Hanwha Vision

WISENET Road AI

LPR/ANPR Cameras

QUICK REFERENCE GUIDE

CONTENTS

1 PRE-INSTALLATION

1.1 Choosing Location

The LPR (License Plate Recognition) / ANPR (Automatic Number Plate Recognition) Technology running on this camera will provide you with the best results when following the recommended installation requirements below.

Fig. 1
Camera shown from side

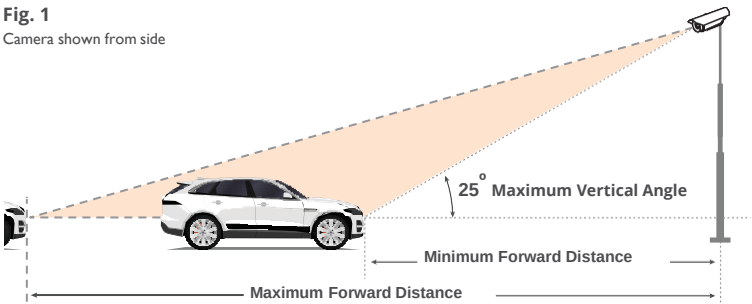
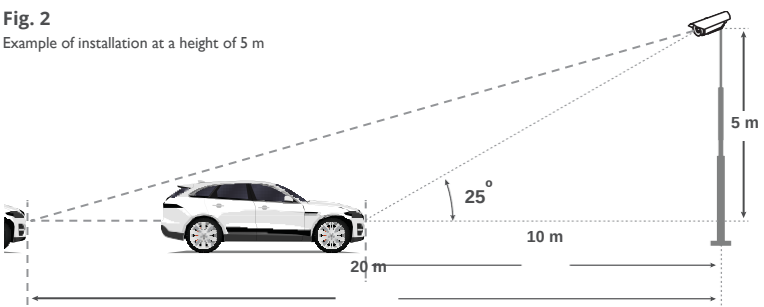


Fig. 2
Example of installation at a height of 5 m



Recommended

25 degrees Maximum Vertical Angle

Maximum Forward Distance depends on lens zoom, however should not exceed

20 m / 65.6 ft (for PNO-A9081RLP model) and **75m / 65.6 ft (for PNO-A9311RLP model)** considering effective IR range. For PNB-A9001LP it depends on the lens installed and IR module used.

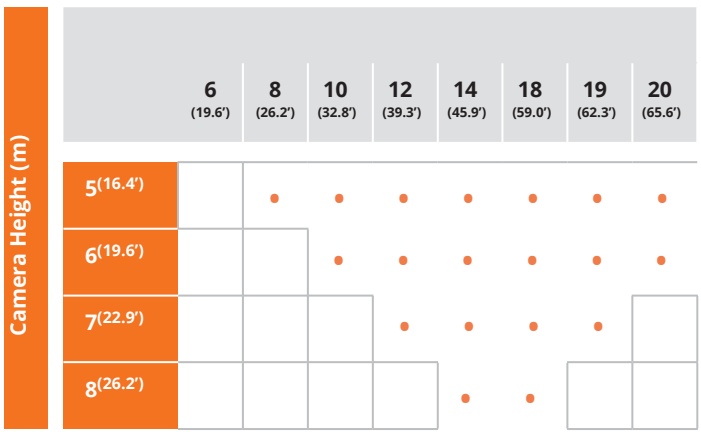
Please consider using external IR for ranges above recommended.

1.1 Choosing Location (continued)

FORWARD DISTANCE TABLES

The orange dots on the tables below are recommended installation measurements.
[PNO/PNV-A9081RLP]

Forward Distance (m)



*Daytime condition with built in IR.

