

# WISENET Road AI LPR Cameras

## QUICK REFERENCE GUIDE



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Color **RED**

Brand **HTV**

Model **HT230C**

Plate **HT-777-WS**

Type **SUV**



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### INSTALLATION WORKSHEET



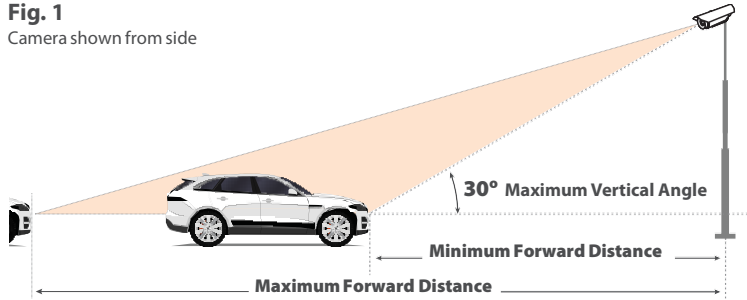
# 1 PRE-INSTALLATION

## 1.1 Choosing a Location

The LPR (License Plate Recognition), also known as ANPR (Automatic Number Plate Recognition) Technology running on this camera will provide you with the best results when following the recommended installation constraints below. Please use the worksheet on page 24 to record your site survey or installation measurements.

**Fig. 1**

Camera shown from side



### Recommended

**30 degrees** Maximum Vertical Angle @ up to 25MPH

**25 degrees** Maximum Vertical Angle @ up to 45MPH

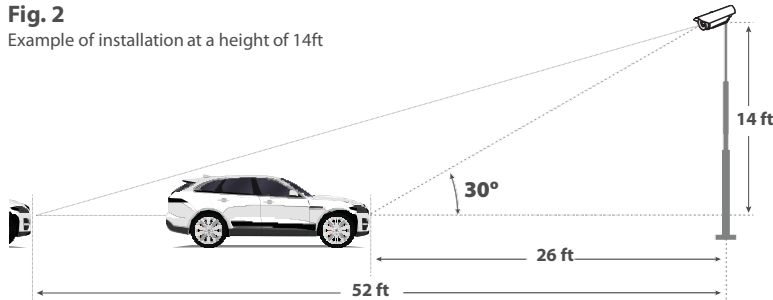
**15 degrees** Maximum Vertical Angle @ up to 75MPH\*

Maximum Forward Distance depends on lens zoom, however should not exceed **52 ft** considering effective IR range (for PNO and PNV models).

\*Please consider using PNB model with external IR for ranges above 52 ft or up to 75MPH.

**Fig. 2**

Example of installation at a height of 14ft



# 1.1 (Continued)

## FORWARD DISTANCE TABLES

The tables below are recommended installation measurements based on camera mounting lane offset and maximum vehicle speed of up to 25MPH / 45MPH.



[PNO-A9081RLP / PNV-A9081RLP]

Camera Height (ft) @ 25MPH / 45MPH	0' LANE OFFSET				
	Maximum Forward Distance (ft)				
	10	20	30	40	50+
4	Y	Y	Y	Y	N
6	Y	Y	Y	Y	N
8	N	Y	Y	Y	N
10	N	Y	Y	Y	N
12	N	Y	Y	Y	N
14	N	N	Y	Y	N

Camera Height (ft) @ 25MPH / 45MPH	10' LANE OFFSET				
	Maximum Forward Distance (ft)				
	10	20	30	40	50+
4	N	Y	Y	Y	N
6	N	Y	Y	Y	N
8	N	Y	Y	Y	N
10	N	Y	Y	Y	N
12	N	Y	Y	Y	N
14	N	Y	Y	Y	N

Camera Height (ft) @ 25MPH / 45MPH	20' LANE OFFSET				
	Maximum Forward Distance (ft)				
	10	20	30	40	50+
4	N	N	Y	Y	N
6	N	N	Y	Y	N
8	N	N	Y	Y	N
10	N	N	Y	Y	N
12	N	N	Y	Y	N
14	N	N	Y	Y	N

Camera Height (ft) @ 25MPH / 45MPH	30' LANE OFFSET				
	Maximum Forward Distance (ft)				
	10	20	30	40	50+
4	N	N	N	N	N
6	N	N	N	N	N
8	N	N	N	N	N
10	N	N	N	N	N
12	N	N	N	N	N
14	N	N	N	N	N

\*Day and night conditions with built-in IR

\* PNB-A9001LP parameters depends on lens & external IR.



