause length between each tour.
5. Click **Start recording tour** to start recording the pan/tilt/zoom movements.
6. When you're satisfied, click **Stop recording tour**.
7. Click **Done**.
8. To schedule the guard tour, go to **System > Events**.

View and record video

This section includes instructions about configuring your device. To learn more about how streaming and storage works, go to *Streaming and storage*, on page 19.

Reduce bandwidth and storage

Important

Reducing the bandwidth can lead to loss of detail in the image.

1. Go to **Video > Stream**.
2. Click  in the live view.
3. Select **Video format AV1** if your device supports it. Otherwise select **H.264**.
4. Go to **Video > Stream > General** and increase **Compression**.
5. Go to **Video > Stream > Zipstream** and do one or more of the following:

Note

The **Zipstream** settings are used for all video encodings except MJPEG.

- Select the **Zipstream Strength** that you want to use.
- Turn on **Optimize for storage**. This can only be used if the video management software supports B-frames.
- Turn on **Dynamic FPS**.
- Turn on **Dynamic GOP** and set a high **Upper limit GOP length** value.

Note

Most web browsers don't support H.265 decoding and because of this the device doesn't support it in its web interface. Instead you can use a video management system or application that supports H.265 decoding.

Set up network storage

To store recordings on the network, you need to set up your network storage.

1. Go to **System > Storage**.
2. Click  **Add network storage** under **Network storage**.
3. Type the IP address of the host server.
4. Type the name of the shared location on the host server under **Network share**.
5. Type the username and password.
6. Select the SMB version or leave it on **Auto**.

7. Select **Add share without testing** if you experience temporary connection issues, or if the share is not yet configured.
8. Click **Add**.

Record and watch video

Record video directly from the camera

1. Go to **Video > Stream**.

2. To start a recording, click .

If you haven't set up any storage, click  and . For instructions on how to set up network storage, see *Set up network storage, on page 11*

3. To stop recording, click  again.

Watch video

1. Go to **Recordings**.
2. Click  for your recording in the list.

Set up rules for events

You can create rules to make your device perform an action when certain events occur. A rule consists of conditions and actions. The conditions can be used to trigger the actions. For example, the device can start a recording or send an email when it detects motion, or show an overlay text while the device is recording.

To learn more, see *Get started with rules for events*.

Trigger an action

1. Go to **System > Events** and click **+ Add a rule**. The rule defines when the device will perform certain actions. You can set up rules as scheduled, recurring, or manually triggered.
2. Enter a **Name**.
3. Select the **Condition** that must be met to trigger the action. If you specify more than one condition for the rule, all of the conditions must be met to trigger the action.
4. Select which **Action** to perform when the conditions are met.

Record video when the camera detects an object

This example explains how to set up the camera to start recording to the SD card when the camera detects an object. The recording will include five seconds before detection and one minute after detection ends.

Before you start:

- Make sure you have an SD card installed.

Make sure that AXIS Object Analytics is running:

1. Go to **Apps > AXIS Object Analytics**.
2. Start the application if it is not already running.
3. Make sure you have set up the application according to your needs.

Create a rule:

1. Go to **System > Events** and add a rule.
2. Type a name for the rule.
3. In the list of conditions, under **Application**, select **Object Analytics**.
4. In the list of actions, under **Recordings**, select **Record video while the rule is active**.

5. In the list of storage options, select **SD_DISK**.
6. Select a camera and a stream profile.
7. Set the prebuffer time to 5 seconds.
8. Set the postbuffer time to 1 minute.
9. Click **Save**.

Direct the camera to a preset position when the camera detects motion

This example explains how to set up the camera to go to a preset position when it detects motion in the image.

Make sure that **AXIS Object Analytics** is running:

1. Go to **Apps > AXIS Object Analytics**.
2. Start the application if it is not already running.
3. Make sure you have set up the application according to your needs.

Add a preset position:

Go to **PTZ** and set where you want the camera to be directed by creating a preset position.

Create a rule:

1. Go to **System > Events** and add a rule.
2. Type a name for the rule.
3. In the list of conditions, under **Application**, select **Object Analytics**.
4. In the list of actions, select **Go to preset position**.
5. Select the preset position you want the camera to go to.
6. Click **Save**.

Zoom in on a specific area automatically with gatekeeper

This example explains how to use the gatekeeper functionality to make the camera zoom in automatically on the license plate of a car that passes through a gate. When the car has passed, the camera zooms out to the home position.

