Verkada

User Guide for License Plate Recognition

Overview

Verkada's License Plate Recognition (LPR) is a powerful feature that utilizes artificial intelligence and computer vision technology to identify and record license plate images in near real time, even in challenging conditions such as high speeds and poor lighting. The captured plate number is instantly displayed on the screen and can be easily searched and accessed, with the option to connect to live or recorded video for added context. With this information, organizations can set up automated alerts and streamline vehicle investigations.

To ensure optimal performance and security, LPR uses security cameras with edge-based processing, and all computation takes place on the camera itself. This minimizes the impact on bandwidth (<200 kbps at rest) and ensures that all data, including video, images, and license plate information, is encrypted both in-transit (AES 128) and at rest (AES 256).

To use LPR, no additional software licenses or hardware is required. This guide will provide an overview of key use cases, the user experience, as well as installation guidance to deliver the best performance of the system.

Responsible Use

License Plate Recognition (LPR) technologies are used to automatically identify and record the license plate numbers of vehicles. These technologies can be used to observe the movements of individual vehicles and the people driving them, so it's important that you check with any laws and regulations that apply to your use of the technology to make sure you comply with those laws.

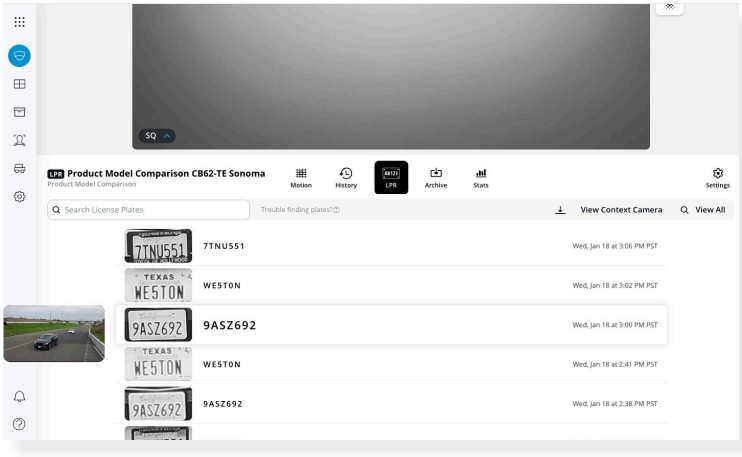
Compatible Cameras

Verkada Bullet cameras are the only models that support LPR. The Telephoto Bullets, specifically designed for capturing license plates from far away, have two options: the CB52-TE with a resolution of 5MP and the CB62-TE with a resolution of 4K. The Wide-angle Bullets can also support LPR but at shorter distances and have two options: the CB52-E with a resolution of 5MP and the CB62-E with a resolution of 4K. Users also have the option to use a dual-camera system with an additional context camera for capturing the entire vehicle and surroundings. Any Verkada camera can be used as a context camera.

Key Features

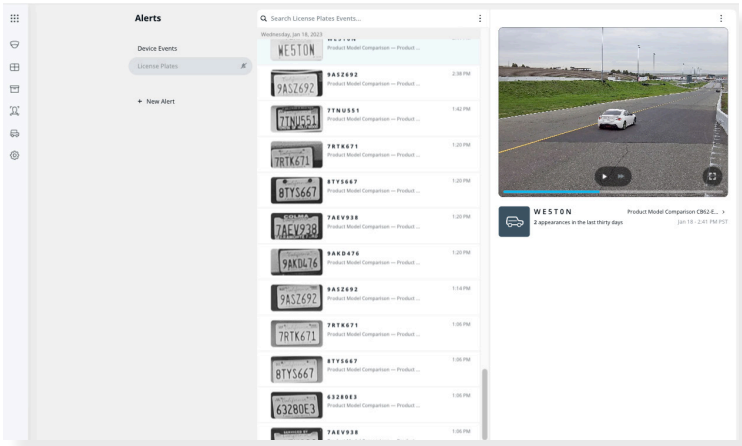
Investigate License Plates of Interest:

LPR can be used to quickly search for all historical appearances of a license plate, making it easier to complete investigations for suspect vehicles.



Receive alerts for License Plates of Interest

With Verkada's LPR solution, you can receive License Plate of Interest alerts when a specific license plate is detected at any of your locations. You can also send these notifications to third-party applications through the Verkada Webhooks API.



Exports results via API integrations

Verkada's LPR results can be systematically exported to third party systems leveraging our API integrations. This allows customers to run custom business reports or integrate with other critical parts of their security infrastructure.

Key Use Cases

Verkada's LPR solution has been designed to recognize license plates accurately and reliably, even on vehicles traveling at high speeds of up to 80 mph / 128 kph and across multiple lanes.

Gatehouse and entry station security

LPR can be used to monitor vehicle traffic at entry points, ensuring that only authorized vehicles are allowed in.

Drive-through analytics

LPR can be used to capture records of license plates passing through drive-throughs, providing valuable data for vehicle count analytics and business intelligence applications.

