

Spectra Enhanced Operations Manual



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Important Notices

Regulatory Notices

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Radio and Television Interference

This equipment has been tested and found to comply with the limits of a Class A digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Changes and modifications not expressly approved by the manufacturer or registrant of this equipment can void your authority to operate this equipment under Federal Communications Commission's rules.

CAN ICES-3 (A)/NMB-3(A)

Regulatory Notices

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Radio and Television Interference

This equipment has been tested and found to comply with the limits of a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However there is no guarantee that the interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

You may also find helpful the following booklet, prepared by the FCC: "How to Identify and Resolve Radio-TV Interference Problems." This booklet is available from the U.S. Government Printing Office, Washington D.C. 20402.

Changes and modifications not expressly approved by the manufacturer or registrant of this equipment can void your authority to operate this equipment under Federal Communications Commission's rules.

This Class B digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.

Warranty Statement

For information about Pelco's product warranty and thereto related information, refer to www.pelco.com/warranty.

Legal Notice

SOME PELCO EQUIPMENT CONTAINS, AND THE SOFTWARE ENABLES, AUDIO/VISUAL AND RECORDING CAPABILITIES, THE IMPROPER USE OF WHICH MAY SUBJECT YOU TO CIVIL AND CRIMINAL PENALTIES. APPLICABLE LAWS REGARDING THE USE OF SUCH CAPABILITIES VARY BETWEEN JURISDICTIONS AND MAY REQUIRE, AMONG OTHER THINGS, EXPRESS WRITTEN CONSENT FROM RECORDED SUBJECTS. YOU ARE SOLELY RESPONSIBLE FOR INSURING STRICT COMPLIANCE WITH SUCH LAWS AND FOR STRICT ADHERENCE TO ANY/ALL RIGHTS OF PRIVACY AND PERSONALTY. USE OF THIS EQUIPMENT AND/OR SOFTWARE FOR ILLEGAL SURVEILLANCE OR MONITORING SHALL BE DEEMED UNAUTHORIZED USE IN VIOLATION OF THE END USER SOFTWARE AGREEMENT AND RESULT IN THE IMMEDIATE TERMINATION OF YOUR LICENSE RIGHTS THEREUNDER.

Audio Notice

NOTE: Improper use of audio/visual recording equipment may subject you to civil and criminal penalties. Applicable laws regarding the use of such capabilities vary between jurisdictions and may require, among other things, express written consent from the recorded subjects. You are solely responsible for insuring strict compliance with such laws and for strict adherence to any/all rights of privacy and personalty.

Video Quality Caution

Frame Rate Notice Regarding User Selected Options

Pelco systems are capable of providing high quality video for both live viewing and playback. However, the systems can be used in lower quality modes, which can degrade picture quality, to allow for a slower rate of data transfer and to reduce the amount of video data stored. The picture quality can be degraded by either lowering the resolution, reducing the picture rate, or both. A picture degraded by having a reduced resolution may result in an image that is less clear or even indiscernible. A picture degraded by reducing the picture rate has fewer frames per second, which can result in images that appear to jump or move more quickly than normal during playback. Lower frame rates may result in a key event not being recorded by the system. Judgment as to the suitability of the products for users' purposes is solely the users' responsibility. Users shall determine the suitability of the products for their own intended application, picture rate and picture quality. In the event users intend to use the video for evidentiary purposes in a judicial proceeding or otherwise, users should consult with their attorney regarding any particular requirements for such use.

Open Source Software

This product includes certain open source or other software originated from third parties that is subject to the GNU General Public License (GPL), GNU Library/Lesser General Public License (LGPL) and different and/or additional copyright licenses, disclaimers, and notices. The exact terms of GPL, LGPL, and some other licenses are provided to you with this product. Please refer to the exact terms of the GPL and LGPL at <http://www.fsf.org> (Free Software Foundation) or <http://www.opensource.org> (Open Source Initiative) regarding your rights under said license. You may obtain a complete corresponding machine-readable copy of the source code of such software under the GPL or LGPL by sending your request to digitalsupport@pelco.com; the subject line should read Source Code Request. You will then receive an email with a link for you to download the source code. This offer is valid for a period of three (3) years from the date of the distribution of this product by Pelco.

CCC Power Cord Statement

Models shipped to China do not include power cords.

NOTE: A CCC approved power cord must be used to power the equipment when used in China.

KCC Certification

If you know the product is being submitted for KCC certification, add one of the following KCC statements and the respective heading to the Important Notices page of your English document. If the KCC mark is not required, do not add this information. The statement should

follow the French FCC translation in the Regulatory Notices section. When the document is translated, this text will already be included and translated per the requirements.

The Korean Class A statement applies to business/commercial product use. This notice indicates that the equipment has acquired electromagnetic conformity registration, so sellers and users are required to use caution.

The Korean Class B statement applies to residential product use. This notice indicates that the equipment has acquired electromagnetic conformity registration, so it can be used in both residential and other areas.

Korean Class A EMC

이 기기는 업무용 (A 급) 전자파 적합기기로서 판매자 또는 사용자는 이 점을 주의하시길 바라며, 가정 외의 지역에서 사용하는 것을 목적으로 합니다.

Korean Class B EMC

이 기기는 가정용 (B 급) 전자파 적합기기로서 주로 가정에서 사용하는 것을 목적으로 하며, 모든 지역에서 사용할 수 있습니다.

2.4 GHZ Radio Device

해당무선설비기기는 운용 중 전파혼신가능성이 있으므로 인명안전과 관련된 서비스는 할 수 없습니다

ESD Warning



WARNING: This product is sensitive to Electrostatic Discharge (ESD). To avoid ESD damage to this product, use ESD safe practices during installation. Before touching, adjusting or handling this product, correctly attach an ESD wrist strap to your wrist and appropriately discharge your body and tools. For more information about ESD control and safe handling practices of electronics, please refer to ANSI/ESD S20.20-1999 or contact the Electrostatic Discharge Association (www.esda.org).

Accessing the Camera

By default, users do not have to log in to view video; anyone who accesses the camera can view live video. If you want to prevent users from viewing video without logging in, you must change the permissions for public users.

The recommended browsers for your camera are Internet Explorer® or Mozilla® Firefox® for Microsoft® Windows® operating systems and Firefox for Mac® operating systems.

1. Open a web browser.
2. Type the camera's IP address (192.168.0.20) or host name in your browser's address bar, and then press Enter.

NOTE: You can obtain your camera's IP address or access the camera using the Pelco Device Utility software. If DHCP is enabled but a DHCP server is not on the network, the camera automatically assigns itself a 192.168.0.20 address. Additional cameras will assign themselves the next available IP addresses in sequential order. For example, if three cameras are connected to a network without a DHCP server, the first camera to connect assigns itself the IP address 192.168.0.20, the second camera assigns itself 192.168.0.21, and the third camera assigns itself 192.168.0.22.

NOTE: You can obtain your camera's IP address or access the camera using the Pelco Device Utility software. If DHCP is enabled but a DHCP server is not on the network, the camera automatically assigns itself both an IPv4 link local address (169.254.x.x, where the lower two octets are random) and a 192.168.0.20 address. Additional cameras will assign themselves different IPv4 link local addresses and the next available 192.168.0.x IP addresses in sequential order. For example, if three cameras are connected to a network without a DHCP server, the first camera to connect assigns itself the IP address 192.168.0.20, the second camera assigns itself 192.168.0.21, and the third camera assigns itself 192.168.0.22.

3. Click Login.
4. Type your user name and password.

NOTE: The default user name and password are both admin (all lowercase). For security purposes, it is recommended that you change the password after logging in for the first time.

- In its out-of-the-box configuration, the camera has no user name and password assigned. For security purposes, it is recommended that you set an administrative user name and password after initial configuration of the camera. Creation of an administrative user name changes the state of the camera to its "operational mode," where credentials must be provided in order to change its configuration.
- There is no provision for recovering a forgotten administrator user name or password. The camera can be restored to its out-of-the box, no-password configuration by powering down, depressing the reset button with an object such as a paper clip, and holding the button down for at least five seconds while powering the camera back up.
- If a user name and password exist, a Login link appears in the upper right area of your web browser.

5. Click Log In.

Accessing Camera Settings

Access to camera settings is determined by user permissions. If you do not have access to camera settings, the Settings link will not appear in the upper-right corner of the interface.

Initially, anyone can access the camera settings until the Admin role is created.

1. Log in.
2. Click Settings.
3. Select the setting you want to change. Place your mouse pointer over any tab on the page to reveal submenus.

Camera Configuration Sequence

Once the camera is installed and power is applied, the camera undergoes a configuration sequence, taking approximately two minutes to complete. The camera will come online once the configuration sequence is complete.

NOTE: If the camera connected to a network without a DHCP server and DHCP is enabled, the configuration sequence can take up to five minutes to complete.

Live Video Page

The live video page provides access to video streams and PTZ controls (where applicable). If user permissions for the camera allow public users to view video, the live video page will be available to all users with network access to the camera.

By default, the camera displays the panoramic image at the top of the page. Below is an immersive view of the camera which supports electronic PTZ using a mouse (default). You can also select the Flat Projection option to show a single flat projection of everything the camera sees if your browser does not support WebGL. The arrangement of the flat projection view is dependent on your camera model.









Keyboard Shortcuts

Keyboard shortcuts to engage video overlays are available when viewing the primary stream using the Pelco Media Player.

Keyboard Shortcuts	Function
SHIFT + A	Displays analytics information for the currently active behavior (if a behavior is currently active).
SHIFT + S	Displays live video details, including image rate, resolution, and bit rate.
SHIFT + T	Displays the current date and time.

Live Video Controls












Viewable controls are based on camera model and user permissions.

	Select Stream: Click to select stream, transmission type, and player settings for your live view stream.
	Maximize Viewing Area: Scales the video stream to the full size of the browser.
	Return to Normal View: Returns the video stream to normal size. This icon is only available after the video stream has been maximized.
	Open Stream in New Window: Opens the video stream in an independent window.
	Take a Snapshot: Captures a still image from the video stream and saves it as a JPEG file.
	Center Viewing Area: ¹ Engages click-to-center functionality. Click the icon, and then click within the video stream to center the camera's field of view.
	Pan and Tilt: Engages pan and tilt functions. Click the icon, and then click and drag the mouse within the video stream to pan and tilt the camera.
	Resize Viewing Area: Allows you to zoom in on an area of interest. Click the icon, and then click and drag over the area in the video on which you want to center the camera's field of view and zoom in.

¹ These icons are always available when using the Pelco Media Player. If you are using QuickTime®, these icons are available only when the QuickView Stream is selected.

PTZ Controls

NOTE: PTZ controls are available only after you have logged in to the camera.

