License Plate Recognition Camera

2MP HD ANPR Network Camera

LR-IPC Overview

Background

With the popularity of automotive applications in daily life, smart car management has become critical in many industries.
ANPR (Automatic License Plate Recognition) technology can detect and identify a vehicle's unique license plate number and is an important part of a complex vehicle management system.

Key Technology

ANPR technology can extract license plates from complex backgrounds, directly identify each character on the license plate, and format and output license plate number information. The technology includes license plate detection and license plate character recognition, all of which are based on deep learning algorithms.

Work Process

Detection

Recognition

Capture

Match Result

Content /

01

Support Area

- Europe
- Asia
- Africa
- South America
- Australia

02

Application

- Applicable Scene
- Not Applicable Scene
- For use with

03

Installation

- Lens Selection
- Installation
- Application Install

04

Settings

- Detection
- Recognition
- Image Settings

05

Product List

- Features
- Model No.

TVT.123456

Support Area

◆ EUROPE
Belgium, Bulgaria, Croatia, Germany, United Kingdom, Greece, Hungary, Italy, Poland, Romania, Russia, Ukraine, Spain, Serbia, France

◆ ASIA
Israel, Indonesia, Turkey, India, UAE, Vietnam, Thailand, Uzbekistan, China, Hong Kong, Taiwan,

◆ AFRICA
South Africa

◆ AUSTRALIA
Australia

◆ AMERICA
Canada , Brazil

USA —

California, Colorado, Florida, Georgia, Iowa, Illinois, Kentucky, Louisiana, Massachusetts, Michigan, Minnesota, North Carolina, New Jersey, New Mexico, Nevada, New York, Ohio, Oregon, Pennsylvania, Texas, Virginia, Washington, Wisconsin, Arizona, Connecticut, Indiana, Maryland, Tennessee, Mississippi, Montana

Application

1. Applicable Scenes




Barrier Control	Road Surveillance	Car Management	Investigation
Entrance & exit	Illegal vehicle Not for Highways	VIP Car Manage	Post-event investigation for forensics

Application

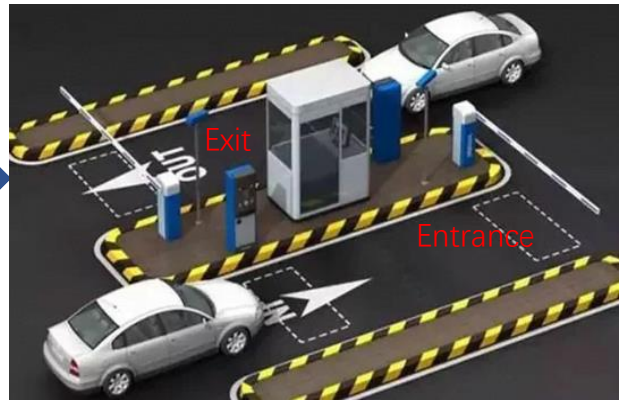
2. Not applicable scene

◆ Entrance Control

Shared exit and entrance ✕

When car leave the gate, the Entrance camera may capture the back plate of the car, and open the gate again.

Correct it



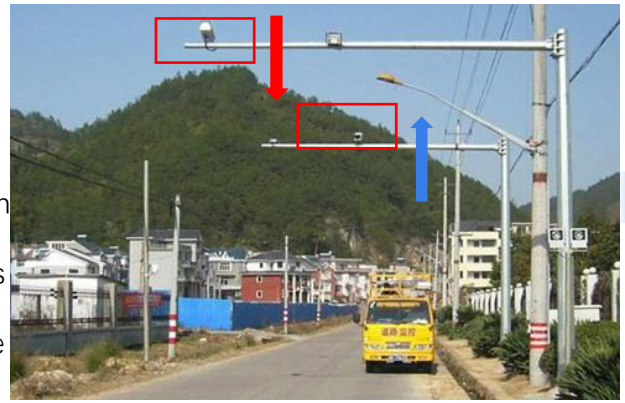
Separate exit and entrance ✓

As shown in the figure, the entrance and exit are located on both sides of the guard booth, and the two cameras at the entrance and exit recognize the control of the license plate in front.

◆ Road Surveillance

Double Direction Shared Road ✕

As shown, two cameras monitoring different directions are located on the same road side, resulting in two cameras capturing the front and rear license plates of the same car, respectively.



Correct it

Single Direction Road ✓

As shown in the figure, different cameras are used on each side of the road to monitor the traffic from different directions.

