AXIS P14 Network Camera Series

AXIS P1447-LE Network Camera

AXIS P1448-LE Network Camera
AXIS P14 Network Camera Series

About this manual

About this manual

This User Manual provides information on the product regarding:

- Access
- Main use cases
- Troubleshooting
- 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
AXIS P14 Network Camera Series

Product overview

Product overview

1 I/O connector
2 Audio connector
3 Status LED indicator
4 Control button
5 microSD card slot
6 Network connector
7 Part number (P/N) & Serial number (S/N)
AXIS P14 Network Camera Series

How to access the product

How to access the product

AXIS IP Utility and AXIS Camera Management are recommended methods for finding Axis products on the network and assigning them IP addresses in Windows®. Both applications are free and can be downloaded from axis.com/support.

The product can be used with the following browsers:

- Chrome™ (recommended), Firefox®, Edge®, or Opera® with Windows®
- Chrome™ (recommended) or Safari® with OS X®
- Chrome™ or Firefox® with other operating systems.

If you need more information about recommended browsers, go to axis.com/browser-support.

How to access the product from a browser

1. Start a web browser.
2. Enter the IP address or host name of the Axis product in the browser’s address field.
   To access the product from a Mac computer (OS X), go to Safari, click on Bonjour and select the product 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 to locate the product on the network. For information about how to discover and assign an IP address, see the document Assign an IP Address and Access the Video Stream on Axis Support web at axis.com/support.
3. Enter your username and password. If this is the first time the product is accessed, the root password must first be configured.
4. The product’s live view page opens in your browser.

About 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 the 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 recommend that you:

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

Set a secure password for the root account

Important
The default administrator user name root cannot be deleted. If the password for root is lost, the device must be reset to the factory default settings.

1. Make sure to follow the instructions about secure passwords. See About secure passwords on page 5.
2. Type a password and then retype it to confirm the spelling.
3. Click Create login. The password has now been configured.
**About the product's built-in help**

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

![Help menu]

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**Image quality**

**How to 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.

**About 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.

**How to hide parts of the image with privacy masks**

**What is a privacy mask?**

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 turn off the privacy masks.

**Important**

Using multiple privacy masks may affect the product's performance.
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Setup

How to create a privacy mask
To create a privacy mask, go to Settings > Privacy mask.

How to focus
1. Go to Settings > Image > Focus.
2. Click Autofocus.

About 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.

Left: no zoom. Right: remote zoom applied.
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Setup

How to enhance 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.
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

How to 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.
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Setup

1. Depending on your product, turn the camera or the 3-axis lens in the camera 90° or 270°.

2. If your product doesn’t rotate the view automatically, go to Settings > Stream > Orientation on the product’s webpage and rotate the view 90° or 270°.

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

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

- Make sure that the exposure mode is automatic.

**Note**
Increasing the max shutter value can result in motion blur.

- The shutter speed should be as slow as possible, which means you should set max shutter to the highest possible value.
- Reduce sharpness in the image.
- Try lowering the max gain value.

How to handle scenes with strong backlight
To make both dark and bright areas of the image visible, turn on WDR.

1. Go to Settings > Image.

2. Turn on WDR under Wide dynamic range.

*Image without WDR.*
Image with WDR.

Note
If you use WDR, you may experience some WDR artifacts in the image.

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

How to benefit from IR light in low-light conditions using night mode

Your camera uses visible light to deliver color images during the day. As light diminishes, you can set the camera to automatically shift to night mode. In night mode 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.

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 longer but there will be more image blur due to low-light noise.

3. Enable IR illumination to use the camera’s built-in IR light when the night mode is activated.

How to maximize details in an image

Important
If you maximize details in an image, bitrate increases and might lead to reduced frame rate.

- Set compression as low as possible.
- Select MJPEG streaming.
- Turn off the Zipstream functionality.

Overlays

About 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.
**AXIS P14 Network Camera Series**

**Setup**

**How to show a text overlay when the camera detects motion**

This example explains how to display the text “Motion detected” when the camera detects motion:

Make sure the AXIS Video Motion Detection application 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 alignment, text size and appearance.
7. Include the text overlay.

Create an action rule:
8. Go to System > Events > Action rules.
9. Create an action rule with AXIS Video Motion Detection as trigger.
10. From the list of actions, select Overlay text.
11. Type “Motion detected”.
12. Set the duration.

**Streaming and storage**

**How to choose video compression format**

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. Installing 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.
How to 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.

How to 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.

How to add audio to your recording

Edit the stream profile which is used for the recording:

1. Go to Settings > System > Stream profiles.
2. Select the stream profile and click Modify.
3. In the Audio tab, select the Audio stream checkbox and select On from the drop-down list.
4. Click Ok.

Events

About events

The event pages allow you to configure your product to perform actions when different events occur. For example, the product can start a recording or send an email notification when motion is detected. The set of conditions that defines how and when the action is triggered is called an action rule.