	Tilt Up: Click and hold to tilt the camera up.
	Tilt Down: Click and hold to tilt the camera down.
	Pan Left: Click and hold to pan the camera left.
	Pan Right: Click and hold to pan the camera right.
	Joystick: Click and hold to pan and tilt the camera. While the mouse cursor is over the joystick button, you can use your mouse's scroll wheel to zoom in and out.
	Zoom In: Click and hold to zoom in.
	Zoom Out: Click and hold to zoom out.
	Focus Near: Click and hold to focus on an object near the camera.
	Focus Far: Click and hold to focus on an object far away from the camera.
	Iris Open: Click and hold to open the iris and brighten the image.
	Iris Close: Click and hold to close the iris and darken the image.

Selecting a Stream

From the live video page, you can select the video stream you want to view, and determine settings for the transmission of the video streams. Your camera outputs four different video streams.

Primary Stream and **Secondary Stream:** Fully configurable video streams. You can configure both streams automatically using the camera's video presets, or you can customize them from the camera's Video menu.

QuickView Stream: A predefined low resolution, low frame rate JPEG video stream that is available when configuring your camera's imaging settings, so you can see how your settings affect video in real time. The QuickView Stream is ideal for users with bandwidth or processing limitations that could cause a high resolution, high frame rate video stream to pause or pixelate.

Event Stream: Displays a list of alerts triggered by an active analytic behavior. Each alert includes a screen capture, the profile that was triggered, and the zone in which the event was detected.

1. Click the Select Stream icon .

2. Select the Primary, Secondary, QuickView, or Event stream.

NOTE: If the secondary stream has not been configured, the option will be unavailable.

3. Configure display settings for your video stream. The availability of settings is dependent on the video compression standard used by the video stream:
 - **Transmission:** Available for MPEG-4 or H.264 video streams; provides a choice between unicast or multicast transmission types.

A **multicast** stream sends video data to multiple users from the same transmission. Each multicast user connecting to the camera consumes no additional processing power.

A **unicast** stream sends a separate transmission to each user requesting video from the camera. Each user viewing video from the camera consumes additional processing power, limiting the number of simultaneous users who can access video from the camera.
 - **Throttle:** Available for JPEG video streams; determines the maximum number of images that the camera can deliver to clients per second. Lowering the throttle setting can compensate for bandwidth and processing limitations.
4. Click Select.

System Menu

The System menu contains general system time settings, and video text overlay settings. It also provides access to basic system information, and the backup, restore, and restart functions.

The System menu contains general system time settings, and on screen display settings. It also provides access to basic system information, and the backup, restore, and restart functions. Options may vary dependent on your camera model.

From the System menu, you can also access snapshots generated by event handlers.

Information Settings

The information settings page includes read-only fields for the firmware version, hardware version, model number, and serial number of the camera. This information is typically required by Pelco Product Support for troubleshooting purposes.

Snapshot Viewer

The Snapshot Viewer page displays a list of snapshots saved to the SD card when a "Write JPEG to SD Card" event handler is activated. From this page, you can open, download, or delete snapshots from the SD card. There are 100 snapshots displayed per page.

NOTE: Snapshot Viewer is not available when recording video to local storage.

Enabling and Disabling LEDs

You can turn your camera's LEDs on or off. By default, your camera's LEDs are on. LED settings do not affect your camera's network status and activity LEDs.

1. Select General Settings from the System menu.
2. Select On or Off beside Enable LEDs.
3. Click Save.

Changing the Camera Name

Providing a user-friendly name might help you and other users identify the camera on the network, and within other applications. The camera name is the friendly name that appears both in the Web interface and within other applications that can find the device.

1. Select General Settings from the System menu.
2. Provide a user-friendly name in the Device Name box (2 to 63 characters).
3. Click Save.

Configuring the SMTP Server

Providing the address of an SMTP server enables your camera to send email notifications when using the Send Email event handler.

1. Select General Settings from the System menu.
2. Type the address of your SMTP server in the SMTP Server box.
3. Click Save.

Configuring Time Settings

You can set your camera to discover a network time server (NTP) automatically, manually provide the address of your network time server, or determine time based on the camera's internal clock.

1. Select General Settings from the System menu.
2. Select your time server setting:
 - **Auto:** Allows your camera to discover and synchronize with your network time server (over IPv4 or IPv6).
 - **Manual:** Requires you to provide the address of your network time server.
 - **None:** The camera will determine time from its internal clock. If you select None, you must also set your time zone. Cameras that are not synchronized with a time server can exhibit time drift.
3. Click Save.

Customizing the Text Overlay

You can set various informational overlays for video produced from your camera, and you can determine the location of overlaying information using the Text Overlay settings. By default, all text overlays are hidden. The text overlays available for your camera are dependent on your model.

1. Select General Settings from the System menu.
2. Determine the text overlays you want to appear:
 - **Date/Time Overlay:** Displays the date and time in the live view overlay.
 - **Camera Name Overlay:** Displays the camera name in the live view overlay.
 - **Pan/Tilt Overlay:** Displays pan, tilt, zoom, and direction positions when using PTZ controls.
3. Select the display position and format for the overlay from the Position and Overlay Format drop-down menus.
4. Click Save.

OSDi

The **OSDi** (Intelligent On Screen Display) feature allows the camera to show pertinent information as an overlay within the field of view. Depending on your camera and model, you may be able to define up to four overlay rules. You can also determine the position of each overlay within the scene.

If using PTZ Preset or Zone overlays, the overlay will use the name of the zone or PTZ preset for the overlay; ensure you set relevant names for zones and presets.

If using the Current Zone Label overlay, and multiple zones are in the field of view, the camera will display the labels in order of size, smallest to largest; if all zones in the field of view are the same size, the camera will display zone labels in order of creation, oldest to newest. If the *Duration* field is set to 0 seconds, the overlay will only display the first zone label using the rules above until the zone is no longer in the field of view.

NOTE: Optera cameras do not support Zone or PTZ Preset overlays.

Configuring OSDi Overlays

1. Go to the *OSDi* page from the *System* menu.
2. Check the box next to the overlay you want to enable.
3. Select the type of overlay you want to show.

4. Select the location of the overlay within the field of view. You can select the **Metadata** option to send the overlay within the camera's event or metadata stream (for use within a video management system).
NOTE: You cannot have metadata and a visible overlay for the same overlay type, even if you configure the overlay types separately.
5. Set details for the overlay.
 - For **Name**, **Date**, and **Time** overlays, provide the text or format for the overlay.
 - For **PTZ** or **Zone Label** overlays, select the duration for which the overlay will appear when active.
 - For Image overlays, provide the image file.
6. Set the font size for the overlay.
7. Click **Save**.

Customizing the Image Overlay

You can set a custom image overlay for video produced from your device, and you can determine the location of the overlaying image using the Image Overlay settings. By default, all overlays are hidden.

Only one overlay image can be saved to memory at a time. Uploading a new image replaces the current image saved to memory.

1. Select General Settings from the System menu.
2. Choose an image file to upload.
NOTE: For Spectra HD (D5220 and D5230) and Spectra Enhanced (D6220 and D6230) models, the image file must be a 24-bit BMP.
NOTE: For Sarix Enhanced models, the image file must be a PPM image with a minimum resolution of 32 x 32 or a maximum resolution of 256 x 192.
3. Select the display position for the overlay from the Position menu.
4. Click Save.

Generating a System Log

If technical difficulties should occur, a system log might help Pelco Product Support troubleshoot problems with your camera. You can contact Pelco Product Support at 1-800-289-9100 (USA and Canada) or +1-559-292-1981 (international).

1. Select General Settings from the System menu.
2. Click Generate System Log.
3. Select the location in which to save the log file.
4. Click Save.

Restarting the Camera

If you are recording video from your camera, restarting the camera will cause a gap in video recording. It is important that you schedule maintenance before restarting the camera.

1. Select General Settings from the System menu.
2. Click Reboot Camera.

Restoring All Camera Defaults

If necessary, you can reset your camera's settings to their factory defaults.

1. Select General Settings from the System menu.
2. Click Restore All Camera Defaults.

Backing Up and Restoring Settings

You can backup your camera configuration, and restore the configuration, should you ever change a setting in error or need to recover from a factory reset. Camera backup files are stored in bin format.

The restore feature is not intended to automatically configure multiple cameras or to recover settings following a firmware upgrade.

Backing Up Camera Settings

1. Select Backup and Restore from the System menu.
2. Click Download Now, and then specify the directory in which to save your backup file.
3. Click OK to save the backup file.

Restoring Camera Settings from a Backup

1. Select Backup and Restore from the System menu.
2. Click Browse, locate your camera's backup file, and then click OK.
3. Click "Upload and Restore"; the camera will restart and restore your camera's settings.

Network Menu

The Network menu contains network configuration settings and options for your camera; from this menu, you can set static IP addressing, enable SSL, enable SSH, configure 802.1x port security, and point your camera to an SNMP manager. By default, your camera receives an address over DHCP, and all other network features are disabled.

Changing General Network Settings

The General page, under the Network menu, contains standard network address settings for your camera.

1. Select General from the Network menu.
2. Set your host name and change port settings (if necessary).
3. Set your IPv4 settings; if you set DHCP to Off, set your IP Address, Subnet Mask, Gateway, and DNS Server settings.
4. *(Optional)* Set IPv6 to On and configure IPv6 address settings.
5. Click Save.

General Network Settings

Host Name

You can configure a host name for your camera containing up to 63 alphanumeric characters. At least one character in the host name must be a letter.

Port Settings

Port settings determine the ports over which users communicate with the camera.

HTTP: Do not change the HTTP when connecting to a Pelco video management system (VMS); doing so may prevent you from viewing or recording video from your imaging camera. The default HTTP port is 80.

HTTPS: Set SSL to Optional or Required and install a security certificate before altering the HTTPS port. The default HTTPS port is 443.

RTSP: Cameras communicate with video management systems over RTSP. Do not change the RTSP port unless you are sure your VMS does not use the default setting. The default RTSP port is 554.

Link Speed: Auto-Negotiate is the default setting for configuring the camera throughput speed automatically. Selecting 100 Mb ensures the throughput speed to 100 Mb. When using Optera with VideoXpert, use the 100 Mb mode to ensure clients can playback video at high framerates.

IPv4 Settings

By default, cameras are configured to obtain network settings over DHCP. If a DHCP server is not available, the camera defaults to an address of 192.168.0.20 on a 255.255.255 subnet. If 192.168.0.20 is already in use on the network, the camera will increment the address by one until it finds an unused address (for example, 192.168.0.21 if 192.168.0.20 is in use).

Set DHCP to Off to configure a static address and manually set the subnet mask, gateway, and DNS Server settings.