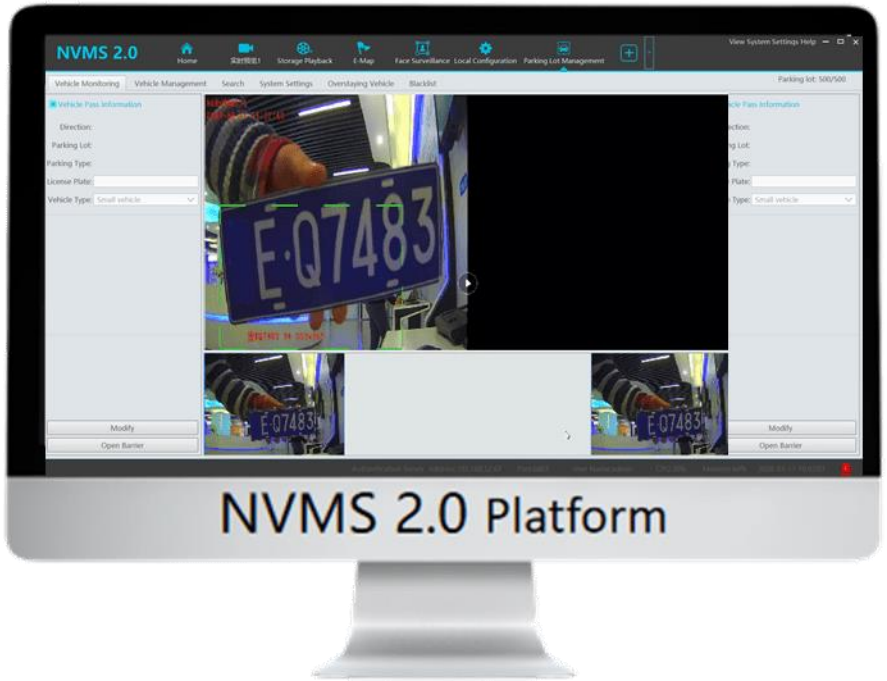
Application

2. For use with

NVR Ver1.4.4

- Can set license plate detection area (range of license plate proportion： 5%~30%)
- Can set entrance and exit directions
- Set up black and white lists, license plate recognition
- License plate library can add the number of licenses 50000

NVMS2.0 ver2.1.0



- View real-time conditions of vehicles entering and leaving
- Add whitelisted vehicle and user information, and set vehicle entry / exit time
- Query the passing vehicle information based on: traffic records, passing charges, and payment information.
- Configure the license plate capture camera for the binding, charging, and subscription of the parking lot channel

Installation

2MP A3-LR User Guide.pdf

- User Guide
- Lens Selection
- Installation Requirements

Lens Selection

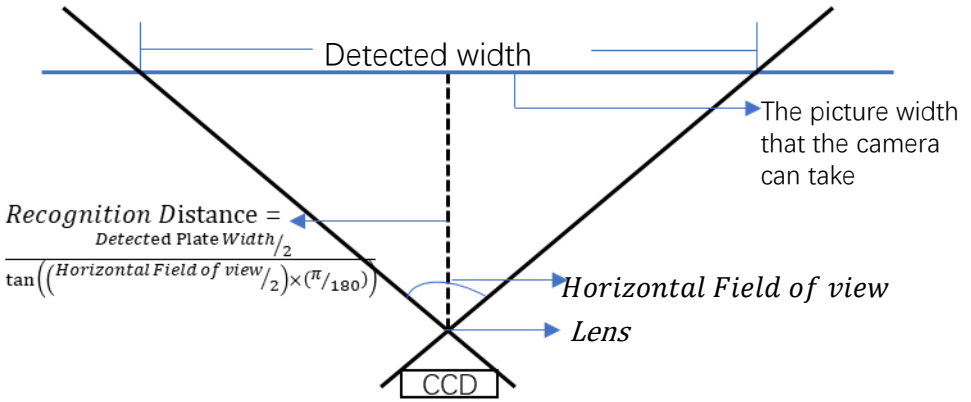
Requirements

1. No obstructions on the license plate.
2. Lens with auto iris mode, suitable for a wide range of illumination changes, such as direct sunlight on the license plate
3. Focus clearly, and select the appropriate focal length segment according to the height of the camera
4. License plate horizontal tilt angle is in the range of -5 ° ~ 5 °

Lens Selection

Select a proper lens according to the table below.

