



ANPR/ALPR CAMERAS AND SOFTWARE FOR TRAFFIC MONITORING

Install Guide

Vidar ANPR Camera

This guide contains information on the hardware installation, maintenance, software requirements and the way to access the camera from a browser.



VIDAR

INSTALL GUIDE

Document version: 2022.11.11.

Table of Contents

THE FCC DECLARATION OF CONFORMITY.....	3
COMPLIANCES.....	4
1. Hardware Overview	5
1.1. Bracket Details and Sizes.....	6
2. Install the Hardware	7
Mounting.....	7
3. Connect the Cables	8
3.1. Cable Layouts.....	9
4. Software Requirements.....	14
5. Accessing the Camera.....	14
6. Recommended Camera Position.....	16
7. SMC Radar (Optional).....	18
7.1. Prerequisites.....	18
7.2. Installation.....	22
7.3. Worked examples.....	24
8. Maintenance / Storage.....	25
APPENDIX.....	26
CONTACT INFORMATION	29





The FCC declaration of conformity

47 CFR PART 15 SUBPART B VIDAR

FCC statement

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

This device may not cause harmful interference, and

This device must accept any interference received, including interference that may cause undesired operation.

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

Changes or modifications not expressly approved by the manufacturer responsible for compliance could void the user's authority to operate the equipment.

Warning: Where shielded interface cables or accessories have been provided with the product or specified additional components or accessories elsewhere defined to be used with the installation of the product, they must be used in order to ensure compliance with FCC. Changes or modifications to product not expressly approved by Adaptive Recognition Hungary could void your right to use or operate your product by the FCC.



Compliances

CE Certificates:

The AR FreewayCAM4 ANPR digital camera (VIDAR) family complies with the European CE requirements specified in the EMC Directive 2014/30/EU.

The ANPR cameras conform to the following Product Specifications:

Emission and Immunity:

EN 55032:2015, EN 55024:2010+A1:2015

Declaration of RoHS Compliance for Electrical and Electronic Products:

Adaptive Recognition Hungary ("the Company") hereby declares that the VIDAR ANPR camera family placed on the European Community market by the Company after 1st July 2006 are compliant with EC Directive 2002/95/EC 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:

- Mercury (Hg) 0.1%
- Lead (Pb) 0.1%
- Cadmium (Cd) 0.01%
- Hexavalent Chromium (Cr+6) 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.

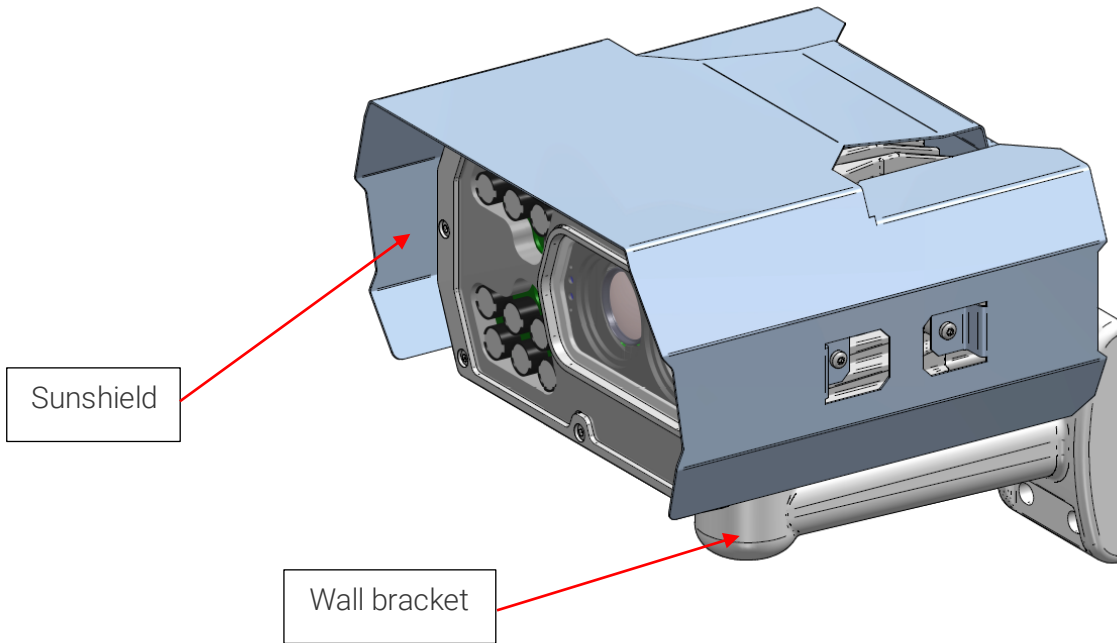
This declaration represents the Company's best knowledge, which is partially based on information provided by third party suppliers.

Laser safety compliance:

All models of VIDAR ANPR camera which are equipped with a measuring laser module are Class 1 laser products according to the IEC 60825-1:2014 standard.



