AXIS P1445-LE-3 License Plate Verifier Kit

User Manual

AXIS P1445-LE-3 License Plate Verifier Kit

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About the product

AXIS P1445-LE-3 License Plate Verifier Kit consists of an AXIS P1445-LE Network Camera and pre-installed AXIS License Plate Verifier application, making it a kit for automated vehicle entry and exit management. AXIS P1445-LE-3 uses a whitelist and a blacklist to verify access to controlled areas such as parking lots.

Get started

These setup instructions are valid for all scenarios:

1. *Camera mounting recommendations on page 4*

2. *Adjust the camera settings on page 7*

3. *Install the application on page 7*

4. *Adjust the region of interest on page 9*

5. *Select region on page 9*

6. *Set up event storage on page 9*

Camera mounting recommendations

- When you select the mounting location, remember that direct sunlight can distort the image, for example, during sunrise and sunset.

- The mounting height should be half of the distance of that between the vehicle and the camera.
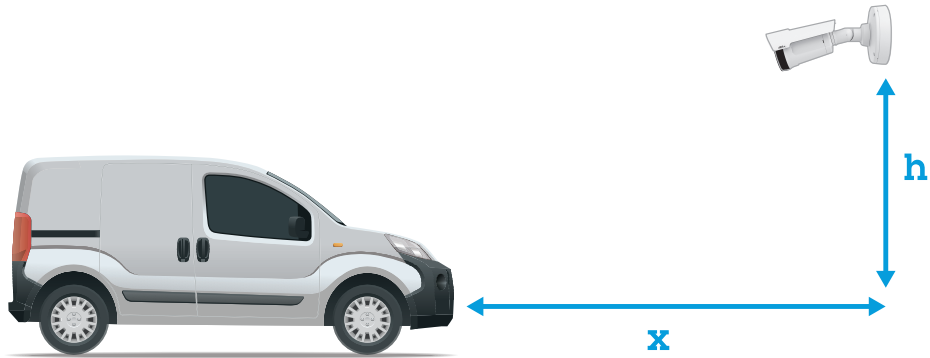
Distance between vehicle and camera (x)	Mounting height (h)
2.0 m (6.6 ft)	1.0 m (3.3 ft)
3.0 m (9.8 ft)	1.5 m (4.9 ft)
4.0 m (13 ft)	2.0 m (6.6 ft)
5.0 m (16 ft)	2.5 m (8.2 ft)
7.0 m (23 ft)	3.5 m (11 ft)

- The camera's mounting angle should not be larger than 30°.

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Get started
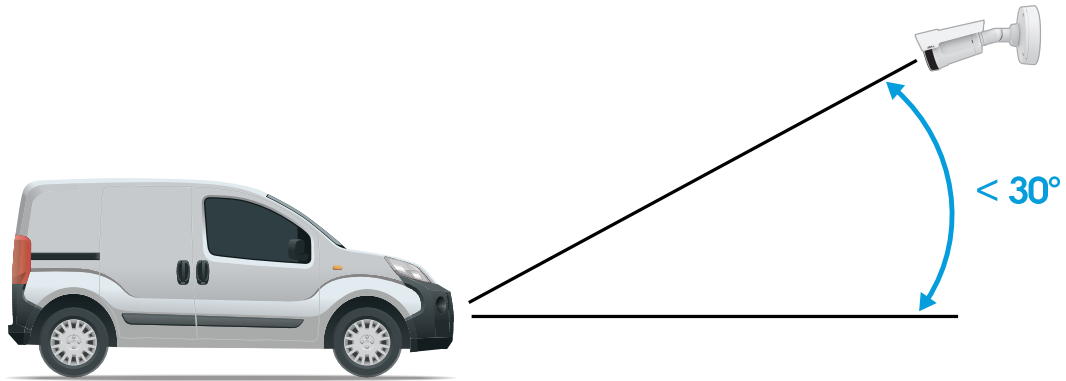
Mounting angle from the side.