License plate Width (cm)	Lens	Horizontal field of view	Max. Detected width(cm)	Min. Detected width(cm)	Max. Recognition Distance (cm)	Min. Recognition Distance (cm)
30.48	22mm	17.6	488	61	1575	197
30.48	12mm	32.4	488	61	839	105
52	22mm	17.6	832	104	2687	336
52	12mm	32.4	832	104	1432	179
44	22mm	17.6	704	88	2274	284
44	12mm	32.4	704	88	1212	151



Notes:

1. License plate width accounts for 1/2 ~ 1/16 of the camera's field of view width
2. License plate width varies in each region
3. Calculate the detected license plate width and recognition distance from the table:

Double click to open it

- Min $Acture\ Plate\ width$=1/16 ×$Horizontal\ Field\ of\ view$
- $Max\ Acture\ Plate\ width$=1/2 ×$Horizontal\ Field\ of\ view$

❑ $\mathrm{Min.}\ Detected\ width = 16 \times Actual\ Plate\ width$

❑ $Max.Detected\ width = 2 \times Actual\ Plate\ width$

❖ $$Min\ Recognition\ Distance = \frac{Min\ Detected\ Plate\ Width/2}{\tan\left(\left(Horizontal\ Field\ of\ view/2\right)\times(\pi/180)\right)}$$

❖ $$Max\ Recognition\ Distance = \frac{Max\ Detectected\ Width/2}{\tan\left(\left(Horizontal\ Field\ of\ view/2\right)\times(\pi/180)\right)}$$

Installation Requirements

Requirements

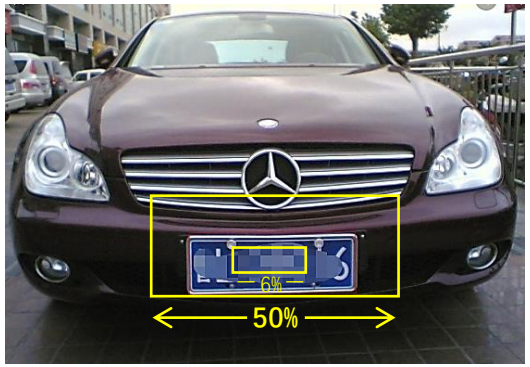
✓ **Percentage of license plate**
The width of the license plate accounts for 6%-50% of the whole image width

✓ **Fill Light**
Keep a certain distance from IPC, to avoid Plate overexposure

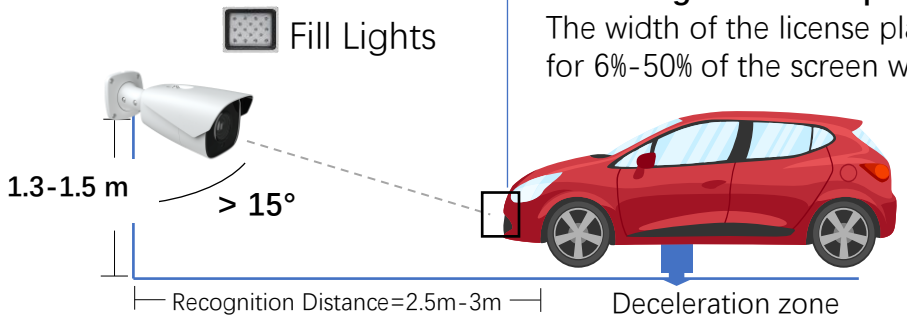
✓ **Installation Angel**
Depression Angel ⩾15 °
Avoid the influence of car lights