IPv6 Settings

Your camera supports IPv6 configurations in conjunction with IPv4; the device does not support IPv6-only network deployments. The camera will accept up to sixteen IPv6 addresses, three IPv6 DNS servers, and three IPv6 gateways.

There are two configuration modes for IPv6 address assignment:

Auto: Enables automatic configuration using router advertisement. Additional configuration can be provided over DHCPv6 (if available on your network). Selecting Auto still allows you to manually configure additional address, DNS servers, and gateways.

Manual Only: Provides a link-local address for the device, and it requires you to manually configure all other IPv6 address settings for the camera. Manually specified addresses require a prefix and must be input in the format *prefix/IPv6Address*. The camera will reject addresses that do not contain prefix information.

NOTE:

- Cameras do not accept multicast, localhost, or undefined IPv6 addresses.
- Manually specified DNS servers are not validated by the camera and supersede automatically discovered DNS servers; verify your DNS addresses before saving IPv6 settings.
- Manually specified gateways must be on the same network as the camera's IPv6 addresses. Behavior for a gateway that is not on the same network as the camera's IPv6 addresses is undefined.
- Some video management systems (VMS), including Pelco systems, do not support connections to cameras and encoders over IPv6.

SNMP

Your camera supports SNMP V2c and V3, and it can be configured to send traps. The MIB file for your camera is available at www.pelco.com.

NOTE: SNMP V2c and SNMP V3 configuration settings are independent of each other, but only one SNMP mode can be active.

Configuring SSL

The SSL settings page includes SSL configuration modes and certificate generation. The camera can generate a certificate signing request (CSR) that can be sent to a certificate authority for a signature (for example, VeriSign®), or it can generate a self-signed certificate using the Generate Self-Signed Certificate option.

SSL is disabled by default. You must enable SSL to access the camera over HTTPS.

1. Select SSL from the Network menu.
2. Select your SSL mode:
 - **Disabled:** Disables HTTPS communications with the device.
 - **Optional:** Requires that you install a signed SSL certificate and enables HTTPS access to the camera; however, the camera will still be available over HTTP.
 - **Required:** Requires that you install a signed SSL certificate and enables HTTPS access to the camera. When attempting to access the camera over HTTP, users will be automatically redirected to the HTTPS URL.

NOTE: Beginning with firmware version 1.8.2, the Required option cannot be enabled or disabled through the Web interface. To enable or disable Required SSL operation, you must use the ONVIF or Pelco APIs. This prevents the camera from entering a state in which it no longer works with a VMS.

Enabling SSH

Advanced troubleshooting for problems that cannot be addressed through the camera interface can be performed by establishing an SSH connection into the camera. By default, SSH is off. The user name for SSH connections is *root*, and cannot be changed.

1. Select SSH from the Network menu.
2. Provide a password for the root user. Passwords are case-sensitive.

3. Confirm your password.
4. Click Save.

Shaping Traffic

You may want to use the traffic shaping function if the framerate at your client is significantly lower than you would expect from the camera.

Your camera can produce large I frames, resulting in a traffic burst within each group of pictures as the camera transmits the frame; if your network infrastructure does not have the buffering capacity to smooth out the traffic, you may experience slow or jittery video. From the Traffic Shaping page, you can control the average transmission rate over a 2ms period and limit traffic bursts coming from the camera to help you prevent frame losses at your client resulting from traffic bursts produced by the camera.

The screenshot shows the 'Traffic Shaping' configuration page. At the top, there are tabs for System, Network, Imaging, A/V Streams, Users, and Events. The 'Traffic Shaping' section has a sub-header and a description: 'Customize your settings to reduce video frame loss which could be resulting from spikes in network traffic.' Below this, there are three radio button options: 'Disabled', 'Enabled', and 'Enabled with Bursts (Advanced)'. The 'Enabled with Bursts (Advanced)' option is selected. A note states: 'Camera limits transmission rate. After periods of idleness, the camera may burst amounts of data at full speed.' The 'Settings' section includes a 'Rate' section with a 'Rate Limit (Mbps)' slider set to 80.0 and a 'Bursts' section with a 'Burst Size (KBytes)' slider set to 10. There are 'Save' and 'Reset' buttons at the bottom. An 'Alerts' section on the right states: 'There are no alerts resulting from the current configuration.'

1. Go to the *Traffic Shaping* page from the *Network* menu.
2. Enable *Traffic Shaping* with or without bursts, depending on your need.
3. Set the average transmission rate over a 2 ms period in Mbps.
4. If you enabled traffic shaping with bursts, set the maximum size of bursts coming from the camera in kilobytes.
5. Click *Save*.

Configuring 802.1x Security

By default, 802.1x security is off. Cameras support EAP-MD5, EAP-TLS, EAP-TTLS, EAP-PEAP, and EAP-FAST protocols.

1. Select 802.1x from the Network menu.
2. Select On for 802.1x port security.
3. Select the (EAP) method from the Protocol drop-down menu.
4. Provide the authentication information for the EAP method you selected.
5. Click Save.

Configuring SNMP V2c

1. Select SNMP from the Network menu.
2. Select SNMP V2c.
3. Provide the community string for your SNMP manager. The default community string is "public."
4. Provide the address and community string for your trap server under Trap Configuration.
5. Click Save.

Configuring SNMP V3

1. Select SNMP from the Network menu.
2. Select SNMP V3.
3. Enter the SNMP user name the camera will use to authenticate with the SNMP server.
4. Select the encryption algorithm for authentication from the Authentication drop-down menu. If using MD5 or SHA authentication methods, enter your authentication code in the box provided.
5. Select the privacy protocol setting from the Privacy drop-down menu. If using DES or AES protocols, enter your privacy key in the box provided.
6. Enter the host name or IP address of your trap server in the Address box under Trap Configuration.
7. Click Save.

Imaging Menu

The Imaging menu contains image quality, exposure, focus, and window blanking settings for your device. If your camera supports pan and tilt positioning functions, you can configure positioning settings, preset positions, and preset tours from the Imaging menu.

The Imaging menu contains image quality, exposure, white balance, and window blanking settings for your camera.

The Imaging menu contains image quality, exposure, focus, white balance, window blanking, presets, preset tours, and positioning settings for your camera. You can also configure positioning settings, preset positions, and preset tours from the Imaging menu.

Configuring General Imaging Settings

The availability of settings might change based on your camera model and the version of the camera firmware installed on your camera.

1. Select General from the Imaging menu.
2. Set your camera's orientation.
3. Select a Freeze Frame setting.
4. Select a Digital Zoom mode.
5. Select an Image Stabilization setting.
6. Select a Highlight mode.
7. Select a Defog mode.
8. Select a Noise Reduction mode.
9. Set your camera's focus settings. If you set all Focus Settings to Off, you will have to manually focus your camera.
10. Set your camera's digital processing settings. For some models, setting a custom value for your camera's sharpness, saturation, contrast, or brightness settings will engage the Custom Quick Setup mode.
11. Click Save.

Digital Zoom

The **Digital Zoom** setting increases the zoom capability of your camera by up to 12X. The total zoom capability of your camera is determined by multiplying the optical and digital capabilities of your camera.

Freeze Frame

The **Freeze Frame** feature freezes video output when a preset is called, resuming video when the camera completes the preset operation. This allows for a smooth transition between preset scenes, reduces bandwidth consumption, and guarantees that blanked areas are not inadvertently revealed when a preset is called.

Image Stabilization

Electronic Image Stabilization attempts to compensate for vibrations that interfere with your camera and video output.

Highlight Mode

The **Highlight Mode** feature allows you to choose from four different lighting modes for your camera including WDR, Visibility Enhancement, Backlight Compensation, and Off.

Use **WDR (Wide Dynamic Range)** to automatically balance the bright and dark zones in the image, increasing the dynamic range.

Use **Visibility Enhancement** to automatically correct brightness and contrast and show bright zones more clearly.

Use **Backlight Compensation** to enhance objects in the center of the picture when a bright backlight causes subjects in the picture to appear dark or silhouetted.

Use **Off** for normal lighting situations.

Defog Mode

The **Defog Mode** feature allows you to make the subject appear clearer when the surrounding area of the subject is foggy and low contrast. Choose High, Medium, Low, or Off for this mode. Low is used for slightly hazy conditions. It does a minimum amount of correction. High is used for more foggy conditions. It does the maximum amount of correction.

Noise Reduction

Noise Reduction: Adjusts for video noise in the scene.

- **Off:** The camera does not compensate for video noise.
- **Normal:** Adjusts for noise in low-light scenes.
- **High:** Adjusts for a greater amount of noise in low-light scenes.

Digital Processing Settings

Digital processing settings adjust the color and detail of captured video. The availability of settings might change based on your camera model.

Image Enhancement: The Temporal Noise Filter reduces video noise between frames. The default setting is Off.

Quick Setup: Contains presets for digital processing settings. You can use any of the quick setup modes as starting points for custom settings; changing sharpness, saturation, contrast, or brightness settings automatically engages the Custom mode.

- **Normal:** A baseline setting in which sharpness, saturation, contrast, and brightness are all set to zero.
- **Vivid:** A setting that enhances color quality, lightens whites, and darkens blacks.
- **Custom:** Allows you to set your own, unique image quality settings.

Noise Reduction: Adjusts for video noise in the scene.

- **Off:** The camera does not attempt to compensate for video noise.
- **Normal:** Adjusts for noise in low-light scenes.
- **High:** Adjusts for a greater amount of noise in low-light scenes.

3D Noise Reduction: Adjusts for video noise in low-light scenes. Turn off 3D noise reduction if details are blurred in moving objects.

Auto White Balance: Defines how the camera processes video images to render true colors in a scene. When this setting is on, the camera maintains automatic color balance for most lighting conditions, including outdoor scenes, scenes with changing lighting conditions, or in scenes with more than one type of light source.

Sharpness: Controls the clarity of detail in the scene. Increasing video sharpness increases video noise.

Saturation: Controls the intensity of colors in the scene.

Contrast: Controls the gradation between the darkest and lightest portions of the scene.

Brightness: Controls the lighting detail of the scene.

Hue: Controls the intensity of red or blue hues in a scene.

WDR Strength: Balances the bright and dark areas of a scene.

Restore Settings to Defaults: Restores the Imaging General page settings to the camera's default settings.

Restore All Imaging Settings: Restores all Imaging settings for that camera.

Restoring Imaging Settings

The Imaging menu contains buttons that allow you to restore your camera's imaging settings.

Use **Restore Settings to Defaults** to reset your camera's settings to their factory defaults on the current webpage.

Use **Restore All Imaging Settings** to reset all of your camera's imaging settings to their factory defaults.

Configuring Exposure Settings

Exposure settings help ensure that video contains an adequate level of detail and contrast between light and dark values.

