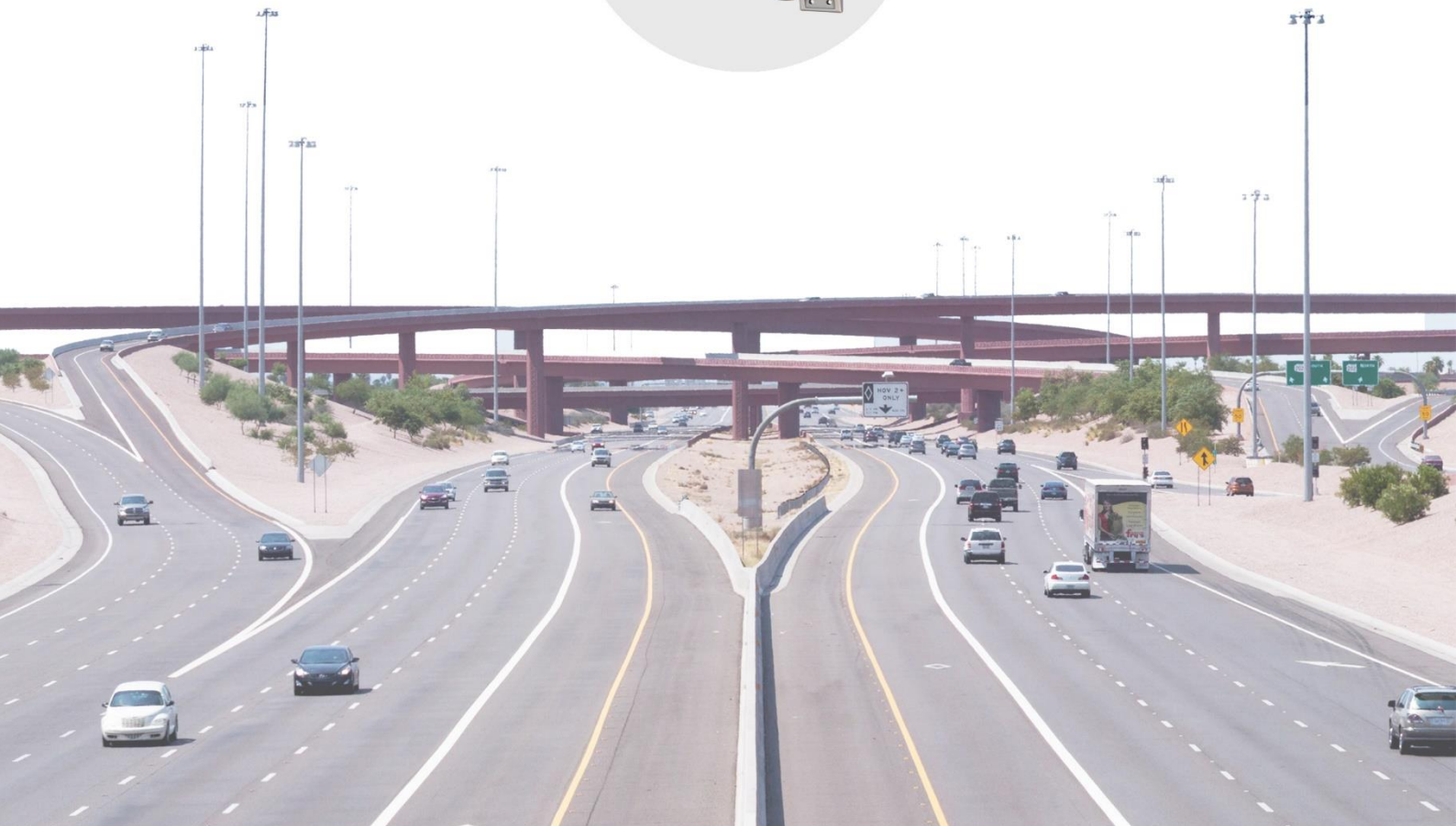


FREEWAYCAM

DIGITAL (IP) LPR CAMERA



INSTALL GUIDE

For versions from 3.1

Document version: 2016.09.28

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COMPLIANCES

CE CERTIFICATES:

The ARH FreewayCAM ANPR digital camera family complies with the European CE requirements specified in the EMC Directive 89/336/EEC.

The ANPR cameras conform to the following Product Specifications:

Emission:

EN 55022, EN 55024

Immunity:

EN 61000-4-2, -3, -4, -5, -6, -8, -11

DECLARATION OF ROHS COMPLIANCE FOR ELECTRICAL AND ELECTRONIC PRODUCTS:

ARH Inc. ("the Company") hereby declares that the FreewayCAM ANPR camera family placed on the European Community market by the Company after 8 June 2011 are compliant with EC Directive 2011/65/EU on the Restrict of Certain Hazardous Substances in Electrical and Electronic Equipment (commonly known as the EU RoHS Directive.)