< 30°
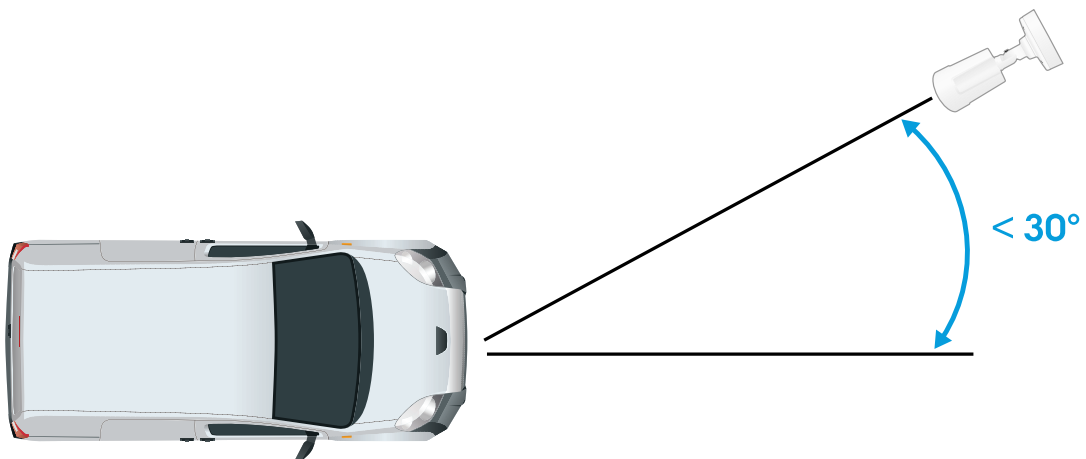
Mounting angle from above.

< 30°

- The image of the license plate should not tilt more than 5° horizontally. If the image is tilted more than 5°, we recommended to adjust the camera so that the license plate is displayed horizontally in the live stream.
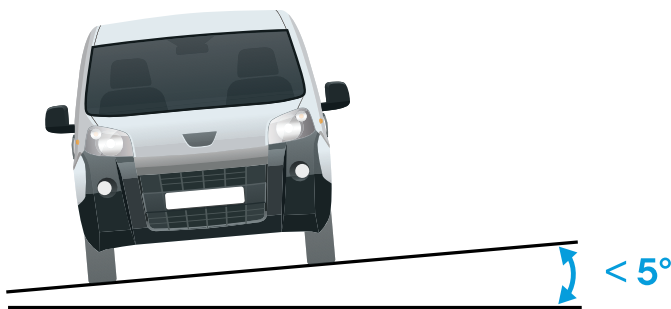
Horizontal tilt.

How to access the product's webpage

If you do not know the IP address of your product, use AXIS IP Utility or AXIS Device Manager to locate the product on the network. Both applications are free and can be downloaded from *axis.com/support*

We recommend the following browsers:

- Chrome^{TM}
- Firefox®

1. Start the web browser.

2. Enter the IP address or host name of the Axis product in the browser's address field.

3. Enter the username and password. If this is the first time you access the product, you must first configure the root password.

4. If this is the first time you access the product, you are prompted to do some initial settings. When you're done, the product's live view page opens in your browser..

For more information about how to discover and assign an IP address, see the document *How to assign an IP address and access your device* on the product page at *axis.com*

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.

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.

Adjust the camera settings

Note

The camera has been preconfigured according to the instructions below. If you've changed settings in the camera, reset to default by following the instructions.

To access the camera settings, go to .

1. Place a vehicle in the region of interest.

2. To make sure the license plate is big enough for the application to detect it, go to **System > Orientation** and select the pixel counter. Check that the width of the license plate equals at least 130 pixels for license plates with one row and at least 70 pixels for license plates with two rows.

3. Go to the camera's webpage, select the **Image** tab and do the following adjustments:

   - Set the autofocus area on the license plate and click **Autofocus**. If the license plate is still not in focus, fine-tune using the manual focus.

   - Turn off **Wide dynamic range**.

   - Set **Local contrast** to 20. This reduces noise during nighttime, but still lights up the license plates enough to make them visible. A higher local contrast value makes the license plates more visible during nighttime, but increases noise.

   - Turn off the **IR-cut filter**.