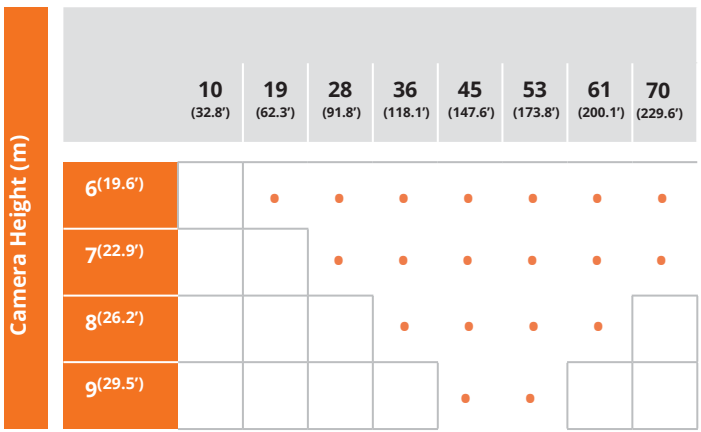
*PNB-A9001LP parameters depend on lens & external IR.

1.1 Choosing Location (continued)

FORWARD DISTANCE TABLES

The orange dots on the tables below are recommended installation measurements.
[PNO-A9311RLP]

Forward Distance (m)



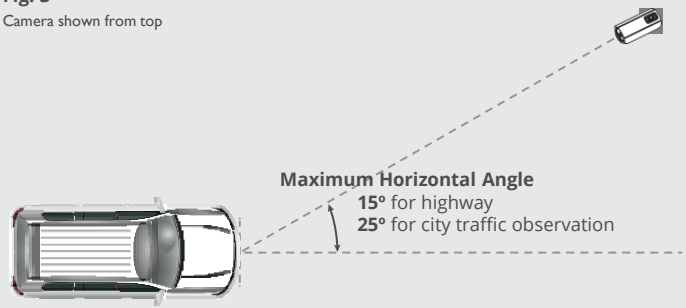
1.1 Choosing Location (continued)

Recommended

30 degrees Maximum Horizontal Angle

Fig. 3

Camera shown from top

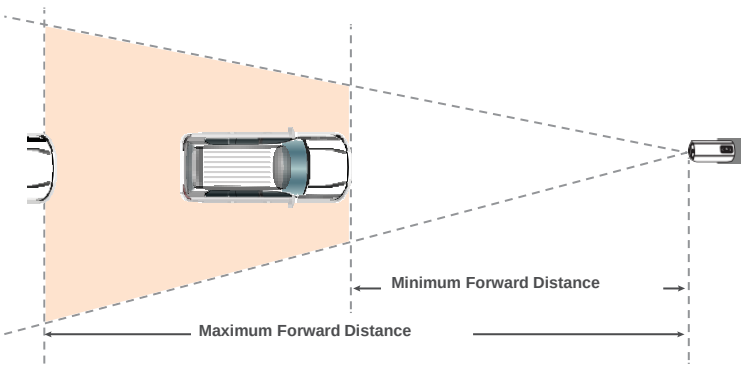


Camera in 4K mode can cover up to 3 road lanes. The FullHD mode can cover up to 2 lanes.

Normally, setting recognition zone (see orange frame below) in lower half of camera view is sufficient and favours app performance.

Best results are achieved when single row number plate width has fit the criteria. Greater width may affect performance.

Fig. 4



All the license Plate that are meeting the pixel criteria as below will be recognized in the selected area.

- **130-300 pixels** for regular EU plates
- **80-300 pixels** for US plates without stacked symbols (small ones)
- **160-300 pixels** for US plates with stacked symbols

Color coded pixel counts are available in the settings section of Road AI.

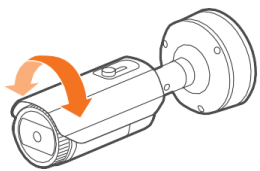
2 INSTALLING AND POSITIONING CAMERA

2.1 Camera Installation

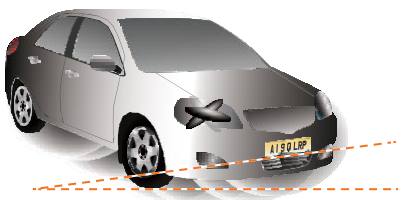
NOTE: ***Refer to PNO-A9081RLP, PNV-A9081RLP, PNO-A9311RLP or PNB-A9001LP installation guide and follow the installation instructions.***

2.2 Adjusting the Plate "Rotation" Angle

For best results, check the angle of your plate compared to the horizontal angle and rotate the camera to less than **5°** as shown below (Recommended Angle(s).