Compliance with RoHS means that where the product falls under the scope of the EU RoHS Directive, the product does not contain the following substances:

- Lead (0,1 %)
- Mercury (0,1 %)
- Cadmium (0,01 %)
- Hexavalent chromium (0,1 %)
- Polybrominated biphenyls (PBB) (0,1 %)
- Polybrominated diphenyl ethers (PBDE) (0,1 %)

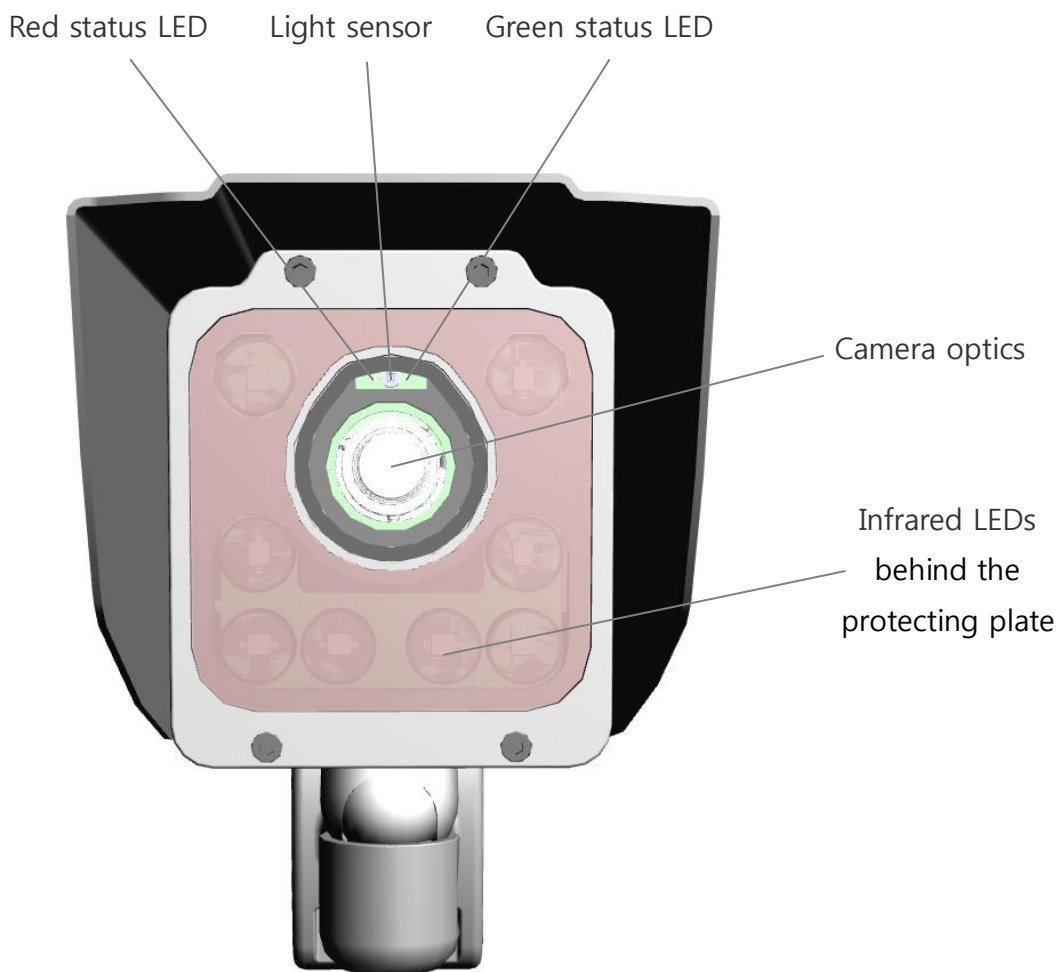
above the indicated maximum concentration values by weight in homogeneous materials unless the substance is subject to an exemption specified in the Directive or in subsequent Commission Decisions.

This declaration represents the Company's best knowledge, which is partially based on information provided by third party suppliers."