   - Set **Max shutter** to 1/500.

   - Set **Max gain** to 24 dB to optimize the blur and noise trade-off in most scenes. If the license plate gets overexposed, adjust the max gain down to 9 dB.

   - Turn off **Lock aperture**. This sets the iris to automatic mode, which we recommend especially if the vehicle faces direct sunlight.

4. Test the above settings by running through the scenario with a vehicle. For best results, test the settings in the darkest lighting conditions. This way, you get a good result both during nighttime and daytime.

Install the application

Note

The camera comes with the application preinstalled. These instructions are only valid if you have reset the camera to factory default.

Get started

Note

To install the application on the device, you need administrator rights.

1. Go to the device's webpage.

2. Go to **Settings > Apps**.

3. Click **Add** to upload the application file (.eap) to the camera.

To activate the license, you need a license key that is generated by the license code and the Axis device serial number. If you don't have a license key on the computer, do the following:

1. Go to *axis.com/applications*

2. Go to **License key registration**.

3. Enter the license code and the serial number.

4. Save the license key file on the computer. Browse to select the file and then click **Activate**.

Access the application settings

1. In the camera's webpage, go to **Settings > Apps**, select the application and click **Open**.

1 *Live view*
2 *Tabs*
3 *Latest event*

Adjust the region of interest

> **Note**
>
> If you move the region of interest more than 60° or if you place it outside the live view, it will automatically jump back to default position. Make sure the region of interest stays in position after you have saved the settings.

1. Go to the application's webpage and select the **Settings** tab.

2. For performance reasons, keep the region of interest as small as possible.

3. To get the correct direction feedback in the **Event log**, point the arrow in the driving direction. The direction feedback shows up in the **Direction** column.

Example with one region of interest.

Select region

1. Go to the application's webpage and select the **Settings** tab.

2. Click **Advanced settings**.

3. In the **Region** drop-down list, select your region.

4. Click **Save**.

Set up event storage

This example explains how to store events of white-listed license plate numbers for 30 days.

Requirements:

- Camera physically installed and connected to the network.

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Get started

- AXIS License Plate Verifier up and running on the camera.

1. Go to the application's webpage and select the **Settings** tab.

2. Go to **Event storage**.

3. Under **Save events**, select **Whitelisted**.

4. Under **Delete events after**, select **30 days**.

5. Click **Save**.

Screenshot of Event storage in the Settings tab.

Additional settings

Import white-listed license plate numbers

You can import white-listed license plate numbers from a .csv file on the computer. In addition to the license plate number, you can also add comments for each license plate number in the .csv file.

The structure of the .csv file must look like this: `license plate number, comment`

Example
```
AXIS123, Reception1

AXIS345, Reception2

AXIS456, Reception3
```

1. Go to **Settings** > **White list**.

2. Click **Import from file**.

3. Browse to select a .csv file on the computer.

4. Click **OK**.

5. Check that the imported license plate numbers appear in the **White list** field.

6. Click **Save**.

Share license plate lists with other cameras

You can share the license plate lists with other cameras on the network. The synchronization will override all current license plate lists in the other cameras.

1. Go to **Settings**.

2. Click **Synchronize lists**.

3. Click **Add**.

4. Enter IP address, username and password.

5. Click **Synchronize**.

6. Check that the date and time under **Last sync** updates accordingly.

Turn on text overlay

A text overlay shows the following event information in the live view: `weekday, month, time, year, license plate number`.

1. Go to **Settings**.

2. Click **Advanced settings**.

3. Check **Turn on text overlay**.

4. Click **Save**.

5. Check that the overlay appears in the live view.

Additional settings

Detect license plates in low-light conditions

Each detection gets a score by the algorithm, this is called the detection score (confidence parameter). Detections that have a lower score than the threshold value will not show up in the list of events.

For scenes with low lighting you can lower the detection score threshold.

1. Go to **Settings**.

2. Click **Advanced settings**.

3. Adjust the detection score threshold value under **Confidence threshold**. To avoid false detections, we recommend that you lower the threshold value with 0.5 at a time.