Tolling booths

LPR can be used to capture records of all license plates that pass through toll booths or other tolling areas. Together with our APIs, this allows customers to connect our LPR system with third party toll and ticketing management systems.

Frequently Asked Questions

Will first generation bullet cameras provide the same level of license plate recognition (LPR) performance as the current, second-generation models?

No, the second-generation Bullet cameras (CB52-E, CB52-TE, CB62-E, CB62-TE) are equipped with a more advanced system on a chip (SOC) and a dedicated computer vision co-processor that supports an improved LPR algorithm, resulting in better license plate character detection. The second-generation cameras can capture license plates from vehicles traveling at speeds of up to 80 mph / 128 kph, compared to the 25 mph / 40 kph capability of first-generation models (CB51-E, CB51-TE, CB61-E, CB61-TE). Additionally, the second-generation bullet cameras can support LPR across up to three lanes, while the first-generation models can only support a single lane.

Is it possible to use cameras in LPR mode for video security beyond just license plate recognition?

Yes, cameras in LPR mode also operate as regular Verkada security cameras. Cameras in LPR mode are still recording footage 24/7 in adaptive quality. This allows customers to review history, perform motion searches, and create archives. Both security footage and captured license plates will be available for the retention period of the camera.

However, it's worth noting that Verkada's People and Vehicle Analytics features are disabled when the camera is in LPR mode.

Is it necessary to use a Bullet camera as the context camera in a dual-camera LPR setup?

No, any Verkada camera that is not a LPR camera can be used as a context camera in a dual-camera LPR setup. You have the flexibility to choose the camera that best suits your needs and preferences.

What is the function of a context camera and when is it necessary to use one?

When using LPR, it is recommended to focus on 1-3 lanes so that passing vehicles take up most of the frame as they pass through the scene. LPR cameras also operate in the infrared range of the light spectrum instead of visible range. This is because license plates are highly reflective for infrared light and are designed to be read in that spectrum.

A customer may want to also monitor the scene while using LPR cameras. In this case, a context camera can be used to provide a broader view without compromising the LPR's performance. Context cameras are also useful for general security purposes and capturing balanced contrast color footage to better investigate observed vehicles.

When is it necessary to use an external IR illuminator for capturing license plates and what model should I choose?

If the location where license plates will be captured is in a low-light or distant area, it is highly recommended to use an external IR illuminator to enhance the visibility of the license plates. Contact a Verkada Sales Representative for recommendations on which 3rd party product to use.

Is it possible to integrate a Verkada LPR camera into an external system, such as a tolling system?

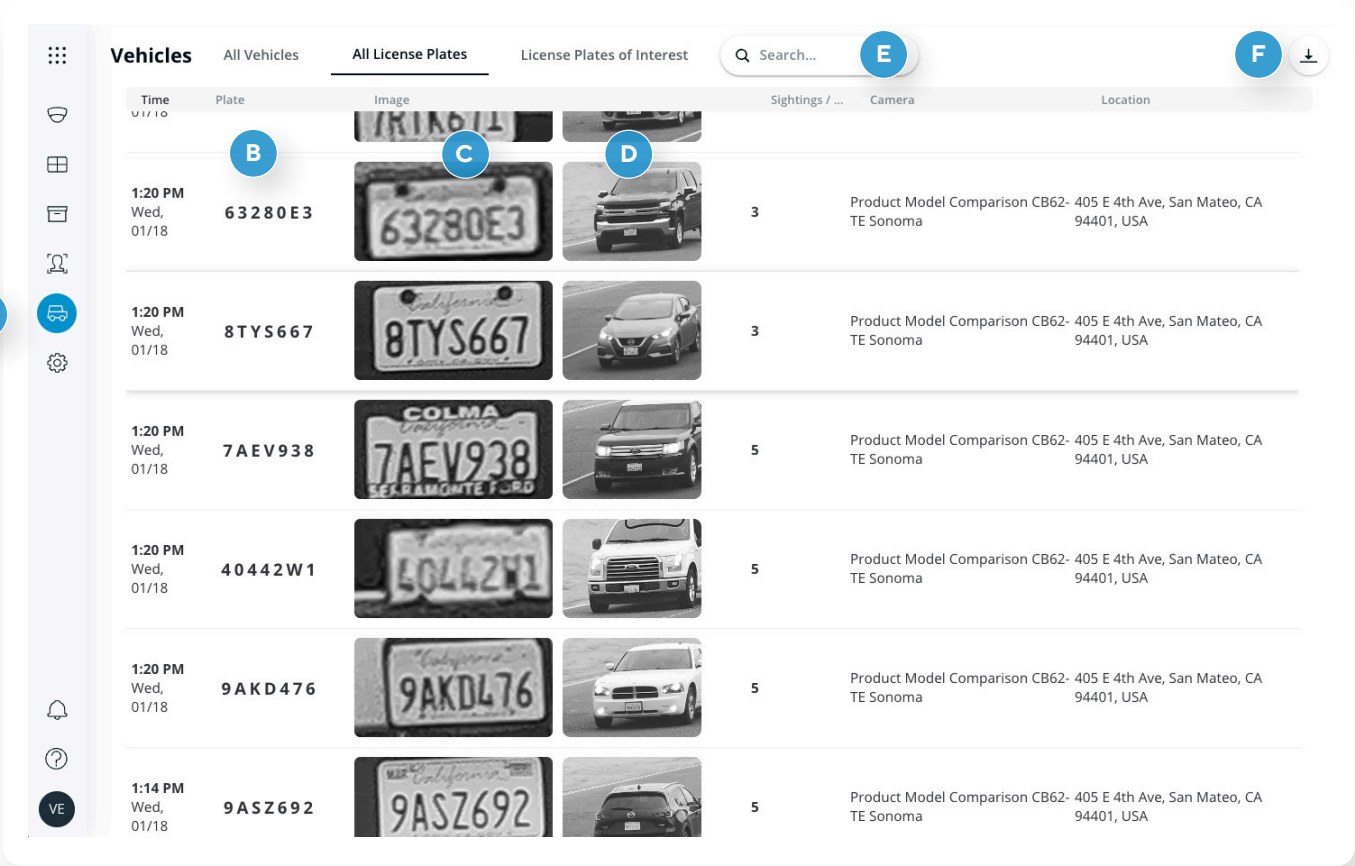
Yes, Verkada offers APIs for accessing license plate data. If you would like to integrate a Verkada LPR camera with an external system, please reach out to our solutions engineering team to see if we can support your specific use case.

