AXIS P14 Network Camera Series

AXIS P1435-LE Network Camera

AXIS P1435-E Network Camera

User Manual

AXIS P14 Network Camera Series

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About this manual

This User Manual provides information on the product regarding:

- Access

- Main use cases

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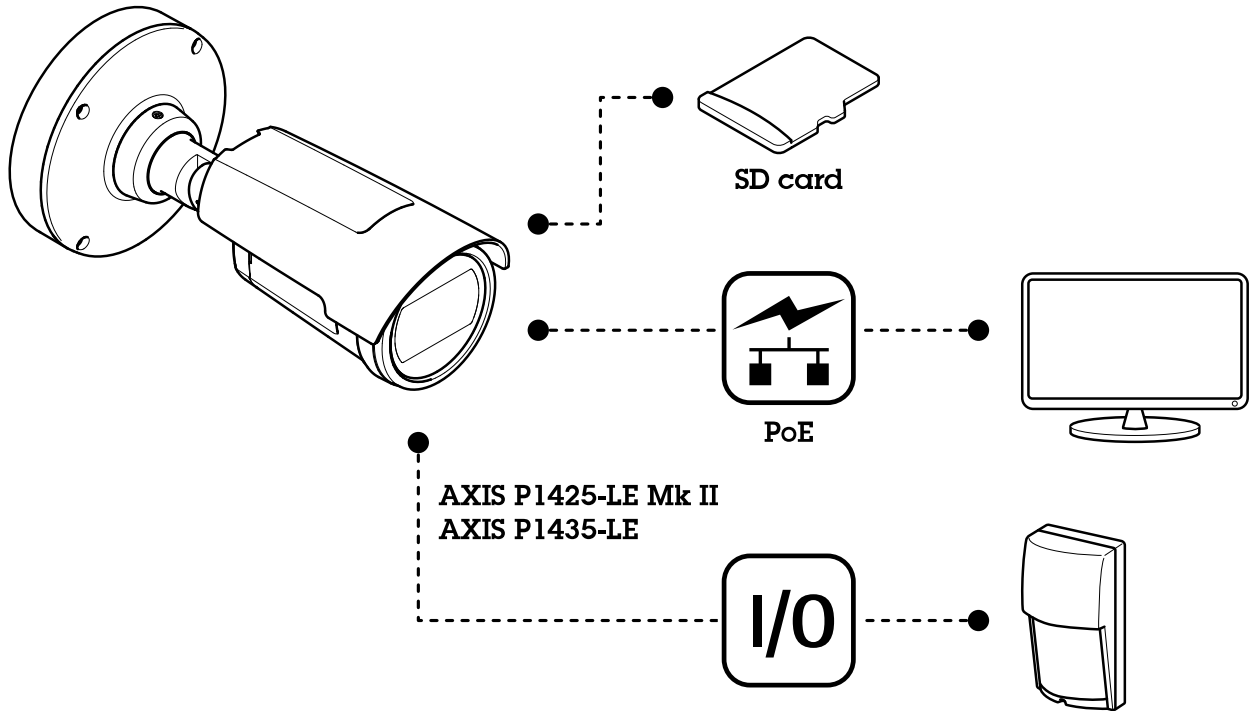
- Specifications

Note

The User Manual may include more than one product. Part of the content, e.g. some use cases or specifications, may only apply to some of them. For more information on the exact feature set and specifications, see the product's web page and datasheet at *www.axis.com*