Create the preset positions:

1. Go to **PTZ > Preset positions**.
2. Create the home position that includes the entrance of the gate.
3. Create the zoomed-in preset position so that it covers the area in the image where you assume that the license plate will appear.

Set up motion detection:

1. Go to **Apps** and start and open **AXIS Object Analytics**.
2. Create an object in area scenario for vehicles, with an include area that covers the entrance of the gate.

Create a rule:

1. Go to **System > Events** and add a rule.
2. Name the rule "Gatekeeper".
3. In the list of conditions, under **Application**, select the **Object Analytics** scenario.
4. In the list of actions, under **Preset positions**, select **Go to preset position**.
5. Select a **Video channel**.
6. Select the **Preset position**.
7. To make the camera wait a while before it returns to the home position, set a time for **Home timeout**.
8. Click **Save**.

Record video when the camera detects impact

Shock detection allows the camera to detect tampering caused by vibrations or shock. Vibrations due to the environment or to an object can trigger an action depending on the shock sensitivity range, which can be set from 0 to 100. In this scenario, someone is throwing rocks at the camera after hours and you would like to get a video clip of the event.

Turn on shock detection:

1. Go to **System > Detectors > Shock detection**.
2. Turn on shock detection, and adjust the shock sensitivity.

Create a rule:

3. Go to **System > Events > Rules** and add a rule.
4. Type a name for the rule.
5. In the list of conditions, under **Device status**, select **Shock detected**.
6. Click **+** to add a second condition.
7. In the list of conditions, under **Scheduled and recurring**, select **Schedule**.
8. In the list of schedules, select **After hours**.
9. In the list of actions, under **Recordings**, select **Record video while the rule is active**.
10. Select where to save the recordings.
11. Select a **Camera**.
12. Set the prebuffer time to 5 seconds.
13. Set the postbuffer time to 50 seconds.
14. Click **Save**.

Detect motion with the thermal channel and zoom in and record with the visual channel

In difficult lighting conditions the thermal channel can detect objects that the visual sensor can't. This example explains how to use the thermal channel to detect motion, and then use the visual channel to zoom in and record. In the example, the camera monitors a gate.

Create a motion detection profile:

Note

If you run AXIS Motion Guard on both channels simultaneously, it can affect the frame rate and the general performance. Therefore, we recommend you to remove all AXIS Motion Guard profiles on the visual channel.

1. Go to **Apps** and open **AXIS Video Motion Detection**.
2. Select **Thermal**.
3. Create a profile named *Gate profile* that covers the area of interest. Find out more in the user manual for AXIS Motion Guard at axis.com/products/online-manual/.

Create the preset positions:

1. Go to **PTZ > Preset positions**.
Both channels share the same preset configurations.
2. Create the home position that includes the area of interest.
3. Create a zoomed-in preset position, called *Gate position*, that covers the area in the image where you predict that the moving object will appear.

Create a rule to zoom in with the visual channel when the thermal channel detects motion:

1. Go to **System > Events** and add a rule.
2. Name the rule *Gatekeeper*.
3. In the list of conditions, under **Applications**, select **Motion Guard: Gate profile (Thermal)**.

4. In the list of actions, under **Preset positions**, select **Go to preset position**.
5. Under **Video channel**, select **Camera 1**.
6. Under **Preset position**, select **Gate position**.
7. Select **Home timeout** and set the duration for the camera to stay in the gate position (wait at least 30 seconds before returning to home position).
8. Click **Save**.

Create a rule to record video to the SD card:

1. Create a rule and name it **Record video**.
2. In the list of conditions, under **PTZ**, select **PTZ preset position reached: Camera 1**.
3. Under **Preset position**, select **Gate position**.
4. In the list of actions, under **Recordings**, select **Record video while the rule is active**.
5. Under **Camera**, select **Camera 1**.
6. Under **Storage**, select **SD card**.
7. Click **Save**.

Radar pairing is a one-way setup where you pair a camera with a radar and use the camera to configure and maintain both devices. The camera has an allocated channel for the radar stream, and when you have paired the devices, the radar stream is automatically assigned to this channel.

Note

Make sure the paired devices run the same AXIS OS version.

Before you start:

- Make sure the camera and radar are directed toward the same area of interest.
- Make sure the camera and radar are synced to the same time source. To check the time sync status, go to **Installation > Time sync status** in each device.