Exposure Modes: Determines the exposure behaviors for your camera.

Exposure Priority: Allows you to prioritize either image quality or frame rate in instances when auto-exposure settings conflict with settings on the stream configuration page.

Flicker Correction: Lessens rolling shutter flicker in images with reduced dynamic range.

Flicker Correction: Lessens rolling shutter flicker in images with reduced dynamic range. The default setting is Off. When selecting On, **Frequency Hint** provides options for None, 50Hz, and 60Hz.

Day/Night Mode: Controls the IR cut filter, determining whether or not your camera captures color (day) or black and white (night) video. You can set the Day/Night position manually, but it is recommended that you engage the auto mode if lighting around your camera is expected to change drastically at any time.

Wide Dynamic Range: Attempts to compensate and even the brightness of a scene when a portion of your camera's picture is bright, and part is dark.

Back Light Compensation: Enhances objects in the center of the picture when a bright backlight causes subjects in the picture to appear dark or silhouetted.

1. Select Exposure from the Imaging menu.

2. Select your camera's Exposure Priority.
 - **Noise:** Prioritizes the best image quality in all conditions regardless of the frame rate selected.
 - **Frame Rate:** Prioritizes a guaranteed frame rate in all lighting conditions.
3. Select your camera's Exposure Mode.
 - **Auto:** Allows you to set maximum Gain limit and Exposure Time limit settings, while retaining the full range of Day/Night controls.
 - **Manual:** Allows you to specify the Exposure Time and adjust the Gain. You should only engage this mode if fixed exposure time is a priority.
4. Select your camera's Exposure Mode.
 - **Auto:** Allows you to specify maximum Exposure Time and maximum Gain, while retaining the full range of Day/Night controls.
 - **Manual:** Allows you to fix the Exposure Time setting and adjust the maximum Gain limit. You should only engage this mode if fixed exposure time is a priority.
5. Select your camera's Exposure Mode.
 - **Normal:** Allows you to set Gain and Exposure Time settings, while retaining the full range of Day/Night controls.
 - **Exposure Time/Gain Control:** Governs exposure settings purely based on Gain and Exposure Time controls; engaging this setting prevents you from configuring an automatic day/night mode. You should only engage this mode if lighting in the field of view is not expected to change during operation.
6. Set the Max Exposure Time or Exposure Time, depending on the exposure mode you selected in earlier steps. The maximum exposure time determines the time, in milliseconds, that the imaging sensor is exposed to light. Decreasing the exposure time reduces motion blurring; increasing the maximum exposure time could help capture more detailed still images in low light.
7. Set the Max Exposure Time or the Exposure Time, depending on the exposure mode you selected. The maximum exposure time determines the time, in milliseconds, that the imaging sensor is exposed to light. Decreasing the maximum exposure time reduces motion blurring; increasing the maximum exposure time could help capture more detailed still images in low light.
8. Set the Max Gain or the Gain, depending on the exposure mode you selected. Increasing the gain allows for better sensitivity in low-light scenes, but also increases video noise.

9. Select the Flicker Correction Mode.
 - **Auto:** Reduces rolling shutter flicker in scenes with low dynamic range. This setting does not correct flicker in scenes with high dynamic range.
 - **On:** Reduces rolling shutter flicker in all scenes, also reducing the overall dynamic range in the image.
 - **Off:** Maintains the maximum amount of dynamic range in the image, but it can produce rolling shutter flicker in scenes with florescent or other oscillating light sources.
10. Select the Flicker Correction Mode.
 - **On:** Reduces rolling shutter flicker in all scenes, also reducing the overall dynamic range in the image. You may specify the **Frequency hint** at None, 50 Hz, or 60 Hz if you are unsure.
 - **Off:** (Default) Maintains the maximum amount of dynamic range in the image, but it can produce rolling shutter flicker in scenes with florescent or other oscillating light sources.
11. Set your Day/Night Mode. If you've set your camera's exposure mode to the Exposure Time/Gain Control setting, the Day/Night Mode setting becomes the Position setting.
 - **Auto:** Engages day or night mode based on the Transition Level setting; this allows you to capture color video (Day) when enough light is available, and automatically switch to black and white video (Night) when light is unavailable.
 - **Manual/Position:** Requires you to choose a Day or Night mode. Day captures color video; Night captures grayscale video.
12. Set your Day/Night Mode.
 - **Auto:** Engages day or night mode based on the Transition Level setting; indicate whether you want to trigger mode switches at lighter levels, the default light level (recommended), or at darker levels.
 - **Manual:** Requires you to choose a Day or Night mode. Day captures color video; Night captures grayscale video.
13. Set your Day/Night Mode.
 - **Auto:** Engages day or night mode based on the Transition Level setting; this allows you to capture color video (Day) when enough light is available, and automatically switch to black and white video (Night) when light is unavailable.
 - **Manual:** Requires you to choose a Day or Night mode. Day captures color video; night captures gray scale video.
14. *(Optional)* Set your camera's Transition Level, determining when the camera switches from Day to Night mode. Lighter settings cause the camera to change modes at higher lux values.
15. *(Optional)* Set the Transition Detect Time, determining the frequency at which the device checks for adequate light to transition to day mode or night mode.
16. Set the Back Light Compensation setting. When back light compensation is turned on, the Wide Dynamic Range setting is unavailable.
17. Set the Wide Dynamic Range Processing (WDR) setting. This setting is only available when back light compensation is turned off.
18. Click Save.

Focus Settings

Focus Settings affect your camera's focusing behaviors. If you set all focus behavior settings to Off, you must manually focus your camera.

Autofocus: Causes your camera to automatically focus during runtime operation.

Sure Focus: Causes your camera to auto focus when pan, tilt, and zoom (PTZ) operations are complete or if the IR cut filter changes state. When your camera achieves an auto focus lock, auto focus is turned off and the focal position will remain until the next PTZ operation. If 30 seconds pass without an auto focus lock, your camera will retain its focal position until the next PTZ action.

Focus Trace: Enables your camera to use a focus trace curve when zooming based on the distance to ground-level targets in the scene; distance to ground-level targets is determined by the Install Height setting. If Auto Focus is disabled, your camera will not perform auto-focus operations, but will perform focus trace corrections when the tilt angle of your camera changes.

Install Height: Determines the distance between your camera and ground-level targets for focus trace operations.

Setting White Balance

Each Sensor has its own white balance settings. Auto mode is the default setting for each sensor. Selecting Manual mode allows you to adjust white balance settings for the sensor.

Auto: the default white balance mode. It has a color temperature range from 7,500K to 2,500K. It can be used to properly balance scenes illuminated by daylight to warm white sources.

Manual: Allows for several options. Use Manual mode to set Basic, White Patch, and Color chart adjustments.

To set white balance:

1. Select White Balance from the Imaging menu.
2. Select a white balance mode:
 - **Auto:** The recommended setting for most lighting conditions. It can be used to properly white balance scenes illuminated by daylight to warm white sources.
 - **Extended Color Temp:** Maintains color balance in outdoor settings where sodium vapor lighting is widely used, such as parking lots or street lights.
 - **Manual:** Allows manual adjustment of the red and blue range; this may be helpful in areas where lighting does not change, such as inside a casino or mall. Move the Red and Blue sliders to change color levels.
 - **ATW:** Has the largest color temperature range.
 - **Warm White:** A fixed white balance mode for warmer (more yellow) sources such as incandescent, tungsten-halogen, warm white compact florescent, or LED lighting.
 - **Cool White:** A fixed white balance mode for cooler (more blue) sources such as true daylight, daylight fluorescent, white light LEDs, or metal halide sources.
3. Select a sensor to configure its white balance. Click Manual mode to adjust that sensor's white balance manually.
 - **Basic:** Adjusts the red and blue range. Move each slider to increase or decrease the color level.
 - **White Patch:** Select White Patch to adjust the white balance in a similar manner as if using a white piece of paper to adjust the white balance. After selecting White Patch, the scene from the camera is presented. If there is an area that should be white, click in that area of the scene, and then drag the mouse to select that portion of the scene to adjust the white balance. If no white area exists, temporarily use a white piece of paper to adjust the camera's white balance.
 - **Color Chart** Allows adjustment of the following color options: Dark Skin, Bluish Green, White, and Black. Using the X-Rite ColorChecker® Classic 24 patch target, place the target in the camera's field of view, following the on-screen instructions.
4. Click Save.

Using the Window Blanking Feature

Blanked areas persist in all video produced from the camera, whether viewing video directly through the camera's interface or from a higher-level recording device or system.

NOTE: For cameras that physically pan, tilt and zoom, window-blanking regions will not scale proportionally with changes in zoom. Set the zoom level for the camera before defining window-blanking regions.

1. Select Window Blanking from the Imaging menu.
2. Select On to enable Window Blanking.
3. If necessary, maneuver the video preview to find the region you want to blank.
4. Drag the mouse across the video area that you want to blank. Select an existing blanking region to delete it, or edit its size and position.
5. Where available, a Set Zoom Point panel and a Set Blanking Type panel appear after you draw a blanking region.
 - a. Select the Set Zoom Point zone to enable the zoom level, and drag the slider or enter a value in the appropriate box to set the zoom factor that will activate the blanking level at which the blanking region is activated.
 - b. Where available, in the Set Blanking Type zone, select the appropriate blanking type you prefer from the drop-down menu.
6. Click Save.

Calibrating Window Blanking

Calibrating the window blanking feature prevents blanked areas from shifting when you zoom the camera. You only need to calibrate the window blanking feature once, and you can calibrate before or after configuring blanking areas. If you notice blanked areas shifting after you have calibrated the window blanking feature, you should recalibrate.

1. Select Window Blanking from the Imaging menu.
2. Click Calibration.
3. Click within the scene to center the camera on an object you want to cover, and then click Ok.
4. Click and drag to draw a blanking region within the camera's field of view, and then click Ok. The camera will zoom in, and the blanking region you drew will shift.

NOTE: The blanking region that you draw should be small enough that it does not fill the field of view when the camera is fully zoomed. If the blanked region fills the screen when the camera zooms in, you will have to recalibrate.
5. Redraw the blanking region now that the camera has zoomed in, and then click OK. Redrawing the region accounts for the shift that can occur when zooming the camera.
6. Click Done, or click the Start Over button to recalibrate.

Setting Up a Preset

A **preset** is a camera position that you can configure and call as a single command, allowing users to quickly move the camera to common positions.

1. Select Presets from the Imaging menu.
2. Click New Preset or select the preset you want to edit.
3. Provide a name for the preset.

4. Select the Focus Lock mode:
 - **On:** The camera's focus settings are saved with the preset, and are called with the preset. This ensures that the camera uses the expected focal point any time the preset is selected.
 - **Off:** The preset does not retain focus settings. This mode requires the camera to use current focus setting when the preset is selected.

