



TrafficCamera: How to start

A step by step guide to help you get started with your smart camera.

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Thank you for purchasing the TrafficCamera and joining the FLOW family of next-gen traffic analytic intelligence! You have purchased the most powerful and versatile traffic AI available – it is waiting in the box to be unleashed by your creativity.

We wish you an exciting journey towards a smoother and safer traffic of tomorrow. Let the traffic FLOW.

On behalf of the whole DataFromSky team

A stylized blue ink signature of David Herman.

David Herman, CEO

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Introduction

TrafficCamera is an easy to deploy and extremely universal AI video analysis solution for a variety of monitoring and control tasks. Thanks to the highly optimized video and data interpretation engine FLOW, which runs directly on the camera, it is a perfect sensor for time-critical applications including traffic control and enforcement. With open API it can be easily integrated with 3rd party systems such as smart city platforms and/or traffic controllers. Integrated fully customizable data visualization and collection functions allow use this device as a traffic data collector.

Product applications:

- Traffic monitoring and management
- Active mobility monitoring
- Enforcement applications
- Public transport
- Parking management
- Retail
- Security

Under the hood

FLOW is a fully customizable video analysis framework for variety of traffic monitoring tasks. The full featured edge version of FLOW for the Azena camera operating system (OS for short) is running on the TrafficCamera as a preinstalled application for your desired use case, be it traffic, parking, retail, security or ALPR. The camera HW (hardware for short) is manufactured by AndroVideo. TrafficCamera is a product name for the ready-to-use solution delivered directly by DataFromSky.



The FLOW applications are available also on Azena store and can be installed on other camera models from different manufactures, including Bosch, Vivotek, and Hanwa.

Compoment	Name	Description
Camera HW	AndroVideo - EBL2	8MP H.265 Low Lux HDR Network Camera
Camera operating system	Azena OS	basic camera parameters such as zoom & focus, video stream quality, network settings
Preinstalled application	FLOW Traffic (DataFromSky)	detection and tracking of the objects, data interpretation and visualization, API

Unboxing

First things first - let's check all the bits and pieces that landed on your table. Depending on the selected configuration, you should be able to find the content displayed on the next page.

Main parts

TrafficCamera



Junction box

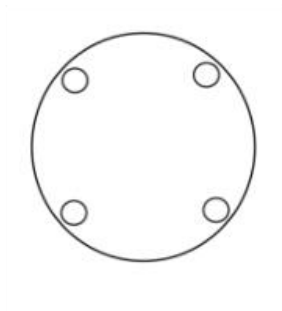


Pole mounting kit



Additional parts

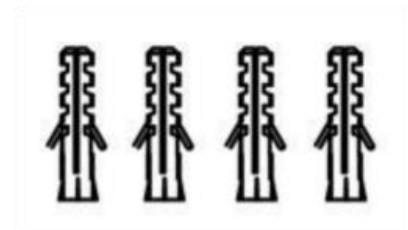
Installation sticker



4 Installation screws (Phillips head self-tapping screw TPA7-19Tx35)



4 Screw anchors (1/4"x1")



Waterproof connector



Torx wrench

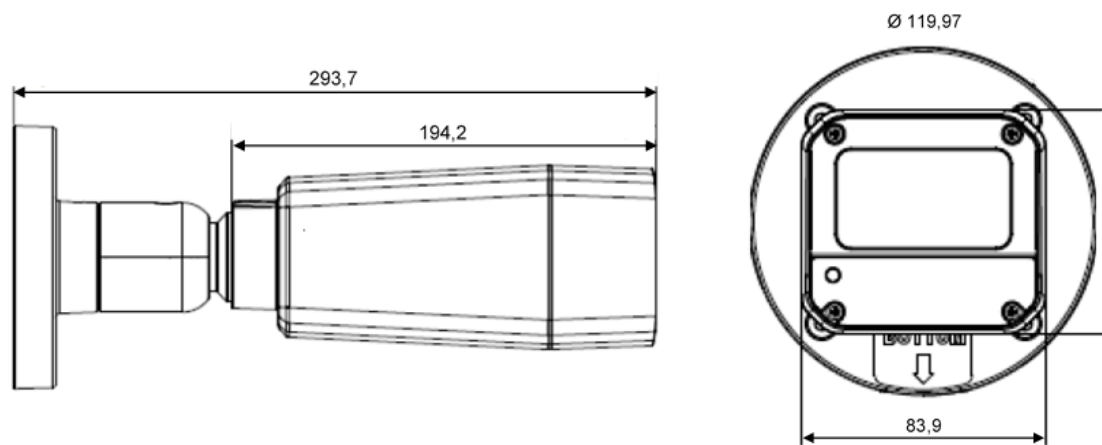


Additional smaller contents



Field installation

If the camera is installed outside, it is necessary to use the Ethernet cable protector packed with the camera to prevent water intrusion. For other cabling please follow the guidelines from the Waterproof and Insulation Procedure section. The Camera needs an Ethernet cable connection for internet connectivity. To achieve this, any device that can connect a camera to Ethernet or a media converter can be used. The Camera uses either POE or needs a 12V DC or 24V AC power source. Make sure the camera is installed at a location with access to both the internet and power. Below you can see the camera dimensions in millimeters to help you determine a suitable location where you can place it. Be sure to check before the installation that there is sufficient space for you to install the camera in the desired position.



TrafficCamera is prepared for permanent outdoor installation thanks to its rugged enclosure with IP67 rating and IK10 standard. Here are a few points to follow to achieve a reliable installation:

- Install the TrafficCamera higher than 3m above ground in order to prevent unauthorized access
- Use cabling certified for permanent outdoor use
- Secure unused connectors against water intrusion
- Attach the unit securely to a light pole or other permanent structure. Consider significant loads that might be imposed by strong winds, snow, etc... Optional mounting accessories can be employed to account for this.

How to install the TrafficCamera on a pole

To install the camera on a pole you will need to use a special mounting accessory such as the one pictured in the optional mounting accessories. Before installation check that the metal strips for the mounting accessory have sufficient length to be installed on the desired pole.

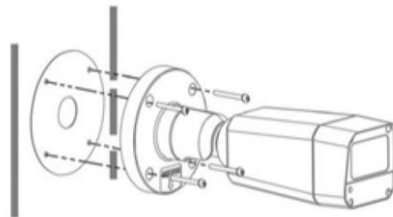
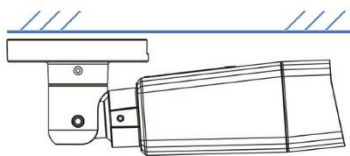
1. Install the respective parts of the junction box on the camera and the pole mounting accessory.