Solution overview

Solution overview

SD card

PoE

AXIS P1425-LE Mk II
AXIS P1435-LE

I/O

AXIS P14 Network Camera Series

Product overview

Product overview

AXIS P1405–LE Mk II Network Camera
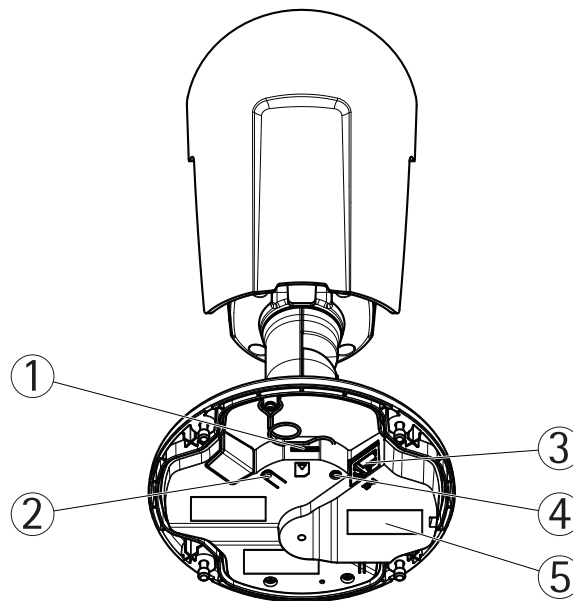
1	*microSD card slot*
2	*Control button*
3	*Network connector*
4	*Status LED indicator*
5	*Part number (P/N) & Serial number (S/N)*

AXIS P1425–LE Mk II and AXIS P1435–LE Network Cameras

1	*microSD card slot*

Product overview

2	*I/O connector*
3	*Control button*
4	*Network connector*
5	*Status LED indicator*
6	*Part number (P/N) & Serial number (S/N)*

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, see the document *How to assign an IP address and access your device* on the device page at *axis.com*.

Access the device

1. Open a browser and enter the IP address or host name of the Axis device.

   If you have a Mac computer (OS X), go to Safari, click Bonjour and select the device from the drop-down list. To add Bonjour as a browser bookmark, go to **Safari > Preferences**.

   If you do not know the IP address, use AXIS IP Utility or AXIS Device Manager to find the device on the network.

2. Enter the username and password. If you access the device for the first time, you must set the root password. See *Set a new password for the root account on page 7* .

3. The live view page opens in your browser.

Secure passwords

Important

> Axis devices send the initially set password in clear text over the network. To protect your device after the first login, set up a secure and encrypted HTTPS connection and then change the password.

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.

Set a new password for the root account

Important

> The default administrator username is **root**. If the password for root is lost, reset the device to factory default settings.

1. Type a password. Follow the instructions about secure passwords. See *Secure passwords on page 7* .

2. Retype the password to confirm the spelling.

3. Click **Create login**. The password has now been configured.
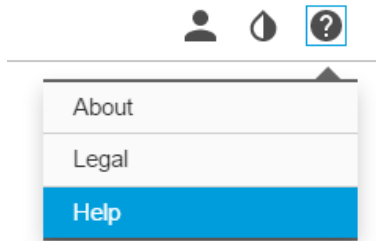
Additional settings

Need more help?

You can access the built-in help from the device's webpage. The help provides more detailed information on the device's features and their settings.

Image quality

Capture modes

Capture mode defines the maximum resolution and maximum frame rate available in the Axis product. If using a capture mode with a smaller resolution than the maximum resolution, the angle of view is reduced. The capture mode also affects light sensitivity. A capture mode with a high maximum frame rate has reduced light sensitivity and vice versa.

The lower resolution capture mode is cropped out from the highest resolution.

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

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

Select capture mode

Which capture mode to choose depends on the requirements of frame rate and resolution for the specific surveillance setup. For specifications about available capture modes, see the product's datasheet. To find the latest version of the datasheet, go to *axis.com*.

Additional settings

Select exposure mode

There are different exposure mode options in the camera that adjusts aperture, shutter speed, and gain to improve image quality for specific surveillance scenes. Go to **Settings > Image > Exposure** and select between the following exposure modes:

- For most use cases, select **Automatic** exposure.

- For environments with certain artificial lighting, for example fluorescent lighting, select **Flicker-free**.

- For environments with certain artificial light and bright light, for example outdoors with fluorescent lighting at night and sun during daytime, select **Flicker-reduced**.

- To lock the current exposure settings, select **Hold current**.

View area

A view area is a cropped part of the full view. You can stream and store view areas instead of the full view to minimize bandwidth and storage needs. If you enable PTZ for a view area, you can pan, tilt and zoom within it. By using view areas you can remove parts of the full view, for example, the sky.