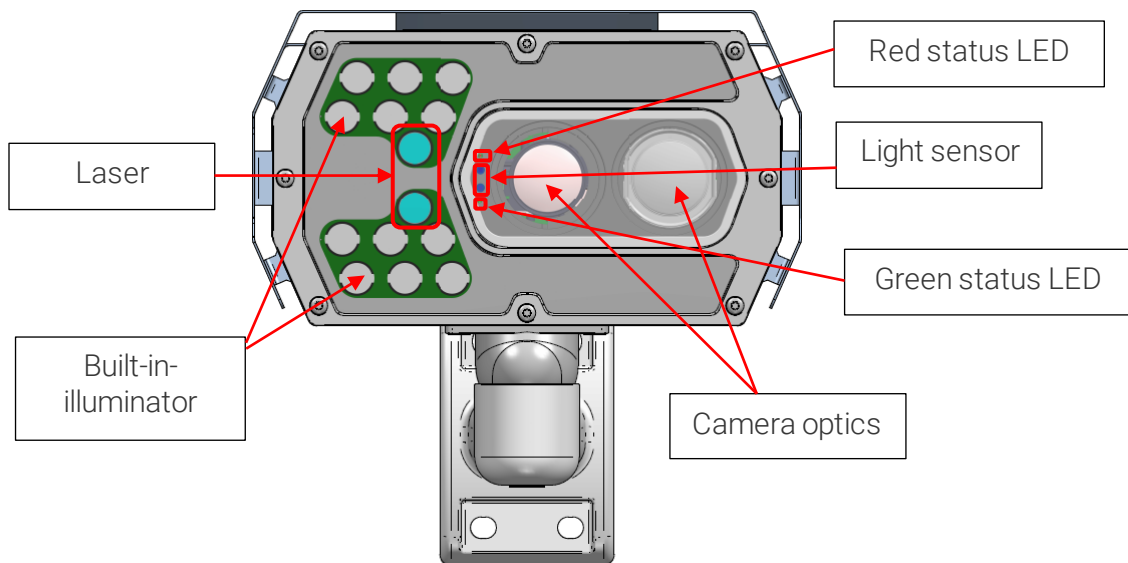
1. HARDWARE OVERVIEW



Sunshield

Wall bracket

Camera with bracket



Laser

Red status LED

Light sensor

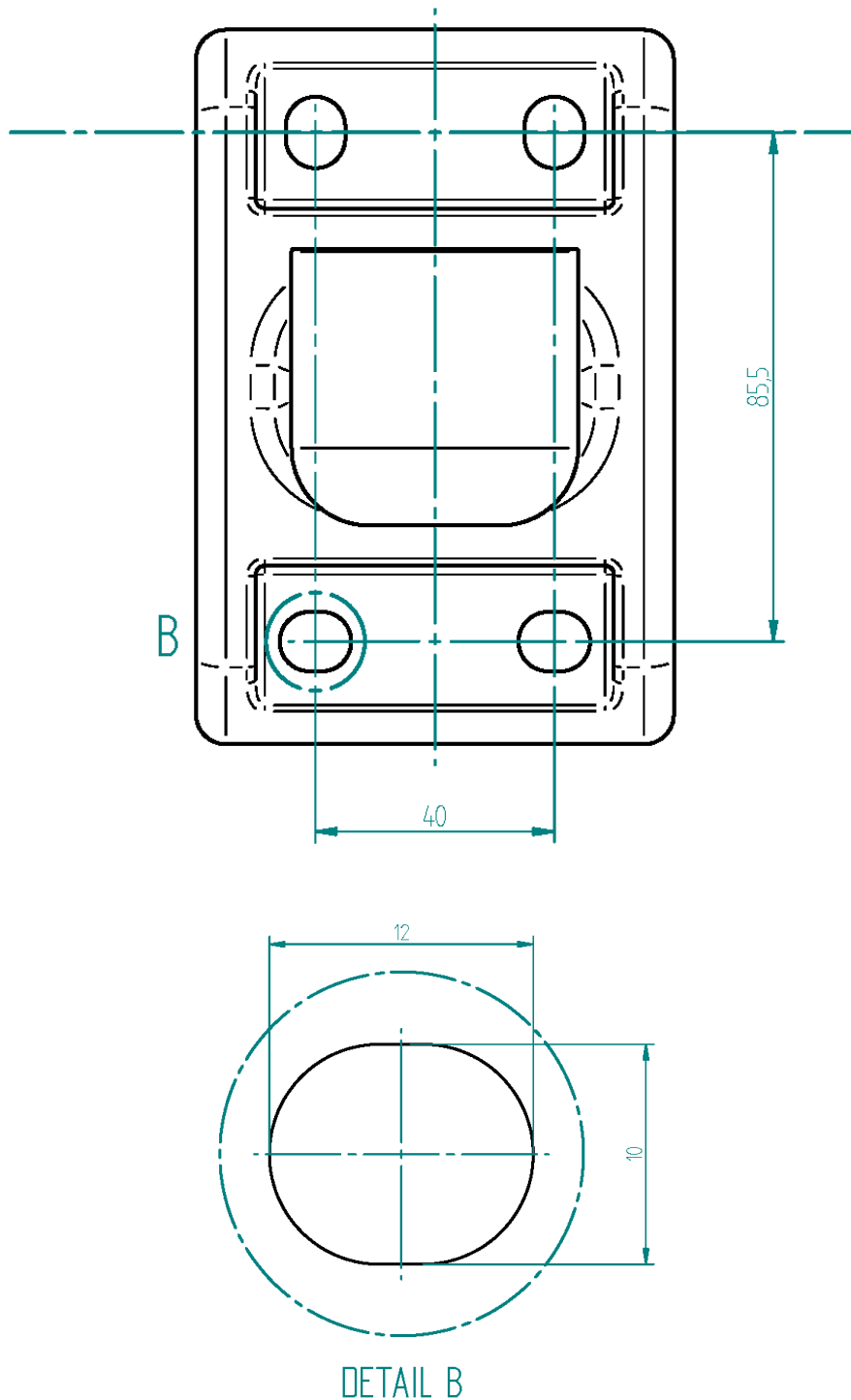
Green status LED

Built-in-illuminator

Camera optics

Camera front

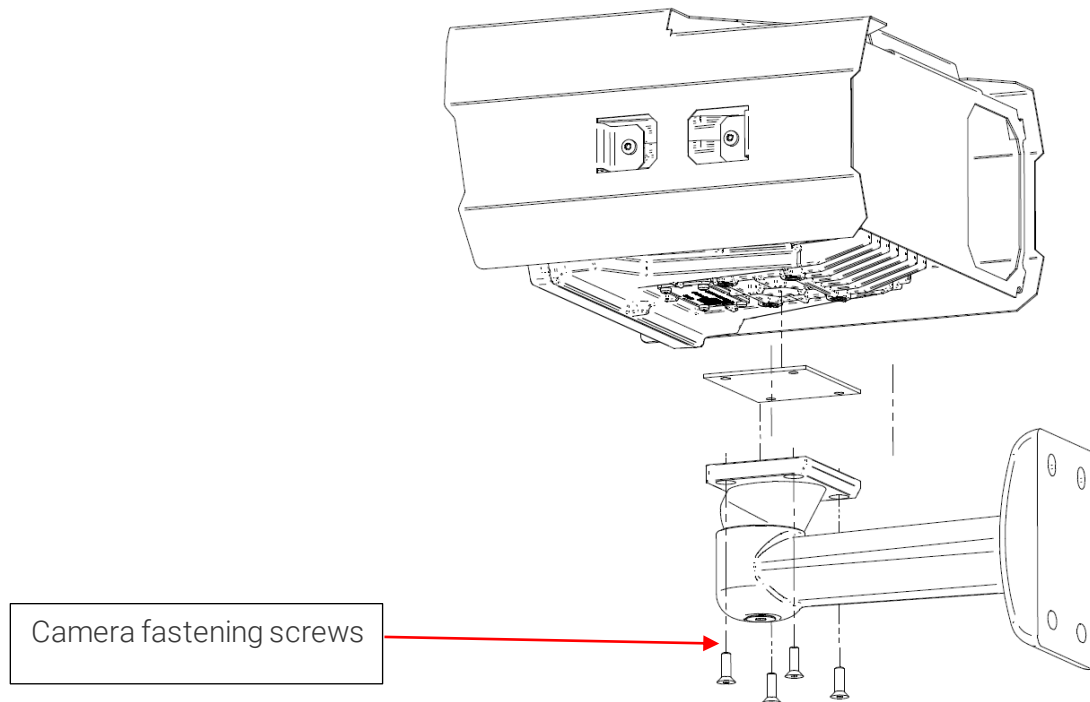
1.1. BRACKET DETAILS AND SIZES



Note

To ensure proper mounting of the camera with bracket please use the largest possible fastener (e.g. fastening screw with DIA 8 mm).