4. Click **Save**.

5. Check that the algorithm detects the license plates as expected.

Allow fewer characters on license plates

The application has a default minimum number of characters for a license plate to be detected. The minimum number of characters is five. You can configure the application to detect license plates with fewer characters.

1. Go to **Settings**.

2. Click **Advanced settings**.

3. In the **Min number of characters** field, enter the minimum number of characters you want to allow.

4. Click **Save**.

5. Check that the application detects license plates as expected.

Allow only exact matches of license plates

The matching algorithm automatically allows a deviation of one character when matching the detected license plate against the whitelist or blacklist. However, some scenarios need an exact match of all characters of the license plate.

1. Go to **Settings**.

2. Click **Advanced settings**.

3. Select **Strict matching**.

4. Click **Save**.

5. Check that the application matches the license plates as expected.

Allow more than one character deviation when matching license plates

The matching algorithm automatically allows a deviation of one character when matching the detected license plate against the whitelist or blacklist. However, you can allow more than one character deviation.

1. Go to **Settings**.

2. Click **Advanced settings**.

3. In the drop-down list, select the number of characters that are allowed to be different.

4. Click **Save**.

5. Check that the application matches the license plates as expected.

Set up secure connection

To protect communication and data between devices, for example between the camera and the door controller, set up a secure connection with HTTPS.

1. Go to **Settings**.

2. Click **Advanced settings** and go to **Security**.

3. Select **Enable HTTPS**.

4. Select **Allow self-signed certificates**.

5. Click **Save**.

Find out more about HTTPS and how to use it at .

Vehicle entry and exit scenario

In the scenario for vehicle entry and exit, the application reads the vehicle license plate captured by the camera and verifies the license plate against a list of authorized or unauthorized license plate numbers stored in the camera.

This scenario requires the application embedded in a camera with I/O support or a connected I/O relay module to open and close the barrier.
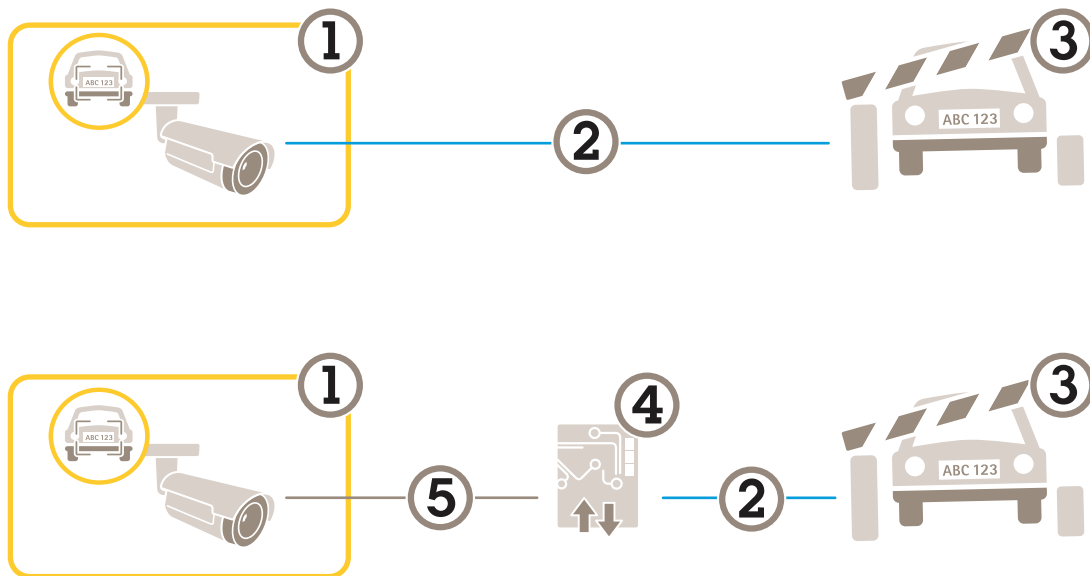
Two possible setups for the vehicle entry and exit scenario.

1   *Axis camera with AXIS License Plate Verifier*
2   *I/O communication*
3   *Barrier*
4   *Axis I/O relay module*
5   *IP communication*

Open a barrier for known vehicles using a relay module

This example explains how to set up AXIS License Plate Verifier together a relay module to open a barrier for a known vehicle driving into, for example, a parking area.