When you set up a view area, we recommend you to set the video stream resolution to the same size as or smaller than the view area size. If you set the video stream resolution larger than the view area size it implies digitally scaled up video after sensor capture, which requires more bandwidth without adding image information.

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 **Settings > Privacy mask**.

2. Click **New**.

3. Adjust the size, color, and name of the privacy mask according to your needs.

Adjust the focus

Remote focus and zoom

The remote focus and zoom functionality allows you to make focus and zoom adjustments to your camera from a computer. It is a convenient way to ensure that the scene's focus, viewing angle and resolution are optimized without having to visit the camera's installation location.

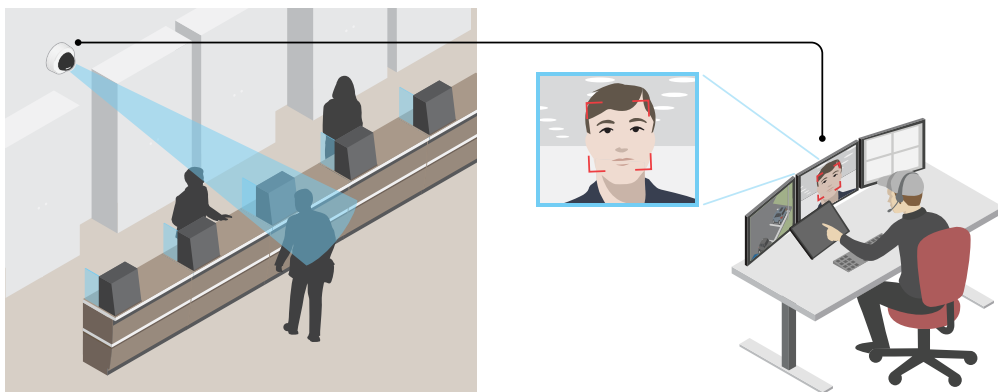*Left: no focus. Right: remote focus applied.*

Additional settings

Left: no zoom. Right: remote zoom applied.

Improve facial recognition

To better recognize the face of a person passing by the camera, you can set the optimal pixel resolution with the camera's pixel counter.

1. Go to **Settings > System** > **Orientation** and click .

2. In the camera's live view, adjust the size and placement of the rectangle around the area of interest, for example, where the faces of passing persons are expected to appear. You can then see the number of pixels represented by the sides of the rectangle.

Note

You can use an object of a known size in the view as a reference to decide how much resolution is needed for recognition.

Improve license plate recognition

To better recognize the license plate of a car passing by the camera, you can apply and adjust a number of things.

One option is to use the pixel counter in your camera to set the optimal pixel resolution:

1. Go to **Settings > System** > **Orientation** and click .

Additional settings

2. Adjust the size and placement of the rectangle in the camera's live view around the area of interest, for example where the license plates of passing cars are expected to appear. You can then see the number of pixels represented by the sides of the rectangle.

Note

You can use an object of a known size in the view as a reference to decide how much resolution is needed for recognition.

In addition, you can try to adjust the following to optimize license plate recognition:

- Shutter speed

- Gain

- Zoom

Monitor long and narrow areas

Use corridor format to better utilize the full field of view in a long and narrow area, for example a staircase, hallway, road, or tunnel.
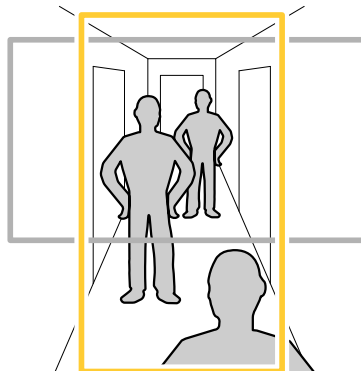
1. Depending on your device, turn the camera or the 3-axis lens in the camera 90° or 270°.

2. If the device doesn't rotate the view automatically, log in to the webpage and go to **Settings** > **System** > **Orientation**.

3. Click ⟳.

4. Rotate the view 90° or 270°.

Find out more at *axis.com/axis-corridor-format*.

