AXIS Q16 Network Camera Series

AXIS Q1645 Network Camera

AXIS Q1647 Network Camera

User Manual

AXIS Q16 Network Camera Series

Table of Contents

Get started

Choose lens

There is more than one lens option for your camera. Which lens to choose depends on the surveillance requirements. The lenses have different capabilities when it comes to light sensitivity and field of view. See the product's datasheet for lens alternatives.

Depth of field and sensor size

The depth of field depends on the lens aperture, the size of the image sensor and the distance to the scene. The lower the f-number and larger the sensor, the shallower depth of field. Due to the large sensor, the depth of field is more shallow in this particular product than in traditional surveillance cameras. Depth of field becomes shallower in dark conditions, due to the fact that the iris opens up to provide enough light to the sensor.

Find out more at *axis.com/learning/web-articles/lenses-for-network-video-cameras*.

Focus and light sensitivity

The focus point is affected by the aperture (f-stop) of the lens. The lower the f-stop value, the more light reaches the image sensor. The smaller the aperture, the deeper depth of field which may lead to an unwanted absolute focus point. During low light conditions, when the aperture is as large as possible, the depth of field decreases and the image may therefore appear unfocused.
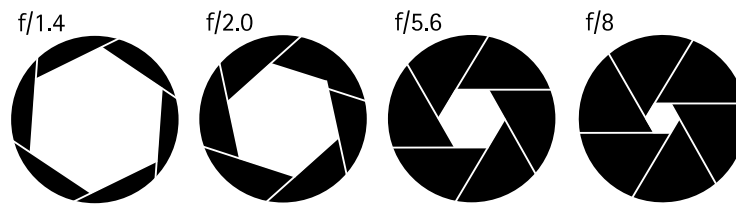
Examples of apertures for different f-numbers.

To calculate the distance between the camera and the object of interest in relation to scene dimensions, resolution, and focal length, use the lens calculator tool, go to *axis.com/tools/lens-calculator*.

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*.

Browser support

You can use the device with the following browsers:

	Chrome^TM	Firefox®	Edge®	Safari®
Windows®	recommended	x	x	
OS X®	recommended			x
Other operating systems	x	x		

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

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 4* .

3. The live view page opens in your browser.

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 4* .

2. Retype the password to confirm the spelling.

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

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.

