

AVC **NBL41M-L1**

INTRODUCTION

4MP 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

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.

1 Support Area

◆ EUROPE

Belgium, Bulgaria, Croatia, Germany, United Kingdom, Greece, Hungary, Italy, Poland, Romania, Russia

◆ AFRICA

South Africa

◆ NORTH AMERICA

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

◆ ASIA

Israel, Indonesia, Turkey, India, UAE, Vietnam, China, Hong Kong, Taiwan

◆ AUSTRALIA

Australia



2.1 Applicable Scenes



Barrier Control

Entrance & exit

Road Surveillance

Illegal vehicle
Not for Highways

Car Management

VIP Car Manage

Investigation

Post-event
investigation
for forensics

2.2 Not Applicable Scenes

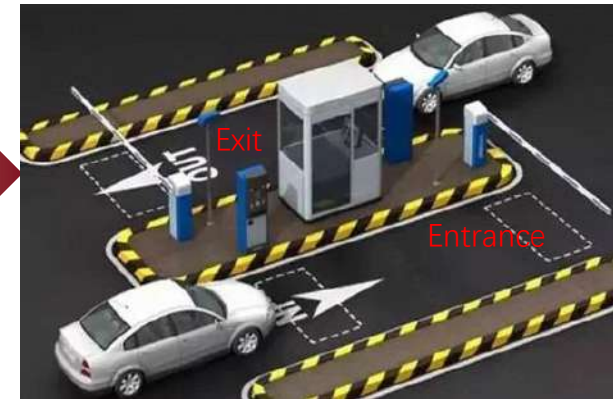
◆ Entrance Control

Shared exit and entrance ✘

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



Correct it



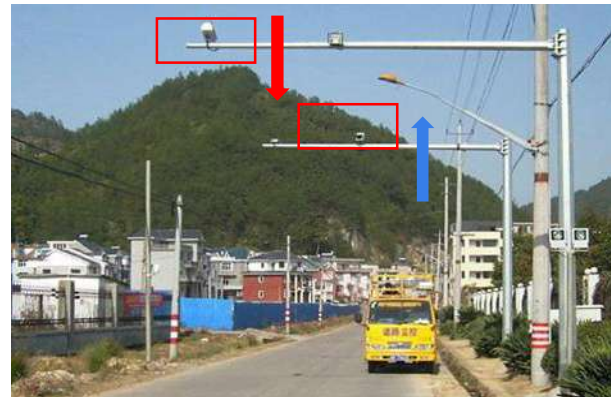
Separate Exit and Entrance ✔

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.

2.3 For Use With...

NVR Ver1.4.4



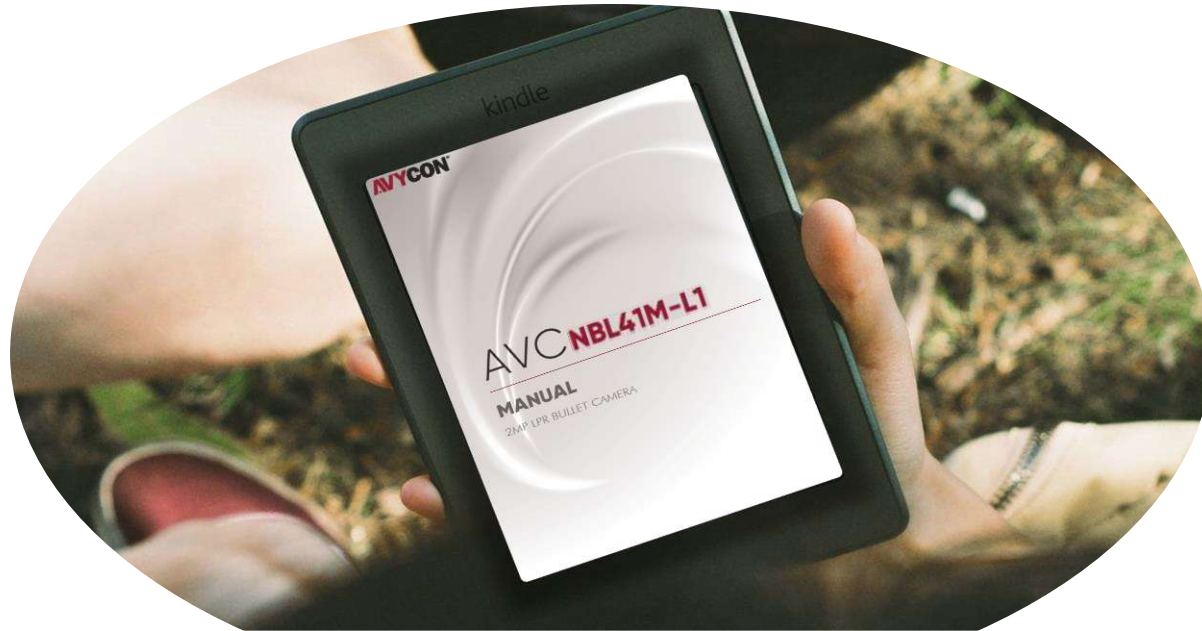
- Can set license plate detection area (range of license plate proportion: 5%~30%)
- Can set entrance and exit directions
- Set up black and white lists, license plate recognition
- License plate library can add the number of licenses 50000