Requirements:

- Camera physically installed and connected to the network.

- AXIS License Plate Verifier up and running on the camera.

- Cables connected between the barrier and the relay module.

- Basic setup done. See .

Vehicle entry and exit scenario

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

www.axis.com/products/online-manual/45019

*This video shows how to get the application up and running
with AXIS A9188 I/O Relay Module.*

1. Go to the camera's webpage, select **Settings** and open AXIS License Plate Verifier.

2. Go to the relay module's webpage and make sure the relay port is connected to the camera's I/O port.

3. Copy the relay module's IP address.

4. Go back to AXIS License Plate Verifier and select the **Relay module** tab.

5. Enter the following information:

    - the IP address for the relay module in format `192.168.0.0`

    - the username for the relay module

    - the password for the relay module

6. To make sure the connection works, click **Connect**.

7. To activate the connection, click **Enable integration**.

8. Click **Save**.

9. Go to the **Settings** tab

10. Enter the license plate number in the **White list** field.

11. In the **Barrier mode** drop-down list, select **open to whitelisted**.

12. In the **Vehicle direction** drop-down list, select **in**.

13. In the **Relay type** drop-down list, select **Relay module.**

Note

> The physical input ports 1 to 8 on the relay module correspond to ports 1 to 8 in the drop-down list. However, the relay ports 1 to 8 on the relay module correspond to ports 9 to 16 in the drop-down list. This is valid even if the relay module only has 8 ports.

14. In the **Relay I/O output** drop-down list, select the I/O port that is connected to the barrier.

15. Click **Save**.

16. Check that the application identifies the license plate number in the whitelist as a known vehicle and that the barrier opens as expected.

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Open a barrier for known vehicles using the camera's I/O

This example explains how to set up AXIS License Plate Verifier together with the camera's I/O port to open a barrier for a known vehicle leaving, for example, a parking area.

Requirements:

- Camera physically installed and connected to the network.

- AXIS License Plate Verifier up and running on the camera.

- Cables connected between the barrier and the camera's I/O port.

- Basic setup done. See .

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

www.axis.com/products/online-manual/45019

This video shows how to get the application up and running with the camera's I/O.

1. Go to the application's webpage and select the **Settings** tab.

2. Enter the authorized license plate numbers in the **White list** field.

3. In the **Relay type** drop-down list, select **Internal**.

4. In the **Barrier mode** drop-down list, select **open to whitelisted**.

5. In the **Vehicle direction** drop-down list, select **out**.

6. Enter the camera's username and password.

7. Click **Save**.

8. Check that the application identifies the license plate number in the whitelist as a known vehicle and that the barrier opens as expected.

Get notified about an unauthorized vehicle

This example explains how to set up the application so that an event that triggers a notification can be created in the camera.

Requirements:

- Basic setup done. See .

1. Go to the application's webpage and select **Settings**.

2. Enter the license plate number in the **Black list** field.

Vehicle entry and exit scenario

3. Click **Save**.

4. Go to the camera's webpage.

5. Go to **Settings > System > Events** and set up an action rule with the application as a condition and with a notification as an action.

6. Check that the application identifies the added license plate number as an unauthorized vehicle and that the action rule runs as expected.

Vehicle access control scenario

In the scenario for vehicle access control, the application can be connected to an Axis network door controller to configure access rules, create schedules for access times, and handle vehicle access not only for employees, but also, for example, visitors and suppliers.

