ADAPTIVE RECOGNITION

VEHICLE RECOGNITION CAMERAS AND DEVICES FOR TRAFFIC MONITORING

Install Guide

MicoCAM

This guide helps to configure GPS LTE routers with AR ANPR cameras in order to pair geographic location information to ANPR events.

MicroCAM

Install Guide

Document version: 2022.12.05

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THE FCC DECLARATION OF CONFORMITY

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.

Federal Communications Commission

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 ARH Inc., Inc could void your right to use or operate your product by the FCC.

COMPLIANCES

CE

CE Certificates:

The AR MicroCAM digital camera family complies with the European CE requirements specified in the EMC Directive 2014/30/EU.
The LPR 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 MicroCAM camera family placed on the European Community market by the Company after 1st July 2006 is 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:

RoHS COMPLIANT

- 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.

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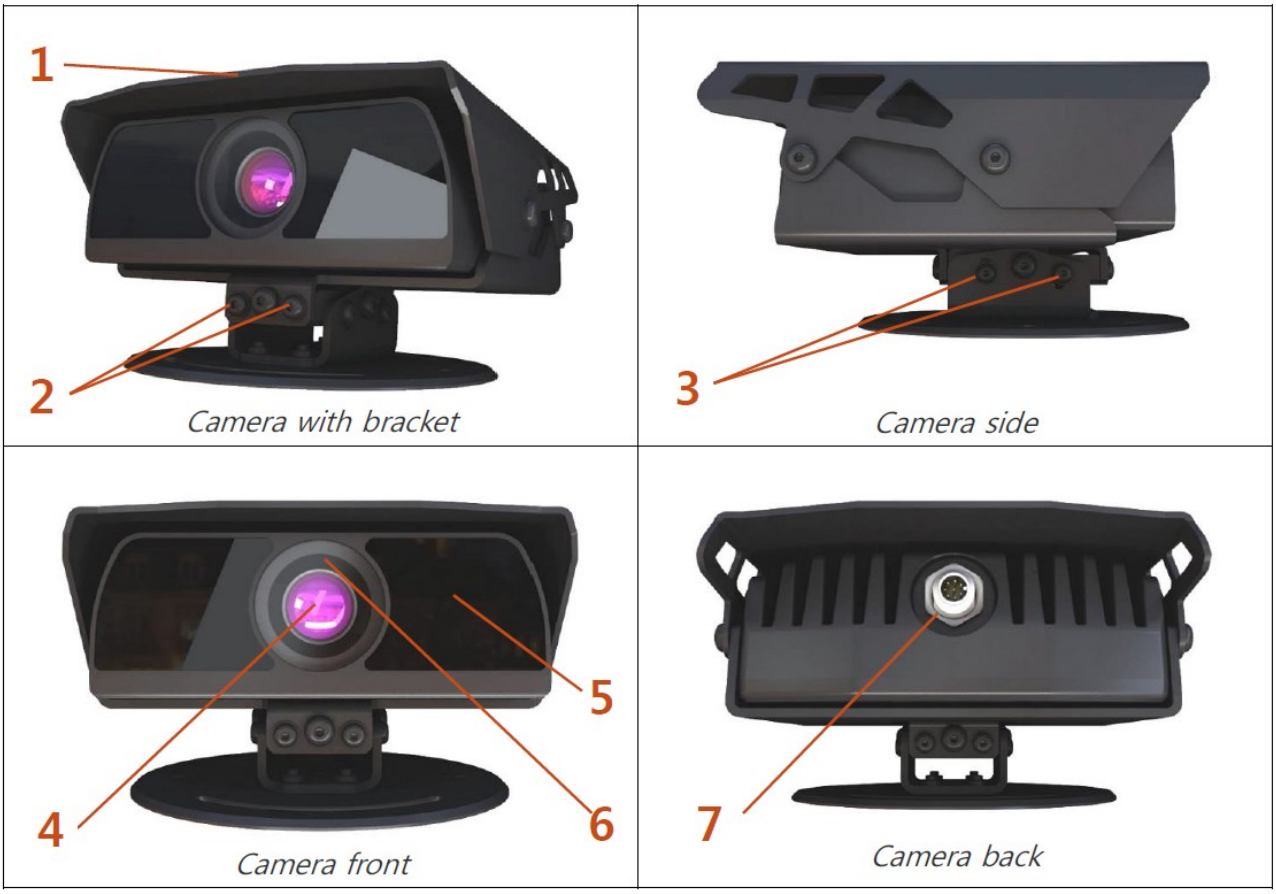
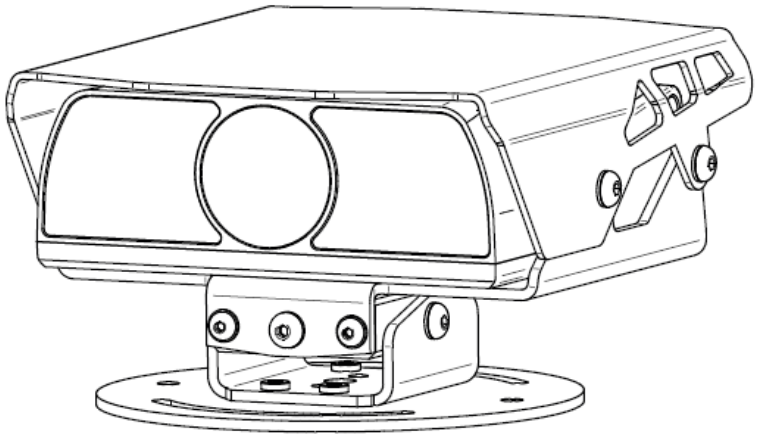
1. HARDWARE OVERVIEW