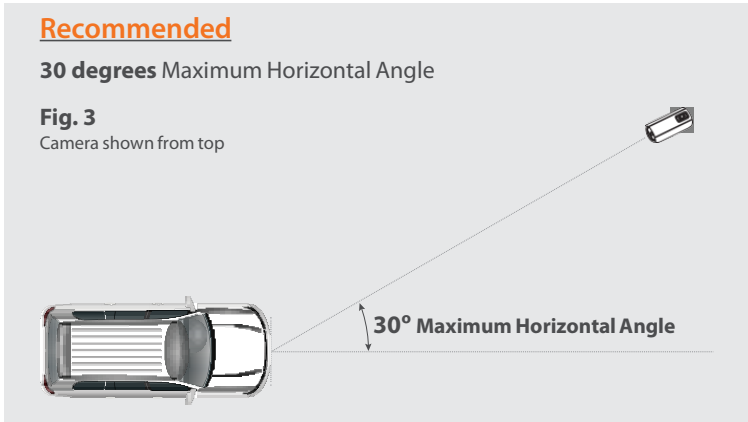
## 1.1 (Continued)

### Recommended

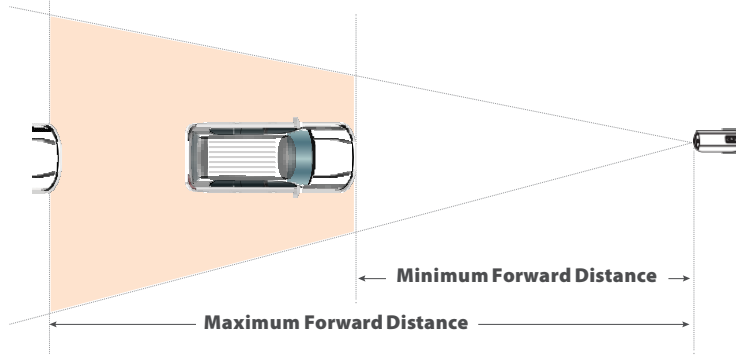
**30 degrees** Maximum Horizontal Angle

**Fig. 3**

Camera shown from top



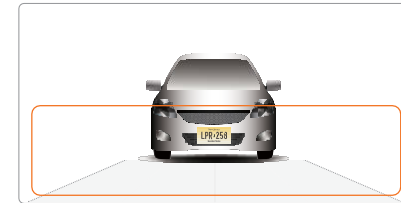
**Fig. 4**



The camera runs in 4K mode to cover up to 2 road lanes. In certain situations, FullHD mode can be used to increase the plate size on screen. MMCR accuracy will decrease in FullHD mode. Please refer to KB article for more information.

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

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



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

- **130-250 pixels** for US / Canada / Mexico plates

### Recommended

**30 degrees** Maximum Horizontal Angle for recognition up to 25MPH.  
**25 degrees** Maximum Horizontal Angle for recognition up to 45MPH.  
**15 degrees** Maximum Horizontal Angle for recognition up to 75MPH\*  
(\*PNB model only)

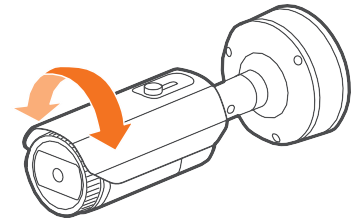
# 2 INSTALLING AND POSITIONING CAMERA

## 2.1 Camera Installation

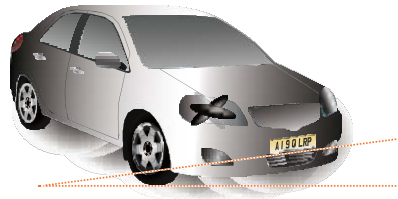
NOTE: Refer to PNO-A9081RLP, PNV-A9081RLP or PNB-A9001LP installation guide and follow the installation instructions.