AVYCON CVMS 2.0 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

3 Installation



- User Guide
- Lens Selection
- Installation Requirements

3.1 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 $-5^{\circ} \sim 5^{\circ}$

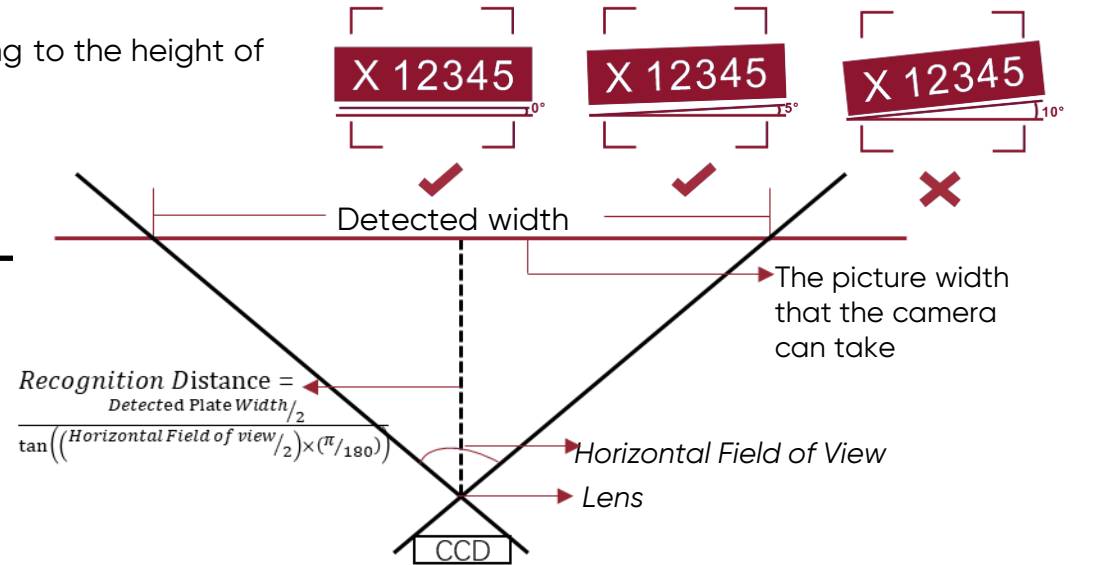
◆ Lens Selection

Select a proper lens according to the table below.

