

TURING

Turing Vision

LPR Camera Optimization Guidelines

September 2023



Image Settings for License Plate Recognition Performance

- **Exposure Settings:**
 - Set "Exposure Mode" to "Custom" or "Low Motion Blur"
 - Set "Shutter(s)" within the range of 1/10000 to 1/100 seconds when selected "Custom" mode
- **Gain:** Set to be between 0 to 10 under "Custom" mode
- **HLC Intensity:** Recommend value "8", adjust based on specific lighting conditions
- **Turn Off Wide Dynamic Range (WDR):** Select the WDR setting and change it to "Off" or "Disabled"
- **Enable IR Mode:**
 - Turn on "Smart Illumination"
 - Locate the "Illumination Mode" and set it to "Infrared"
 - Set "Control Mode" to "Global Mode" or "Overexposure Restrain"
- **Focus Mode:** Select "One-Click Focus (IR)"

Video Settings for License Plate Recognition Performance

- **Bit-Rate Settings:**
 - Enable the "Sub Stream" option:
 - Set the minimum bit rate (Kbps) to 2048
 - Set the image quality to "High"
 - Select Bitrate Type: CBR (Constant Bit Rate) vs. VBR (Variable Bit Rate)
 - VBR offers better overall video quality as it dynamically adjusts data used for each frame. VBR may exceed set max bitrate during complex scenes, which can result in dropped frames or buffering.
 - CBR maintains the same bitrate regardless of the scene complexity, which may result in lower quality for complex scenes.
- **Increase Frame Rate:** Set the frame rate to a higher value, such as 30 FPS
- **Region of Interest (ROI):**
 - Find "Set up detection area(s)"
 - Set the region to focus on the area where license plates will be most visible
 - Make sure the selected region is as minimal as possible to avoid unnecessary distractions or false detections

Camera Position and External Light Source

- **Camera Height:**

- Keep the camera at least 5 feet high to minimize potential obstructions

- **Field of View:**

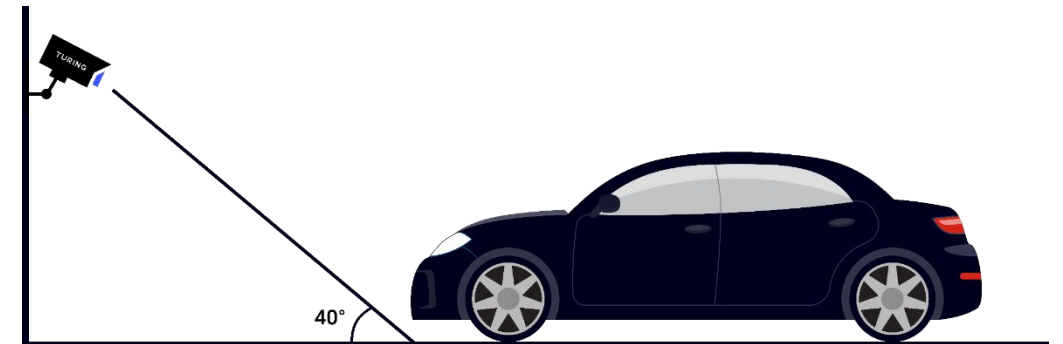
- Typically requires a horizontal field of view between 30°-60° to capture entire license plate as vehicles pass by

- **Lighting Conditions:**

- If additional lighting is required, place an external light source as close to the camera as possible
- Using smart events may result in decreased performance

- **Camera Angle:**

- No mandatory requirements for the angle, please adjust it according to the scene
- To avoid reflections and direct light contact with headlights, please ensure that the camera is angled downwards by at least 5 degrees
- It is recommended that the camera angle should not exceed 40 degrees downwards



LPR (License Plate Recognition) Mode

- **LPR mode is specifically designed to enhance the recognition and capture of license plates:**
 - Utilizes a fixed focus and night-time setting to ensure clear and consistent capturing of license plate details, regardless of the time of day
 - Resolves the issue of focus inconsistency between daytime and infrared (IR) mode
 - Operating in LPR mode, the image will be displayed in black and white, which may impact the recognition of certain human and vehicle attributes
- **Enable the LPR mode:**
 - Set up the camera to Night mode:
 - Go to the camera settings menu, and select "Image → Image → Exposure"
 - Locate "Exposure-Day/Night Mode" in the list
 - From the options, select "Night"
 - Adjust the shutter speed for high-speed vehicles:
 - Go to the camera settings menu, and select "Image → Image → Exposure"
 - Find the "Exposure Mode" and set it to "Custom"
 - Locate "Shutter(s)" and adjust the range to "1/100000 ~ 1/100000"

LPR (License Plate Recognition) Mode (Continued)

