

User manual

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Get started

Get started

Find the device on the network

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

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

Browser support

You can use the device with the following browsers:

	Chrome TM	Firefox®	Edge TM	Safari [®]
Windows [®]	recommended	recommended	✓	
macOS®	recommended	recommended	✓	✓
Linux®	recommended	recommended	✓	
Other operating systems	✓	✓	√	√ *

^{*}To use AXIS OS web interface with iOS 15 or iPadOS 15, go to **Settings > Safari > Advanced > Experimental Features** and disable NSURLSession Websocket.

Open the device's web interface

- 1. Open a browser and type the IP address or host name of the Axis device.
 - If you do not know the IP address, use AXIS IP Utility or AXIS Device Manager to find the device on the network.
- 2. Type the username and password. If you access the device for the first time, you must create an administrator account. See *Create an administrator account on page 3*.

Create an administrator account

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

- 1. Enter a username.
- 2. Enter a password. See Secure passwords on page 3.
- 3. Re-enter the password.
- 4. Click Add user.

Important

The device has no default account. If you lose the password for your administrator account, you must reset the device. See Reset to factory default settings on page 29.

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.

Get started

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.

Verify that no one has tampered with the firmware

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

- Reset to factory default settings. See Reset to factory default settings on page 29.
 After the reset, secure boot guarantees the state of the device.
- 2. Configure and install the device.

Web interface overview

This video gives you an overview of the device's web interface.



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

help.axis.com/?&piald=70289§ion=web-interface-overview

Axis device web interface

Configure your device

Configure your device

Add a camera

1. Go to Video sources > Camera sources.

- 2. Click Add camera source:
 - To add a predefined camera from a list, select Network discovery.
 - To add a camera manually, select Manual.
 - For Axis cameras: enter name, IP address, streaming protocol, port, camera username and password.
 - For third-party cameras: enter name, IP address, camera username and password.
- 3. Click Add.

Edit a camera source

After you've added a camera, you can edit the settings from the Edit view.

- 1. Go to Video sources > Camera sources.
- 2. Select the camera source and click
- 3. Click Edit and do your changes.
- 4. Click Save.

Remove a camera

- 1. Go to Video sources > Camera sources.
- 2. Select the camera source and click
- 3. Click Delete and confirm.

Add a media file

- 1. Go to Video sources > Media sources.
- 2. Click Add media source.
- 3. Upload the media file to the device and select the location to put it.
- 4. Click Add.

Set up a sequence

1. Go to Sequences > Sequences.

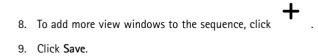
Configure your device



3. Enter a name of the new sequence.



- 5. In the view window, Click to select camera source or media for this segment.
- 6. Select Camera or Media and select a source from the list.
- 7. Click Add and continue adding sources until the view window is full.



10. Click to play the sequence.

Set up rules for events

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

To learn more, check out our guide Get started with rules for events.

Trigger an action

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

Note

If you make changes to an active rule, the rule must be turned on again for the changes to take effect.

Audio

Audio files

The device doesn't support audio-only files.

The web interface

The web interface

To reach the device's web interface, type the device's IP address in a web browser.

Note

Support for the features and settings described in this section varies between devices. This icon the feature or setting is only available in some devices.





Show or hide the main menu.



Access the release notes.



Access the product help.



Change the language.



Set light theme or dark theme.





The user menu contains:

- Information about the user who is logged in.
- Change user: Log out the current user and log in a new user.
- Log out: Log out the current user.
- The context menu contains:
 - Analytics data: Accept to share non-personal browser data.
 - Feedback: Share any feedback to help us improve your user experience.
 - Legal: View information about cookies and licenses.
 - About: View device information, including firmware version and serial number.
 - Legacy device interface: Change the device's web interface to the legacy version.

Status

Device info

Shows the device information, including firmware version and serial number.

Upgrade firmware: Upgrade the firmware on your device. Takes you to the Maintenance page where you can do a firmware upgrade.

Time sync status

Shows NTP synchronization information, including if the device is in sync with an NTP server and the time remaining until the next sync.

NTP settings: View and update the NTP settings. Takes you to the Date and time page where you can change the NTP settings.

Security

The web interface

Shows what kind of access to the device that is active, and what encryption protocols are in use. Recommendations to the settings are based on the AXIS OS Hardening Guide.

Hardening guide: Link to AXIS OS Hardening guide where you can learn more about cybersecurity on Axis devices and best practices.

Connected clients

Shows the number of connections and connected clients.

View details: View and update the list of the connected clients. The list shows IP address, protocol, port, and PID/Process of each client.

Sequences

Monitor

Shows information about the sequence.

Sequences

Important

To avoid problems with multi-stream playbacks, follow the recommendations in the web interface.



Add sequence: Click to add a sequence.

Name: Enter a name for the sequence.



: Click to select how many sources you want to display.



: Click to add one more



: Click to play the sequence.

The

The context menu contains:

Edit sequence

Delete sequence

Audio

Device settings

Audio out: Turn on or off audio from the audio out connector.

The web interface

Video sources

Camera sources



Add a video source: Click to add a new video source.

- Network discovery: Search for an IP address manually or select an Axis device from the list.
 - Streaming protocol: Select which protocol to use
 - Port: Enter the port number.
 - 554 is the default value for RTSPT
 - 80 is the default value for RTSP over HTTP
 - 443 is the default value for RTSP over HTTPS
 - Username: Enter the username for the device.
 - Password: Enter the password for the device.
- Manual: Add a device manually.
 - Name: Enter the video source's name.
 - **IP** address: Enter the device's IP address.
 - **Username**: Enter the username for the device.
 - Password: Enter the password for the device.