Pair the camera with the radar:

1. In the camera's web interface, go to **System > Edge-to-edge > Pairing**.
 2. Click  **Add**.
 3. In the list of pairing types, select **Radar**.
 4. Enter the host name, username, and password for the radar.
 5. Click **Connect** to pair the devices.
- When the connection is established, the radar settings become available in the camera's web interface.

Note

When you upgrade the camera's AXIS OS version, make sure to upgrade the radar to the same version to keep your system up-to-date. We recommend using a device management system like AXIS Device Manager.

The web interface

To read about all the features and settings available in the web interface of devices with AXIS OS, go to *AXIS OS web interface help*.

Learn more

Color palettes

To help the human eye distinguish details in a thermal image, you can apply a color palette to the image. The colors in the palette are artificially created pseudocolors that emphasize temperature differences.

Long-distance connections

This product supports fiber-optic cable installations through a media converter. Fiber-optic cable installations offer a number of benefits such as:

- Long-distance connection
- High speed
- Long lifetime
- Large capacity of data transmission
- Electromagnetic interference immunity

Find out more about fiber-optic cable installations in the white paper "Long distance surveillance - Fiber-optic communication in network video" at axis.com/learning/white-papers.

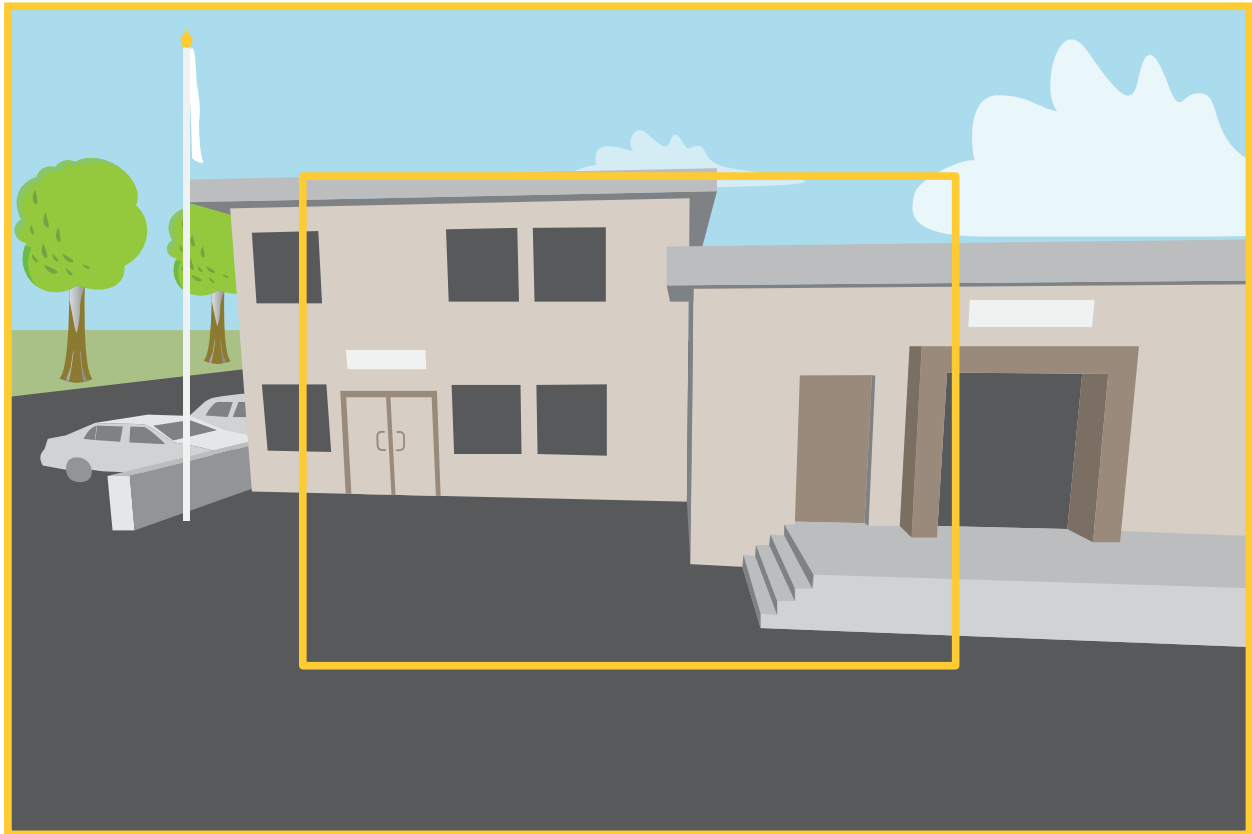
For information about how to install the media converter see the Installation Guide for this product.