2. INSTALL THE HARDWARE



Note

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

Adjust the bracket

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

Tighten the screw back.

Note

Do not overtighten the screws.

Mounting

The bracket can be mounted into different surfaces. Use appropriate screws for installation according to the mountable surface.

Note

Failures due to inappropriate installation void the warranty.

3. CONNECT THE CABLES

The 24-28VAC flexible power cord must only be a cord with the following parameters:

Manufacturer: MOLEX L L C

Identification Catalog No.: TFC 272-5

Temperature rating: 75°C

Flame rating: VW-1, FT2

Certificate file No.: UL: E319346

Note

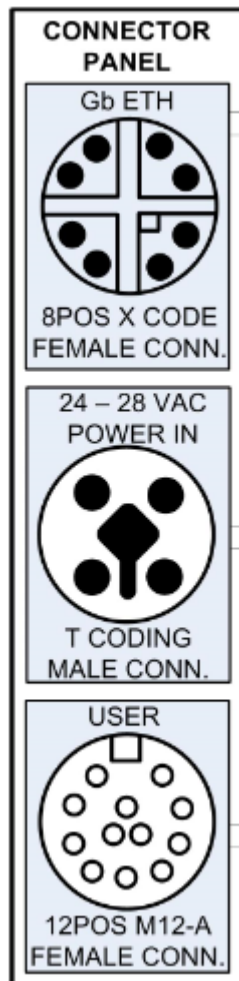
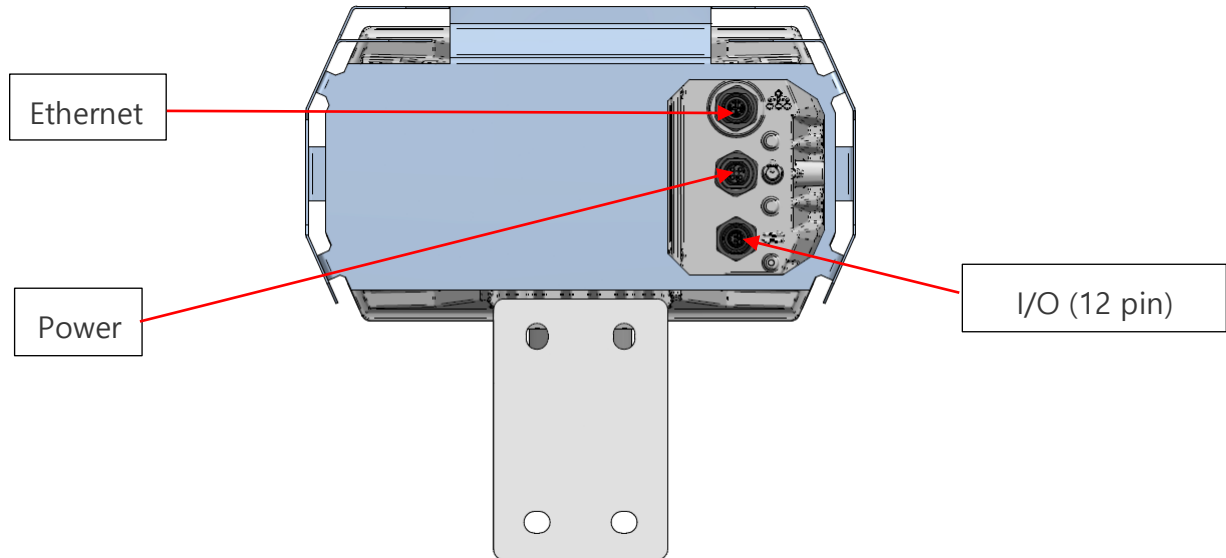
Technical specifications are subject to change without prior notice.

Important!

- For cabling use quality, outdoor-certified cables! Improper cabling causes warranty to void!
- Water may enter into the camera inside through not properly sealed connectors. To maintain the camera's watertightness please make sure that connected cables are tightened properly and the unused connectors are capped!
- SEAL THE UNUSED CABLE ENDINGS (END SLEEVES) BEFORE CONNECTING TO POWER IN ORDER TO AVOID DAMAGES DUE TO SHORT CIRCUIT!



3.1. CABLE LAYOUTS



Ethernet

(8 pos. M12 X coded, Female) RJ45

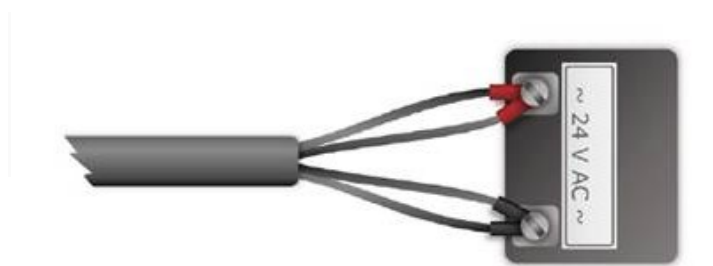
Wire colours and RJ45 positions refer to those in the supplied standard ETH cable. Use quality outdoor Cat6 cable.

1 - D1+	(wh/or)	1
2 - D1-	(or)	2
3 - D2+	(wh/gr)	3
4 - D2-	(gr)	6
5 - D4+	(wh/br)	7
6 - D4-	(br)	8
7 - D3-	(wh/bl)	5
8 - D3+	(bl)	4

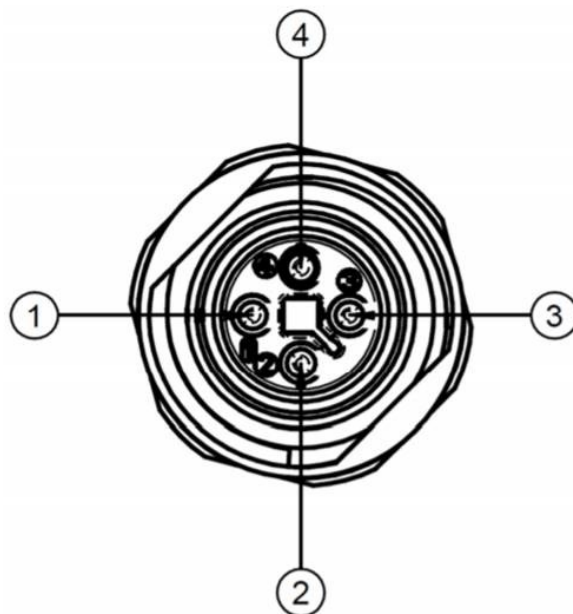
Power

4 pos. M12 T coded, Male

Input voltage should be connected to AC1 and AC2. Both signals are connected to two pins (a and b) to allow for larger effective cable diameter/two wires for each potential. AC1_a and AC1_b are connected in the device. AC2_a and AC2_b are connected in the device.



