CM30/40/70/80/90 Manual

TABLE OF CONTENTS

UNPACKING

This chapter provides details about the contents of a complete product package, along with instructions on how to safely unpack the product and, if needed, initiate a product return.

Package Contents

The following table contains an overview of the package contents of the Product.

No.	Quantity	Description	Avonic SKU
1	1 pc	PTZ Camera	AV-CM93-IP-B/W
2	1 pc	Remote Control	AV-CM40-RC
3	1 pc	USB cable type A to type B	AV-USB20-AB
4	1 pc	* Power Adapter 12V/A (GME Technology (Shenzhen) Co., ltd, model number: GME24A - 120200FDS2)	AV-CM40-PSU
5	1 pc	RS-232 9-pin D-Sub female to mini DIN -8 male	AV-CM-RS-232
6	1 pc	5-way Phoenix Balanced audio con. (CTBP92HE/5)	AV-PHNX-5
7	1 pc	2-way Phoenix RS-485 connector	AV-PHNX-2

Each item is visualized below and referenced by the associated number in the table above:


AVONIC
1

Figure 4: Package Contents

Power Adapter Usage

* Use only the Power Adapter of GME Technology (Shenzhen) Co., Ltd with model number: GME24A-120200FDS2 in combination with the CM93 camera. Using another Power Adapter may lead to injury and/or damage to the product. See the picture of the Power Adapter label at the left:

UK plug Australian plug

Figure 5: Power Adapter label Figure 6: Power plugs

* The plug of the power plug cable related to the power adapter can be different according to the above mentioned picture of the package contents. This depends on the electrical system that is used in the country you live in. This is the case for UK and Australian customers, for example. See the picture above at the right.

Handling Precautions

Always take the camera by its base and do **not** move the position of the lens manually. See below.

Figure 7: Handling Precautions

Unpacking the Camera

Execute the following steps to unpack the camera and associated components:

1. Verify the following on and inside the box:
    - If the box and the plastic camera bag are sealed.
    - If the camera is placed inside the box in its protective foam.
    - If the contents of the box matches exactly the items as described in Package Contents.
    - If this is NOT the case, contact Avonic and stop here. See also the picture below:

Figure 8: Camera in its plastic bag and protective foam

2. Break the seal of the sealed camera bag.
3. Take the camera out of the bag. Be sure to follow the Handling Precautions while doing so.
4. Install the camera following the steps as outlined in chapter MOUNTING AND INSTALLATION.

Return Procedure

If, for any reason, you have to return the camera to Avonic, execute the following steps:

1. Place the camera back in its protective foam. Verify that the lens is in HORIZONTAL position!
2. Place the camera with **all** of its components in the box.
3. Verify that the contents of the box **exactly** matches the items as outlined in Package Contents.
4. Follow the Transport and Storage instructions and contact Avonic for the Return Procedure.

Mounting and Installation

This chapter outlines how to mount and install the Product in a correct and safe manner.

These steps are subdivided into the following groups, each of which is documented in a separate section:

1. Mounting on Wall or Ceiling
2. Connecting the Components to the Camera
3. Connecting a Controller to a Camera
4. Connecting the camera to a local network

Take the following precautions to prevent the Product from falling down, which may cause injuries:

- Set up this Product on a hard, stable surface, or mount it to a wall or ceiling.
- **ONLY** use an Avonic mount for mounting to a wall or ceiling.
- Ensure the mounting construction is capable of supporting four times the weight of the Product. (See 'General Specifications > Weight product' in the Product Datasheet for the exact weight.)
- Use a safety loop or drop protection that prevents the Product from falling if the mounting construction fails.
- During mounting and installation, **NEVER** install a Product above a person.
- Check the installation at least once a year. An improper mounting could cause the unit to fall off, resulting in personal injury.

Mounting on Wall or Ceiling

The following accessories (AV-MT300) are separately available if the client wants to mount the camera to the wall or ceiling. Contact your Avonic reseller or local distributor for purchasing details.

Wall and Ceiling mount (AV-MT300)

SKU white: AV-MT300-W
SKU black: AV-MT300-B

Visit www.avonic.com to download instructions for mounting the camera to wall or ceiling using the accessory AV-MT300.

Connecting the Components to the Camera

Execute the following steps to unpack the camera and associated components:

1. Connect all provided components (see Package Contents) to the ports at the rear of the camera. The figure below shows the applicable ports.

- Balanced Audio Line in 5-pin Phoenix connector
- RS-232 mini-DIN-8 IN (connect the supplied RS-232 cable)
- RS-232 mini-DIN-8 OUT for daisy chaining RS-232 connection
- RS-485 two-wire serial communication with 2-pin Phoenix connector
- Kensington Lock
- System Select (see Using the System Select)
- HDMI Type A
- USB2.0 Type B, UVC video output and control
- BNC 3G-SDI output, SMPTE 425M level A
- RJ45 Ethernet, with PoE (48Vdc, 0.25A, comply with LPS/PS2 circuits)
- DC12V power with locking screw (connect the supplied DC PSU)
- Power ON/OFF
- Fall protection eye

2. If you have connected the power cable to the camera, set the power switch at the back of the camera to the 'ON' position. If you use a PoE Ethernet connection, ensure that the Power switch is always ‘ON’.

After powering the camera on, it starts initializing by first rotating the Pan-Tilt to the maximum top right position and then to the center.

If position preset '0' has been stored, this is the position that will be called after initialization.

The current IR-channel setting and IP Address of the camera are displayed on the OSD Menu. From this point onwards, the user can start controlling the camera.

Balanced Audio Connection

To connect balanced audio to the camera, you need the following:

- Double Male XLR cable with the possibility to connect it to a 5-pin phoenix connector (CTBP92HE/5: see package contents).

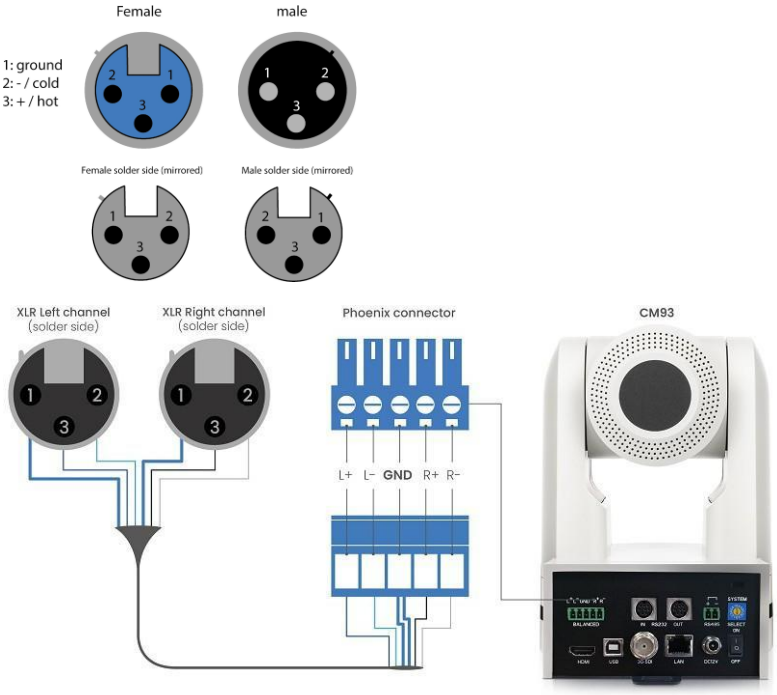
- Audio input device with multiple XLR input/outputs, such as a mixer. (It is also possible to use audio over HDMI).
- PoE (CAT) cable for streaming. See below:

Follow the instructions below to connect the audio cable to the Phoenix and the XLR connectors.

1. Connect the wires of the audio cable as shown in picture 1 to both XLR connectors. Note that the pictures of the connector's back are **mirrored!**
2. Connect the wires on the other side of the audio cable as shown in picture 2.

The colors of the wires in your audio cable may differ from the ones shown in the pictures (XLR and Phoenix connector) below. You need to identify the left and right channels, as well as the GND (ground) wire.

Picture 1: XLR connector **Picture 2: Phoenix connector**



Connecting a Controller to a Camera

You can connect one or more cameras to a VISCA (serial) controller.

A controller gives you direct control over the most important camera settings (e.g., Pan, Tilt, Zoom, Focus, White Balance). You can access all other settings through the **OSD Menu** of the camera using the controller.

Connecting the camera to a local network

The camera can be connected via a serial connection to USB, HDMI, SDI, RS-232, RS-485, or via a LAN Ethernet connection. Each of these options is outlined below.

Connecting via USB, HDMI or SDI

Execute the following steps to connect the camera to a desktop or a (computer) monitor via USB, HDMI or SDI:

1. Connect the camera to the desktop or monitor via the USB, HDMI or SDI port (see figure above).
2. Open the Windows Camera app or a third-party camera app.
3. Open the Settings.
4. Select the camera you just connected, or click on the option / icon to change the camera to the camera you just connected.
5. Press the **MENU** button on the provided IR Remote Control to open the **OSD Menu**.

See Using the Remote Control for more information on how to use the Remote Control.

Serial Connecting via RS-232 or RS-485

COM Port Settings

In default working mode, the camera can connect to a VISCA controller via an RS-232 or RS-485 serial interface. The applicable COM port settings are (where '*' stands for 'Default value'):

RS-232

- Baudrate: 2400/4800/9600*/115200
- Start bit: 1 bit
- Data bit: 8 bits
- Stop bit: 1 bit

RS-485 (half-duplex mode)

- Baudrate: 2400/4800/9600*
- Start bit: 1 bit
- Data bit: 8 bits
- Stop bit: 1 bit

RS-232 Interface

Connect the controller to the back of the camera via the RS-232 cables as shown below:

No.	Function
1.	DTR
2.	DSR
3.	TXD
4.	GND
5.	RXD
6.	GND
7.	IR OUT
8.	NC

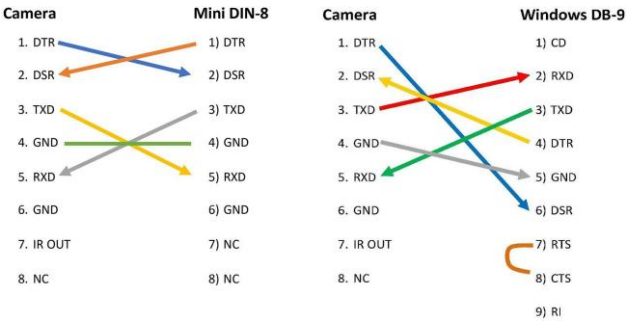


Figure 11: RS-232 Cable and Interface Connection (Mini DIN-8 and Windows DB-9)

RS-232 Network Connection

Execute the following step to connect the controller to the back of the camera(s) via RS-232:

1. Make the connection using **daisy chaining** network architecture. Keep in mind that the maximum cable length for RS-232 is 10–15 m.

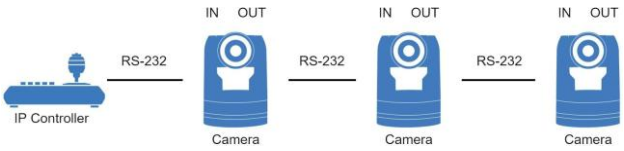


Figure 12: RS-232 Network Connection Diagram

For a connection **between** the Avonic cameras, you need a third-party RS-232 mini DIN-8 male-to-male cable, since both RS-232 ports at the back of the camera are only suitable for these types of connectors.

RS-485 Interface

Connect the controller to the + and - terminals at the back of the camera via the RS-485 cables, as shown below. The color of the connecting cables (orange and blue in the figure) may vary.

Figure 13: RS-485 Interface

RS-485 Network Connection

Execute the following steps to connect multiple cameras to RS-485:

1. Attach the cameras to a 2-wire twisted pair bus (maximum length 1200 m) that is terminated at both ends with a 120 Ω impedance resistor.

2. Ensure that the maximum distance from the bus to the back of the camera or controller is 5 m. If you use only one camera, the impedance resistor is not needed.

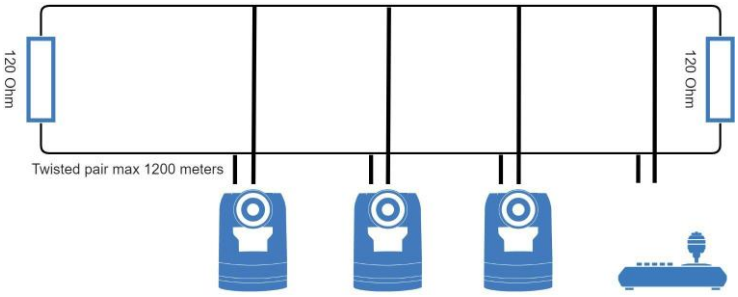


Figure 14: RS-485 Network Connection Diagram

Connecting via LAN

Avonic IP cameras can be controlled by any device using the VISCA over IP protocol (see the command list in Appendix A - VISCA Settings and Command List).

Settings

By default, the IP address of the camera is "192.168.5.163" with "admin" for both the username and password. The control parameters for the CM93 series cameras are as follows:

- IP Address: 192.168.5.163
- Username: admin
- Password: admin
- TCP or UDP port: 1259

IP (Network) Connection

Execute the following steps to connect an Avonic PoE camera to a LAN:

1. Use a standard (PoE) switch. If the unit is simultaneously connected to both PoE and its own power supply, the power supply will take priority. If the power supply is disconnected while PoE is present, the camera will remain operational without interruption.
2. Ensure that addressing is done via IP. When using VISCA over IP, the 'x' in all the '8x' addresses is always '1', where the VISCA address in a VISCA over IP environment is always 1. (See Appendix A - VISCA Settings and Command List for more information.)

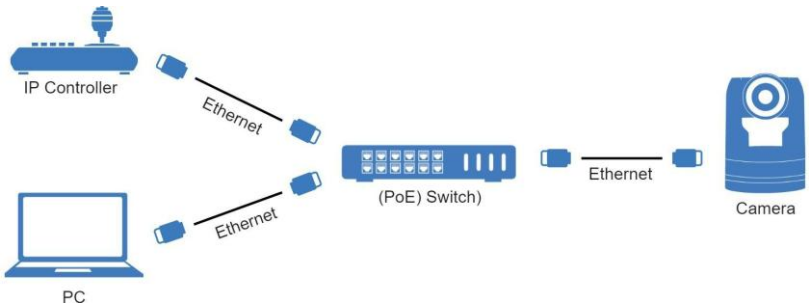


Figure 15: IP Network Connection Diagram

OPERATION

This chapter outlines all the camera features to help you to understand how the camera can be used. This is subdivided into the following sections:

1. WebGUI
2. Using the Remote Control
3. Other Key Combinations
4. OSD Menu
5. Using the System Select

WebGUI

You can access or change settings in the camera by using the WebGUI. The WebGUI can be accessed over IP using your local network.

Login

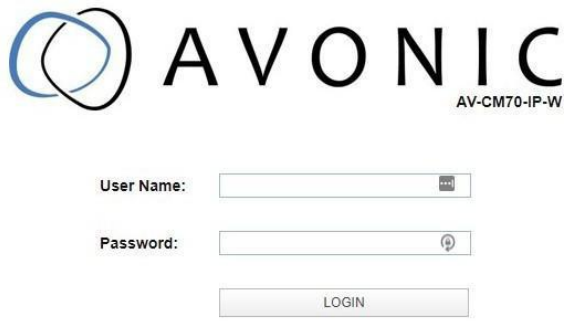


Figure 16: WebGUI > Login

Login

Execute the following steps to log on to the WebGUI:

1. Open your web browser. Enter the default IP address "192.168.5.163". The "Login" screen appears.
2. Enter "admin" for both the Username and Password and click **LOGIN** to continue. There is also a possibility to fill in the Username and Password automatically (see User).

- **DHCP:** If DHCP is enabled and no DHCP server is available, the camera will automatically assign itself an IPv4 link-local address between **169.254.0.0** and **169.254.255.255**. The IP address is shown on the screen at start-up.
- If you don't know the camera's IP address, see: How do I know the IP address assigned to my camera?

After a successful logon, the WebGUI is displayed. Here, you can select various tabs that are outlined below.

Preview (LOCAL)

In this tab, you can see a preview of the camera IP video output.

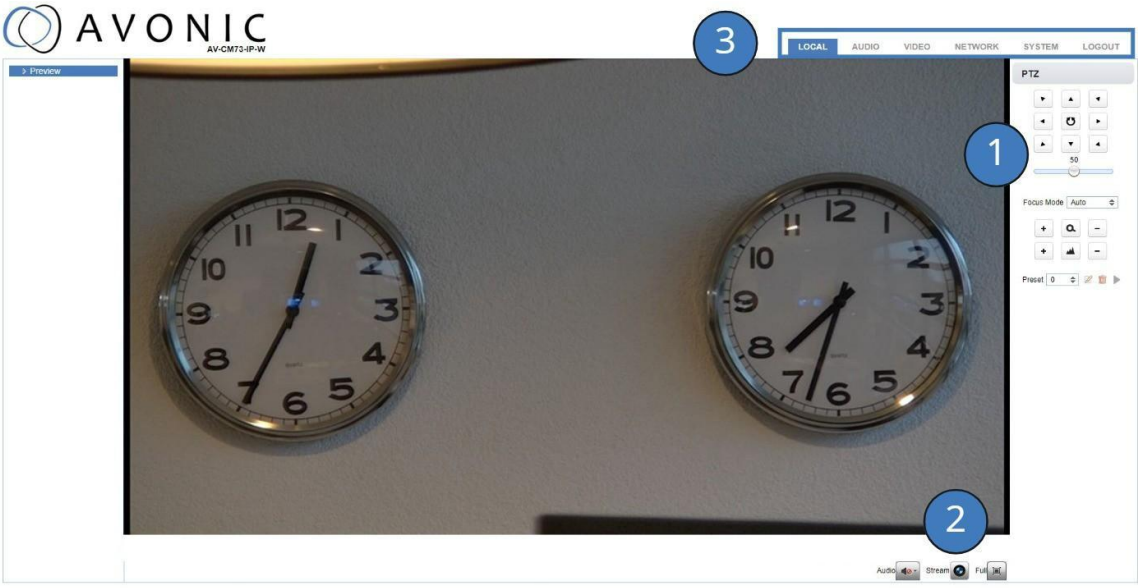


Figure 17: WebGUI > Preview

Next to the preview you see:

1. PTZ keys to move the lens of the camera and Focus keys (works only when the focus is set to manual). You can adjust the PTZ speed using the bar below the PTZ keys.
2. Click on the audio icon to activate the audio (make sure to connect an audio cable to the balanced audio input of the camera). Remember to enable the "Audio Enable" option in the Audio tab of the WebGUI.
    - Stream icon: Click to switch between main and sub stream. Click again to return to the main stream.
    - Full icon: Click to enter full screen. Press ESC to return to the WebGUI Preview.
3. On top: The main tabs to enter different pages of the WebGUI.

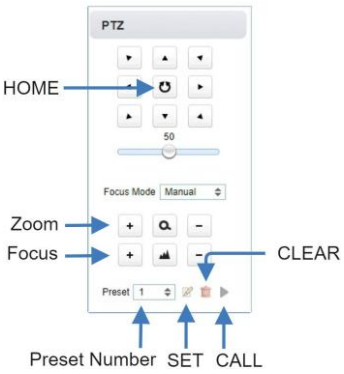
Set, Call and Delete Presets

To set, call and delete presets, follow these steps:

1. Set the camera in the desired position with the preferred zoom and focus level.
2. Type the number of the preset under "Preset" and click on the **SET** icon.
3. To call a preset, select the preset number and click the **RUN** icon.
4. To delete a preset, select the preset number and click the **CLEAR** icon.

Presets store the Pan and Tilt position along with the zoom level (excluding exposure or white balance settings). If manual focus is selected, the focus position is also stored. Be aware that upon camera restart, the lens will automatically move to the position of preset 0 if preset 0 was previously selected. Deleting preset 0 ensures that the camera starts with the lens facing forward.

Next to the preset icons, there is also a "Home" icon located at the center of the PTZ buttons. Clicking this icon causes the camera to zoom out and return to a forward-facing lens position. The "Home" icon cannot be used as a standard preset and affects only the Pan, Tilt, and Zoom position of the camera.