1	Sunshield	
2	Bracket	Adjustable. Can be rotated horizontally right or left (+/-5°) using the adjustment screws, to keep the camera horizontally.
3	Tilt adjustment screws	Used when tilting the camera to set the field of view (+5/-15°).
4	Lens	With fixed zoom and focus.
5	Infrared LEDs	8 SMD IR LEDs behind the protecting plates.
6	Red status LED	Software configurable.
	Green Status LED	Software configurable.
	Light / Color Sensor	Senses the level of ambient light to determine when to switch day/night mode. Do not cover the light sensor otherwise the automatic brightness control will not operate properly.
7	Combined connector	POE Network connection (more details at the Cable Layouts section).

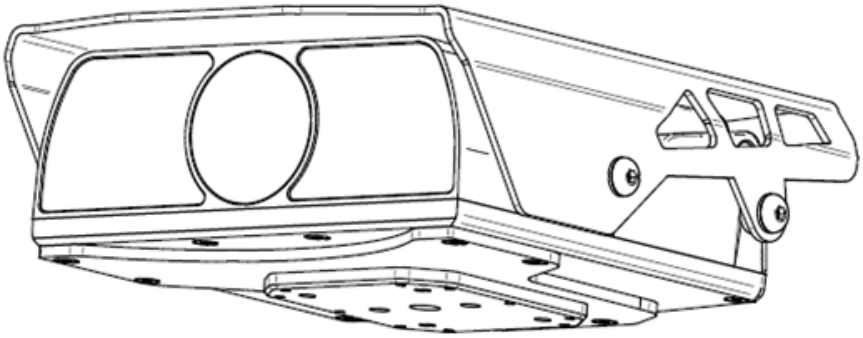
1.1. BRACKET



Note

Additional accessories and mounting accessories may be required depending on the actual vehicle. See an extra bracket option below – contact your sales person for further details & availability.

We do NOT recommend removing the camera shield in hot environments, as it protects the device from direct sunlight exposure, which also helps with the unit's temperature regulation.



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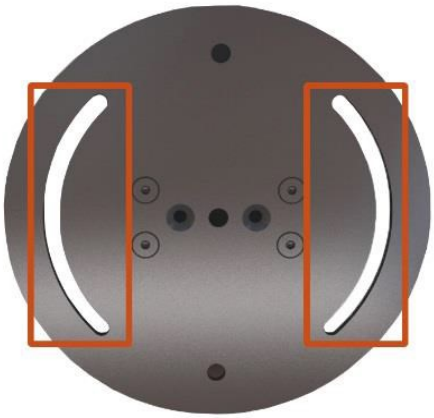
2. INSTALL THE HARDWARE

Note

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

Adjust the bracket



1. Place the camera on the roof or trunk of the vehicle, gantry or pole (in case of fixed installation), and slightly tighten the bracket plate at the curve slots of the plate designed for this purpose.
2. Adjust the bracket into the desired position.
Tighten the screw back.
3. It is recommended to secure the camera by a cable (carabiner) to the roof of the vehicle or to the vehicle's roof rack.

Note

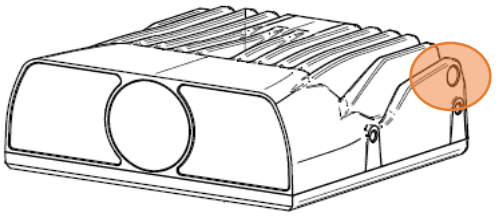
Do not overtighten the screws.

Additional accessories and mounting elements may be required depending on the actual vehicle.

Secure mounting is the responsibility of the user.

2.1. MOUNTING

The bracket can be mounted into different surfaces. Use appropriate screws for installation according to the mountable surface. By default, the camera is provided with a mobile (vehicle) bracket. By using this bracket, the camera can be mounted on a vehicle roof rack or on a flat surface. As a safety precaution, you may want to secure the camera with a cable or steel wire rope through the anchor hole – in case the mount screws should, for any reason, let go. See camera side panel to find the anchor hole as shown in the image (upper hole).



3. CONNECT THE CABLES

If the cable is plugged correctly to the connector of the camera, the fastening ring of the plug should be turned clockwise to keep it tight and waterproof.

3.1. CABLE LAYOUTS

The unit comes with a 5-meter (16 feet) cable. First connect the cable to the camera and after that, to the POE+ connector. The power supply must meet IEEE 802.3at POE+ standards.

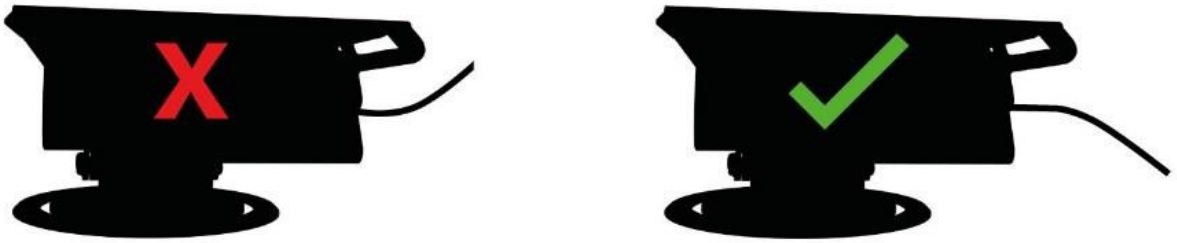
POWER SPECIFICATIONS:

Please use the proper input according to the specification and consider the voltage drop factor.