If an operator has changed the focus of the camera before the preset is selected, it is possible that the camera will be out of focus when the camera displays the preset position later. Turn on Focus Lock to avoid this problem.

5. Position the camera using the pan and tilt controls.
6. Adjust the zoom and focus controls as necessary.
7. Click Save.

Configuring a Preset Tour

You must configure presets before adding them to a preset tour.

A **preset tour** is a series of presets through which your camera will cycle. You can configure the length of time for which the camera will remain at each preset position in the tour.

1. Select Preset Tours from the Imaging menu.
2. Click New Tour or select the preset tour you want to edit.
3. Provide a name for the tour.
4. Click and drag presets to the "Tour workspace" section of the page.
5. Set the dwell time for each preset. **Dwell time** is the length of time (in minutes or seconds) the camera will remain at a preset position before engaging the next preset in the tour.
6. Set the transition speed for each preset.
7. Click >> in the "Transition preview" area to review the tour.
8. Click Save.

Configuring Pan/Tilt Speed Control

Pan and tilt speed control determines the acceleration of your camera's pan and tilt controls.

1. Select Positioning from the Imaging menu.

2. Select the Pan/Tilt Speed Control type:
 - **A: Linear:** Pan and tilt speeds accelerate at a fixed rate.
 - **B: Default:** Pan and tilt speeds accelerate at a rate corresponding to the length of time for which a user engages pan and tilt controls; the longer a user engages pan and tilt controls, the faster the camera will pan and tilt.
 - **B: Exponential:** Pan and tilt speeds accelerate at a rate corresponding to the length of time for which a user engages pan and tilt controls; the longer a user engages pan and tilt controls, the faster the camera will pan and tilt.
 - **Proportional Velocity:** Automatically reduces pan and tilt speeds proportional to the camera's zoom level.
 - **Auto Flip:** Allows the dome to rotate 180 degrees when the tilt is pointing straight down (e.g. -90 degrees tilt angle).
 - **PTZ Resume:** Allows the dome to recover the last PTZ action requested before the camera loses power. The camera will resume the previous action upon start-up.
3. Select the Proportional Velocity mode. Turning this setting on automatically reduces pan and tilt speeds proportionally to the zoom level of the camera.
4. Click Save.

Setting the Pan Center Point

The pan center point determines the zero point for pan operations. Setting a new center point automatically adjusts Pan Limit Stop settings to account for the new center point.

On the Positioning page, you can click Go To Pan Center Point to determine the current center point or click Restore Default Center Point to restore the camera's default center position.

1. Select Positioning from the Imaging menu.
2. Use the left and right arrows next to the video preview to pan the camera to the desired location.
3. Click Set New Pan Center Point.
4. Click Save.

Configuring Pan and Tilt Limit Stops

Pan and tilt limit stops allow you to limit the range of motion for your camera. Pan and tilt limit values are provided in degrees.

1. Select Positioning from the Imaging menu.
2. Select On for Pan Limit Stops, Tilt Limit Stops, or both.
3. Configure the left and right pan limits and the top and bottom tilt limits. You can provide a value, in degrees, for each limit, or click Get Current Pan/Tilt to retrieve the current value from the video preview window.
4. Click Save.

A/V Streams Menu

The A/V Streams menu contains settings for your camera's video and audio streams.

Selecting Preset Video Configurations

The Video Presets page contains fully-configured video configurations for both your primary and secondary video streams, offering a balance between video performance and bandwidth. These presets can also be used as a starting point for a custom video configuration.

1. Select Video Presets from A/V Streams menu.
2. Select your desired video preset stream configuration.
3. Click Save.

Configuring Custom Video Streams

The Video Configuration page contains settings for customizing your camera's primary and secondary video streams. Although each stream can be configured independently, the settings for one stream can limit the options available to the other stream, depending on the processing demands of your stream settings.

The Video Configuration page contains settings for customizing your camera's Mosaic and Full video streams.

The Mosaic video stream is a low resolution composite of the video streams. You can create a custom configuration of the Mosaic video streams.

Full video streams must have the same configuration. Depending on the model, the camera produces between two and five full resolution video streams.

The compression standard, resolution, image rate, bit rate, and I-frame interval settings are dependent on each other. You must first decide the setting you want to take priority before you configure a stream. For example, if you want an image rate of 30 ips, set the image rate before you configure the other settings.

By default, all fields on the Video Configuration page are populated with settings from your Video Presets. You can clear all fields, or use the default settings as a starting point for your custom stream. Configure the primary stream before the secondary stream. The primary stream should be the most resource-intensive video stream.

Depending on your camera, by default all fields on the Video Configuration page are populated with settings from your Video Presets. You can clear all fields, or use the default settings as a starting point for your custom stream. Configure the Mosaic stream before the Full stream. The Mosaic stream should be the most resource-intensive video stream.

1. Select Video Configuration from the A/V Streams menu.
2. Select the aspect ratio (e.g. 16:9 or 4:3) and the maximum frame rate (e.g. 60 fps, 50 fps, 30 fps, or 25 fps). These settings affect both the primary and secondary stream configurations.
3. Select the maximum frame rate (e.g. 10 fps, 12 fps, or 12.5 fps). These settings affect both the Mosaic and Full resolution configurations.
4. Select the Compression Standard, Resolution, Image Rate, and Bit Rate. For H.264 encoding, select I-frame Interval, profile, QoS (DSCP) Codepoint, Endura Signing, and rate control for the Mosaic stream.
5. Select the Image Rate. For H.264 encoding, select I-frame Interval, profile, QoS (DSCP) Codepoint, Endura Signing, and rate control for the Full stream.
6. *(Optional)* Provide a user-friendly name for your custom streams in the Name box (2 to 64 characters).
7. Set the Compression Standard, Resolution, Image Rate, Bit Rate, and I-frame Interval settings for the primary stream.
8. Configure QoS (DSCP) Codepoint, Endura Signing, Profile, and GOP Structure.

9. Repeat the previous steps for the Secondary stream.
10. Click Save.

Video Configuration Settings

Compression Standards: Available compression standards depend upon the model of the camera that you are using.

- **JPEG:** Has the least impact on the camera's processor but requires the most bandwidth.
- **MJPEG:** Has the same characteristics as JPEG but differs in its mode of transfer (RTP).
- **MPEG-4:** Less processor-intensive than JPEG but requires more bandwidth than H.264.
- **H.264:** The most processor-intensive compression standard but requires the least amount of bandwidth.

Resolution: The quality of the video stream, rendered in pixels for both width and height. Higher values result in greater video quality but consume more bandwidth.

Image Rate: The number of images per second (ips) available for the video stream configuration. Available image rates depend upon the model of the camera that you are using.

Image Rate: The number of frames per second (fps) available for the video stream configuration. Available frame rates depend upon the model of the camera. The maximum frame rate affects the options for the image rate of each stream.

NOTE: The maximum image rate setting might not be obtainable due to the compression standard and the resolution of the stream.

Bit Rate: The quality of the video stream, rendered in kilobits per second. Higher values result in greater video quality but consume more bandwidth.

NOTE: When you change video stream configuration settings, the camera automatically adjusts the bit rate. Choosing a bit rate below the camera's automatic setting might reduce video quality and limit stream configuration options.

I-Frame Interval: Determines the number of partial frames that occur between intra-coded frames (I-frames) in your video stream. I-frames are complete images, used as a reference for change in the following video frames. Following an I-frame, the camera will capture and encode only video data in the scene differing from the I-frame until the next I-frame. This setting is only available for H.264 video streams. Increasing the I-frame interval can improve video compression rates and reduce the size of video data; however, higher values are recommended only for highly-reliable networks.

Profile: Defines the subset of bit stream features in an H.264 stream, which includes color reproduction and additional video compression. It is important you select a profile that is compatible with your recording device(s) to ensure that your camera's video stream can be decoded and viewed.

- **Baseline:** A simple profile with a low compression ratio. A baseline profile is compatible with more recorders but uses more bits to compress video than the other profiles. This profile supports I-frames and P-frames only. Use the baseline profile in applications with limited scene changes, an indoor scene with a single, unchanging primary light source and minimal motion.
- **Main:** An intermediate profile with a moderate compression ratio. This profile is compatible with most recorders and uses fewer bits to compress video than the baseline profile, but more bits than the high profile. The main profile supports I-frames, P-frames, and B-frames.
- **High:** A complex profile with a high compression ration. This is the primary profile for high-definition television applications. The high profile supports I-frames, P-frames, and B-frames.

Quality of Service (QoS) for Different Services Code Point (DSCP): A mechanism for prioritizing network traffic. This setting is available only with H.264 and MPEG-4 compression standards. Your network must be QoS-aware to take advantage of this setting. If you are unsure if your network is QoS-aware, contact your network administrator.

Endura Signing: Allows an Endura® system to authenticate recorded video streams. This setting is available only with H.264 and MPEG-4 compression standards.

GOP Structure: Determines the sequence in which frames are ordered within a video stream. The Group of Pictures (GOP) structure always includes both intra-coded frames (I-frames) and predictive coded frames (P-frames), and can include bidirectional predictive coded frames (B-frames) depending on your settings.

Each GOP structure begins with an I-frame: an image of the complete scene that is used as the reference frame. P-frames record data changes from the referenced I-frame, allowing the video encoder to save space by not duplicating video data from the I-frame. B-frames capture data changes from both the previous frame and the frame after the B-frame. B-frames are more compressed than P-frames but require more processing power to decode. Your device supports the following GOP structures:

- **IP:** A compression scheme using I-frames and P-frames to provide low latency and a high level of decoder support. This GOP structure is compatible with more recorders and decoders than IBBrBP.
- **IBBrBP:** The most sophisticated H.264 compression available. IBBrBP provides the highest quality image at a given bit rate, but it also increases the latency of the video and requires more processing power from decoders.

Rate Control: Determines the bit rate and quality of each frame in the H.264 video stream. Each rate control setting is a compromise between image quality and the resources required for video storage. The availability of rate control settings depend upon the model of the camera that you are using.

- **CBR:** The constant bit rate (CBR) streams video at a fixed number of bits per second. CBR uses the full capacity of the bit rate setting for scenes with or without motion. Video is always streamed at the user bit rate setting.
- **VBR:** The variable bit rate (VBR) reduces or increases bit rates in response to motion while maintaining high-quality video. VBR uses variable capacity of the bit rate setting for scenes according to a user-defined target bit rate.
- **CVBR:** The constrained variable bit rate (CVBR) provides high-quality video and long recording time of variable bit rate while limiting variations in recording capacity consumption.