## 2.2 Adjust for 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)



5°max



>5°

## 2.3 LPR / MMCR Specification



### LPR CAMERAS

### PNV-A9081RLP

### PNO-A9081RLP

### PNB-VA9001LP-50MM\*

Solution	Community Traffic Observation / Parking Application		City Traffic Observation	Secondary Roads
Speed Description	Moderate Speed	Low speed	Regular Speed	Moderate Speed
Lane Coverage	2 lanes @Color (18ft Wide) 1 lane @Black & White with built-in IR	2 lanes @Color (24ft Wide) 1 lane @Black & White with built-in IR	Up to 2 lanes (18ft Wide)	Up to 2 lanes (18ft Wide)
Speed limit	Up to 45mph (70kph)	Up to 25mph (40mph)	Up to 65mph (100mph)	Up to 75mph (140kph)
Min. Forward Distance	38ft (12m)	10m (33ft)	52ft (16m)	90ft (27m)
Max. Forward Distance	Color: 52ft (15.8m) Black & White w/ IR: 45ft (13.7m)	Color: 52ft (15.8m) Black & White w/ IR: 45ft (13.7m)	Color: 120ft (36.5m) Black & White: 120ft with external IR	Color: 120ft (36.5m) Black & White: 120ft with external IR
Max. Horizontal Angle	25°	30°	25°	15°
Max. Vertical Angle	25°	30°	25°	15°
Horizontal Offset	Up to 18ft (5.4m)	Up to 24ft (7m)	Up to 24ft (7m)	Up to 12ft (3.6m)
Camera Height	Up to 18ft (5.4m)	Up to 24ft (7m)	Up to 24ft (7m)	Up to 12ft (3.6m)
Vehicle Recognition	70+ Makes 600+ models 10 colors	70+ Makes 600+ models 10 colors	70+ Makes 600+ models 10 colors	70+ Makes 600+ models 10 colors

\*Model number pending

\*\*Specifications may vary based on installation conditions

# 3 CONFIGURING YOUR CAMERA

**NOTE:** *There is no default user name and password to access the camera.*

*1) You must set the admin password when you first access the camera .*

*2) Make sure to set correct date and time for the camera before going in to any additional setting to ensure accurate time stamps for plate reads. It is recommended to sync the camera to a Network Time Protocol (NTP) server.*

## 1. 1 Field of View

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

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

## 2. 2 Configure 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 setting or turning off is strongly advised.



## 3.2 (Continued)

### [Date and Time]

WISENET PNO-AS081RLP admin Help

Basic **Date & Time**

Video profile  
User  
Date & Time  
IP & Port  
PTZ  
Video & Audio  
Network  
Event  
Analytics  
Statistics  
System

Current system time  
Date & Time 2000-01-03 21:14:13

**A** Time zone  
Time zone (GMT) Greenwich Mean Time : Dublin, Edinburgh, Lisbon, London  
Daylight saving time  Enable  
Start time March, last, Sun/01:00:00  
End time October, last, Sun/02:00:00  
Apply Cancel

**B** System time setup  
 Manual  
Y - M - D 2000 - 01 - 03 h : m : s 21 : 13 : 57  
 Synchronize with PC viewer  
2001-03-15 16:49:10  
 Synchronize with NTP server  
Address 1 pool.ntp.org  
Address 2 asia.pool.ntp.org  
Address 3 europe.pool.ntp.org  
Address 4 north-america.pool.ntp.org  
Address 5 time.nist.gov  
Apply Cancel

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 (Continued)

### [IP, DNS, Ports]

The screenshot displays the 'IP & Port' configuration page in the WISENET interface. The page is divided into two main sections: 'IPv4 setup' and 'IPv6 setup'. The 'IPv4 setup' section is highlighted with an orange box and contains the following fields:

Field	Value
IP type	DHCP
MAC address	00:09:18:61:A7:60
IP address	192.168.0.36
Subnet mask	255.255.255.0
Gateway	192.168.0.1
DNS setting by DHCP	<input type="checkbox"/> Use
DNS 1	168.126.63.1
DNS 2	168.126.63.2
Host name	PNO-A8081R-00091861A760
MTU	1500 (1280 ~ 1500)

The 'IPv6 setup' section is located below the IPv4 setup and includes the following fields:

Field	Value
Enable	<input type="checkbox"/>
IP type	Default
IP address	
Prefix	64

Buttons for 'Apply' and 'Cancel' are located at the bottom of the configuration page.