Power requirement	POE+
Power consumption	14 – 25 W

Note

Technical specifications are subject to change without prior notice.



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.

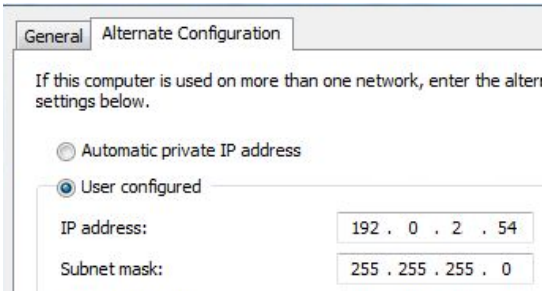
Note

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

5. ACCESSING THE CAMERA

Steps for accessing the camera's web interface from a browser:

1. Connect the camera to a POE+ network switch. During the boot cycle the red status LED on the camera front will turn on and the green status LED flashes twice. You might also notice the IR illumination getting activated, and after successful booting each LED turns off signaling that the camera is ready for operation.
   Ensure that the computer you are connecting from is within the same IP subnet as the camera. In case of first connection the camera factory IP is 192.0.2.3, so be sure to 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 Appendix.



2. 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
3. Soon, the ping package returns: Reply from 192.0.2.3.
   a. 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 in default administrator mode, ready to be set up and configured.
   b. If you cannot reach the device interface:
      - first check the Ethernet LEDs at the PC or the switch side
      - check whether the IP address is set correctly; or if you can ping the PC's own IP address.
      - check if proxy is set in the browser or that the browser is not set to offline.

If you can confirm that none of these issues apply but there is still no reply, power off then on and enter the previous ping command again.

Note

The firmware version of the camera can be seen on the right lower side of the screen. New firmware versions are regularly released. If update is necessary, do not hesitate to contact the support team of ARH.

6. RECOMMENDED CAMERA POSITION

After you have connected your computer directly or via switch to the camera, you should be able to see the web interface in your browser (camera default IP is 192.0.2.3). You may now follow the steps below to set your camera properly. This section intends to provide recommendations to achieve the best setup for both vehicle mounted and fixed MicroCAM installations.

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 should carefully select most ideal camera position.

6.1. MOBILE DEPLOYMENTS

To use the M402 camera on your vehicle, it can be mounted in different ways depending upon the purpose of the use case. A couple of common use cases (and installations) are as follows:

- Parking application (short-range lens): camera is turned 80°-90° from the longitudinal axis of the car towards parked cars, and tilted down (max. 35°) to reduce background interference (e.g. horizon, signs, fences).
- Traffic monitoring (long-range lens): camera is turned approx. 0°-25° from the longitudinal axis of the car towards the monitored lane (left or right) and tilted down 5°-15°.

1.1.1. Parking application:

Ensure that you have mounted the camera in a way that allows target license plates of parked vehicles to remain at approximately 1-2 meters / 3-7 feet from the device (if possible) as your vehicle patrols the parking area, and that the camera's view of the vehicles is not blocked. The most important factor is to capture the vehicle plate and have a workable license plate size with characters around 25-80 pixels tall, as explained in the install guide.

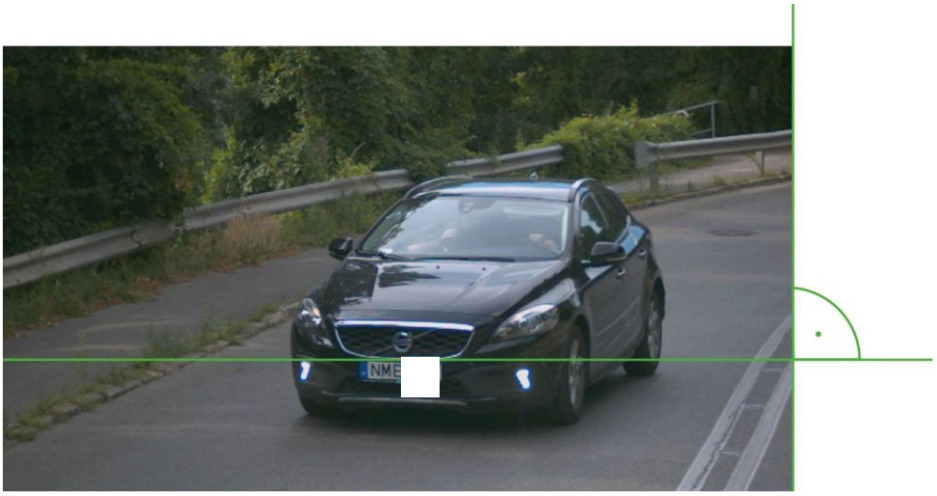
Sample images:

In case of trunk or roof installation, the camera should provide similar images:

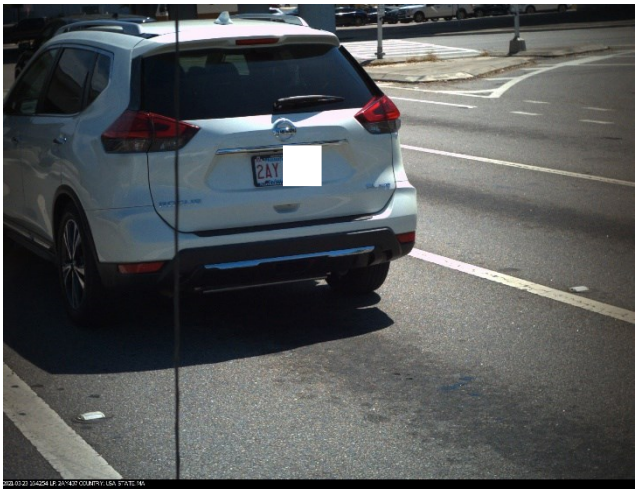
6.1.1. Traffic monitoring (often directed at **oncoming traffic**):

The camera should be mounted on the vehicle corresponding to the direction of the travel, or the opposite, panned to the left or right (or centered) as appropriate (e.g. ~25°relative to the longitudinal direction of the oncoming vehicles) and slightly tilted down (by ~8°relative to horizontal position). Height of the vehicle rooftop may change the tilt angle (+8°difference).

Try to keep the license plate in a horizontal position in the live view (see below image).



The camera should provide similar images, depending on the angles



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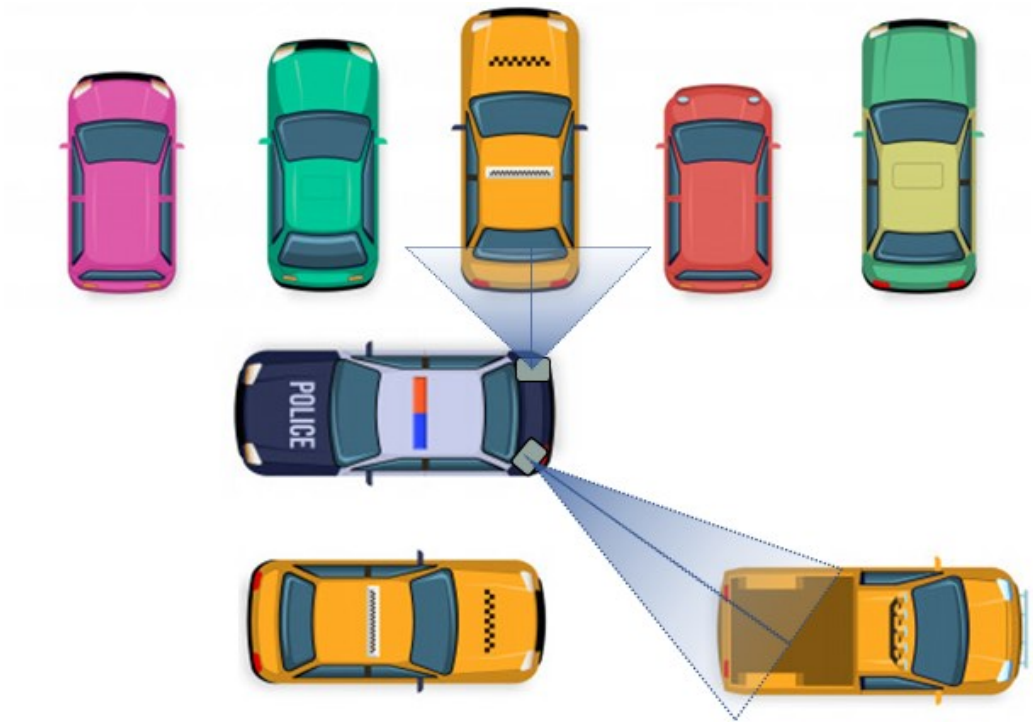
Example for dual camera setup:



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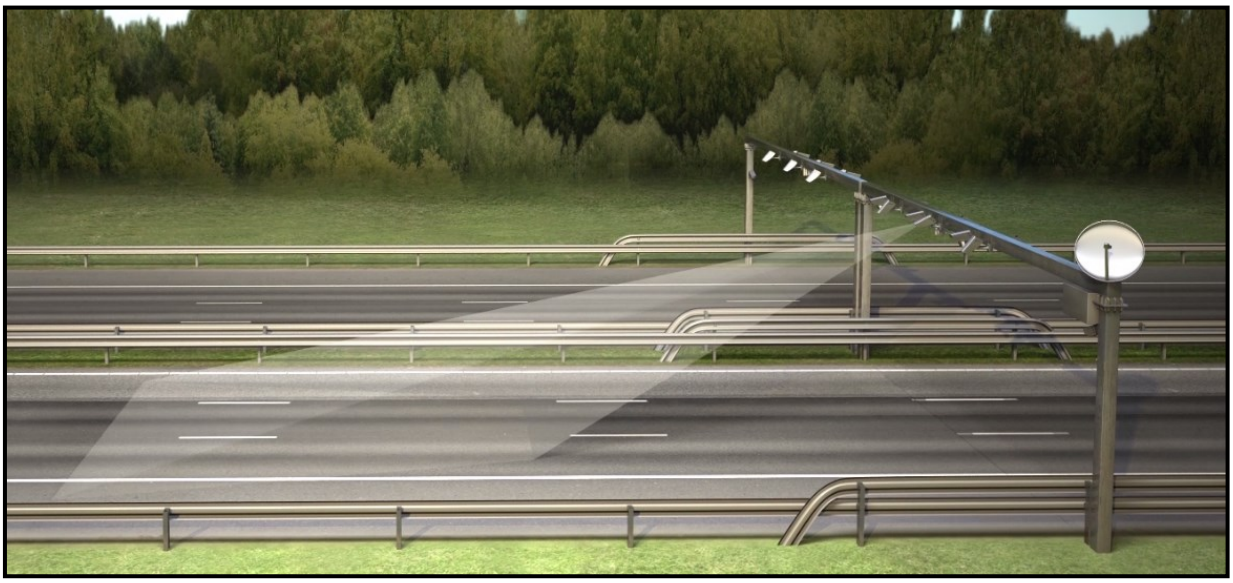
6.2. FIXED POSITION DEPLOYMENTS