4 Pole Power Connector	
Pin	Function
1	AC_1
2	
3	AC_2
4	



IO (12 pin)

12 pos. M12 A coded, Female

Connector pinout and wire color coding. Colours refer to those in the supplied standard I/O cable.

PIN	WIRE	FUNCTION
1	BROWN	OPTO_IO_G (default: OPTO_IN_G)
2	BLUE	TA_USER
3	WHITE	RB_USER
4	GREEN	ILL_STR
5	PINK	USB_GND (USB/UART/PWR GND)
6	YELLOW	USB_D_P
7	BLACK	USB_D_N
8	GRAY	USB_5V
9	RED	SW_12V_OUT
10	PURPLE	OPTO_OUT_S
11	GRAY/PINK	OPTO_OUT_G
12	RED/BLUE	OPTO_IO_S (default: OPTO_IN_S)



POWER SPECIFICATIONS:

The required input voltage is model dependent, please use the proper input according to your model!
Please consider voltage drop if you use cables!

	Camera with HDx sensor	Camera with FullHD sensor
AC Input	isolated 24 - 28V AC (sinusoidal)	
Power (typical)*	11 – 19 W	18 – 26 W
Power (max. / max. with heating)	25 / 51 W	26 / 52 W
Over-current Protection	by fuse	

* - Depending on usage and configuration

! Important!

1. When performing a power reset, please wait at least 10 seconds before turning your power source on again.
2. Please make sure that the power cable is firmly connected to the camera before the power is applied when installing the device.

** - Please use the following fuse protection or equivalent:

Littelfuse Cartridge Fuses 02183.15MXP

Distributor: Mouser: 576-02183.15MXP

! Important!

For safety reasons please use proper fuse** protection on input power at the source.

Product: Glass Fuse

Current Rating: 3.15A

Fuse Type: Time delay / Slow Blow

Fuse Size: 5 mm x 20 mm

Voltage Rating AC: 250 VAC

Mounting Style: Holder / Clips

Minimum Operating Temperature: -55 °C

Maximum Operating Temperature: + 125 °C

Suggested power source with fuse protection:

AC/AC transformer:

Type: BREVE PSS 63/230/24V

Main parameters: 63W, 230Vac input, 24Vac output, 2.6A, IP30.

Procurement source: TME PSS63/230/24V

Note

To power off the camera (e.g. in case of relocation) please disconnect the power cord from the device by releasing the screw locking mechanism of the power connector, or disconnect the 24-28 VAC 50Hz power source from the camera power cord.

TRIGGER SPECIFICATIONS:

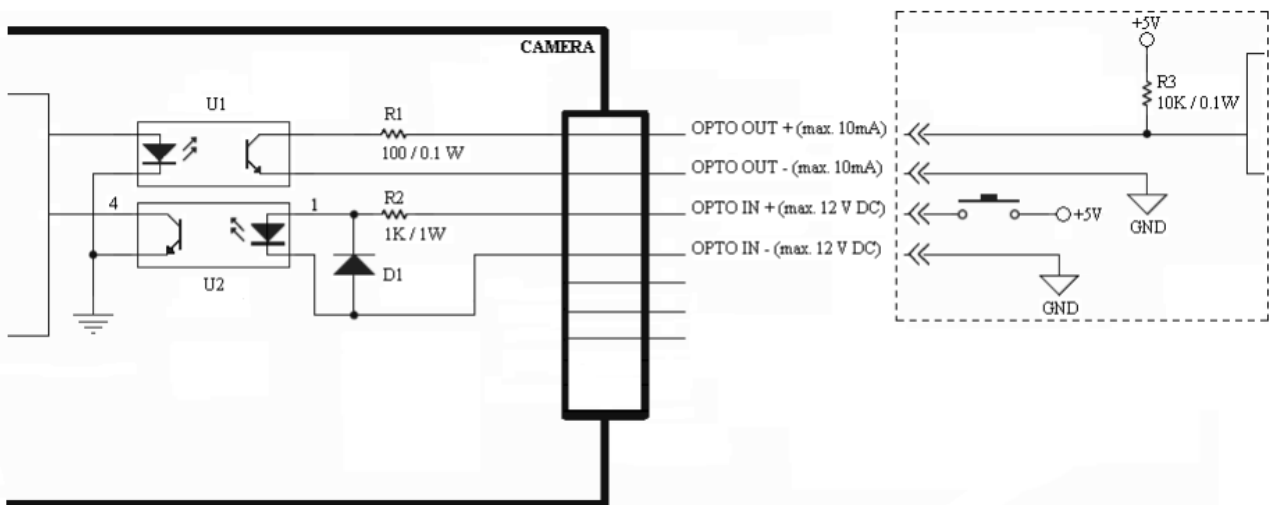
- **Input:** min. 5V, max. 12V
- **Pulse width:** min. 1 ms

Logic Output: min. 5V, max. 12V, max. 10mA

Note

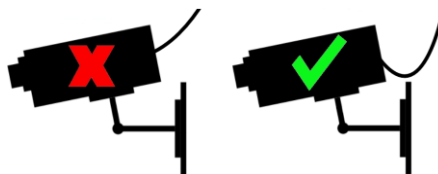
Be aware of the polarity.

SCHEMATIC FOR TRIGGERING:



SERIAL CONNECTION SPECIFICATION:

The serial port of the camera complies with the RS 232/485 standard.



Route the cable according to the image to avoid collecting rainwater at the socket.

4. SOFTWARE REQUIREMENTS

The cameras are developed to operate without any kind of special software.

Software requirements:

- For network setup, administrator (root) privileges are necessary.
- Web browser: Mozilla Firefox 52, Microsoft Edge, Google Chrome 51.X.X.X or later editions. If it is possible, update your browser (Firefox or Chrome) to the newest available version.

Note

To enable all camera functions, enable JavaScript control in your browser.

5. ACCESSING THE CAMERA

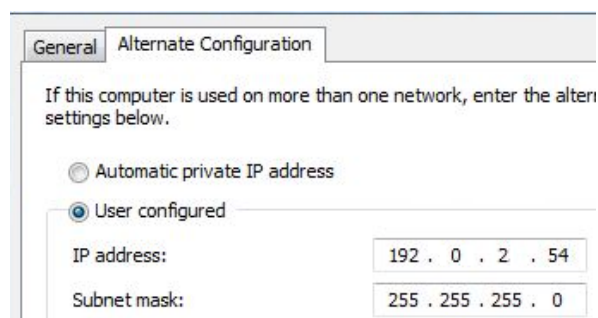
Steps of accessing the web interface of the camera from a browser:

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 camera front) are turned on while the camera is booting. After finished, 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.