License plate Width (in)	Lens	Horizontal field of view	Max. Detected width(in)	Min. Detected width(in)	Max. Recognition Distance(ft)	Min. Recognition Distance(ft)
12	22mm	17.6	192	24	52	6
12	12mm	32.4	192	24	28	3
20	22mm	17.6	327	41	88	11
20	12mm	32.4	327	41	47	6
17	22mm	17.6	277	35	75	9
17	12mm	32.4	277	35	40	5

Notes:

1. License plate width accounts for $1/2 \sim 1/16$ 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:



- Max Acture Plate width = $1/2 \times$ Horizontal Field of view
- Min Acture Plate width = $1/16 \times$ Horizontal Field of view
- Min. Detected width = $16 \times$ Actual Plate width

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

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

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

3.2 Installation Requirements

◆ Requirements

✓ **Target size**
≤50% of the scene size

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

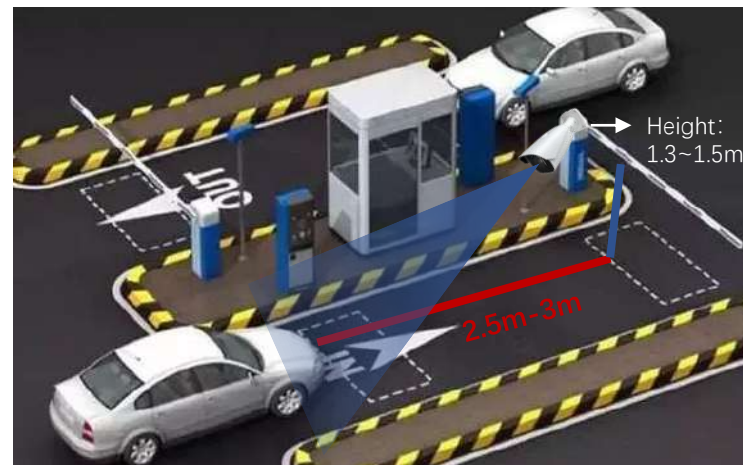
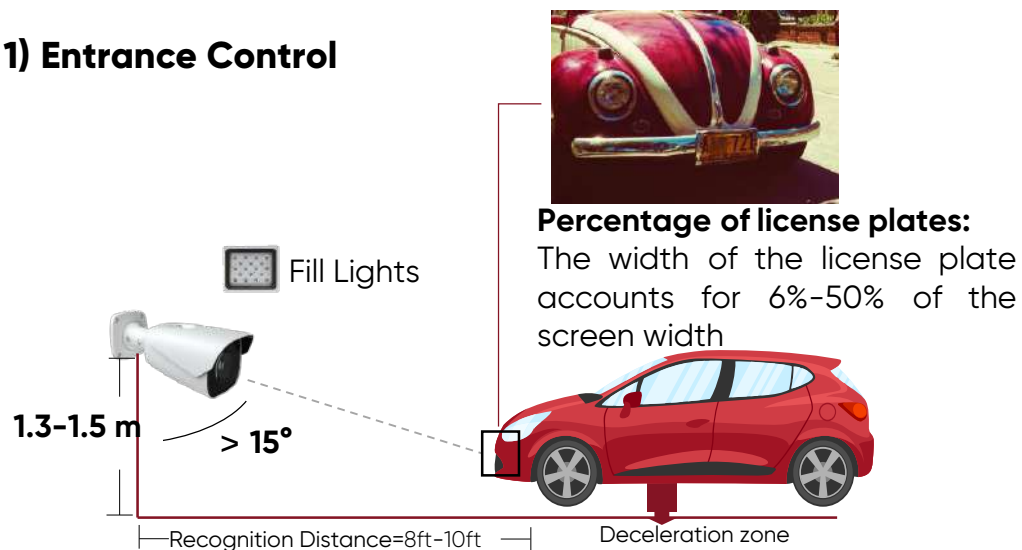
✓ **Target Height**
≥10% of the scene size