First time usage

If you are using the camera for the first time, it is helpful to set up the basic camera settings before exploring the functionalities in detail. Depending on the lighting conditions in your room or on stage, follow the instructions at:

1. Basic Camera Setup
2. Basic Camera Setup using (semi)manual settings

Basic Camera Setup

Do you have changing light conditions? Follow the instructions below to set up the basic camera settings. After that, you can continue with the rest of this chapter.

Connect cables

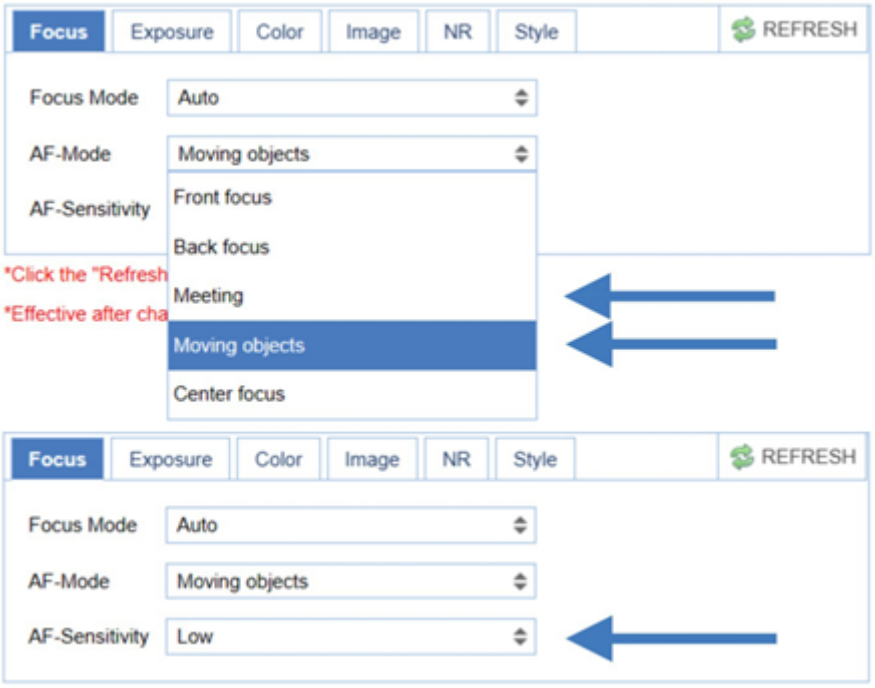
- Connect a CAT6a cable to the ethernet port of the camera and a (PoE) network switch. If you use a standard switch, also connect the power cable.
    - Connect an HDMI or SDI cable to the camera and a monitor.
    - Turn the ON/OFF button at the back of the camera to ON. When the camera starts, the lens will rotate and finish in the forward-facing position. This takes a few seconds.

Login and change output resolution

- Use the standard IP addressand log in to the WebGUI.
    - Navigate to **Output Format** and change the video out format (over HDMI or SDI) if your monitor does not support the default 4K resolution. Set it to 1080p60 or lower. Click **SAVE** to apply the new resolution.
    - You can also use the System Select button at the back of the camera to change the video output format.

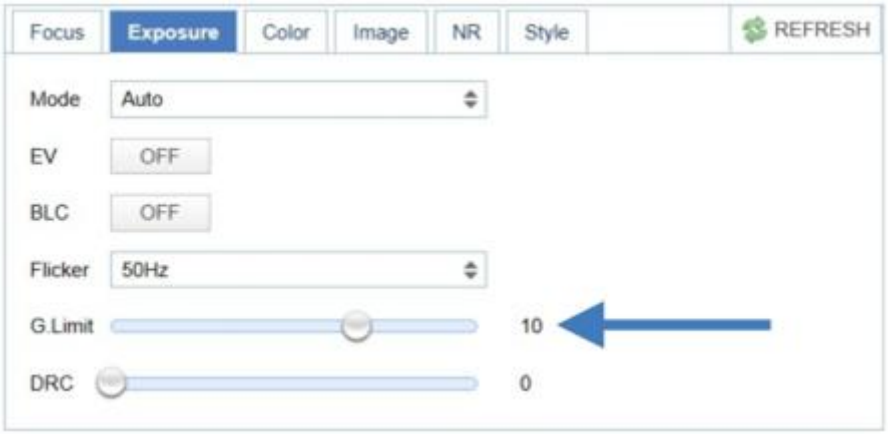
Focus

- Navigate to **Video > Camera Settings > Focus** in the WebGUI.
- Choose **Focus Mode > Auto**
    - At AF-Mode, choose **Moving Objects** or **Meeting**, depending on what is being filmed:
        - **Moving Objects:** For a person or object that is frequently moving in any direction in the room or on stage.
        - **Meeting:** For general meeting purposes where the person or object in the room or on stage is not exhibiting significant movement.
    - If you have chosen **Moving Objects**, set the **AF-Sensitivity** to **high**. You can leave it to **low** or **middle** when you have chosen **Meeting** at AF-Mode.



Exposure

Navigate to the Exposure tab and set the Gain Limit (G.Limit). The higher the Gain Limit, the lighter the picture will be.

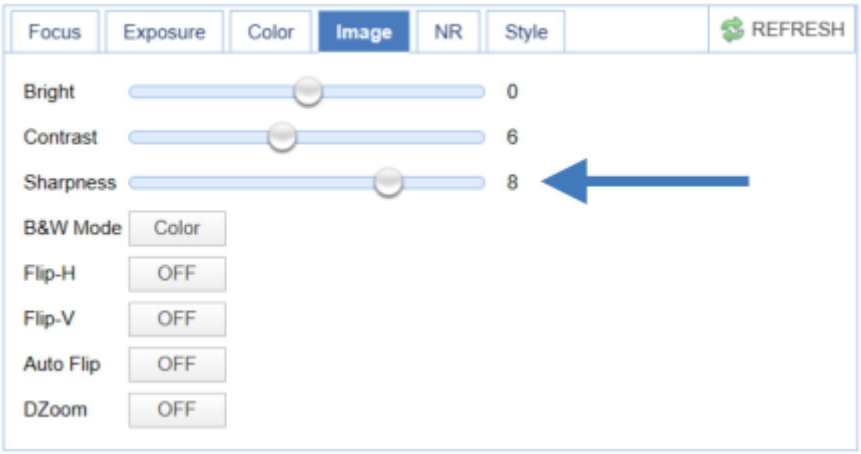


Color

Navigate to the Color tab and set the WB Mode to Auto.

Image

Navigate to the Image tab and set the sharpness. The higher the number, the more sharp the picture will become.



Noise Reduction

Navigate to the Noise Reduction tab and set the NR to OFF.

Basic camera setup using (semi)manual settings

Do you have fixed light conditions? Or is the filmed person or object not clear towards the background and the autofocus has difficulties to find the correct focus? Then a (semi)manual setup is useful. Follow instructions below:

Connect cables

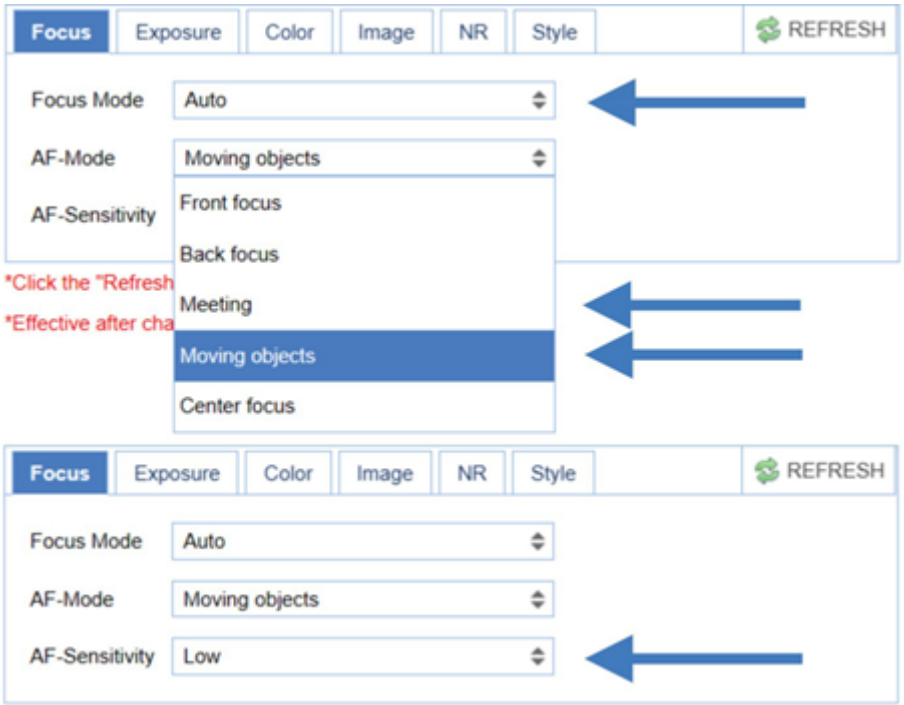
- Connect a CAT6a cable to the ethernet port of the camera and a (PoE) network switch. If you use a standard switch, also connect the power cable.
- Connect an HDMI or SDI cable to the camera and a monitor.
- Turn the ON/OFF button at the back of the camera to ON. When the camera starts, the lens turns from back to front and finishes facing forward. This will take a few seconds.

Login and change output resolution

- Use the standard IP addressand log in to the WebGUI.
    - Navigate to Output Format and change the video out format (over HDMI or SDI) when your monitor does not support the default 4K video resolution. Change this to 1080p60 or lower. Click SAVE to apply the new resolution format.
    - You can also use the System Select button at the back of the camera to change the video output format.

Focus

- Navigate to Video > Camera Settings > Focus.
- If you have difficulties focusing, choose **Focus Mode > Manual**. Otherwise, set the Focus Mode to Auto and choose at **AF-Zone > Moving Objects** if the filmed person or object is frequently moving, or **Meeting** for general meeting purposes.
- Set the AF-Sensitivity to **high** if you have chosen Moving Objects. Otherwise, you can leave it set to **low**.



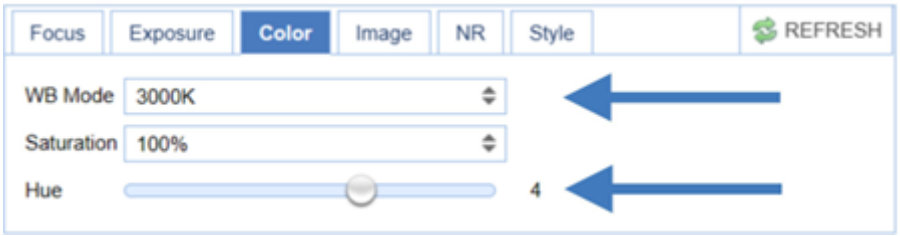
Exposure

- Navigate to the Exposure tab.

- Choose one of the following options under Mode:
    - SAE: Do you have fast moving persons or objects before the camera? Choose this mode to set the shutter speed.
    - AAE: Do you need more depth of field, because the distance between the camera and filmed object is large? Choose this mode to set the Iris (F-stop).
    - Bright: Do you have challenging light conditions? Choose this mode to set the artificial brightness.
    - Manual: Do you have a fast moving person or object on large distance? Choose Manual to set the shutter speed and the Iris (F-stop).

Color

- Navigate to the Color tab.
- Choose one of the White Balance values (2400K ~ 7100K) at WB Mode.
    - Do you need a lot of yellow light? Set the value of the WB Mode approximately between 5000K and 7100K.
    - Do you need a lot of blue light? Set the value of the WB Mode approximately between 2400K and 3300K.
- If needed, change the Hue to compensate.



Image

- Navigate to the Image tab and set the sharpness.
    - If needed, also change the bright and contrast settings to add more brightness to the picture.

Noise Reduction

Do you have a lot of noise in the picture? Navigate to the Noise Reduction tab and change the NR to smooth the picture over.

Tracking (license needed)

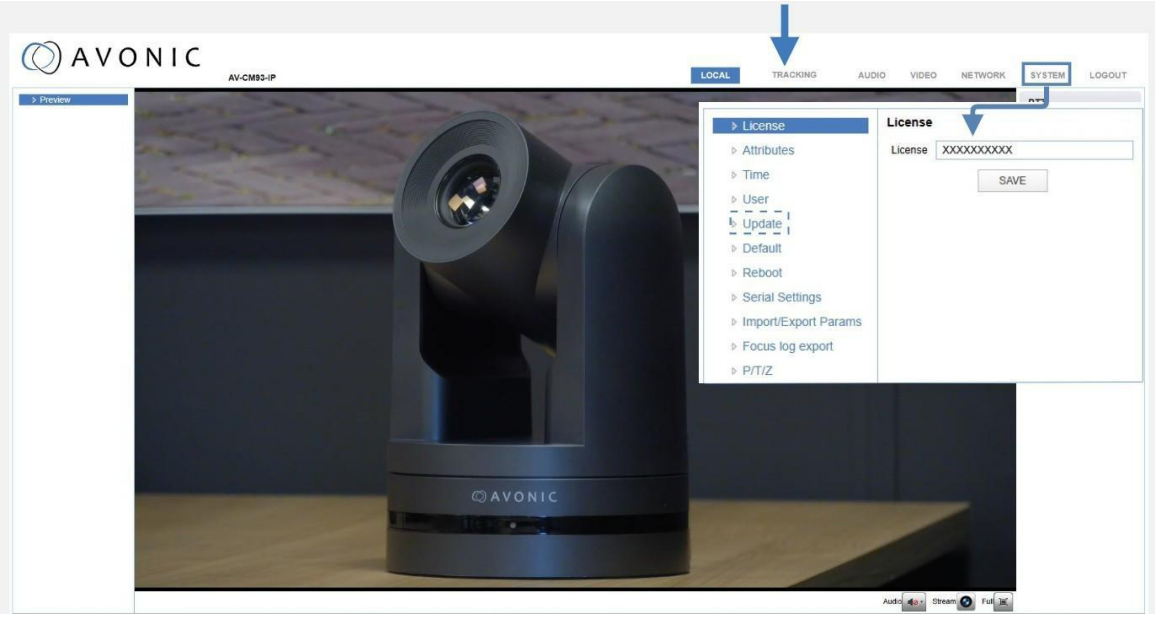
The CM93 camera has the possibility to track a person in front of the camera. The camera will automatically follow this person. This is very useful for (large) conferences, education (like teaching), worship, webcast etc. The Tracking feature is available when you obtain a separate license from the Avonic website.

This is a single camera tracking solution, meaning that the tracked person needs to stay in the picture. Unlike the CamDirector, there is no overview shot to use as fallback. If the speaker is no longer detected, the camera will return to the home position (preset 0) or Preset 200.

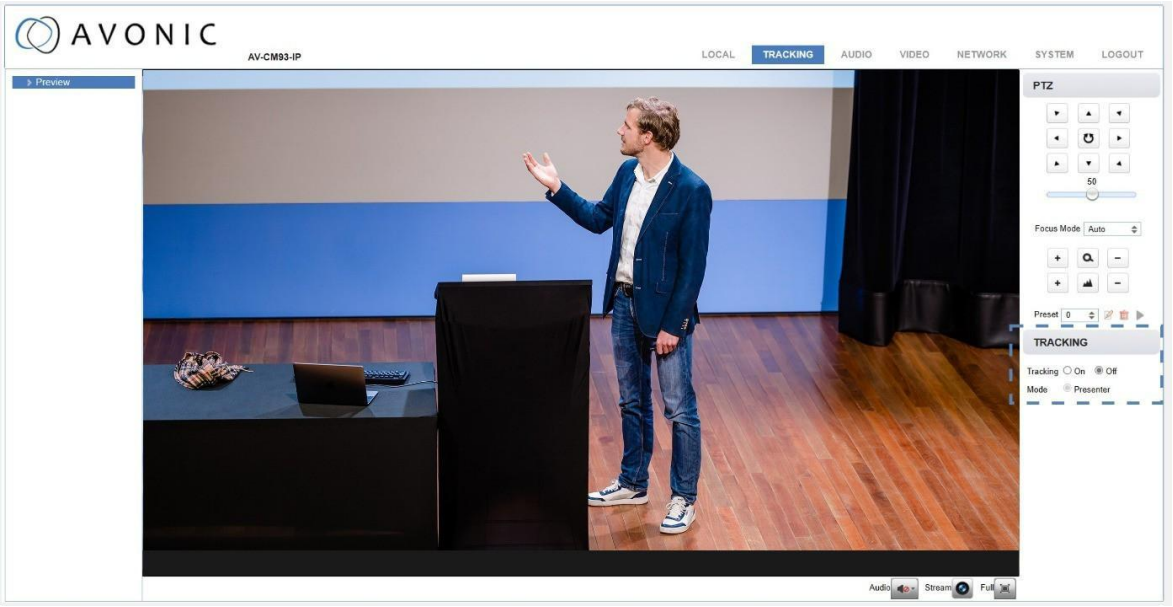
How to activate Tracking

Follow the steps below to unlock the Tracking feature:

- Update the firmware to MCU and Camera version 1.1.4 or later. You can find the firmware on the CM93 product page on the Avonic website. See also System > Update in this user manual.
- Once the update has been completed and the camera has rebooted, the feature license under System > License will become available. Enter the purchased license code in the designated field and click on "SAVE".
- Log out and in again, or refresh the WebGUI to see the Tracking feature.



When you open Tracking, you will see the following page in the WebGUI with an overview image at the top and the Tracking settings on the right.



Tracking

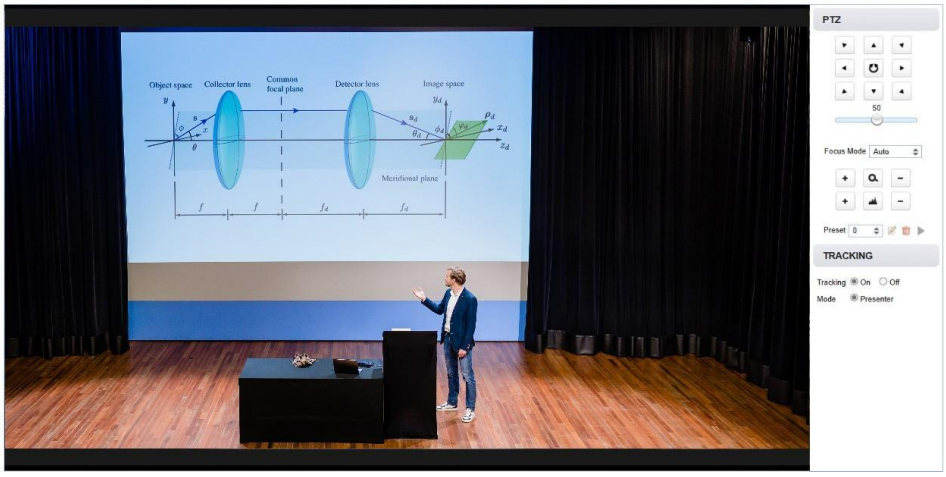
Tracking has the following options:

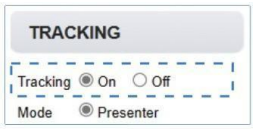
Feature	**Setting**	**Comment**
Tracking	ON / OFF	To set the tracking on or off.
(Tracking) Mode	Presenter	The camera always operates in Presenter Tracking Mode, which means that the camera will track and follow one person (at a time) in front of

Feature	Setting	Comment
		the camera, keeping this person’s upper body and face always in the picture.

Best Practices

- **Camera needs time to focus:** Do not run or walk very fast in front of the camera and stop regularly, as the camera needs time to move and focus on the presenter’s upper body and face.
- **Max 15 meters:** Tracking will operate up to a maximum distance of 15 meters from the camera. For larger distances we recommend the Avonic CamDirector.
- **Film face and upper body:** The speaker’s upper body and face should always be visible. If this is not the case (e.g. the speaker is behind a large object), the camera will return to the Home position (or preset 200).
- **Person closest to the camera will be tracked:** If multiple presenters are in the picture, the camera will track the person who is (relatively) closest to the camera. For example, if a small person is in the foreground and a larger person is in the background, the camera may track the larger person if they occupy more visible space.
- **Avoid large objects and busy backgrounds:** These can interfere with accurate tracking. Keep the background simple to allow the camera to focus on the speaker’s face.
- **Focusing issues:** If you experience problems with autofocus, try another autofocus strategy or switch to **Focus Mode > Manual** to configure focus manually.





Preset 200

If the camera is unable to locate the person on stage, the Tracking feature can be configured to return to preset 200 instead of the camera's home position. This can be useful for returning to a previous tracking position or using an overview shot of the room or stage.