3. For more information, see [Appendix](#).



4. 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`

5. Soon, the ping package returns: **Reply from 192.0.2.3**. If not:

- first check the Ethernet LEDs at the PC or the switch side
- check whether the IP address is set correctly; the own IP address of the PC can be pinged.
- proxy is set in the browser or the browser is not set to offline.

If these obstacles are checked and there is still no reply, power off then on and enter the previous ping command again.

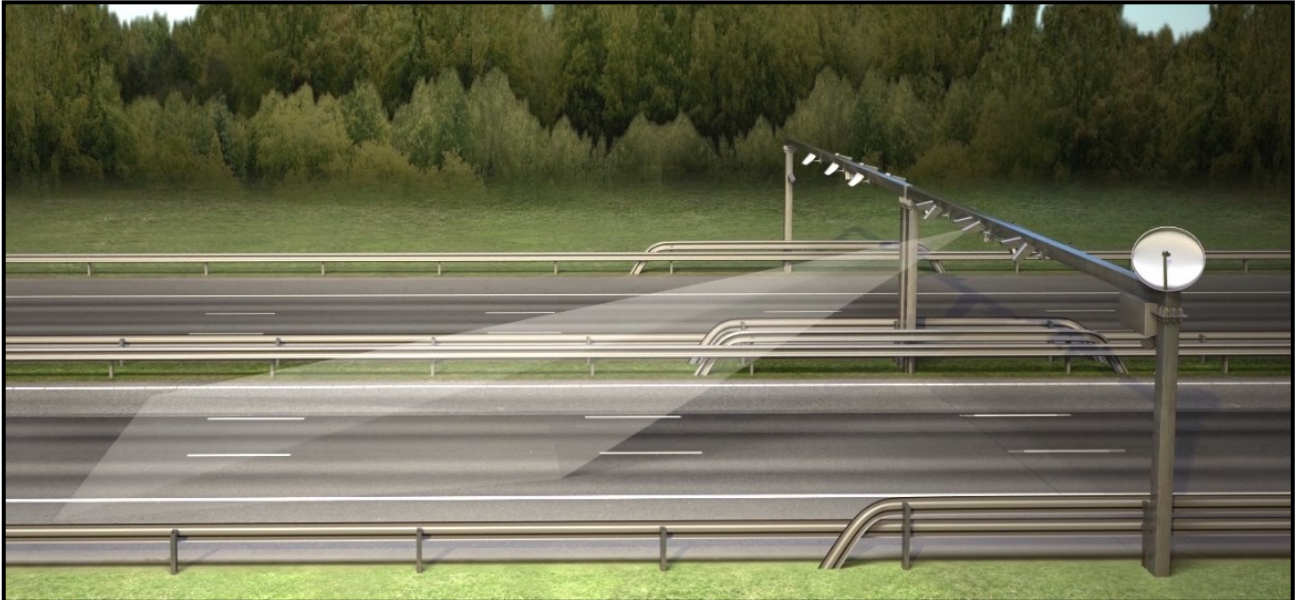
6. Start a browser then enter the default IP address of the camera into the address bar (**http://192.0.2.3**). After this, the camera starts with administrator privileges, ready to be set up and configured.

Note

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

6. RECOMMENDED CAMERA POSITION

A good ANPR engine can read the plates from images taken in various conditions. However, if you want to achieve over 95% recognition rate 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 gentry above the traffic lane (see below).

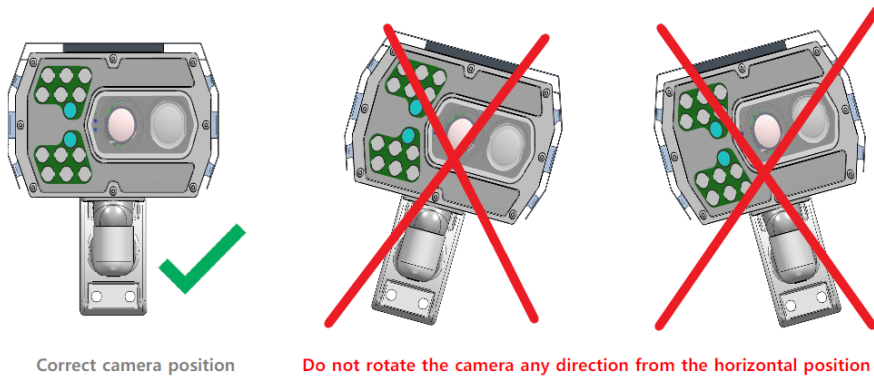


If there is no possibility to install a gantry above the concerned road section the installation of the camera can be done near the road. In this case the angle between the camera axis and the direction of the vehicle movement should be minimal and the camera should be installed 1 – 1,5 meters above 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 recognizing them. 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 over the camera's field of view (when the vehicle is near to the side of the lane or the plate is not at the middle of the vehicle).

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

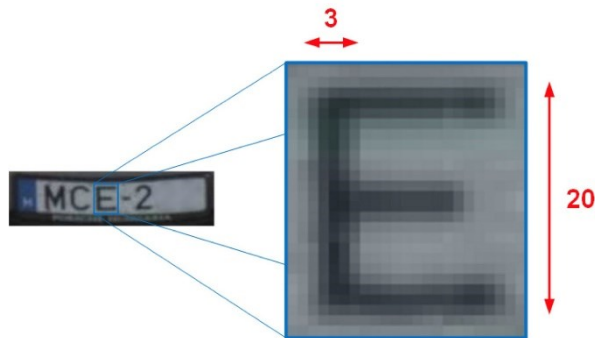




A properly set camera should provide a similar image:



A proper sample image

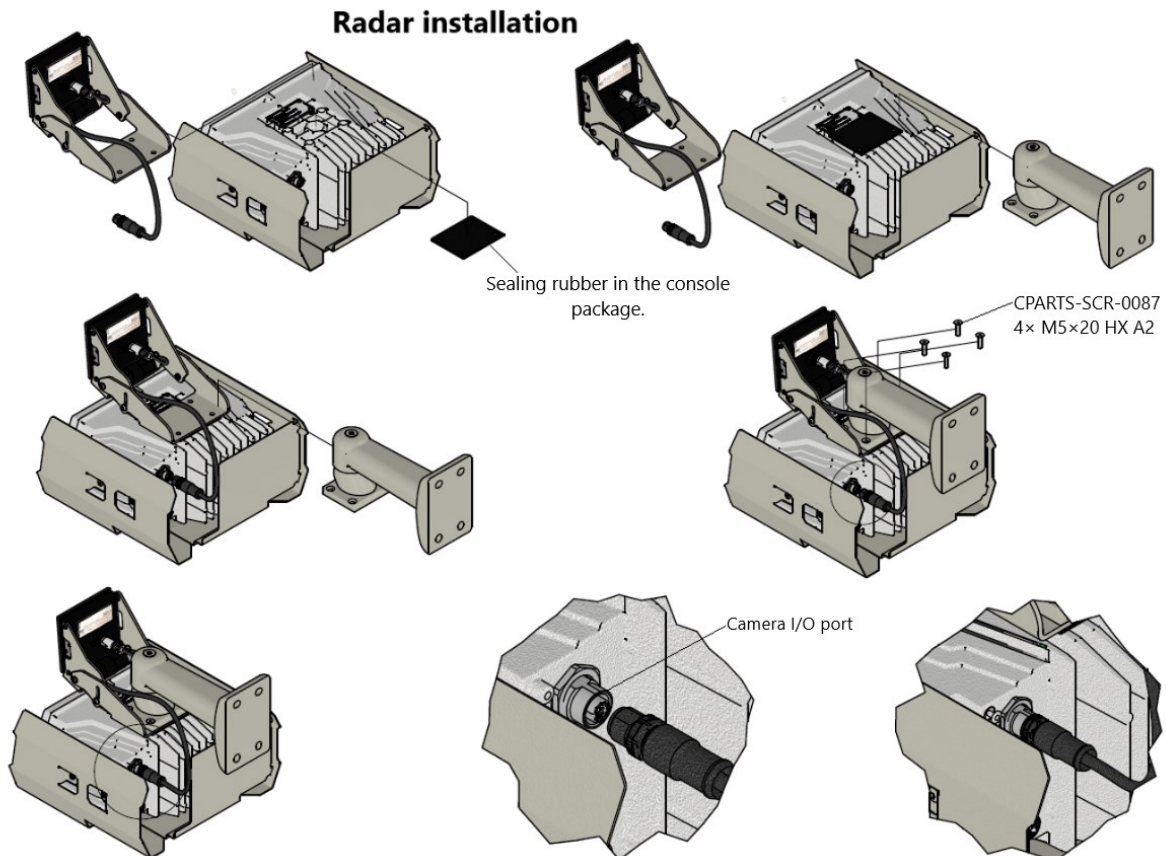


Proper character sizes (in pixels) on the sample image

7. SMC RADAR (OPTIONAL)

7.1. PREREQUISITIES

For a precise measurement the installation geometry must be determined precisely. One must find balance between numerous factors (field of view of radar and camera, trigger distance, character size for LPR, illumination, etc.). The following section will guide through this installation process.

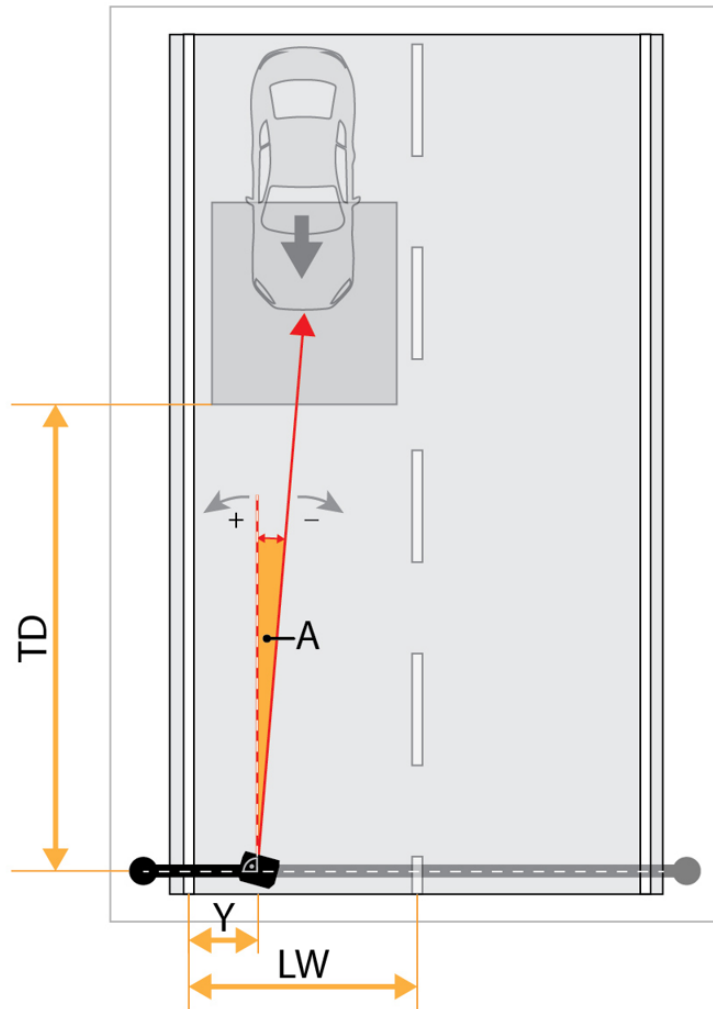


! Important!

Only the fasteners included in the radar package can be used; the use of any other washer and fastener, or in case of deviation from the assembly instruction, the measuring device becomes unsuitable for authentic speed measurement!

7.1.1. General

- Use meters and degrees.
- All angles follow the usual sign convention: counterclockwise is positive.
- The origin of the coordinate system is where the left side of the road meets the installation point. The X axis points along the road, the Y axis points left. See figure.



Installation geometry includes the following (not necessarily independent) values:

- Y offset of the device, measured from the origin/ side of the road.
- Lane width
- Elevation angle. Down is negative.
- Azimuth angle. Right is negative.
- Trigger distance

If you need to, always measure distance and calculate angle. In the relevant range, an angle measured with a precision of one degree roughly corresponds to a distance measured with a precision of half a meter.

The radar is factory set up to have the radar and the camera aligned (not precisely but for practical purposes).

! Important!

It is not recommended to modify the radar console settings.

It is possible for one person to carry out the installation, but it is a far easier for two.

7.1.2. Plan your site

A good installation site is the basis of reliable operation. When choosing an installation site, a couple tens of meters can make or break the system.

- Choose a straight stretch of road, where there is at least **20 m / 60 ft** before the trigger point, where the vehicles are already visible to the radar.
- If possible, avoid up/downhill road sections, where proper interpretation/measurement of installation geometry is more complicated.
- Avoid large reflecting (especially metal) structures in the field of view of the radar, like signs, gantries, buildings, trees, etc. These may cause reflections that hinder measurement.
- Consider the line of sight for both the camera and the radar. Occlusions bring hit statistics down.
- Mount to stiff poles/arms. Oscillation, swing should be minimal.
- Most of the calculations can be carried out beforehand. The results can be used at least as a sanity check of the on-site measurements.