Recommended Angle(s)



NOTE: ***Refer to the "show plate grid" section available in Wisenet Road AI settings for assistance.***

2. 3 LPR(ANPR)/ MMCR Specification




LPR(ANPR) CAMERAS	**PNV-A9081RLP**	**PNO-A9081RLP**	**PNB-A9001LP** (* with 50mm lens)	**PNO-A9311RLP**
LPR Usage Conditions	Community Traffic	Parking Application	City Traffic	City Traffic
Speed Description	Moderate Speed	Low speed	Regular Speed	High Speed
Lane Coverage	1 lane (3.6m/12ft Wide) (with built in IR)	1 lane (3.6m/12ft Wide) (with built in IR)	Up to 2 lanes (5m/18ft Wide)	Up to 2 Up to 2 lanes (5m/18ft Wide) (5m/18ft Wide)
Speed limit	Up to 70kmh (45mph)	Up to 40kmh (25mph)	Up to 100kmh (65mph)	Up to 100kmh (65mph)
Min. Forward Distance	12m (38ft)	10m (33ft)	16m (52ft)	18m (60ft)
Max. Forward Distance	12m (40ft)	13m (45ft)	36m (120ft) (with Ext. IR)	75m (250ft)
Max. Horizontal Angle	25°	30°	25°	25°
Max. Vertical Angle	25°	30°	25°	25°
Horizontal Offset	Up to 5m (18ft)	Up to 7m (24ft)	Up to 7m (24ft)	Up to 12m (24ft)
Camera Height	Up to 5m (18ft)	Up to 7m (24ft)	Up to 7m (24ft)	Up to 12m (24ft)
Vehicle Recognition	Make : 70+ Makes Model : 600+ models Color : 11 colors	Make : 70+ Makes Model : 600+ models Color : 11 colors	Make : 70+ Makes Model : 600+ models Color : 11 colors	Make : 70+ Makes Model : 600+ models Color : 11 colors

3 CONFIGURING YOUR CAMERA

NOTE: *There is no default user name and password to access the camera setting, 1) Please make your own user name and password at the first instance when you access the camera settings.*
2) Make sure to set correct date and time for the camera before going in to any additional settings.

1. Field of View

The below steps you will perform in the Wisenet camera configuration webpage

- Configure camera so left and right are correct, not mirrored.
- Set camera zoom to capture license plate
- Adjust camera view angle so plate passes through the middle of the image.

1. Configuring Initial Camera Settings

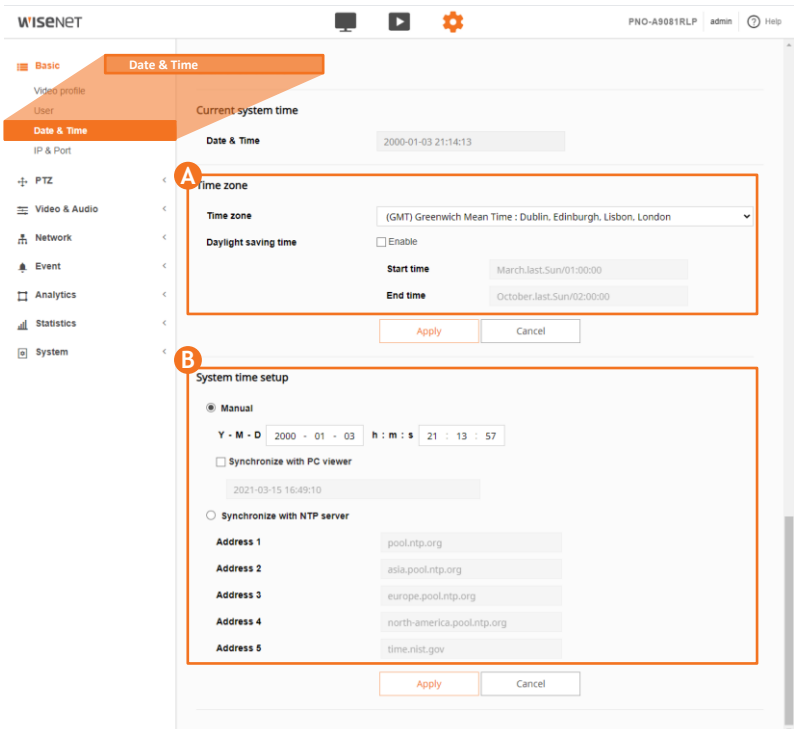
For proper operations, please, check and set properly:

- **Camera Date Time** (+page 9)
- **IP settings** (+page 10)
- **SD card storage** (+page 13)
- **Camera exposure and focus** (+pages 14~15)

SSDR, WDR, DIS, Defog, AGC and anti-flickering features are good for human eye but affect computer vision performance and therefore setting these to the least possible effect or turning off strongly advised.

3. 2 Configuring Initial Camera Settings (continued)

[Date and Time]



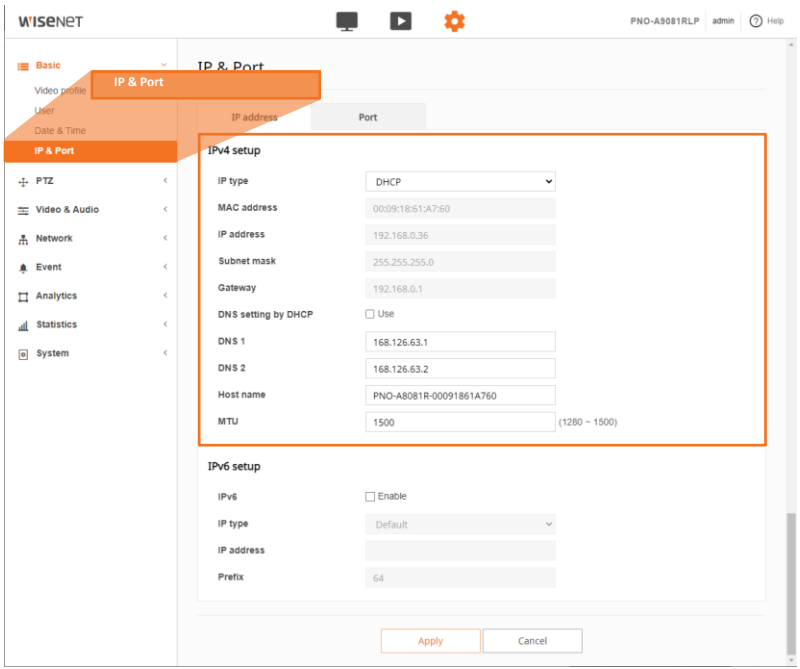
Choose **A** **Timezone** and set **Use daylight saving time** as appropriate.

Set **B** **date and time** or opt to **synchronize with your PC** or **NTP server.**

NOTE: *Wisenet Road AI app relies on these settings and if these are not set properly you may not see events in Wisenet Road AI app and events delivered to the outer systems may not contain proper timestamps.*

3. 2 Configuring Initial Camera Settings (continued)

[IP, DNS, Ports]



Proper IP, DNS and ports setting are important for:

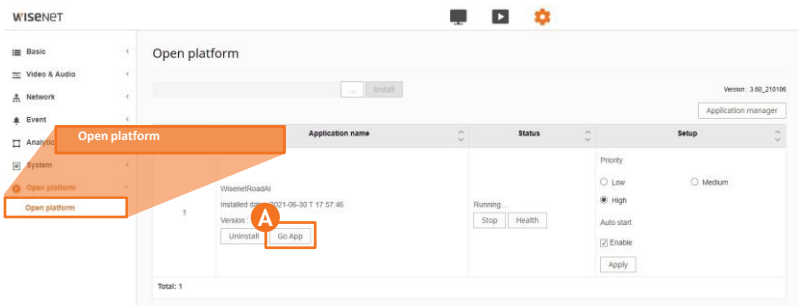
- NVR and other integrations
- outside LAN access if required

NOTE: *Reboot the camera whenever IP address gets changed.*

3. 2 Configuring Initial Camera Settings (continued)

[Go to App]

Please go to App in camera open platform section.

