



# **AXIS Body Worn Live, Self Hosted**

## This is AXIS Body Worn Live

With AXIS Body Worn Live, body worn camera users can stream live video and audio over Wi-Fi® or mobile networks. Operators can view the live video. The video stream is encrypted for secure transmission.

When you set up AXIS Body Worn Live, you have two hosting options:

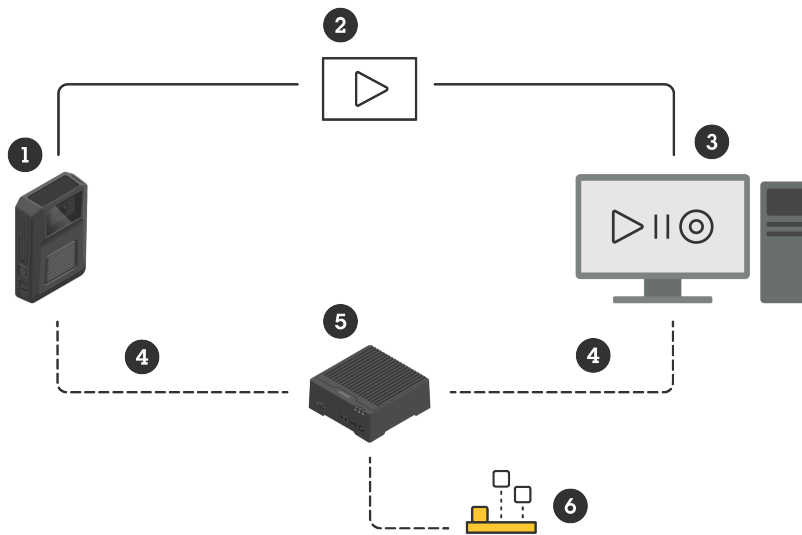
 Hosted by Axis – hosted in the Axis cloud.

 Self-hosted – hosted by you.

This manual helps you set up and use the self-hosted option. We describe a custom setup, but the setup varies depending on your VMS (video management software). Check your VMS documentation for more information.

For instructions on how to set up the other option, see *AXIS Body Worn Live, Axis Hosted user manual*.

### Solution overview



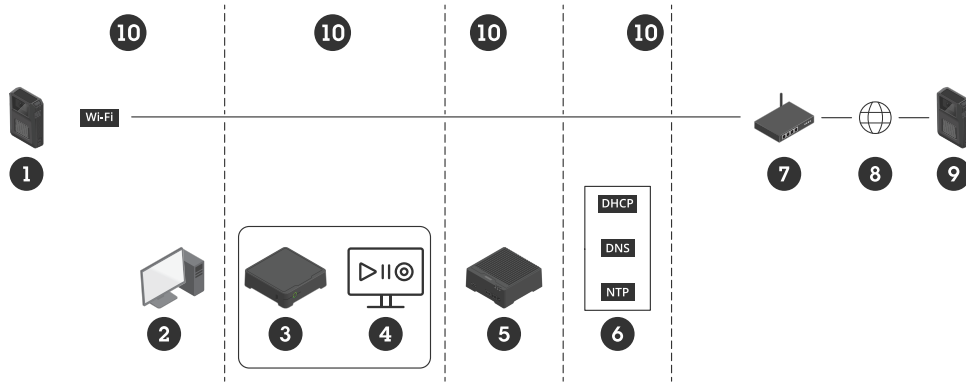
- 1 Body worn camera
- 2 Peer-to-peer streaming (encrypted)
- 3 WebRTC client
- 4 WebRTC signaling
- 5 AXIS Body Worn Live, Self Hosted Server device
- 6 AXIS Body Worn Live Self-hosted Server app

The AXIS Body Worn Live Self-hosted Server app (6) is installed on the AXIS Body Worn Live, Self Hosted Server device (5). It is used to set up WebRTC signaling (4) between the body worn camera (1) and a WebRTC client (3). Once the connection has been established, the body worn camera uses an encrypted peer-to-peer connection (2) to stream live video to the WebRTC client.