The context menu contains:

Edit video source: Edit the properties of the video source.

Delete video source: Delete the video source.

Media sources



Add a media source: Click to add a new media source.

- Upload or drag and drop a media file. You can use .mp4, .mkv, .jpeg or .png files.
- Upload location: Select the location from the drop-down list.

Apps



Add app: Install a new app.

Find more apps: Find more apps to install. You will be taken to an overview page of Axis apps.

Allow unsigned apps: Turn on to allow installation of unsigned apps.

Allow root-privileged apps: Turn on to allow apps with root privileges full access to the device.

Note

The device's performance might be affected if you run several apps at the same time.

Use the switch next to the app name to start or stop the app.

Open: Access the app's settings. The available settings depend on the application. Some applications don't have any settings.

- The context menu can contain one or more of the following options:
 - Open-source license: View information about open-source licenses used in the app.

The web interface

- App log: View a log of the app events. The log is helpful when you contact support.
- Activate license with a key: If the app requires a license, you need to activate it. Use this option if your device
 doesn't have internet access.
 - If you don't have a license key, go to axis.com/products/analytics. You need a license code and the Axis product serial number to generate a license key.
- Activate license automatically: If the app requires a license, you need to activate it. Use this option if your device has internet access. You need a license code to activate the license.
- Deactivate the license: Deactivate the license to replace it with another license, for example, when you change from a trial license to a full license. If you deactivate the license, you also remove it from the device.
- Settings: Configure the parameters.
- Delete: Delete the app permanently from the device. If you don't deactivate the license first, it remains active.

System

Time and location

Date and time

The time format depends on the web browser's language settings.

Note

We recommend you synchronize the device's date and time with an NTP server.

Synchronization: Select an option for the device's date and time synchronization.

- Automatic date and time (manual NTS KE servers): Synchronize with the secure NTP key establishment servers connected to the DHCP server.
 - **Manual NTS KE servers**: Enter the IP address of one or two NTP servers. When you use two NTP servers, the device synchronizes and adapts its time based on input from both.
- Automatic date and time (NTP servers using DHCP): Synchronize with the NTP servers connected to the DHCP server.
 - Fallback NTP servers: Enter the IP address of one or two fallback servers.
- Automatic date and time (manual NTP servers): Synchronize with NTP servers of your choice.
 - Manual NTP servers: Enter the IP address of one or two NTP servers. When you use two NTP servers, the device synchronizes and adapts its time based on input from both.
- Custom date and time: Manually set the date and time. Click Get from system to fetch the date and time settings once from your computer or mobile device.

Time zone: Select which time zone to use. Time will automatically adjust to daylight saving time and standard time.

Note

The system uses the date and time settings in all recordings, logs, and system settings.

Network

IPv4

Assign IPv4 automatically: Select to let the network router assign an IP address to the device automatically. We recommend automatic IP (DHCP) for most networks.

IP address: Enter a unique IP address for the device. Static IP addresses can be assigned at random within isolated networks, provided that each address is unique. To avoid conflicts, we recommend you contact your network administrator before you assign a static IP address.

Subnet mask: Enter the subnet mask to define what addresses are inside the local area network. Any address outside the local area network goes through the router.

Router: Enter the IP address of the default router (gateway) used to connect devices that are attached to different networks and network segments.

The web interface

Fallback to static IP address if DHCP isn't available: Select if you want to add a static IP address to use as fallback if DHCP is unavailable and can't assign an IP address automatically.

IPv6

Assign IPv6 automatically: Select to turn on IPv6 and to let the network router assign an IP address to the device automatically.

Hostname

Assign hostname automatically: Select to let the network router assign a hostname to the device automatically.

Hostname: Enter the hostname manually to use as an alternative way of accessing the device. The server report and system log use the hostname. Allowed characters are A–Z, a–z, 0–9 and –.

DNS servers

Assign DNS automatically: Select to let the DHCP server assign search domains and DNS server addresses to the device automatically. We recommend automatic DNS (DHCP) for most networks.

Search domains: When you use a hostname that is not fully qualified, click Add search domain and enter a domain in which to search for the hostname the device uses.

DNS servers: Click Add DNS server and enter the IP address of the DNS server. This provides the translation of hostnames to IP addresses on your network.

HTTP and HTTPS

HTTPS is a protocol that provides encryption for page requests from users and for the pages returned by the web server. The encrypted exchange of information is governed by the use of an HTTPS certificate, which guarantees the authenticity of the server.

To use HTTPS on the device, you must install an HTTPS certificate. Go to System > Security to create and install certificates.

Allow access through: Select if a user is allowed to connect to the device through the HTTP, HTTPS, or both HTTP and HTTPS protocols.

Note

If you view encrypted web pages through HTTPS, you might experience a drop in performance, especially when you request a page for the first time.

HTTP port: Enter the HTTP port to use. The device allows port 80 or any port in the range 1024–65535. If you are logged in as an administrator, you can also enter any port in the range 1–1023. If you use a port in this range, you get a warning.

HTTPS port: Enter the HTTPS port to use. The device allows port 443 or any port in the range 1024–65535. If you are logged in as an administrator, you can also enter any port in the range 1–1023. If you use a port in this range, you get a warning.