The camera will **only** return to preset 200 if you have specifically set this preset. It will also use preset 200 upon startup instead of preset 0.

How to set Preset 200

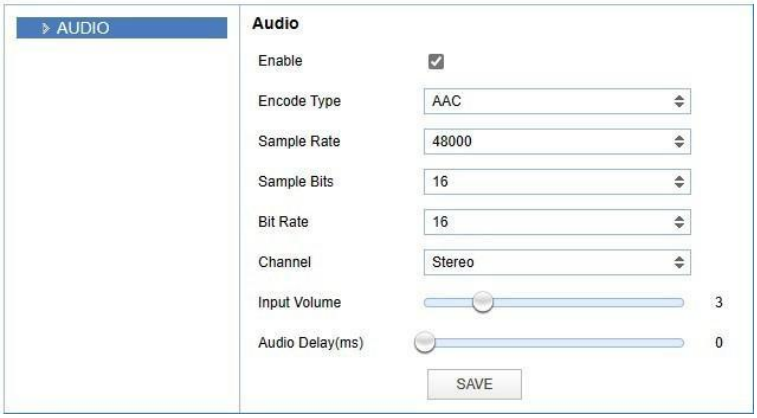
- Disable Tracking. Click **OFF** to turn off the Tracking feature.
- Type **200** in the Preset field.
- Use the PTZ, zoom and focus buttons, or the remote control to adjust the camera position as desired.
- Click **SET** to store the preset. Preset 200 is now saved.

How to use Preset 200

- Turn Tracking OFF, click CALL preset, and then turn Tracking ON again. This ensures that the camera does not mistakenly follow other persons in the frame when using the Tracking feature.
- Walk out of the picture. When the camera no longer detects a person in front of it, it will automatically return to Preset 200.

AUDIO

Connect an audio cable with XLR connectors to the 5-pin Phoenix connector and plug the cable into the camera. See Balanced Audio Connection for more details.



Audio Settings in WebGUI

Figure 18: WebGUI > Audio

Make your settings as follows:

1. Enable (checked) or disable (blank) embedding of audio input (camera rear).
2. Encoding type: only AAC.

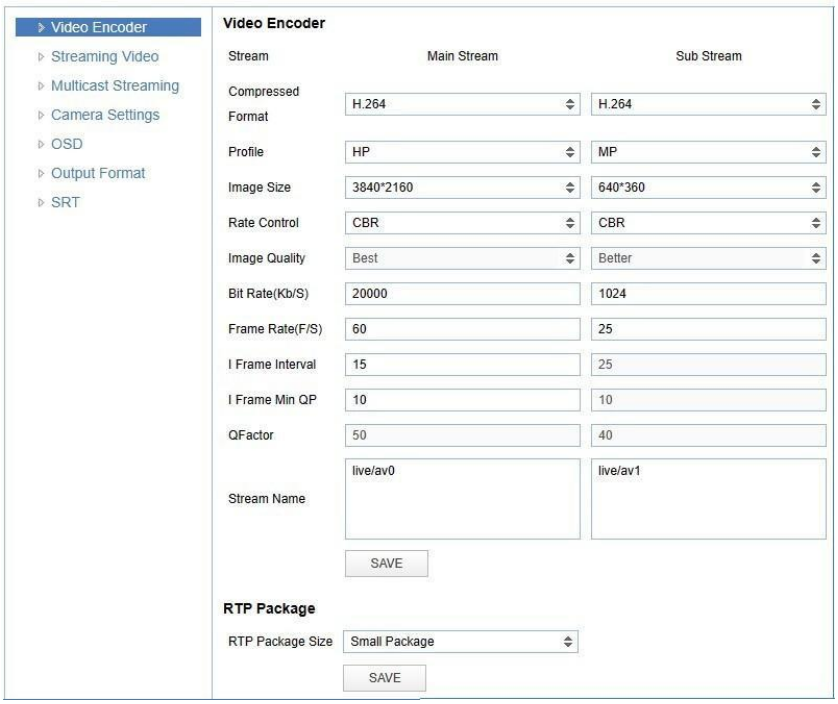
3. Sample rate: only 48000.
4. Set the sample bits always to 16.
5. Select the Bitrate: 32, 48, 64, 96 or 128 Kbps.
6. Select the Channel: Mono or Stereo.
7. Set the Input Volume: 1 ~ 10.
8. Set the Audio Delay (ms): 0 ~ 200.
9. Click **SAVE** to apply your settings. A small confirmation dialogue appears in the bottom right corner.

Make sure to **enable audio** and to click the **audio button** at the bottom of the "Preview page" of the WebGUI.

VIDEO

Video enables you to configure your video settings, which includes encoder, streaming and camera settings.

VIDEO - Video Encoder



The Video Encoder settings are listed below.

Video Encoder Option	**Main Stream**	**Sub Stream**
Compressed Format	MJPEG / H.264 / H.265	MJPEG / H.264 / H.265
Profile	BP / MP / HP	BP / MP / HP
Image Size	3840x2160 / 1920x1080 / 1280x720	1920x1080 / 1280x720 / 720x480 / 640x480 / 640x360 / 320x240
Rate Control	CBR (constant bit rate) / VBR (variable bit rate) depending on format	
Image Quality	Fixed at ‘best’	Fixed at ‘better’
Bit Rate (Kb/s)	64–81920	64–5120
Frame Rate (F/s)	5–60 frames per second	5–30 frames per second
I Frame Interval	1–300	1–150
I Frame Min. QP	10–51	10–51
QFactor	50	40
Stream Name	live/av0	live/av1

Video Encoder Option	Main Stream	Sub Stream
RTSP Link	rtsp://<ip-address>/live/av0	rtsp://<ip-address>/live/av1
RTP Package	Small Package (standard MTU size, 1500 bytes), Big Package (approx. 60kb MTU size)	

Saving settings for NDI

NDI uses the **Main Stream** of the camera. Execute the following steps to save your settings:

1. Click **SAVE** to apply your settings. A small confirmation dialogue appears in the bottom right corner.
2. Reboot the camera if you changed RTP package.
3.

VIDEO - Streaming Video

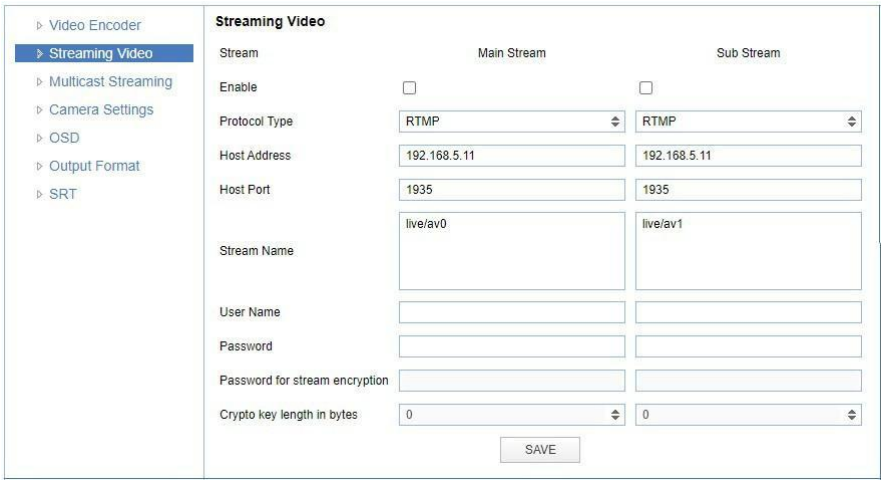


Figure 20: WebGUI > VIDEO > Streaming Video

The recommended Streaming Video settings are listed below. See for more Streaming on the website.

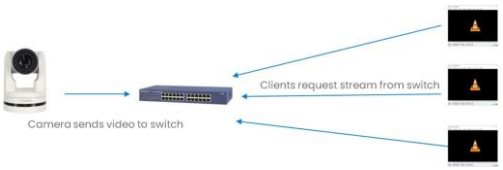
Stream Option	Main Stream	Sub Stream
Enable	Mark checkbox to enable	Mark checkbox to enable
Protocol Type	RTMP, SRT	RTMP, SRT

Host Address	192.168.5.11	192.168.5.11
Host Port	1935	1935
Stream Name	live/av0	live/av1
User Name	Empty is default setting	Empty is default setting
Password	Empty is default setting	Empty is default setting
Password for stream encryption*	Empty is default setting	Empty is default setting
Crypto Key Length in bytes	0, 16, 24, 32	0, 16, 24, 32

Execute the following steps to save your settings:

1. Mark the checkbox to enable and select RTMP or SRT as Protocol Type. You need an optional license if you want to use SRT.
2. (* in the table) Enter a value for **Password for stream encryption** if the selected **Protocol Type** is "SRT". This is the **Caller Mode**. For the **Listener Mode** see Video - SRT.
3. Change the **Host Address** to the IP address of the camera.
4. Click **SAVE** to apply your settings. A small confirmation dialogue appears in the bottom right corner.
5. Start a video streaming application like VLC mediaplayer, Daum Potplayer etc.
6. At **Media > Open Network stream >Network** type rtmp//192.168.5.11/live/av0 or rtsp//192/168.5.11/ live/av0 (or live/av1 if you use the substream) and click Play.

VIDEO - Multicast Streaming If you intend to stream your live video to a group of hosts within a network, multicast streaming is the suggested method. Multicast streaming permits the transmission of data (video) to a group of hosts in a network concurrently, with minimal network traffic. To achieve this, you will require a switch that supports multicast streaming to transmit the video stream. Additionally, clients need to be connected to this multicast switch to request the video stream from it. See the picture below:



Next to multicast, there is also unicast allowing you to stream video (via RTSP) to one single users IP address. For more information read also Unicast, Multicast and Broadcast on the website.

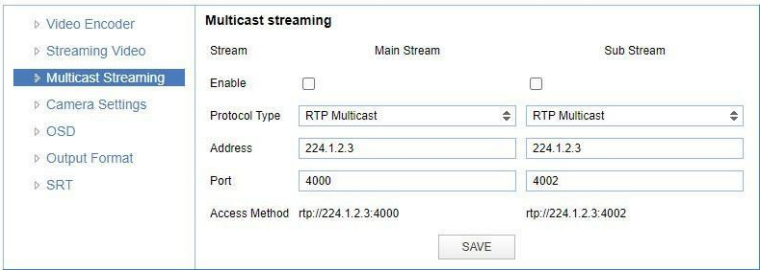


Figure 21: WebGUI > VIDEO > Multicast Streaming

The recommended Multicast Streaming settings are listed below.

Stream Option	**Main Stream**	**Sub Stream**
Enable	Mark checkbox to enable/ disable	Mark checkbox to enable/ disable
Protocol Type	RTP Multicast/ TS Multicast/ TS Unicast	RTP/ TS Multicast/ TS Unicast
Address (multicast)	224.0.0.0~ 239.255.255.255	224.0.0.0~ 239.255.255.255
Address (unicast)	Specify the IP address to which you want the Unicast stream pushed.	
Port	4000 (default)	4002 (default)
Access Method	rtp://224.1.2.3:4000	rtp://224.1.2.3:4002

Click **SAVE** to apply your settings. A small confirmation dialogue appears in the bottom right corner.

VIDEO - Camera Settings

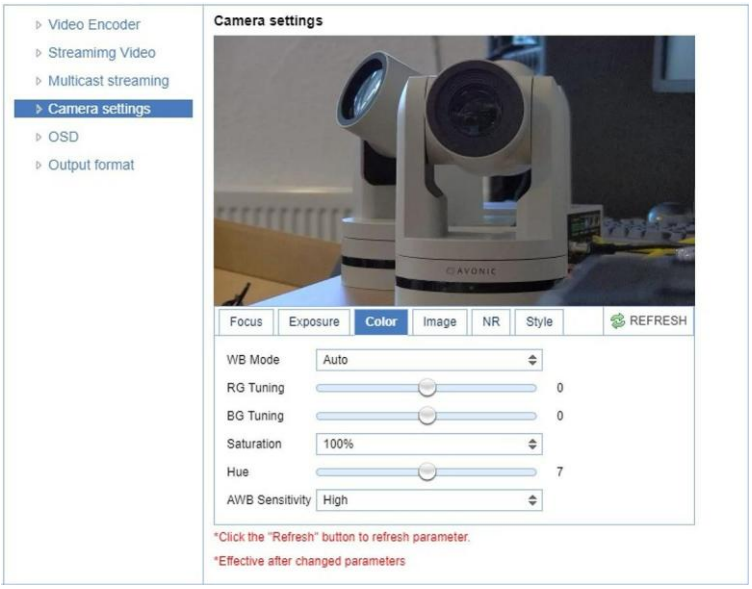


Figure 22: WebGUI > VIDEO > Camera Settings

Execute the following steps to define your camera settings:

1. Use the **Camera Settings** tabs (outlined below) to change the OSD settings as if you are using the remote control.
2. If you have changed a value with the remote control, update the WebGUI using the **REFRESH** button.

A picture is shown **ONLY** if the main video stream is set to H264.

Focus

Figure 23: WebGUI > VIDEO > Camera Settings > Focus

The Focus settings are explained below.

Focus Mode

Auto The camera automatically adjusts the focus position based on the contents of the captured object.

Manual The user is able to set a fixed focus position manually. This can be useful when the contents of the filmed object are not clear towards the background and the autofocus has difficulties finding the correct focusing.

One-push The camera will focus once and will keep the focus in that position until another focus command is sent.

AF-Mode

This setting defines the area where the autofocus is aimed at and is not visible at manual focus.

Front Focus: Focus close to the camera has priority. In the absence of an object or person nearby, the camera will focus on an object or person at a greater distance.

Back Focus: Focus far from the camera has priority. If there are no objects or persons to focus on from far, the camera will adjust the focus to an object or person that is closer to it.

Meeting: For general meeting scenarios. Focussing straight forward. Camera considers also focussing on the whole room or stage.

Moving Objects: For focussing in the whole room or on stage. Re-focussing is done when the object or person is moving around.

Center Focus: Focus straight forward at the middle of the room or on stage. Re-focussing is done when the object or person moves.

AF-Sensitivity

Sets the level of speed with which the autofocus responds. This can be useful if you have people walking through the picture. If the setting is 'High', the camera will respond immediately. The camera will remain less responsive

to sudden and brief changes when the AF-Sensitivity setting is set to 'Low' or 'Medium'. This setting is visible and applicable only when the Focus Mode is set to 'Auto'.

In some cases the autofocus will have some difficulties to focus. We are highly recommended you to focus manually in order to avoid autofocus issues. See also Troubleshooting/ Image in this manual.

Exposure

If you click in the field after the option 'mode', you will see that you have the following Exposure options: Auto, Manual, SAE, AAE and Bright. These options are outlined below.

Auto Exposure Mode

In Automatic exposure mode, the camera determines the iris and shutter settings. See the settings below:

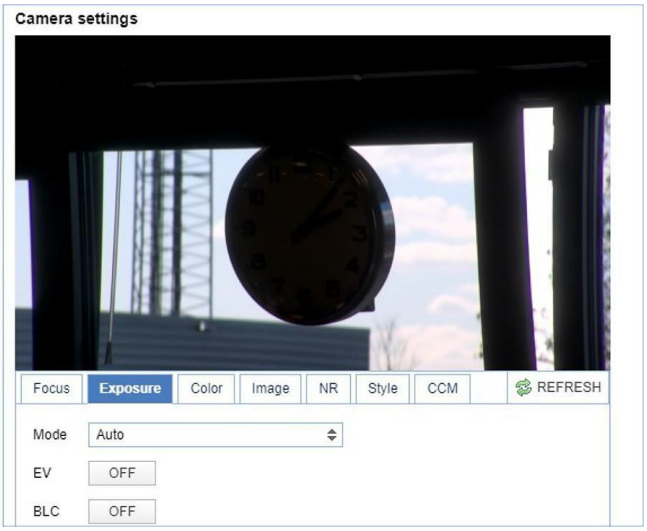
EV (Exposure Value): ON/OFF and Level

If the light conditions require this, you can create a quick adjustment to your current exposure settings without actually changing the fundamental values like iris and shutter. When enabling this setting and using the EV level, you can make the picture lighter. Take note that this setting is artificial.

Take care to not 'overdo' the settings or the picture will become washed out bright or too dark.

BLC (Back Light Compensation): ON/OFF

Compensation for having to film against bright light directly into the lens. Enabling the BLC (Backlight Compensation) will make the filmed object slightly more visible, but it may cause overexposure in the background. See the pictures below:



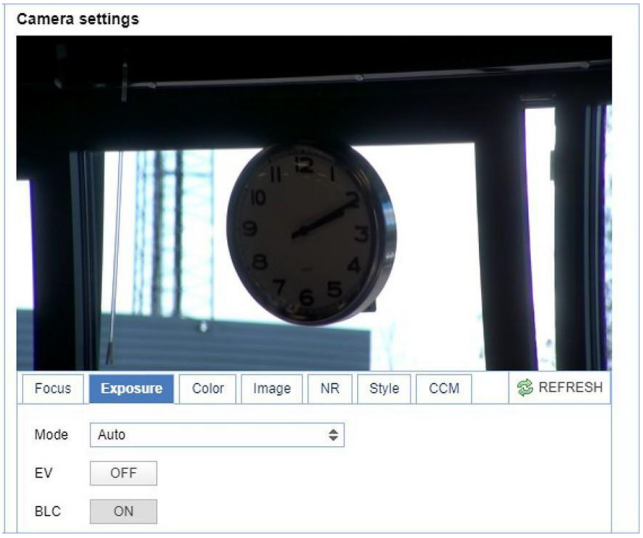


Figure 24: Camera Settings > Auto Expo (BLC OFF) Figure 25: Camera Settings > Auto Expo (BLC ON)

Flicker

This setting handles the flickering of artificial lighting in its operating space. Under certain artifical lighting conditions it is possible that you experience flickering in the picture. Depending on these lighting conditions you can reduce the flickering by using 50hz, 60hz, or set this feature to OFF. See for more Anti-flickering on the website.

G.Limit

Gain limit is the maximum level of artificial brightness and contrast that the camera can automatically add to the image. This setting will make a significant difference to the overall picture.

Be careful not to set the Gain Limit too high, because this setting add noise to the picture in dark areas and produce a washed out, greyish picture.

Be careful not to set the Gain Limit too high, because this setting add noise to the picture in dark areas and produce a washed out, greyish picture.

DRC

Dynamic Range Compression has a similar effect on the picture as the above mentioned gain limit. The DRC works by compressing the natural dynamic range of the image by taking out the darkest and lightest parts. This can be a particular helpful setting when the light conditions are challenging. The differences should be clearly visible in dark parts of the image, as they will become lighter/more grey as the level of DRC increases. Like the Gain Limit the DRC will add more noise to the picture.

Manual Exposure Mode

Figure 26: WebGUI > VIDEO > Camera Settings > Manual Exposure Mode

In Manual exposure mode, you can manually set the shutter, Iris and DRC options.

Shutter

The shutter setting determines the amount of time per second that the sensor is exposed. The range of the shutter speed setting is 1/25th of a second (40 milliseconds) to 1/10000th of a second (0.1 milliseconds). If you shoot a video with a shutter time of 1/25th of a second, you can imagine that the video becomes blurry and overexposed. The faster the shutter is set to open and close, the sharper your filmed object will be. However, the amount of light that falls onto the sensor is also diminished. A higher shutter setting comes in handy when you have regularly a fast moving person or object before the camera. Otherwise keep the shutter as low as possible.

If you are inexperienced or if the light conditions change a lot, it's best practice to keep the came ra on the automatic exposure setting.

Iris

The Iris is a part of a lens that regulates the amount of light that passes through the lens and onto the sensor, by altering the diameter of the hole through which the light enters. The diameter of the hole is measured in **F-stop** value. A higher value results in less light, while a lower setting results in more light. This setting affects the length of the depth of field. The higher F-stop you use, the deeper your depth of field. Reason: the smaller the aperture, the more focused the light beams will be, resulting in a more focused image. This implies that the light beams are highly

"concentrated," causing the camera to focus at a point further away (making the camera in the picture

sharp). However, the object located in front (i.e., the IR remote control) is not within the focus range, resulting in an out-of-focus image.

A higher F-stop value comes in handy when the filmed person or object is in great distance from the camera (and zooming in is not possible). At the other side the lower F-stop values are useful when the filmed person or object is close to the camera.