Smart Compression

Smart Compression can greatly reduce the bit rates produced by your camera at the potential cost of a slight to moderate degradation in video quality, depending on the compression level you set. This change in video quality is dependent on the complexity of the scene and the compression level you select. The *High* Smart Compression setting can reduce the bit rate up to 90% of the expected bit rate.

From the *Smart Compression* page, you can also set a dynamic group of pictures (GoP) length, allowing the camera to update picture groups depending on scene composition and motion. A dynamic GoP can further reduce bit rates produced by the camera, by allowing the camera to increase the GoP length when there is little action in the scene.

NOTE: Dynamic or long GOP lengths may cause compatibility issues with some video management systems (VMS). Ensure your VMS supports dynamic GOP settings before enabling this setting.

Configuring Smart Compression

1. Go to the *Smart Compression* page from the *A/V Strams* page.
2. Indicate your Smart Compression Level.
3. (Optional) Enable Dynamic GoP Length.
 - a. (Optional) Set the maximum GoP length for your streams if you want to limit the upper limit of the dynamic GoP setting.

NOTE: Dynamic or long GOP lengths may cause compatibility issues with some video management systems (VMS). Ensure your VMS supports dynamic GOP settings before enabling this setting.
4. Click Save.

RTP Settings

The RTP Settings page provides access to advanced multicast and MTU settings.

Setting Static Multicast Addresses

You can set static multicast addresses and ports for all of your camera's multicast streams (primary, secondary, service, etc).

Default, automatically-assigned multicast addresses are confined to the 239.x.x.x block in a scheme matching your IP address and network settings; you can determine the automatically-assigned multicast address(es) for your camera from the RTP page.

1. Go to the *RTP Settings* page from the *A/V Streams* menu.
2. Enter static multicast addresses and ports for your streams as necessary.
3. Set the *Time to Live (TTL)* for each stream; this is the number of routers the stream can pass through before it expires.
4. Determine whether or not to *Always Multicast this stream*. This setting eliminates the need for a client to connect to the camera to initiate a stream; when enabled, the camera begins sending the multicast stream when it starts up, without requiring initiation from a client.
5. Click *Save*.

Enabling "Always On" Multicast

From the *RTP Settings* page, you can enable the *Always Multicast this stream* setting. This setting eliminates the need for a client to connect to the camera to initiate a stream; when enabled, the camera begins sending the multicast stream when it starts up, without requiring initiation from a client.

Setting the Maximum Transfer Unit Size

You can adjust the maximum transfer unit size to adjust to your network's constraints. Changing the MTU setting will require your camera to restart.

1. Go to the *RTP Settings* page from the *A/V Streams* menu.
2. Set the *Max Transfer Unit* size.
3. Click *Save and Reboot Camera*.

Configuring Audio

Not all camera models are equipped with an internal audio device. If your camera does not support audio natively, you must connect an audio device to the accessory port to capture audio. You can only enable audio through the primary video stream.

Audio is disabled by default, but you can enable and configure audio streams from the Audio Configuration page.

Audio and video might not be synchronized when viewing the primary stream through a Web browser. You might experience up to a 3-second delay in video when viewing the primary stream with audio enabled.

NOTE: Improper use of audio/visual recording equipment may subject you to civil and criminal penalties. Applicable laws regarding the use of such capabilities vary between jurisdictions and may require, among other things, express written consent from the recorded subjects. You are solely responsible for ensuring strict compliance with such laws and for strict adherence to any/all rights of privacy and personalty.

1. Place your mouse pointer over the *A/V Streams* tab, and select *Audio Configuration* from the drop-down menu.
2. Select *Audio Configuration* from the *A/V Streams* menu.
3. Enable *Audio*.

4. Select your audio device.
 - **USB Line In:** Enables audio from a microphone connected to the USB accessory port.
 - **Native Line In:** (Only available for products with built-in audio support.) Enables audio from a microphone connected to the audio-in connector.
 - **Line Out:** Enables audio to headphones/speakers connected to the audio-out connector.
 - **Native Microphone In:** (Only available for products with built-in audio support.) Enables audio from the internal microphone.
5. Select your sample rate. The sample rate is the quality of the audio stream (measured in hertz per second).
6. Select the encoding method.
7. *(Optional)* Enable Echo Cancellation.
8. If required, mute the audio device using the Mute option on the Audio Configuration page.

NOTE: Do not use the mute button on your audio device; doing so will override your device's audio settings.
9. Set the Input Level. Input sensitivity is measured on a scale from 0 to 100 (low to high).

NOTE: If the camera is installed in a noisy environment or the connected microphone has a built-in line amplifier, you should lower audio sensitivity.
10. Click Save.

Managing Local Recording

This device is capable of recording and storing video and audio to an SD card through the ONVIF API. To ensure reliable local storage, it is recommended that you use a 32 GB SanDisk Extreme® PLUS microSDHC™ UHS-I card. For more information about local storage capabilities, refer to the ONVIF Profile G specification.

NOTICE:

- You must use a new SD card to ensure reliable local storage. If the card has previously been used or reformatted, the local storage feature may not function properly.
 - Do not enable local storage if you are using the "Write JPEG to SD Card" event handler. Writing JPEGs to the SD card disables local storage of video and audio.
1. Place your mouse pointer over the A/V Streams tab, and select Local Recording from the drop-down menu.
 2. Click the REC button to enable or disable local recording. The following colors indicate the status of the local recording feature:
 - **Red:** Recording enabled.
 - **Gray:** Recording disabled.
 - **Yellow:** An error has occurred, typically caused by a missing SD card, an SD card that was previously used or reformatted, or the camera's time settings being improperly configured.

Local Recording Storage Limits

The number of hours of video you can store on the SD card depends on several factors besides the capacity of the SD card. The bit rate is an important factor. For example, with the recommended 32 GB card at 1080p with a maximum controlled variable bit rate (CVBR) of 7 Mbps, you can store over 10 hours of video. Scenes with lower complexity and less motion, which allow for lower resolutions and frame rates with lower bit rates, result in longer recording times. You can, for example, record more than 48 hours of video at standard definition of 1.5 Mbps CVBR.

There is, however, a limit on the total number of frames that can be stored on the SD card. Below a bit rate of 1.5 Mbps, you can store a maximum of 48 hours of video at 30 fps regardless of resolution. You can increase the maximum available hours of storage by decreasing the frame rate.

NOTE: The numbers listed above do not include audio. With audio enabled, the number of hours you can record decreases. The impact is minimal above bit rates of 2.25 Mbps. At bit rates below 2.25 Mbps, the number of hours you can record may drop by approximately 40 percent.

Users and Groups

The Users menu contains settings determining how your camera authenticates users (locally or remotely) and an interface for managing local user accounts.

Access Levels and User Roles

User permissions are governed by the role assigned to a user. When authenticating users locally, you will assign a role to each individual user. When authenticating users remotely, users will be assigned roles based on their CN and DN assignments. Your camera supports the following four roles:

- **Admins:** Can access and change all camera settings.
- **Managers:** Can access and change all settings, except user permissions. Managers are also unable to restore factory default settings.
- **Operators:** Can view video, use PTZ functions (where available), and use the API.
- **Viewers:** Can view video and use the API.

Enabling Local User Management

Local Mode is enabled by default, and it sets the camera to manage user accounts and access locally.

1. Select General Settings from the Users menu.
2. Select Local Mode under User and Group Management.
3. Click Save.

Configuring Local Users

When the local mode for user management is enabled, your camera authenticates local user accounts. By default, your camera contains only the *admin* user account. You can configure additional local users from the Users page. If you are a user with Admin permissions, you can delete local user accounts at any time.

Initially, the camera authentication is open to view and configure without a user name and password. Once the Admin role is created and Local Mode User Management is enabled, your camera will authenticate local user accounts. You can configure additional local users from the Users page. If you are a user with Admin permissions, you can delete local user accounts at any time.

1. Select Users from the Users menu.
2. Click New User or select the user whose permissions and settings you want to edit.
3. Select an Access Level for the user.
4. Provide a user name between 2 and 32 alphanumeric characters for the user. User names are not case-sensitive and are saved in lowercase characters.
5. Provide a password between 4 and 64 alphanumeric characters for the user. Passwords are case-sensitive.
6. Re-type your password in the appropriate box to confirm your password.
7. Click Save.

Events and Analytics

The Events tab contains settings for camera events and analytics.

An **event** is a user-defined occurrence, consisting of a source and a handler. A **source** defines the trigger for an event; a **handler** defines the action your camera will take when the event source occurs. When configuring a source, you can link the source to multiple handlers, providing multiple outcomes for the event; when configuring a handler, you can link the handler to multiple sources, providing a single outcome for multiple events.

Analytics are specialized event sources that are triggered by the user-defined behaviors or scenarios occurring within your camera's field of view. Analytics are compatible with Endura® or third-party systems that support alarms using Pelco's API. The analytic behaviors available for your camera are dependent on your model and firmware version.

Sources

An event source defines the trigger for an event, something that must occur before your camera takes action (defined by a handler).

Configuring an Alarm Event Source

An alarm source triggers an event upon a signal from external signaling devices, such as a door contact or a motion detector. If the Pelco Alarm accessory is connected to the camera's accessory port, the camera can support up to four alarm sources.

An alarm source triggers an event upon a signal from external signaling devices, such as a door contact or a motion detector.

1. Select Sources from the Events menu.
2. Click New Source or select the source you want to edit.
3. Provide a name, between 2 and 23 alphanumeric characters, for the event source in the Name box.
4. Select Alarm from the Type drop-down menu.
5. Select your relay bank. Relay bank options might include GPIO (General Purpose Input/Output), PCP, or the serial number of your relay device; relay bank options might change depending on your model or accessories attached to your camera.
6. Select the alarm you want to trigger when an event occurs from the Alarm drop-down menu.
7. Set the dwell time for the alarm between 1 and 25 seconds. Dwell time is the amount of time that the source will remain active during an alarm event.
8. Select the polarity of your alarm input (normally open or normally closed).
9. Select either True or False from the Supervised drop-down menu.
10. Click Submit.

Configuring an Analytic Event Source

An analytic event source triggers an event when a behavior defined by a video analytic occurs.

1. Select Sources from the Events menu.
2. Click New Source, or select the source you want to edit.
3. Provide a name, between 2 to 23 alphanumeric characters, for the event source in the Name box.
4. Select Analytics from the Type drop-down menu.
5. Select the analytic that will trigger the event from the available boxes. If you haven't configured an analytic profile yet, the "any" box, indicating that any analytic will trigger the event, is selected.

6. *(Optional)* If available, select the handler(s) that you want to associate with this source.
7. Click Submit.

Configuring a Park Action Event Source

A park action event source triggers an event if the camera is inactive for a specified period of time.