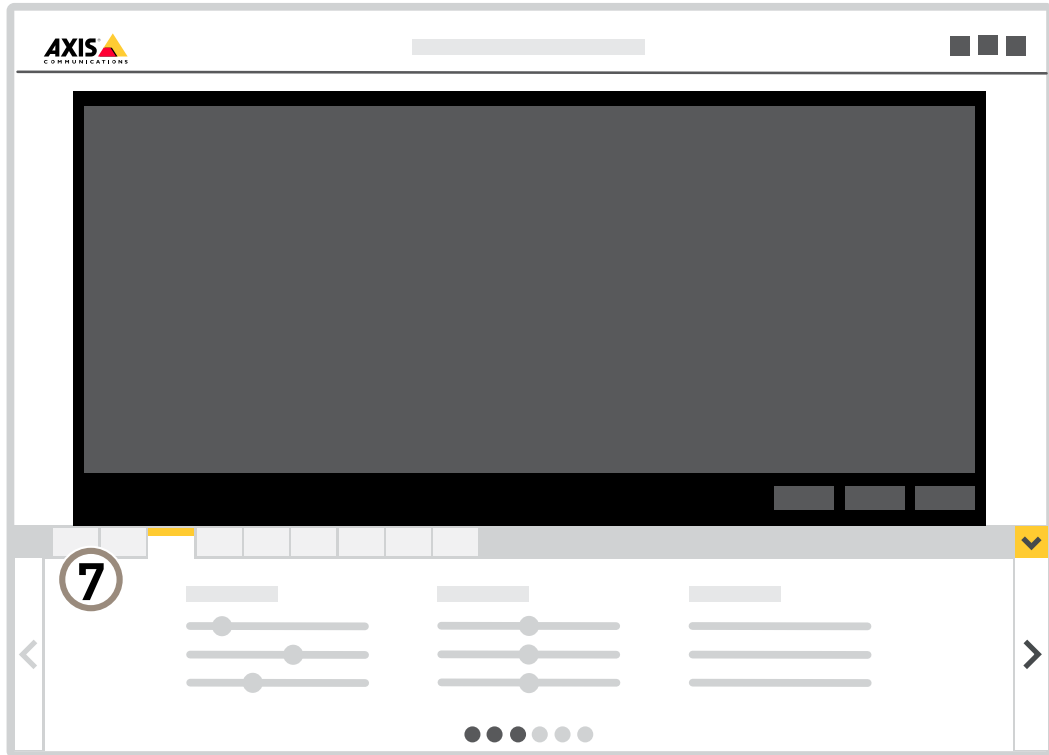# AXIS Q16 Network Camera Series

Get started

Webpage overview

1   Live view control bar
2   Live view
3   Product name
4   User information, color themes, and help
5   Video control bar
6   Settings toggle

Get started

7   Settings tabs

Additional settings

Adjust the image

To find out more about what you can do with the image, see *Learn more on page 17*.

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*.

Adjust the focus

1. Go to **Settings > Image > Focus** and click **Show AF area**.

2. Adjust the autofocus area to cover the part of the image that you want to be in focus.

   If you don't select an autofocus area, the camera focuses on the entire scene. We recommend that you focus on a static object.

3. Click **Autofocus**.

4. To fine tune the focus, use the focus slider.

Reduce motion blur in low-light conditions

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

Note

> Image noise will increase if you increase the gain.

- Increase shutter speed and gain. Go to **Settings > Image** > **Exposure** and set **Max shutter** to a shorter time, and **Max gain** to a higher value.

If you are still experiencing motion blur, you can try one of the following:

- Increase the light level in the scene.

- Mount the camera so that objects move toward it or away from it rather than sideways.

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**.

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**.

  Select the same frequency as the power line frequency.

Additional settings

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

  Select the same frequency as the power line frequency.

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

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.

Stabilize a shaky image with Electronic Image Stabilization (EIS)

Electronic Image Stabilization (EIS) can be used in environments where the product is mounted in an exposed location and subject to vibrations, for example, wind or passing traffic. Turn on EIS to get a smoother and steadier image without blur.

EIS also reduces the file size of the compressed image and lowers the bitrate of the video stream.

Note

>   When EIS is turned on the image is cropped slightly, lowering the maximum resolution.

1. Go to **Settings > Image > Image correction**.

2. Turn on EIS.

Compensate for barrel distortion

Barrel distortion is a phenomenon where straight lines appear increasingly bent closer to the edges of the frame. A wide field of view often creates barrel distortion in an image. Barrel distortion correction compensates for this distortion.

Note

>   Barrel distortion correction affects the image resolution and field of view.
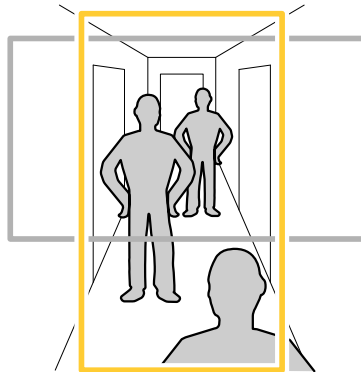
1. Go to **Settings > Image > Image correction**.

2. Turn on **Barrel distortion correction (BDC)**.

3. Set the level of correction that gives you the best image.

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.

Additional settings

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 [icon].