Note

The recommended camera unit for fixed deployment is the Vidar camera family

The best position is if the camera is installed on a gantry above the traffic lane (see below).

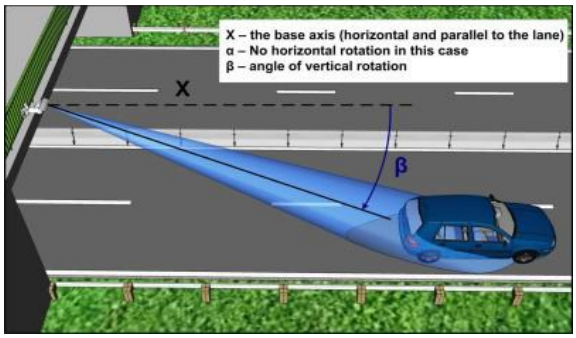


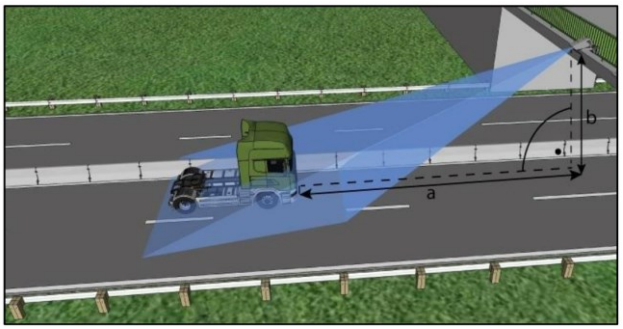
If there is no possibility to install a gantry above the concerned road section, the installation of the camera can be done near the road. In this case the angle between the camera axis and the direction of the vehicle movement should be minimal and the camera should be installed 1 – 1,5 meters above 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 recognition. 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 edge of the lane or the plate is not at the middle of the vehicle). From an LPR software point of view, the most important factor is the height of the characters on the image. For Latin characters it is recommended to have **at least 20 pixel** average **character height (optimal 30-40 pixel)**. Oversize characters are also not suitable for LPR, therefore try to avoid settings where the character height is greater than 80 pixels. Also, the **line width** of a character on the image should be **at least 2 pixels**.

Overhead is when the device is installed above the lane (approx. 4-8 meters high) in the center (for example on an overpass or gantry, etc.) tilted down, the vertical tilt (β) should be less than 35 degrees (optimal 30 degrees) and the horizontal rotation should be 0 degrees.

Typical deployment: fixed installation on a highway or city monitoring from gantry, bridge or "L" type pole.





A properly set camera should provide a similar image:

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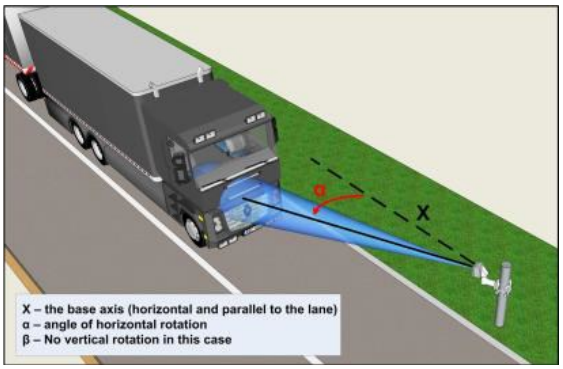
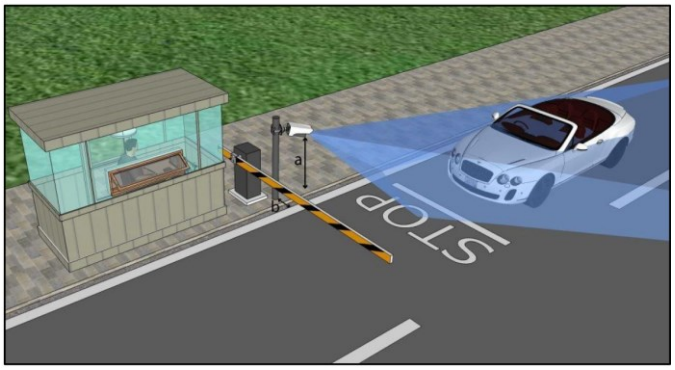
Lateral is when the device is placed near the traffic lane. We recommend no more than 1m distance from the lane, and the angle of horizontal rotation (α) should be 25 degrees or less. The camera should be a relatively low position (approx. 1-1,5 meters high or 1m + the level of the vehicle headlights in case of front vehicle monitoring). The vertical rotation degree should be as low as possible.

Typical deployment: portable tripod installation on roadside, pole mount access control or from parked vehicle.