Reduce noise in low-light conditions

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

- Set the exposure mode to automatic.

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.

- Reduce sharpness in the image.

- Set the max gain to a lower value.

Additional settings

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 **Settings > Image > Wide dynamic range**.

2. If required, turn on WDR.

Image without WDR.

Image with WDR.

> Note
>
> WDR may cause artifacts in the image.

Find out more about WDR and how to use it at *axis.com/web-articles/wdr*.

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

Your camera uses visible light to deliver color images during the day. As the available light diminishes, you can set the camera to automatically shift to night mode, in which the camera uses both visible light and near-infrared light to deliver black-and-white images. Since the camera uses more of the available light it can deliver brighter, more detailed, images.

1. Go to **Settings > Image > Day and night**, and make sure that the **IR cut filter** is set to **Auto**.

2. To determine at what light level you want the camera to shift to night mode, move the **Threshold** slider toward **Bright** or **Dark**.

3. Enable **Allow IR illumination** and **Synchronize IR illumination** to use the camera's IR light when night mode is activated.

> Note
>
> If you set the shift to occur when it's brighter, the image remains sharper as there will be less low-light noise. If you set the shift to occur when it's darker, the image colors are maintained for longer, but there will be more image blur due to low-light noise.

Additional settings

Maximize details in an image

Important

If you maximize details in an image, the bitrate will probably increase and you might get a reduced frame rate.

- Make sure to select the capture mode that has the highest resolution.

- Set the compression as low as possible.

- Select MJPEG streaming.

- Turn off Zipstream functionality.

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.

Show a text overlay in the video stream when the device detects motion

This example explains how to display the text "Motion detected" when the device detects motion:

Make sure that AXIS Video Motion Detection is running:

1. Go to **Settings > Apps** > **AXIS Video Motion Detection**.

2. Start the application if it is not already running.

3. Make sure you have set up the application according to your needs.

Add the overlay text:

4. Go to **Settings > Overlay**.

5. Enter #D in the text field.

6. Choose text size and appearance.

Create a rule:

7. Go to **System > Events > Rules** and add a rule.

8. Type a name for the rule.

9. In the list of conditions, select AXIS Video Motion Detection.

10. In the list of actions, select **Use overlay text**.

11. Select a view area.

12. Type "Motion detected".

13. Set the duration.

14. Click **Save**.

Streaming and storage

Bitrate control

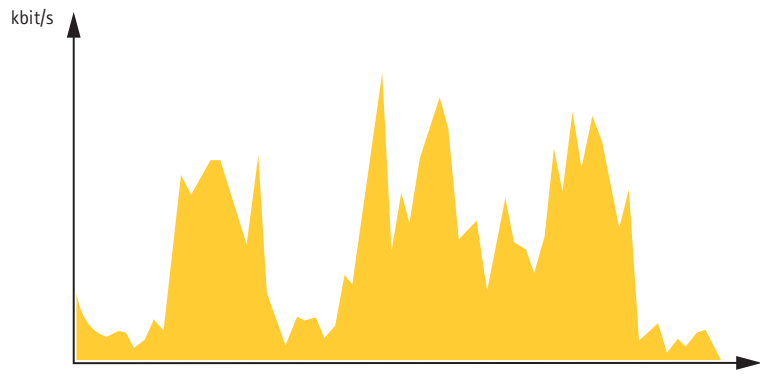With bitrate control, you can manage the bandwidth consumption of your video stream.

Additional settings

Variable bitrate (VBR)

With variable bitrate, the bandwidth consumption varies based on the level of activity in the scene. The more activity in the scene, the more bandwidth you need. You are guaranteed constant image quality but it requires storage margins.