Capture modes

A capture mode is a preset configuration that defines how the camera captures images.

- The capture mode setting can affect the maximum resolution and maximum frame rate available in the device.
- The capture mode with a lower resolution than the maximum can reduce the field of view.
- The capture mode also affects the shutter speed, which in turn affects the light sensitivity. This is because a capture mode with a high maximum frame rate has a reduced light sensitivity, and the other way around.
- With some capture modes you can't use WDR.

The lower resolution capture mode might be sampled from the original resolution, or it might be cropped out from the original, in which case the field of view could also be affected.



The image shows how the field of view and aspect ratio can change between two different capture modes.

What capture mode to choose depends on the requirements for the frame rate and resolution of the specific surveillance setup. For specifications about available capture modes, see the product's datasheet at axis.com.

Privacy masks

Note

Privacy masks are only available for the visual channel.

A privacy mask is a user-defined area that prevents users from viewing a part of the monitored area. In the video stream, privacy masks appear as blocks of solid color.

You'll see the privacy mask on all snapshots, recorded video, and live streams.

You can use the VAPIX® application programming interface (API) to hide the privacy masks.

Important

If you use multiple privacy masks it may affect the product's performance.

You can create several privacy masks. Each mask can have 3 to 10 anchor points.

Overlays

Overlays are superimposed over the video stream. They are used to provide extra information during recordings, such as a timestamp, or during product installation and configuration. You can add either text or an image.

Note

Overlays are included in all video streams except SIP calls when the connection is over PoE class 3.

Pan, tilt, and zoom (PTZ)

Guard tours

A guard tour displays the video stream from different preset positions either in a predetermined or random order, and for configurable periods of time. Once started, a guard tour continues to run until stopped, even when there are no clients (web browsers) viewing the images.

The guard tour function includes tour recording. This allows recording a custom tour using an input device, such as a joystick, a mouse, or a keyboard, or through using the VAPIX® Application Programming Interface (API). A recorded tour is a replay of a recorded sequence of pan/tilt/zoom movements, including their variable speeds and lengths.

Streaming and storage

Video compression formats

Decide which compression method to use based on your viewing requirements, and on the properties of your network. The available options are:

H.264 or MPEG-4 Part 10/AVC

Note

H.264 is a licensed technology. The Axis product includes one H.264 viewing client license. To install additional unlicensed copies of the client is prohibited. To purchase additional licenses, contact your Axis reseller.

H.264 can, without compromising image quality, reduce the size of a digital video file by more than 80% compared to the Motion JPEG format and by as much as 50% compared to older MPEG formats. This means that less network bandwidth and storage space are required for a video file. Or seen another way, higher video quality can be achieved for a given bitrate.

H.265 or MPEG-H Part 2/HEVC

H.265 can, without compromising image quality, reduce the size of a digital video file by more than 25% compared to H.264.

Note

- H.265 is licensed technology. The Axis product includes one H.265 viewing client license. Installing additional unlicensed copies of the client is prohibited. To purchase additional licenses, contact your Axis reseller.
- Most web browsers don't support H.265 decoding and because of this the camera doesn't support it in its web interface. Instead you can use a video management system or application supporting H.265 decoding.

How do Image, Stream, and Stream profile settings relate to each other?

The **Image** tab contains camera settings that affect all video streams from the product. If you change something in this tab, it immediately affects all video streams and recordings.

The **Stream** tab contains settings for video streams. You get these settings if you request a video stream from the product and don't specify for example resolution, or frame rate. When you change the settings in the **Stream** tab, it doesn't affect ongoing streams, but it will take effect when you start a new stream.

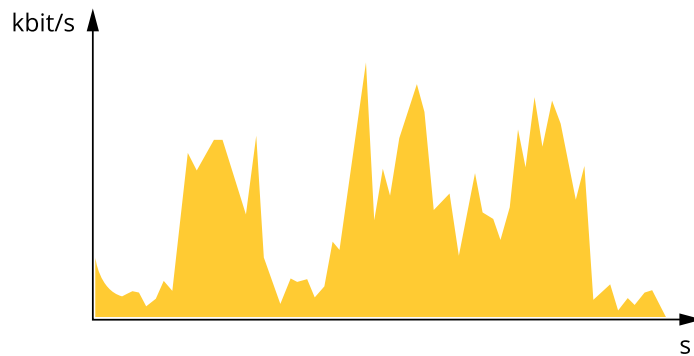
The **Stream profiles** settings override the settings from the **Stream** tab. If you request a stream with a specific stream profile, the stream contains the settings of that profile. If you request a stream without specifying a stream profile, or request a stream profile that doesn't exist in the product, the stream contains the settings from the **Stream** tab.