2. Attach the pole mounting accessory to the pole. Use the attached metal strips to do so. Make sure to use both of them to balance the mounting plate. Install and tighten them one at a time. Start with the strip on the top.
3. Fit the Ethernet cable through the holes and connect it to the camera Ethernet connector. The correct Ethernet cable connection procedure is described in How to install the network cable section...
4. Reassemble the junction box to attach the camera to the mounting accessory.

How to install TrafficCamera on a wall

The Camera can be mounted on ceilings or on walls. However, keep the device away from water and moisture if possible. The following section describes how to secure the back plate to the ceiling.

1. Use the sticker as the guideline for drilling holes for cables and installation screws. Make sure the diameter of the hole is big enough for the cables to go through. The center of the sticker should align with the center of the cable hole on the wall.
2. Drill 4 holes on the wall.
3. Insert anchors into the holes.
4. Install the cables. Be sure to waterproof the cables (refer to waterproofing cables section).
5. Put the cables through the hole in the wall and connect them to respective sockets.
6. Adjust the Camera's viewing angle (refer to Adjusting the Camera Viewing Angles section below).
7. Fix the Camera on the wall or ceiling using 4 installation screws.



To adjust the angles, use the provided torx wrench to loosen the respective screws shown below. Be sure to tighten the screws after the adjustment.

Adjusting the Camera Viewing Angles

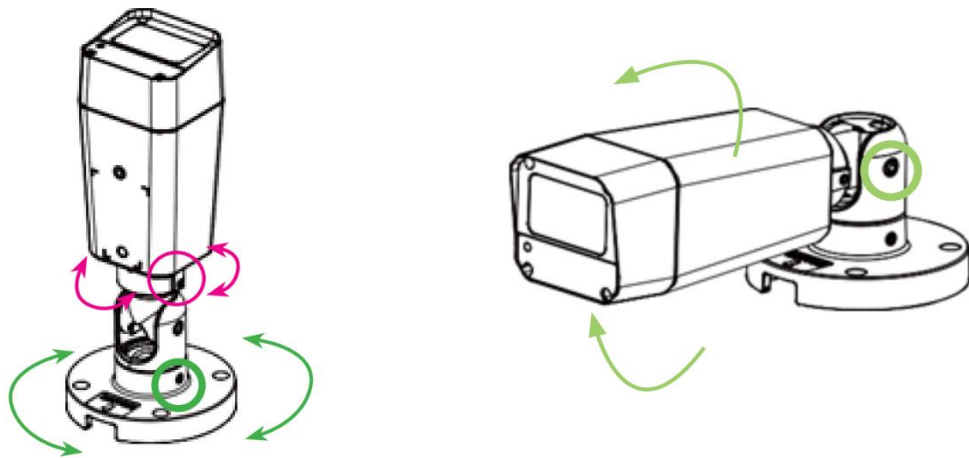
The camera is designed for easy and flexible installation.

- Adjust the Camera's viewing angle by rotating its base (pan).
- Adjust the Camera's viewing angle by rotating and tilting its body (roll and tilt).
 - Adjust the focus and zoom of the Camera via the Azena camera OS accessible through the Web Administration Interface (this is described in more detail in the Camera web interface section).

To adjust the angles, use the provided torx wrench to loosen the respective screws shown below. Be Sure to tighten the screws after the adjustment.

Note: If you find it hard to tilt the Camera, loosen the base (Pan) screw a little. When rotating the Camera, make sure the cables are not entangled.

Note: If installing the Camera on the wall, verify the orientation of the Camera is correct (with "BOTTOM" indicated on the Camera base) for smoother cable placement and proper waterproof measures.



Camera framing

Camera positioning and framing are defining parameters for video stream quality which is the main driving factor of AI traffic analytics accuracy. Therefore, we do recommend paying appropriate attention to fine-tuning the acquisition geometry. Here are a few points to consider:

- Camera image center should be ideally identical with Region of Interest center
- Align the Camera with horizon – avoid roll
- Tilt the Camera to have ROI (region of interest) just a little bit below the centerline of the image
- There should be sufficient padding between the image borders and the ROI
- Incidence angle between the Camera lens axis and the ground plane should be ideally 30-45 degrees in order to avoid reflections and dynamic occlusions
- The objects in ROI should be fully visible; at least 70 % of the object area should be visible to achieve high accuracy (be aware of dynamic/static occlusions)
- Do not capture the sky – capturing the sun can have negative impact on video analytic (tilt the Camera down if necessary)
- If possible, orient the Camera perpendicular to the traffic flow or aligned with the flow, in the direction of travel - this will help to avoid reflections from vehicle lights in night scenes
- After you set up the Camera for the first time and start detecting traffic you might need to come back to adjust the zoom and ROI depending on your detection needs. Common mistake is the assumption that what we see on the edges will get detected but ideally the location where we want to detect objects reliably should be more towards the center of the Camera view.

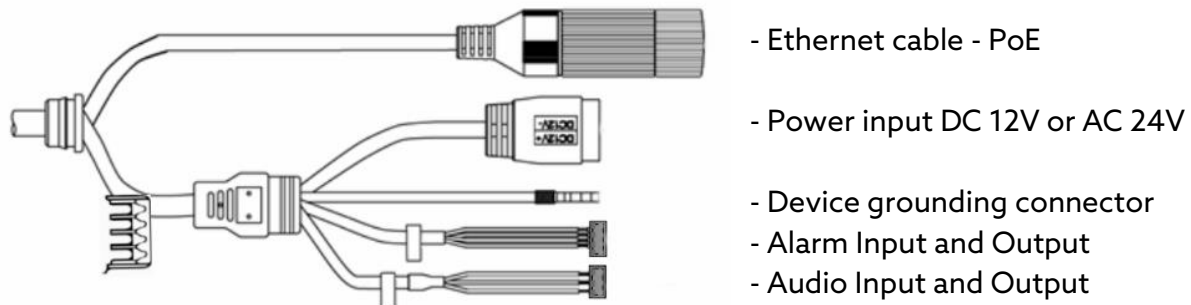


Region of Interest

Powering and data connection of TrafficCamera

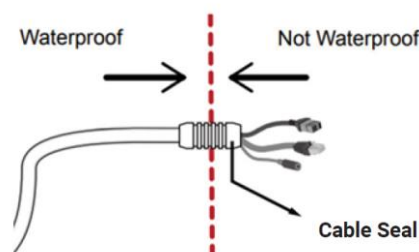
The camera has 2 main power options: (in the following section refer to A.) or B.) for your specific power option)