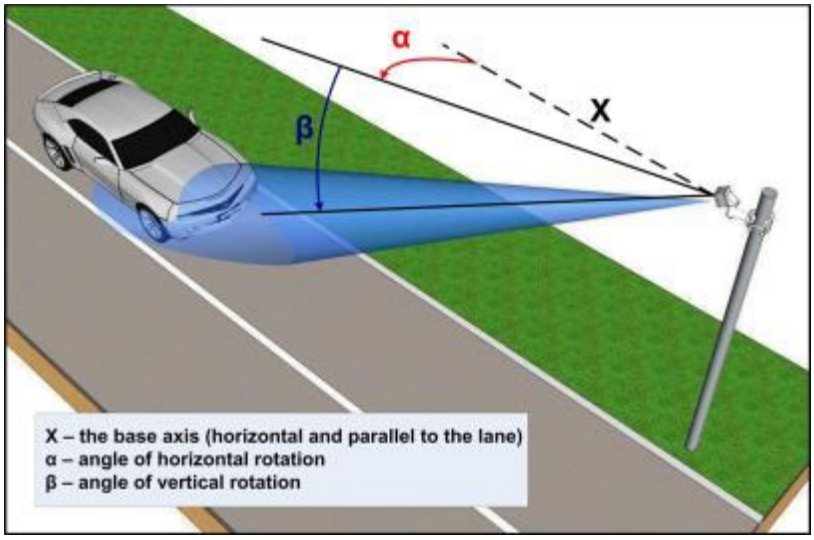
A properly set camera should provide a similar image

Note

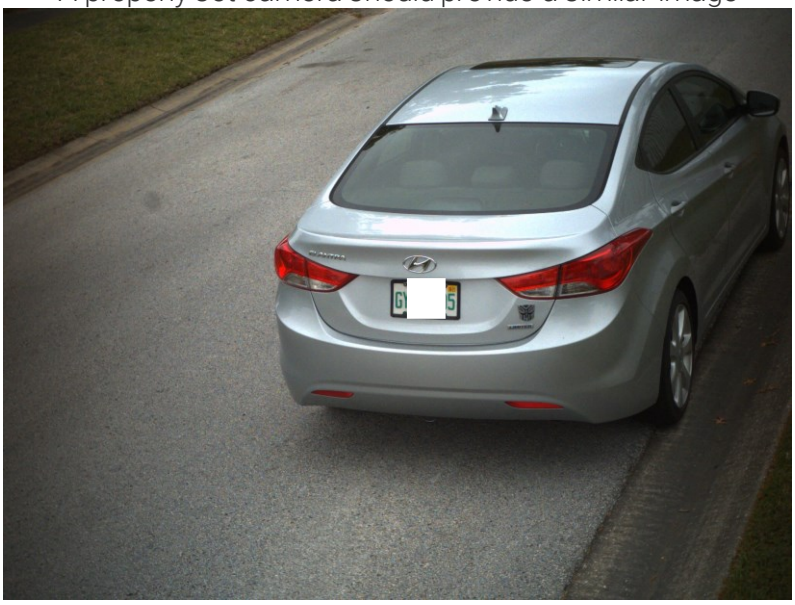
The camera should be tilted down, and NOT monitor the horizon, or the sky.

Transversal is when the device is installed on a pole near the road. It should be pointed towards the vehicles by panning and tilting (approx. placed at a distance of 1-2 meters from the road and 3-6 meters high).

Typical deployment: fixed installation on a road from pole for traffic counting, red-light enforcement or city monitoring.



A properly set camera should provide a similar image



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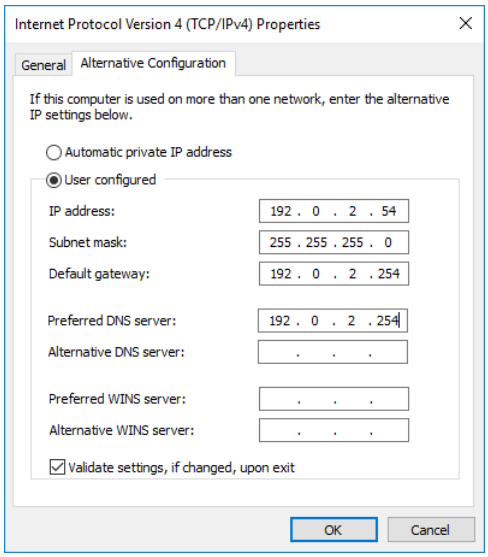
7. APPENDIX

7.1. ADDING ALTERNATE IP ADDRESS

Windows



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 the right side screenshot sample.
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 eth**Y** 192.0.2.25

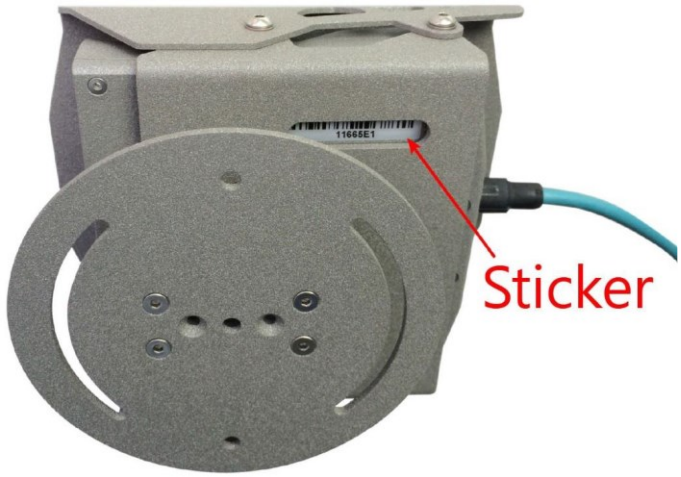
where **Y** is a free eth (e.g. eth1) and 192.0.2.25 is a sample IP address.