You can use either AXIS W401 Body Worn Activation Kit or AXIS D3110 Mk II Connectivity Hub as the AXIS Body Worn Live, Self Hosted Server device (5).

### Network recommendations

This is an example of a professional, segmented network configuration. Your network doesn't have to be connected to the internet like the one in the example. Contact your IT admin for help with your network setup.



- 1 Body worn camera connected to Wi-Fi
- 2 Client for watching streams
- 3 System controller
- 4 Video management software server
- 5 AXIS Body Worn Live, Self Hosted Server device
- 6 Network infrastructure services
- 7 Gateway/firewall solution
- 8 Internet (only for internet-connected networks)
- 9 Body worn camera connected to mobile network (only for internet-connected networks)
- 10 Different network segments

## Recommendations

- If you plan to use Wi-Fi, we recommend that the access points support IEEE 802.11k/v/r and WPA2-Personal/WPA2-PSK.
- Segment the network based on need (in this example there are four segments – 10), where the body worn system (system controller – 3, video management software server – 4) is in a separate segment.
- Minimum recommended network infrastructure services are DHCP, DNS, and NTP server (6).
- If your network is connected to the internet, the AXIS Body Worn Live, Self Hosted Server device (5) must be reachable from a public IPv4 address (no CGNAT).
- If your network is connected to the internet and you are using body worn cameras connected to a mobile network, the AXIS Body Worn Live, Self Hosted Server device (5) should have appropriate DDoS mitigation (gateway/firewall solution – 7) in place.
- Access to a Certificate Authority to sign certificate requests.
- Infrastructure that supports 2.5 Mbps (360p resolution) or 8 Mbps (720p resolution) per body worn camera.

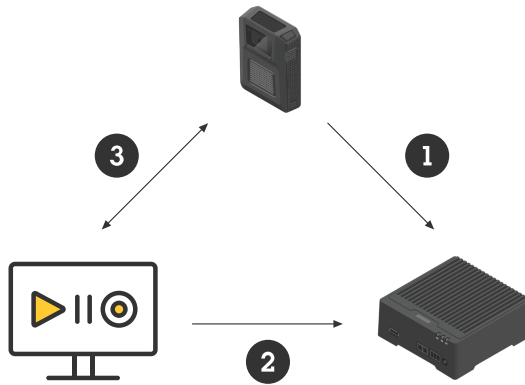
## Network requirements

Port forwarding and/or firewall configuration is required for:

- the body worn camera and the video management software to reach the AXIS Body Worn Live Self-hosted Server app
- peer-to-peer communication between the body worn camera and the video management software

### Important

If peer-to-peer communication isn't possible, devices will use the app's TURN server, which we don't recommend. The advanced setting **Relay endpoint port range** controls which ports are exposed to the app's TURN server for both the body worn camera and the video management software.



Inbound ports, from the AXIS Body Worn Live, Self Hosted Server device's perspective:

Connection	Port number	Explanation
1	TCP 8082	Used by the body worn camera to signal its presence to the app.
1	TCP/UDP 3478	Used by the body worn camera to get its public IP from the app (STUN).
1	TCP 8883	Used by the body worn camera to send MQTT information, such as its location and status, to the app's MQTT broker.
2	TCP 443	Used by the video management software to communicate with the app (signaling and events).
2	TCP/UDP 3478	Used by the video management software to get its public IP from the app (STUN).

Outbound ports, from the body worn camera's perspective:

Connection	Port number	Explanation
3	TCP/UDP 49152–65535 (ephemeral port range)	The advanced setting <b>Host endpoint port range</b> controls which ports are used by the body worn camera for peer-to-peer communication.

### Limitations

The camera connection doesn't support IEEE 802.1x, IPv6, or proxies.

### Get started - guided setup

If your body worn system, the AXIS Body Worn Live, Self Hosted Server device, and your PC are all connected to the same network, you can do a guided setup. The guided setup requires that cameras use the Wi-Fi network for streaming and not a mobile network.

