

# IndigoVision's LPR powered by InnoWare

## Camera Positioning Guide

### Table of Contents

Introduction .....	2
Vehicle access control applications .....	2
Free flowing vehicle applications.....	3

# How to position your camera for LPR

## Introduction

Careful camera placement is critical for optimal performance of License Plate Recognition applications. In simplest terms, the camera must be positioned in such a way that it can repetitively capture good images of the license plates of vehicles passing by or approaching.

Recommendations differ according to whether the LPR is being used for vehicle access control or free flowing traffic applications.

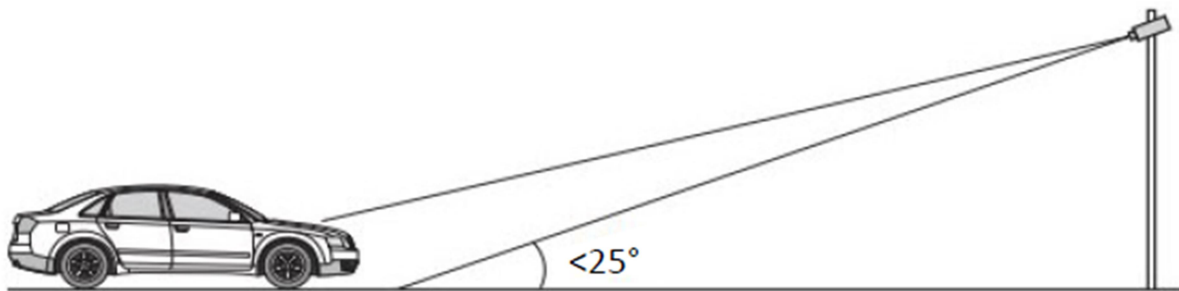
## Vehicle access control applications

The theoretical ideal situation would be to position the LPR camera directly in front of the approaching object – obviously this is not possible in practise as a camera cannot be placed in the middle of a lane of traffic, and also there would likely be disturbance from oncoming headlights. Therefore the camera will usually be placed to the side and somewhat higher than the oncoming vehicles, creating a horizontal and vertical angle between the camera and the license plate to be read.

Theoretical limitations are as follows: an access control LPR camera should be positioned in such a way that the horizontal angle of the camera does not exceed  $40^\circ$  and the vertical (tilt) angle does not exceed  $50^\circ$ .

**In practice it is advised to limit the horizontal angle to  $15^\circ$  and the vertical angle to  $25^\circ$**

Vertical positioning of the camera:



Horizontal positioning of the camera:



Note: whilst the illustrations above show a car, IndigoVision's LPR powered by InnoWare can detect plates on most moving vehicles (car, truck, trailer etc.)

## Considerations

- Always keep motion blur effects in mind.
- Place your camera in such a way that it can capture the plate of every vehicle even when they are queuing.
- Set your camera's shutter speed in such a way that, for the given circumstances, multiple consecutive images of the objects are equally sharp even during motion.
- Note that the above angles are theoretical maxima. In practice it is advisable to locate an access control LPR camera as close to the lane as possible at a height of around 2m.

## Advice

For vehicle access control LPR cameras, IndigoVision recommends the following:

- Place your camera about 1m (3.3 ft) to the side of the lane
- Place your camera at about 2m (6.5 ft) height
- Place your camera about 6m (20 ft) from the detection zone
- Choose a lens that provides at least 24 pixels plate height in the image (approx. 300 px/m for "standard" European license plates, 400 px/m for small license plates like front Italian plates)

## Free flowing vehicle applications

In "free flow" environments, vehicles move at much higher speeds. For reliable License Plate Recognition, the camera should be positioned at a height / vertical angle that allows it to capture the plates of every object whilst also being able to capture at least 5 consecutive sharp frames of each object, each frame showing a sufficiently large character size (24 to 50 pixels plate height).

It is recommended to position the camera directly above the lane, or if this is not possible then as close to the side of the lane as possible.

### Advice:

For free flow LPR applications, IndigoVision recommends the following:

When positioned above the lane:

- Place your camera at a height of about 5m (16 ft)
- Place your camera about 15m to 20m (49 – 65 ft) from the detection zone.
- Place your camera at an angle of about 15° to 20°.
- Choose a camera / lens combination that provides between 24 and 50 pixels plate height in the image (approx. 300 px/m for "standard" European license plates, 400 px/m for small license plates, like the front Italian plates)
- Choose a camera / lens combination with the appropriate depth of view (about 12m to capture 5 frames of an object moving at 200kph with a 25fps camera)

When positioned alongside the lane:

- Place your camera at about 3m (10 ft) height
- Place your camera about 1m (3.3 ft) to the side of the lane
- Place your camera about 15m to 20m (49 to 65 ft) from the detection zone
- Place your camera at an angle of about 5° to 10°.
- Choose a camera / lens combination that provides between 24 and 50 pixels plate height in the image
- Choose a camera / lens combination with the appropriate depth of view (about 12m to capture 5 frames of an object moving at 200kph with a 25fps camera)