7.2. INFRARED (IR) CAUTION

The device is equipped with an 850nm (or 760nm) wavelength infrared LED illumination, which is barely or not at all visible to the human eye. Do not look directly into the IR emitters from a close range or for more than 100 seconds. Eye damage may occur if these precautions are not taken.

7.3. UNIT SERIAL NUMBER

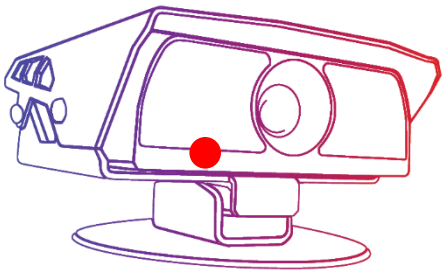
There is a sticker on the bottom of the unit, indicating the Model, IP address, MAC address and the Serial Number of the camera.

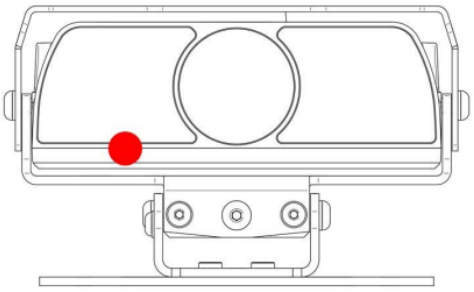


7.4. RECOVERY MODE

You can put the device in recovery mode in two different ways.

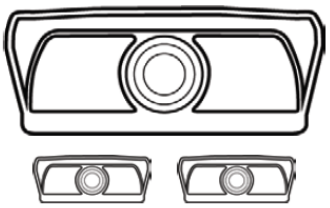
- Select RECOVERY MODE under the MAINTENANCE section on the camera interface
- If the web interface is not reachable (for example unknown IP address), you can use the magnetic reset procedure. The recommended strength of the magnet is 1210 mT (millitesla). Not included in the camera package and not supplied by Adaptive Recognition. Steps:
  1. Start by powering OFF the device.
  2. Place a magnet to the indicated position (red spot below)





  3. Power on the device by plug into a POE+ connector (if the magnet is in proper position, the green indicator led on the front of the camera will start flashing)
  4. Wait 10 seconds and then remove the magnet
  5. Enter the default 192.0.2.3 IP address in a connected browser

7.5. MODEL VERSIONS

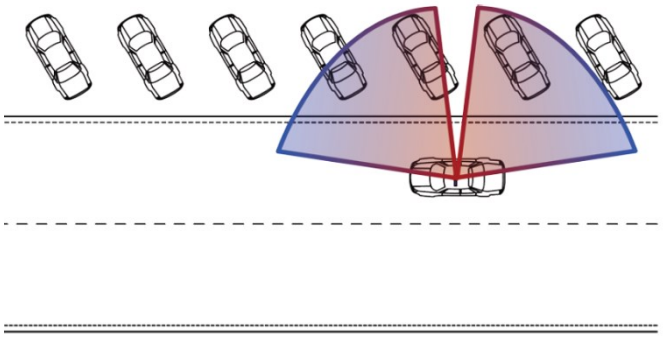


MicroCAM is available in four different versions. You can choose between two lens options – a long- and a short-range (wide) – with or without on-board ANPR / LPR.

and

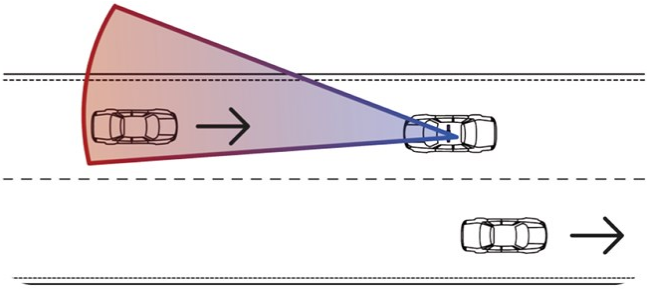
	Without on-board ANPR\LPR	With on-board ANPR/LPR
Wide (short-range optics)	M202 Wide	M402 Wide
Long range optics	M202	M402

7.5.1. SHORT-RANGE MICROCAMS



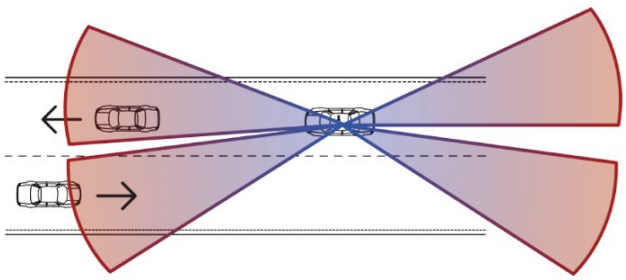
(M202 Wide and M402 Wide)
These cameras are designed mostly for urban deployments; traffic situations involving slower moving traffic, such as monitoring parked vehicles. These cameras are typically mounted on the roof or trunk of the patrolling vehicle turned 75-90° to the side, tilted down slightly. Wide angle lens MicroCAM models have an LPR range of 1-3 meters and a 76° angle of view.