- **Enable the LPR mode (Continued):**
 - Set up the gain:
 - Still in the "Image → Image → Exposure" menu
 - Find "Gain(dB)" and adjust the upper bound to a suitable value between "0~15"
 - The exact value will depend on the specific conditions - if the license plate is too dark, a higher value might be needed; if the license plate is too bright, a lower value should be used
 - Set up the camera focus to be fixed:
 - Go to the camera settings menu, and select "Image → Image → Focus"
 - Locate "Focus-Focus Mode" in the list
 - Select "One-click Focus(Locked)" from the available options
 - Setup for high-speed vehicles:
 - Select high-contrast area within frame, e.g. road markings or object edges, for sharper image creation
 - Ensure the focus point is at an appropriate distance
 - It's important to validate at night whether the camera can effectively focus on license plates
 - Test and adjust the settings in real-world conditions to find the optimal configuration for your specific LPR application

LPR (License Plate Recognition) Mode (Continued)

Smart Illumination

Smart Illumination ☐ Off ☒ On

Illumination Mode

Control Mode

Near-illumination Lev...

Far-illumination Level

Image Enhancement

Brightness Sharpness

Saturation Noise Reduction

Contrast Image Rotation

Exposure

Exposure Mode

Shutter(s) ~

Gain(dB) ~

Slow Shutter ☒ Off ☐ On

Slowest Shutter

Compensation

Day/Night Mode

Day/Night Sensitivity

Day/Night Switching(s)

WDR

WDR Level

White Balance

Advanced

Turing Camera suggested distance for LPR

Turing LPR recognition works with minimum of 100 PPF (Pixel per foot).

Distance longer than the recommended value will lead to missing events or false recognitions.

Focus distance	Recommended maximum Object distance
2.8 mm	19 ft
4 mm	25 ft
12 mm	68 ft
13.5 mm	76 ft
50 mm	280 ft

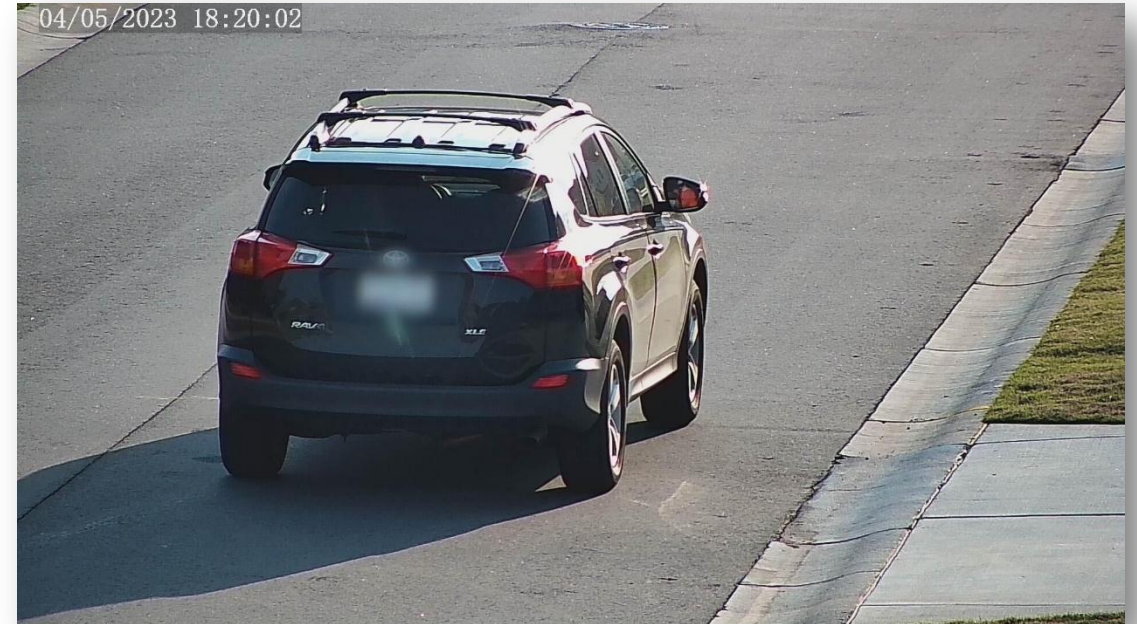
Turing Camera suggested distance for vehicle attribute

Turing vehicle attribute recognition works with minimum of 50 PPF (Pixel per foot).

Distance longer than the recommended value will lead to missing events or false recognitions.

Focus distance	Recommended maximum Object distance
2.8 mm	38 ft
4 mm	50 ft
12 mm	136 ft
13.5 mm	153 ft
50 mm	560 ft

Examples of Optimal Positions for LPR Detection



Examples of Video-Based LPR at Night