Bitrate control

Bitrate control helps you to manage the bandwidth consumption of your video stream.

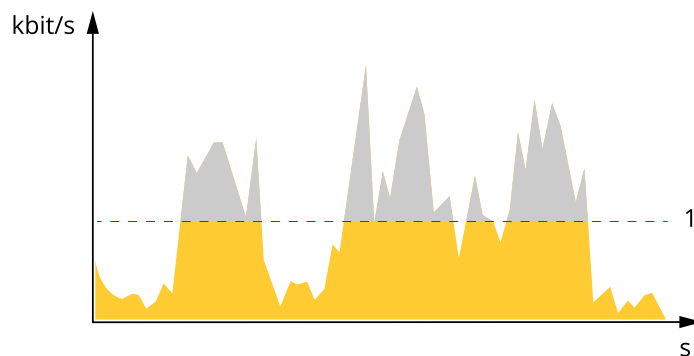
Variable bitrate (VBR)

Variable bitrate allows the bandwidth consumption to vary depending on the level of activity in the scene. The more activity, the more bandwidth you need. With variable bitrate you are guaranteed constant image quality, but you need to make sure you have storage margins.



Maximum bitrate (MBR)

Maximum bitrate lets you set a target bitrate to handle bitrate limitations in your system. You might see a decline in image quality or frame rate as the instantaneous bitrate is kept below the specified target bitrate. You can choose to prioritize either image quality or frame rate. We recommend that you configure the target bitrate to a higher value than the expected bitrate. This gives you a margin in case there is a high level of activity in the scene.



1 Target bitrate

Analytics and apps

With analytics and apps you can get more out of your Axis device. AXIS Camera Application Platform (ACAP) is an open platform that makes it possible for third parties to develop analytics and other apps for Axis devices. Apps can be preinstalled on the device, available for download for free, or for a license fee.

To find the user manuals for Axis analytics and apps, go to help.axis.com.

Note

- Several apps can run at the same time but some apps might not be compatible with each other. Certain combinations of apps might require too much processing power or memory resources when run in parallel. Verify that the apps work together before deployment.

Autotracking

Set up Autotracking 2

This example explains how to set up the camera to track moving objects in an area of interest.

In the device's web interface:

1. Go to **PTZ > Preset positions**.
2. Direct the camera view to the area you want to track, and click **+** **Add preset position** to create a preset position.
3. Go to **PTZ > Autotracking**.
4. Click **Autotracking** to start and open the application.

In the application interface:

1. Go to **Settings > Profiles**.
2. Click **+** and select the preset position you created in the device's web interface.
3. Click **Done**.
4. Select a **Trigger area**.
5. Go to **Settings > Filters**:
 - To exclude small objects, set width and height.
 - To exclude short-lived objects, set a time between 1 and 5 seconds.
6. Click **Autotracking** to start tracking.

Metadata visualization

Analytics metadata is available for moving objects in the scene. Supported object classes are visualized in the video stream through a bounding box surrounding the object, along with information about the object type and confidence level of the classification. To learn more about how to configure and consume analytics metadata, see *AXIS Scene Metadata integration guide*.

Cybersecurity

For product-specific information about cybersecurity, see the product's datasheet at axis.com.

For in-depth information about cybersecurity in AXIS OS, read the *AXIS OS Hardening guide*.

TPM module

The TPM (Trusted Platform Module) is a component that provides cryptographic features to protect information from unauthorized access. It is always activated and there are no settings you can change.

Edge-to-edge technology

Edge-to-edge is a technology that makes IP devices communicate directly with each other. It offers smart pairing functionality between, for example, Axis cameras and Axis audio or radar products.

Note

Make sure the paired devices run the same AXIS OS version.

For more information, see the white paper "Edge-to-edge technology" at whitepapers.axis.com/edge-to-edge-technology.

Radar pairing

With edge-to-edge radar pairing, you can connect your camera to a compatible Axis radar and benefit from integrated radar features, such as speed detection.