- A. 12V DC/ 24V AC that must be delivered from power supply to the camera power connector
- B. POE+ (Power over Ethernet) - for connection to POE - devices with POE standard capable of powering devices via an Ethernet cable



Cables installation – general guidelines

- For outdoor installation, install a lightning arrester and employ proper grounding to protect against lightning.
- Adhere to the power voltage requirement of the Camera. Be sure to separate different voltages (high and low) of power supplies with a distance of at least 5 cm to avoid damage to the device.
- Please keep the tag if you need to trim off the end of a cable.
- The unshielded wires at the end of the cable are not waterproofed, please employ proper waterproof and insulation measures (refer to Waterproof and Insulation Procedure).



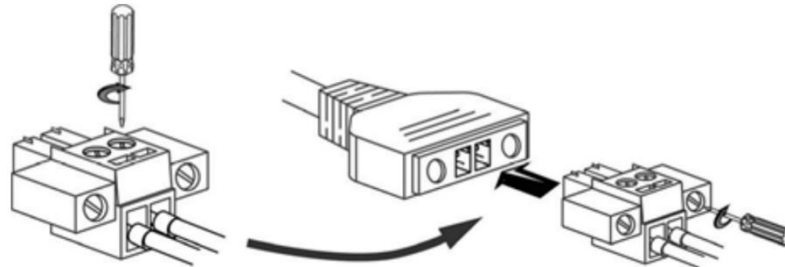
A. How to install the Power Wire

Read this section only if you are powering the camera via 12V DC/ 24V AC power supply, otherwise skip to Ethernet cable installation.

Connector types:

- Power connector type on the camera cable is: DEGSON 15EDGRM-3.5.
- Counterpart to this power connector is: DEGSON 15EDGKM-3.5.

The size of power cables should be at least 22 AWG. The ground impedance should not exceed 5 ohms. The picture below shows how the power cable should be installed.



To reduce the risk of personal injury from electrical shock and hot surfaces, power off the device and be sure to disconnect the power cord from the electric outlet and allow the internal components to cool before you handle them.

A. and B. Ethernet cable installation

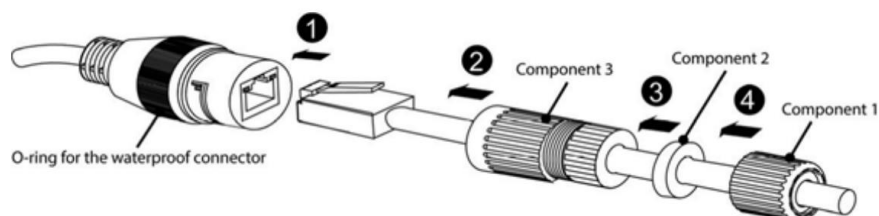
This section is important for both power options as Ethernet cable is always needed to provide the internet connection. The camera can be deployed in different scenarios and with different network setups.

For standard deployment these scenarios are considered:

1. Connection to Ethernet device with a PoE capability and that supports one of these POE standards (802.3af or 802.3at) for powering IP cameras (this way the camera gets both the network connectivity and power through the Ethernet cable).
2. Connection to device with Ethernet cable only for connecting the TrafficCamera into the network (internet connection only via this setup).

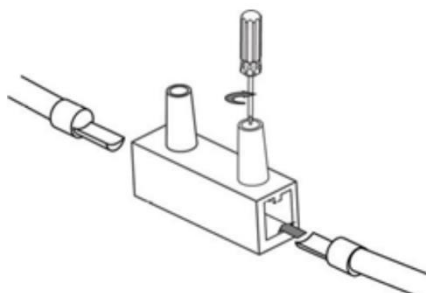
How to install the network cable

Disintegrate the waterproof connector into 3 parts. Thread the network cable through these parts in the sequence shown below and assemble the waterproof connector. Make sure the waterproof connector is securely installed or the components may come loose later. The following diagram shows the installation of the network cable.



How to install the ground wire

The attached ground wire of the Camera has to be properly grounded to protect against lightning strike. The following diagram shows how the ground wire should be installed.

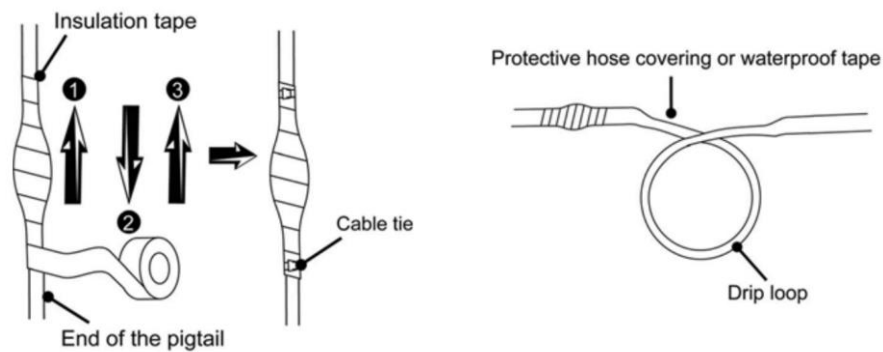


Waterproof and insulation procedure

Waterproof and insulate all cables including power cables, network cables, etc.

1. Wrap one layer of the insulation tape around the junctions of the wires.
2. Apply three layers of waterproof tape: Wrap the waterproof tape around the wire from the top downward along the wire. Wrap the waterproof tape around the wire but in the opposite direction. Wrap the waterproof tape around the wire from the top downward again.
3. Seal the top and bottom edges with cable ties.
4. Use waterproof tape to wrap the rest of the cable and make a drip loop the lowest point of the cable. Make sure it is installed tightly for effectiveness.

Enclose all cables inside the Junction Box to prevent any water intrusion. Make sure to follow the waterproofing procedures shown in the pictures below.