Proper IP, DNS and ports setting are important for:

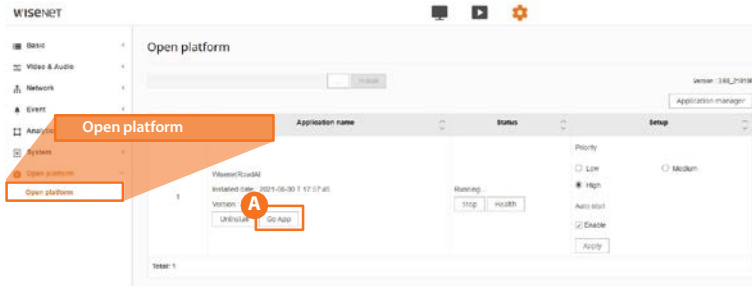
- NVR / VMS or other integrations
- outside LAN access if required

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

## 3.2 (Continued)

### [Go to App]

Please go to App in camera open platform section.

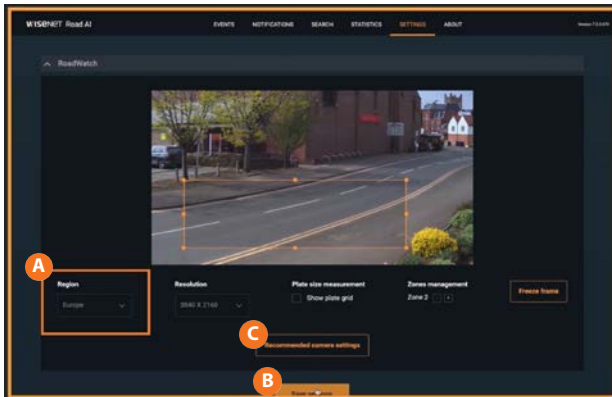


To run the Wisenet RoadAI app, select the **Open platform** menu and click the **Go App** button in the **Application name** field.

## 3.2 (Continued)

### [Go to App] (Continued)

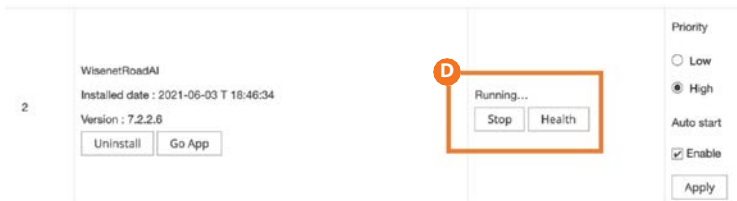
Go to Wisenet Road AI application tab and select “Settings” from the top menu.



Select the **A** correct Region from the selection. The default setting is “**Europe**”. In US/Canada/Mexico regions, you must select the correct region/country that matches your usage.

Click **B** to **save the settings**.

In the same “Settings” section, you can also choose to have the **C** Recommend camera setting applied.

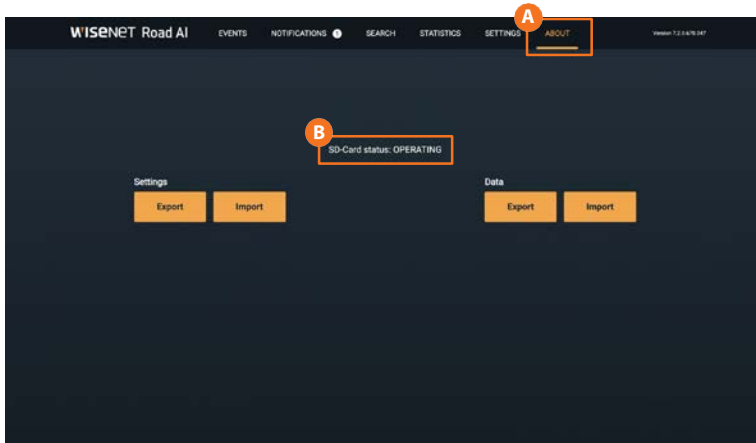


**NOTE:** You must go to the web menu of the camera, Open Platform Area to **D** Stop and Re-start the application for the Region setting change to be effective.