HARDWARE OVERVIEW

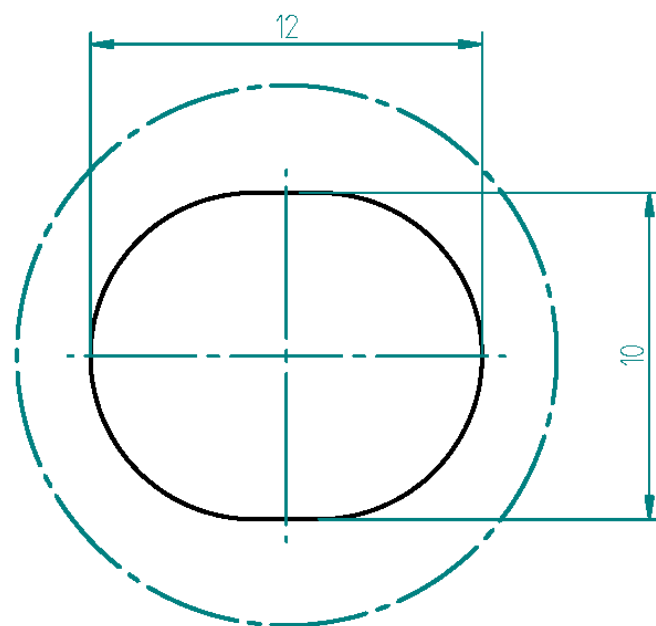
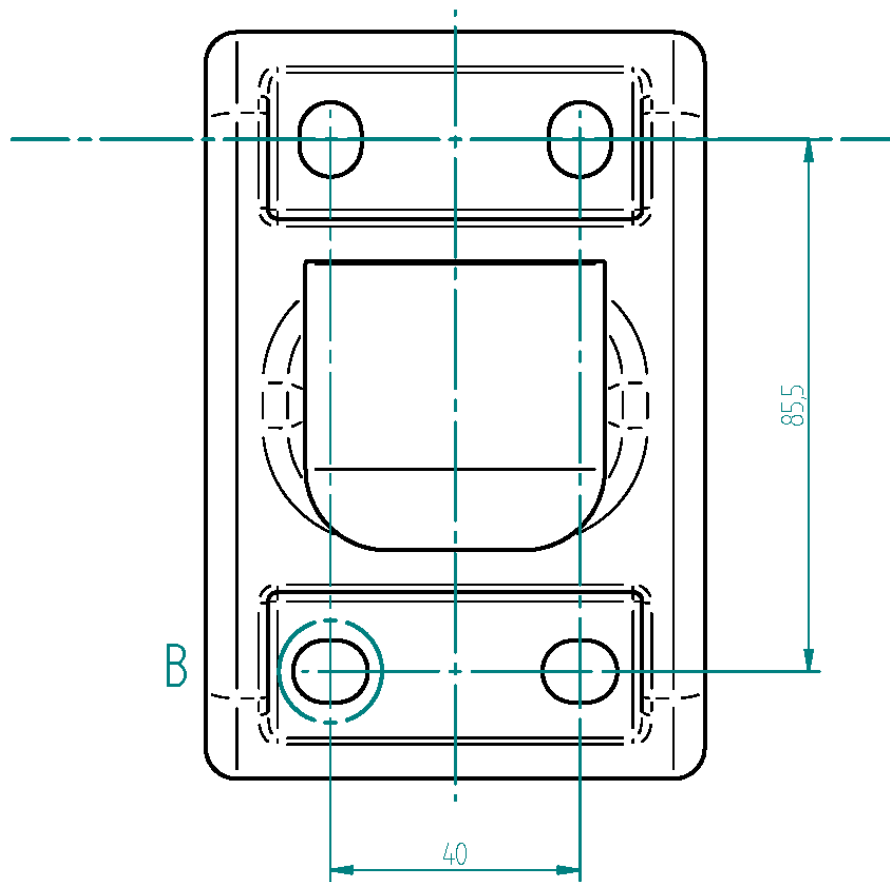


Camera with bracket



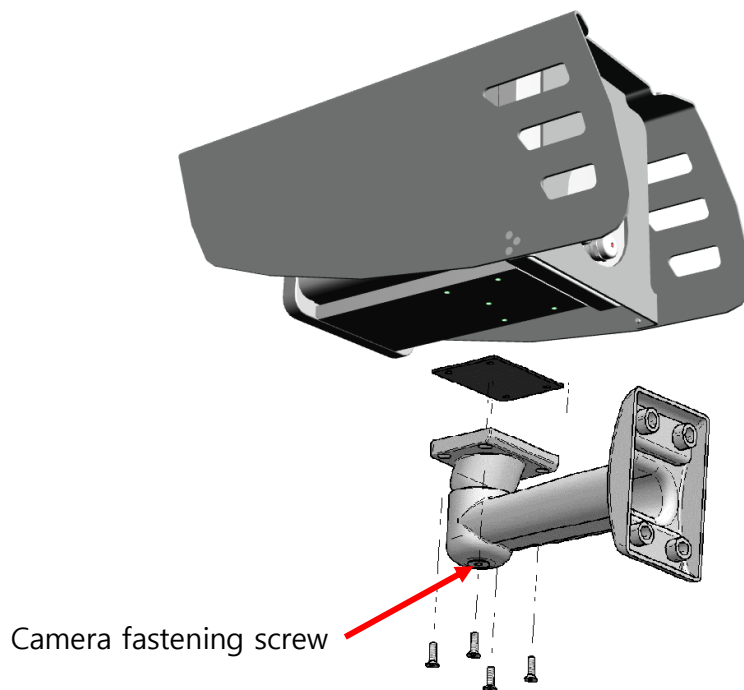
Camera front

1. BRACKET DETAILS AND SIZES (in mm)



DETAIL B

INSTALLING THE HARDWARE



Note

Remove protective film from the protecting plate (on the front of the camera) before using the FreewayCAM.

