

## Idesco EPC 2.0

### User Manual for vehicle identification



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## 1. Introduction

In long-range applications, transponder type, readers' and transponders' respective positioning – and especially unique features of the installation environment – all will impact performance. Each contributes significantly to read range and therefore your application's functional reliability.

In the following we list some aspects for optimal positioning of Idesco EPC 2.0 long range readers and tags, how to identify important features in an installation environment and gauge your readers' emission patterns for vehicle identification (AVI) applications.

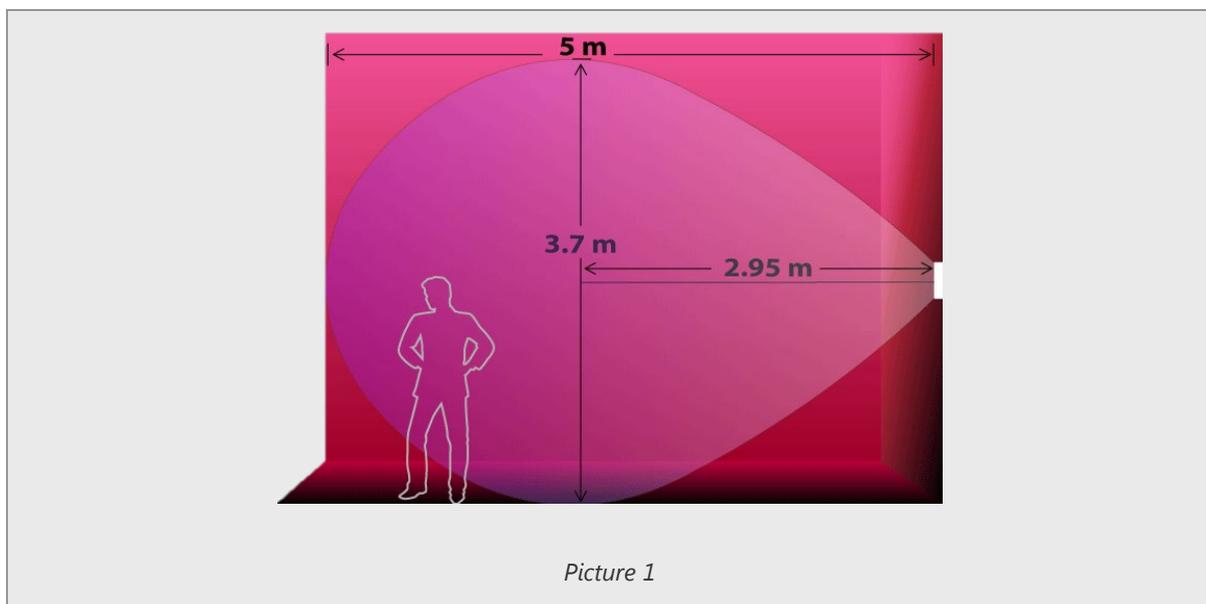
## 2. Reader and transponder (tag) Factors

- A yellow LED in Idesco EPC 2.0 will flash to report a successful reading event. This function is helpful during initial testing after installation.
- Note: EPC Windshield Label tags function properly only when installed on glass or plastic surfaces
- If Handheld or cardboard-mounted, these label tags only reply reliably during testing at distances up to ~1,5 meters
- Only hold tags by their edges – holding the tag in its middle may disturb the antenna operation.
- Note: numerous radio-reflective surfaces can heavily impact performance. Allow for extended testing to identify optimal reader site in such reflective environments.
  - Reflections may also distort or skew the reliable reading area
  - Reflections can have positive or negative effects on the shape of a reading zone and its distance
  - Metal surfaces give the strongest reflection, but other materials can also cause them.

## 3. Emission Patterns – readers and transponders

- Idesco EPC 2.0 readers emits radio waves outward in the shape of a cone.
  - The beam cone expands outward, vertically and horizontally, at an angle of 65° off of the plane of the reader.
- A reader's antenna only transmits effectively forward.
  - Backward and side scatter emission is so weak that reliable reading at those angles is less than 1 meter. Environmental reflections at a site sometimes give better results but they are only due to those reflections and not a reader's emission pattern.
- Transactions occur when this pattern overlaps with the EPC Windshield Label tag, lending the chip enough power to reply to the reader.

- EPC Windshield Labels reply with emissions in 360 degrees around their axes; amplitude is strongest perpendicular to the tag axis.
  - At angles radiating parallel around a tag's axis and away from the Idesco EPC 2.0 reader, the strength of the tag's reply gets progressively weaker, until a tag's reply emission effectively disappears.
  - Because of this pattern, Idesco EPC 2.0 reader installed above a lane reads horizontally-installed tags more reliably than if it's installed on the side of the lane.
- The pattern of 3D Frog Labels is omnidirectional (360 degrees to every direction), so its orientation won't impact reading reliability.