Certificate: Select a certificate to enable HTTPS for the device.

Network discovery protocols

Bonjour®: Turn on to allow automatic discovery on the network.

Bonjour name: Enter a friendly name to be visible on the network. The default name is the device name and MAC address.

UPnP®: Turn on to allow automatic discovery on the network.

UPnP name: Enter a friendly name to be visible on the network. The default name is the device name and MAC address.

WS-Discovery: Turn on to allow automatic discovery on the network.

The web interface

One-click cloud connection

One-click cloud connection (O3C) together with an O3C service provides easy and secure internet access to live and recorded video from any location. For more information, see axis.com/end-to-end-solutions/hosted-services.

Allow O3C:

- One-click: This is the default setting. Press and hold the control button on the device to connect to an O3C service over the internet. You need to register the device with the O3C service within 24 hours after you press the control button. Otherwise, the device disconnects from the O3C service. Once you register the device, Always is enabled and the device stays connected to the O3C service.
- Always: The device constantly attempts to connect to an O3C service over the internet. Once you register the device, it stays connected to the O3C service. Use this option if the control button on the device is out of reach.
- No: Disables the O3C service.

Proxy settings: If needed, enter the proxy settings to connect to the proxy server.

Host: Enter the proxy server's address.

Port: Enter the port number used for access.

Login and Password: If needed, enter username and password for the proxy server.

Authentication method:

- Basic: This method is the most compatible authentication scheme for HTTP. It's less secure than the Digest method because it sends the username and password unencrypted to the server.
- Digest: This method is more secure because it always transfers the password encrypted across the network.
- Auto: This option lets the device select the authentication method depending on the supported methods. It prioritizes the Digest method over the Basic method.

Owner authentication key (OAK): Click Get key to fetch the owner authentication key. This is only possible if the device is connected to the internet without a firewall or proxy.

SNMP

The Simple Network Management Protocol (SNMP) allows remote management of network devices.

SNMP: Select the version of SNMP to use.

- v1 and v2c:
 - Read community: Enter the community name that has read-only access to all supported SNMP objects. The
 default value is public.
 - Write community: Enter the community name that has read or write access to all supported SNMP objects (except read-only objects). The default value is write.
 - Activate traps: Turn on to activate trap reporting. The device uses traps to send messages for important events or status changes to a management system. In the web interface, you can set up traps for SNMP v1 and v2c. Traps are automatically turned off if you change to SNMP v3 or turn off SNMP. If you use SNMP v3, you can set up traps through the SNMP v3 management application.
 - Trap address: Enter the IP address or host name of the management server.
 - **Trap community:** Enter the community to use when the device sends a trap message to the management system.
 - Traps:
 - Cold start: Sends a trap message when the device starts.
 - Warm start: Sends a trap message when you change an SNMP setting.
 - Link up: Sends a trap message when a link changes from down to up.
 - Authentication failed: Sends a trap message when an authentication attempt fails.

Note

All Axis Video MIB traps are enabled when you turn on SNMP v1 and v2c traps. For more information, see AXIS OS Portal > SNMP.

• v3: SNMP v3 is a more secure version, which provides encryption and secure passwords. To use SNMP v3, we recommend you to activate HTTPS, as the password is then sent through HTTPS. This also prevents unauthorized

The web interface

parties' access to unencrypted SNMP v1 and v2c traps. If you use SNMP v3, you can set up traps through the SNMP v3 management application.

- Password for the account "initial": Enter the SNMP password for the account named "initial". Although the password can be sent without activating HTTPS, we don't recommend it. The SNMP v3 password can only be set once, and preferably only when HTTPS is enabled. Once the password is set, the password field is no longer displayed. To set the password again, you must reset the device to factory default settings.

Security

Certificates

Certificates are used to authenticate devices on a network. The device supports two types of certificates:

• Client/server certificates

A client/server certificate validates the device's identity, and can be self-signed or issued by a Certificate Authority (CA). A self-signed certificate offers limited protection and can be used before a CA-issued certificate has been obtained.

CA certificates

You can use a CA certificate to authenticate a peer certificate, for example to validate the identity of an authentication server when the device connects to a network protected by IEEE 802.1X. The device has several pre-installed CA certificates.

These formats are supported:

Certificate formats: .PEM, .CER, and .PFX
Private key formats: PKCS#1 and PKCS#12

Important

If you reset the device to factory default, all certificates are deleted. Any pre-installed CA certificates are reinstalled.



Filter the certificates in the list.



Add certificate: Click to add a certificate.

- TI
 - The context menu contains:
 - Certificate information: View an installed certificate's properties.
 - Delete certificate: Delete the certificate.
 - Create certificate signing request: Create a certificate signing request to send to a registration authority to apply for a digital identity certificate.

Secure keystore ①:

- Secure element (CC EAL6+): Select to use secure element for secure keystore.
- Trusted Platform Module 2.0 (CC EAL4+, FIPS 140-2 Level 2): Select to use TPM 2.0 for secure keystore.

IEEE 802.1x

The web interface

IEEE 802.1x is an IEEE standard for port-based network admission control providing secure authentication of wired and wireless network devices. IEEE 802.1x is based on EAP (Extensible Authentication Protocol).

To access a network protected by IEEE 802.1x, network devices must authenticate themselves. The authentication is performed by an authentication server, typically a RADIUS server (for example, FreeRADIUS and Microsoft Internet Authentication Server).