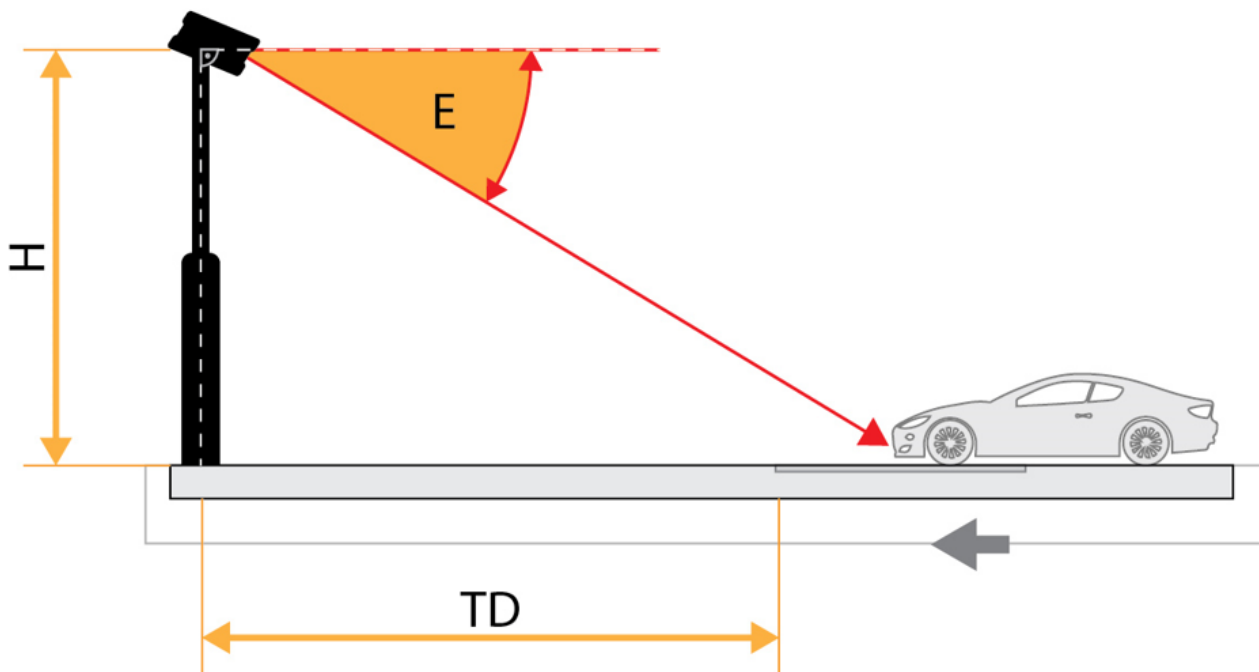
7.1.3. Default values, best practice

Hard limits, use these values when designing the site.

- Mounting height (**H**): 4 to 9 m
- Elevation angle (**E**): -9 to -20 deg.
- Azimuth angle (**A**): -15 to 15 deg.
- Trigger distance (**TD**): 20 to 35 m.

The key value is **elevation**. Use the following table to choose a default elevation angle for your installation height:

Installation height [m]	Elevation [deg.]
4	11
5	12
6	13
7	15
8	17
9	18



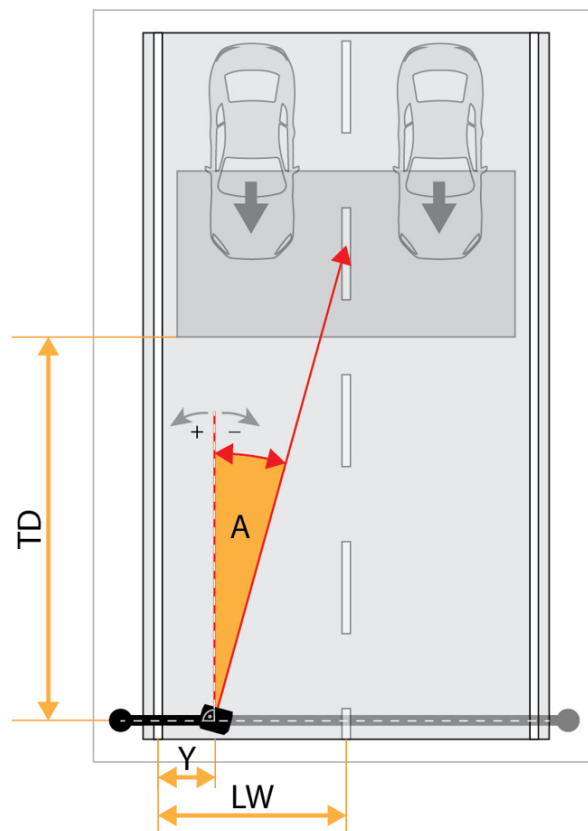
7.2. INSTALLATION

7.2.1. A - Initial measurements

- A/1: Measure the lane width. Enter the value to LW in two significant figures.
- Measure the installation height from the ground up to the radar front. Enter the value to H in two significant figures.
- A/1: Measure the Y offset from the side of the road to the radar front. Enter the value to Y in two significant figures.

7.2.2. B – Alignment

- B/1: Use a H5 Allen key to loosen the M8 hex screw in the console so that the device can be aligned with ease.
- B/2: Apply the above discussed default elevation to the device. Use the built-in accelerometer displayed on the GUI. At this step do not try to be very exact yet.
- B/3: Display the indicator of the image center clicking BASIC SETUP / LIVE VIEW / EXTENSIONS/ Image Center.
- B/4: Try to keep elevation at the previously set value and following the video stream rotate the device until the image center is either
 - at the middle of the lane (1 lane), or
 - on the median (2 lanes).



- B/5: Now check if elevation is within 0.3 degrees of the prescribed value. Correct if necessary. Work in small increments. The measurement is displayed each second.
- B/6: Also make sure the displayed roll less than +/- 0.3 degrees.
- B/7: Check roll, elevation and image center again. Correct if necessary.
- B/8: Tighten the M8 console screw.
- B/9: Check roll, elevation and image center again. Correct if necessary.
- B/10: Enter elevation to E. Trigger distance and azimuth will be calculated (but you can override the values, see: C/4 below)
- B/11: Set up zoom and focus so that the image covers the lanes and is in focus.

7.2.3. C – Verification

- C/1: Measure the displayed trigger distance (TD) along the road.
- C/2: Mark the spot on the road surface where TD meets the median (two lanes), or the middle line of the lane.
- C/3: Check if this point corresponds roughly to the image center. This is around where vehicles will be captured.
- C/4: For legal speed enforcement, you may need to measure the alignment of the radar with an independent/certified external device. In this case keep the alignment, and modify the corrected measurement values (Y/H/A/E). The difference should be minimal.
- C/5: Optional step - if a handheld doppler simulator is available during installation, it is recommended to re-check the position of the measuring device with the signal generator.