4. Rotate the view 90° or 270°.

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

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.
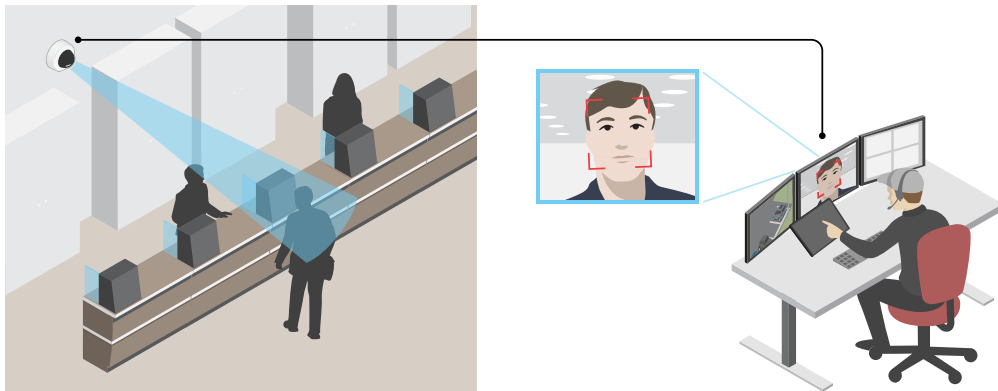
1. Go to **Settings > System** > **Orientation** and click [icon].

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.

Additional settings

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 .

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

Optimize the image for traffic surveillance

To get the best possible image for traffic surveillance, use the AXIS Traffic Wizard in combination with the Traffic overview scene profile.

1. Go to **Settings > Apps** > **AXIS Traffic Wizard**.

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

3. To set up the application, click **Open**.

4. Select units (metric or imperial).

5. Enter the values for Road distance, Camera height, Vehicle distance and Max speed.

6. To make both dark and bright areas of the image visible, turn on WDR.

7. Set the level of low-light gain depending on the light conditions.

8. If external IR illumination is available, select the **Supplemental IR illumination** checkbox.

9. Click **Save**.

10. Go to **System** > **Orientation**.

11. Select **Traffic overview** under **Scene profile**.

12. Click **Done**.

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.

3. Use the **Contrast** slider to adjust the amount of WDR.

Additional settings

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*.

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.

### Add street names and compass direction to the image

> **Note**
>
> The street name and compass direction will be visible on all video streams and recordings.

1. Go to **Settings > Apps**.

2. Select **axis-orientationaid**.

3. Click **Open**.

4. To add a street name, click **Add text** and modify the text to fit the street.

5. To add a compass, click **Add compass** and modify the compass to fit the image.

Additional settings
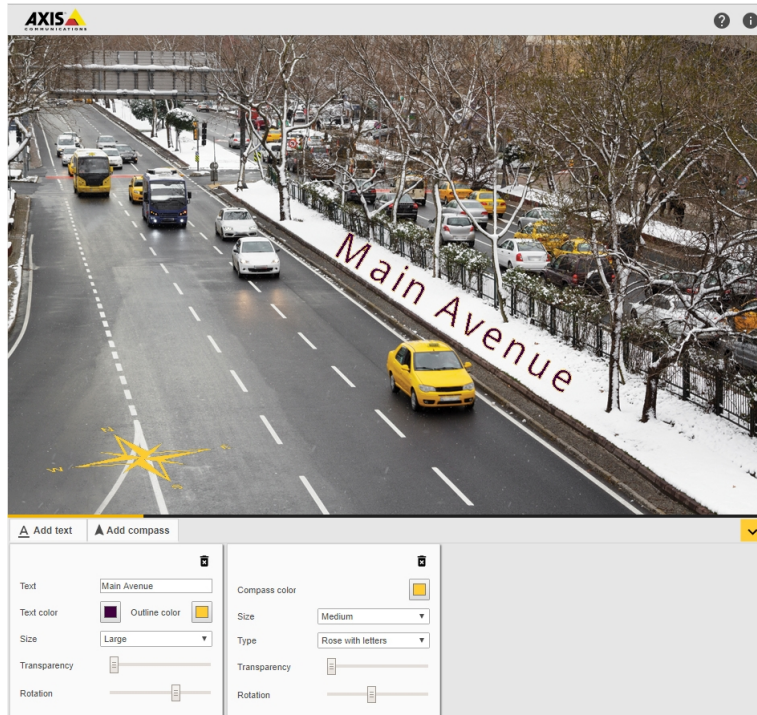
Replace the lens

1. Stop all recordings and disconnect power from the product.

2. Disconnect the lens cable and remove the standard lens.

3. Attach the new lens and connect the lens cable.

4. Reconnect the power.

5. Log in to the product's webpage, go to the **Image** tab and then select the **P-Iris lens** you have installed.

Note

If you use a DC iris lens, select **Generic DC Iris**.