## 3.2 (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.

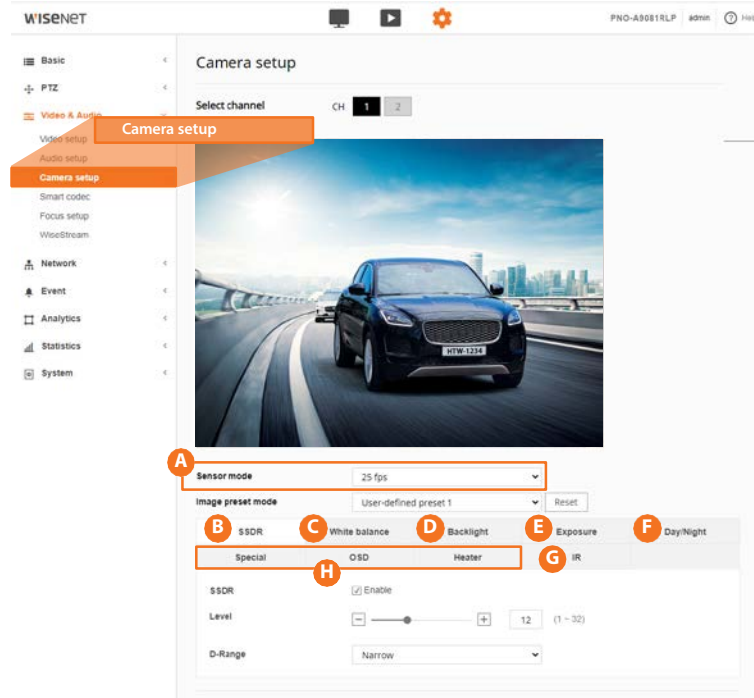
Please check the **B** SD-Card status in the **A** **ABOUT** section of the Wisenet RoadAI app.

Change the micro SD card if you see Error status

## 3.2 (Continued)

### [Exposure adjustments]

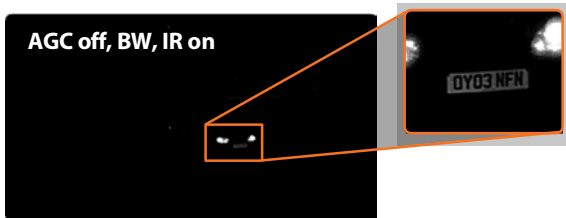
Use the recommended default settings from the Wisenet Road AI application in most cases. If you need to manually adjust here are the most common settings that affect the LPR performance. The recommended settings can also be applied from within the RoadAI app.



- A.** Sensor: 30 fps
- B.** SDR: Off
- C.** White balance: ATW
- D.** Backlight: Off  
(try other backlight options only if camera gets blinded by headlights in the night)
- E.** Exposure:
  - Minimum shutter speed : 1/300
  - Maximum shutter speed : 1/700
  - Preferred shutter speed : 1/500
  - Anti flicker : Off
  - SSNR : Default
  - AGC : Low
- F.** Day/Night:
  - Mode: Auto
- G.** IR: manual
- H.** Other settings: default

## 3.2 (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, while lighter areas tend to become over-exposed. 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 so it is closer to the center of the frame to avoid IR vignette effect.

**NOTE:** Do not use WDR as it decrease the shutter speed and may blur the vehicles.

### 3.3 Simple Focus on Plate Read Area

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.

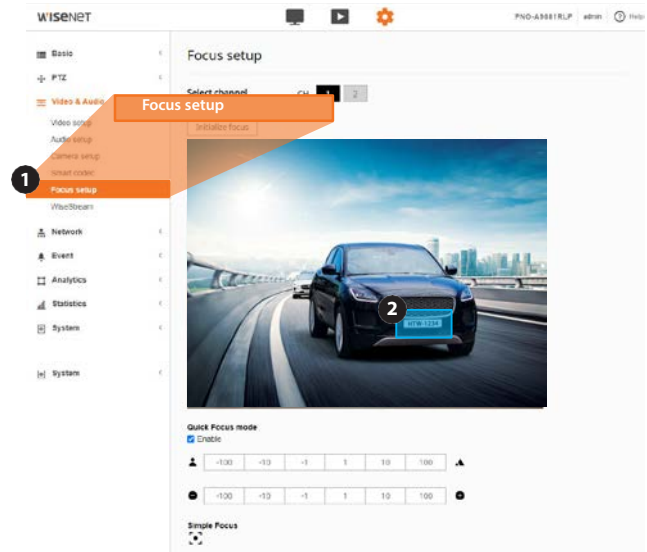
#### NOTE:

*The PNB-A9001LP should be focused according to the manual varifocal lens controls. Simple focus can be activated for fine tuning.*