For backup, use an access system involving a door controller and card reader. To set up the door controller and the card reader, see the user documentation at *axis.com*
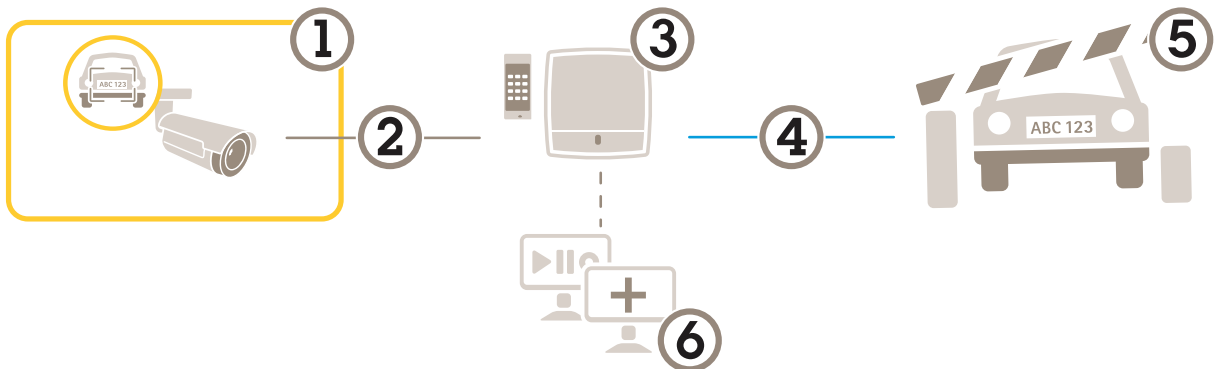
1   *Axis camera with AXIS License Plate Verifier*
2   *IP communication*
3   *Axis network door controller with card reader*
4   *I/O communication*
5   *Barrier*
6   *Optional third-party software*

Connect to a door controller

In this example we connect the camera to a network door controller which means the camera works as a sensor. The camera forwards the information to the controller which in turn analyzes the information and triggers the events.

Note

> When switching between the AXIS License Plate Verifier and AXIS Entry Manager, make sure to refresh the webpages to get access to all parameters.

Requirements:

- Camera and door controller physically installed and connected to the network.

- AXIS License Plate Verifier up and running on the camera.

- Basic setup done. See .

Vehicle access control scenario

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

www.axis.com/products/online-manual/45019

*This video shows how to get the application up and running
with AXIS A1001 Door Controller.*

Hardware configuration in AXIS Entry Manager

1. Go to AXIS Entry Manager and start a new hardware configuration under **Setup**.

2. In the hardware configuration, rename the network door controller to "Gate controller".

3. Click **Next**.

4. In **Configure locks connected to this controller**, clear the **Door monitor** option.

5. Click **Next**.

6. In **Configure readers connected to this controller**, clear the **Exit reader** option.

7. Click **Finish**.

Configuration in AXIS License Plate Verifier

1. Go the AXIS License Plate Verifier webpage.

2. Select the **Controller** tab and enter the following information:

    - the IP address for the controller in format `192.168.0.0`

    - the username for the controller

    - the password for the controller

3. Click **Connect**.

4. If the connection is successful, "Gatecontroller" shows up in the **Network Door Controller name** drop-down list. Select "Gatecontroller".

5. In the **Reader name** drop-down list, select the reader connected to the door "Gatecontroller", for example "Reader entrance". These names can be changed in AXIS Entry Manager.

6. To activate the connection, select **Enable integration**.

7. Click **Save**.

8. Select the **Settings** tab.

9. In the **Relay type** drop-down list, select **Controller**.

10. Enter one of the user's license plate number in the test field and click **Test**. Check that the test was successful.

Configure users, groups, doors, and schedules in AXIS Entry Manager

1. Go to AXIS Entry Manager.

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Vehicle access control scenario