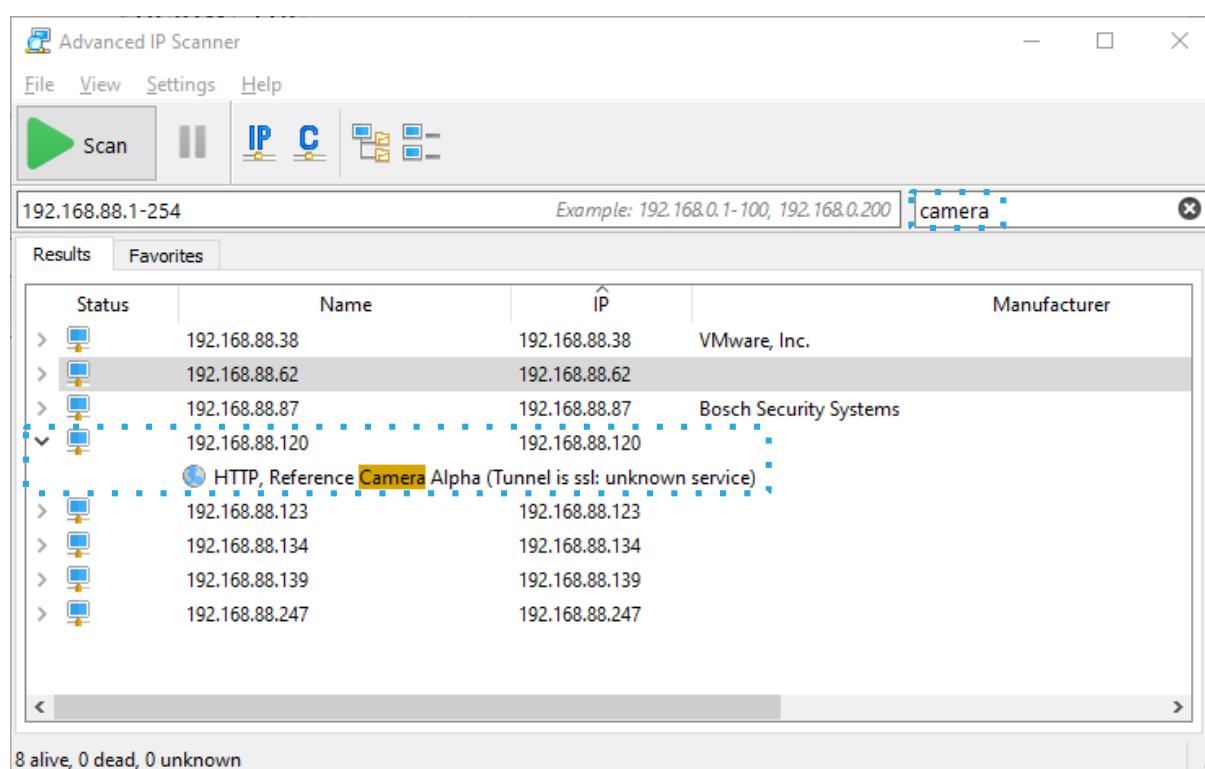


Network configuration

The camera can be deployed in different scenarios and with different network setups.

Next, to set up our camera, we need to make it accessible and know what IP address it has. The Camera uses DHCP IP address configuration by default and it will be assigned with a dynamic IP address automatically if there is a DHCP server in the network. Most routers should have a DHCP server built in. Once your camera communicates with the DHCP server it will receive an IP address.

Next, use an IP scanning utility such as the Advanced IP scanner (you can download it here: <https://www.advanced-ip-scanner.com/>) and scan for the camera within the network you have connected it to. Look for "reference camera" in the dropdown menu in the IP scanner to help you identify the correct device as shown in the picture below.



The name of the camera should be – Reference Camera Alpha which is visible after you open the dropdown menu in the Advanced IP scanner. Alternatively, you can use the ONVIF device manager tool which is designed specifically for scanning for ONVIF devices so it is easier to identify the TrafficCamera if your network has many connected devices. It is downloadable here: <https://sourceforge.net/projects/onvifdm/>.



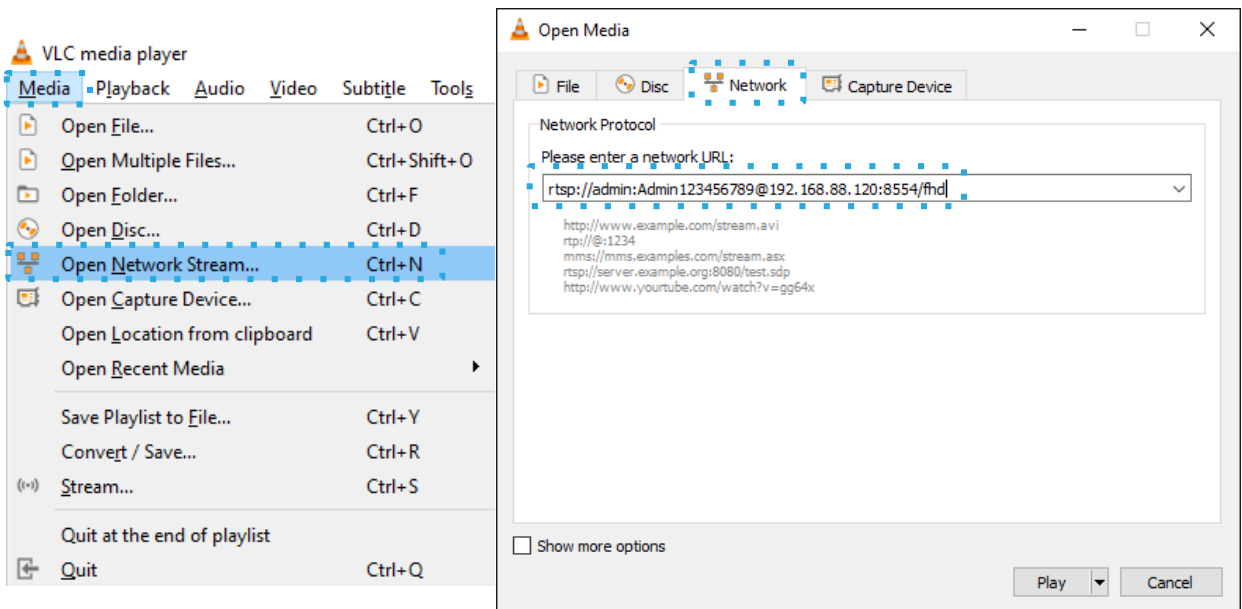
To change the network settings – go to Azena camera operating system accessible via the Camera Web Interface.