What types of license plates are incompatible with Verkada's LPR technology?

Our LPR system is only designed to recognize license plates with Latin characters and does not support license plates with three or fewer characters.

LPR Page in Command

Using Command, Verkada's web-based management platform, users can access their LPR cameras and view real-time and historical footage of vehicles.



A Accessing LPR from Command

B Translated license plate

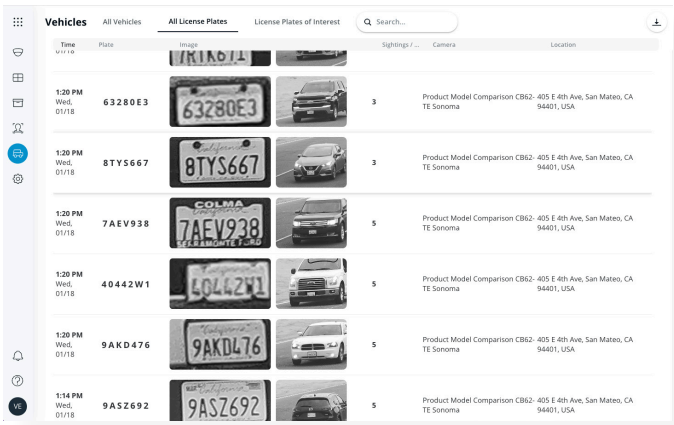
C Plate sightings

D Context camera feed

E License plate search