To get started with the guided setup:

1. If the AXIS Body Worn Live, Self Hosted Server device isn't new, reset it to factory default settings. For instructions, see the device's user manual at *help.axis.com*
2. Upgrade the device with the latest AXIS OS version.
3. Go to **System > Network** and assign a static IP address.
4. *Install AXIS Body Worn Live Self-hosted Server app, on page 6*
5. Use the switch to start the **AXIS Body Worn Live Self-hosted Server** app.
6. Open the app.
7. Select **Guided setup**.
8. Enter the hostname, username, and password for the body worn system.
9. Click **Continue**.
10. Go to **AXIS Body Worn Manager** and assign a Wi-Fi network. For instructions, see *Assign a Wi-Fi network, on page 7*.

#### Note


You can continue using the solution after the evaluation period if you add licenses. If you want to add more body worn systems, you can't use the guided setup again.

## Get started - manual setup

To be able to live stream to AXIS Body Worn Live you must go through all the steps below:

1. Create a system controller configuration file in *AXIS Body Worn Manager*, on page 6
2. Prepare the *AXIS Body Worn Live, Self Hosted Server* device, on page 6
3. Install *AXIS Body Worn Live Self-hosted Server* app, on page 6
4. Set up *AXIS Body Worn Live, Self Hosted*, on page 6
5. Connect *AXIS Body Worn Live* to *AXIS Body Worn Manager*, on page 6
6. License, on page 7

### Create a system controller configuration file in *AXIS Body Worn Manager*

1. In *AXIS Body Worn Manager*, go to Add-on services .
2. Under *AXIS Body Worn Live*, click Self-hosted.
3. Click Install.
4. In *Certificate validity*, enter how many days the file should be valid, and click **Next**.
5. In *System controller configuration file*, click **Download** to download the system controller configuration file.

### Prepare the *AXIS Body Worn Live, Self Hosted Server* device

Use *AXIS W401 Body Worn Activation Kit* or *AXIS D3110 Mk II Connectivity Hub* to run the *AXIS Body Worn Live Self-hosted Server* app.

1. If the device isn't new, reset it to factory default settings. For instructions, see the device's user manual at [help.axis.com](http://help.axis.com)
2. Upgrade the device with the latest *AXIS OS* version.

### Install *AXIS Body Worn Live Self-hosted Server* app

Before you start

Download the *AXIS Body Worn Live Self-hosted Server* app from [axis.com/products/axis-body-worn-live](http://axis.com/products/axis-body-worn-live).


1. In the device you'll use for *AXIS Body Worn Live, Self Hosted Server*, go to **Apps**.
2. Click **Add app**.
3. Drag-and-drop the app and click **Install**.

### Set up *AXIS Body Worn Live, Self Hosted*



1. In the device that runs *AXIS Body Worn Live, Self Hosted Server*, go to **Apps**.
2. Use the switch to start the *AXIS Body Worn Live Self-hosted Server* app.
3. Open the app.
4. Click **Manual setup**.
5. Enter the server device's public IPv4 address or hostname.

### Connect *AXIS Body Worn Live* to *AXIS Body Worn Manager*

1. In the *AXIS Body Worn Live Self-hosted Server* app settings, go to **Body worn systems** and click **Add**.
2. Click **Select file** and select the system controller configuration file created in *AXIS Body Worn Manager*.


3. Click **Add**.
4. Download the live self-hosted server configuration file.
5. In AXIS Body Worn Manager, go to **Add-on services**  > **AXIS Body Worn Live**.
6. Click **Import**.
7. Select the live self-hosted server configuration file.
8. If you intend to use Wi-Fi for streaming, follow the instructions in *Assign a Wi-Fi network, on page 7*.
9. If you intend to use a mobile network for streaming, go to **Settings > Camera > Mobile networks** and configure the settings.
10. Go to **Camera profiles > AXIS Body Worn Live** and allow **Streaming**.
11. If you intend to use Wi-Fi for streaming, click **Wireless connection** and select the network.