Certificates

When configured without a CA certificate, server certificate validation is disabled and the device tries to authenticate itself regardless of what network it is connected to.

When using a certificate, in Axis' implementation, the device and the authentication server authenticate themselves with digital certificates using EAP-TLS (Extensible Authentication Protocol – Transport Layer Security).

To allow the device to access a network protected through certificates, you must install a signed client certificate on the device.

Client certificate: Select a client certificate to use IEEE 802.1x. The authentication server uses the certificate to validate the client's identity.

CA certificate: Select CA certificates to validate the authentication server's identity. When no certificate is selected, the device tries to authenticate itself regardless of what network it is connected to.

EAP identity: Enter the user identity associated with the client certificate.

EAPOL version: Select the EAPOL version that is used in the network switch.

Use IEEE 802.1x: Select to use the IEEE 802.1x protocol.

Prevent brute-force attacks

Blocking: Turn on to block brute-force attacks. A brute-force attack uses trial-and-error to guess login info or encryption keys.

Blocking period: Enter the number of seconds to block a brute-force attack.

Blocking conditions: Enter the number of authentication failures allowed per second before the block starts. You can set the number of failures allowed both on page level and device level.

IP address filter

Use filter: Select to filter which IP addresses are allowed to access the device.

Policy: Choose whether to Allow or Deny access for certain IP addresses.

Addresses: Enter the IP numbers that are either allowed or denied access to the device. You can also use the CIDR format.

Custom-signed firmware certificate

To install test firmware or other custom firmware from Axis on the device, you need a custom-signed firmware certificate. The certificate verifies that the firmware is approved by both the device owner and Axis. The firmware can only run on a specific device which is identified by its unique serial number and chip ID. Only Axis can create custom-signed firmware certificates, since Axis holds the key to sign them.

Install: Click to install the certificate. You need to install the certificate before you install the firmware.

Accounts

Accounts

The web interface

+

Add account: Click to add a new account. You can add up to 100 accounts.

Account: Enter a unique account name.

New password: Enter a password for the account. Passwords must be 1 to 64 characters long. Only ASCII printable characters (code 32 to 126) are allowed in the password, for example, letters, numbers, punctuation, and some symbols.

Repeat password: Enter the same password again.

Privileges:

- Administrator: Has full access to all settings. Administrators can also add, update, and remove other accounts.
- Operator: Has access to all settings except:
 - All **System** settings.
 - Adding apps.
- Viewer: Has access to:
 - Watch and take snapshots of a video stream.
 - Watch and export recordings.
 - Pan, tilt, and zoom; with PTZ user access.

The context menu contains:

Update account: Edit the account properties.

Delete account: Delete the account. You can't delete the root account.

Anonymous access

Allow anonymous viewing: Turn on to allow anyone access the device as a viewer without logging in with an account.

Allow anonymous PTZ operating: Turn on to allow anonymous users to pan, tilt, and zoom the image.

Events

Rules

A rule defines the conditions that triggers the product to perform an action. The list shows all the currently configured rules in the product.

Note

You can create up to 256 action rules.



Add a rule: Create a rule.

Name: Enter a name for the rule.

Wait between actions: Enter the minimum time (hh:mm:ss) that must pass between rule activations. It is useful if the rule is activated by, for example, day-night mode conditions, to avoid that small light changes during sunrise and sunset activate the rule repeatedly.

Condition: Select a condition from the list. A condition must be met for the device to perform an action. If multiple conditions are defined, all of them must be met to trigger the action. For information about specific conditions, see *Get started with rules for events*.

Use this condition as a trigger: Select to make this first condition function only as a starting trigger. It means that once the rule is activated, it remains active for as long as all the other conditions are met, no matter the state of the first condition. If you don't select this option, the rule will simply be active whenever all the conditions are met.

Invert this condition: Select if you want the condition to be the opposite of your selection.

The web interface



Add a condition: Click to add an additional condition.

Action: Select an action from the list and enter its required information. For information about specific actions, see *Get started with rules for events*.

Recipients

You can set up your device to notify recipients about events or send files. The list shows all the recipients currently configured in the product, along with information about their configuration.

Note

You can create up to 20 recipients.



Add a recipient: Click to add a recipient.

Name: Enter a name for the recipient.

Type: Select from the list:

FTP

- Host: Enter the server's IP address or hostname. If you enter a hostname, make sure that a DNS server is specified under System > Network > IPv4 and IPv6.
- Port: Enter the port number used by the FTP server. The default is 21.
- Folder: Enter the path to the directory where you want to store files. If this directory doesn't already exist on the FTP server, you will get an error message when uploading files.
- Username: Enter the username for the login.
- Password: Enter the password for the login.
- Use temporary file name: Select to upload files with temporary, automatically generated filenames. The
 files get renamed to the desired names when the upload completes. If the upload is aborted/interrupted,
 you don't get any corrupt files. However, you probably still get the temporary files. This way you know
 that all files that have the desired name are correct.
- **Use passive FTP**: Under normal circumstances, the product simply requests the target FTP server to open the data connection. The device actively initiates both the FTP control and data connections to the target server. This is normally needed if there is a firewall between the device and the target FTP server.

HTTP

- **URL**: Enter the network address to the HTTP server and the script that will handle the request. For example, http://192.168.254.10/cgi-bin/notify.cgi.
- Username: Enter the username for the login.
- Password: Enter the password for the login.
- Proxy: Turn on and enter the required information if a proxy server must be passed to connect to the HTTP server.