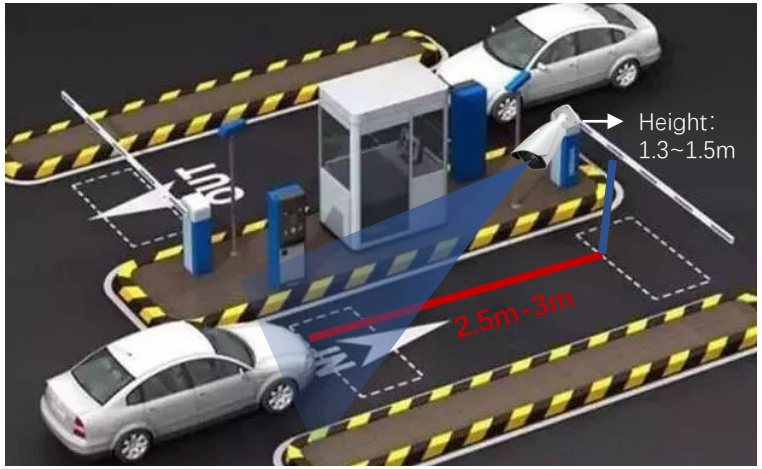
Installation

1) Entrance Control



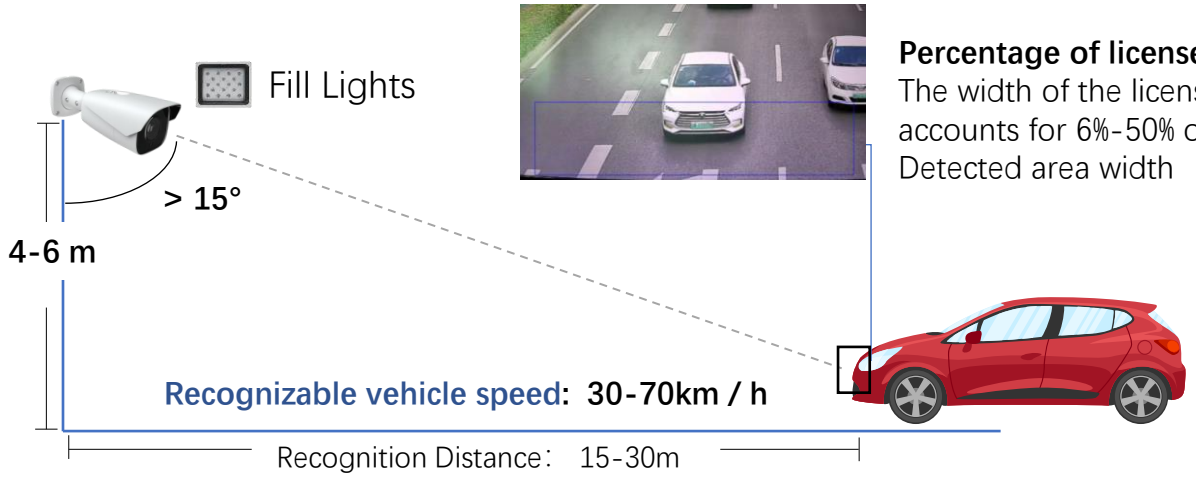
Percentage of license plates:
The width of the license plate accounts for 6%-50% of the screen width





Installation Requirements

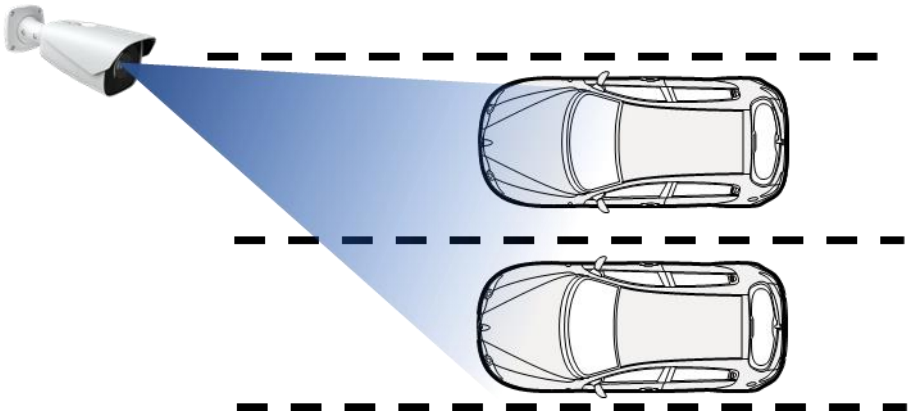
2) Road Surveillance



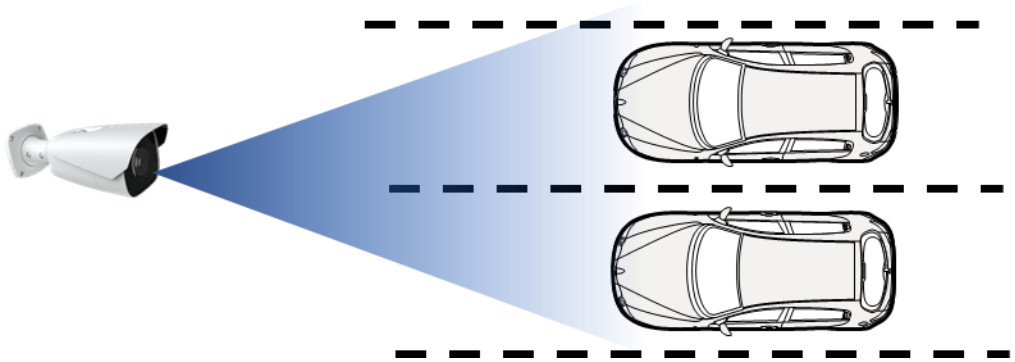
Percentage of license plates:
The width of the license plate accounts for 6%-50% of the Detected area width

Note:

1. Not applicable for Highways.
2. The Highest Recognizable speed is 70km/h
3. It can be used to cover two lanes.



Camera on the roadside



Camera in the middle road

Recommended Settings

Due to the wide variety of actual use environments, no perfect image setting can cover all application scenarios.