RTSP Streaming

The camera supports RTSP streaming. You can use the stream to check if your camera is operational and sending video data without logging into FLOW Insights.

To open a network stream, type the following RTSP URL `rtsp://:8554` in a media player such as VLC media player. If you have configured RTSP authentication in the Azena web interface, please enter the RTSP URL in the following format:

`rtsp://username:password@:8554/` so for example the address could look like this:
`rtsp://admin:Admin123456789@192.168.88.120:8554/fhd`



If you would disable authentication, then `rtsp://192.168.88.120:8554/fhd` would be sufficient. If the video stream is not working you might have wrong RTSP address or RTSP not enabled on the camera. The camera access also might not be available on your PC in which case, you should contact administrator of your local network.



To change the video stream quality/parameters settings – go to the Azena camera operating system accessible via the Camera Web Interface.

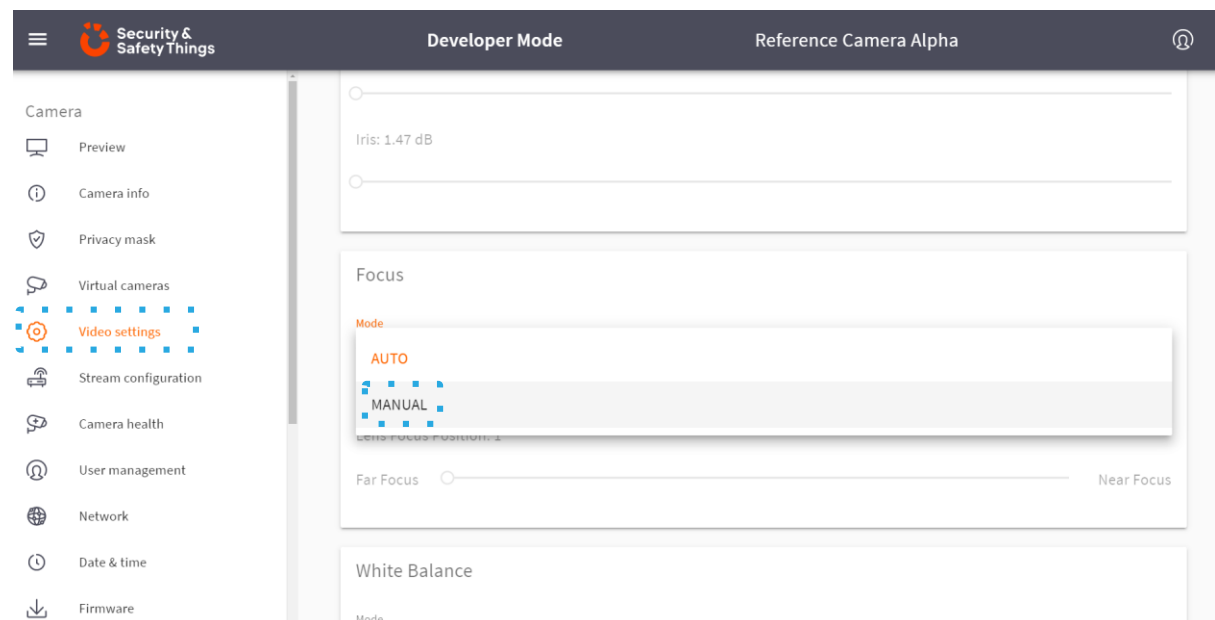
Camera web interface and camera settings

This camera web interface allows you to access the Azena camera OS and to set up and monitor a variety of parameters for example the zoom settings, IR mode, IP address, general diagnostics and more. In this section we will cover the most important ones.

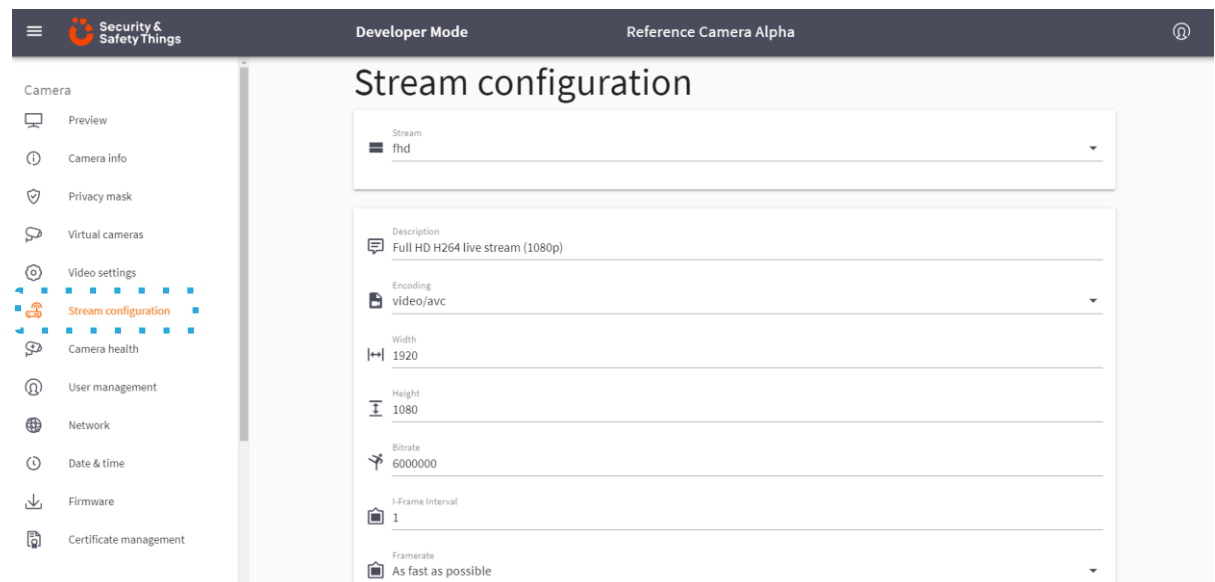
The camera's web administration interface can be accessed using the URL: https://<ip_address>:8443/ (example URL format: <https://192.168.88.75:8443/>). You can sign in with the following default login details:

- **login: admin**
- **password: Admin123456789**

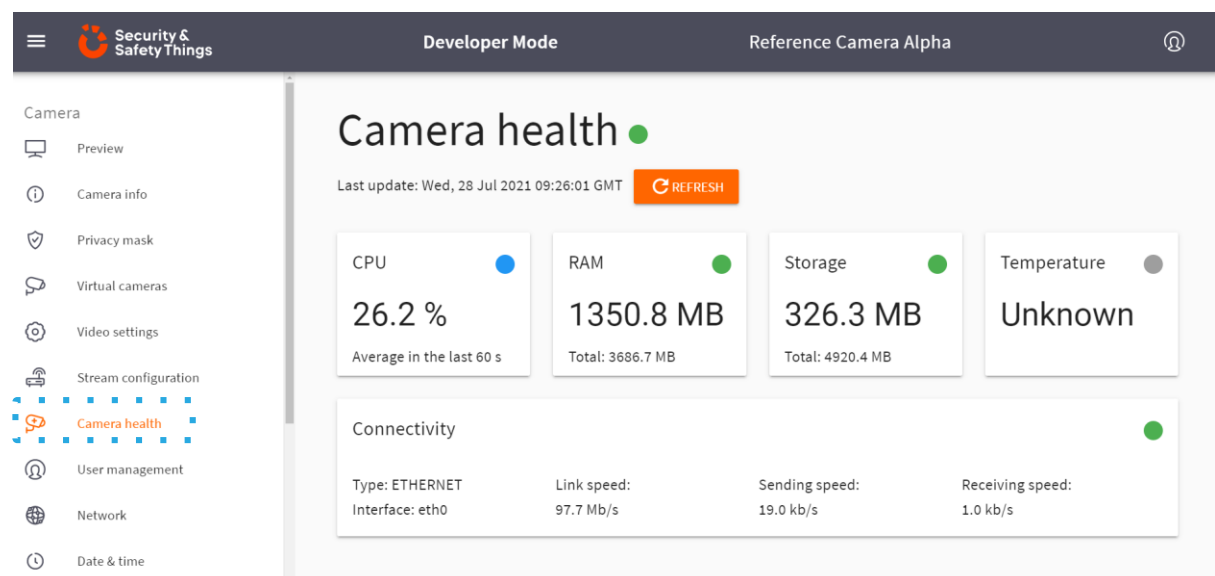
In the **Preview** section you can see a preview of the camera and adjust refresh rate settings. Most of these settings are set on auto by default so if you are not satisfied with the given parameter, you can adjust them manually. If for some reason the video stream is working but you are not able to connect to FLOW Insights, please contact us at support@datafromsky.com. Another important section is the **Video Settings**, there you can adjust exposure, focus, zoom IR and day/night mode.



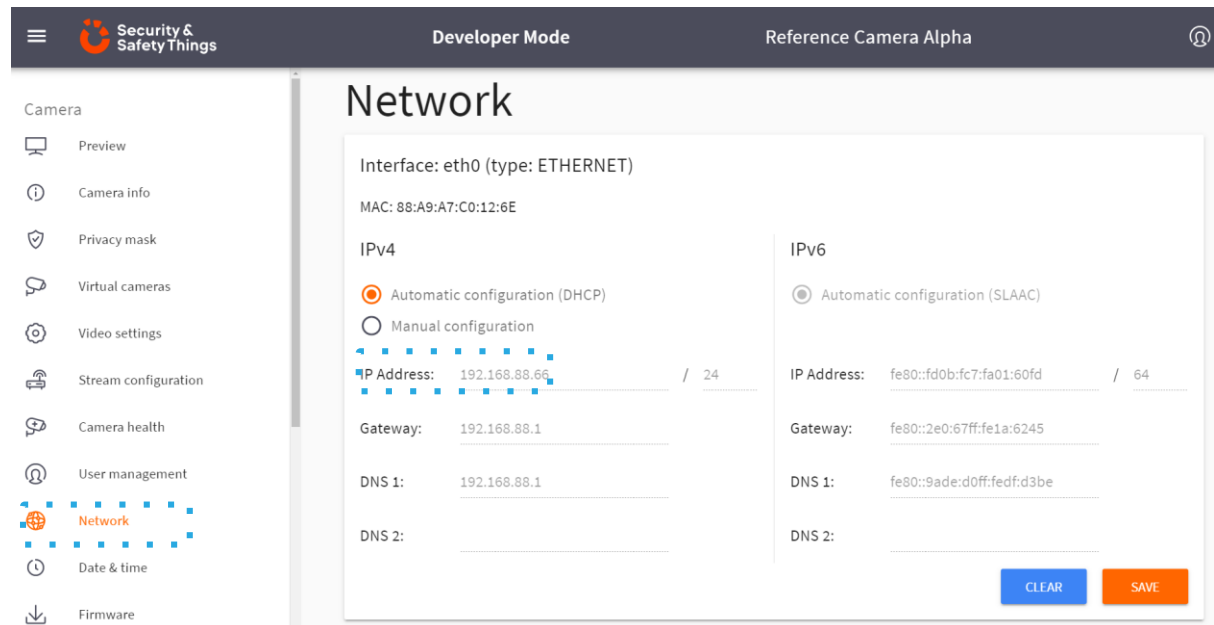
Next is the **Stream configuration** section. There you can adjust the quality and codec of the camera stream or framerate.



Under the **Camera health** section, you can check how much CPU and RAM (cache memory) the camera is currently using as well as details about the internet connection to the camera

