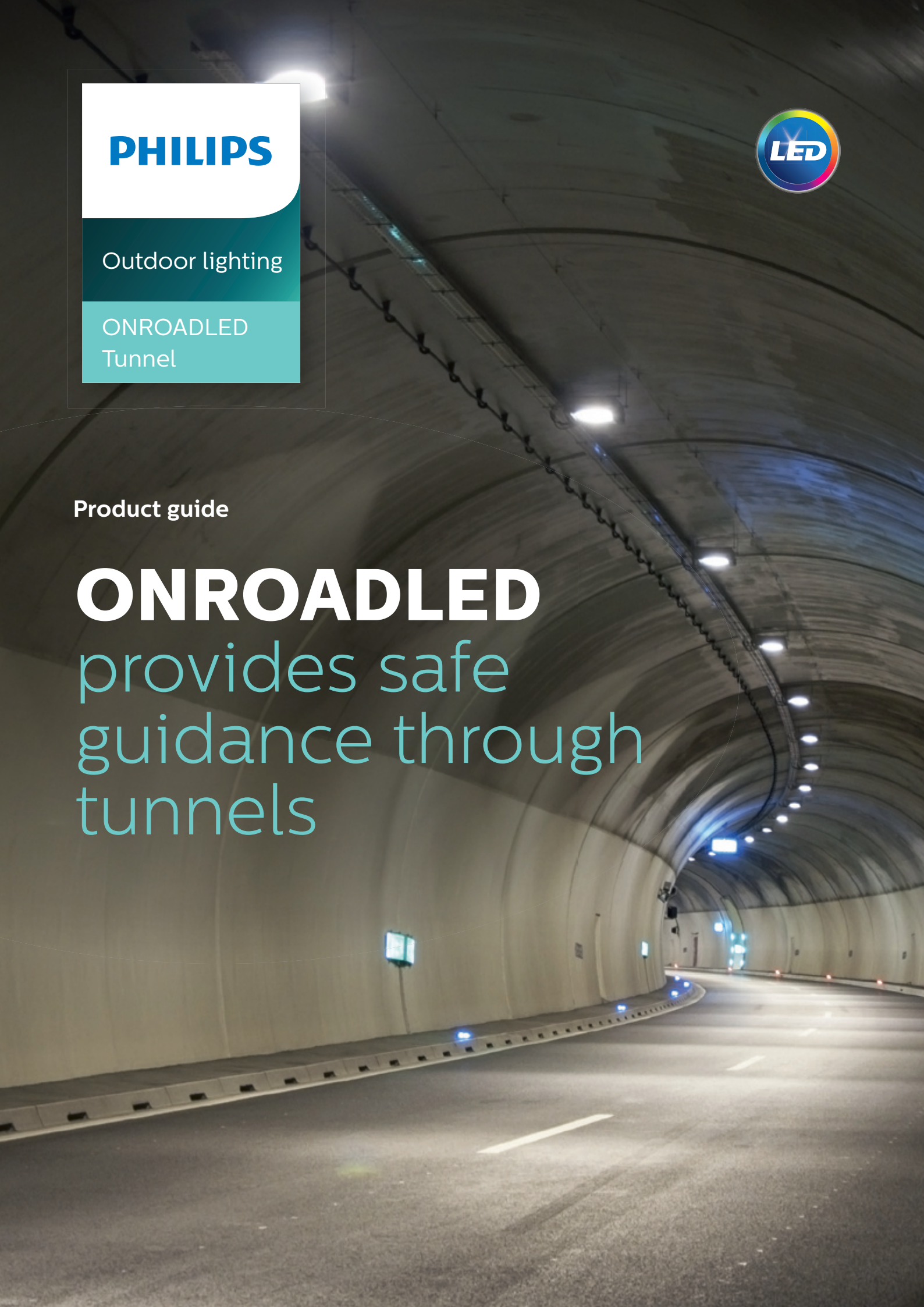
PHILIPS

Outdoor lighting

ONROADLED Tunnel



Product guide

ONROADLED provides safe guidance through tunnels

Contents

Saltash Tunnel, Cornwall, United Kingdom

About ONROADLED

By combining revolutionary Inductive Power Transfer (IPT) with tough and intelligent LED markers, ONROADLED incorporates an active road guidance technology that is set to establish a new lighting standard.