Radar pairing is a one-way setup where you pair one camera with one radar and use the camera to configure and maintain both devices. When paired, you can access the radar's settings and create rules for radar-specific

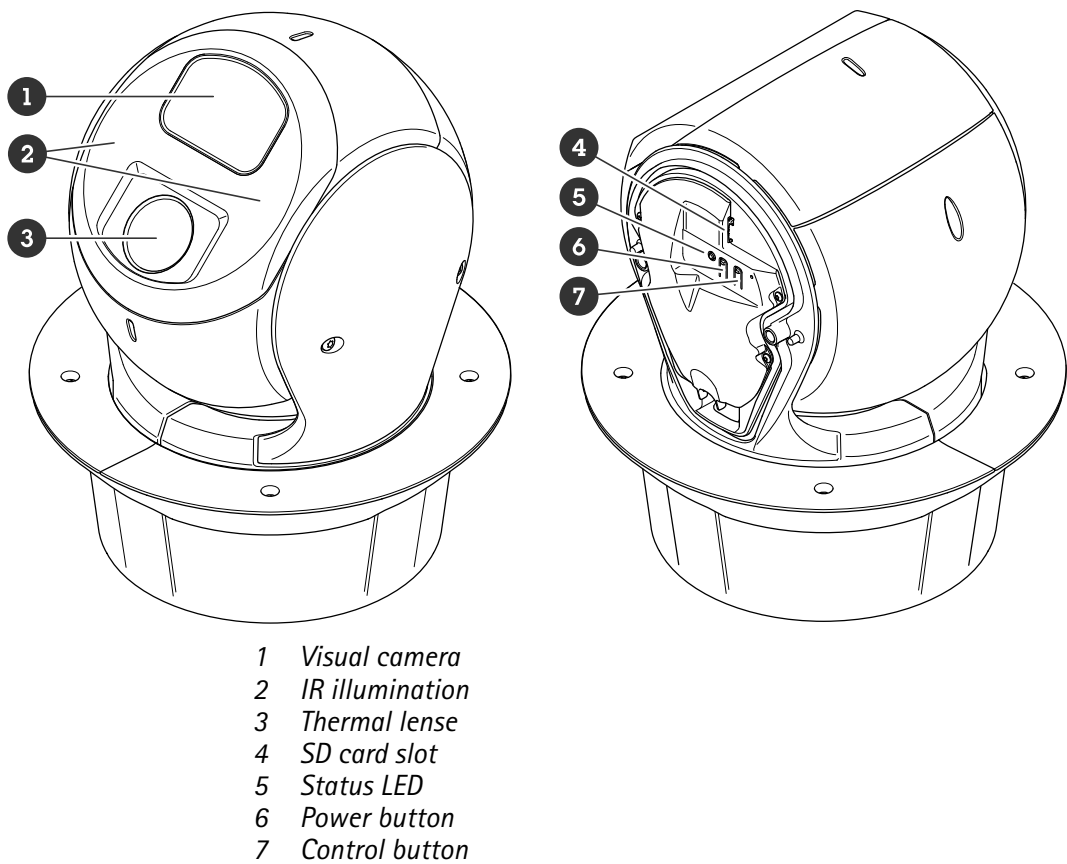
events directly in the camera's web interface. The camera will also identify itself to a VMS as a camera with integrated radar functionality.

The camera has an allocated channel for the radar stream, and after pairing, the radar stream will be assigned automatically to this channel.

Additionally, the radar metadata is available through the camera's metadata producer channels after pairing. If the camera in itself has one channel, the radar metadata is available through the second channel.

Specifications

Product overview



LED indicators

Status LED	Indication
Unlit	Connection and normal operation.
Green	Connection and normal operation.
Amber	Steady during startup. Flashes during device software upgrade or reset to factory default.
Amber/Red	Flashes amber/red if network connection is unavailable or lost.
Red	Device software upgrade failure.

SD card slot

NOTICE

- Risk of damage to SD card. Don't use sharp tools, metal objects, or excessive force when inserting or removing the SD card. Use your fingers to insert and remove the card.
- Risk of data loss and corrupted recordings. Unmount the SD card from the device's web interface before removing it. Don't remove the SD card while the product is running.

For SD card recommendations, see axis.com.

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Buttons

Control button

The control button is used for:

- Resetting the product to factory default settings. See *Reset to factory default settings, on page 26*.

Power button

The power button is used with the control button to reset the camera to factory default settings. See *page 26*.

Connectors

Network connector

RJ45 Push-pull Connector (IP66) with High Power over Ethernet (High PoE).