Maximum bitrate (MBR)

With maximum bitrate, you can set a target bitrate to handle bitrate limitations in your system. You may see a decline in image quality or frame rate when the instantaneous bitrate is kept below the specified target bitrate. You can choose to either prioritize 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 for additional complexity that needs to be captured.
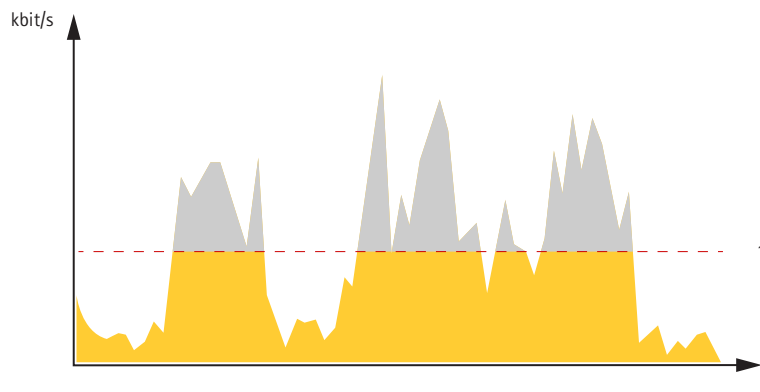
1   Target bitrate

Average bitrate (ABR)

With average bitrate, the bitrate is automatically adjusted over a longer timescale. This is so you can meet the specified target and provide the best video quality based on your available storage. Bitrate is higher in scenes with a lot of activity, compared to static scenes. You are more likely to get better image quality when needed when using the average bitrate option. You can define the total storage required to store the video stream for a specified amount of time (retention time) when image quality is adjusted to meet the specified target bitrate. Specify the average bitrate settings in one of the following ways:

- To calculate the estimated storage need, set the target bitrate and the retention time.

- To calculate the average bitrate, based on available storage and required retention time, use the target bitrate calculator.

Additional settings
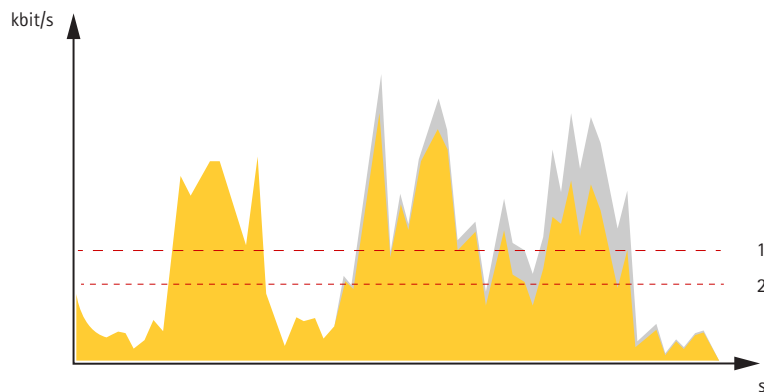
1 Target bitrate
2 Actual average bitrate

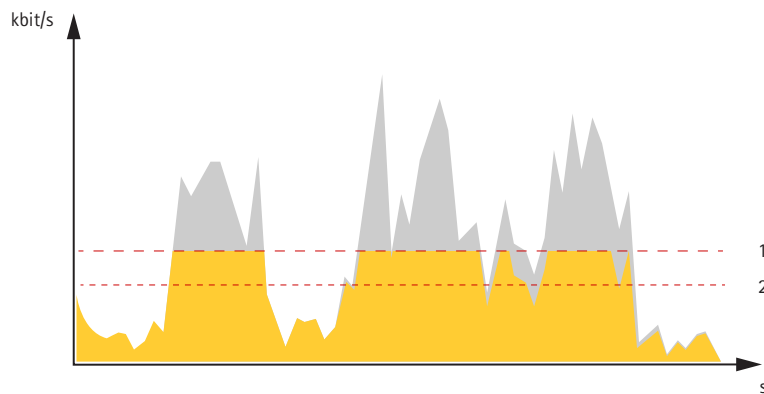You can also turn on maximum bitrate and specify a target bitrate within the average bitrate option.

1 Target bitrate
2 Actual average bitrate

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:

Motion JPEG

Motion JPEG, or MJPEG, is a digital video sequence that is made up of a series of individual JPEG images. These images are then displayed and updated at a rate sufficient to create a stream that shows constantly updated motion. For the viewer to perceive motion video the rate must be at least 16 image frames per second. Full motion video is perceived at 30 (NTSC) or 25 (PAL) frames per second.