6. For the changes to take effect, you need to restart the device. Go to **System > Maintenance** and click **Restart**.

7. Adjust the zoom and focus.

View and record video

To learn more about settings for viewing and recording video, see *Streaming and storage on page 18*.

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**.

Record and watch video

To record video you must first set up network storage, see *Set up network storage on page 13*, or have an SD card installed.

Record video

1. Go to the camera's live view.

2. To start a recording, click **Record**. Click again to stop the recording.

Watch video

1. Click **Storage > Go to recordings**.

2. Select your recording in the list and it will play automatically.

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.

Additional settings

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**.

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 the camera detects loud noises

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

> Note
>
>   The following instructions require that a microphone is connected to audio-in.

Turn on audio:

1. Set up the stream profile to include audio, see *Add audio to your recording on page 16*.

Turn on audio detection:

1. Go to **Settings > System > Detectors > Audio detection**.

2. Adjust the alarm level 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 **Audio**, select **Audio Detection**.

4. In the list of actions, under **Recordings**, select **Record video**.

5. Select the stream profile where audio has been turned on.

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 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 **Settings > System > Detectors**.

2. Turn on shock detection, and set a value for the shock sensitivity.

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 **Device status**, select **Shock detected**.

4. Click **+** to add a second condition.

Additional settings

5. In the list of conditions, under **Scheduled and recurring**, select **Scheduled event**.

6. In the list of schedules, selet **After hours** .

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

8. Select a **Camera**.

9. Set the prebuffer time to 5 seconds.

10. Set the postbuffer time to 60 seconds.

11. Select where to save the recordings.

12. Click **Save**.

Send an email automatically if someone spray paints the lens

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

2. Turn on **Trigger on dark images**. This will trigger an alarm if the lens is sprayed, covered, or rendered severely out of focus.

3. Set a duration for **Trigger after**. The value indicates the time that must pass before an email is sent.

Create a rule:

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

2. Type a name for the rule.

3. In the list of conditions, select **Tampering**.

4. In the list of actions, select **Send notification to email** and then select a recipient from the list. Go to **Recipients** to create a new recipient.

   To create a new recipient, click ✛ . To copy an existing recipient, click ▤ .

5. Type a subject and a message for the email.

6. Click **Save**.

Add audio

Add audio to your recording

Turn on audio:

1. Go to **Settings > Audio** and turn on **Allow audio**.

Edit the stream profile which is used for the recording:

2. Go to **Settings > Stream** and click **Stream profiles**.

3. Select the stream profile and click **Audio**.

4. Select the checkbox and select **Include**.

5. Click **Save**.

6. Click **Close**.

Learn more

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 on *axis.com/technologies/fiber-optics*.

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

Capture modes

A capture mode consists of a resolution and the corresponding frame rate available in the product. The capture mode setting affects the camera's field of view and aspect ratio.

The lower resolution capture mode is cropped out from the highest resolution.
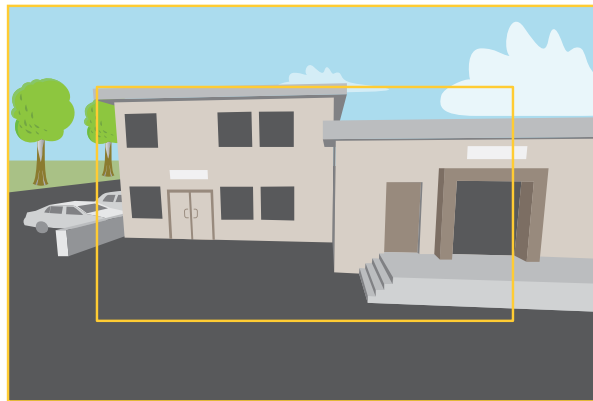
The image shows how the field of view and aspect ratio can change between two different capture modes.