#### 4. Idesco EPC 2.0 Reader Installation

- Your Idesco 2.0 EPC reader will be delivered with an installation set for deployment on wall, ceiling or poles.
- Installation can be made on poles with diameters between 25,5 and 44,5 mm.
- The best deployment location always depends, of course, on the site environment.
- Generally, the best reader location is above a vehicle lane, but not too high. When installing above a lane, place tags horizontally inside windshields, opposite the rearview mirror (picture 3).
- When tags are deployed elsewhere inside a windshield, they still require at least 20 mm. buffer distance between the tag's edge and any other metal surface of the automobile.
- If it's impossible to install your Idesco EPC 2.0 reader above a vehicle lane, install it to the side of it.

- When your Idesco EPC 2.0 reader is installed on the side of a lane, tags must be positioned on the side of windshields, closest to the reader, either upper or lower corners.
- To minimize the horizontal distance between your Idesco 2.0 EPC reader and tags as much as possible, install the reader as close as possible to the lane's edge. This is particularly important for sites that will employ EPC Windshield Labels in horizontal positions (see Emission Patterns, above).
- You can attempt installing Idesco EPC Windshield Labels vertically, if a satisfactory detection range or reliability can't be achieved with labels horizontally positioned.
- Note that vertically-positioned EPC Windshield Labels require you accommodate windshield declination during reader installation. Siting your Idesco EPC 2.0 reader slightly above the expected position of vertical tags lets it benefit from the more powerful reply amplitudes of tags' perpendicular axes.
- Remember however, that in vertical positions, EPC Windshield Labels also radiate strongly sideways, to be potentially detected by a reader in an adjacent lane. This is why strong sideway-replying tags (e.g. 3D Frog Tag) are not recommended for sites with adjacent lanes.
- After installing your Idesco EPC 2.0 reader, experiment to determine the reliable reading area using a tag installed on the surface of a glass or plastic plate. This will help you identify any reflection or 'dark' zones.
- If you don't initially achieve your preferred read distance or zone, experiment by changing the angle or location of your Idesco EPC 2.0 reader.
- Remember: your Idesco EPC 2.0 reader will flash yellow after a successful reading event, which will help you identify your reader's reliable reading zone.
- When testing, always hold your tag in a position and orientation that represents where it will be installed in a vehicle. This lets you simulate a vehicle driving through the gate as you walk your test tag into your reader's detection zone.
- After achieving an acceptable reading distance and detection zone with this method, follow-up by testing reader operation again with a tag installed in a vehicle.

## 5. Special windshields

- Note that some vehicle windshields have metal coatings. These can substantially reduce reliable reading distance or even hinder reading.
- Frequently, however, a metal-free area can be found in the windshield, either directly behind the rear-view mirror or at one of the corners.
- If the reliable read distance of a windshield tag is unsatisfactory, Idesco offers also other long range tags which can be used for vehicle identification. Please contact your sales representative for further information.

## 6. Long distance read error

- Too great an identification zone can also cause problems for your site. Sometimes your reader might transact with a tagged vehicle in an adjacent lane or even down a nearby street.
- To prevent this, try horizontal siting of the EPC Windshield Label (see Emission Patterns, above).
- In some instances, metal surfaces near Idesco EPC 2.0 reader can skew the reading area, causing errors.
- Hanging your Idesco EPC 2.0 reader from above and aiming it straight downward can reduce such reflections while also shortening the reading distance. This may also help protect your reader from erroneously transacting with transponders outside your preferred identification zone.
- If problems can't be resolved by changing tag orientation or reader direction it is possible to reduce the transmitting power of your reader to limit its transaction zone.

## 7. Examples of reader and tag siting

Whenever possible, the most ideal position for an Idesco EPC 2.0 reader is above the vehicle lane (picture 2). This gives the reader the most optimal position for transacting with the tag. Correspondingly, tags should be installed opposite the rear-view mirror, in the middle of the vehicle's windshield (picture 3).



Picture 2



*Picture 3*

If your reader can't be installed above the vehicle lane, deploy it to the side of the lane (picture 4). In this case, install your reader as close as possible to the vehicle lane, with the transponder preferably sited on that part of the windshield which most closely approaches your reader (picture 5). If corner siting of your tag isn't feasible, try siting it close to your rear-view mirror – but only if a reliable reading distance has already been identified from your own testing (picture 6).



*Picture 4*



*Picture 5*



*Picture 6*