NOTICE

To comply with the IP66-rated design of the camera and maintain the IP66 protection, the supplied RJ45 Push-pull Connector (IP66) shall be used. Alternatively, use the RJ45 IP66-rated cable with premounted connector which is available from your Axis reseller. Do not remove the plastic network connector shield from the camera.

Clean your device

You can clean your device with lukewarm water and mild, nonabrasive soap.

NOTICE

- Harsh chemicals can damage the device. Don't use chemicals such as window cleaner or acetone to clean your device.
 - Avoid cleaning in direct sunlight or elevated temperatures, since this can cause stains.
1. Use a can of compressed air to remove dust and loose dirt from the device.
 2. If necessary, clean the device with a soft microfiber cloth dampened with lukewarm water and mild, nonabrasive soap.
 3. To remove any residual cleaning agents, wipe the device with a soft microfiber cloth dampened with lukewarm water.
 4. To avoid stains, dry the device with a clean, nonabrasive cloth.

For more information about cleaning of Axis devices, see the white paper *Chemical resistance to common cleaning agents*.

Troubleshooting

Reset to factory default settings

⚠ WARNING

⚠ Possibly hazardous optical radiation is emitted from this product. It can be harmful to the eyes. Don't stare at the operating lamp.

Important

Reset to factory default should be used with caution. A reset to factory default resets all settings, including the IP address, to the factory default values.

To reset the product to the factory default settings:

1. Press and hold the control button and the power button. See *Product overview, on page 23*.
2. Release the power button but continue to hold down the control button for 15–30 seconds until the status LED indicator flashes amber.
3. Release the control button.
4. The process is now complete. The product has been reset to the factory default settings. If no DHCP server is available on the network, the device IP address will default to one of the following:
 - Devices with AXIS OS 12.0 and later: Obtained from the link-local address subnet (169.254.0.0/16)
 - Devices with AXIS OS 11.11 and earlier: 192.168.0.90/24
5. Using the installation and management software tools, assign an IP address, set the password and access the video stream.

You can also reset parameters to factory default through the device's web interface. Go to **Maintenance > Factory default** and click **Default**.

AXIS OS options

Axis offers device software management according to either the active track or the long-term support (LTS) tracks. Being on the active track means continuously getting access to all the latest product features, while the LTS tracks provide a fixed platform with periodic releases focused mainly on bug fixes and security updates.

Using AXIS OS from the active track is recommended if you want to access the newest features, or if you use Axis end-to-end system offerings. The LTS tracks are recommended if you use third-party integrations, which are not continuously validated against the latest active track. With LTS, the products can maintain cybersecurity without introducing any significant functional changes or affecting any existing integrations. For more detailed information about Axis device software strategy, go to axis.com/support/device-software.

Check the current AXIS OS version

AXIS OS determines the functionality of our devices. When you troubleshoot a problem, we recommend that you to start by checking the current AXIS OS version. The latest version might contain a correction that fixes your particular problem.

To check the current AXIS OS version:

1. Go to the device's web interface > **Status**.
2. Under **Device info**, see the AXIS OS version.

Upgrade AXIS OS

Important

- When you upgrade the device software, your preconfigured and customized settings are saved.

Axis Communications AB can't guarantee that the settings are saved, even if the features are available in the new AXIS OS version.

- Starting from AXIS OS 12.6, you must install every LTS version between your device's current version and the target version. For example, if the currently installed device software version is AXIS OS 11.2, you have to install the LTS version AXIS OS 11.11 before you can upgrade the device to AXIS OS 12.6. For more information, see *AXIS OS Lifecycle guide: Upgrade path*.
- Make sure the device remains connected to the power source throughout the upgrade process.

Note

- When you upgrade the device with the latest AXIS OS version in the active track, the product receives the latest functionality available. Always read the upgrade instructions and release notes available with each new release before you upgrade. To find the latest AXIS OS version and the release notes, go to axis.com/support/device-software.
1. Download the AXIS OS file to your computer, available free of charge at axis.com/support/device-software.
 2. Log in to the device as an administrator.
 3. Go to **Maintenance > AXIS OS upgrade** and click **Upgrade**.

When the upgrade has finished, the product restarts automatically.

Technical problems and possible solutions

Problems upgrading AXIS OS

AXIS OS upgrade failed

If the upgrade fails, the device reloads the previous version. The most common reason is that the wrong AXIS OS file has been uploaded. Check that the name of the AXIS OS file corresponds to your device and try again.

Problems after AXIS OS upgrade

If you experience problems after the upgrade, roll back to the previously installed version from the **Maintenance** page.