*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.*

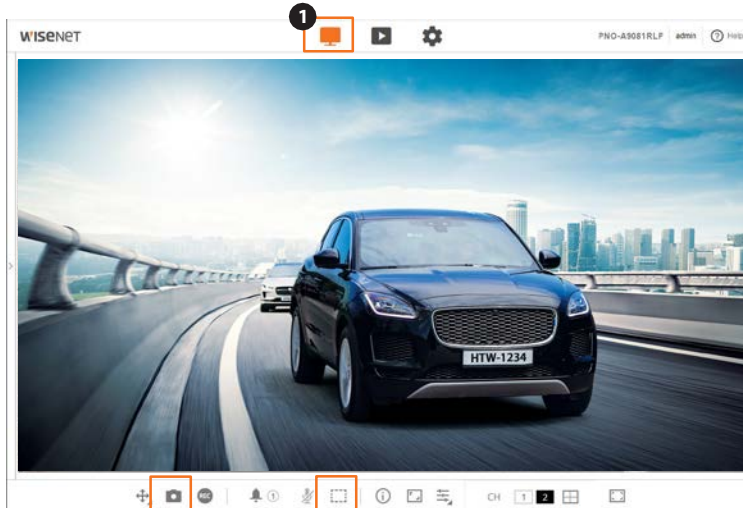
- 130 – 250 pixels for US plates without stacked symbols (small ones)





### 3.4 To measure pixel width of license/number plate

- 1 Observe vehicles passing across the scene. Use the snapshot or pixel counter tools in the web viewer Live page as needed.



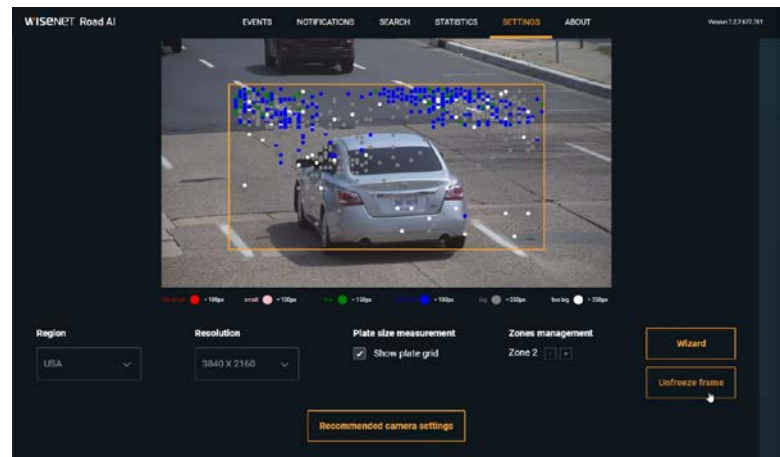
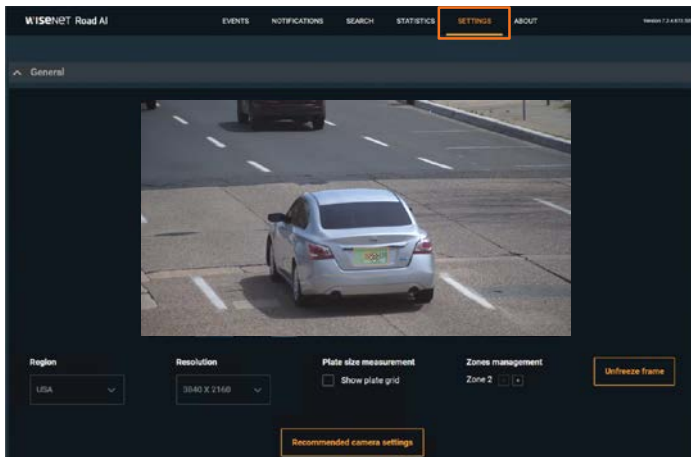
### 3.4 (Continued)

2 Use **Plate Grid** tool in the **Settings** tab of WisenetRoadAI to display a license plate minimum/maximum overlay as well as a protractor to measure rotation. The **Freeze Frame** will stop the camera movement for inspection of the image.

The **Wizard** will show a color-coded overlay of plate reads indicating if the plates are sized correctly. 100 cars must pass by for the results to be displayed. Adjust the camera field of view and/or settings accordingly.

3 You can apply the recommended camera image adjustment settings with the **Recommended Camera Settings** button.

4 Use **Zone Management** to draw up to 2 regions that plates will be read in, to prevent false reads from signs, etc. The default zone does not cover the entire Field of View. It is recommended to check the zone and modify as needed.