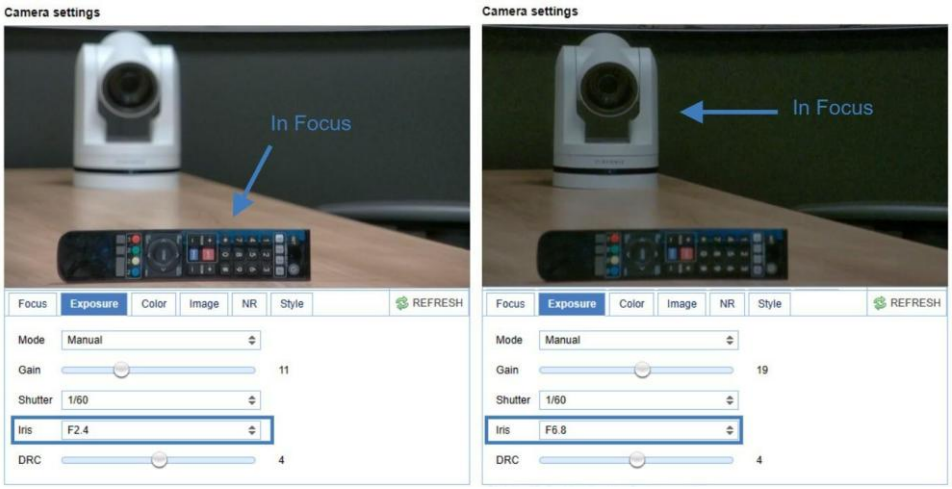


Figure 27: Exposure > Manual with Iris F2.0 (left) and Iris F6.8 (right)

DRC

Dynamic Range Compression has a similar effect on the picture as the above mentioned gain limit. The DRC works by compressing the natural dynamic range of the image by taking out the darkest and lightest parts. This can be a particular helpful setting when the light conditions are challenging. The differences should be clearly visible in dark parts of the image, as they will become lighter/more grey as the level of DRC increases. Like the Gain Limit the DRC will add more noise to the picture.

SAE Mode (Shutter Auto Exposure)

The shutter speed is user-adjustable in this mode. The camera automatically decides the best Iris F-stop value for an optimal exposure setting. This setting will come with a cost. The higher the shutter speed, the more sharp the picture become, but also the more dark the picture will be.

The shutter speed is the amount of time that each frame of the sensor has been exposed to light.

The shutter speed is the amount of time that each frame of the sensor has been exposed to light.

To compensate poor lighting conditions, it is possible to adjust the Gain and DRC (Dynamic Range Compression). The DRC works by compressing the natural dynamic range of the image, taking out the darkest and lightest parts. This can be a particular helpful setting when the light

conditions are challenging. The differences should be clearly visible in dark parts, as they will become lighter / more grey as the DRC increases.

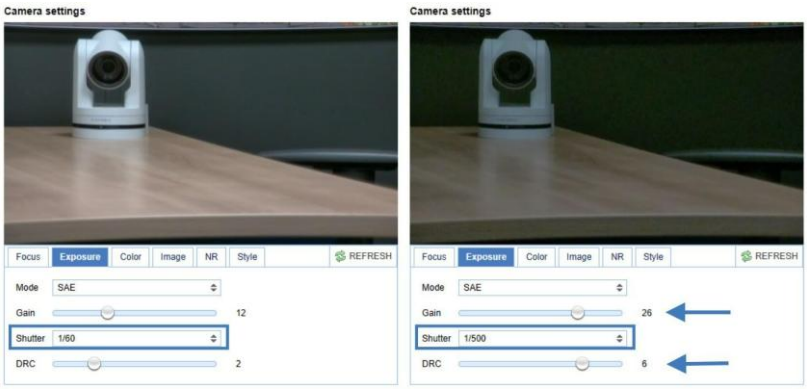


Figure 28: Exposure > Shutter speed at 1/60 (left) and 1/500 (right)

AAE Mode (Aperture Auto Exposure)

In this mode you can set the Iris F-stop value (aperture). The higher the F-stop value, the deeper the depth of field will become in the picture. The camera will automatically set the shutter speed based on the Iris F-stop set by

the user. As the camera determines the preferable shutter speed, it is possible to turn the anti flicker setting to the required 50Hz or 60Hz to eliminate the effects of a shutter functioning at 1/50th of a second, for example. Like, with the shutter speed in SAE mode, there is a cost. The higher the F-stop value, the more dark the picture become. To compensate this you can set both the Gain Limit and the DRC.

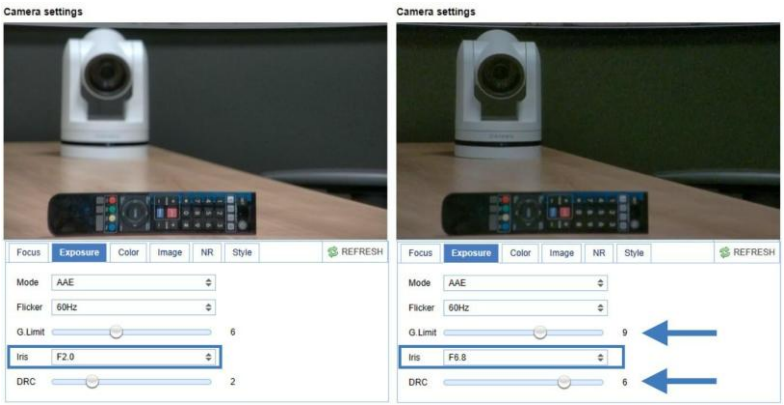


Figure 29: Exposure > AAE with Iris F2.0 (left) and Iris F6.8 (right)

Bright Mode

This mode is to try and create a decent image when the light conditions are exceptionally poor.

Figure 30: WebGUI > VIDEO > Camera Settings > Bright Exposure Mode

In this mode, you should keep the Bright level, Gain limit and DRC as low as possible to avoid too much noise in the picture. If the level of noise in the image becomes unacceptable, you can use noise reduction to smooth the picture over.

Color

The color modes inside the camera are designed in such a way that the video output of the camera can match the current light conditions to produce accurate colors. There are several automatic preset modes and a manual mode to set the colors to the preference of the user.

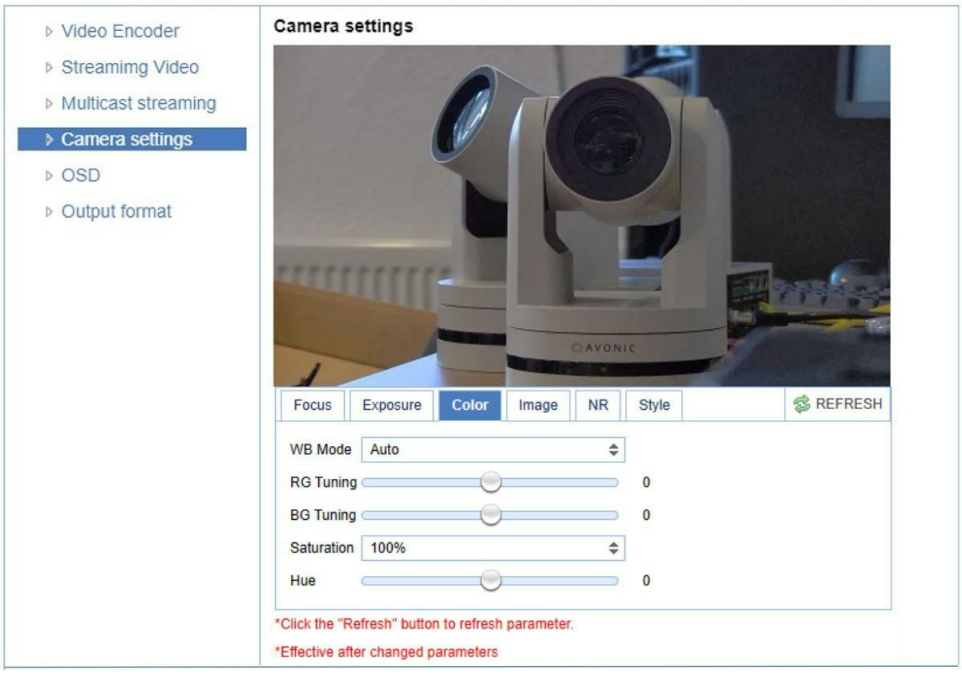


Figure 31: WebGUI > VIDEO > Camera Settings > Color

The settings are listed below.

WB mode

RG Tuning BG Tuning Saturation Hue or tint

The camera continuously measures and defines the light conditions and acts accordingly (Auto). In this mode, there are some adjustments that can be made to tune the image to the preference of the user (in manual or when the white balance is set to a specific value).

Red Gain Tuning, increase or decrease red. Blue Gain Tuning, increase or decrease blue.

How saturated the image's colors are. 0% would produce a black and white image.

The balance between green and red. -15 is green, 15 is red, 0 is natural color.

Image

Figure 32: WebGUI > VIDEO > Camera Settings > Image

These are settings that have an effect on the image post-processing. Basically, these settings are all artificial: they don't affect the optical parts of the camera itself. The settings are listed below.

Bright The amount of detail that is visible in darker areas of the image. Be careful n ot to set this setting too high, as you will see that the image becomes 'milky-white'!

Contrast The amount of detail that is visible in lighter areas of the image.

Sharpness Artificial contrast, be careful not to set this too high as it will create a sort o f 'halo' around sharp edges of filmed objects. The setting Sharpness coincides with the setting of Noise Reduction.

B&W Mode Black and White Mode makes the picture black and white.

Flip-H, Flip-V, Auto flip The Flip-H mode turns the picture horizontally, while the Flip-V mode turns it vertically by 180 degrees. When Auto Flip is on, the camera will automatically flip the picture horizontal and vertical.

DZoom This is the digital zoom of the camera. With this feature ON, you can zoom in slightly on the filmed object. Disabling this feature while the camera is already zoomed in to the maximum level, will cause the camera to automatically zoom out several times, until it reaches the maximum zoom level without using the additional digital part.

NR (Noise Reduction)

Figure 33: WebGUI > VIDEO > Camera Settings > NR

Noise reduction can be used to soften the image when noise is present due to poor lighting conditions. The higher the amount of noise reduction, the softer the image will be, ultimately resulting in loss of details.

Be careful when adjusting the noise reduction, as it can take away the natural ‘crispness’ of the image. You will lose the natural 'crispness' of the image, if you set the dynamic contrast and gain too high (this will cause more noise). Better practice is to add light to the filmed object.

Style

Figure 34: WebGUI > VIDEO > Camera Settings > Style

Here, you can choose the style you want, such as **Default** (standard setting), **Normal** (which makes the picture more 'natural'), **Clarity** (makes the picture more clear), **Bright** (which makes the picture more bright) and **Soft** (which softens the picture).

VIDEO - OSD

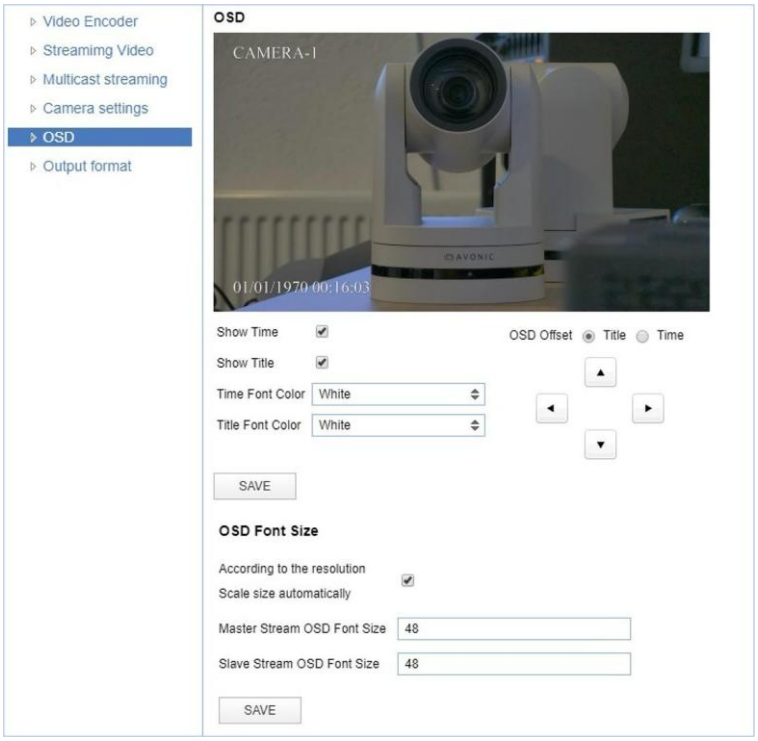


Figure 35: WebGUI > VIDEO > OSD

In this area, you can put a camera name and time as overlay on the IP stream (the overlay feature is exclusively available on the IP stream, not on other outputs).

Only the output of the camera will be shown with the main stream set to H264.

Fields

You can enable or disable **Show Time** and **Show Title** by marking or unmarking the checkbox next to the respective setting (the time and name settings can be found under the tab **SYSTEM**, sections **Attributes** and **Time**). You can use the dropdown menus **Time Font Color** and **Title Font Color** to set the desired font colors.

You can use the directional arrows on the right to move the title and time to the preferred position on the screen.

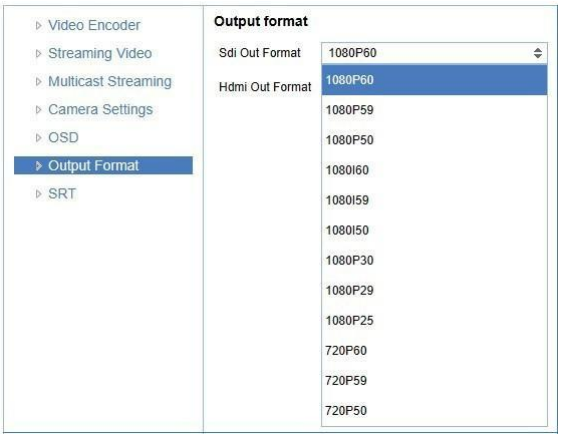
OSD Font Size (related to Camera Name and Time)

You can use **Scale size automatically** for both main stream and sub stream. If checked, the camera name and time overlay will always scale with the image, keeping the proportions intact.

Click **SAVE** to apply your settings. A small confirmation dialogue appears in the bottom right corner.

VIDEO - Output Format

Figure 36: WebGUI > VIDEO > Output Format



This setting is related to the output resolution and frame rate on the HDMI and SDI connectors. SDI resolution between 720p50 - 1080p60, HDMI resolution between 720p50 - 3840x2160p60. For the 4K resolutions you need a 4K compatible monitor.

Use the WebGUI to set the resolution of the main and sub IP streams. The resolution of the USB output is determined by the computer that is connected to it.

Click **SAVE** (not shown here) to apply your settings. A small confirmation dialogue appears in the bottom right corner.

Video output over IP cannot be a higher resolution than the physical SDI/HDMI output setting.

VIDEO - SRT

These settings are related to SRT streaming protocol. With SRT you can define the port, passkey and encryption bit.

When not using Encryption, make sure to set the **Crypto key length** to 0.

SRT Listener Mode and Caller Mode are both supported. Define the Listener mode settings here, whereas the Caller Mode settings can be defined in the Streaming Video tab. See the respective figures below for the Listener and Caller Mode Settings, respectively.

Figure 37: WebGUI > VIDEO > SRT (Listener Mode)

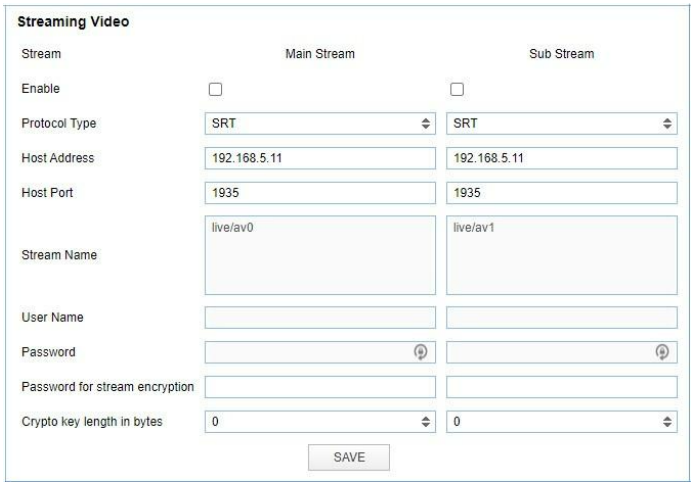


Figure 38: WebGUI > VIDEO > Streaming Video (Caller Mode)

NETWORK

Use the tabs on the NETWORK screen to define the appropriate **Port**, **Ethernet** and **DNS** settings.

Port Settings

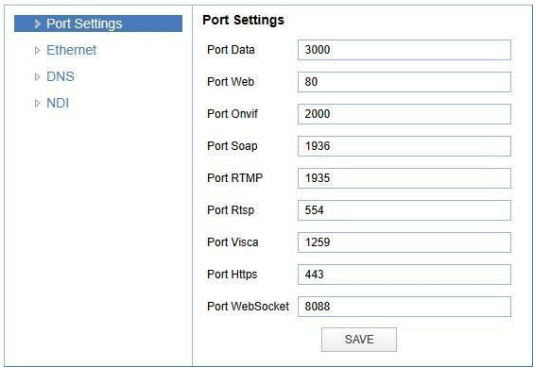


Figure 39: WebGUI > NETWORK > Port Settings

You can define specific ports for the different streaming outputs and protocols the camera supports.

Make sure these settings don't interfere with other uses and services on the same network.

Click **SAVE** to apply your settings. A small confirmation dialogue appears in the bottom right corner.

NETWORK - Ethernet

In this section, you can specify the IP settings for the Ethernet adapter.

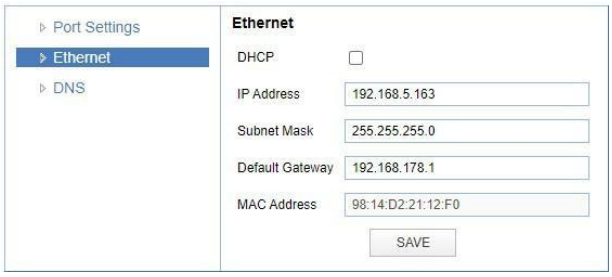


Figure 40: WebGUI > NETWORK > Ethernet

Execute the following steps to save your settings:

1. Click **SAVE** to apply your settings. A small confirmation dialogue appears in the bottom right corner.
2. Reboot the camera.

NETWORK - DNS

Here, you can specify the **Preferred** and **Alternative DNS Server**.

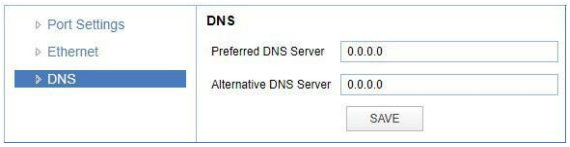


Figure 41: WebGUI > NETWORK > DNS

Click **SAVE** to apply your settings. A small confirmation dialogue appears in the bottom right corner.

SYSTEM

You can use the **SYSTEM** tabs to define the desired system settings.

License

Figure 42: WebGUI > SYSTEM > License

Under license you can enter the license key you obtained for the tracking functionality of the camera.

- License is visible from MCU and Camera version 1.1.4. Update your camera to use the lic ense feature!
- You can acquire a license through your local sales channel or directly at Avonic.

Enter your license key in the license field and click SAVE. **Refresh the webpage or login and out again to see this feature.**

Attributes

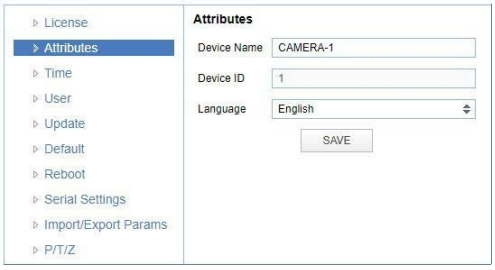


Figure 43: WebGUI > SYSTEM > Attributes

Specifying a specific device name to be displayed in the OSD can be useful when using multiple cameras on the same LAN. The Device-ID is always 1 (addressing is done via IP). The language cannot be changed. Click **SAVE** to apply your settings. A small confirmation dialogue appears in the bottom right corner.

The ONVIF protocol does NOT accept spaces in the camera name.

