



Installation Guide of Hikvision LPR cameras

1 Overview

To obtain the maximum license plate recognition accuracy, you need to install the LPR camera in the proper way to capture the qualified plate images. When you install the LPR camera, there are certain criteria to meet, including the plate size, the lighting condition and the angle of the camera. In this document, we provide the qualified image examples, and the unqualified image examples, which are generated when the LPR camera is set in an improper way. We also provide the easy installation instructions on how to fix those unqualified plate images.

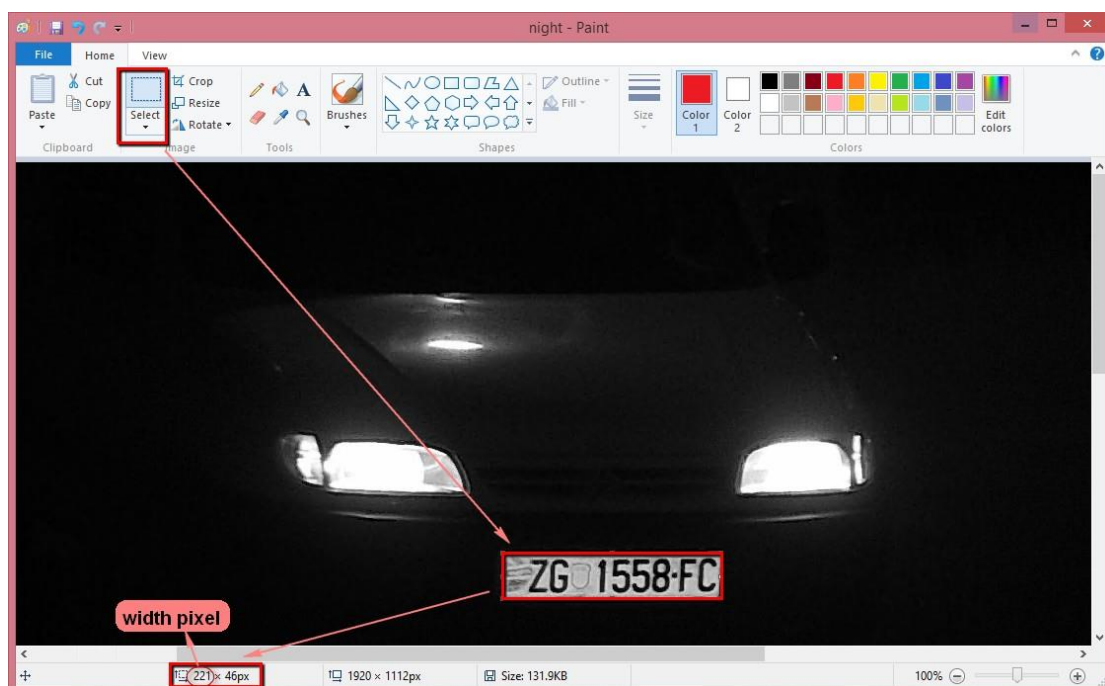
2 Installation Requirements

2.1 Pixels Requirement

(1) License plate must be readable and well lit.

(2) License plate dimensions must be 130 to 300 px for EU region (optimal 150-200 px). For ex-USSR region LP must be at least 150 px.

Please use Paint software to check character width.

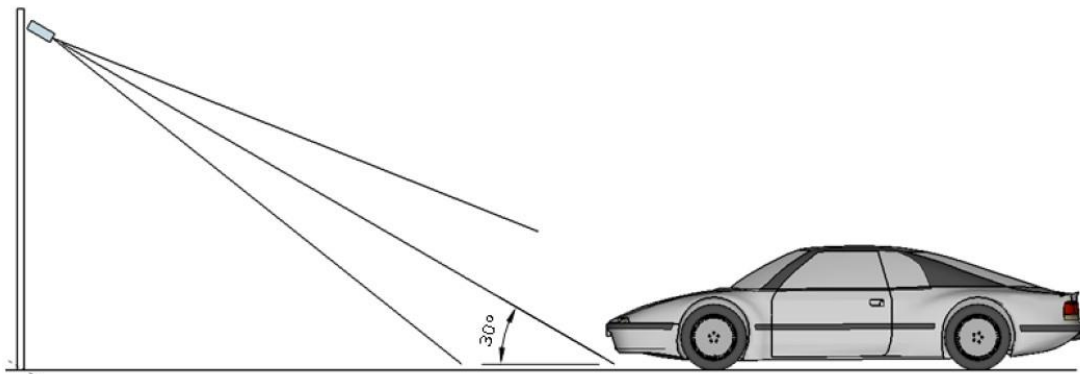


(3) License plate tilt angle must be within +/-5 degrees.