7.5.2. LONG-RANGE MICROCAMS



(M202 and M402)
The long-range cameras' main purpose is to monitor traffic adjacent lanes in any direction, often at high speeds. These cameras are typically mounted on the roof or trunk of the patrolling vehicle turned 0-25° to the side, tilted down slightly. Long-range MicroCAM models have an LPR range of 4-10 meters with an angle of view of 25°.

7.5.3. MIXED CAMERAS USED

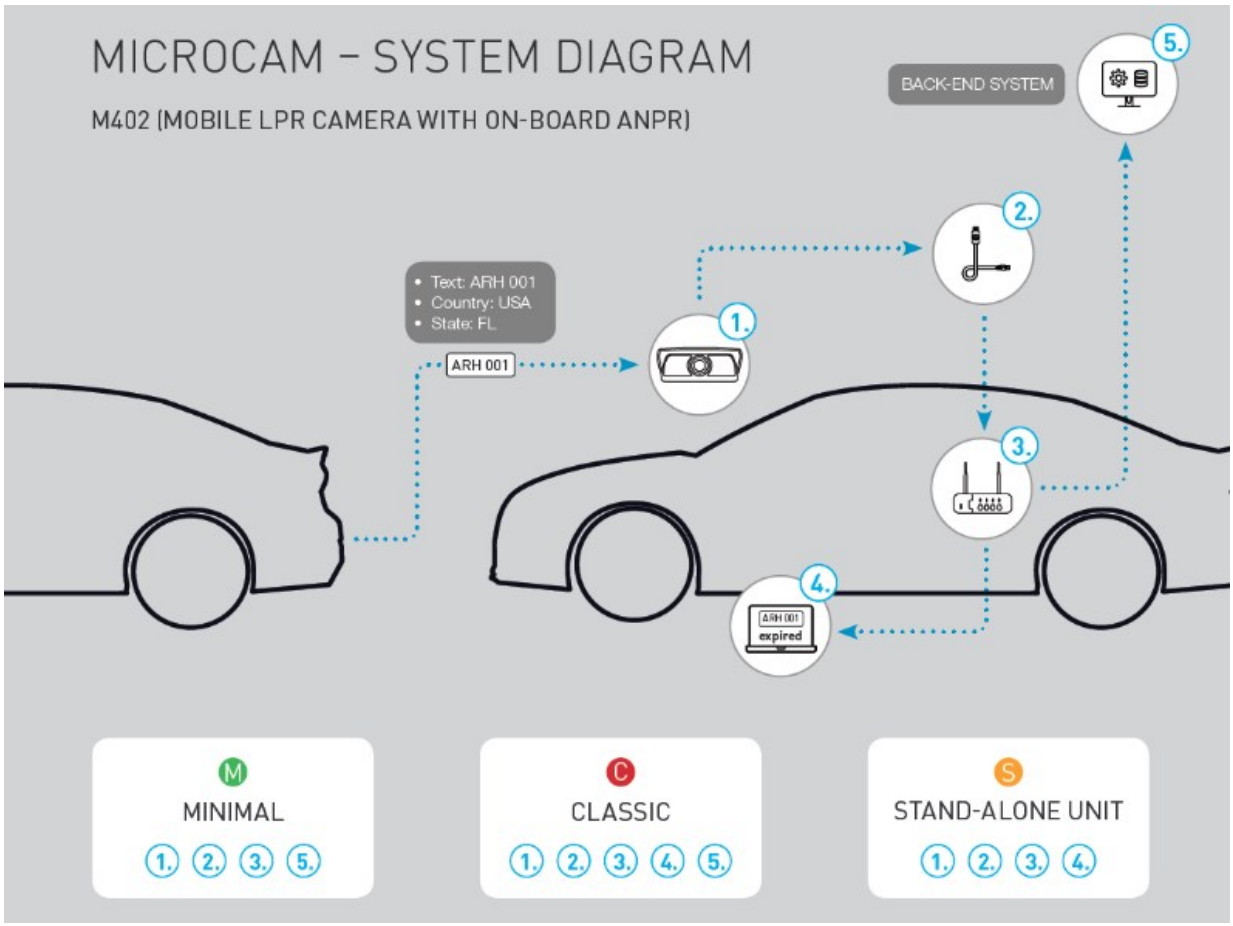


Sometimes multiple cameras are required to capture the highest number of license plates since not every US state requires front and back license plates. In addition to this, you can combine short and long range units to increase capture rate.

7.5.4. ONBOARD ANPR/LPR OPTIONS

Adaptive Recognition offers two different MicroCAMs for two different system architectures. The M402 ANPR/LPR camera provides on-board ANPR/LPR which keeps the system light-weight and incredibly easy to integrate. However, the limited onboard processing capacity of edge-processing units does not offer the highest detection rates. M202 cameras deployed with separate Carmen LPR software modules may reach higher detection and recognition rates.

7.5.5. TYPICAL SYSTEM STRUCTURES



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

PRODUCT DOCUMENTATION

All product manuals are available under http://doc.arh.hu

ATSS HELPDESK PORTAL

Adaptive Recognition Technical Support Site (ATSS) is designed to provide you the fastest and most proficient technical assistance.

New User

If this is your first online support request, please create an account by clicking on this http://atssregistration.arh.hu/.

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 sing into the support site.

Note

For login or registration assistance, please contact atsshelp@adaptiverecognition.com