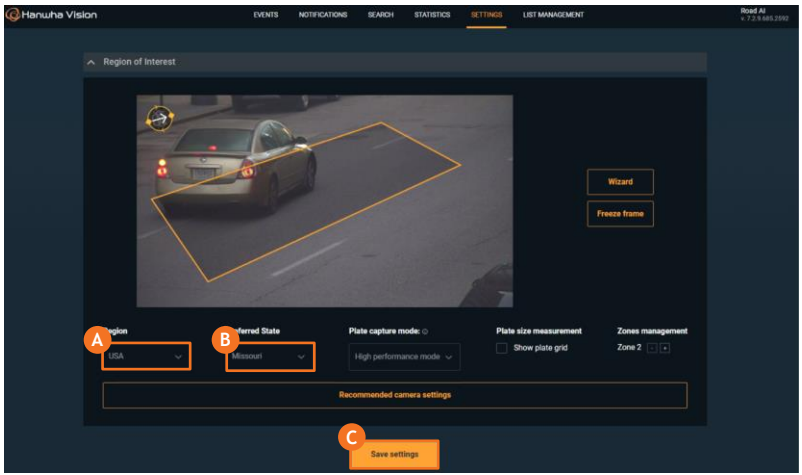


To run the Wisenet RoadAI app, select the **Open platform** menu and click the A **Go App** button in the **Application name** field.

3. 2 Configuring Initial Camera Settings (continued)

[Go to App] (Continued)

Go to Wisenet Road AI application tab and select “Settings” from the pull down menu.



A First, choose the **Region**.

Choose the correct region that matches your country/region (Europe is set by default).

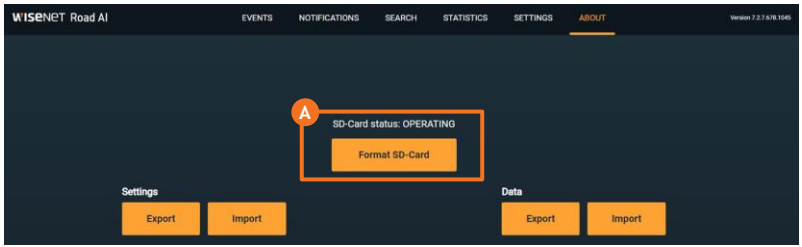
For Europe/US region specify B the **Preferred country/state** to improve the ANPR accuracy.

Save the settings. Click C **Save settings**. The application will restart for the selected region to take effect. After clicking Reload, wait for several seconds and reload the browser page.

3. 2 Configuring Initial Camera Settings (continued)

[microSD card]

Your camera is supplied with micro SD card.



SD-card is managed by the Wisenet RoadAI application and no user interaction needed.