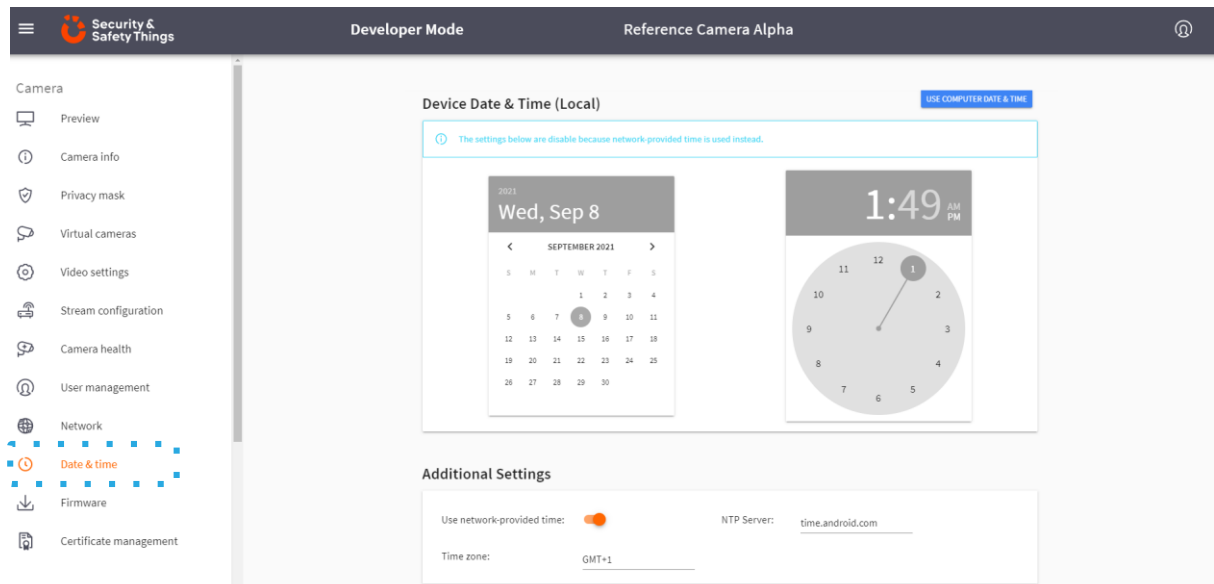


In the **Network** section you can assign a static IP address to your camera.



The screenshot shows the 'Network' configuration page in the Azena camera web interface. The interface has a dark header with 'Security & Safety Things', 'Developer Mode', and 'Reference Camera Alpha'. A sidebar on the left lists various settings, with 'Network' highlighted. The main content area is titled 'Network' and shows settings for the 'eth0 (type: ETHERNET)' interface. It includes the MAC address '88:A9:A7:C0:12:6E'. Under 'IPv4', 'Automatic configuration (DHCP)' is selected, and the IP address is '192.168.88.66'. Under 'IPv6', 'Automatic configuration (SLAAC)' is selected, and the IP address is 'fe80::fd0b:fc7:fa01:60fd'. Other fields include Gateway, DNS 1, and DNS 2. 'CLEAR' and 'SAVE' buttons are at the bottom right.

Under Date and Time, you should set the current time and day to get data with correct timestamps.



The screenshot shows the 'Date & Time' configuration page in the Azena camera web interface. The interface has a dark header with 'Security & Safety Things', 'Developer Mode', and 'Reference Camera Alpha'. A sidebar on the left lists various settings, with 'Date & time' highlighted. The main content area is titled 'Device Date & Time (Local)' and includes a 'USE COMPUTER DATE & TIME' button. A message states: 'The settings below are disable because network-provided time is used instead.' Below this, there is a calendar for 'SEPTEMBER 2021' showing 'Wed, Sep 8' and a digital clock showing '1:49 AM'. Under 'Additional Settings', there is a toggle for 'Use network-provided time' which is turned on, an 'NTP Server' field with 'time.android.com', and a 'Time zone' dropdown set to 'GMT+1'.

You can learn more about the camera web interface for accessing the Azena camera OS and how to set up the various camera parameters on the Azena support page:

<https://support.azena.com/hc/en-us>

FLOW – connect and define traffic analytics

FLOW is an AI-based traffic video-analytical engine that runs on the camera. To configure various traffic tasks on the camera you need the FLOW Insights application which can be downloaded here: <https://datafromsky.com/flow-versions/> There you should choose the correct version of FLOW Insights to match the version of the FLOW application running on the camera. You can check the version of the application running on the camera in the Azena web interface.

If you have the latest version of the application you get the latest FLOW Insights version here: http://www.datafromsky.com/download/flow/demokit/FLOW_Demokit.exe

How to connect to the camera with FLOW Insights

First, download the FLOW Insights desktop application and install it on your computer. It needs to be a 64-bit Windows platform which is the only one currently supported. Make the device accessible via network and find out its IP address as described previously in the Network configuration section.

Launch FLOW Insights on your PC, tablet, etc... Click on start FLOW in the third window on the bottom left named "Traffic survey or FLOW device live stream" In the first field, enter the camera's IP address and port number (8088) in the format xx.xx.xx.xx:8088. Leave the second field empty and hit enter.



On the next screen, log in with the following credentials:

- **Login: admin**
- **Password: admin**



Note that you should change this password when you log into FLOW insights in the user settings section.

How to define traffic analytics

FLOW framework is a complex system that supports a variety of hardware devices. FLOW currently runs on TrafficCamera, TrafficEmbedded, TrafficEnterprise and TrafficDrone (mobile processing unit). No matter the hardware requirements or use case you are able to work in the same system. The system is regularly updated with new functions, performance improvements and bug fixes. We have a dedicated help section on our web where you can find a plethora of articles about FLOW, how it works or how to set up the analytics for a variety of use-cases.



Next you can explore all of the articles about FLOW here:

<https://intercom.help/datafromsky/en/collections/2019942-flow-and-flow-insights>.

Note: You can use the search bar on the top to help you find what you are looking for.

Basic FLOW principles:

We suggest starting with the FLOW basics article:

<https://intercom.help/datafromsky/en/articles/3773025-the-basics-of-flow-insights>

Data filtration - How to use FLOW filters and operators:

We also suggest reading some of the articles about the various types of filters such as the spatial filters article which is the most important one.

<https://intercom.help/datafromsky/en/articles/3656473-spatial-filters-in-flow-insights>

Visualization – widgets and dashboards:

To learn everything, you need to know about widgets and data visualization please read this article:

<https://intercom.help/datafromsky/en/articles/3666528-using-widgets-to-view-data-on-the-dashboard-in-flow-insights>

Tutorials – how to create:

<https://intercom.help/datafromsky/en/collections/2019942-flow-and-flow-insights#use-case-tutorials-how-to-series>

Highway camera: <https://intercom.help/datafromsky/en/articles/3854223-how-to-create-highway-traffic-camera-with-flow>

The best way to learn FLOW is by applying it to a specific use-case making it easily understandable. Choose a specific use-case guide that you like and follow along.

Generic:

Some general guidelines that you may find useful on how to capture video can be found here: <https://intercom.help/datafromsky/en/collections/2232238-general-faq>

In case you have not found what you have been looking for please get in touch with us using the live chat or send us email to support@datafromsky.com.

Quick start guide

This section will guide you through all the necessary steps to get your camera running. This does not include installation on a traffic pole but rather is a guide to help you try and launch the TrafficCamera for the first time before you head out to the field to do so. You can even test the detection by pointing the camera at a screen with running a traffic video.