2. Go to **Access Management**.

3. Add users and, for each user, add the credential **License plate**.

4. Click **Add credential** again and enter the license plate information.

5. Click **Add new group** and enter the information.

6. To add user to a group, drag and drop **Users** to a user group.

7. To give users access, drag and drop the **Door** to the user group.

8. To limit the access time, drag and drop a **Schedule** to the user group.

9. Go to **Doors > Add identification type**.

10. In the **Credentials needed** drop-down list, select **License plate only**.

11. To set limits for when the identification type can be used, drag and drop a **Schedule** to the door.
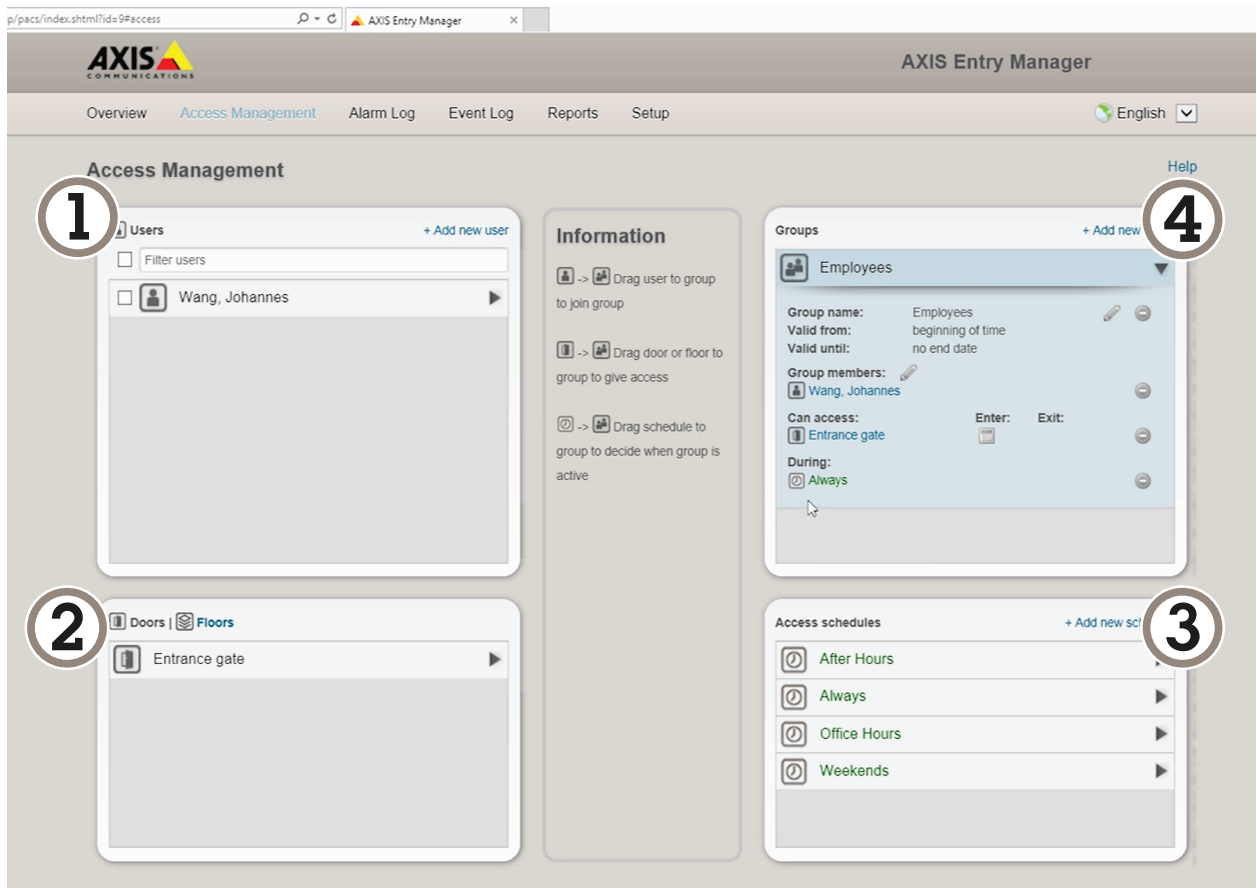
Overview of AXIS Entry Manager user interface.

1   Users
2   Doors
3   Schedules
4   User groups

Push event information to third-party software

Note

The application sends the event information in JSON format. For more information about the included data and API documentation, please contact the *Axis Development Partner helpdesk*.

With this feature you can integrate third-party software by pushing the event data through TCP or HTTP POST.

Before you start:

- The camera must be physically installed and connected to the network.

- AXIS License Plate Verifier must up and running on the camera.