Time

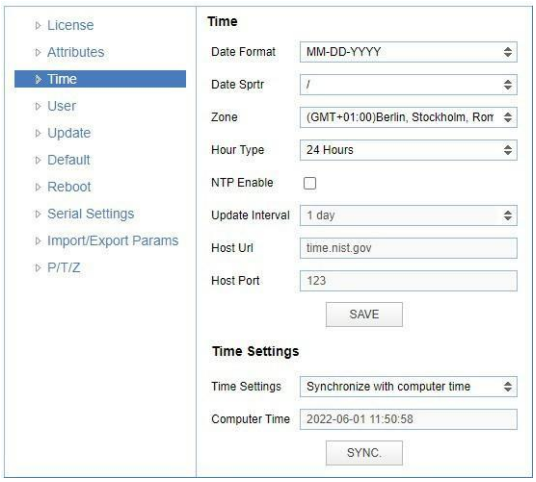


Figure 44: WebGUI > SYSTEM > Time

Here you have the option to manually configure the time and date or synchronize it via a computer or an external server within the Local Area Network (LAN) or Wide Area Network (WAN). Click **SAVE** to apply your manual settings, or **SYNC** to synchronize the time and date.

User

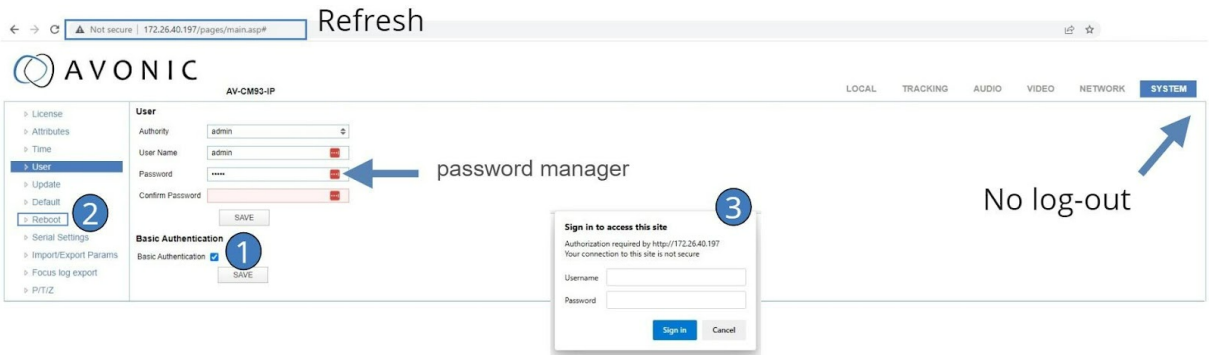


Figure 45: WebGUI > SYSTEM > User

You can define different users with specific permission levels and different username / passwords combinations. There are 2 levels of users: **administrators** with access to all features, and **user-1 and user-2** with access to the preview and PTZ controls. Click **SAVE** to apply your settings.

It is also possible to fill automatically your user name and password using your browser if you use password managers as LastPass for example.

The last option you have, is the (HTTP) Basic Authentication. Basic Authentication is a popular way to prove your identity when using websites. You provide your username and password, and the server checks if they are

correct. If they match, access will be granted. If they don't match, you'll see a specific message. Remember, use always strong passwords and user names.

Use this in the following way:

1. Click Enable and SAVE.
2. In the lower right corner appears a notification to reboot the camera. Reboot the camera.
3. After the reboot is completed open the WebGUI again and you will see that your browser ask you for your username and password instead of the normal login.
4. Disable the Basic Authentication, click SAVE and reboot the camera again to return the normal login page of the WebGUI.

Update

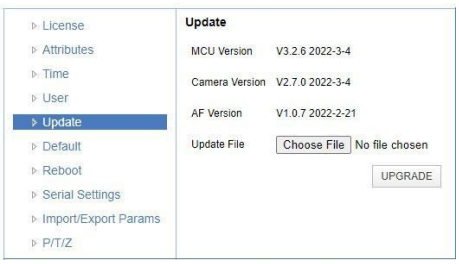


Figure 46: WebGUI > SYSTEM > Update

By default, this screen shows a readout of the current firmware versions. The **Update file** provides a firmware upgrade functionality via this screen. When the camera is done uploading and processing the update, it will automatically reboot.

Execute the following steps to perform a firmware upgrade.

1. Click **Choose File** to select the firmware update file.
2. Click **UPGRADE** to start the firmware upgrade wizard.
3. Follow the steps in the wizard. Wait until the process finishes and reboots.
4. Refresh your browser and log in again after the reboot.

Default

If necessary, you can perform a factory reset. This restores all default settings.

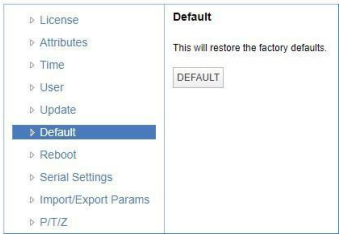


Figure 47: WebGUI > SYSTEM > Default

Click on the button **This will restore the factory defaults** to perform a factory reset. When completed, the camera automatically reboots. The camera will be ready for use again after the boot cycle.

Reboot

If necessary, you can manually perform a camera reboot. It is also possible to create a new reboot schedule to automatically reboot the camera at any time you want.

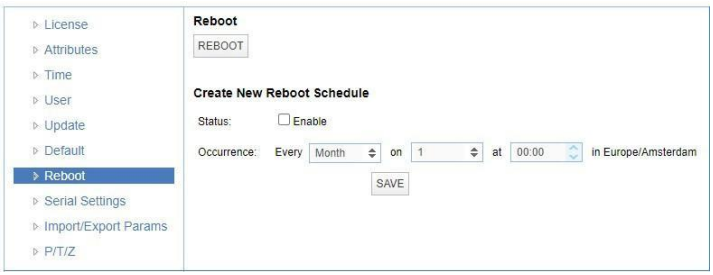


Figure 48: WebGUI > SYSTEM > Reboot

Click on the button **Reboot** to reboot the camera. It will be ready for use again after the boot cycle.

Follow instructions below if you want to create a new reboot schedule.

1. Enable "create new reboot: status".
2. Select at "occurrence" the month and day and select the time you want to reboot the camera. Take note that **Amsterdam/ European timezone** is used.

Serial Settings

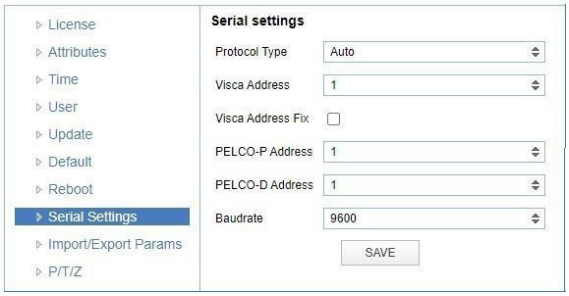


Figure 49: WebGUI > SYSTEM > Serial Settings

You can choose the preferred protocol to use and the accompanying address to go with it. Or you can select the default protocol type 'Auto' to let the camera detect which protocol is being used. **Addressing** is still needed, even with the automatic setting.

Click **SAVE** to apply your settings. A small confirmation dialogue appears in the bottom right corner.

Import/Export Parameters

Figure 50: WebGUI > SYSTEM > Import/Export

The cameras have the ability to import or export a configuration.

Select the appropriate button to import or export your configuration parameters and follow the steps.

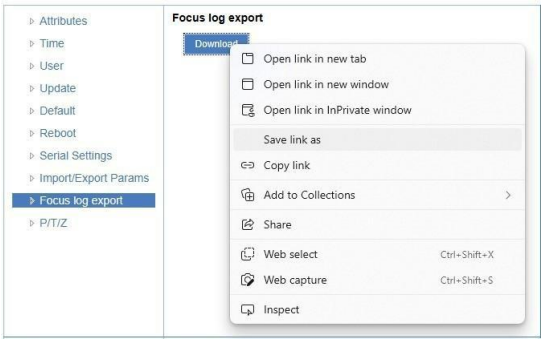
The exported settings do NOT include any presets that are stored in the camera!

Focus log export

You can download a log file of the focus information of the camera.

Follow instructions below:

1. **Right click** with your mouse on the DOWNLOAD button.
2. Select SAVE LINK AS and click SAVE. The text file is available after downloading in your download directory of your computer.



P/T/Z

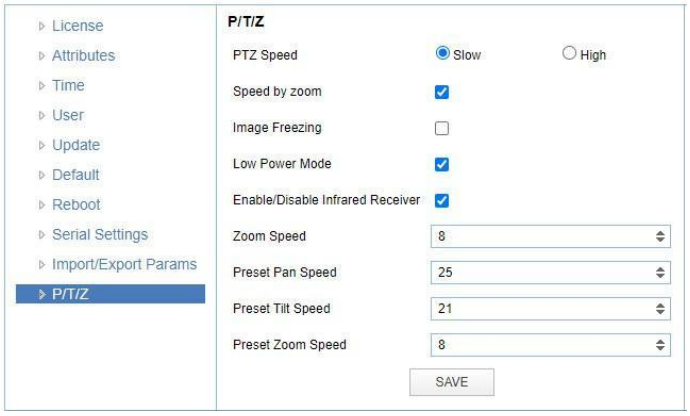


Figure 51: WebGUI > SYSTEM > P/T/Z

In this window, you can define various P/T/Z settings for your camera. These are:

PTZ Speed Increases the maximum pan and tilt speed. This can be useful in a conference system where quick action is necessary. The camera will produce slightly more noise when this option is set to 'high'.

Speed by zoom Affects the PTZ speed when the camera is zoomed in to its max. If you move the stick of your controller when this mode is disabled, the camera will move too fast to control it. Enabling reduces this speed in relation to the current zoom factor.

Image Freezing * Freeze the image when the camera moves from one preset to another when the (remote) controller is used.

Low Power Mode: The camera will enter stand by mode to reduce its power when this mode is enabled. In order to reduce the power the camera uses, the camera will shut down the IP Port. To activate the camera again, use a serial connection or the IR Remote to turn off the Low Power Mode.

Enable/ Disable Infrared Enable/disable the Infrared Receiver. When you disable the Inf rared Receiver and the Low Power Mode

Receiver: is enabled, it
will **NOT** be possible to activate the camera again using the IR Remote Control.

Zoom
Speed Set the speed to which the camera will zoom in to the image. The higher th e number, the faster the camera will zoom in. This works only when the remote controller is used to control the camera.

Preset Pan, Tilt and Zoom Speed This mode affects the speed to which the camera is switching from one preset to another when you use your (remote) controller. The higher the number, the faster it will switch.

* Before freezing the image, ensure that the audio is turned off if you are using it during streaming. Freezing the image could produce a paused audio output on the IP Stream. This leads to (audio) stuttering. The video stutters when it is re-engaged, but this is rather easily solvable by putting the iFrame value at 4 or 5 times per second. That is quick enough to counteract the video stutter.

* Before freezing the image, ensure that the audio is turned off if you are using it during streaming . Freezing the image could produce a paused audio output on the IP Stream. This leads to (audio) stuttering. The video stutters when it is re-engaged, but this is rather easily solvable by putting the iFrame value at 4 or 5 times per second. That is quick enough to counteract the video stutter.

MJPEG Snapshot

The Avonic CM93 camera is equipped with a MJPEG snapshot feature for implementation into third party software for example. Every time the page is refreshed, the picture will be updated.

To access the MJPEG snapshot feature, use the following
format: http://IP/img/capjpg/snapshot.jpg. See also MJPEG Snapshot on the website.

Using the Remote Control

The Product is provided with an IR Remote Control for full control of the camera and use of the OSD menu.

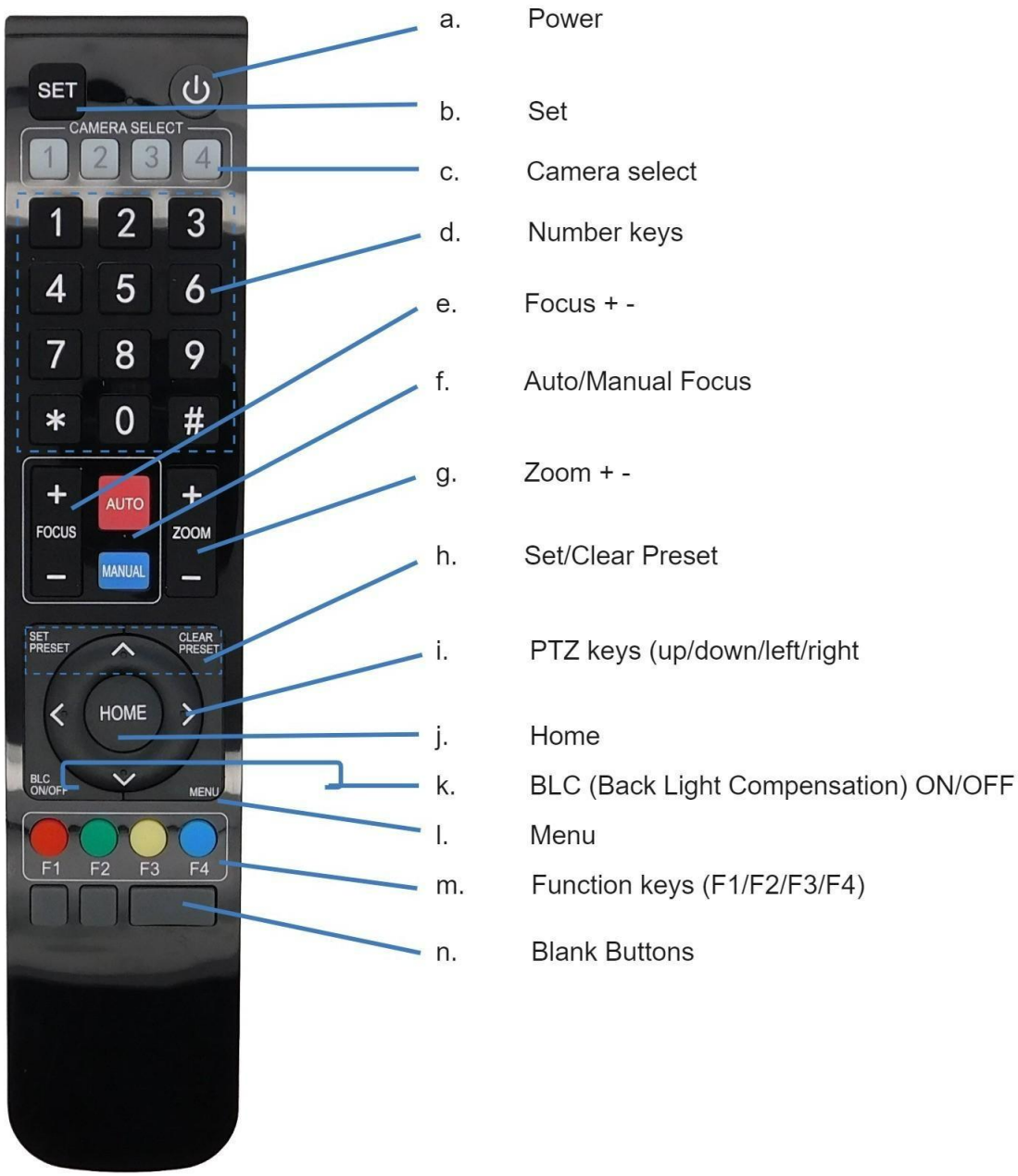


Figure 52: Remote Control

The various options (a. through o.) are outlined below.

a. **Power**

1. Put two AAA 1.5v batteries in the IR Remote Control. Use **ONLY** this type of batteries! Using other type of batteries can damage the IR Remote Control.
2. Press the **Power** button to turn on the camera. If the position preset '0' has been stored, this will be called after initialization.
3. Press the **Power** button again to turn the camera off. The lens will turn backwards when turned off. This is called the “privacy mode”.

b. **Set**

This button has **no** function with this camera.

c. **Camera Select**

Up to 4 different cameras can be controlled with one IR remote Control. You can use the **camera select** buttons [**1,2,3,4**] to select the IR channel that the remote control is using. The default camera IR channel is 1.

1. To control a camera on first use, select camera 1 (IR channel 1) on the remote control.
2. To control a second camera, you need to change first the IR channel stored in the camera from 1 to

2. Do the following:

a. Deactivate the cameras in the room that are not intended to be modified (except for camera 1).

b. Select camera 1 on the remote control, because the camera is still configured to listen to IR channel 1.

c. Press **[*]→[#]→[F2]** to change the IR channel inside the camera to IR channel 2. The camera will confirm this on the screen.

d. Select camera 2 on the remote control to control this camera.

Key Combinations: (Default IR address is 1) **[*]→[#]→[F1]** Camera Address No. 1 **[*]→[#]→[F2]** Camera Address No. 2 **[*]→[#]→[F3]** Camera Address No. 3 **[*]→[#]→[F4]** Camera Address No. 4

The Function buttons F1, F2, F3 and F4 are the colored buttons on the remote.

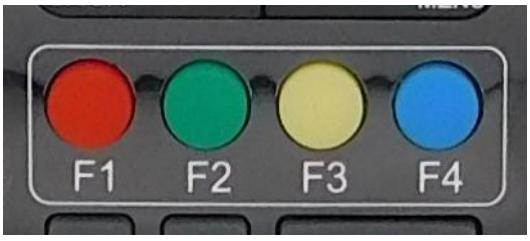


Figure 53: Function Buttons on Remote

d. **Number Keys**

The number keys are used to call presets.

Press the number **[0-9]** of the desired preset and the camera will respond accordingly (See ‘h’ on how to set & clear presets).

e. **Focus + -**

1. Push the button [manual focus] before using the focus buttons.
2. Focus the camera with the [+] and [–] button.

If the camera does not respond, check if the camera is set to autofocus.

f. **Auto/Manual Focus**

Set the camera to 'autofocus' or 'manual focus'.

If the camera is configured to 'auto focus', the buttons [Focus + -] are disabled.

If the camera is in 'manual focus' and the **Zoom** buttons are used, the camera automatically switches to 'autofocus'.

g. **Zoom + -**

Zoom the camera with these buttons.

h. **Set & Clear Preset**

A preset is a specific position of a camera that you save in the camera. A preset is assigned to a number from 0-9.

1. To set a preset, first point the camera in a specific direction and a specific zoom position.
2. Assign the position to a number with the button **Set Preset**.
3. You can call the preset by pressing one of the numbers 0-9 on the remote control.

Set Preset: [SET PRESET]→[<number>]

Call Preset: [<number>]

Clear Preset: [CLEAR PRESET]→[<number>]

If the position preset '0' has been stored, this position will be called after initialization.

Use ONLY presets between 0-9 when using the Remote Control. For presets 10 or higher you need a serial or IP connection!

i. **PTZ Keys (up/down/left/right)**

Use these keys to move the camera in the desired direction.

j. **Home**

If you use this key, the camera will automatically turn to its start up position: the camera will zoom out and turns to a position with the lens straight forward. This affects only the Pan, Tilt and Zoom position and NOT the focus level of the camera, or exposure and white balance settings!

If you have obtained a tracking license, the Home key will not work when tracking is enabled.

k. **BLC ON/OFF**

Use this key to enable / disable the Back Light Compensation feature.

l. **Menu**

1. Use the **Menu** button to open the OSD menu. This menu is visible on the HDMI/SDI output.
2. If the menu is not in English, press **[*]→[#]→[4]** to change the Menu language into English.

l. **Function Keys (F1/F2/F3/F4)**

Used to configure the IR channel of the camera. See **'c. Camera Select'** above for instructions.

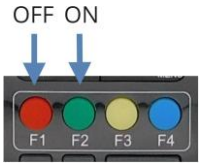
n. **Blank Buttons**

These buttons have NO function with this camera.

o. **Tracking**

With the red F1 and green F2 you can set the Tracking feature ON and OFF.

This feature works only when you have obtained a Tracking license.



Other Key Combinations

The following key combinations on the Remote Controller have specific functions. These are:

Combination Function

[*] → [#] → [4] Menu set to English

[*] → [#] → [6] Restore factory defaults

[*] → [#] → [9] Flip switch (just temporary flip to view the image flipped)

[*] → [#] → [Auto] Enter into the aging mode, only for quality control purposes

[*] → [#] → [Manual] Restore the default username, password, and IP address

[#] → [#] → [#] Clear all presets

[#] → [#] → [0] Switch the video format to1080p60*

[#] → [#] → [1] Switch the video format to 1080p50*

[#] → [#] → [2] Switch the video format to 1080i60*

[#] → [#] → [3] Switch the video format to 1080i50*

[#] → [#] → [4] Switch the video format to 720p60*

[#] → [#] → [5] Switch the video format to 720p50*

[#] → [#] → [6] Switch the video format to 1080p30*

[#] → [#] → [7] Switch the video format to 1080p25*

[#] → [#] → [8] Switch the video format to 4K60*

[#] → [#] → [9] Switch the video format to 4K50*

The camera returns to the video output setting of the system select after a reboot.