Prepare the following:

- TrafficCamera
- Ethernet cable connecting the camera to the desired network (with DHCP server)
- Ethernet cable for connecting the camera to POE enabled slot or an appropriate power cable to connect to the camera with DC 12V or AC 24V to power the camera
- Computer with installed FLOW Insights Windows version. You can download the respective FLOW Insights version here: <https://datafromsky.com/flow-versions/>

First connect your TrafficCamera to the desired network/switch/router, etc... via the Ethernet cable.

If you want to power the camera over the Ethernet cable, the device you connect it to must have POE standards (802.3af or 802.3at). The other option is to use the Power input DC 12V or AC 24V.

Next, to set up our camera, we need to make it accessible and know what IP address it has with the help of an IP scanning tool. For more details on this please refer to the Network configuration section.

To configure the camera zoom, focus, colors or to assign a static IP address to the camera, access the Azena camera OS web interface. Enter the camera address into the browser window and login with the following details that are set as default:

- **login: admin**
- **password: Admin123456789**

After you have configured the camera based on your needs, you can connect to the camera analytics with FLOW Insights. The web interface has been described in the camera web interface and camera settings section which you can refer to for more details.

1. Run FLOW Insights and connect to the camera using its IP address with the port number 8088 at the end (xx.xx.xx.xx:8088).
2. Log in with the username "admin" and password "admin" which are set as default.
3. Design any sensor you need! (More on this can be found in the How to define traffic analytics section above)

You are now communicating with the camera and you can start configuring it. You can refer to the How to connect to the camera with FLOW Insights section for more details on logging into FLOW insights.

Congratulations – you have successfully connected your very first TrafficCamera. You can now enjoy the power of acclaimed DataFromSky traffic analytics. For more information on how to work with FLOW, tutorials and support please visit our learning portal here: <https://intercom.help/datafromsky/en/collections/2019942-datafromsky-flow>

Conclusion

This manual has covered everything you need to know to set up the TrafficCamera. We went over the contents of the TrafficCamera package, Field installation, Camera framing, Power supply, Waterproofing, Network setup, Camera web interface and Quick start guide.

FLOW has regular updates with new functions, performance improvements and bug fixes. Inside FLOW Insights you will be notified when new FLOW version is available, however please do not update FLOW Insights without updating the FLOW camera application version first. If you would like to update the version of FLOW Insights on your camera please get in touch with us at support@datafromsky.com.

We hope you will enjoy TrafficCamera. If you have any kind of feedback please reach out to us at info@datafromsky.com.

FAQ

How to change camera date and time?

To change the date and time of the camera you need to use the camera web interface that allows you to access the Azena camera OS accessible by entering camera address into the web browser. There you can set the date and time. More about this can be found in the Camera web interface section.

How to zoom / focus?

To adjust the zoom, focus and other camera parameters you need to use the camera web interface that allows you to access the Azena camera OS accessible by entering camera address into the web browser. There you change the camera settings according to your needs. More about this can be found in the Camera web interface section.

How to change IP address of the camera?

To assign a static IP address to the camera you need to use the camera web interface that allows you to access the Azena camera OS accessible by entering camera address into the web browser. There you can decide whether to have DHCP server to assign IP address or you can choose a static one. More about this can be found in the Camera web interface section.

How to obtain IP address of the camera?

To obtain the IP address of the camera you need to use one of the network device scanning utilities. You can use Advanced IP scanner (<https://www.advanced-ip-scanner.com/>) or ONVIF device manager (<https://sourceforge.net/projects/onvifdm/>). Look for a device with "camera" in its description. You can learn more on how to scan for the IP address in the Network configuration section.

Technical specification

Camera – general	
Processor	Qualcomm QCS605
RAM Memory	4GB RAM/16GB eMMC
Power Supply	12V DC /24V AC/ POE+ (IEEE 802.3at) (max consumption 25.5W)
Image Sensor	1/1.8" progressive scan low lux CMOS
Picture Elements	3840 (H) x 2160 (V)
Minimum Illumination	0.025 Lux @F1.47 (Color), 0.02 Lux @F1.47 (B/W), 0 Lux (IR ON)
HDR/WDR	120 dB
Regulatory	CE, FCC,VCCI compliant, RoHS compliant, IP67, IK10
Dimensions	84 mm x 77 mm x 293 mm (with sunshield and bracket)
Weight	1.56Kg
Micro SD	Micro SD card slot, Pre-built SD: 16GB
LED Indicator	3 LEDs: Power, Status, Ethernet

Lens	
Day/Night	Yes (with removable IR-cut filter)
Lens Type	Motorized
Focal Length	4.46-11mm
Maximum Aperture	F/1.47
Horizontal FOV	40° ~ 110°
Image Format	1/1.8"
Max. IR Distance (Radius)	30m (98.43ft)

Video capture parameters	
Video Compression	H.265, H.264, MJPEG
Frame Rate	30 fps at 3840 x 2160
Audio Compression	G.711

Network and connectivity	
Interface	10/100 Ethernet
Protocols	TCP, UDP, DHCP, DDNS, HTTP, HTTPS, NTP, RTSP, SMTP, AMQP
Ethernet	RJ-45
Audio	Line in/Line out
Digital I/O	1 Input (Dry Contact), 2 Digital Output (Wet Contact)

Storage, startup and operating conditions	
Storage temp.	-30 °C ~ 60 °C (-22 °F ~ 140°F)
Storage humidity	10% ~ 90% (no condensation)
Startup temp.	-20 °C ~ 50 °C (-4 °F ~ 122 °F)
Operating temp. (IR off)	-30 °C ~ 50 °C (-22 °F ~ 122 °F)
Operating temp. (IR on)	-30 °C ~ 40 °C (-22 °F ~ 104 °F)
Operating humidity	10% ~ 90% (no condensation)

Video Analysis Functions

- Detection and tracking of objects
- Category classification into 7 object types
- Detection scale of 320x320 pixels
- Minimum object size required for detection - 32x32 pixels in detection scale

Traffic analytics & visualization functions

- Fully programmable trajectory processing and evaluation thanks to the FLOW framework.
- Speed and stationary time measurement
- Customizable OpenAPI - REST/UDP/JSON format.
- Customizable dashboards with interactive widgets
- Color recognition