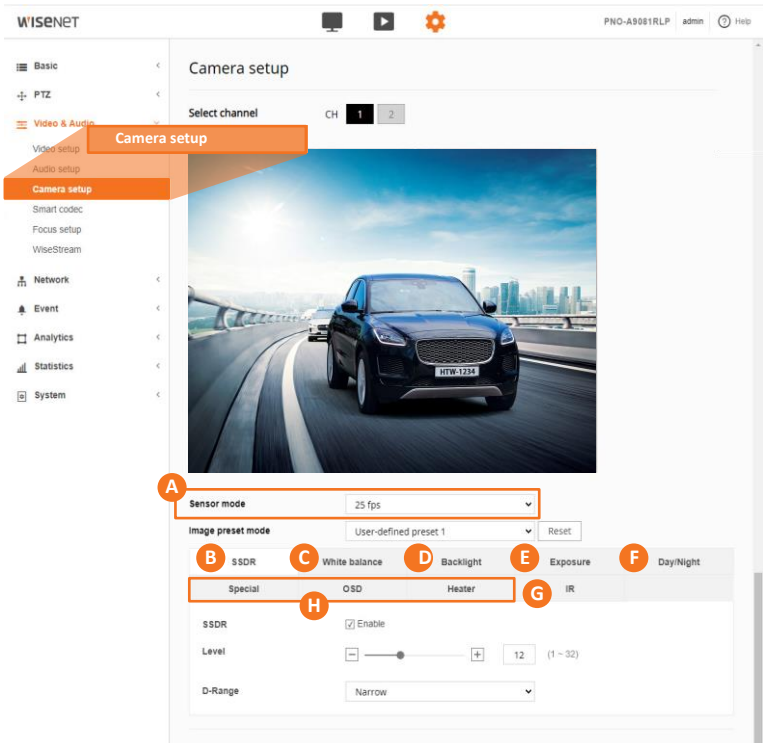
Please check the A SD-Card status in the **ABOUT** section of the Wisenet RoadAI app.

Change the micro SD card if you see Error status.

3. 2 Configuring Initial Camera Settings (continued)

[Exposure adjustments]

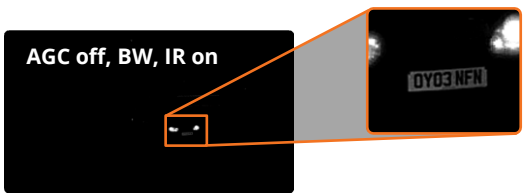
Use the recommended settings from the Wisenet Road AI application in most cases. But if you need to manually adjust here are the most common settings that affect the LPR performance.



- **A** Sensor: 25-30 fps
- **B** SSDR: Off
- **C** White balance: ATW
- **D** Back light: Off
  (try other backlight options only if camera gets blind- ed by headlights in the night)
- **E** Exposure:
  - minimum shutter speed : 1/700
  - maximum shutter speed : 1/12000
  - preferred shutter speed : 1/1000
  - Anti flicker : Off
  - SSNR: Off
  - AGC: Low
- **F** Day/Night:
  - Mode: Auto
- **G** IR: mode Auto
- **H** Other settings: default

3. 2 Configuring Initial Camera Settings (continued)

[Exposure adjustments-Automatic Gain Control]



Automatic Gain Control can improve overall scene visibility notably. However, even at low setting AGC produces noise that can ruin license plate images, also lighter areas tend to bleach out. See illustrations to the left.

Start with turning AGC off. See the illustration to the left. Set AGC to low to improve plates visibility unless only other methods are helpful.

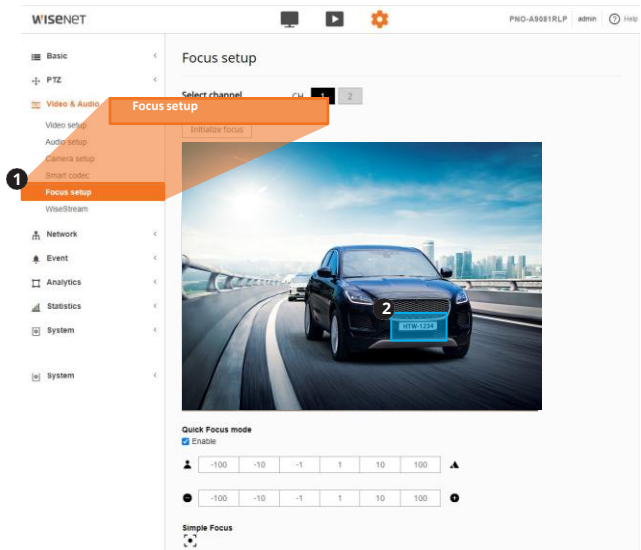
Adjust zoom so that real plate pixel width is at least 130px. Consider adjusting recognition zone to be closer to the centre of the frame to avoid the IR vignette effect.