✓ **Installation Angle**
Depression Angle ≥15° Avoid the influence of car lights

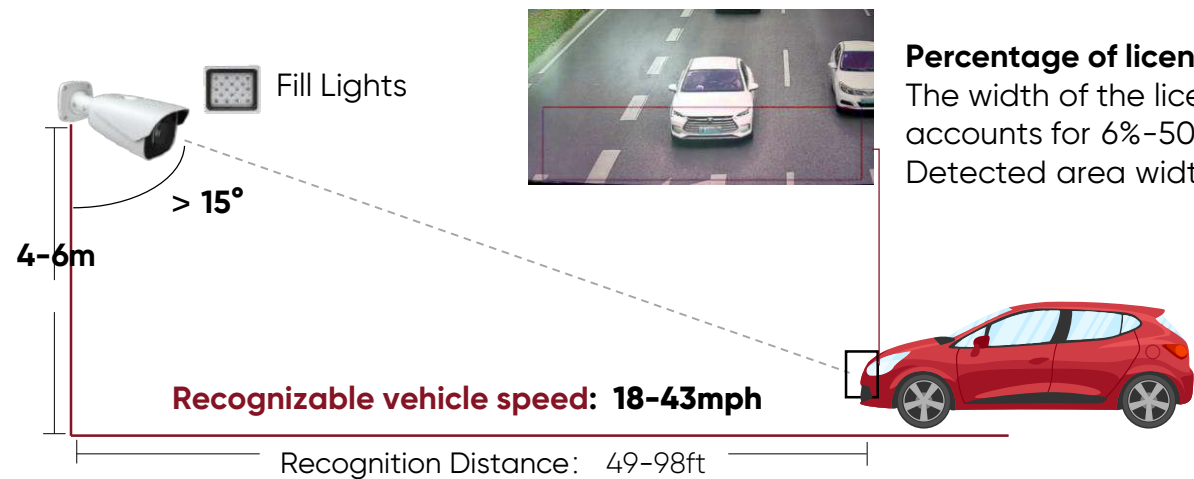


◆ Installation

1) Entrance Control

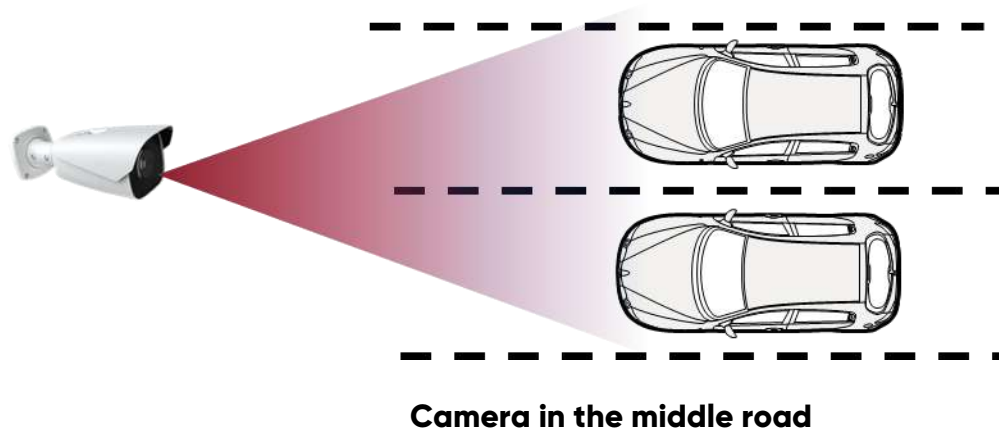
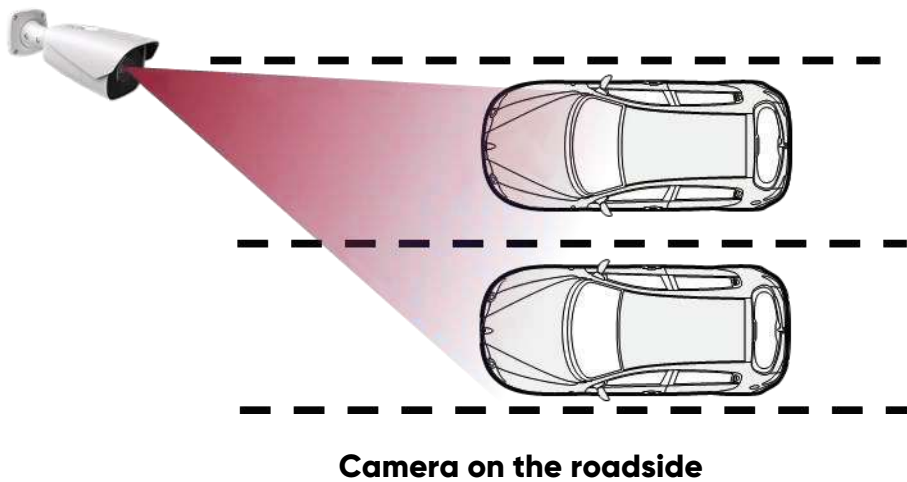