The Motion JPEG stream uses considerable amounts of bandwidth, but provides excellent image quality and access to every image contained in the stream.

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 the MPEG-4 standard. 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.

Reduce bandwidth and storage

Important

> If you reduce the bandwidth it can result in loss of details in the picture.

1. Go to live view and select **H.264**.

2. Go to **Settings > Stream**.

3. Do one or more of the following:

   - Turn on the Zipstream functionality and select the desired level.

   - Turn on dynamic GOP and set a high GOP length value.

   - Increase the compression.

   - Turn on dynamic FPS.

Set up network storage

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

1. Go to **Settings > System** > **Storage**.

2. Click **Setup** under **Network storage**.

3. Enter the IP address of the host server.

4. Enter the name of the shared location on the host server.

5. Move the switch if the share requires a login, and enter username and password.

6. Click **Connect**.

Events

Set up rules and alerts

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 when it records.

Trigger an action

1. Go to **Settings > System > Events** to set up a rule. The rule defines when the camera will perform certain actions. Rules can be setup as scheduled, recurring, or for example, triggered by motion detection.

2. 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.

3. Select which **Action** the camera should perform when the conditions are met.

Note

> If you make changes to an active rule, then the rule needs to be restarted for the changes to take effect.

Record video when the camera detects motion

This example explains how to set up the camera to start recording to the SD card five seconds before it detects motion and to stop one minute after.

Make sure that AXIS Video Motion Detection is running:

1. Go to **Settings > Apps** > **AXIS Video Motion Detection**.

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 **Settings > System > Events** and add a rule.

2. Type a name for the rule.

3. In the list of conditions, under **Application**, select **AXIS Video Motion Detection (VMD)**.

4. In the list of actions, under **Recordings**, select **Record video while the rule is active**.

5. Select an existing stream profile or create a new one.

6. Set the prebuffer time to 5 seconds.

7. Set the postbuffer time to 60 seconds.

8. In the list of storage options, select **SD card**.

9. Click **Save**.

Record video when a PIR detector senses motion

This example explains how to connect an Axis PIR detector to the camera, and set up the camera to start recording when the detector senses motion.

Required hardware

- 3-wire cable (ground, power, I/O)

- Axis PIR detector

NOTICE

    Disconnect the camera from power before connecting the wires. Reconnect to power after all connections are done.

Connect the wires to the camera's I/O connector

Note

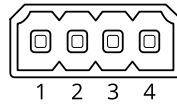   For information on the I/O connector, see *Connectors on page 22*.

1. Connect the ground wire to pin 1 (GND/–).

2. Connect the power wire to pin 2 (12V DC output).

3. Connect the I/O wire to pin 3 (I/O input).

Connect the wires to the PIR detector's I/O connector

Additional settings

1. Connect the other end of the ground wire to pin 1 (GND/-).

2. Connect the other end of the power wire to pin 2 (DC input/+).

3. Connect the other end of the I/O wire to pin 3 (I/O output).

Configure the I/O port in the camera's webpage

1. Go to **Settings > System** > **I/O ports**.

2. Give the input module a descriptive name.

3. To make the PIR detector send a signal to the camera when it senses motion, select **Closed circuit** in the drop-down list.

To trigger the camera to start recording when it receives a signal from the PIR detector, you need to create a rule in the camera's webpage.

Applications

Applications

AXIS Camera Application Platform (ACAP) is an open platform that enables third parties to develop analytics and other applications for Axis products. To find out more about available applications, downloads, trials and licenses, go to *axis.com/applications*.

To find the user manuals for Axis applications, go to *axis.com*.

Note

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

AXIS People Counter

AXIS People Counter is an analytic application that can be installed on a network camera.