ADJUST THE BRACKET

1. Loosen the camera fastening screw on the bottom of the bracket. (Use a size 5 Allen key).
2. Adjust the bracket into the desired position.
3. Tighten the screw back.

Note

Do not overtighten the screws.

1. MOUNTING

The bracket can be mounted on different surfaces. Use appropriate screws for installation, the surface on which the camera will be mounted determines what screws should be used.

Note

Damages resulting from inappropriate installation void the warranty.

CONNECTING THE CABLES

Note

Technical specifications are subject to change without prior notice.

! Important

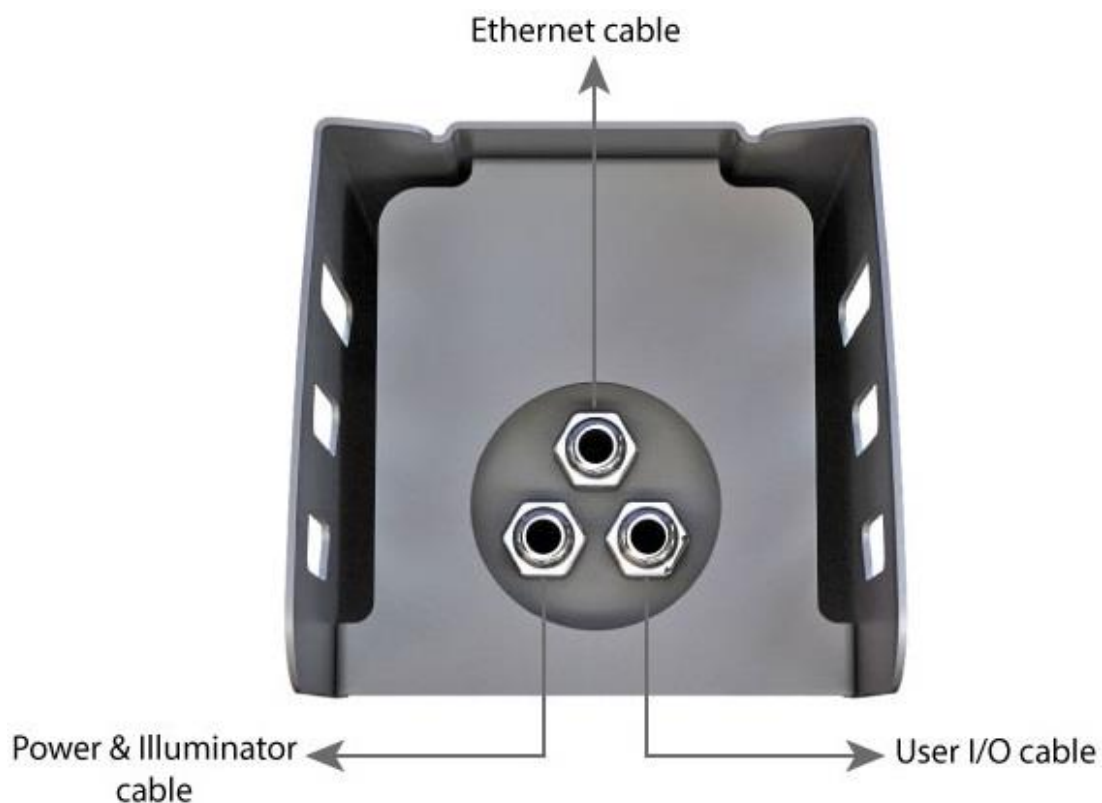
For cabling use quality cables certified for outdoor use! Using improper cabling will void the warranty! Water may enter the inside of the camera through loose cable ends. Only use smooth circular cables (6-8mm in diameter).

! Important

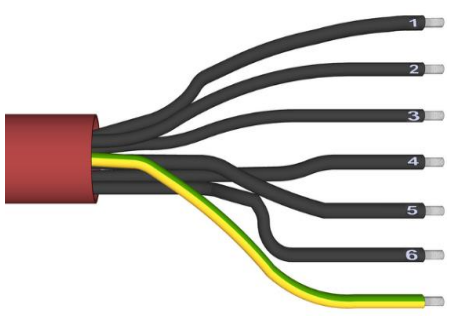
Seal the unused cable endings (end sleeves) **before connecting to power** in order to avoid any damages caused by a possible short circuit.

1. CABLE LAYOUTS

In case of **WVGA** and **HD** cameras:



ETHERNET SPECIFICATION: CAT5e crossover cable with an RJ45 plug.