1. Select Sources from the Events menu.
2. Click New Source, or select the source you want to edit.
3. Provide a name, between 2 and 23 alphanumeric characters, for the event source in the Name box.
4. Select Park Action from the Type menu.
5. Configure the dwell time (the amount of inactivity before the event handler starts).
6. Click Submit.

Configuring a System Event Source

A system source triggers an event when your camera boots.

1. Select Sources from the Events menu.
2. Click New Source, or select the source you want to edit.
3. Provide a name, between 2 and 23 alphanumeric characters, for the event source in the Name box.
4. Select System from the Type menu.
5. *(Optional)* If available, select the handler(s) that you want to associate with this source.
6. Click Submit.

Configuring a Timer Event Source

A timer event source triggers an event at specified intervals of time.

1. Select Sources from the Events menu.
2. Click New Source, or select the source you want to edit.
3. Provide a name, between 2 and 23 alphanumeric characters, for the event source in the Name box.
4. Select Timer from the Type drop-down menu.
5. Configure the frequency of the event.
6. *(Optional)* If available, select the handler(s) that you want to associate with this source.
7. Click Submit.

Deleting an Event Source

1. Select Sources from the Events menu.
2. Select the source that you want to delete.
3. Click Delete Source to remove the event source.

Handlers

Event handlers are the actions that your camera takes when an event source occurs. The availability of handlers might change based on your camera model.

Configuring an Event Handler: Send Email

You must have provided your camera with the address of an SMTP mail server on the General Settings page (available under the System menu) for your camera to send email notification for events.

The Send Email event handler sends an email from your camera when a source event is triggered.

1. Select Handlers from the Events menu.
2. Click New Handler or select the handler you want to reconfigure.
3. Provide a name, between 2 and 23 alphanumeric characters, for the event handler in the Name box.
4. Select Send Email for the handler Type.
5. Provide the necessary information for your email in the To, From, Subject, and Message boxes.
6. *(Optional)* Select the JPEG Snapshot box if you want to send a JPEG snapshot as an attachment to the email.
7. *(Optional)* Select the Attach Raw Event Data box if you want the email to include extra data about the event. For example, select this box if the event is triggered by an alarm and you want to receive data about the state, time, or type of alarm.
8. *(Optional)* Set time filters to determine the days and times during which the handler will be active. If you do not select any filters, the handler will remain active at all times. All time values must be formatted in 24-hour notation.
9. *(Optional)* If available, select the source(s) that you want to trigger this event handler.
10. Click Submit.

Configuring an Event Handler: Upload JPEG to FTP Server

This event handler captures and uploads a JPEG to an FTP server when an event source is triggered. JPEG files are named according to the date and time at which they are recorded; although, you can determine the order of factors in the date-and-time filename.

1. Select Handlers from the Events menu.
2. Click New Handler or select the handler you want to reconfigure.
3. Provide a name, between 2 to 23 alphanumeric characters, for the event source in the Name box.
4. Select the Upload JPEG to FTP Server handler type.
5. Provide the address of your FTP server in the Server box.
6. Provide the credentials the camera will use to authenticate with the FTP server; the user name must be between 1 and 32 alphanumeric characters, and the Password must be between 4 and 16 alphanumeric characters.
7. Provide the path in which to store JPEG files on your FTP server in the Base Path box.
8. Select the File Name for your JPEG snapshots. JPEG files are named according to the date and time at which they are recorded.
9. *(Optional)* Set time filters to determine the days and times during which the handler will be active. If you do not select any filters, the handler will remain active at all times. All time values must be formatted in 24-hour notation.
10. *(Optional)* If available, select the source(s) that you want to trigger this event handler.
11. Click Submit.

Configuring an Event Handler: Go to Preset

You must define a preset before you can create a Go to Preset event handler.

The "Go to Preset" handler activates a camera preset when a source event occurs.

1. Select Handlers from the Events menu.
2. Click New Handler or select the handler you want to reconfigure.
3. Provide a name, between 2 and 23 alphanumeric characters, for the event handler in the Name box.
4. Select the "Go to Preset" handler Type.
5. Select a preset from the Preset drop-down menu.
6. *(Optional)* Set time filters to determine the days and times during which the handler will be active. If you do not select any filters, the handler will remain active at all times. All time values must be formatted in 24-hour notation.
7. *(Optional)* If available, select the source(s) that you want to trigger this event handler.
8. Click Submit.

Configuring an Event Handler: Open/Close Relay

Some models require the Pelco Alarm accessory be connected to the camera's accessory port for Open/Close Relay to function.

The Open/Close handler opens or closes a relay when a source event occurs.

1. Select Handlers from the Events menu.
2. Click New Handler or select the handler you want to reconfigure.
3. Provide a name, between 2 and 23 alphanumeric characters, for the event handler in the Name box.
4. Select the Open/Close Relay handler Type.
5. Select your relay bank. Relay bank options might include GPIO PCP (General Purpose Input/Output) or the serial number of your relay device; relay bank options might change depending on your model or accessories attached to your camera.
6. Select the individual relay you want to trigger when an event occurs from the Relay drop-down menu.
7. Use the On Time controls to set the amount of time the relay will remain open, up to 200 seconds.
8. Use the Off Time controls to set the amount of time the relay will remain closed, up to 200 seconds.
9. Set the pulse count for the relay. The pulse count is the number of relay pulses (number of on and off cycles).
10. *(Optional)* Set time filters to determine the days and times during which the handler will be active. If you do not select any filters, the handler will remain active at all times. All time values must be formatted in 24-hour notation.
11. *(Optional)* If available, select the source(s) that you want to trigger this event handler.
12. Click Submit.

Configuring an Event Handler: Run Tour

You must define a preset tour before you can create a Run Tour event handler.

1. Place your mouse pointer over the Events tab.
2. Click New Handler or select the handler you want to reconfigure.
3. Select Handlers from the drop-down menu.

4. In the New Event Handler section of the window, click the Name box and type a user-friendly name (2 to 23 alphanumeric characters).
5. Select Run Tour from the Type drop-down menu.
6. Select a tour from the Tour drop-down menu.
7. *(Optional)* Set time filters to determine the days and times during which the handler will be active. If you do not select any filters, the handler will remain active at all times. All time values must be formatted in 24-hour notation.
8. Click Submit.

Deleting an Event Handler

1. Select Handlers from the Events menu.
2. Select the handler that you want to delete.
3. Click Delete Handler.

Analytic Configuration

Analytic configurations are contained within profiles; you must create a profile to enable analytic behaviors. An analytic **profile** consists of profile settings calibrating to maximize the accuracy of analytic detection, the analytic behaviors you want to enable, and the zones within the field of view that your camera will monitor for each enabled behavior.

You can configure multiple profiles and multiple behaviors per profile. However, the complexity of each profile, including active behaviors and zones per behavior, increases the processing load on your camera; if the camera cannot support the processing requirement of a profile, either due to the complexity of the profile itself, or because other profiles are also running, you will not be able to run the profile.

Once configured, your camera will monitor your defined zones for activity violating the parameters of the behavior. You can view analytic events through your camera's event stream. However, analytic alarms are only transmitted through Pelco's API, and are therefore only available with compatible VMS systems or through direct integration.

For information on how to receive analytic alerts for Object Video Suites, refer to the Object Video Web Console User Guide.

Profile Settings

Profile settings: Define the attributes of a normal scene within the field of view of your camera, providing context for analytic behaviors. Properly configured profile settings help ensure the accuracy of analytic behaviors. Each profile contains the following profile settings:

Camera Preset: Selects a camera preset for the profile.

Scene Type: Determines whether or not the scene is indoor or outdoor.

Background: Determines the expected amount of background movement in the scene; the background can be still or noisy. A stable background with few moving objects should be set to Still. A busy background, with many moving objects should be set to Noisy.

Fine Tuning: Defines zone violation sensitivity. Available settings include Conservative, Normal, or Aggressive. The Conservative setting is the least sensitive setting, reducing the number of false alarms, but might prevent the camera from detecting zone violations. The Aggressive setting is the most sensitive setting, detecting all suspect violations, but might cause the camera to trigger more false alarms.

Sensitivity: Defines the relative amount of motion, between 1 (low) and 10 (high), that will trigger a behavior. The higher the setting, the greater the chance for false alarms; lower settings will reduce the chance of false alarms, but might result in missed violations.

Behaviors

Behaviors: Analyze the camera's field of view to detect and trigger events or alarms when specific activity occurs. You can configure multiple analytic behaviors per profile. However, each analytic behavior has its own settings; many analytic behaviors also require you to configure zones that the camera will monitor for activity. The analytic behaviors available to your camera are dependent on the your model and firmware version.

Behavior Settings

Each analytic behavior contains a number of settings determining the conditions under which events are triggered. The settings available are dependent on the analytic behavior that you are configuring.

Enable Alarm: Enables a zone alarm. Analytic events for the zone will appear in the event stream when viewing live video, and trigger event handlers if the Analytic Event source is enabled.

Direction: Determines the direction of motion a zone should track. Events will only be triggered when your camera detects motion in the specified direction.

Alarm severity: Defines the severity of alarms triggered. Alarm severity helps you and other users prioritize alarms.

Dwell time: Defines the amount of time that an alarm will remain active when an alarm-triggering object exits the field of view or the zone.

Delay before alarm: Defines the amount of time an object must remain in a zone before triggering an alarm. For the Camera Sabotage behavior, this defines the delay between a scene violation and the trigger of an alarm.

Alarm at (Object Counting): Determines the number of objects entered into a zone that will trigger an alarm.

Follow Options: Determines whether an object is tracked only within the current field of view or beyond.

Camera Placement: Defines the vertical height of the camera's location relative to the area being monitored.

Optimize Zoom Settings for Objects of this Type: Defines the type of object to be tracked.

Minimum Object Size: Defines the minimum size of objects tracked. Observe the location of where you place this element and the relationship to the perspective of the scene.

Average Object Size: Determines the average size of objects to be counted.

Maximum Object Size: Defines the maximum size of objects tracked. Observe the location of where you place this element and the relationship to the perspective of the scene.

Sensitivity: Overrides the global Profile sensitivity setting for the selected behavior, defining the relative amount of motion, between 1 (low) and 10 (high) that will trigger an event or alarm. Sensitivity is an advanced option for some behaviors.

Zone Sensitivity: Defines the relative amount of motion within the selected zone that will trigger an event or alarm. Zone sensitivity can be set at a lower or higher setting than the overall sensitivity setting for the rest of the scene or the Profile sensitivity setting for the selected behavior.

Average Width: Defines the average width of objects to track.

Average Height: Defines the average height of objects to track.

Object Speed: Adjusts for speed if the scene is configured to track moving objects at a slower or faster rate than actual speed.

NOTE: When advanced options are enabled for AutoTracker or Stopped Vehicle behaviors, any excluded zones that you have previously created within the scene are disabled. You can create additional excluded zones, but the zones will remain exclusive to the behavior within the selected profile.