How to trigger an action

1. Go to Settings > System > Events to set up an action rule. The action rule defines when the camera will perform certain actions. Action rules can be setup as scheduled, recurring, or for example, triggered by motion detection.
2. Select what Trigger must be met to trigger the action. If you specify more than one trigger for the action rule, all of them 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 action rule, the action rule needs to be restarted for the changes to take effect.

**How to 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 the AXIS Video Motion Detection application 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 an action rule:

4. Go to Settings > System > Events and add an action rule.
5. Type a name for the action rule.
6. From the list of triggers, select Applications and then select AXIS Video Motion Detection (VMD).
7. From the list of actions, select Record video.
8. Select an existing stream profile or create a new one.
9. Set the pre-trigger time to 5 seconds.
10. Set the post-trigger time to 60 seconds.
11. Select SD card from the list of storage options.
12. Click Ok.

**How to 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 20*

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

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 web page

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 an action rule in the camera’s web page.

Applications

About 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.
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Setup
Troubleshooting

How to 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 4.
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.
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 via the web interface. Go to Settings > System > Maintenance and click Default.

How to 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.

How to 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, 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 latest firmware file to your computer, available free of charge at axis.com/support/firmware
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Troubleshooting

2. Log in to the product as an administrator.
3. Go to Settings > System > Maintenance in the product's webpage and follow the instructions. When the upgrade has finished, the product restarts automatically.

AXIS Camera Management can be used for multiple upgrades. Find out more at axis.com/products/axis-camera-management

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 product 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 product and try again. |

Problems setting the IP address

| The product is located on a different subnet | If the IP address intended for the product and the IP address of the computer used to access the product 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 product from the network. Run the ping command (in a Command/DOS window, type ping and the IP address of the product):
  - 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 product.
  - If you receive: Request timed out, this means that the IP address is available for use with the Axis product. Check all cabling and reinstall the product. |

Possible IP address conflict with another device on the same subnet

| The static IP address in the Axis product 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 product. |

The product 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. |
| 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 Camera Management to locate the product on the network. Identify the product using its model or serial number, or by the DNS name (if the name has been configured). |
| Certificate error when using IEEE 802.1X | For authentication to work properly, the date and time settings in the Axis product must be synchronized with an NTP server. Go to Settings > System > Date and time |

The product is accessible locally but not externally

| Router configuration | Check that your router allows incoming data traffic to the Axis product. The router must support UPnP. |
| Firewall protection | Check the Internet firewall with your network administrator. |
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Troubleshooting

Problems with streaming

<table>
<thead>
<tr>
<th>Problem</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multicast H.264 only accessible by local clients</td>
<td>Check if your router supports multicasting, or if the router settings between the client and the product need to be configured. The TTL (Time To Live) value may need to be increased.</td>
</tr>
<tr>
<td>No multicast H.264 displayed in the client</td>
<td>Check with your network administrator that the multicast addresses used by the Axis product are valid for your network. Check with your network administrator to see if there is a firewall preventing viewing.</td>
</tr>
<tr>
<td>Poor rendering of H.264 images</td>
<td>Ensure that your graphics card is using the latest driver. The latest drivers can usually be downloaded from the manufacturer’s website.</td>
</tr>
<tr>
<td>Color saturation is different in H.264 and Motion JPEG</td>
<td>Modify the settings for your graphics adapter. Go to the adapter’s documentation for more information.</td>
</tr>
</tbody>
</table>
| Lower frame rate than expected               | • See Performance considerations on page 19.  
• 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.  
• The maximum frames per second is dependent on the utility frequency (60/50 Hz) of the Axis product. |

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.
- 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.
To find the latest version of the product’s datasheet, go to the product page on axis.com and locate Support & Documentation.

**LED Indicators**

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

**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

**Buttons**

**Control button**

The control button is used for:

- Resetting the product to factory default settings. See How to reset to factory default settings on page 17.
- Connecting to an AXIS Video Hosting System service. To connect, press and hold the button for about 3 seconds until the status LED flashes green.

**Connectors**

**Network connector**

RJ45 Ethernet connector with Power over Ethernet (PoE).

**Audio connector**

The Axis product has the following audio connectors:

- Audio in (pink) – 3.5 mm input for a mono microphone, or a line-in mono signal.

For audio in, the left channel is used from a stereo signal.
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Specifications

3.5 mm audio connectors (stereo)

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<tr>
<th>1 Tip</th>
<th>2 Ring</th>
<th>3 Sleeve</th>
</tr>
</thead>
<tbody>
<tr>
<td>Audio Input</td>
<td>Microphone/Line in</td>
<td>Microphone bias voltage</td>
</tr>
</tbody>
</table>

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.

Digital output – For connecting external devices such as relays and LEDs. Connected devices can be activated by the VAPIX® Application Programming Interface or in the product’s webpage.

4-pin terminal block

Example

1  DC ground
2  DC output 12 V, max 25 mA
3  I/O digital input
4  I/O digital output