Cable Layout	Core Number	User I/O Cable	Power&Illuminator Cable
	1	Opto Out G (-)**	AC
	2	Serial RX***	Illuminator Control 1
	3	Serial TX***	Illuminator Control 2
	4	Opto In S (+)*	Illuminator Control Out +
	5	Opto In G (-)*	Illuminator Control 3
	6	Opto Out S (+)**	AC
	NA	Serial GND***	Illuminator Control Out -

* For trigger input

** For trigger output

*** General-purpose serial port

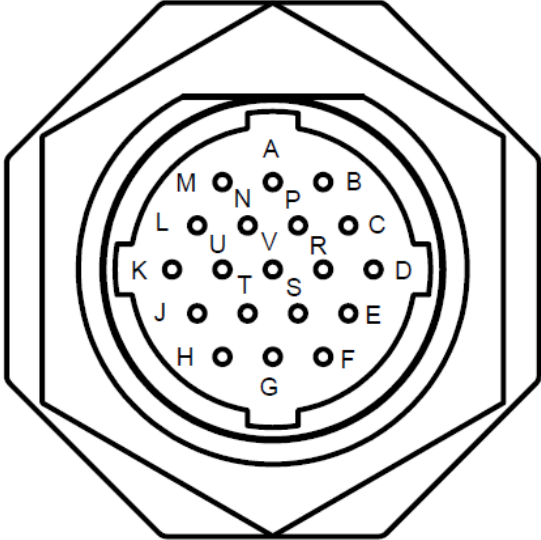
In case of **FullHD** cameras:



The lower two connectors of the back panel of the camera are for the power supply and Ethernet connection. The additional two sealed outputs are designed for GPS and radar connections if necessary.

ETHERNET SPECIFICATION: CAT5e crossover cable with an RJ45 plug.

The layout of the upper user I/O connector is the following:

INDICATION	USER I/O CABLE	FRONT VIEW (CAMERA CONNECTOR SIDE)
K	OPTO1_IN_S	
J	OPTO1_IN_G	
T	OPTO1_OUT_S	
H	OPTO1_OUT_G	
M	OPTO2_IN_S	
N	OPTO2_IN_G	
A	OPTO2_OUT_S	
P	OPTO2_OUT_G	
B	RB_USER	
R	TA_USER	
C	GND_USER	

POWER SPECIFICATIONS:

The required input voltage is model dependent, please use the proper input according to your model. Furthermore, please be aware that voltage drop can occur when using cables.

	FREWAYCAM WIDEVGA	FREWAYCAM HD	FREWAYCAM FULLHD
AC Input	isolated 24-28V AC		
Power	7W – 14W (max. 31W with heating)	8W – 15W (max. 32W with heating)	11W – 17W (max. 20W with heating)
Input Current *without heating	0.3A (max. 2.5A transients occur for a few msecs)	0.4A (max. 2.5A transients occur for a few msecs)	0.5A (max. 2.5A transients occur for a few msecs)
Over-current Protection	by fuse		

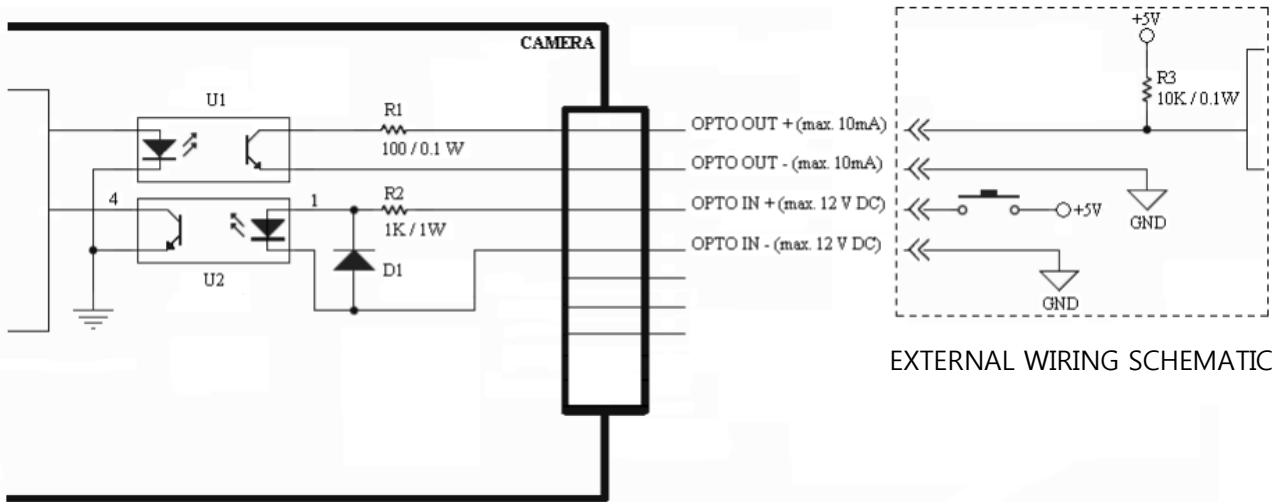
TRIGGER SPECIFICATIONS:

- **Input:** min. 5V, max. 12V
- **Pulse width:** min. 1 ms
- **Logic Output:** min. 5V, max. 12V, max. 10mA

Note

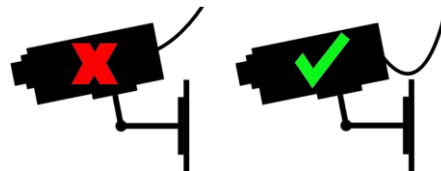
Mind the polarity.