### Assign a Wi-Fi network

1. In AXIS Body Worn Manager, go to **Settings**  > **Camera**.
2. Under **Wi-Fi® networks**, click **Add**.
3. Enter the **Name (SSID)** and **Password** for the Wi-Fi network.
4. Click **Add**.
5. Go to **Camera profiles** .
6. Select the camera profile you want to assign the Wi-Fi network to.
7. Expand the **Wireless connection** panel.
8. Select the Wi-Fi network to assign it to the camera profile.

### License

To license AXIS Body Worn Live, Self Hosted, you must export a system file, upload it to AXIS License Manager to generate a license file, and then import that file.

1. In AXIS Body Worn Manager, go to **Settings**  > **AXIS Body Worn Live > License**.
2. Click **Add licenses** to expand the instructions.
3. Click **Export** and save the system file to your PC.
4. Log in to *AXIS License Manager*.
5. Upload the system file in AXIS License Manager. For instructions, see *License offline systems* in My Systems user manual.
6. Start your subscription, see *Start a subscription*.
7. Buy licenses, see *Buy licenses*.
8. Redeem your license key, see *Redeem license key*.
9. Go to **Systems setup** and click your system name.
10. Click **Download license file**.
11. In AXIS Body Worn Manager, click **Import**.

## Learn more

### Options for viewing live video streams

There are different options for viewing the live video streams:

- Connect to the AXIS Body Worn Live Self-hosted Server app through a video management software, for example Milestone XProtect® or Airship AI. This option allows for several clients to view the live streams.
- Embed the simple web client as a web tile in your video management software. Use the following URL: `https://[live_self-hosted_server_device_IP]/local/BodyWornLiveSelfHosted/index.html#/targets/[camera_MAC_address]?compact`. This option only allows for one client to view the live streams.
- Connect to the AXIS Body Worn Live Self-hosted Server app through a browser. This option only allows for one client to view the live streams.

### Licenses

The number of cameras assigned to users with a live streaming-enabled camera profile during a 24-hour period, averaged over the last week, determines how many AXIS Body Worn Live licenses you need.

The license model is the same whether you use fixed or self-assign camera assignment.




We recommend that you dedicate a camera profile for live streaming to minimize the number of licenses used.

To learn more about licenses for Axis products and services, see *My Systems user manual*.

## Daily use

### Start a live stream

To start a live stream:


1. Double-press the function button on the body worn camera. The recording LED turns red, and depending on your camera model:
  - The Wi-Fi® connectivity LED starts pulsing amber.
  -  turns white.
2. When the camera has established a connection, depending on your camera model:
  - The Wi-Fi® connectivity LED starts pulsing green.
  -  turns blue.
3. When the camera has started streaming, depending on your camera model:
  - The Wi-Fi connectivity LED turns green.
  -  turns green.

#### Note

You can start a live stream whether you're already recording or not. If you're not already recording, a recording starts at the same time as the live stream.

### Troubleshooting

To help troubleshoot some issues, you can use troubleshooting mode in AXIS W102 and AXIS W120 Body Worn Cameras. To turn it on:

1. In AXIS Body Worn Manager, go to **Add-on services**  > **AXIS Body Worn Live**.
2. In **Self-hosted overview**, click **Show more**.
3. Turn on **Allow troubleshooting mode**.
4. On the body worn camera, start a live stream.
5. Double-press the top button.  
To show the next page, single-press the top button.  
To leave troubleshooting mode, press and hold the top button for 5 seconds.

The information is organized in pages in this way:

#### Page 1:

- System time
- Network status (**NET**)
- Wi-Fi or mobile network mode (**Submode WLAN or LTE**)
- Signal strength in dB
- Connection status

#### Page 2 – when using Wi-Fi:

- SSID
- Authentication method (**Auth**)
- The camera's IPv4 address
- Authentication status (**Status**)
- MAC address of the connected access point

#### Page 2 – when using mobile networks:

- The camera's IP address
- Roaming status
- SIM status
- APN

#### Page 3:

- Nameservers used by the camera

#### Page 4:

- The status of the AXIS Body Worn Live, Self Hosted Server device (**Server**)
- The status of the viewer client (**Peer**)
- Response code from endpoint query
- The IP address of the Self Hosted Server device (**Sig IP**)