NOTE: Do not use WDR as it decreases the shutter speed and may lead to the blur of the vehicles on footage.

3.3 Focus

A unique feature of this camera allows you to select the plate area and hit a button to perform a “Simple Focus” on this plate area.

1. From the Video & Audio menu, select **Focus setup**.
2. Click and drag to draw an area of focus where the license plate is displayed.
3. Click the **Simple Focus** button to initiate a focus operation on the user-specified area.



NOTE:

The focus setting of PNB-A9001LP is related to the lens type, and manual focus is activated when using a manual varifocal lens.

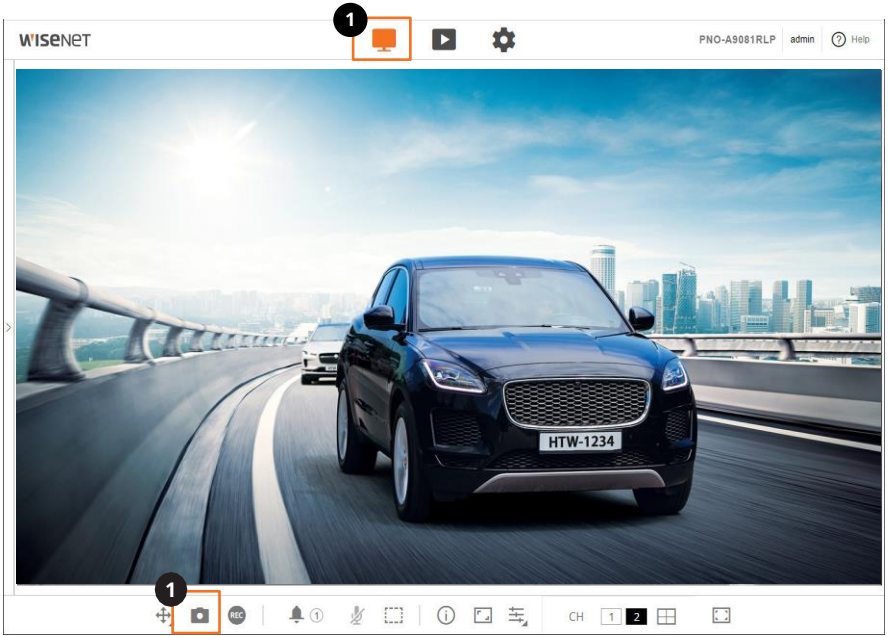
The area indicated is not stored. If you need to perform a new Simple Focus, please draw a new area on-screen.

Set the focus to have plates in the proper pixel size.

- *130-300 pixels for regular EU plates*
- *80-300 pixels for US plates without stacked symbols (small ones)*
- *160-300 pixels for US plates with stacked symbols*

3. 4 Pixel width of License/Number plate

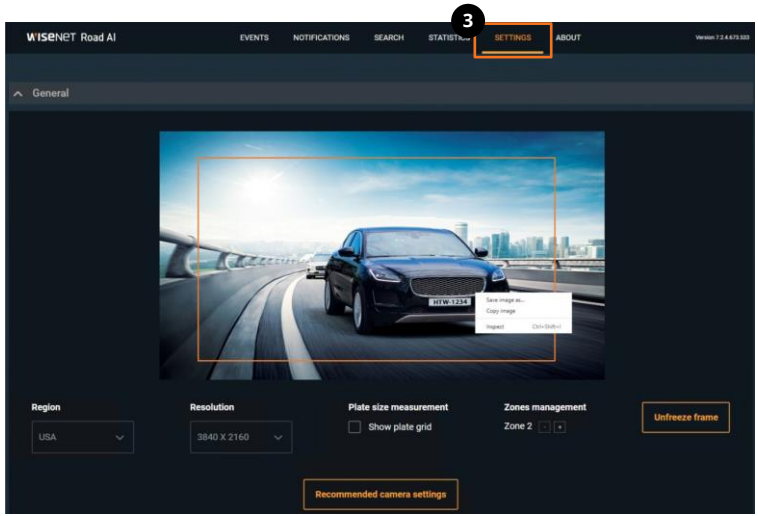
1 Spread or move license/number plate (vehicles) across the scene and take snapshots using web viewer capturing feature (**Live ; Capture**);