Use ONLY presets between 0-9 when using the Remote Control. For presets 10 or higher you need a serial or IP

connection!

Tally Light Functionality

The tally light is the LED light on the front of the camera and can **ONLY** be controlled through the VISCA commands or even by NDI with the CM93-NDI camera. The tally light cannot be controlled through the WebGUI or the OSD menu of the camera. See the VISCA commands in appendix A in this manual.

OSD Menu

Each camera is provided with an

On-Screen Display (OSD) Menu.

This is an integrated on-screen menu that can be accessed within the camera to change specific functions that affect how the camera processes an image.

The OSD Menu is visible on the HDMI and SDI outputs.

The OSD menu can be accessed by the Remote Control or an Avonic PTZ controller. See also How can I open the OSD menu of my camera on the website.

Tracking is only visible with an optional license.

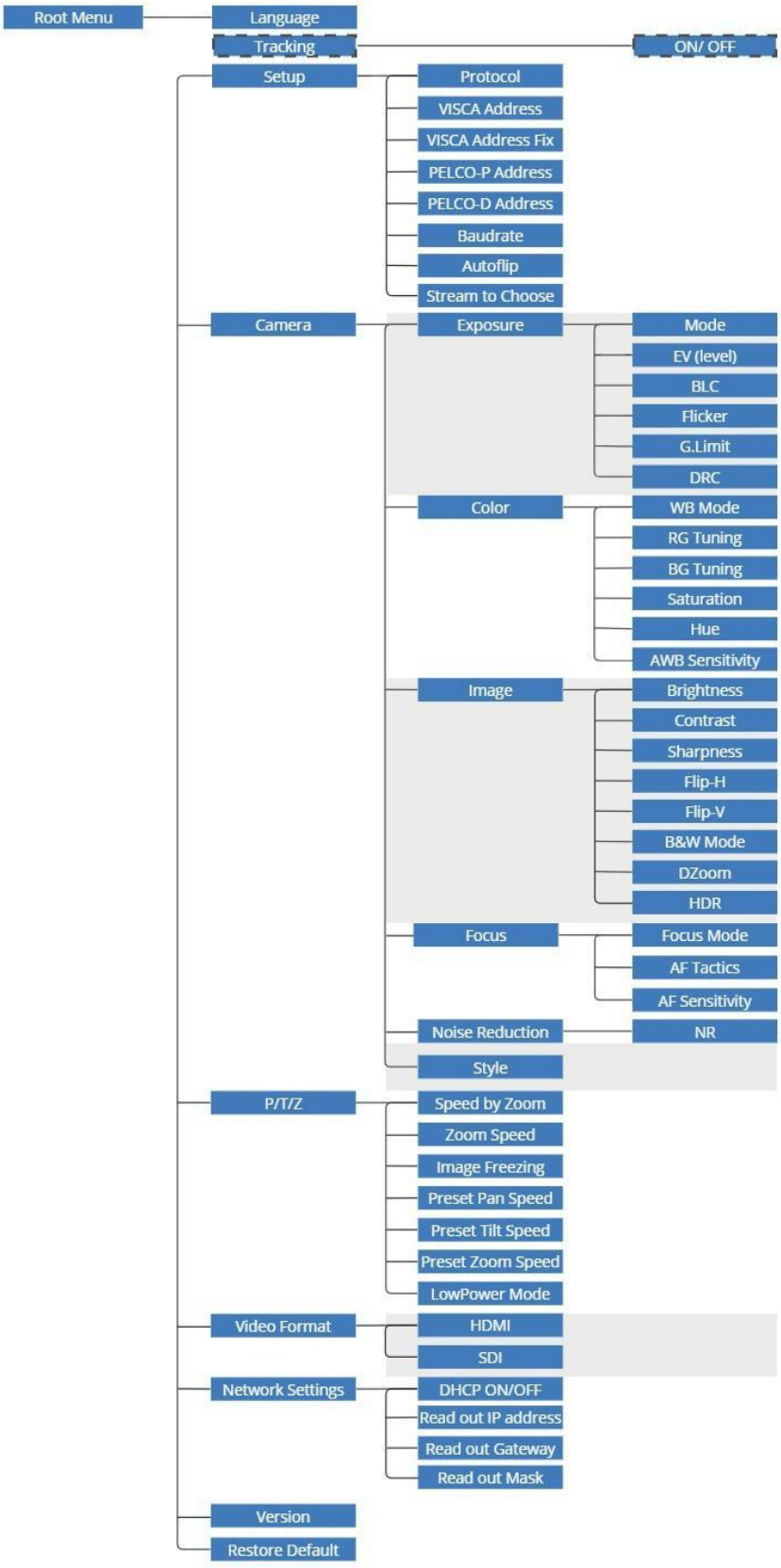


Figure 54: OSD menu structure

1. **MENU**

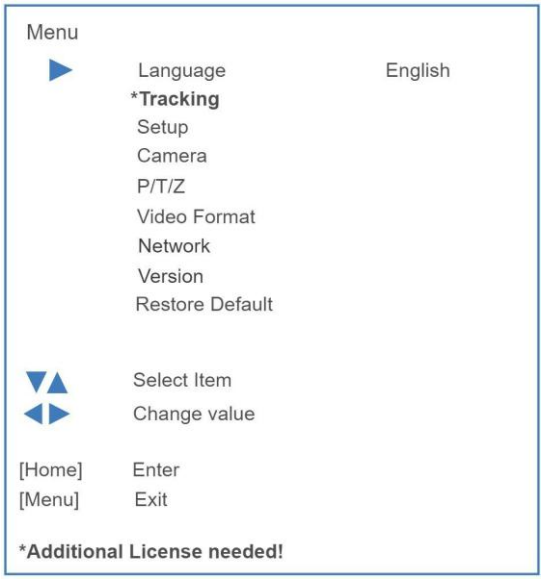


Figure 55: OSD - MENU

1. Press the MENU button to display the main menu on the screen.
2. Use the arrow buttons to move the cursor to the item to be set. Press the HOME button to enter the corresponding sub-menu.
3. Press [

◀▶

] to change settings. Press [**MENU**] again to go back.

Language is always English and cannot be changed.

Language is always English and cannot be changed.Language is always English and cannot be changed.Language is always English and cannot be changed.

1. **TRACKING**

You can see this feature only when you have purchased an additional license! See Settings > License. Update

the firmware to at least MCU and Camera version 1.1.4 in the WebGUI.

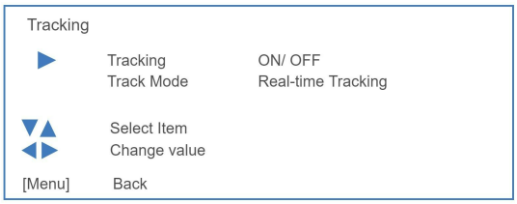


Figure 56: OSD - Tracking

Track Mode is always Real-time Tracking. For its functionality see WebGUI > Tracking Mode - Presenter.

Track Mode is always Real-time Tracking. For its functionality see WebGUI > Tracking Mode - Presenter.

2. **SETUP**

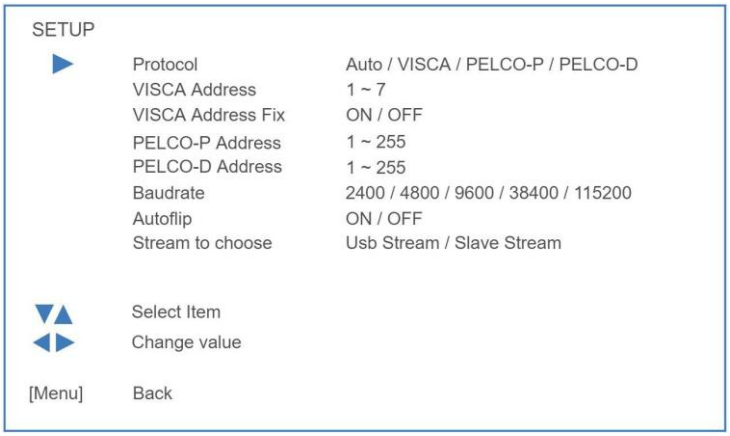


Figure 57: OSD - SETUP

If you want to use the USB port of the camera choose "USB Stream:" at "Stream to choose". This feature is only

visible in the OSD menu. The Slave Stream is the secondary IP stream (see Streaming Video).

3. **CAMERA**

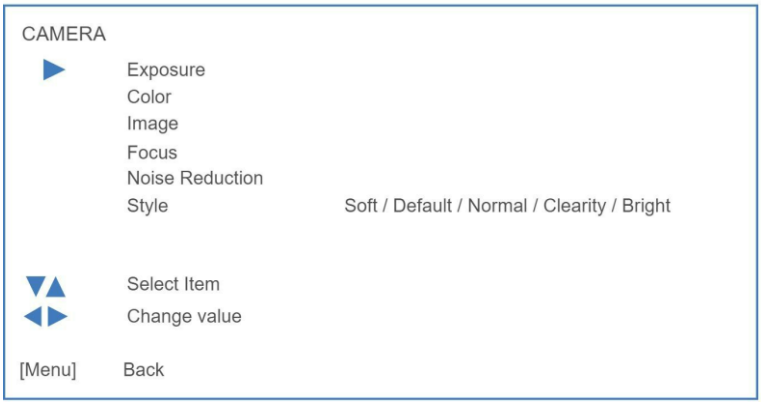


Figure 58: OSD - CAMERA

1. **EXPOSURE**

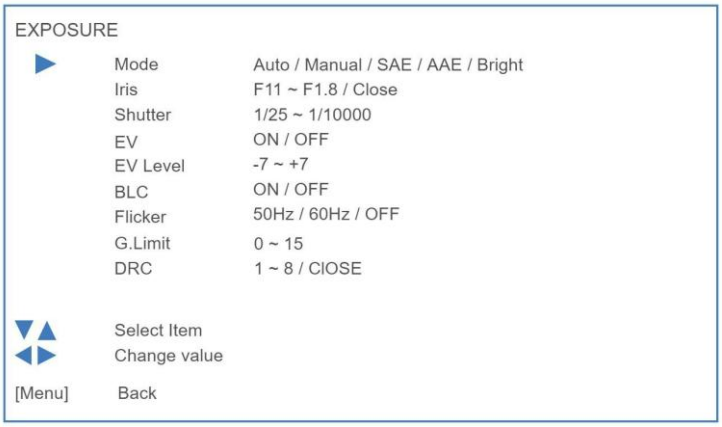


Figure 59: OSD - EXPOSURE

2. **COLOR**

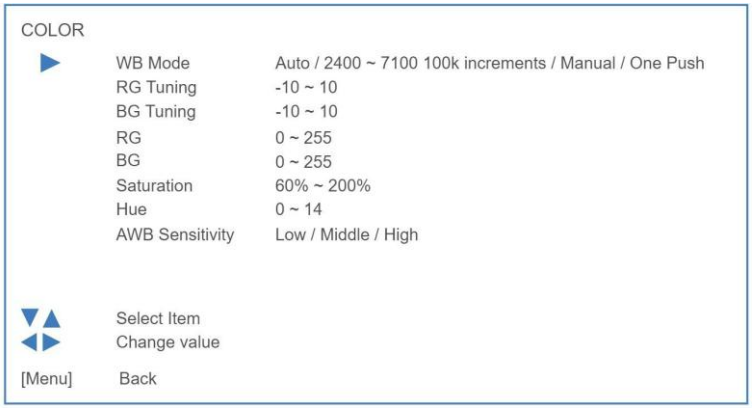


Figure 60: OSD - COLOR

3. **IMAGE**

The Flip function can be set, although the camera has an automatic flip function.

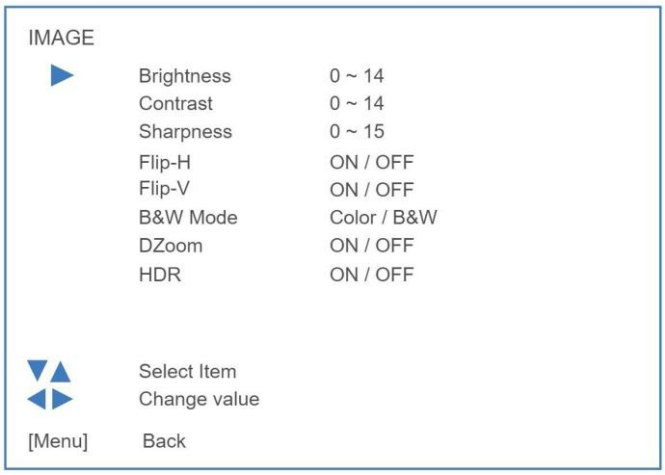


Figure 61: OSD - IMAGE

4. **FOCUS**

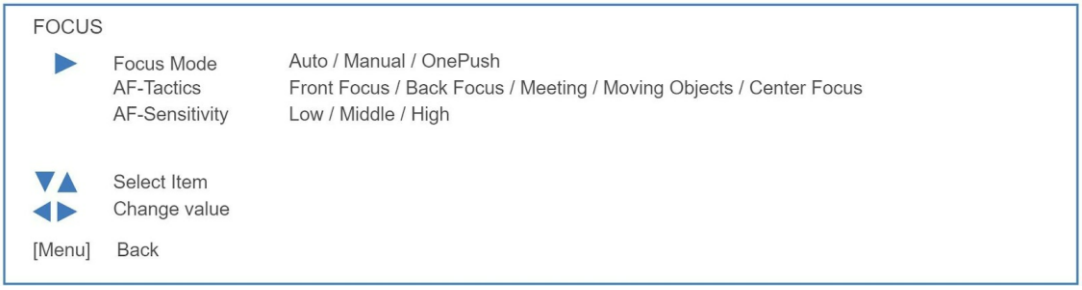


Figure 62: OSD - FOCUS

5. **NOISE REDUCTION**

Figure 63: OSD - NOISE REDUCTION

6. **STYLE**

Figure 64: OSD - STYLE

4. **PTZ**

Figure 65: OSD - PTZ

5. **VIDEO FORMAT**

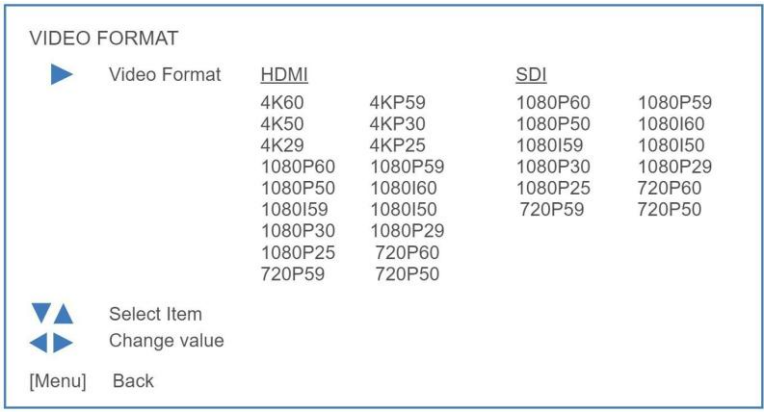


Figure 66: OSD - VIDEO FORMAT

6. **NETWORK SETTINGS**

Figure 67: OSD - NETWORK SETTINGS

7. **VERSION**

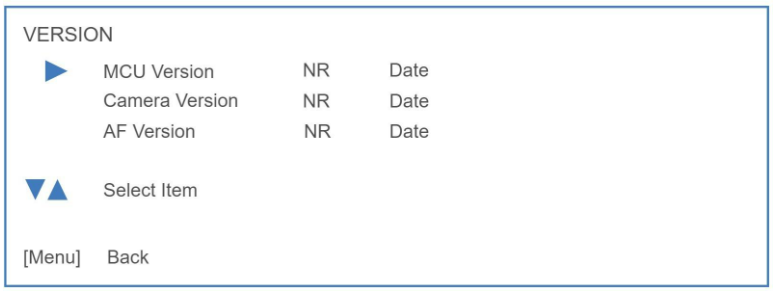


Figure 68: OSD - VERSION

8. RESTORE DEFAULT

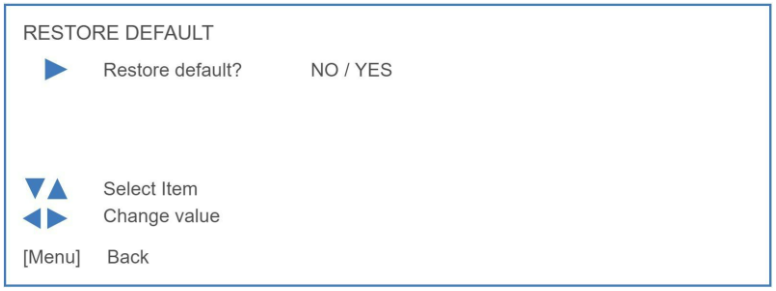


Figure 69: OSD - RESTORE DEFAULT

Using the System Select

The rear of the camera is provided with a System Select that can be used to manually select a video format.

This System Select is important for the video quality during video recording or streaming. It determines the video resolution and with this you can "enforce" the video resolution by selecting one of the numbers/letters at the back of the camera. After a reboot the system select will always return to the previous selected number or letter. See the table below for a description of the possible settings and the associated video output quality.

Figure 70: System Select	0	1080p60	8	4K60 (only over HDMI)
	1	1080p50	9	4K50 (only over HDMI)
	2	1080i60	A	1080p59.94
	3	1080i50	B	4K30 (only over HDMI)
	4	720p60	C	4K25 (only over HDMI)
	5	720p50	D	1080p29

	6	1080p30	E	(no format)
	7	1080p25	F	Default (via OSD)

A few notes on the System Select:

- The setting 'F' is the **default** setting. If you set the system select to 'F', you can set the video format via the OSD Menu. If you change the system select to another setting than F, it is not possible to change it again using the OSD menu. Change it back (manually) to use the OSD video format setting again.
- The **highest** video output quality 4K60 (setting '8') over HDMI and 1080p60 over SDI.
- The **lowest** video output quality is 720p50 (setting '5').

Selecting the video output through the WebGUI or the OSD Menu is strongly recommended as it is an easier

method compared to manual selection. If this is not possible, you can use the System Select.

IMPORTANT

• After changing the System Select, you need to restart the camera.

• There are five ways to select the video output of the camera (OSD / direct button combination on the

remote control / WebGUI / System Select/ HTTP API "VideoOUT" command). The System Select takes priority

after a reboot, except on setting F, where all the outputs are defined digitally.

• If you have made a change to the System Select, a "hard reboot" is needed. Click the Reboot button and

when the reboot is finished, turn the camera off and unplug all cables connected to the camera. Replug

them again and start the camera.

TROUBLESHOOTING

General

1. Turn the camera off and on again and check if the problem persists.
2. If it does, restore to factory default.

Power Issues

If the camera does NOT perform a self-test and / or if the power LED is OFF:

1. Check the net power.
2. Check the power supply.
3. Check the physical power button on the back of the camera.

Image

No image

1. Check the power of the camera and monitor.
2. Check the quality and length of the video cable.
3. Check if the video specifications of your monitor matches the specifications of the camera.
4. Check if the Iris under **Exposure settings** is set to 'closed'.

Abnormal image

1. Check the quality and length of the video cable.
2. Check the cable connections.
3. Check if the Iris under **Exposure settings** is set to 'closed'.

Dithering or flickering image

1. Check the camera fixation and nearby vibration sources.
2. Check the Anti-flickering setting in the OSD.
3. Check the Noise Reduction settings in the OSD.

Color issues

Check the OSD settings for exposure, white balance, color temp, Red and Bluetuning.