HTTPS

- **URL**: Enter the network address to the HTTPS server and the script that will handle the request. For example, https://192.168.254.10/cgi-bin/notify.cgi.
- Validate server certificate: Select to validate the certificate that was created by HTTPS server.
- Username: Enter the username for the login.
- **Password**: Enter the password for the login.
- Proxy: Turn on and enter the required information if a proxy server must be passed to connect to the HTTPS server.

Network storage

You can add network storage such as NAS (network-attached storage) and use it as a recipient to store files. The files are stored in the Matroska (MKV) file format.

- Host: Enter the IP address or hostname for the network storage.
- Share: Enter the name of the share on the host.
- Folder: Enter the path to the directory where you want to store files.
- **Username**: Enter the username for the login.
- Password: Enter the password for the login.

SFTP

The web interface

- Host: Enter the server's IP address or hostname. If you enter a hostname, make sure that a DNS server is specified under System > Network > IPv4 and IPv6.
- Port: Enter the port number used by the SFTP server. The default is 22.
- Folder: Enter the path to the directory where you want to store files. If this directory doesn't already exist on the SFTP server, you will get an error message when uploading files.
- Username: Enter the username for the login.
- Password: Enter the password for the login.
- SSH host public key type (MD5): Enter the fingerprint of the remote host's public key (a 32-digit hexadecimal string). The SFTP client supports SFTP servers using SSH-2 with RSA, DSA, ECDSA, and ED25519 host key types. RSA is the preferred method during negotiation, followed by ECDSA, ED25519, and DSA. Make sure to enter the right MD5 host key that is used by your SFTP server. While the Axis device supports both MD5 and SHA-256 hash keys, we recommend using SHA-256 due to stronger security over MD5. For more information on how to configure an SFTP server with an Axis device, go to the AXIS OS Portal.
- SSH host public key type (SHA256): Enter the fingerprint of the remote host's public key (a 43-digit Base64 encoded string). The SFTP client supports SFTP servers using SSH-2 with RSA, DSA, ECDSA, and ED25519 host key types. RSA is the preferred method during negotiation, followed by ECDSA, ED25519, and DSA. Make sure to enter the right MD5 host key that is used by your SFTP server. While the Axis device supports both MD5 and SHA-256 hash keys, we recommend using SHA-256 due to stronger security over MD5. For more information on how to configure an SFTP server with an Axis device, go to the AXIS OS Portal.
- Use temporary file name: Select to upload files with temporary, automatically generated filenames. The files get renamed to the desired names when the upload completes. If the upload is aborted or interrupted, you don't get any corrupt files. However, you probably still get the temporary files. This way, you know that all files that have the desired name are correct.
- SIP or VMS



SIP: Select to make a SIP call.

VMS: Select to make a VMS call.

- From SIP account: Select from the list.
- To SIP address: Enter the SIP address.
- Test: Click to test that your call settings works.

Email

- **Send email to**: Enter the email address to send emails to. To enter multiple addresses, use commas to separate them.
- Send email from: Enter the email address of the sending server.
- **Username**: Enter the username for the mail server. Leave this field empty if the mail server does not require authentication.
- Password: Enter the password for the mail server. Leave this field empty if the mail server does not require authentication.
- **Email server (SMTP)**: Enter the name of the SMTP server, for example, smtp.gmail.com, smtp.mail.yahoo.com.
- Port: Enter the port number for the SMTP server, using values in the range 0-65535. The default value is 587.
- Encryption: To use encryption, select either SSL or TLS.
- Validate server certificate: If you use encryption, select to validate the identity of the device. The certificate can be self-signed or issued by a Certificate Authority (CA).
- POP authentication: Turn on to enter the name of the POP server, for example, pop.gmail.com.

Note

Some email providers have security filters that prevent users from receiving or viewing large amount of attachments, from receiving scheduled emails and similar. Check the email provider's security policy to avoid your email account being locked or missing out on your expected emails.

TCP

- Host: Enter the server's IP address or hostname. If you enter a hostname, make sure that a DNS server is specified under System > Network > IPv4 and IPv6.
 - Port: Enter the port number used to access the server.

Test: Click to test the setup.

• • •

The context menu contains:

View recipient: Click to view all the recipient details.

Copy recipient: Click to copy a recipient. When you copy, you can make changes to the new recipient.

The web interface

Delete recipient: Click to delete the recipient permanently.

Schedules

Schedules and pulses can be used as conditions in rules. The list shows all the schedules and pulses currently configured in the product, along with information about their configuration.



Add schedule: Click to create a schedule or pulse.

Manual triggers

You can use the manual trigger to manually trigger a rule. The manual trigger can, for example, be used to validate actions during product installation and configuration.

MQTT

MQTT (Message Queuing Telemetry Transport) is a standard messaging protocol for the Internet of Things (IoT). It was designed for simplified IoT integration and is used in a wide variety of industries to connect remote devices with a small code footprint and minimal network bandwidth. The MQTT client in Axis device firmware can simplify integration of data and events produced in the device to systems which are not video management software (VMS).

Set up the device as an MQTT client. MQTT communication is based on two entities, the clients and the broker. The clients can send and receive messages. The broker is responsible for routing messages between clients.

You can learn more about MQTT in AXIS OS Portal.