Problems setting the IP address

Can't set the IP address

- If the IP address intended for the device and the IP address of the computer used to access the device are located on different subnets, you can't set the IP address. Contact your network administrator to obtain an IP address.
- The IP address could be in use by another device. To check:
 1. Disconnect the Axis device from the network.
 2. In a Command/DOS window, type `ping` and the IP address of the device.
 3. If you receive: `Reply from <IP address>: bytes=32; time=10...` this means that the IP address might already be in use by another device on the network. Obtain a new IP address from the network administrator and reinstall the device.
 4. If you receive: `Request timed out`, this means that the IP address is available for use with the Axis device. Check all cabling and reinstall the device.
- There could be a possible IP address conflict with another device on the same subnet. The static IP address in the Axis device is used before the DHCP server sets a dynamic address. This means that if the same default static IP address is also used by another device, there could be problems accessing the device.

Problems accessing the device

Can't log in when accessing the device from a browser

When HTTPS is enabled, make sure that you use the correct protocol (HTTP or HTTPS) when you try to log in. You might need to manually type `http` or `https` in the browser's address field.

If you've lost the password for the root account, you must reset the device to the factory default settings. For instructions, see *Reset to factory default settings, on page 26*.

The IP address has been changed by DHCP

IP addresses obtained from a DHCP server are dynamic and could change. If the IP address has been changed, use AXIS IP Utility or AXIS Device Manager to locate the device on the network. Identify the device using its model or serial number, or by the DNS name (if the name has been configured).

If required, you can assign a static IP address manually. For instructions, go to axis.com/support.

Certificate error when using IEEE 802.1X

For authentication to work properly, the date and time settings in the Axis device must be synchronized with an NTP server. Go to **System > Date and time**.

The browser isn't supported

For a list of recommended browsers, see *Browser support, on page 6*.

Can't access the device externally

To access the device externally, we recommend you to use one of the following applications for Windows®:

- AXIS Camera Station Edge: free of charge, ideal for small systems with basic surveillance needs.
- AXIS Camera Station Pro: 90-day trial version free of charge, ideal for small to mid-size systems.

For instructions and download, go to axis.com/vms.

Problems with MQTT

Can't connect over port 8883 with MQTT over SSL

The firewall blocks traffic that uses port 8883 since it's regarded insecure.

In some cases the server/broker might not provide a specific port for MQTT communication. It might still be possible to use MQTT over a port normally used for HTTP/HTTPS traffic.

- If the server/broker supports WebSocket/WebSocket Secure (WS/WSS), typically on port 443, use this protocol instead. Check with the server/broker provider to see if WS/WSS is supported and which port and basepath to use.
- If the server/broker supports ALPN, the use of MQTT can be negotiated over an open port, such as 443. Check with your server/broker provider to see if ALPN is supported and which ALPN protocol and port to use.

Problems with operating the device

Front heater and wiper aren't working

If the front heater or wiper are not turning on, confirm that the top cover is properly fastened to the bottom of the housing unit.

If you can't find what you're looking for here, try the troubleshooting section at axis.com/support.

Performance considerations

When you set up your system, it's important to consider how different settings and situations affect performance. Some factors affect bandwidth (bitrate), others affect frame rate, and some affect both.

The most important factors to consider:

- High image resolution or lower compression levels result in images containing more data which in turn affects the bandwidth.
- Rotating the image in the GUI can increase the product's CPU load.
- Access by large numbers of Motion JPEG clients or unicast H.264/H.265/AV1 clients affects the bandwidth.
- Simultaneous viewing of different streams (resolution, compression) by different clients affects both frame rate and bandwidth.
Use identical streams wherever possible to maintain a high frame rate. Stream profiles can be used to ensure that streams are identical.
- Accessing video streams with different codecs simultaneously affects both frame rate and bandwidth. For optimal performance, use streams with the same codec.
- Heavy usage of event settings affects the product's CPU load which in turn affects the frame rate.
- Using HTTPS may reduce frame rate, in particular if streaming Motion JPEG.
- Heavy network utilization due to poor infrastructure affects the bandwidth.
- Viewing on poorly performing client computers lowers perceived performance and affects frame rate.
- Running multiple AXIS Camera Application Platform (ACAP) applications simultaneously may affect the frame rate and the general performance.
- Running multiple AXIS Camera Application Platform (ACAP) applications on the Visual and Thermal channels simultaneously may affect the frame rate and the general performance.

Contact support

If you need more help, go to axis.com/support.

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