When experiencing image problems, you may also check Appendix D - CMOS Image Sensor

Characteristics

Autofocus Issues

- Check the autofocus (position, speed etc.) before streaming
- Check Video/Camera Settings in de WebGUI or the OSD menu (for example: if the image is too bright, too dark, or too noisy, the camera will have difficulties to focus

Check environmental conditions and the subject of focussing. The camera will have difficulties to focus in the following situations:

- Light: Strong light, low light/dark areas and backlight conditions
- Moving subjects
- Small objects before a plain or solid background
- Blurry or unsharp subjects: filming through wet glass or dirty objects

- Distance: filming two or more different subjects, some near and some far away
- Position in the image: subject positioned in the corners of the picture
- Faces: partly hidden faces, sideways filmed faces, diagonal or up side down
- When the camera itself moves, or when the iris is narrowed down

When you experience one or more of the above mentioned problems check also our Appendix - CMOS

characteristics

Control

No self-test (PTZ cameras only) and no power LED

1. Check the net power
2. Check the power supply

Remote Controller does not work

1. Check the power of the controller.
2. Check the RS-232 or RS-485 cable quality, length, polarity and network architecture.
3. Check the serial communication settings on the camera and controller.
4. Check the VISCA / PELCO address settings on the camera and controller.
5. Check the IP network settings on the camera and controller.

Camera does not respond to commands send over IP

1. Check if the Low Power Mode is set to ON. If so disable it.

WebGUI

Cannot enter WebGUI

1. Check the network cable.
2. Check if the computer is connected to the same subnet as the camera.
3. Use an **incognito** window in your browser, sometimes cache issues arise when using multiple cameras that have the same default IP address
4. Reset the factory default IP settings by pressing **[*] [#] [Manual]** and **Reboot.**

Tracking feature issues (license needed for Tracking)

1. Reset the camera to default, if you have tracking issues. The (additional) license is removed from your camera. Enter your license in the WebGUI (system > license) to use the Tracking feature again.
2. If you still tracking issues, contact Avonic.

Firmware update failed

1. Check firmware file integrity, download it again.
2. Make sure you are trying to flash the UVC file for the correct color camera (ARM is generic, UVC is color-dependent).

Take the following precautions to prevent the Product from falling down which may cause injuries:

- Set up this Product on a hard, stable surface, or mount it to a wall or ceiling.
- ONLY use an Avonic mount for mounting to a wall or ceiling.
- Ensure the mounting construction is capable of supporting four times the weight of the P roduct. (See 'General Specifications > Weight product' in the Product Datasheet for the e xact weight.)
- Use a safety loop or drop protection that prevents the Product from falling if the mountin g construction fails.
- During mounting and installation, NEVER install a Product above a person.
- Check the installation at least once a year. An improper mounting could cause the unit to fall off, resulting in personal injury.

Getting Started

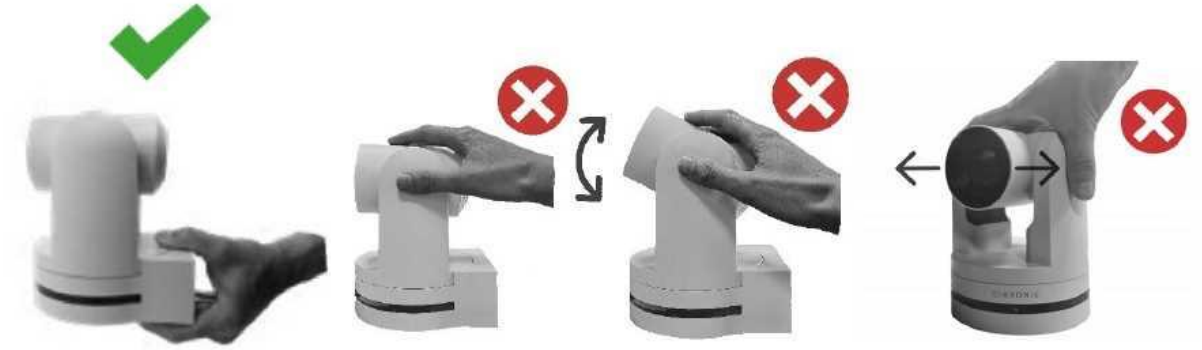
This section helps you avoid installation issues by highlighting critical steps for a successful setup of your Avonic camera.

- Always handle the camera by its base to prevent damage to the moving parts.
- Unbox the camera carefully; if the seal is broken, contact Avonic support.
- Ensure the camera is placed on a stable surface or mounted using official Avonic accessories.

- Power the camera using PoE (IEEE 802.3at) or the supplied adapter and set the physical switch to ON.
- The default IP address is **192.168.5.163**. Ensure your computer is in the same subnet for initial configuration.

Unboxing

Handle the camera with care, particularly its moving PTZ components. Always hold the camera by its base and avoid manually repositioning the lens. The camera comes in a sealed bag—if this seal is broken, contact Avonic support immediately. Place the camera on a stable surface or securely mount it using Avonic mounting accessories (sold separately).



No.	Quantity	Description	Avonic SKU
1	1 pc	PTZ Camera	AV-CM93-IP-B/W
2	1 pc	Remote Control	AV-CM40-RC
3	1 pc	USB cable type A to type B	AV-USB20-AB
4	1 pc	* Power Adapter 12V/A (GME Technology (Shenzhen) Co., ltd , model number: GME24A - 120200FDS2)	AV-CM40-PSU
5	1 pc	RS-232 9-pin D-Sub female to DIN -8 male	AV-CM-RS-232
6	1 pc	5-way Phoenix Balanced audio con. (CTBP92HE/5)	AV-PHNX-5
7	1 pc	2-way Phoenix RS-485 connector	AV-PHNX-2

Mounting

This section explains how to safely mount and install the product.

- Only use Avonic mounts for wall or ceiling installation.
- Ensure mounting structures support at least 4× the product weight.

- Use a safety loop or drop protection to prevent falls.
- Never mount the camera above people.
- Inspect the installation at least annually.

Mounting options (AV-MT300):
SKU white: AV-MT300-W
SKU black: AV-MT300-B

Visit www.avonic.com to download installation guides for AV-MT300.

Power On

Power the camera using the supplied adapter or PoE+ (IEEE 802.3at). Ensure the physical power switch is set to ON, also when use PoE. Upon powering up, the camera will auto-calibrate its PTZ functions. A blinking red LED indicates the booting process. Once the LED stops, the camera is ready. If shut down digitally, the PTZ head enters ‘privacy mode’.

Connections & Network Setup

Physical Interfaces

Connect all components to the correct ports on the rear of the camera. Refer to the diagram for port layout:

1. Balanced Audio Line in 5-pin Phoenix connector

2. RS-232 mini-DIN-8 IN (connect the supplied RS-232 cable)

3. RS-232 mini-DIN-8 OUT for daisy chaining RS-232 connection

4. RS-485 two-wire serial communication with 2-pin Phoenix connector

5. Kensington Lock

6. System Select (see Using the System Select)

7. HDMI Type A

8. USB2.0 Type B, UVC video output and control

9. BNC 3G-SDI output, SMPTE 425M level A.

10. RJ45 Ethernet, with PoE (48Vdc, 0.25A, comply with LPS/PS2 circuits)

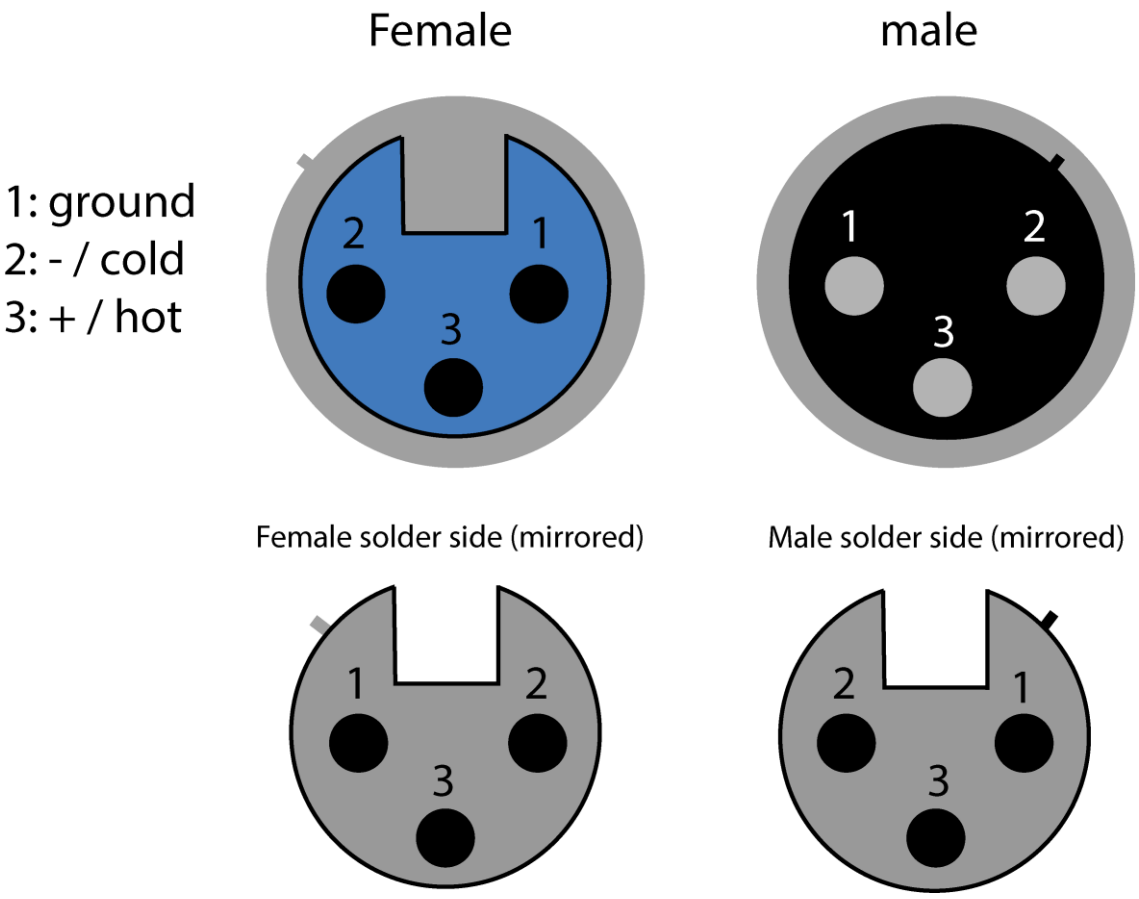
11. DC12V power with locking screw (connect the supplied DC PSU)

12.Power ON/OFF

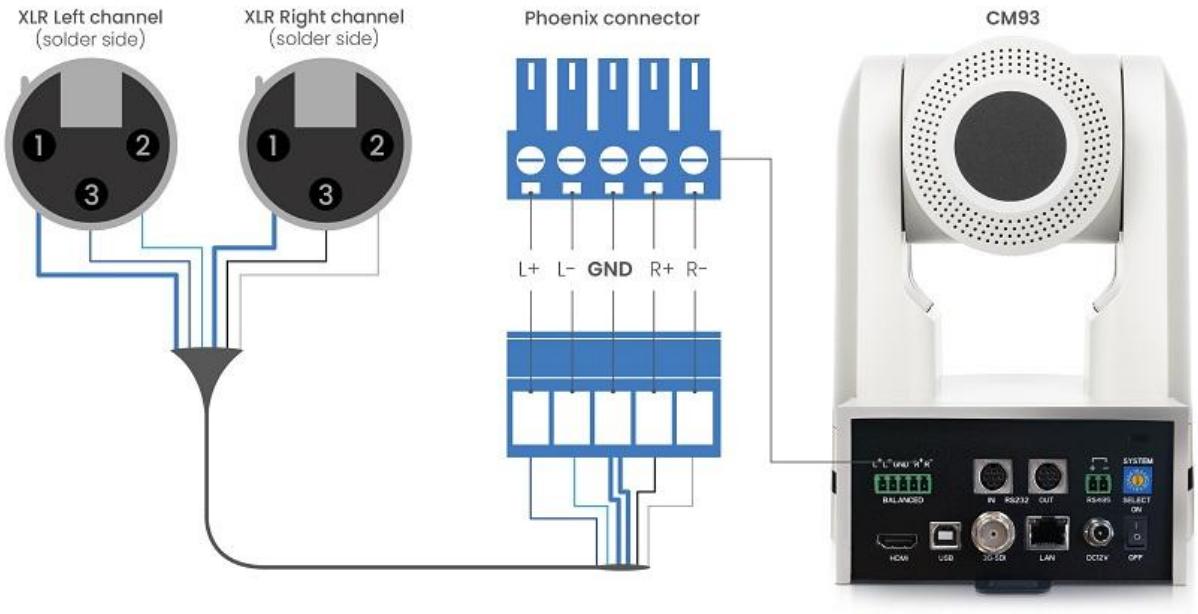
13. Fall protection eye

Balanced Audio Connection

- Double male XLR cable to 5-pin Phoenix connector
- Audio mixer with XLR outputs
- PoE CAT cable (for streaming)



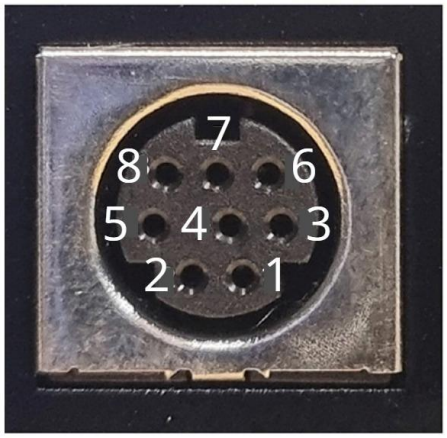
Picture 1: XLR connector



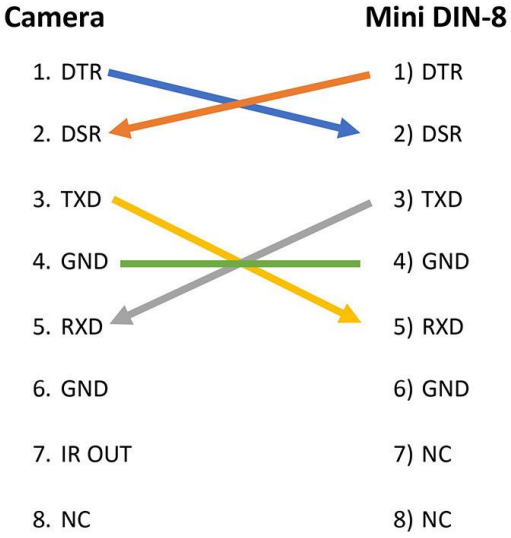
Picture 2: Phoenix connector

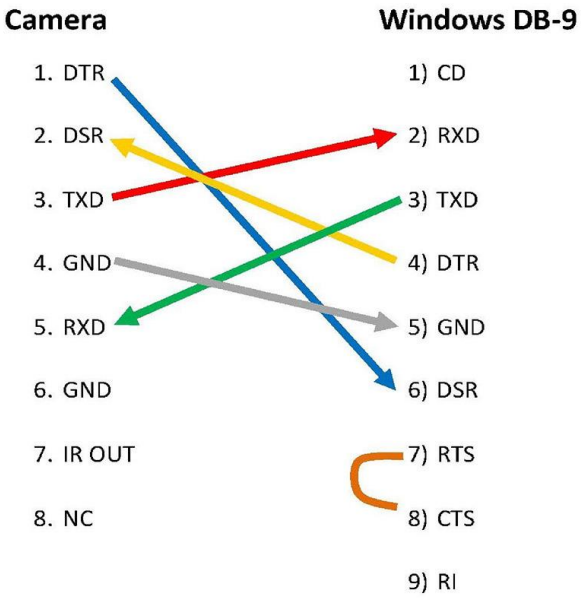
Serial Connections (RS-232 / RS-485)

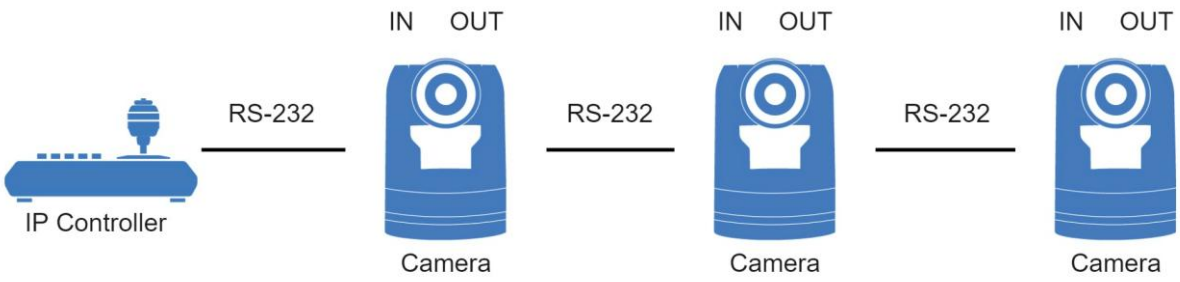
Connect VISCA controllers via RS-232 or RS-485. Daisy chaining via RS-232 is supported.



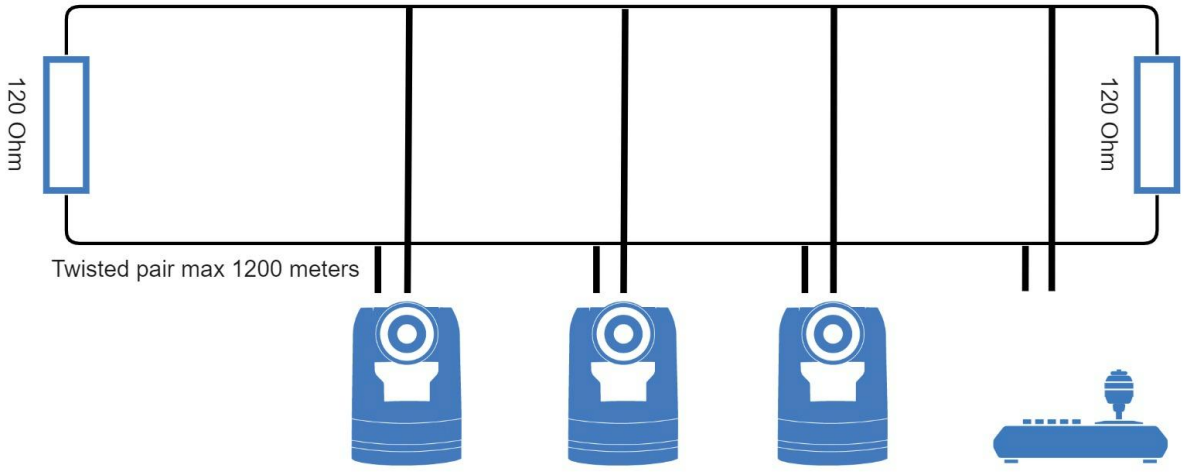
No.	Function
1.	DTR
2.	DSR
3.	TXD
4.	GND
5.	RXD
6.	GND
7.	IR OUT
8.	NC







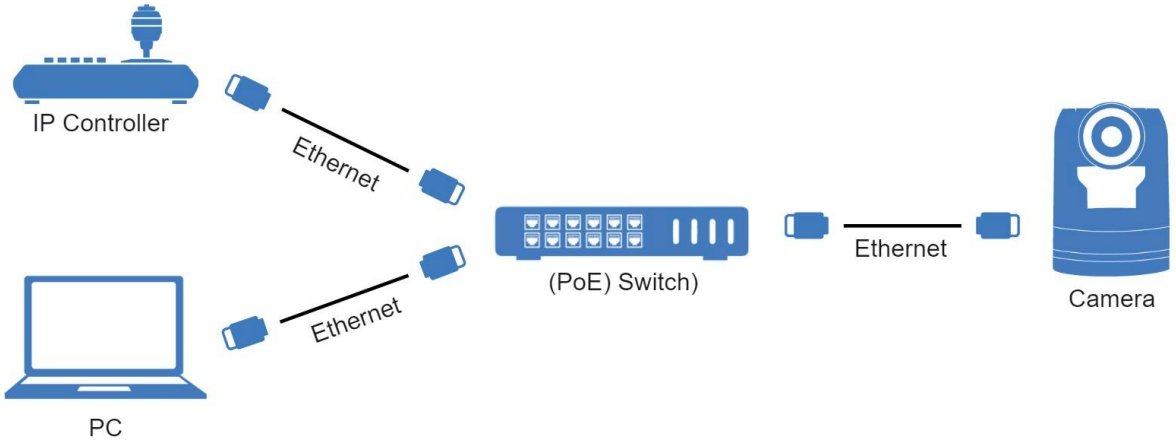

SYSTEM
+ −
0123456789ABCDEF
OUT
SELECT
ON
I
O
LAN
2V
OFF


120 Ohm
120 Ohm
Twisted pair max 1200 meters

LAN / IP Connection

Use a PoE switch or external adapter. If both are connected, the DC power supply takes priority.