SCHEMATIC FOR TRIGGERING:



SERIAL CONNECTION SPECIFICATION:

The serial port of the camera complies with the RS 232 standard.



Route the cable according to the image to avoid the collection of rainwater at the socket

SOFTWARE REQUIREMENTS

The FreewayCAM is developed to operate without any kind of special software.

SOFTWARE REQUIREMENTS:

- For network setup, administrator (root) privileges are necessary.
- Web browser: Mozilla Firefox 47, Internet Explorer 10-11, Google Chrome version 51 or later. If possible, update your browser (Firefox or Chrome) to the latest available version.

Note

To enable all camera functions, enable JavaScript and ActiveX controls in your browser.

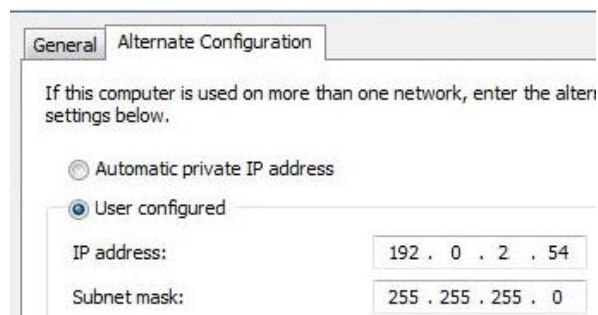
ACCESSING THE CAMERA

STEPS OF ACCESSING THE WEB INTERFACE OF THE CAMERA FROM A BROWSER:

1. Connect the camera to a computer or network switch, then power on the camera. After it is turned on, both status LEDs (red and green on the front of the camera) are turned on while the camera is booting. After it has finished booting, the green status LED flashes two times while the red one turns off signaling that the camera is ready for operation.



2. Enter an alternate IP address (or set your computer's IP) in the 192.0.2.x subnet – where x is an integer number between 1 and 254 **except 3** – with the subnet mask of 255.255.255.0. For more information, see the [Appendix](#).



3. Use the ping command to test the communication with the camera:

Windows:

C:\>ping -t 192.0.2.3

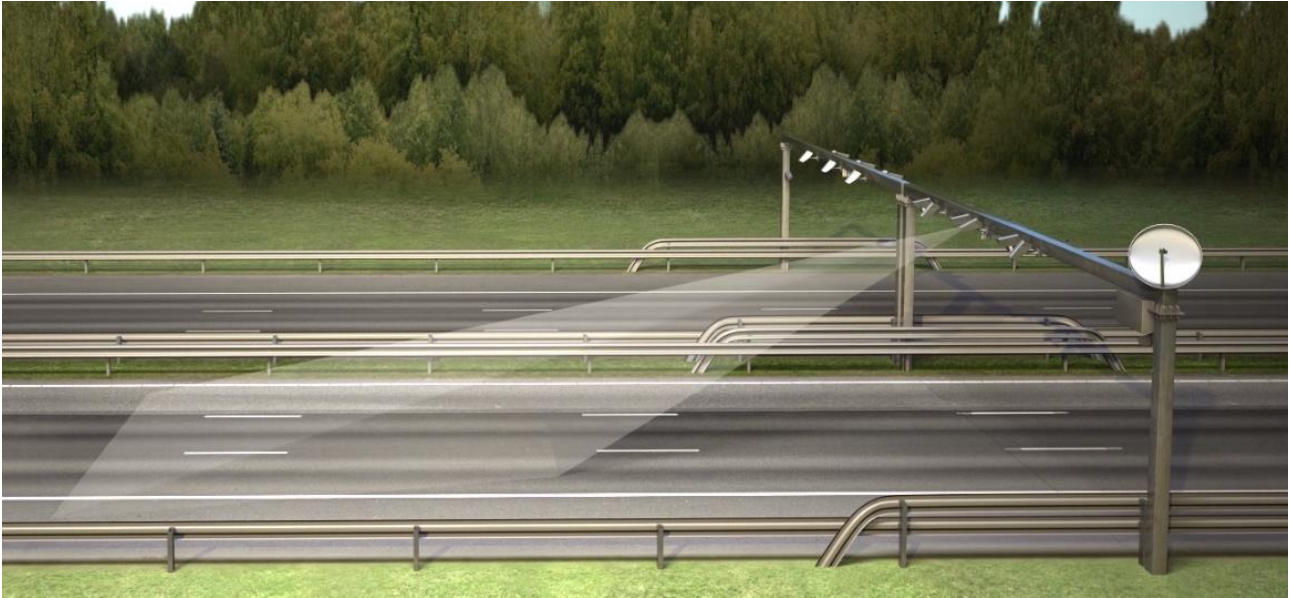
Linux:

username@mylinux:~\$ ping 192.0.2.3

4. After a short while the ping package should return: **Reply from 192.0.2.3**. If not:
 - o first check the Ethernet LEDs on the PC or the switch
 - o check whether the IP address is set correctly; the IP address of the PC can be pinged.
 - o check that the proxy is set in the browser or that the browser is not set to offline.
 If these obstacles are checked and there is still no reply, power the device off, turn it back on and enter the previous ping command again.
5. Start a browser then enter the default IP address of the camera into the address bar (**http://192.0.2.3**). Once this is done, the camera starts with administrator privileges, ready for setup and configuration.