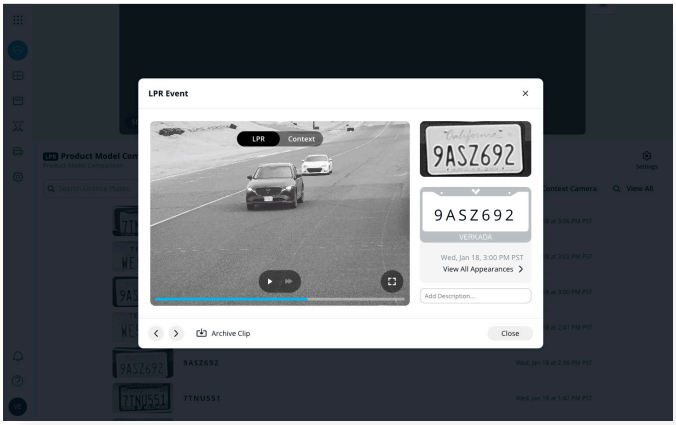
F CSV export

User Experience



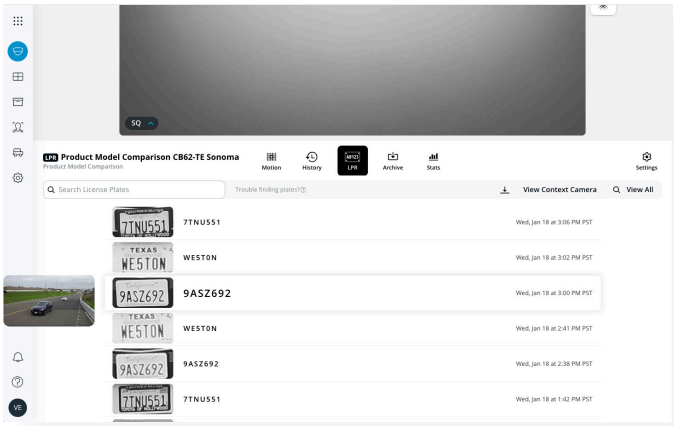
Monitor in real-time

View live plate detection across your organization from the LPR page in Command



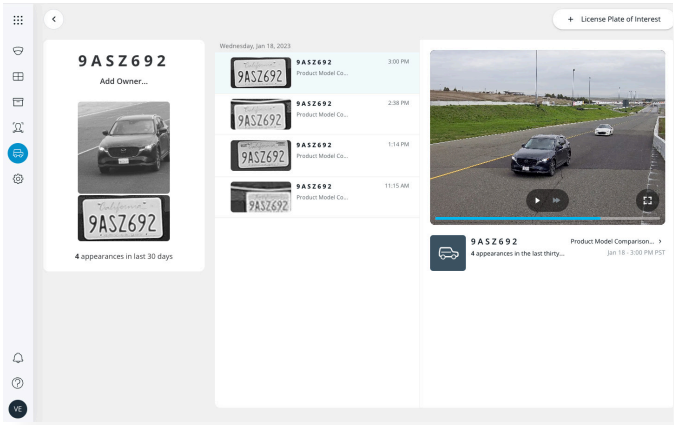
Switch viewing modes

Toggle between LPR and context views



Search plates

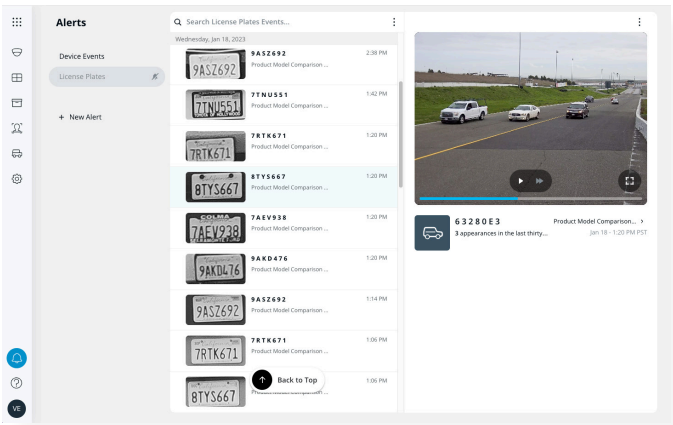
LPR Cameras detect and read plates, making them searchable



Investigate events

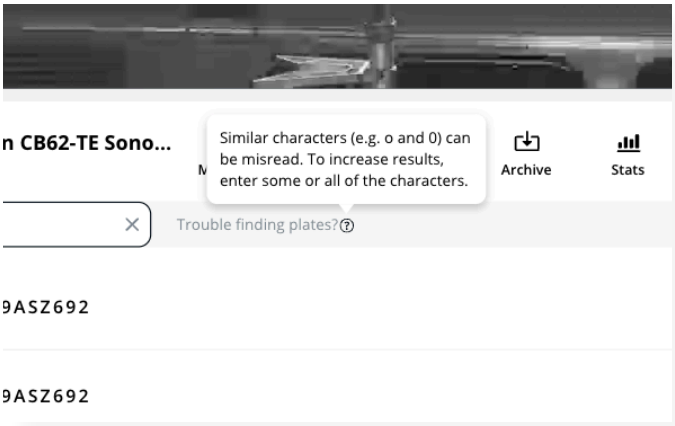
See how events unfold and access archived footage from the LPR page