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*.

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.

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.

Privacy masks

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

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

Important

> Set the zoom and focus before you create a privacy mask.

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.

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:

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.

Learn more

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

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

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.
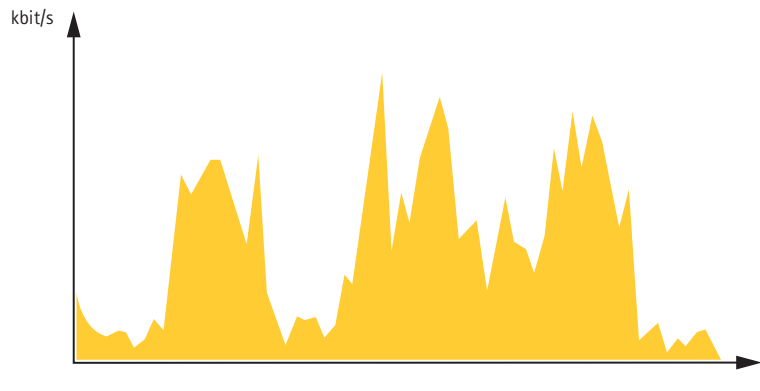
Maximum bitrate (MBR)
With maximum bitrate, you can set a target bitrate to handle bitrate limitations in your system. You may see a decline in image quality or frame rate when the instantaneous bitrate is kept below the specified target bitrate. You can choose to either prioritize image quality or frame 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.
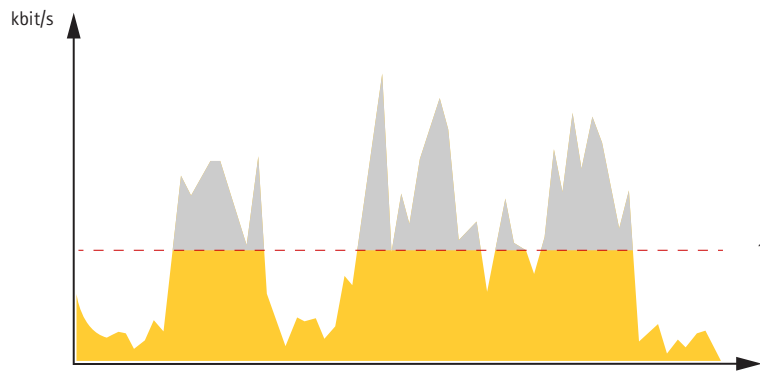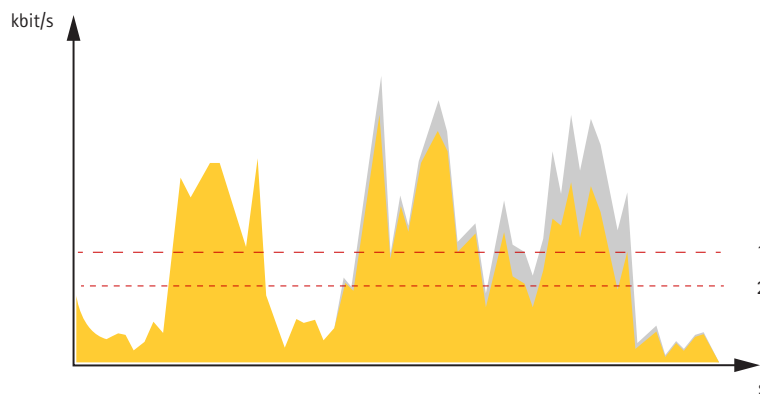

1   Target bitrate

Learn more

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.