2) Road Surveillance



Notes:

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



4.1 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

4.2 Detection

◆ The key points that affect the snapping effect

✓ Definition

Recognizable by the human eye

✓ Duration

License plate appears on the screen for more than 1 second

✓ Size

Meet the set size range

✓ Area

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

◆ 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

Config Home ▶ Event ▶ ANPR

Detection Config Comparison and Linkage **Area** Schedule Vehicle Database

Detection Area Blocked Area

Min 5 % Max 50 %

Draw Area Clear

License Plate Exposure 1

6% < Plate size < 50%

Save

◆ 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

Config Home ▶ Event ▶ ANPR

Detection Config Comparison and Linkage **Area** Schedule Vehicle Database

Detection Area Blocked Area

Min 12 % Max 50 %

Draw Area Clear

License Plate Exposure 1

Plate side < Min Area as setted

Save

◆ Plate Proportion Comparison



4.3 Recognition

✓ Vehicle Database

Detection Config Comparison and Linkage Area Schedule **Vehicle Database**

Add Bulk Entry **add multiple vehicles**

Add

License plate number List Type

Start Time End Time

Owner License plate type **Save**

License plate number List Type **Search**

Index	License plate	Owner	License plate	List Type	Start Time	End Time	Operate
1	AB123	xxx		Unknown ve...	2019-10-08...	2019-10-08...	Delete Md

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: YYYY/MM/dd hh:mm:ss; time range is from 1970 to 2037.
4. The effective end time is optional; format: YYYY/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

✓ Comparison and Linkage

Detection Config **Comparison and Linkage** Area Schedule Vehicle Database

Allow fault character(s) of the plate number

Alarm List

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



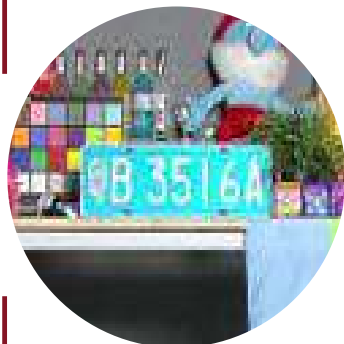
Comparison Result

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

4.4 Image Settings

4.4.1 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



Gain 1



Gain 2



Insufficient brightness will affect image brightness

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.

4.4.2 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.



4.4.3 Image settings in Day/Night mode

✓ Brightness

Day: stay within 25 (reflection license plate : 5) Night: Lower it to see the license plate clearly



Reflective plate

Non-Reflective plate

✓ Shutter

ShutterUpper: 1/500~1/1000;

- In the scene where the vehicle speed is lower than 25mph, it can be appropriately extended, but not more than 1/100;
- If the gate can be set to 1/100, the faster the speed, the smaller the value needs to be.
- The smaller the shutter limit is setted, the worse the image will be in low light scenes, please switch to night mode earlier.

ShutterLower: 1/100,000

✓ Gain

Gain Settings: Auto;

Not to exceed 20, it can be reduced to about 10.

✓ Auxiliary lighting

If the ambient visible light is low, in order to grasp the license plate clearly, you need to limit the gain and shutter. At this time, you need to increase auxiliary lighting.

- For license plates with strong infrared reflection, use white light to supplement light;
- License plates that do not have strong infrared reflection, use infrared light to fill the light.
- Adjusting the angle of the lamp, try to let the light reflected from the license plate enter the lens.

4.4.4 Backlighting scene configuration

◆ License plate exposure settings

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

Detection Area Blocked Area

Min 6 % Max 22 %

Draw Area Clear

License Plate Exposure 1

◆ 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.



5 Product List

Image

- ✓ Smart H.265
- ✓ 4MP@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 0-43 mph



AVC-NBL41M-L1

- ✓ 7~22mm Motorized Auto-Focus Lens
- ✓ 1 CH Audio input/output;
- ✓ 1 CH Alarm input/output