User Experience



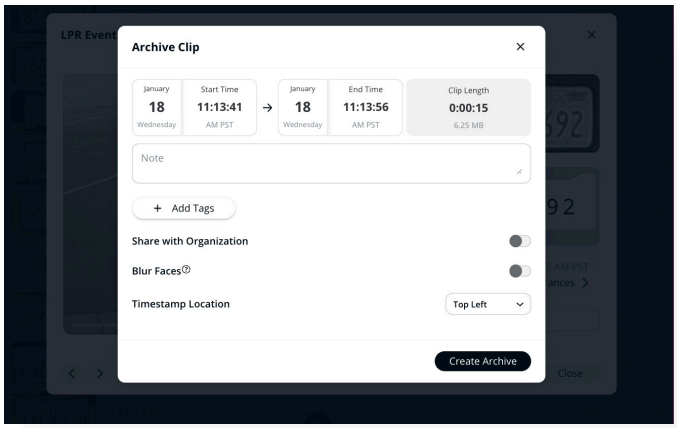
Get alerts

Get notified when a specific plate is detected at any of your locations



Expand results

Get more comprehensive search results through approximate license plate matches



Archive footage

Archive clips, add descriptions and view all appearances of the plate

1/18/2023 1:20:24 PM	7AEV938		Product Model Comparison	Product Model Comparison CB62-TE Sonor
1/18/2023 1:20:23 PM	40442W1		Product Model Comparison	Product Model Comparison CB62-TE Sonor
1/18/2023 1:20:23 PM	9AKD476		Product Model Comparison	Product Model Comparison CB62-TE Sonor
1/18/2023 1:14:48 PM	9ASZ692		Product Model Comparison	Product Model Comparison CB62-TE Sonor
1/18/2023 1:06:28 PM	7RTK671		Product Model Comparison	Product Model Comparison CB62-TE Sonor
1/18/2023 1:06:26 PM	8TYS667		Product Model Comparison	Product Model Comparison CB62-TE Sonor
1/18/2023 1:06:24 PM	7AEV938		Product Model Comparison	Product Model Comparison CB62-TE Sonor
1/18/2023 1:06:24 PM	9AKD476		Product Model Comparison	Product Model Comparison CB62-TE Sonor
1/18/2023 1:06:24 PM	40442W1		Product Model Comparison	Product Model Comparison CB62-TE Sonor
1/18/2023 12:58:07 PM	7RTK671		Product Model Comparison	Product Model Comparison CB62-TE Sonor
1/18/2023 12:58:04 PM	8TYS667		Product Model Comparison	Product Model Comparison CB62-TE Sonor
1/18/2023 12:58:03 PM	40442W1		Product Model Comparison	Product Model Comparison CB62-TE Sonor
1/18/2023 12:58:02 PM	7AEV938		Product Model Comparison	Product Model Comparison CB62-TE Sonor
1/18/2023 12:58:02 PM	9AKD476		Product Model Comparison	Product Model Comparison CB62-TE Sonor
1/18/2023 12:46:26 PM	40442W1		Product Model Comparison	Product Model Comparison CB62-TE Sonor
1/18/2023 12:46:22 PM	9AKD476		Product Model Comparison	Product Model Comparison CB62-TE Sonor
1/18/2023 12:46:21 PM	7AEV938		Product Model Comparison	Product Model Comparison CB62-TE Sonor
1/18/2023 12:42:29 PM	40442W1		Product Model Comparison	Product Model Comparison CB62-TE Sonor

Export results

Create custom reports or integrate with other security systems via API

Installation Guidance

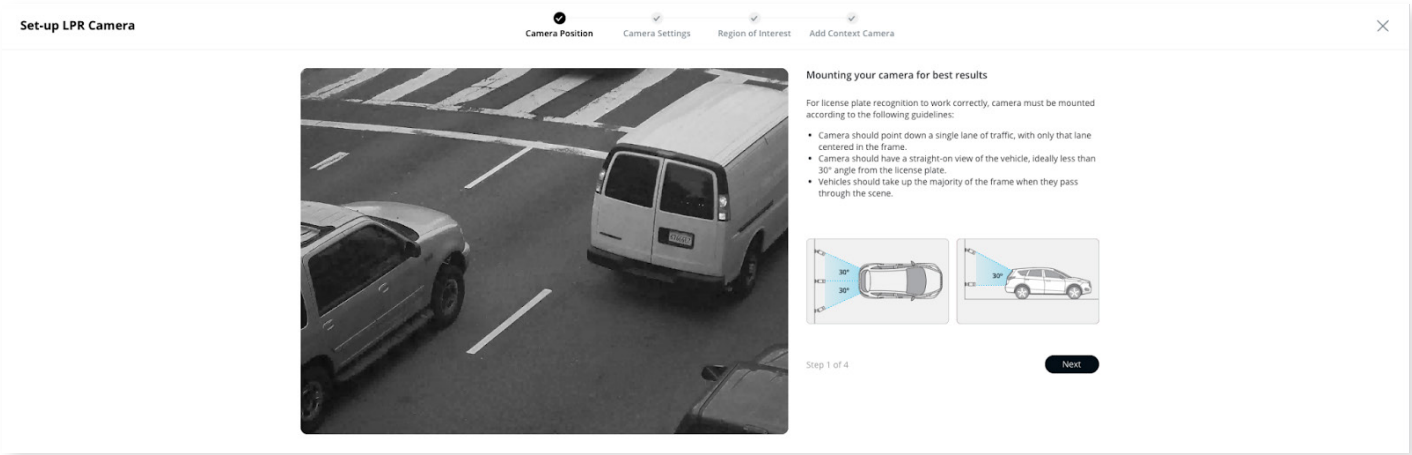
Before installing your LPR Camera, consider the following:

- To ensure optimal license plate detection with the CB52-TE and CB62-TE cameras, it is recommended that vehicles be within 35m / 115ft of the camera. However, it is possible to detect license plate details from up to 50m / 164ft away or further.
- To ensure optimal license plate detection with the CB52-E and CB62-E cameras, it is recommended that vehicles be within 14m / 46ft of the camera. However, it is possible to detect license plate details from up to 20m / 66ft away or further.
- If the area where license plates will be captured is far away and not well lit, it is strongly recommended to use an external IR illuminator to improve the visibility of the license plates.