RECOMMENDED CAMERA POSITION

A good ANPR engine can read the plates from images taken in various conditions. However, if you want to achieve recognition rates of over 95% with short recognition times, you have to calculate the position of the camera accurately. The best position is if the camera is installed on a gantry above the traffic lane (see below).



If it is not possible to install a gantry above the road section in question, the camera can be installed near the road as well. In this case the angle between the camera axis and the direction of the vehicle movement should be minimal. Furthermore, the camera should be installed 1 – 1.5 meters above the headlights of the vehicles.

The distance between the camera and plate is also important. If the camera is too far from the plate, the characters may not be large enough for recognition. In this case, zoom-in until you reach the proper size. If the distance is too short, it may happen that a part of the plate is outside the camera's field of view (when the vehicle is near the side of the lane or the plate is not centered on the vehicle).

In terms of ANPR/LPR, the size of the characters on the image is the most important. For Latin characters it is recommended to have at least a 16 pixel average character height, for Arabic or other special characters it is recommended to have a height of 20 pixels (this is due to the fact that these characters are more calligraphic than English characters). Characters that are too large are also not suitable for ANPR; therefore, try to avoid settings where the character size is greater than 50 pixels in height. The line width of a character on the image should be at least 2 pixels.



Correct camera position

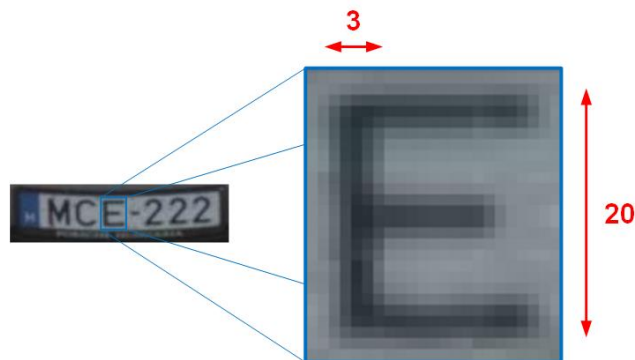


Do not rotate the camera any direction from the horizontal position

A properly set camera should provide a similar image:



A proper sample image



Proper character sizes (in pixels) on the sample image

MAINTENANCE / STORAGE

The cameras are designed to operate 24/7/365 under all weather conditions without the need for special maintenance. Please keep the front of the camera clean. During the cleaning process, make sure that you do not scratch the front cover.

Never use the camera without its sun-shield in a hot environment, because it was specially designed to provide proper air-cooling.

The cameras should be stored in a low humidity environment in the temperature range of -35 °C to + 55 °C. Always use the sealing caps on the connectors to keep the camera unit waterproof. Not using the caps will void the warranty.

The maintenance of the devices is recommended on a quarterly basis. In case of extreme weather conditions, maintenance should be performed more frequently.

During maintenance, make sure that:

- the camera operates properly,
- it is facing in the previously set direction,
- the fastenings are not loose,
- the front of the camera and the camera itself is clean (no spider webs or any other contaminants inhibit the visibility),
- the mechanical components and parts are not damaged in any way

APPENDIX

ADDING AN ALTERNATE IP ADDRESS

WINDOWS 7 / WINDOWS 8

1. Click **Start** and select **Control Panel**.
Select either the **Small icons** or **Large icons** option from the **View by** drop-down menu which is found on the upper right hand side of the window.
2. Open **Network and Sharing Center**.
3. Click on **Change adapter settings** (Win 7/8) on the left side of Network and Sharing Center.
4. Right click on the network connection you want to add an IP address to (the one the camera has been connected to) and select **Properties**.