### 3.5 Observing PROPER Installation

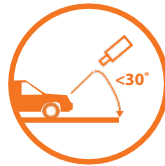
#### SCENE REQUIREMENTS:



License plate is more than 130px in width



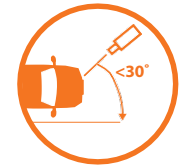
License plate is readable



Vertical angle is less than  $30^\circ$



Tilt angle is less than  $5^\circ$



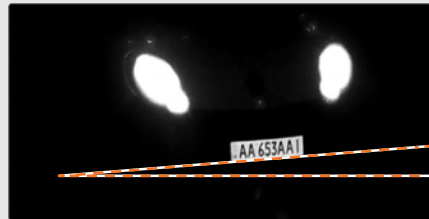
Horizontal angle is less than  $30^\circ$

**Fig. 1**  
Daytime



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

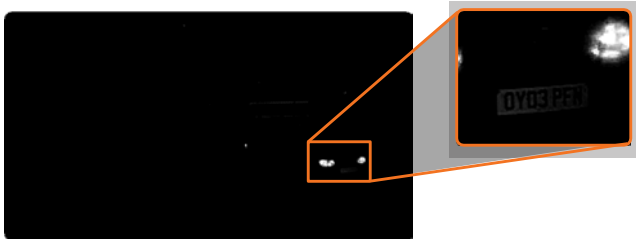
**Fig. 2**  
Night time



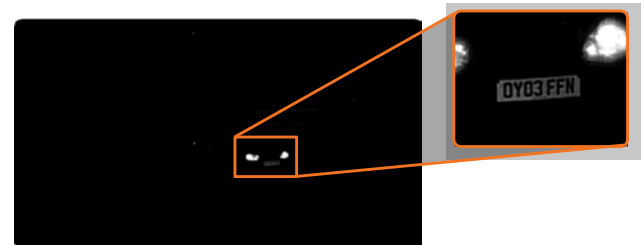
- good proportion to the frame width
- perfect IR power
- sufficient contrast
- critical yet acceptable tilt angle

### 3.5 (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 lit 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 lighting is.

Also in this particular case 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 (Continued)

### Exposure faults



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

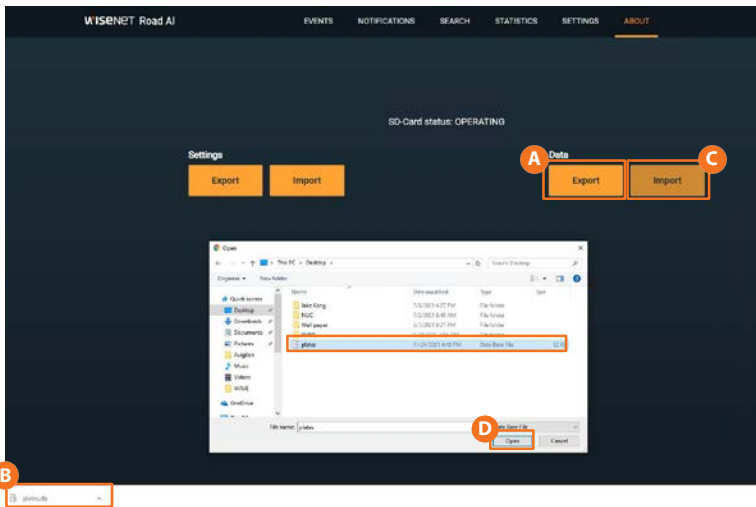


Insufficient light. Adjust exposure settings or provide additional lighting.

### 3.6 (Continued)

#### DB Export & Import

Go to Wisenet Road AI application tab and select **ABOUT** from the pull down menu.



Select **A** to export current stored DB to another place in connected PC. It is highly recommended to export DB after all of settings have been finalized.

**B** Check the file to be downloaded

Select **C** to import DB and select **D** for the place that DB is placed.

## Installation Worksheet



To ensure proper deployment within specifications, please use this worksheet to record the system details. When working with Technical Support or Field Engineering, please have these values available.

Form Factor \_\_\_\_\_

Color/Black & White or Forced Black & White \_\_\_\_\_

Forward Distance from Camera to Plate \_\_\_\_\_

Camera Offset \_\_\_\_\_

Installation Height \_\_\_\_\_

Number of Lanes \_\_\_\_\_

Lane Width \_\_\_\_\_



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