1   *Target bitrate*
2   *Actual average bitrate*

You can also turn on maximum bitrate and specify a target bitrate within the average bitrate option.
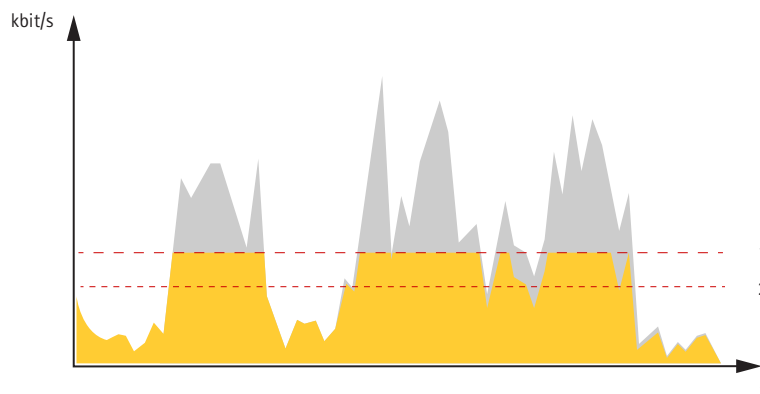
1   *Target bitrate*
2   *Actual average bitrate*

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

- We recommended running one application at a time.
- Avoid running applications when the built-in motion detection is active.

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 24*.

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 21*.
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 23*. • 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.
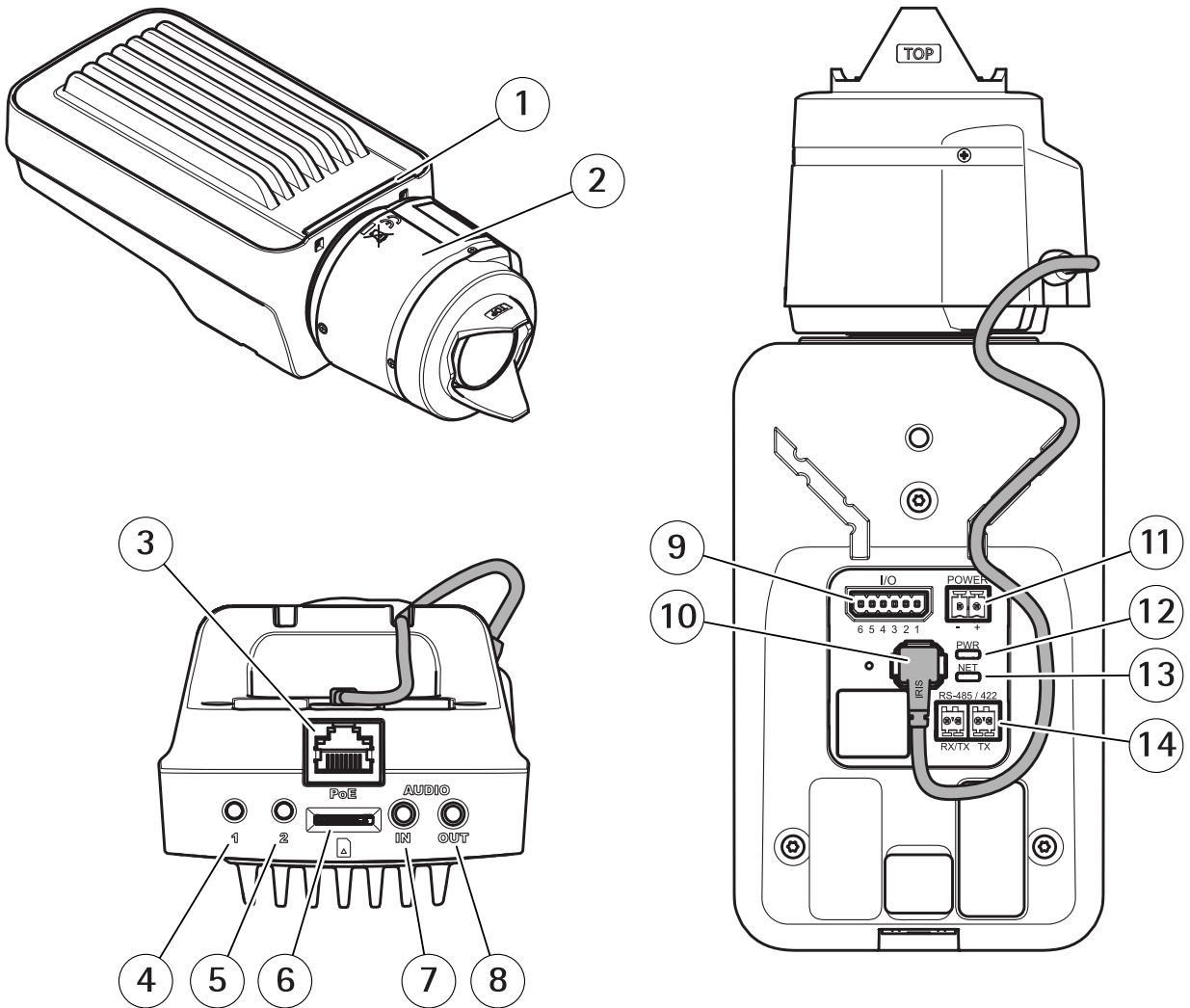
AXIS Q16 Network Camera Series