To install your LPR camera, follow these steps:

1. Position the camera:

- Position the camera with the black underside facing downwards. Ensure the camera is not rotated at 90°, 180°, or 270°.
- Aim the camera towards the desired traffic area, such as a garage entrance or drive-through lane. CB62-E/TE and CB52-E/TE cameras have the ability to monitor up to 3 lanes, while CB61-E/TE and CB51-E/TE cameras can monitor one lane.
- For optimal results, position the camera so that it has a direct, unobstructed view of the vehicle with an angle of less than 30° vertically or horizontally from the license plate. It is acceptable to have a larger angle for lower speeds (e.g. 45° for parking lot deployments) and recommended to have a smaller angle for fast speeds (e.g. 15° for highway deployments). The camera may still be able to capture adequate images outside of these angles, but with a lesser degree of accuracy.
- Avoid installing the camera at a parallel angle to the horizon facing east or west, as the glare of a sunrise or sunset may obstruct the ability to capture license plate details.
- If changing lighting conditions cause overexposure of the license plate, use the exposure slider to fix it. Overexposure may impact the camera's ability to accurately capture license plate details.



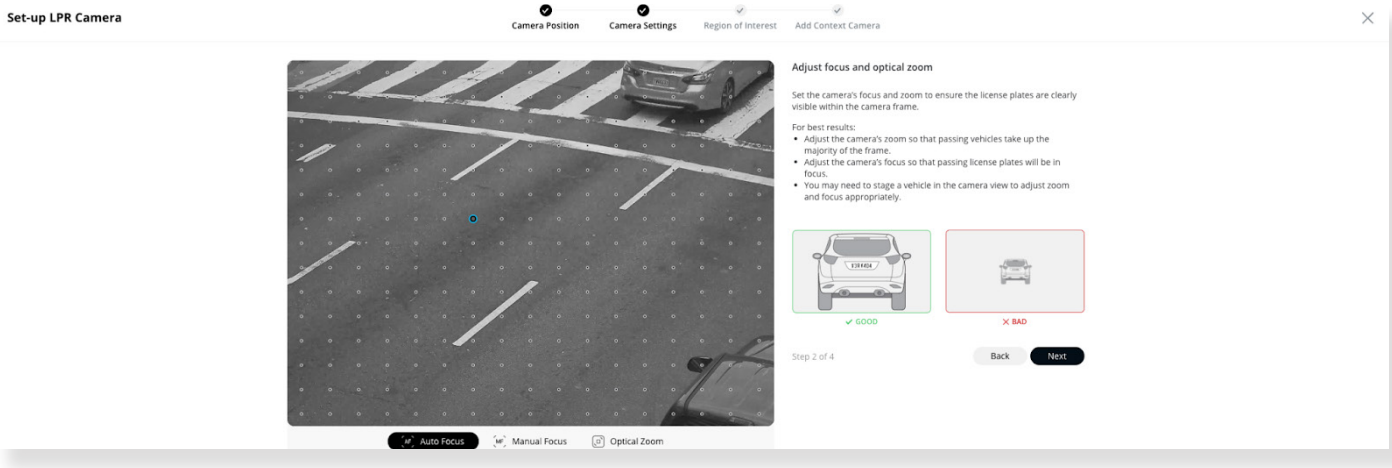
Balanced exposure

Overexposure

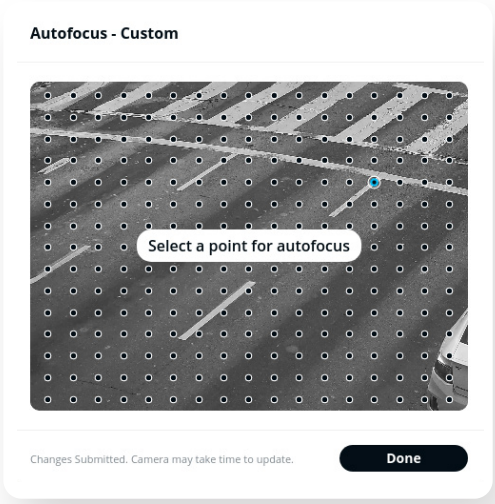
Installation Guidance

2. Adjust the focus and zoom:

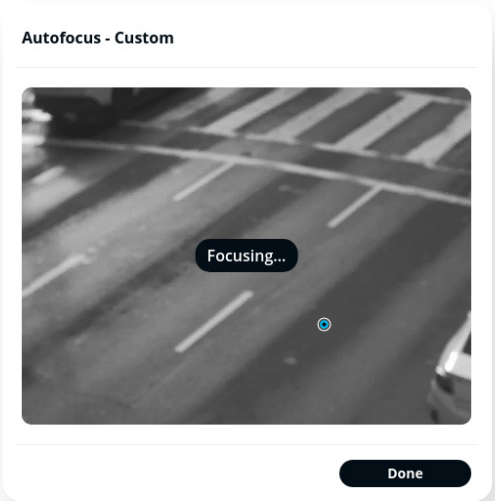
- Use the built-in focus and optical zoom features to adjust the camera's field of view so that passing vehicles take up most of the frame as they pass through the scene.
- Ensure that the license plates of passing vehicles are in focus as they move into the scene.
- To get the best focus when using autofocus, consider these tips:
  a. Choose a point in the frame with high contrast. Edges of objects or lines usually have pronounced light and dark areas, which can help achieve a sharper image.
  b. Make sure the focus point is at an appropriate distance, such as the distance at which you will be capturing license plate details.