ALPN

ALPN is a TLS/SSL extension that allows for the selection of an application protocol during the handshake phase of the connection between the client and server. This is used to enable MQTT traffic over the same port that is used for other protocols, such as HTTP. In some cases, there might not be a dedicated port open for MQTT communication. A solution in such cases is to use ALPN to negotiate the use of MQTT as the application protocol on a standard port, allowed by the firewalls.

MQTT client

Connect: Turn on or off the MQTT client.

Status: Shows the current status of the MQTT client.

Broker

Host: Enter the hostname or IP address of the MQTT server.

Protocol: Select which protocol to use.

Port: Enter the port number.

- 1883 is the default value for MQTT over TCP
- 8883 is the default value for MQTT over SSL
- 80 is the default value for MQTT over WebSocket
- 443 is the default value for MQTT over WebSocket Secure

ALPN protocol: Enter the ALPN protocol name provided by your MQTT broker provider. This is only applicable with MQTT over SSL and MQTT over WebSocket Secure.

Username: Enter the username that the client will use to access the server.

Password: Enter a password for the username.

The web interface

Client ID: Enter a client ID. The client identifier is sent to the server when the client connects to it.

Clean session: Controls the behavior at connection and disconnection time. When selected, the state information is discarded at connect and disconnect.

Keep alive interval: Enables the client to detect when the server is no longer available without having to wait for the long TCP/IP timeout.

Timeout: The time interval in seconds to allow a connect to complete. Default value: 60

Device topic prefix: Used in the default values for the topic in the connect message and LWT message on the MQTT client tab, and in the publication conditions on the MQTT publication tab.

Reconnect automatically: Specifies whether the client should reconnect automatically after a disconnect.

Connect message

Specifies if a message should be sent out when a connection is established.

Send message: Turn on to send messages.

Use default: Turn off to enter your own default message.

Topic: Enter the topic for the default message.

Payload: Enter the content for the default message.

Retain: Select to keep the state of client on this Topic

QoS: Change the QoS layer for the packet flow.

Last Will and Testament message

The Last Will Testament (LWT) lets a client provide a testament along with its credentials when connecting to the broker. If the client disconnects ungracefully at some point later (maybe because his power source died), it can let the broker deliver a message to other clients. This LWT message has the same form as an ordinary message and gets routed via the same mechanics.

Send message: Turn on to send messages.

Use default: Turn off to enter your own default message.

Topic: Enter the topic for the default message.

Payload: Enter the content for the default message.

Retain: Select to keep the state of client on this Topic

QoS: Change the QoS layer for the packet flow.

MQTT publication

The web interface

Use default topic prefix: Select to use the default topic prefix, that is defined in the device topic prefix in the MQTT client tab.

Include topic name: Select to include the topic that describes the condition in the MQTT topic.

Include topic namespaces: Select to include ONVIF topic namespaces in the MQTT topic.

Include serial number: Select to include the device's serial number in the MQTT payload.

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Add condition: Click to add a condition.

Retain: Defines which MQTT messages are sent as retained.

- None: Send all messages as non-retained.
- Property: Send only stateful messages as retained.
- All: Send both stateful and stateless messages as retained.

QoS: Select the desired level for the MQTT publication.

MQTT subscriptions

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Add subscription: Click to add a new MQTT subscription.

Subscription filter: Enter the MQTT topic that you want to subscribe to.

Use device topic prefix: Add the subscription filter as prefix to the MQTT topic.

Subscription type:

- Stateless: Select to convert MQTT messages into a stateless message.
- Stateful: Select to convert MQTT messages into a condition. The payload is used as the state.

QoS: Select the desired level for the MQTT subscription.

Storage

Onboard storage

Important

Risk of data loss and corrupted recordings. Do not remove the SD card while the device is running. Unmount the SD card before you remove it.

Unmount: Click to safely remove the SD card.

Write protect: Turn on to stop writing to the SD card and protect recordings from being removed. You can't format a write-protected SD card.

Autoformat: Turn on to automatically format a newly inserted SD card. It formats the file system into ext4.

Ignore: Turn on to stop storing recordings on the SD card. When you ignore the SD card, the device no longer recognizes that the card exists. The setting is only available for administrators.

Retention time: Select how long to keep recordings, to limit the amount of old recordings, or to comply with regulations regarding data storage. If the SD card becomes full, old recordings are removed before the selected time period has passed.

Tools

- Check: Check for errors on the SD card. This only works for the ext4 file system.
- Repair: Repair errors in the ext4 file system. To repair an SD card with the VFAT file system, eject the SD card, insert it in a computer, and perform a disk repair.

The web interface

- Format: Format the SD card, for example, when you need to change the file system or quickly erase all data. VFAT and ext4 are the two available file system options. The recommended format is ext4, due to its resilience against data loss if the card is ejected or if there is an abrupt power loss. However, you need a third-party ext4 driver or application to access the file system from Windows®.
- Encrypt: Use this tool to format the SD card and enable encryption. Encrypt deletes all data stored on the SD card. After using Encrypt, the data that's stored on the SD card is protected using encryption.
- Decrypt: Use this tool to format the SD card without encryption. Decrypt deletes all data stored on the SD card. After using Decrypt, the data that's stored on the SD card is not protected using encryption.
- Change password: Change the password required to encrypt the SD card.

Use tool: Click to activate the selected tool.