Specifications

Specifications

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

Product overview

1   Status LED indicator
2   Lens
3   Network connector (PoE)
4   Control button (1)
5   Function button (2)
6   microSD Card slot
7   Audio in
8   Audio out
9   I/O connector
10 Iris connector
11 Power connector

Specifications

12   Power LED indicator
13   Network LED indicator
14   RS485/RS422 connector

LED Indicators

Note

- The Status LED can be configured to be unlit during normal operation. To configure, go to **Settings > System > Plain config**.

- The Status LED can be configured to flash while an event is active.

Status LED	Indication
Green	Steady green for normal operation.
Amber	Steady during startup. Flashes when restoring settings.

Note

The Network LED can be disabled so that it does not flash when there is network traffic. To configure, go to **Settings > System > Plain config**.

Network LED	Indication
Green	Steady for connection to a 100 Mbit/s network. Flashes for network activity.
Amber	Steady for connection to a 10 Mbit/s network. Flashes for network activity.
Unlit	No network connection.

Note

The Power LED can be configured to be unlit during normal operation. To configure, go to **Settings > System > Plain config**.

Power LED	Indication
Green	Normal operation.
Amber	Flashes green/amber during firmware upgrade.

Status LED behavior for focus assistant

Note

Only valid for optional P-iris, DC-iris or manual iris lenses.

The status LED flashes when the Focus Assistant is active.

Color	Indication
Red	The image is out of focus. Adjust the lens.
Amber	The image is close to focus. The lens needs fine tuning.
Green	The image is in focus.

Buzzer signal for focus assistant

Note

Only valid for optional P-iris, DC-iris or manual iris lenses.

Specifications

Buzzer	Lens
Fast interval	Optimally adjusted
Medium interval	Less optimally adjusted
Slow interval	Poorly adjusted

Status LED behavior and buzzer signal for leveling assistant

For information on the function button used for leveling the camera, see *page 27*.

Color	Buzzer	Camera position
Fixed green	Continuous beep	Level
Flashing green	Fast beeps	Almost level
Flashing orange	Medium beeps	Not level
Flashing red	Slow beeps	Far from level

Buzzer signal for focus assistant

Note

Only valid for optional P-iris, DC-iris or manual iris lenses.

Buzzer	Lens
Fast interval	Optimally adjusted
Medium interval	Less optimally adjusted
Slow interval	Poorly adjusted

Status LED behavior and buzzer signal for leveling assistant

For information on the function button used for leveling the camera, see *page 27*.

Press and hold the function button (2) for more than two seconds to level the camera.

- When the camera is level, both LEDs are steady green, and the beep is continuous.

- When the camera is not level, the LEDs flash a combination of red, green and orange, and the beep occurs at slow intervals.

Both LEDs briefly flash green to indicate that the leveling is getting better.

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*.

Specifications

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 21*.

Function button

Note

Focus assistant is only valid for optional P-iris, DC-iris or manual iris lenses.

Use the function button to activate the following functions:

Leveling assistant – This function helps to make sure the camera is level. To start the leveling assistant, press the button for about 3 seconds. Press again to stop the leveling assistant. The status LED and buzzer signal assist leveling of the camera, see *Status LED behavior and buzzer signal for leveling assistant on page 26*. The camera is level when the buzzer beeps continuously.