When the default parameter settings of the A3-LR software cannot achieve satisfactory results, please refer to the recommended settings for effect adjustment.

License Plate Detection

Detection Area
Camera Angle
Plate Proportion Test

License Plate Recognition

Add License Plate
White List

Image Settings

Image setting points
Day/Night Mode
License Plate Exposure

Detection

The key points that affect the snapping effect

✓ **Definition**
Recognizable by the human eye

✓ **Size**
Meet the set size range

✓ **Duration**
License plate appears on the screen for more than 1 second

✓ **Area**
Snapshot area is drawn at the position with the best license plate quality

Application capture suggestions

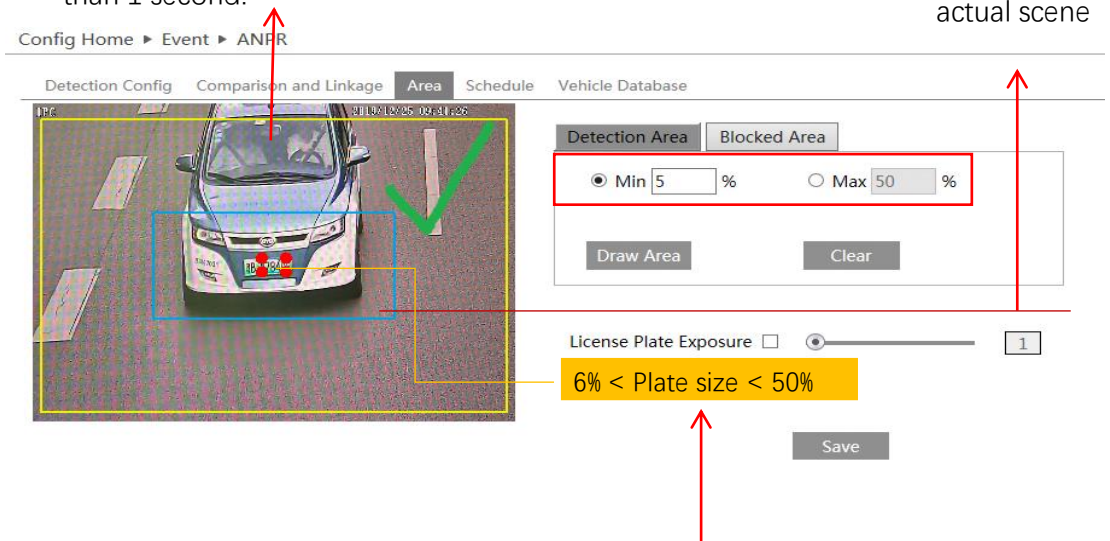
- Entrance Control
  Draw the snapshot area in a slower area, such as near the speed bump. Makes the license plate more positive in the area.
- Road Surveillance
  Draw the snapshot area only in the closer lane, and at the bottom of the screen, occupying one third of the area