#### Page 5 – MQTT connection status:

- The connection status to the MQTT broker (MQTT)
- The IP address of the MQTT broker

### General issues

**Problem:** The live stream doesn't show up in the client.

Symptom	Cause	Solution
I can't reach AXIS Body Worn Live, Self Hosted.	<ul style="list-style-type: none"> <li>• Firewall issues</li> <li>• Port forwarding issues</li> <li>• DMZ rules</li> <li>• Proxy required</li> </ul>	<p>If you can reach AXIS Body Worn Live, Self Hosted over port 443, go to <b>Settings &gt; Health</b> and click <b>Perform ICE self-test</b>.</p> <p>Otherwise, use the PowerShell commands to verify the connection:</p> <ul style="list-style-type: none"> <li>• Test-NetConnection [IPv4 address] -Port 8082</li> <li>• Test-NetConnection [IPv4 address] -Port 3478</li> <li>• Test-NetConnection [IPv4 address] -Port 8883</li> </ul>

**Problem:** The body worn camera doesn't show up in the list when I try to stream live video.

Symptom	Cause	Solution
When I turn on troubleshooting mode, there is no information about the Self Hosted Server device.	The camera doesn't have the required information to connect to the device.	Dock the camera to synchronize it with the body worn system.
The body worn camera doesn't show up in the list.	<ul style="list-style-type: none"> <li>• Firewall issues</li> <li>• Port forwarding issues</li> <li>• DMZ rules</li> <li>• Proxy required</li> </ul>	Turn on troubleshooting mode and enter a <b>Network test endpoint</b> that the camera can try to ping.
Certificate appears to have expired.	The time in the camera, the Self Hosted Server device, and the body worn system are not in synch.	<ol style="list-style-type: none"> <li>1. Check and compare the time in the camera with that of the Self Hosted Server device and the body worn system. To check the time in the camera, turn on troubleshooting mode.</li> <li>2. If the time in the camera differs from the device and/or the system, dock the camera.</li> <li>3. In AXIS Body Worn Manager, check if there is any RTC error on the camera. If there is, contact Axis support.</li> <li>4. If there is no RTC error, define an NTP server for the system controller and the Self Hosted Server device to synchronize the time.</li> <li>5. Redo the configuration.</li> </ol>

	The certificate has expired.	Renew the certificate in AXIS Body Worn Manager and redo the configuration.
	There is a certificate mismatch between the camera and the Self Hosted Server device.	Check the log file and system report from AXIS Body Worn Live, Self Hosted for any mismatch errors. If there are errors, dock the camera and redo the configuration.
The AXIS Body Worn Live license appears to have expired.	The license has expired.	Renew the license.
When I turn on troubleshooting mode, I see <b>No signaling IP</b> .	Bad DNS configuration.	Check the DNS configuration.


**Problem:** The body worn camera shows up in the list but can't stream.

Symptom	Cause	Solution
I get the message <b>Can't communicate with device</b> .	All ICE candidates fail.	Use <code>chrome://webrtc-internals/</code> in Chrome or <code>about:webrtc</code> in Firefox to improve the network infrastructure.
The video is badly rendered. When I click the video client's information button, the bitrate is lower than 2.5 Mbps in 360p or lower than 8 Mbps in 720p.	UDP packets get dropped.	Improve the network infrastructure to allow for a higher throughput. Examples of commands to simulate one camera and verify the UDP throughput: <ul style="list-style-type: none"> <li>• <code>iperf3.exe -server</code></li> <li>• <code>iperf3.exe -client SERVER_IP -udp -bitrate 8M -time 30 -length 1460</code></li> </ul>
The video is badly rendered. When I click the video client's information button, relay mode is used.	TURN is used instead of peer-to-peer streaming.	