7.2.4. D – ANPR Setup

- D/1 - Set up a ROI (Region-Of-Interest) corresponding to the lane(s). Push the CONFIGURE ROI #1 and CONFIGURE ROI #2 buttons to set up the ROIs for the corresponding lanes. Chose a grid resolution and mark the cells in which you would like to find license plates.
- D/2 - Click ANPR/ANPR SETTINGS and choose Trigger Frame for both Preselection and ANPR Stage. This way the previously defined ROIs will be used to find license plates.

7.3. WORKED EXAMPLES

Key	1	2	3	4	5	6
Lanes	2	1	2	2	2	2
LW [m]	3.75	3	3.75	3.75	3.75	3.75
Y [m]	0	1.8	0	0	0	1.2
H [m]	4	4	6	6	8	8
E [deg.]	-11	-11	-13	-13	-17	-17
A [deg.]	-10.5	0.8	0.0	-8.3	-8.2	-5.6
TD [m]	20.2	20.6	26.0	25.7	25.9	26.0

Cosine error [%]							
	Angle [deg.]						
Delta Angle [deg.]		-3	-2	-1	1	2	3
	3	-0.14	-0.12	-0.08	0.11	0.24	0.41
	5	-0.32	-0.24	-0.14	0.17	0.36	0.59
	7	-0.50	-0.36	-0.20	0.23	0.49	0.77
	9	-0.68	-0.49	-0.26	0.29	0.61	0.95
	11	-0.86	-0.61	-0.32	0.35	0.73	1.13
	13	-1.04	-0.73	-0.38	0.41	0.84	1.31
	15	-1.22	-0.84	-0.44	0.47	0.96	1.49
	17	-1.40	-0.96	-0.50	0.52	1.08	1.66

8. MAINTENANCE / STORAGE

The cameras are designed for 24/7/365 work for every weather condition and they do not need special maintenance. Please keep clean the camera front. During the cleaning process, avoid scratching the front cover.

Do not use the camera without its sun-shield in hot environment, because it was specially designed to provide proper air-cooling.

The cameras should be stored in low humidity environment in temperature range of -40 °C to +55 °C. Always use the sealing caps on the connectors to keep the camera unit waterproof! If you miss to use it, the warranty will be void!

The maintenance of the devices is recommended on a quarterly basis. In case of extreme weather conditions more often.

During the maintenance, make sure that:

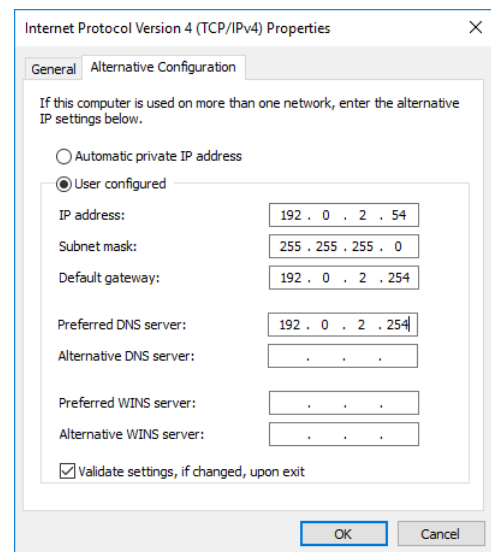
- the camera operates properly,
- it is facing to the previously set direction,
- the fastening is not slack,
- the front of the camera and the camera itself is clean (no spider webs or any other contaminants inhibit the visibility),
- there are no strange circumstances (vapor, damage).

Appendix

Adding Alternate IP Address

Windows Vista/Windows 7/Windows 10

1. Click **Start** and select **Control Panel**.
2. Open **Network and Sharing Center**.
3. Click **Manage Network Connections** on the left side of Network and Sharing Center.
4. Click on the network connection you want to add an IP address for (to which the camera has been connected) and select **Properties**.
5. Select **Internet Protocol Version 4(TCP/IPv4)**, click on **Properties** and select the **Alternate Configuration** tab.
6. Select **User configured** and enter e.g. the **192.0.2.54 IP address** and **255.255.255.0** as **Subnet mask** as shown on *Figure 1*.
7. Click **OK** in the opened windows.



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.

These menu entries restart the camera in normal or in recovery mode. If the web interface is not functional (for example due to a lost IP), Recovery Mode may also be entered applying the magnetic reset procedure.

The **magnetic reset procedure** is as follows:

- Start with a powered off device.
- Place a magnet at the indicated position
- Power on the device (if the magnet is in proper position, the green indicator led on the front of the camera will start flashing very fast)
- Remove the magnet
- Enter the web interface at the 192.0.2.3 (default) IP

Entering Recovery mode to Vidar camera:

Starting of the Recovery mode can be implemented by magnetization in the following way:

By magnetization:

1. Power off the camera.
2. Touch a magnet (not included) to the back of the camera and hold it in position. See figures below.
3. Power on the camera and wait 5 seconds. If the magnet is in proper position, the green indicator led on the front of the camera will start flashing very fast.
4. Remove the magnet.
5. Reach the camera via its default (192.0.2.3) IP address.



Position of the magnet on the back of the camera

The recommended strength of the magnet is 1210 mT (millitesla).

Position of the sticker

Sticker is placed on the bottom of the device.

Note

The sticker, indicating the Name, IP address, MAC address and the Serial Number of the camera, can be found on a small metal placket at the bottom of the camera.

CAUTION!

The device is equipped with an infra led 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. Eyes can be damaged by not taking these precautions.



Contact Information

Headquarters:

Adaptive Recognition Hungary Inc.
Alkotás utca 41 HU-
1123 Budapest Hungary
Phone: +36 1 201 9650
Fax: +36 1 201 9651

Web: www.adaptiverecognition.com

Service Address:

Adaptive Recognition Hungary Inc.
Ipari Park HRSZ1113/1 HU
2074 Perbál Hungary
Phone: +36 1 2019650

E-mail: rmarequest@adaptiverecognition.com

Adaptive Recognition Hungary Technical Support System (ATSS) is designed to provide you the fastest and most proficient assistance, so you can quickly get back to business. For further technical information about our products, please visit our official website.

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.

New User

If this is your first online support request, please create an account by clicking on this [link](#).

Returning User

All registered ATSS customers receive a personal access link via e-mail. If you previously received a confirmation message from ATSS, it contains the embedded link that allows you to securely enter the support site.

If you need assistance with login or registration, please contact atsshhelp@adaptiverecognition.com for help.