Good focus point



Poor focus point



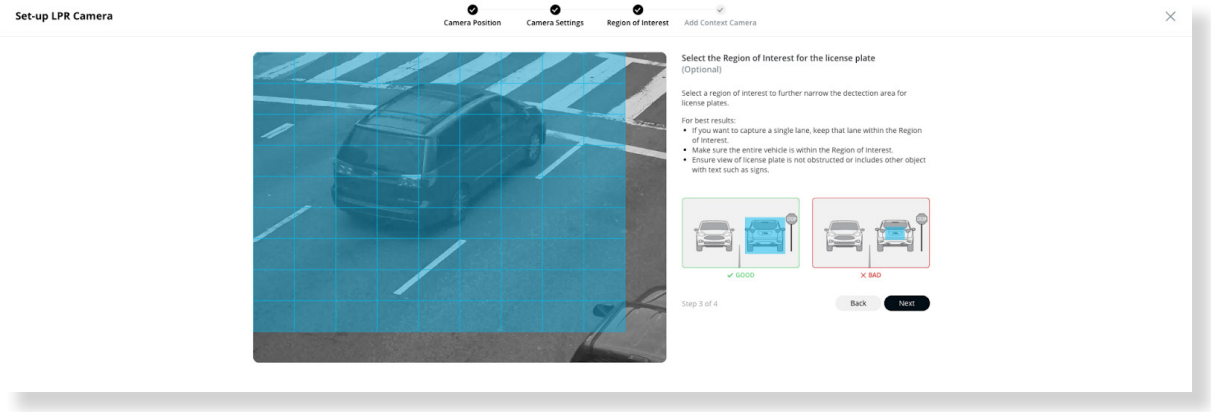
Installation Guidance

3. Optional step: select the region of interest for the license plate:

- Using the grid, highlight the area where license plates are most likely to pass.
- The highlighted area should be as large as possible and should not be obstructed or include other objects with text, such as road signs or construction signs. If the highlighted area includes road signs, use the privacy regions feature to block them out.

This step is necessary in the following situations:

1. The user wants to only perform LPR on certain lanes or regions.
2. The user wants to remove distractions such as the footpath, but does not want to use the privacy region feature.
3. The camera is installed at an almost parallel angle to the horizon, and the user wants to focus on license plates that are closer to the camera rather than those further away.

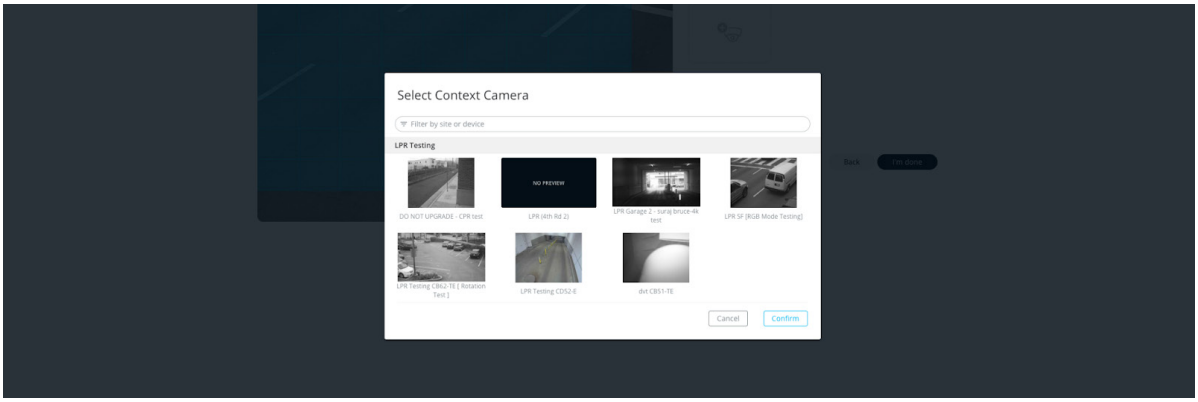


4. Optional step: add a context camera:

- Select a nearby context camera to capture a wider field of view and provide more detail around vehicle events. The context camera should be looking at the same region as the LPR camera, so that the footage for both cameras can be synced.

This step is necessary in the following situations:

1. The user wants to use Vehicle Analytics features.
2. The user wants to capture a wider view and color footage of the area being observed by the LPR camera.