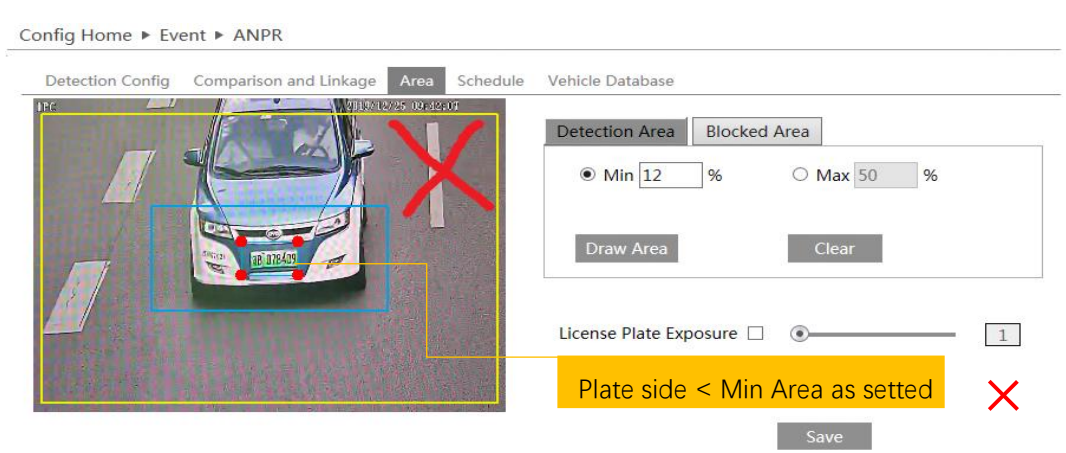
Recommended Settings

1. Adjust the camera angle and height to ensure that the license plate stays in the picture for more than 1 second.

2. Adjust the maximum and minimum settings.

3. Draw snapshot area, the position depends on the actual scene



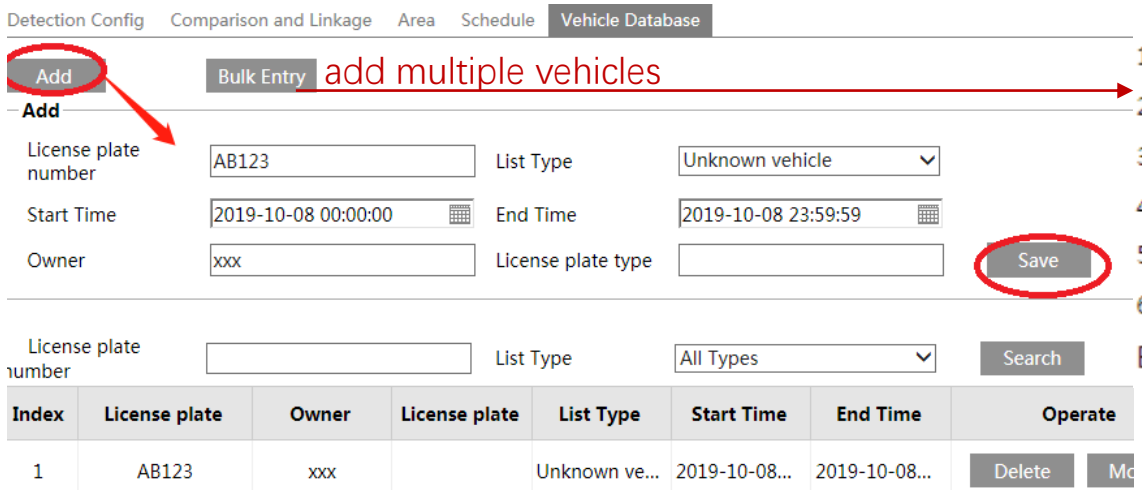


Detection

Plate Proportion Comparison

Recognition

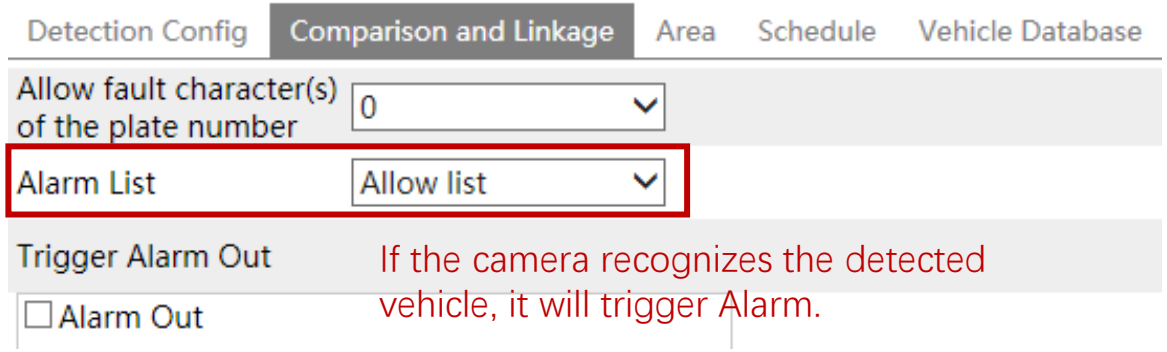
✓ Vehicle Database



1. License plate number is compulsory, a maximum of 12 characters supported.
2. Owner name is optional, a maximum of 12 characters supported.
3. The effective start time is optional; format: YYY/MM/dd hh:mm:ss; time range is from 1970 to 2037.
4. The effective end time is optional; format: YYY/MM/dd hh:mm:ss; time range is from 1970 to 2037.
5. Vehicle type is optional, a maximum of 12 characters supported.
6. List Type is compulsory. 1 stands for block list; 2 stands for allow list; 3 stands for unknown vehicle

Example Download

✓ Comparison and Linkage



If the camera recognizes the detected vehicle, it will trigger Alarm.