2.2 Camera Installation

The view angle of the camera should be within 30 degrees to the ground. Based on the view angle and the IR distance of your camera, install the camera at a proper height and distance. **Vertical angle - should not exceed 30 degrees.**



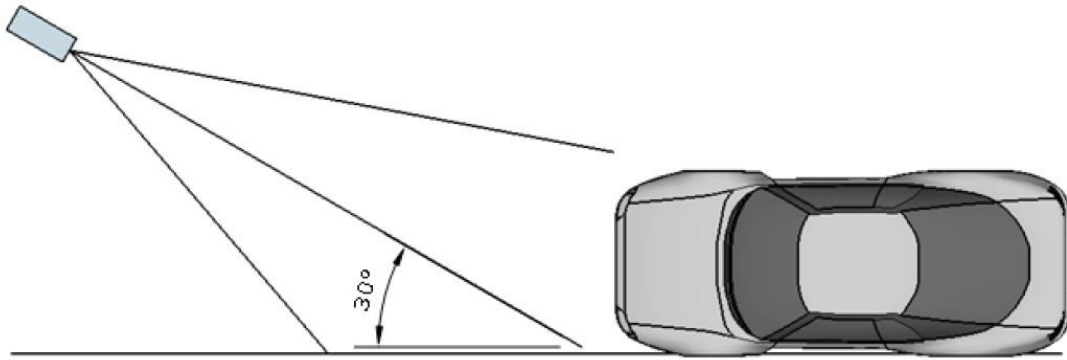
The view angle of the camera should be within 30 degrees to the path of movement. **Horizontal angle - should not exceed 30 degrees**

The installer can measure all of the needed geometrical lengths using a Pythagorean equation.

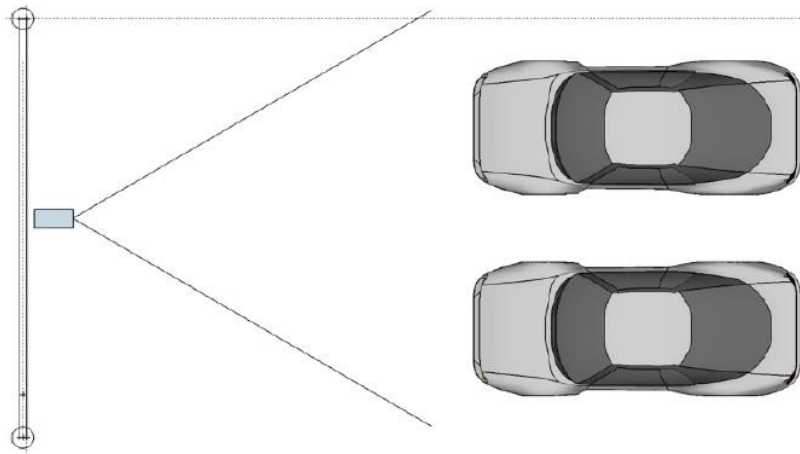
I am assuming the height of camera mounting (let it be x), from the camera to the car, by the ground (let it be y) .

The initial formula is $y = (\text{square root of } 3) * x = 1,7 * x$

If $x = 3$ meters, the minimum length y must be bigger than 5.1 meters.



Install the camera to the front of the vehicle (Recommended). If you want to recognize two lanes - it is generally recommended to mount a camera on a crossbar.