ONROADLED is inherently resilient. The system relies on power supplies that can be up to 2 km apart, a shallow cable, nodes to separate the cable at road-marker sites and high-impact UV-stable polycarbonate markers incorporating varying numbers of LEDs.

ONROADLED markers exploit the unique characteristics of IPT, drawing their power wirelessly from the recessed cable. Additionally, IPT provides communication functionality to individual markers and also receives diagnostic data from each marker.

The power supplies interface with a range of standards and can be monitored remotely. They are available in mains and 24 V versions and can be customised.

ONROADLED Partnership

Philips has a distribution arrangement with 3i Innovations to sell the ONROADLED portfolio in Europe. The new partnership is centred on the Philips TotalTunnel® lighting solution.

ONROADLED – Tunnel guidance

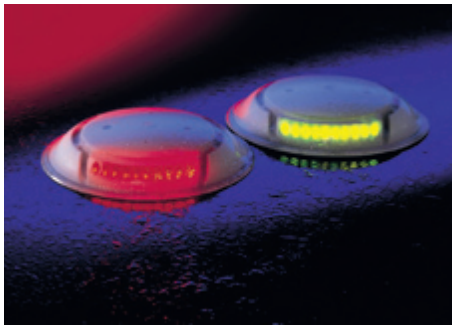
Safe guidance under all conditions

Active ONROADLED guidance systems are being used in an increasingly wide range of traffic applications as municipal authorities worldwide seek to improve traffic flows, reduce accidents and improve safety. After the Mont Blanc Tunnel fire killed 39 people in 1999, the European Union brought in new strict safety regulations. By 2019, active on-road emergency lighting will be obligatory throughout the EU in all road tunnels exceeding 500 metres in length.

Tunnels present two main traffic safety issues: guidance and emergencies. Driver and pedestrian visibility in tunnels is limited, and normal reflective guidance, especially in emergencies, is insufficient. Guidance markers are used for pedestrian evacuation, road-edge marking and lighting around exit doors. Lane markers are also used to provide greater safety through guidance and traffic separation.

Temporary lane changes and tube closures can give rise to dangerous traffic conditions and emergencies demand a high level of concentration from drivers. Fire, smoke and chemical spills are the most hazardous tunnel emergencies. Restricted visibility and disorientation can hinder vehicle occupants when they are seeking safety. An active ONROADLED system dramatically improves tunnel safety in emergency situations.

TLM



SST

TGM

- **High visibility** – because they emit light, markers can be seen from a greater distance than passive reflectors, thereby giving drivers advance warning of bends or hazards and giving pedestrians guidance in an emergency.
- **Delivery of intense, focused beams of light** – in rain or fog and during the night and the day.
- **Clear guidance** – markers are positioned directly in the drivers' line of sight, with the result that they instinctively follow the line of lights.
- **Programmable** – markers can be controlled so that they remain invisible until activated, or they can be made to flash to increase driver awareness.

Family range

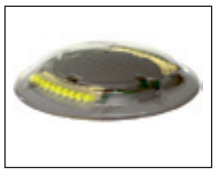
ONROADLED – a robust, intelligent tunnel marker system

ONROADLED is a complete marker system. As well as a wide variety of markers, a wide range of power supplies and accessories are also available. This complete portfolio allows you to create any marker system needed to enhance safety.