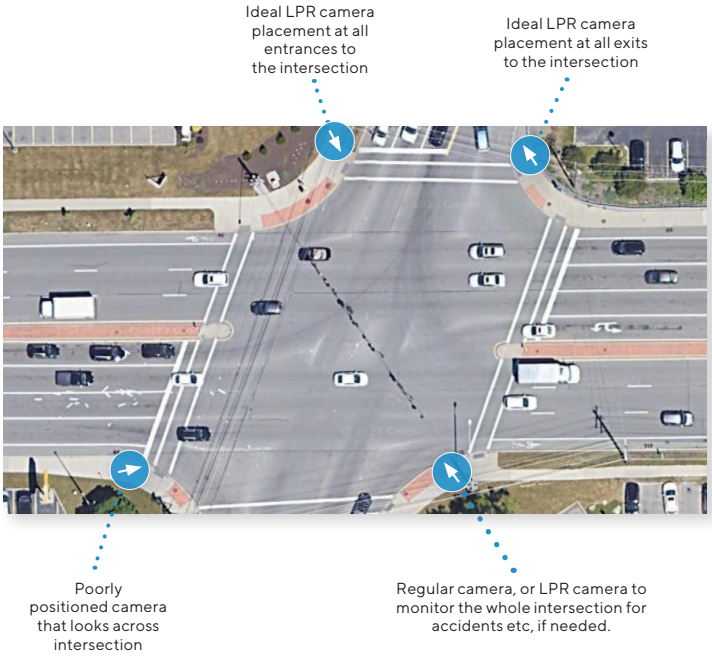


Note that even if Verkada LPR cameras are not installed in the best way, they may still be able to capture license plate details accurately. While these installation instructions are intended to help you get the most comprehensive and clear results, it is still possible to achieve high-quality results even if you are unable to follow these recommendations exactly.

Use Case Specific Considerations

Intersections

- Place LPR cameras at all entrances or exits to the intersection. Position the cameras to observe the lanes near the corner where the camera is installed, rather than across the intersection to capture plates on the opposite side.
- It is recommended to point the cameras towards the back license plates, as some jurisdictions do not require vehicles to have front plates.
- Verkada's solution only requires four LPR cameras per intersection, as they can cover up to three lanes. Other solutions may require one camera per lane, potentially requiring up to 12 or more cameras.



Highways

- To get the most accurate results for high-speed vehicle observations (e.g. 80-128 km/h or 50-80 mph), it is best to have head-on shots of the license plates. To achieve this, it is recommended to install the camera at a smaller angle (e.g. 15°) that is more parallel to the road.
- For the best results, mount the camera at a point where the license plates are unlikely to be occluded by other vehicles or details in the scene. For example, a camera mounted on an overpass or highway sign should have clear visibility across all lanes. A camera mounted on the side of the highway at a low angle may occasionally miss a vehicle if another vehicle in a closer lane causes occlusion.

Parking lots

- If you expect a lot of parked cars in the scene and cannot zoom in further, set the region of interest along the driving paths and try to exclude the parking spots where cars remain stationary.

Enabling LPR Mode

To enable LPR on your telephoto Bullet camera, follow these steps:
1. Navigate to the designated LPR page.
2. Click the "Info" tab.
3. Click on "Settings."
4. Click on "Device."
5. Toggle on "LPR Mode."

Please note that enabling LPR mode will initiate a firmware update that could take up to five minutes to complete.

Examples of Good LPR Results

7TNU551

WE5T0N

9ASZ692
Nascar Driver

WE5T0N

9ASZ692
Nascar Driver

9AKD476

40442W1

7RTK671

8TYS667

63280E3

Availability by Country

Verkada's LPR solution has been tested and is currently recommended for use in the following countries.

Jurisdiction	License Plate Recognition	License Plate of Interest alerts
United States	X	X
United Kingdom	X	X
Australia	X	X
Ireland	X	X
European Union	X	X

Ordering Information

Telephoto Bullet cameras

Product Name	Maximum SQ Onboard Retention[1]	Model Number	Cost (MSRP) USD
CB52-TE	30 Days	CB52-256TE-HW	$1,499
	60 Days	CB52-512TE-HW	$1,899
	90 Days	CB52-768TE-HW	$2,299
	365 Days	CB52-2TBTE-HW	$3,699
CB62-TE	30 Days	CB62-512TE-HW	$1,899
	60 Days	CB62-1TBTE-HW	$2,799
	90 Days	CB62-2TBTE-HW	$3,699

Wide-angle Bullet cameras

Product Name	Maximum SQ Onboard Retention[1]	Model Number	Cost (MSRP) USD
CB52-E	30 Days	CB52-256E-HW	$1,399
	60 Days	CB52-512E-HW	$1,799
	90 Days	CB52-768E-HW	$2,199
	365 Days	CB52-2TBE-HW	$3,599
CB62-E	30 Days	CB62-512E-HW	$1,799
	60 Days	CB62-1TBE-HW	$2,699
	90 Days	CB62-2TBE-HW	$3,599

1. All our cameras record in "adaptive quality," capturing both standard and high quality streams. Standard quality (SQ) video is stored up to the amount of retention specified by the customer. The amount of high quality video stored on the camera will depend on the amount of motion detected by the camera over time. To learn more, visit our website: https://www.verkada.com/blog/recording-in-adaptive-quality/