Wear trigger: Set a value for the SD card wear level at which you want to trigger an action. The wear level ranges from 0–200%. A new SD card that has never been used has a wear level of 0%. A wear level of 100% indicates that the SD card is close to its expected lifetime. When the wear-level reaches 200%, there is a high risk of the SD card malfunctioning. We recommend setting the wear trigger between 80–90%. This gives you time to download any recordings as well as replace the SD card in time before it potentially wears out. The wear trigger allows you to set up an event and get a notification when the wear level reaches your set value.

ONVIF

ONVIF accounts

ONVIF (Open Network Video Interface Forum) is a global interface standard that makes it easier for end-users, integrators, consultants, and manufacturers to take advantage of the possibilities offered by network video technology. ONVIF enables interoperability between different vendor products, increased flexibility, reduced cost and future-proof systems.

When you create an ONVIF account, you automatically enable ONVIF communication. Use the username and password for all ONVIF communication with the device. For more information see the Axis Developer Community at axis.com.

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Add accounts: Click to add a new ONVIF account.

Account: Enter a unique account name.

New password: Enter a password for the user. Passwords must be 1 to 64 characters long. Only ASCII printable characters (code 32 to 126) are allowed in the password, for example, letters, numbers, punctuation, and some symbols.

Repeat password: Enter the same password again.

Role:

- · Administrator: Has full access to all settings. Administrators can also add, update, and remove other users.
- Operator: Has access to all settings except:
 - All System settings.
 - Adding apps.
- Media account: Allows access to the video stream only.

The context menu contains:

Update account: Edit the account properties.

Delete account: Delete the account. You can't delete the root account.

Logs

Reports and logs

The web interface

Reports

- View the device server report: View information about the product status in a pop-up window. The Access Log is automatically included in the Server Report.
- Download the device server report: It creates a .zip file that contains a complete server report text file in UTF-8 format, as well as a snapshot of the current live view image. Always include the server report .zip file when you contact support.
- **Download the crash report**: Download an archive with detailed information about the server's status. The crash report contains information that is in the server report as well as detailed debug information. This report might contain sensitive information such as network traces. It can take several minutes to generate the report.

Logs

- View the system log: Click to show information about system events such as device startup, warnings, and critical
 messages.
- View the access log: Click to show all failed attempts to access the device, for example, when a wrong login password is used.

Network trace

Important

A network trace file might contain sensitive information, for example certificates or passwords.

A network trace file can help you troubleshoot problems by recording activity on the network.

Trace time: Select the duration of the trace in seconds or minutes, and click Download.

Remote system log

Syslog is a standard for message logging. It allows separation of the software that generates messages, the system that stores them, and the software that reports and analyzes them. Each message is labeled with a facility code, which indicates the software type generating the message, and assigned a severity level.



Server: Click to add a new server.

Host: Enter the hostname or IP address of the server.

Format: Select which syslog message format to use.

- Axis
- RFC 3164
- RFC 5424

Protocol: Select the protocol and port to use:

- UDP (Default port is 514)
- TCP (Default port is 601)
- TLS (Default port is 6514)

Severity: Select which messages to send when triggered.

CA certificate set: See the current settings or add a certificate.

Plain config

Plain config is for advanced users with experience of Axis device configuration. Most parameters can be set and edited from this page.

The web interface

Maintenance

Restart: Restart the device. This does not affect any of the current settings. Running applications restart automatically.

Restore: Return *most* settings to the factory default values. Afterwards you must reconfigure the device and apps, reinstall any apps that didn't come preinstalled, and recreate any events and PTZ presets.

Important

The only settings saved after restore are:

- Boot protocol (DHCP or static)
- · Static IP address
- Default router
- Subnet mask
- 802.1X settings
- 03C settings

Factory default: Return *all* settings to the factory default values. Afterwards you must reset the IP address to make the device accessible.

Note

All Axis device firmware is digitally signed to ensure that you only install verified firmware on your device. This further increases the overall minimum cybersecurity level of Axis devices. For more information, see the white paper "Signed firmware, secure boot, and security of private keys" at axis.com.

Firmware upgrade: Upgrade to a new firmware version. New firmware releases can contain improved functionality, bug fixes, and completely new features. We recommend you to always use the latest release. To download the latest release, go to axis.com/support.

When you upgrade, you can choose between three options:

- Standard upgrade: Upgrade to the new firmware version.
- Factory default: Upgrade and return all settings to the factory default values. When you choose this option, you can't revert to the previous firmware version after the upgrade.
- Autorollback: Upgrade and confirm the upgrade within the set time. If you don't confirm, the device reverts to the previous firmware version.

Firmware rollback: Revert to the previously installed firmware version.

Learn more

Learn more

Streaming and storage

Video compression formats

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

H.264 or MPEG-4 Part 10/AVC

Note

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

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

H.265 or MPEG-H Part 2/HEVC

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

Note

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

External storage device

To be recognized by the video decoder, the first partition of you external storage device must use an exFAT or ext4 file system.

Cybersecurity

Signed firmware

Signed firmware is implemented by the software vendor signing the firmware image with a private key. When a firmware has this signature attached to it, a device will validate the firmware before accepting to install it. If the device detects that the firmware integrity is compromised, the firmware upgrade will be rejected.

Secure boot

Secure boot is a boot process that consists of an unbroken chain of cryptographically validated software, starting in immutable memory (boot ROM). Being based on the use of signed firmware, secure boot ensures that a device can boot only with authorized firmware.

Axis Edge Vault

Axis Edge Vault provides a hardware-based cybersecurity platform that safeguards the Axis device. It offers features to guarantee the device's identity and integrity and to protect your sensitive information from unauthorized access. It builds on a strong foundation of cryptographic computing modules (secure element and TPM) and SoC security (TEE and secure boot), combined with expertise in edge device security.