The counter is embedded in the camera which means you do not need a dedicated computer to run the application. AXIS People Counter is intended for retail environments, like stores or shopping malls, or other environments where you want to count people.
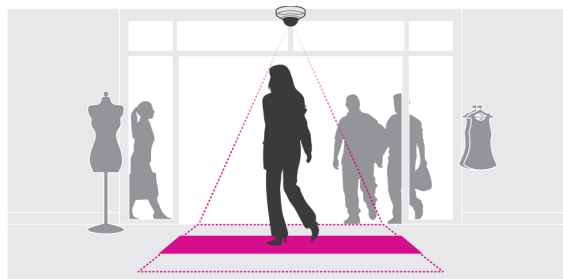
Troubleshooting

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

Reset to factory default settings

> **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. Disconnect power from the product.

2. Press and hold the control button while reconnecting power. See *Product overview on page 5* .

3. Keep the control button pressed for 15–30 seconds until the status LED indicator flashes amber.

4. Release the control button. The process is complete when the status LED indicator turns green. The product has been reset to the factory default settings. If no DHCP server is available on the network, the default IP address is `192.168.0.90`.

5. Use the installation and management software tools to assign an IP address, set the password, and access the video stream.

   The installation and management software tools are available from the support pages on *axis.com/support*.

It is also possible to reset parameters to factory default through the web interface. Go to **Settings > System > Maintenance** and click **Default**.

Check the current firmware

Firmware is the software that determines the functionality of network devices. One of your first actions when troubleshooting a problem should be to check the current firmware version. The latest version may contain a correction that fixes your particular problem.

To check the current firmware:

1. Go to the product's webpage.

2. Click on the help menu ❓ .

3. Click **About**.

Upgrade the firmware

> **Important**
>
> Preconfigured and customized settings are saved when the firmware is upgraded (provided that the features are available in the new firmware) although this is not guaranteed by Axis Communications AB.

> **Important**
>
> Make sure the product remains connected to the power source throughout the upgrade process.

> **Note**
>
> When you upgrade the product with the latest firmware 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 upgrading the firmware. To find the latest firmware and the release notes, go to *axis.com/support/firmware*.

1. Download the firmware file to your computer, available free of charge at *axis.com/support/firmware*.

2. Log in to the product as an administrator.

3. Go to **Settings > System > Maintenance**. Follow the instructions on the page. When the upgrade has finished, the product restarts automatically.

AXIS Device Manager can be used for multiple upgrades. Find out more at *axis.com/products/axis-device-manager*.

Technical issues, clues and solutions

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

Problems upgrading the firmware

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

Problems setting the IP address

The device is located on a different subnet	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 cannot set the IP address. Contact your network administrator to obtain an IP address.
The IP address is being used by another device	Disconnect the Axis device from the network. Run the ping command (in a Command/DOS window, type `ping` and the IP address of the device): • If you receive: `Reply from <IP address>: bytes=32; time=10...` this means that the IP address may already be in use by another device on the network. Obtain a new IP address from the network administrator and reinstall the device. • 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.
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 may be problems accessing the device.

The device cannot be accessed from a browser

Cannot log in	When HTTPS is enabled, ensure that the correct protocol (HTTP or HTTPS) is used when attempting to log in. You may need to manually type `http` or `https` in the browser's address field. If the password for the user root is lost, the device must be reset to the factory default settings. See *Reset to factory default settings on page 19*.
The IP address has been changed by DHCP	IP addresses obtained from a DHCP server are dynamic and may 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, a static IP address can be assigned 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 **Settings > System > Date and time**.

The device is accessible locally but not externally

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

• AXIS Companion: free of charge, ideal for small systems with basic surveillance needs.
• AXIS Camera Station: 30-day trial version free of charge, ideal for small to mid-size systems.
For instructions and download, go to *axis.com/products/axis-companion*.