1. Go to the application's webpage and select **Push events**.

2. In the **Protocol** drop-down list, select one of the following protocols:

    -   TCP

    -   HTTP POST

3. In the **Server URL** field, enter the server address and port in the following format: `127.0.0.1:8080`

4. In the **Device ID** field, enter the name of the device or leave as is.

5. Under **Event types**, select one or more of the following options:

    -   **New** means the first detection of a license plate.

    -   **Update** means that if the algorithm adjusts the license plate information after the first detection, for example if there's a correction from the number 1 to the letter I, the adjusted event will be sent to the third-party software again.

    -   **Lost** means a license plate that's been detected but then lost due to, for example, insufficient pixel size.

6. To turn on the feature, select **Send event data to server**.

7. To reduce bandwidth when using HTTP POST, you can select **Do not to send images through HTTP POST**.

8. Click **Save**.

Troubleshooting

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

Unknown vehicles are marked as accepted

If the application lets in vehicles with license plates that are not in the whitelist, one probable reason is that the comparison allows a deviation of one character.
For example, if **AXI S1234** is in the whitelist the application accepts **AXI SI234**.
Similarly, if **AXIS 1234** is in the whitelist the application accepts **AXI 1234**.

The connection between the application and controller or relay module doesn't work

Make sure the controller, or relay module, allows data traffic through HTTP. To find out how to change this setting, go to the user manual for the corresponding device.

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 23*.
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*.

Troubleshooting

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*.

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 24*. - 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 device.

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.

Note

> The camera has been preconfigured with AXIS License Plate Verifier. If you reset to factory default, you need to reinstall the license key. See *Install the application on page 7* .

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 .

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**.

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*.

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.
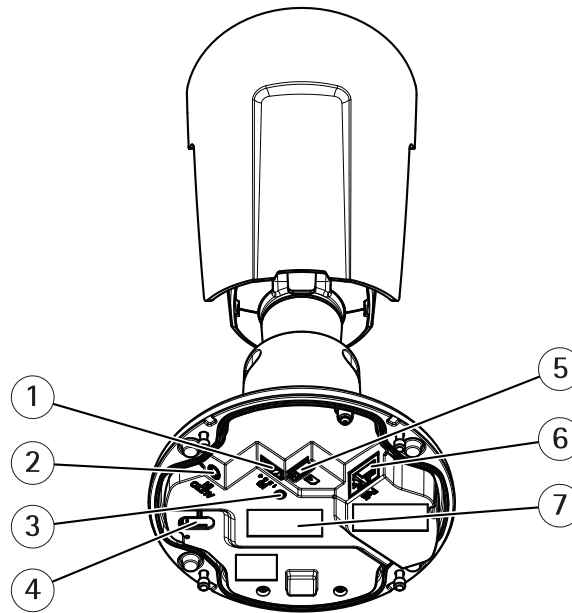
Hardware overview

Hardware 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)

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:

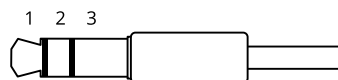- Resetting the product to factory default settings. See *Reset to factory default settings on page 23*.

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).

Specifications

	1 Tip	2 Ring	3 Sleeve
Audio Input	Microphone/Line in	Microphone bias voltage	Ground

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

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.

4-pin terminal block
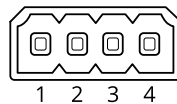
Example
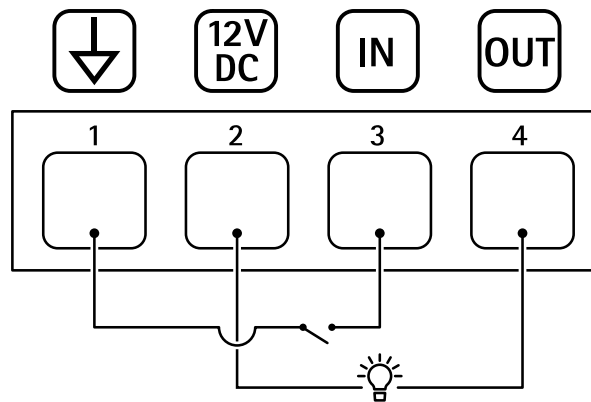
1   *DC ground*
2   *DC output 12 V, max 25 mA*
3   *Digital input*
4   *Digital output*