Learn more

Axis device ID

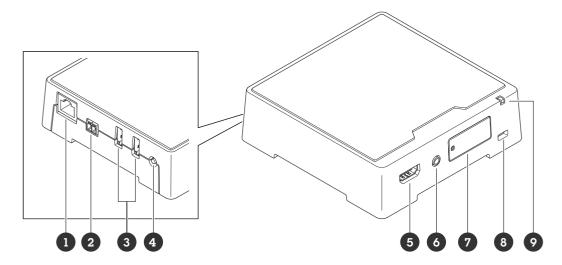
Being able to verify the origin of the device is key to establishing trust in the device identity. During production, devices with Axis Edge Vault are assigned a unique, factory-provisioned, and IEEE 802.1AR-compliant Axis device ID certificate. This works like a passport to prove the origin of the device. The device ID is securely and permanently stored in the secure keystore as a certificate signed by Axis root certificate. The device ID can be leveraged by the customer's IT infrastructure for automated secure device onboarding and secure device identification

To learn more about Axis Edge Vault and cybersecurity features in Axis devices, go to axis.com/learning/white-papers and search for cybersecurity.

Specifications

Specifications

Product overview



- 1 Network connector PoE
- 2 Power connector
- 3 2x USB ports
- 4 Control button
- 5 HDMI type A connector
- 6 Audio out
- 7 MicroSD card slot
- 8 Security slot
- 9 Status LED

LED indicators

Status LED	Indication
Amber	Steady during startup, during reset to factory default or when restoring settings.
Amber/Red	Flashes during startup, and if network connection is unavailable or lost.
Green	Shows steady green for 10 seconds for normal operation after startup completed.
	When the LED turns off after being green, the device is running.
Green/Red	Flashes for identification purposes.

SD card slot

NOTICE

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

This device supports microSD/microSDHC/microSDXC cards.

Specifications

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 29.
- Connecting to a one-click cloud connection (O3C) service over the internet. To connect, press and hold the button for about 3 seconds until the status LED flashes green.

Connectors

HDMI connector

Use the HDMITM connector to connect a display or public view monitor.

Network connector

RJ45 Ethernet connector with Power over Ethernet (PoE).

USB connector

Use the USB connector to connect external accessories. See the product's datasheet for supported accessories.

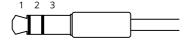
Important

Only one USB storage is supported at a time.

Turn off the device before removing the USB storage.

Audio connector

 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.



Audio output

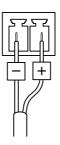
1 Tip	2 Ring	3 Sleeve
Channel 1, unbalanced line, mono	Channel 1, unbalanced line, mono	Ground

Power connector

AC/DC connector. Use the supplied adapter.

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 \leq 100 W or a rated output current limited to \leq 5 A.

Specifications



Note

When DC is available, it takes priority over PoE.

Troubleshooting

Troubleshooting

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 26.
- 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 device.

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

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

Firmware options

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

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

Check the current firmware version

Firmware is the software that determines the functionality of network devices. When you troubleshoot a problem, we recommend you to start by checking the current firmware version. The latest firmware version might contain a correction that fixes your particular problem.

To check the current firmware:

- 1. Go to the device's web interface > Status.
- 2. See the firmware version under Device info.

Upgrade the firmware

Important

- Preconfigured and customized settings are saved when you upgrade the firmware (provided that the features are available in the new firmware) although this is not guaranteed by Axis Communications AB.
- Make sure the device remains connected to the power source throughout the upgrade process.

Troubleshooting

Note

When you upgrade the device 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 you upgrade 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 device as an administrator.
- 3. Go to Maintenance > Firmware upgrade and click Upgrade.

When the upgrade has finished, the product restarts automatically.

You can use AXIS Device Manager to upgrade multiple devices at the same time. 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 after firmware upgrade	If you experience problems after a firmware upgrade, roll back to the previously installed version from the Maintenance page.

subnets, you cannot set the IP address. Contact your network ldress.
the network. Run the ping command (in a Command/DOS window, f the device):

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 can't be accessed from a browser

Can't 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 root account is lost, the device must be reset to the factory default settings. See *Reset to factory default settings on page 29*.

Troubleshooting

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 System > Date and time.

The device is accessible locally but not externally

To access the device externally, we recommend you to use 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/vms.

Problems with streaming

Multicast H.264 only accessible by local clients	Check if your router supports multicasting, or if you need to configure the router settings between the client and the device. You might need to increase the TTL (Time To Live) value.	
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 that prevents viewing.	
Poor rendering of H.264 images	Ensure that your graphics card uses the latest driver. You can usually download the latest drivers from the manufacturer's website.	
Lower frame rate than expected	 See . 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. 	

Can't select H.265 encoding in live view

Web browsers don't support H.265 decoding. Use a video management system or application that supports H.265 decoding.

Can't connect over port 8883 with MQTT over SSL

The firewall blocks traffic using port 8883 as it's deemed insecure.

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

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

Performance considerations

- Using HTTPS may reduce frame rate.
- Heavy network utilization due to poor infrastructure affects the bandwidth.
- A non-correlation between the input and output of the video stream can affect the performance of the video decoder.

Troubleshooting

Contact support

Contact support at axis.com/support.

User manual
AXIS D1110 Video Decoder 4K
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