Comparison Result

- ✓ Time: 07:28:15
- ✓ Plate No.: B72FB9
- ✓ Alarm List

Image Settings

1. Image setting points

Brightness

25

5

☜ Setting the brightness in the daytime profile to a smaller value will cause the overall screen to be darker, but it will be more effective for reflective license plates

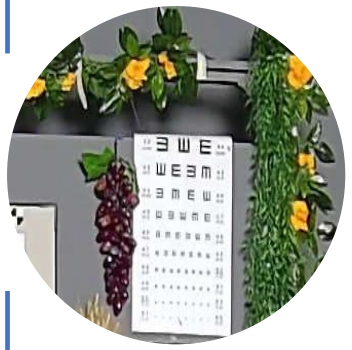
Gain

☞ Insufficient brightness will affect image brightness


Gain 1


Gain 2

Shutter Upper


1/25


1/100


1/750

☜ Simulate the brightness of the evening scene: the shorter the shutter upper limit time setting, the larger the image noise

☜ In scenes with lights (such as street lights), the exposure time is set to less than 1/100 and prone to power frequency interference.

Image Settings

- **1.Set schedule (Day/Night mode switching)**

✓ Headlights directly from the Vehicle will cause the image to switch from B/W mode to color mode

✓ Under a scene around nightfall, the image quality is poor, with infrared light enabled, can get much better performance

✓ It may cause camera keep color mode all night when with street lights.

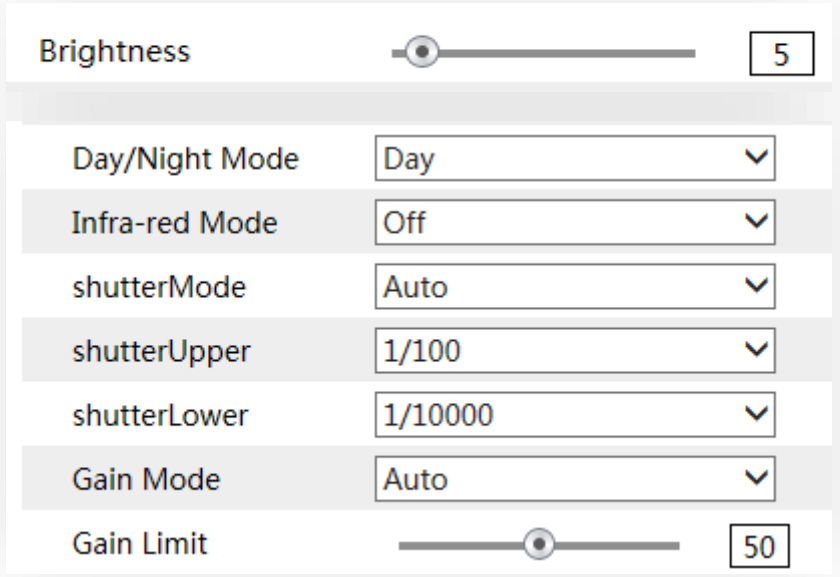
So it is recommended to adopt the schedule setting for day/night mode.

Note: 4 and 180 mean brightness value ,unit is **Lux**

Image Settings

2. Image Settings under Day Mode

- **Brightness setting**: If the license plate is reflective, it is recommended to reduce it to about 5
- **Day and night mode setting**: day mode
- **Infrared light setting:** off
- **Shutter upper limit setting:** according to the use scene configuration, such as the gate can be set to 1/100, the faster the speed, the smaller the value needs to be set
- **Gain mode setting:** automatic mode
- **Gain value setting:** can be reduced to about 10



Note: The smaller the shutter setting, the worse the image will be in low light scenes, so you need to switch to night vision mode earlier.