Focus assistant – This function is used for enabling the focus assistant. To enable the focus assistant, press and very quickly release the button. Press again to stop the focus assistant. To find out more, see the Installation Guide.

Connectors

Network connector

RJ45 Ethernet connector with Power over Ethernet (PoE).

Audio connector

- **Audio in** – 3.5 mm input for a mono microphone, or a line-in mono signal (left channel is used from a stereo signal).

- **Audio out** – 3.5 mm output for audio (line level) that can be connected to a public address (PA) system or an active speaker with a built-in amplifier. A stereo connector must be used for audio out.
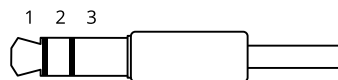
	1 Tip	2 Ring	3 Sleeve
Audio Input	Balanced: 'Hot' signal Microphone/Line in Unbalanced: Microphone/Line in	Balanced: 'Cold' signal Microphone/Line in Unbalanced: Unused	Ground
Audio Output	Line out, mono	Line out, mono	Ground

The internal microphone is used by default; the external microphone is used when connected. You can disable the internal microphone by connecting a plug to the microphone input.
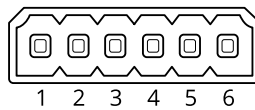
Specifications

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 from the product's webpage.

6-pin terminal block

| Function	Pin	Notes	Specifications
DC ground	1		0 V DC
DC output	2	Can be used to power auxiliary equipment. Note: This pin can only be used as power out.	12 V DC Max load = 50 mA
Configurable (Input or Output)	3–6	Digital input – Connect to pin 1 to activate, or leave floating (unconnected) to deactivate.	0 to max 30 V DC
		Digital output – Internally connected to pin 1 (DC ground) when active, and floating (unconnected) when inactive. If used with an inductive load, e.g., a relay, connect a diode in parallel with the load, to protect against voltage transients.	0 to max 30 V DC, open drain, 100 mA

Example
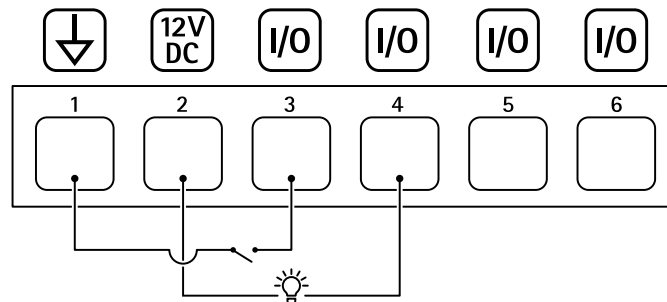
1   DC ground
2   DC output 12 V, max 50 mA
3   I/O configured as input
4   I/O configured as output
5   Configurable I/O
6   Configurable I/O

Power connector

2-pin terminal block for DC power input. Use a Safety Extra Low Voltage (SELV) compliant limited power source (LPS) with either a rated output power limited to ≤100 W or a rated output current limited to ≤5 A.
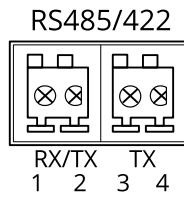
Specifications
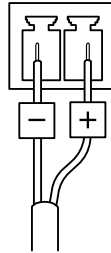
RS485/RS422 connector

Two 2-pin terminal blocks for RS485/RS422 serial interface used to control auxiliary equipment such as pan-tilt devices.

The serial port can be configured to support:

- Two-wire RS485 half duplex

- Four-wire RS485 full duplex

- Two-wire RS422 simplex

- Four-wire RS422 full duplex point to point communication

RS485/422

RX/TX   TX
1   2   3   4

Function	Pin	Notes
RS485B alt RS485/422 RX(B)	1	RX pair for all modes (combined RX/TX for 2-wire RS485)
RS485A alt RS485/422 RX(A)	2	
RS485/RS422 TX(B)	3	TX pair for RS422 and 4-wire RS485
RS485/RS422 TX(A)	4	

Important

The maximum cable length is 30 m (98 ft).