- **IP Address:** 192.168.5.163
- **Username:** admin
- **Password:** admin
- **TCP or UDP Port:** 1259



IP Streaming

Access the Web GUI to configure streaming options. Default IP: **192.168.5.163**.

- Streaming with VLC
- Streaming with NDI Studio Monitor
- Streaming to YouTube
- Streaming via SRT
- Using vMix
- NDI to OBS Setup

HDMI / SDI Output

Connect HDMI or SDI to a supported device. HDMI supports 2160p60; SDI up to 1080p60. Adjust output resolution using the Web GUI or system select switch.

Learn more | Resolution troubleshooting

USB Output

Enable USB output in OSD (OSD → Camera → Choose Stream → USB). A splash screen appears if USB is not selected. Quality depends on the software used by the connected computer.

Basic Pan/Tilt Operation

1. Press the POWER button
The camera will turn ON and perform the PTZ check movement.
2. Press an arrow button to move the camerahead left/right or up/down
Pressing a button short will result in a small movement. Keeping the button pressed longer will result in a longer, larger movement.
3. Press the HOME button to have the camera facing forwards again, fully zoomed out.
If you accidentally move the camera by hand, turn the camera off and on again, so that the pan tilt mechanism can reset itself.

Zoom operation

Press either the Zoom+ or Zoom- button to respectively zoom the camera in or out

Focus operation

To adjust the focus automatically, press the AUTO button. To adjust the focus manually press the MANUAL button and use the Focus+ and Focus- buttons to bring the object in focus.

Back Light Compensation or BLC

When shooting against a bright light source, BLC or Back Light Compensation can be turned on. Press the BLC button. To turn BLC off, press the button again

Presets

The camera is able to store preset positions containing Pan/Tilt position, Zoom position and Auto or Manual Focus position. In case of Auto Focus, the camera will adjust the focus based on the contents of the filmed object. If a preset is stored with a Manual Focus value, the camera will always return to that specified focus position. The camera is able to store up to 255 presets. The number of presets that can be used, depends on the manner of control. The IR remote control supports up to 10 presets (0~9), via Visca, HTTP API or webUI all presets are available.

Store a preset using the IR Remote Control

Control the camera to the prefered position. Press the SET PRESET button and a numeric button sequentially. The camera will display in the top left corner of the connected screen a message Set: Preset 1. Preset 0 is the start up preset which is called after booting the camera. So if the user needs a specific position to which the camera must go immediately afterstartup, preset 0 can be stored.

Delete a preset using the IR Remote Control

Configure the Camera

Settings can be changed via the Web GUI or On-Screen Display (OSD). Default settings work well automatically, but manual tuning may improve image quality depending on your setup.

See our recommended settings for tips on lighting and exposure.

Custom Home Position

To set a custom home position with the IR remote:

- **Press [*] → [#] → [0]**

Anti-Flicker Settings

If flickering occurs, test different anti-flicker settings via OSD or Web GUI.

Lighting Adjustments

For changing lighting, leave exposure and white balance on auto. For consistent lighting, use manual exposure (AAE or SAE). Learn more.

On-Screen Display (OSD) Menu

Press "Menu" on the IR remote (requires 2x AAA batteries) to access the OSD menu on an HDMI/SDI display. See How to access the OSD menu.

Web GUI Access

Go to http://192.168.5.163 in your browser. Login: admin / admin. See this guide.

IR Remote Control

Default IR ID is 1. To assign unique IDs:

- **Turn on only Camera 2 → [*] → [#] → [F2]**
- **Turn on only Camera 3 → [*] → [#] → [F3]**

More info: IR Remote Control Guide

Resetting the Camera

You can reset your camera to factory defaults in three ways:

1. **Via the IR remote control (with or without OSD)**
2. **Via the Web GUI see guide**

3. **Via an Avonic PTZ controller [see guide]**

Note: This resets the IP address to 192.168.5.163.

Reset via IR Remote Control

To restore factory defaults, press the following combination on the remote:

- **[*] → [#] → [6]**

Press each button one after another, not simultaneously.

Reset via OSD Menu

Press the MENU button on the IR remote to open the OSD menu on a monitor. Navigate to *Restore Defaults* and press HOME to confirm.

Use the LEFT/RIGHT arrows to select "YES" and press HOME to confirm.

Reset IP Configuration (CM4x/CM7x)

To reset only the IP configuration (IP address, gateway, DNS), use:

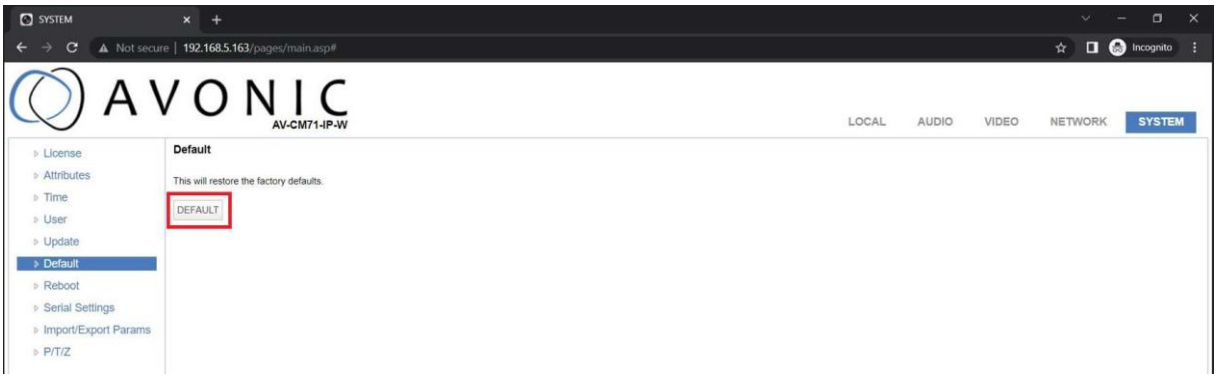
- **[*] → [#] → [Manual]**

This also resets the admin username/password, but not user1/user2.

Combination	Function
[*] → [#] → [4]	Menu set to English
[*] → [#] → [6]	Restore factory defaults
[*] → [#] → [9]	Flip switch (just temporary flip to view the image flipped)
[*] → [#] → [Auto]	Enter into the aging mode, only for quality control purposes
[*] → [#] → [Manual]	Restore the default username, password, and IP address
[#] → [#] → [#]	Clear all presets
[#] → [#] → [0]	Switch the video format to1080p60*

Reset via Web GUI

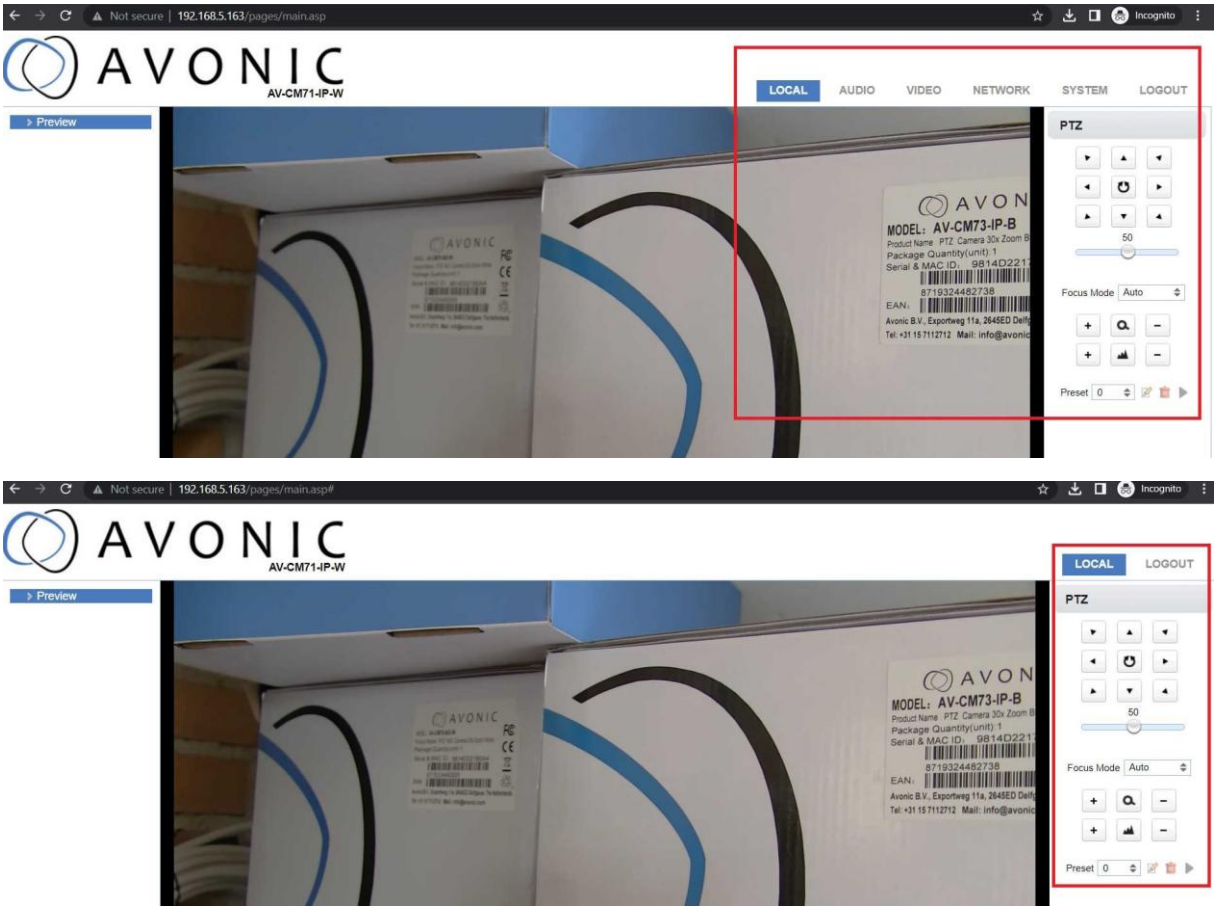
Go to *SYSTEM* > *Default* and click the DEFAULT button.



User Accounts

The camera Web GUI provides three user levels:

- **admin: full access**
- **user1: limited to PTZ, presets, focus**
- **user2: same as user1**



You can change passwords under *SYSTEM* > *User* tab. Don't forget to click SAVE.

Note: Resetting IP via remote will only reset the *admin* account.

Export and Import Settings

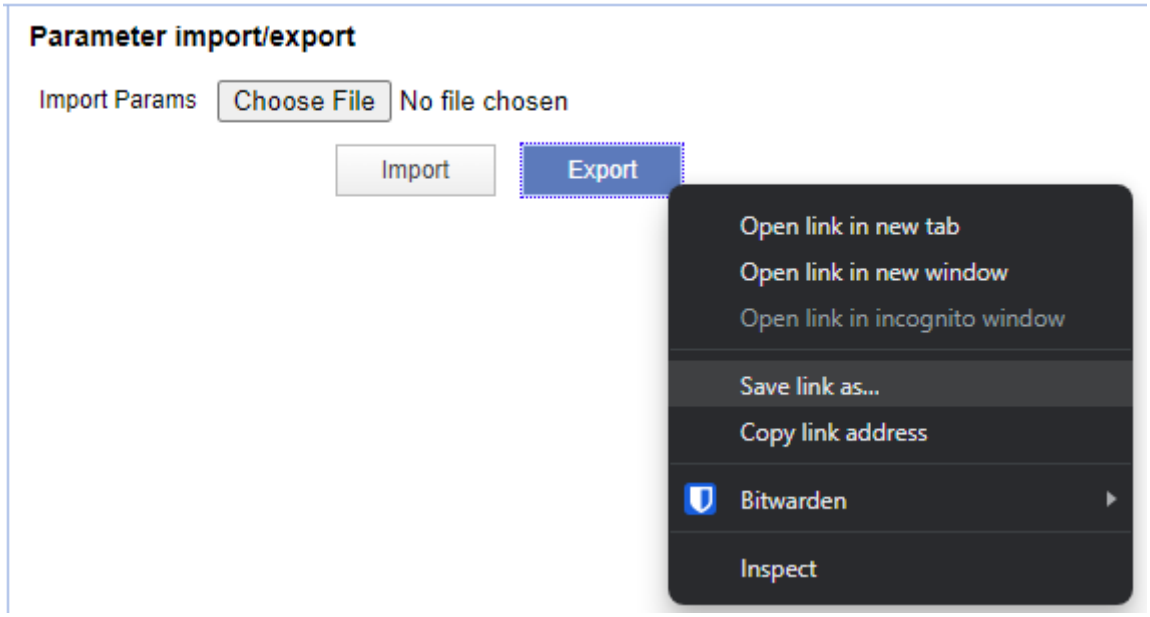
Why Export Settings?

- **To back up before a factory reset**
- **To configure multiple cameras with identical settings**
- **To compare settings during troubleshooting**

Export Settings

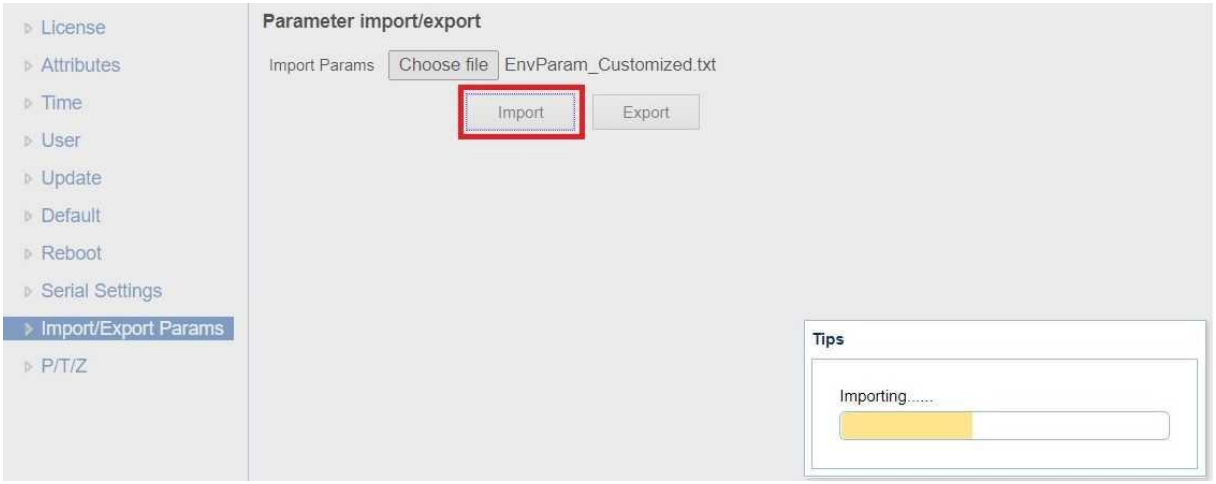
Go to Web GUI > SYSTEM > Import/Export Params.

Right-click *Export* and choose "Save link as...".



Import Settings

To import a saved EnvParam_Customized.txt file, go to the same menu and click Choose file → Import.



Reboot the camera after import for all changes to apply.

Note

Do not edit the contents of EnvParam.txt unless you are certain of what you're doing.

If the imported settings include a new IP address, use that to access the Web GUI again.

For a video guide: English, French, Spanish

License Activation

The following licenses are available for unlocking additional features on CM70- and CM93-series PTZ cameras:

CM70-series

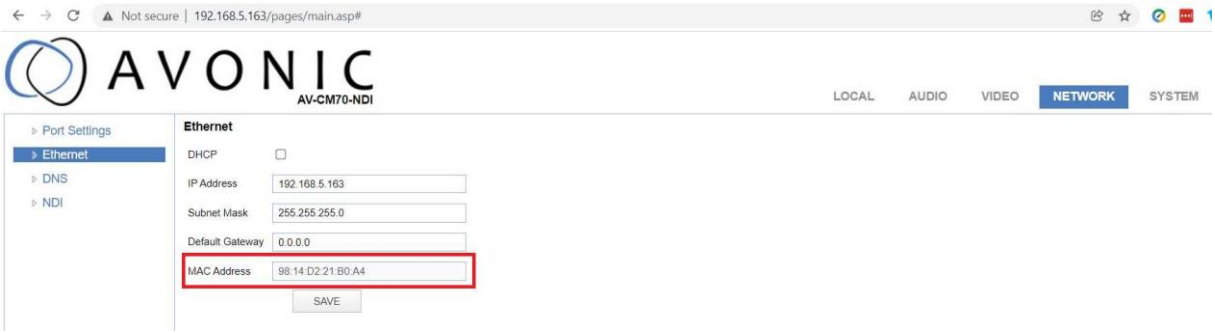
- **Tally light (via serial or IP control)**
- **Customizable Color Matrix (CCM)**
- **SRT streaming**

CM93-series

- **Tracking Modes**

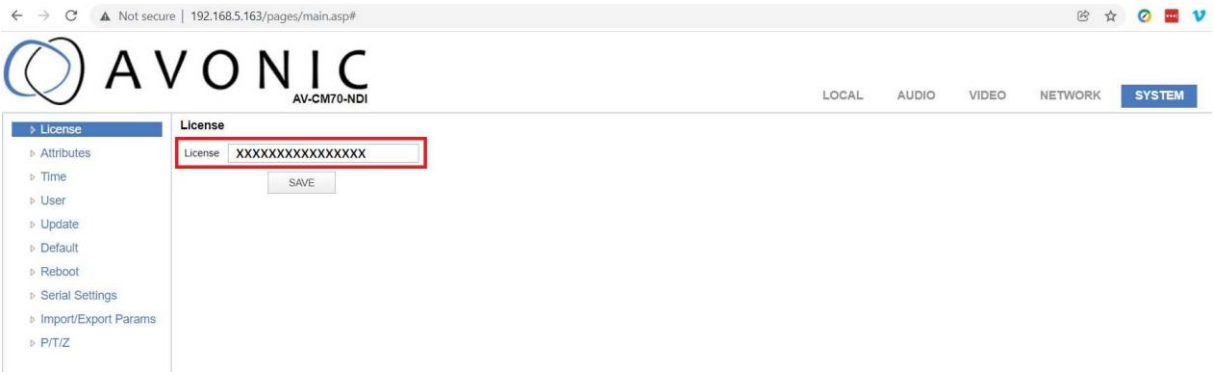
Licenses are valid for one camera and require the MAC address, which can be found:

- **On the product box**
- **On the sticker under the camera**
- **In the Web GUI under *Network* → *Ethernet* tab**



Entering a License Key

Go to Web GUI → SYSTEM → License. Enter your license key and click SAVE.



No reboot is required; refresh the page using F5 to activate.

Important Notes

- **After reset, the license is removed and must be re-entered.**
- **Only CM70-NDI cameras show "NDI Tally Light" in the Web GUI.**
- **CCM and SRT tabs become visible after license activation.**

Using the System Select Switch (Rotary Dial)

The rotary dial on the back of the camera allows manual video format selection. It's often easier to set the format via Web GUI or OSD, but the dial is useful for quick setup.

How to Use

- **Use a small screwdriver to turn the switch.**
- **After selecting, perform a hard reboot (unplug and replug power).**
- **The "F" setting allows digital output configuration via Web GUI or OSD.**

CM4x / CM7x Switch Positions

Figure 62: Select Switch

0	1080p60	8	720p30
1	1080p50	9	720p25
2	1080i60	A	1080p59.94
3	1080i50	B	1080i59.94
4	720p60	C	720p59.94
5	720p50	D	1080p29.97
6	1080p30	E	720p29.97
7	1080p25	F	Default (via OSD / WebGUI)

CM93 Switch Positions

Figure 70: System Select				
	0	1080p60	8	4K60 (only over HDMI)
	1	1080p50	9	4K50 (only over HDMI)
	2	1080i60	A	1080p59.94
	3	1080i50	B	4K30 (only over HDMI)
	4	720p60	C	4K25 (only over HDMI)
	5	720p50	D	1080p29
	6	1080p30	E	(no format)
	7	1080p25	F	Default (via OSD)

Resolution Ranges

- **CM40/CM70: 720p25 (setting 7) to 1080p60 (setting 0)**
- **CM93: 720p50 (setting 5) to 2160p60 (setting 8)**

Note: Some formats (e.g. 720p30) are not supported via SDI on CM70 models.

Refer to your product manual for supported formats per switch setting.

Dimensions CM30/40/70/80