Abandoned Object

The **Abandoned Object** behavior detects objects placed within a defined zone and triggers an alarm if objects remain in the zone longer than the user-defined time allows.

Ideal Scene Setup for Abandoned Object Analytics

Install the camera in a ceiling or against a wall with the lens pointing at a slight downward angle, above regular motion activities.

The ideal scene for the Abandoned Object behavior contains light traffic where people or objects within the field of view are continually moving, there are minimal obstructions, and the background is clean. If heavy traffic or a busy background is unavoidable, place monitoring zones in relatively stable areas.

Avoid crowded scenes where people or objects remain in one place for long periods of time.

Adaptive Motion

The Adaptive Motion behavior detects and tracks objects that enter a scene and then triggers an alarm when the objects enter a user-defined zone.

The Adaptive Motion behavior is designed to work indoors and outdoors to track a few moving objects in uncrowded fields of view. The behavior learns the background scene over time and adjusts to changing conditions like snow, fog, wind, and rain.

Ideal Scene Setup for Adaptive Motion

Install the camera in a ceiling or against a wall with the lens pointing at a slight downward angle, above regular motion activity.

The ideal scene for Adaptive Motion behavior is one with light traffic and a clean background. If heavy traffic or a busy background is unavoidable, place zones in a relatively stable area.

Avoid crowded scenes where people move in all directions or stand in place for long periods of time.

NOTE: Objects that are very small might not be classified as the correct object type. This could result in false alarms or alarms not being triggered. If objects appear too small in the scene, zoom in on the particular zone of interest or move the camera closer to the zone of interest to increase the relative size of the objects in the scene.

Auto Tracker

The AutoTracker behavior detects and tracks movement in the camera's field of view. When the AutoTracker behavior is configured, the system automatically pans and tilts to follow the moving object until the object stops or exits the monitored area.

Ideal Scene Setup for Auto Tracker

Install the camera in a ceiling or against a wall with the lens pointing at a slight downward angle, above regular motion activity.

The ideal scene for the AutoTracker behavior contains light traffic and a clean background. If heavy traffic or a busy background is unavoidable, place zones in relatively stable areas.

Avoid crowded scenes where people move in all directions or stand in place for long periods of time.

NOTE: Objects that are very small might not be classified as the correct object type. This could result in false alarms or a failure to trigger valid alarms. If objects appear too small in the scene, zoom in on the particular zone of interest or move the camera closer to the zone of interest to increase the relative size of the objects in the scene.

Camera Sabotage

The Camera Sabotage behavior detects contrast changes in the field of view, and triggers an alarm if the lens is obstructed by spray paint, a cloth, or if it is covered with a lens cap. Any unauthorized repositioning of the camera also triggers an alarm.

Ideal Scene Setup for Camera Sabotage

Install the camera in a high position, looking down on the scene. The field of view should be as large as possible. A small field of view could result in the view being blocked by an adjacent object.

Avoid scenes with a dark, uniform background, low lighting, and large moving objects.

Directional Motion

The Directional Motion behavior generates an alarm in a high traffic area when a person or object moves in a specified direction. Examples of typical installations for this behavior include airports, entrances and exits, and vehicle traffic through tunnels.

In an airport installation, cameras observe passengers boarding a plane in a terminal. If a person moves in the opposite direction of the normal flow of traffic, an alarm triggers.

In a tunnel installation, an operator wants to observe traffic flow. If a car enters a tunnel through an exit, an alarm alerts the operator to activate the traffic signals to stop all traffic in the tunnel.

In an entrance or exit installation, a camera is pointed at an exit door. If a person tries to enter through the exit door, an alarm triggers.

Ideal Scene Setup for Directional Motion

Install the camera in a ceiling or against a wall with the lens pointing at a slight downward angle, above regular motion activity. The width of the object you want to detect should be at least one-tenth of the total width of the scene. To achieve increased accuracy in a crowded scene, set the width of the object to one-sixth of the total width of the scene.

The ideal scene selection for the Directional Motion behavior contains light traffic with all people and objects moving in the same direction, minimal obstructions, and a clean background; however, the behavior can be used in settings that do not meet all of these requirements. If heavy traffic or a busy background is unavoidable, place zones in a relatively stable areas.

Avoid crowded scenes in which people move in all directions or stand in one place for long periods of time.

Loitering Detection

The Loitering Detection behavior identifies when people or vehicles remain in a defined zone longer than the user-defined time allows. This behavior is effective in real-time notification of suspicious behavior around ATMs, stairwells, and school grounds.

Ideal Scene Setup for Loitering Detection

Install the camera in a ceiling or against a wall with the lens pointing at a slight downward angle, above regular motion activity.

The ideal scene for Loitering Detection behavior is one with light traffic and a clean background. If heavy traffic or a busy background is unavoidable, place the user-defined zone in a relatively stable area.

Avoid crowded scenes where people move in all directions or stand in one place for long periods of time.

Object Counting

The Object Counting behavior counts the number of objects that enter a user-defined zone. This behavior can be used to count people at a store entrance/exit or inside a store where the traffic is light. It might also be used to monitor vehicle traffic on highways, local streets and roads, parking lots, and garages.

Ideal Scene for Object Counting

If you plan to detect people, install the camera pointing downward (vertically) above regular motion activity. If you plan to detect vehicles, install the camera pointing downward at a slight angle above regular motion activity.

The ideal scene for the Object Counting behavior contains light traffic, minimal obstructions, and a clean background. If heavy traffic or a busy background is unavoidable, place zones (polygon or line) in relatively stable areas.

A one-directional motion scene (for example, a vertical hallway) is preferable. Avoid crowded scenes in which people or objects move in all directions or remain in place for long periods of time.

Object Removal

The Object Removal analytic behavior triggers an alarm if an object is removed from a user-defined zone. It is ideal for detecting the removal of high-value objects, such as a painting from a wall or a statue from a pedestal.

Ideal Scene for Object Removal

Install the camera in a high position looking down on the scene. The monitored object should occupy a quarter of the camera scene, and the field of view should be as wide as possible.

The ideal scene selection for the Object Removal behavior is a clean background with stable lighting and minimal obstruction.

Stopped Vehicle

The Stopped Vehicle behavior detects vehicles stopped near a sensitive area, and sets an alarm if the vehicle is present for longer than a user-specified period of time. This behavior is ideal for parking enforcement, identifying suspicious parking, finding traffic lane break-downs, and spotting vehicles waiting at gates.

Ideal Scene for Stopped Vehicle

Install the camera in a ceiling or against a wall with the lens pointing at a slight downward angle, above regular motion activities.

The ideal scene for the Stopped Vehicle analytic behavior contains light traffic in which vehicles are continually moving, there are minimal scene obstructions, and the background is clean. If heavy traffic or a busy background is unavoidable, place monitoring zones relatively stable areas.

Avoid crowded scenes where people or objects remain in place for long periods of time.





Zones




Some analytic behaviors require you to configure zones. A **zone** is a defined boundary that your camera monitors for an analytic behavior. A zone can be defined by a polygon or line. Zones defined by polygons trigger analytics based on motion within the zone; zones defined by lines trigger analytic events when an object within the scene crosses the line.

When configuring a zone-based analytic behavior, you can draw zones by selecting one of the zone-drawing tools, and then clicking within the scene to draw the zone.

NOTE:

- The availability of zone drawing tools is dependent on the analytic behavior you are configuring.
- Zones will not scale proportionally with changes in zoom. Set the zoom level for the camera before defining zones.

	Box: Tracks objects in a defined zone and triggers an alarm if the objects move in the same direction as defined.
	Polygon: Tracks objects in a defined zone and triggers an alarm if the objects move in the same direction as defined.
	Line: Tracks objects that cross a line and triggers an alarm if the objects move in the same direction as defined.
	Exclude Zone Box Tool: Ignores objects inside a defined zone.

	Exclude Zone Polygon Tool: Ignores objects inside a defined zone.
	Object Size Filter: Sets the minimum and maximum object size for a zone.
	Display Size: Sets the size of a tracked object, relative to the surrounding scene, and maintains the size of the object within the scene.

Configuring an Analytic Profile

A profile consists of profile settings, the behaviors you want to operate on the profile, and the zones you want to monitor for selected behaviors. The instructions below describe how to configure a profile, but there are many settings and possibilities for each step below; the following sections provide a detailed understanding of the settings and controls available for each behavior.

1. Select Analytic Configuration from the Events menu.
2. Click New to create a new profile or select the profile you would like to edit.
3. Configure Profile Settings.
4. Calibrate the scene. Click Calibrate Scene, adjust the scene accordingly, and then click Return to Main View.
5. Select a behavior.
6. Configure advanced settings for the behavior.
7. Configure zones for the behavior.
8. Select Activate Behavior to ensure that the behavior and all zones are enabled when you run the profile.
9. Repeat the previous 4 steps to activate additional behaviors on the profile.
10. Click Save.

Calibrating a Scene

The Calibrate Scene option, under Profile Settings, allows you to adjust an analytic profile's scene setup to reflect the perspective and viewing angle of your camera. A properly calibrated scene makes the object sizes you set when configuring zones for a behavior more meaningful, increasing the accuracy of analytics.

It is important that you calibrate the scene before running a profile. If you find that you are encountering an excess of false alarms, or are not registering normal analytic alarms, you might need to recalibrate the scene for the profile.

1. Select Analytic Configuration from the Events menu.
2. Select the profile for which you want to calibrate the scene, or create a new profile.
3. Click Calibrate Scene
4. *(Optional)* Click Pause to pause the field of view if the scene contains moving objects. This allows you to more easily calibrate the scene and focus on near and far objects.
5. Adjust each of the blue boxes to account for objects in the scene. There are boxes for objects at the near left, near right, and an object in the distance; drag the boxes over appropriate objects, and adjust the size of each box to approximate the size of the object the box overlays.
6. Set the real-world height of an object used in the calibration.
7. Select "Set Width" and set the width of both a near object in the scene and a far object in the scene.

8. Click Return to Main Menu.
9. Finish adjusting the profile, and then click Save.

Running Profiles

An analytic profile must be running for your camera to monitor the profile for analytic behaviors.

The complexity of each profile, including active behaviors and zones per behavior, increases the processing load on your camera. If the camera cannot support the processing requirement of a profile, either due to the complexity of the profile itself, or because other profiles are also running, you will not be able to run the profile.

1. Select Analytic Configuration from the Events menu.
2. Select the profile you want to run or stop.
3. Click Run to activate the profile or Stop to deactivate the profile.

NOTE: Stopping or deleting a profile deactivates all of the behaviors associated with that profile, including motion detection enabled through the Pelco API.

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