Image Settings

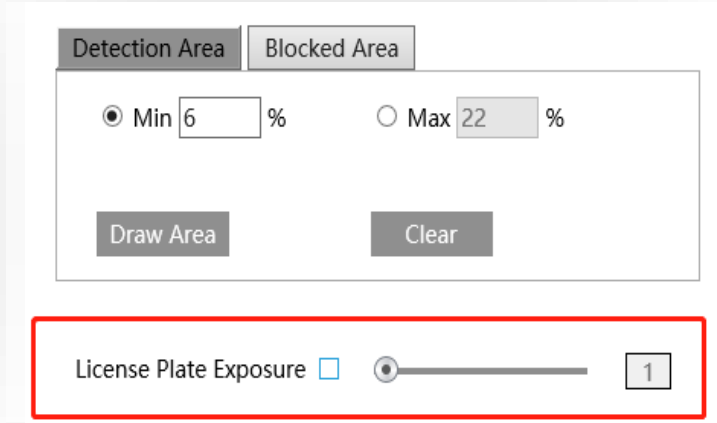
3. Effect by brightness setting

Reflective license plate

Non-reflective license plate

Image Settings

4.Backlighting scene configuration



◆ **License plate exposure settings**

1. Set Detection Area
2. Enable Plate Exposure, set value

◆ **Cautions on using the license plate exposure function**

If the customer sets the license plate as still black according to the above method, it means that the scene has a large dynamic range, and the license plate exposure cannot be used to improve the license plate capture
Need to set up license plate detection area reasonably

Image Settings

5. Image Settings under Day Mode

- **Brightness setting:** If the license plate is reflective, it is recommended to reduce it to about 5
- **Day and night mode settings:** Night mode
- **Infrared light setting:** On
- **Shutter upper limit setting:** According to the use scene configuration, such as the gate can be set to 1/100, the faster the speed, the smaller the value needs to be
- **Gain mode setting:** Auto
- **Gain value setting:** 10

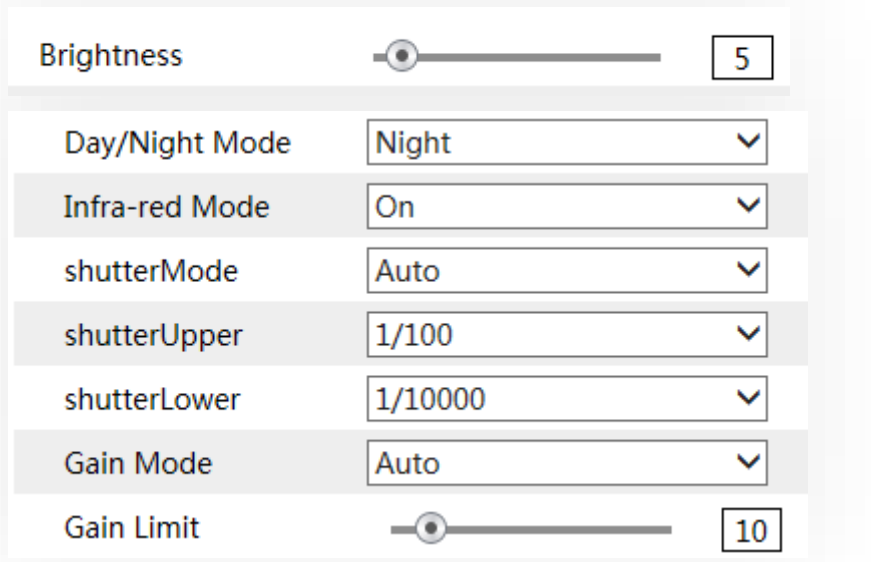


Image Settings

6. Summary

◆ **Back-light scene**
Turn on license plate exposure

◆ **Different Speed**
Set different shutter upper limit values according to different vehicle speeds

◆ **Reflective scene**
Adjust the brightness and gain according to the actual scene

Product List

Image

- ✓ Smart H.265
- ✓ 2MP@30fps
- ✓ 1 / 2.8"CMOS
- ✓ Sony Starvis Sensor
- ✓ DC Iris

Interface

- ✓ Hard Reset
- ✓ SD card slot; up to 128GB
- ✓ PoE, IEEE802.3 af
- ✓ - 30 °C ~ 60 °C
- ✓ Humidity<95%

Functions

- ✓ Intelligent Analytics
  Video tampering detection
  Scene change detection
  License plate
- ✓ Watermark

LPR

- ✓ Snapshot
  Overview and cutout of plate for picture
- ✓ White List--10000
- ✓ Capture Speed Range
  0-70 km/h

TD-9322A3-LR

- ✓ CS Lens Mount
- ✓ ABF
- ✓ IP67
- ✓ RS485
- ✓ 2 CH Alarm Input/Output
- ✓ USB
- ✓ 1 CH Audio input/output ; 1CH built-in MIC

TD-9423A3-LR

- ✓ 2.8~12MM@F1.4 , Motorized; 7~22MM@F1.6 , Motorized
- ✓ 1 CH Audio input/output;
- ✓ 1 CH Alarm input/output

Secure the world with you !