## Wi-Fi issues





**Problem:** The body worn camera won't connect to the Wi-Fi network.


Symptom	Cause	Solution
When I turn on troubleshooting mode, the camera says it's unauthorized.	The Wi-Fi uses 802.1X (WPA-EAP-TLS), which the camera doesn't support.	Use WPA2-Personal/WPA2-PSK.
	The Wi-Fi has a MAC filter that blocks the camera.	Allow the camera's MAC address in filters.
	The Wi-Fi password is incorrect.	Verify the Wi-Fi password in AXIS Body Worn Manager. Try to connect a different device to the same network using the same password.
When I turn on troubleshooting mode, the submode is LTE.	There's a SIM card in the camera.	Turn off the camera and remove the SIM card.

When I turn on troubleshooting mode, the camera has no IPv4 address.	WPA2 isn't allowed by the access point.	Enable WPA2 on the access point.
	The password for the Wi-Fi network is wrong.	In AXIS Body Worn Manager or AXIS Body Worn Assistant, enter the correct password.
When I turn on troubleshooting mode, the access point has no MAC address.	Wrong SSID.	Enter the correct SSID.
The camera display shows  .	The camera is too far away from a Wi-Fi access point.	Use the camera closer to an access point.
When the camera switches from one Wi-Fi access point to another, the stream sometimes lags.	This is a known limitation. For more information, see the release notes.	-

## Mobile network issues

**Problem:** The body worn camera won't connect to the mobile network.

Symptom	Cause	Solution
When I turn on troubleshooting mode, the submode is <b>WLAN</b> .	There's no SIM card in the camera.	Turn off the camera and insert a SIM card.
In AXIS Body Worn Manager, the SIM card's state is <b>Unknown</b> .	The SIM card is incompatible.	Contact the operator or try another SIM card.
The camera display shows  .	The SIM card has been replaced while the camera was turned on and undocked.	Dock the camera.
	The camera isn't enabled for use by the network provider.	<ol style="list-style-type: none"> <li>In AXIS Body Worn Manager, go to <b>Cameras</b>  and click the camera to find the camera's international mobile equipment identity (IMEI) number.</li> <li>Check if the IMEI is blocked, for example at <a href="http://imeicheck.com">imeicheck.com</a>.</li> <li>If the IMEI is blocked, contact the operator to allow it.</li> </ol>
When I dock the camera, I get an alert in AXIS Body Worn Manager that the SIM card is locked.	The SIM card is locked.	Use the PUK code to set a new PIN.
When I dock the camera, I get an alert in AXIS Body Worn Manager that the SIM PIN is wrong or missing.	The SIM card PIN is wrong or missing.	In AXIS Body Worn Manager, go to <b>Cameras</b>  and click the camera. Enter the correct PIN.
 doesn't show up in the camera display.	The operator doesn't support any of the LTE bands that the camera supports.	Compare the LTE bands listed in the camera's datasheet to the operator's band capabilities.

	The camera is too far away from a mast.	Use the camera closer to a mast.
When I turn on troubleshooting mode, the camera has no IPv4 address and there's no APN listed.	The gateway between the mobile network and the internet, the access point name (APN), is required by the operator.	<p>Add the APN in AXIS Body Worn Manager:</p> <ol style="list-style-type: none"> <li>1. Go to Settings  &gt; Camera &gt; Mobile networks.</li> <li>2. Click Show more.</li> <li>3. Enter the access point name used by your network provider.</li> </ol>
When I turn on troubleshooting mode, the camera has no IPv4 address and roaming is inactive.	Roaming is disabled in the mobile network subscription.	<ol style="list-style-type: none"> <li>1. Dock the camera.</li> <li>2. Enable roaming in the mobile network subscription.</li> </ol>
When I turn on troubleshooting mode, the camera has an IPv4 address.	There is no more credit for data transfer.	Contact the network operator for help.
When I turn on troubleshooting mode, the connection status is ICCID_EMPTY.	There is no SIM card in the camera.	Insert a SIM card.
When I turn on troubleshooting mode, the connection status is ICCID_MISMATCH.	The SIM card in the camera doesn't match the SIM registered in the system.	Dock the camera.



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