The qualified image examples
DAY



NIGHT

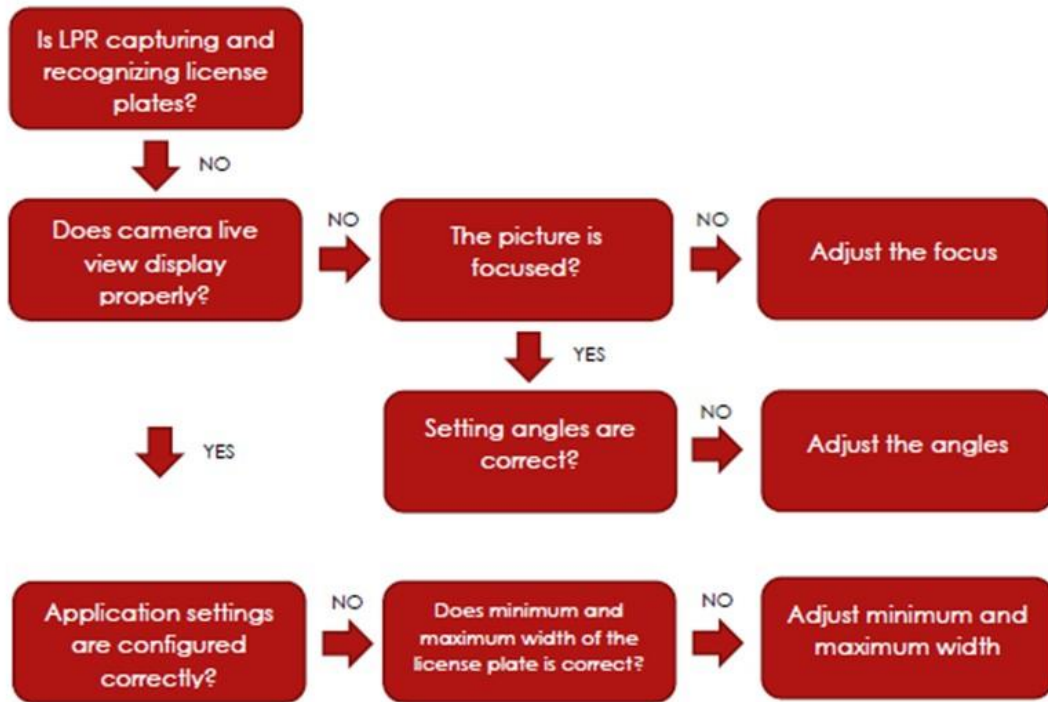


3 Recommend Parameters

1. We assume that you have IR-Led, if you want to recognize LP at nighttime.
2. Shutter speed must be big enough to cut the light from car's headlights at night (usually it's about 1/1000).
3. Depth of focus - is a very important parameter. If you are using a camera with a CS-mount lens, use fixed lens. Fixed lens are better for LP recognition due to greater depth of focus. Megapixel lens is strongly recommended - usually they have M or MP marking.
4. When you'll be choosing the place of mounting, remember about sunrises and sunsets. Direct sunlight beams can distort a picture.
5. If you are mounting a camera on a roadside pole - check how the pole reacts to heavy cars or a convoy of cars. Some poles have tangible tremor. It will make LP recognition almost impossible.
6. If you tuned the camera perfect for the daylight - wait for the night, and see what happens then (and vice versa).
7. If you don't know, how many pixels are in the LP - take a full-frame screenshot and use a graphic editor

4 FAQ

The troubleshooting flowchart is as follows, please refer to it for more details.



5.Common mistakes:

5.1License plate tilt angle





Solution: Notice the license plate tilt angle. License plate tilt angle must be within +/-5 degrees.

5.2 Depth of focus



Solution: Notice how there is not enough focus for all frame. Car with a green frame will be detected, and other cars will not. Adjust the focus on the lens.



On these example,you can adjust the focus or shutter speed.

5.3 Lighting



Solution: License plate overexposed, image parameters should be

adjusted. You can either adjust the shutter speed, or dim the IR-Led (for the night)

5.4 License plate width



Solution: It seems that LP is well lit and readable by eye. However, if we'll measure full frame in photoshop, we will see that LPR width is under 100px which is not enough. License plate width in the frame should be increased and be at least 130 pixels.

5.5 Not enough sharpness



Solution: Sharpness must be configured correctly. Image license plate must be clear and readable.

5.6 Not enough light



Solution: Not sufficient light degrades recognition performance. The camera must be configured to night mode. Should be used an infrared light.

5.7 Not enough shutter speed



Solution: Not enough shutter speed of the camera. Should be reduced to 1/1000 or 1/2000 depending on vehicle speed and lighting.

6 Appendix

The supported countries list are as follows:

Stage I:

- Czech Republic CZE
- Germany DEU
- Spain ESP
- France FRA
- Italy ITA
- Netherlands NLD
- Poland POL
- Slovakia SVK
- Belarus BLR
- Moldova MDA
- Ukraine UKR

- Russia RUS

Stage II:

- Belgium BEL
- Bulgaria BGR
- Denmark DNK
- Finland FIN
- Great Britain GBR
- Greece GRC
- Croatia HRV
- Hungary HUN
- Israel ISR
- Luxembourg LUX
- Macedonia MKD
- Norway NOR
- Portugal PRT
- Romania ROU
- Serbia SRB
- Azerbaijan AZE
- Georgia GEO
- Kazakhstan KAZ
- Lithuania LTU