3. 4 Pixel width of License/Number plate (Continued)

2 Use **Plate Grid** tool in the **Settings** tab of WisenetRoadAI and **Freeze Frame** feature to check whether plate fits the allowed range.

3 You can add an image from the Wisenet Road AI **; Settings ;** Freeze frame to show the actual settings.



3. 5 Observing **PROPER** Installation

SCENE REQUIREMENTS:

License/number plate is more than 130px in width

License/number plate is readable

Vertical angle is less than 30°

Tilt angle is less than 5°

Horizontal angle is less than 30°

Fig. 1
Daytime

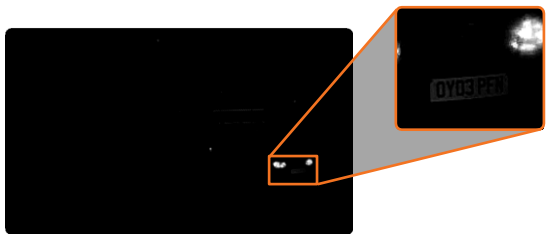
- good proportion to the frame width
- well illuminated
- sufficient contrast
- acceptable tilt angle

Fig. 2
Night time

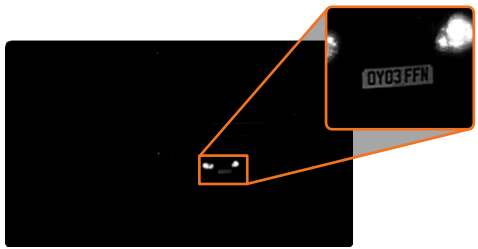
- good proportion to the frame width
- perfect IR power
- sufficient contrast
- critical yet acceptable tilt angle

3. 5 Observing **PROPER** Installation (continued)

POSSIBLE IR RESTRICTIONS:



The license/number plate is quite close to the frame boundary. You may notice a vignette effect.



The license/number plate is closer to the centre of the frame. The plate is illuminated much better.

Pay special attention to IR vignette effect (see illustration on the left) when setting up recognition zone. The closer to the center the more even illumination is.

Also, in this particular case the real pixel width of the license/number plate is critically small.

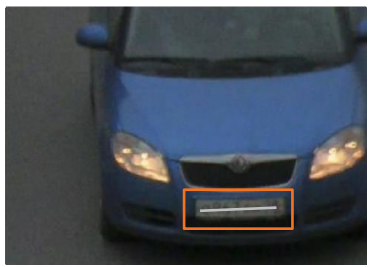
The Automatic Gain Control effect will be illustrated in camera exposure settings section.

3. 6 Examples of IMPROPER Installation

Too small (less than 130px wide) Tilt angle exceeds 5°

Focus and Shutter faults

Depth of field is insufficient to cover foreground license plates. Adjust the lens settings.



Improper focus settings. Adjust the lens.

Blurry image due to long exposure. Fix the shutter speed to obtain sharper picture.

3. 6 Examples of IMPROPER Installation (continued)

Exposure faults

Too much light. Either adjust the iris or shutter speed. Night time: dim the IR or set AGC to Low.

Insufficient light. Adjust exposure settings or provide additional lighting.

For more information visit us at

Hanwha-Security.com

Head Office
6, Pangyo-ro 319beon-gil, Bundang-gu, Seongnam-si, Gyeonggi-do, 463-400
Rep. of KOREA
Tel : +82.70.7147.8753
Fax : +82.31.8018.3740
http://hanwha-security.com