Troubleshooting

Problems with streaming	
Multicast H.264 only accessible by local clients	Check if your router supports multicasting, or if the router settings between the client and the device need to be configured. The TTL (Time To Live) value may need to be increased.
No multicast H.264 displayed in the client	Check with your network administrator that the multicast addresses used by the Axis device are valid for your network. Check with your network administrator to see if there is a firewall preventing viewing.
Poor rendering of H.264 images	Ensure that your graphics card is using the latest driver. The latest drivers can usually be downloaded from the manufacturer's website.
Color saturation is different in H.264 and Motion JPEG	Modify the settings for your graphics adapter. Go to the adapter's documentation for more information.
Lower frame rate than expected	- See *Performance considerations on page 21*. - Reduce the number of applications running on the client computer. - Limit the number of simultaneous viewers. - Check with the network administrator that there is enough bandwidth available. - Lower the image resolution. - Log in to the device's webpage and set a capture mode that prioritizes frame rate. Changing the capture mode to prioritize frame rate might lower the maximum resolution depending on the device used and capture modes available. - The maximum frames per second is dependent on the utility frequency (60/50 Hz) of the Axis device.

Performance considerations

When setting up your system, it is important to consider how various settings and situations affect the performance. Some factors affect the amount of bandwidth (the bitrate) required, others can affect the frame rate, and some affect both. If the load on the CPU reaches its maximum, this also affects the frame rate.

The following factors are the most important 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 will increase the product's CPU load.

- Access by large numbers of Motion JPEG or unicast H.264 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 Motion JPEG and H.264 video streams simultaneously affects both frame rate and bandwidth.

- 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.

Specifications

To find the latest version of the product's datasheet, go to the product page at *axis.com* and locate **Support & Documentation**.

LED Indicators

Status LED	Indication
Unlit	Connection and normal operation.
Green	Steady green for 10 seconds for normal operation after startup completed.
Amber	Steady during startup. Flashes during firmware upgrade or reset to factory default.
Amber/Red	Flashes amber/red if network connection is unavailable or lost.
Red	Firmware upgrade failure.

SD card slot

NOTICE
- Risk of damage to SD card. Do not 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. Do not remove the SD card while the product is running. Unmount the SD card from the product's webpage before removal.

This product supports microSD/microSDHC/microSDXC cards.

For SD card recommendations, see *axis.com*.

microSD, microSDHC, and microSDXC Logos are trademarks of SD-3C LLC. microSD, microSDHC, microSDXC are trademarks or registered trademarks of SD-3C, LLC in the United States, other countries or both.

Buttons

Control button

The control button is used for:

- Resetting the product to factory default settings. See *Reset to factory default settings on page 19*.

Connectors

Network connector

RJ45 Ethernet connector with Power over Ethernet (PoE).

I/O connector

Use the I/O connector with external devices in combination with, for example, motion detection, event triggering, and alarm notifications. In addition to the 0 V DC reference point and power (DC output), the I/O connector provides the interface to:

Digital input – For connecting devices that can toggle between an open and closed circuit, for example PIR sensors, door/window contacts, and glass break detectors.
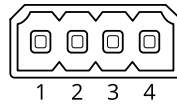
Specifications

Digital output – For connecting external devices such as relays and LEDs. Connected devices can be activated by the VAPIX® Application Programming Interface or from the product's webpage.
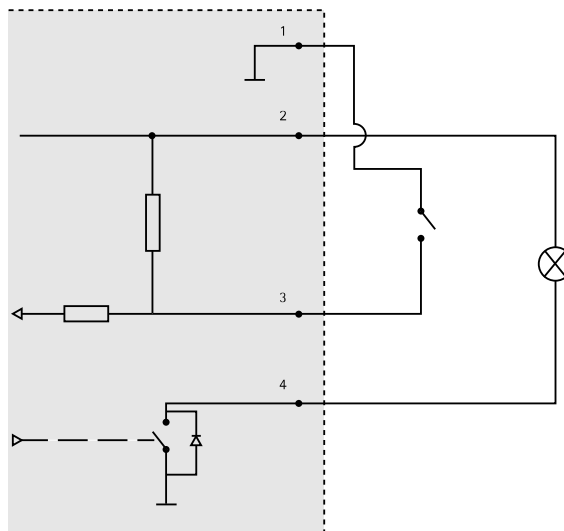
4-pin terminal block

Connection Diagrams

I/O Connector

Note

> Valid for AXIS P1435-LE Network Camera

1	0 V DC (–)
2	DC output 12 V, max 25 mA
3	Digital input
4	Digital output