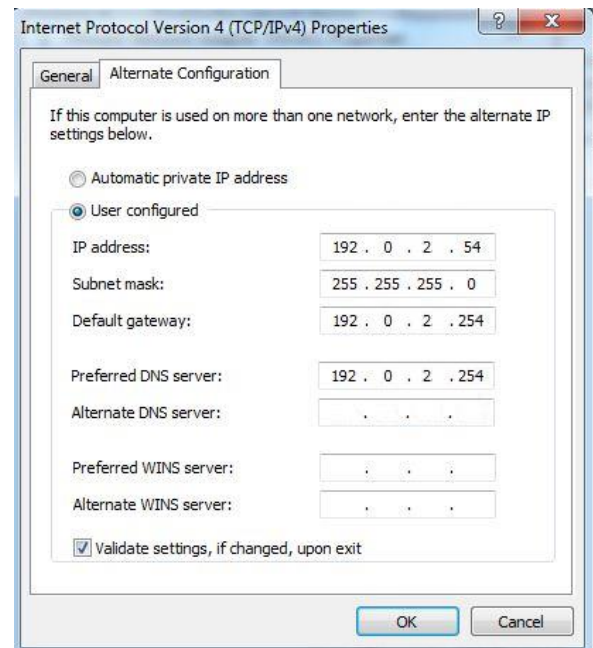


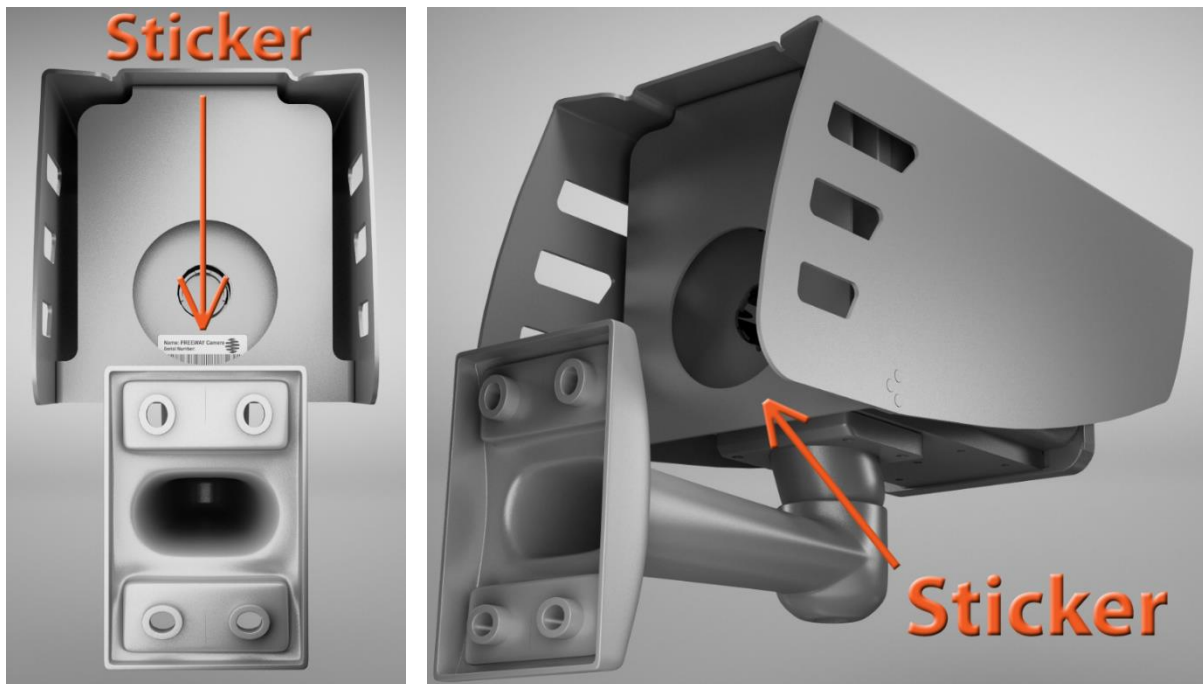
Figure 1

5. Look for Internet **Protocol Version 4 (TCP/IP v4)** and press the **Properties** button.
6. Select **Obtain an IP address automatically** and click on the **Alternate Configuration** tab.
 1. Select **User configured** and enter an **IP address** (e.g.:192.0.2.54). The **Subnet mask** should be 255.255.255.0 as shown in *Figure 1*.
 2. Click **OK** in the opened windows to close them.

LINUX

1. Open a terminal.
2. Enter the ifconfig command to see the reserved Ethernets (e.g. eth0).
3. Enter the following command: `ifconfig ethY 192.0.2.25`
where **Y** is a free eth (e.g. eth1) and 192.0.2.25 is a sample IP address.

POSITION OF THE STICKER



The sticker indicating the Name, IP address, MAC address and the Serial Number of the camera, can be found on the bottom of the device.

! Important

The device is equipped with an 850nm InfraRed illumination unit. The human eye will not or slightly see this light coming from the LED's. Do not look into the illumination unit directly from close range or for more than 100 seconds. If you do not take these safety precautions, you risk damaging your eyes.

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ARH Technical Support System (ATSS) is designed to provide you the fastest and most proficient assistance, so you can quickly get back to business.

Information regarding hardware, software, manuals and FAQ are easily accessible for customers who previously registered to enter the dedicated ATSS site. Besides offering assistance, the site is also designed to provide maximum protection while managing your business information and technical solutions utilized.

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