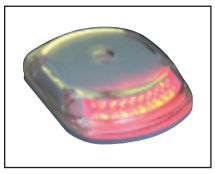
Portfolio overview

Inductively powered markers

Tunnel lane marker (TLM)
Inductively powered, intelligent, directional LED road marker



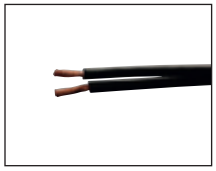
SMARTSTUD marker (SST)
Inductively powered, intelligent, directional LED off-road guidance marker



Tunnel guidance marker (TGM)
Inductively powered, intelligent, directional LED off-road guidance marker

Additional items

Nodes (IPH/IPL)
Nodes for inductively powered markers



Cabling (IPH/IPL)
Cabling and "inline" capacitors for inductively powered markers

Power Supply
Power supplies for inductively powered markers, standard or intelligent

Accessories
Various accessories (snow cap and flange/ base)

Installation materials
Adhesives and marker adhesive application stamp

Installation tools
Coring bits and various installation tools (Air Dual Applicator)

ONROADLED features

Safety

Inductive power is spark-free and there is no danger of electrocution. This makes it suitable for installation and maintenance by non-electrical specialists and much safer to use than traditional wiring systems.

High performance and system longevity

Few lighting applications are more demanding than road guidance. The LED markers are made from specially formulated UV-stable polycarbonate that is scratch-resistant and able to withstand extreme conditions and temperatures. The shell face is designed to concentrate light at the desired intensity – markers are visible from a distance of up 800 metres – and to facilitate self-cleaning. The markers are designed to meet three main criteria: they can withstand high volumes of traffic, they are cost-effective to install or replace and they are sustainable in order to ensure a low total cost of ownership.

Watertightness

Markers can be sealed completely and they are therefore corrosion-free and more resilient than hard-wired products.

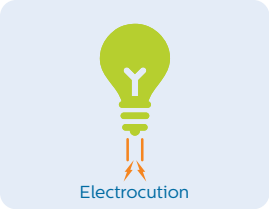
Intelligent control and diagnostics

The same cables that generate the magnetic field to light up the LED markers are used to communicate with microprocessors in each light. This makes them individually programmable, allowing dimming, flashing, sequencing and changes in the colour of the light. Each marker has the capability for independent diagnostic tests and provides system evaluation reports.
IPT power supplies are compatible with a range of interface protocols and can be controlled remotely.

ONROADLED features

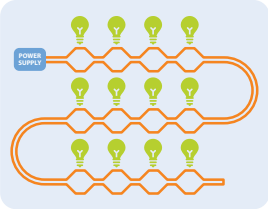
Safer

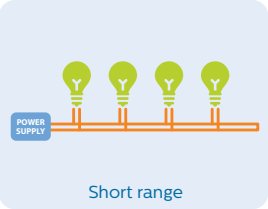
No exposed wires, no electrocution danger, no sparks, double installation.



Long range

Power 2,500 metres of cable from one power supply. A wired system powers less than 800 metres.



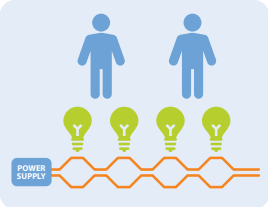


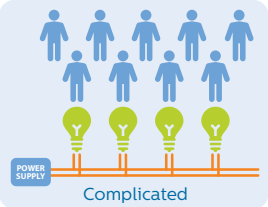
Durable

Completely sealed lights. No connections means no corrosion. High performance in high-traffic applications. High performance in extreme temperatures.

Simple

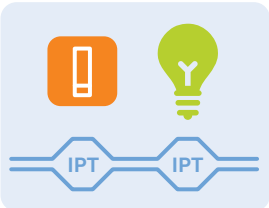
Easy installation and maintenance. Faster fault detection.

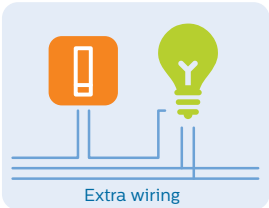




Wireless control

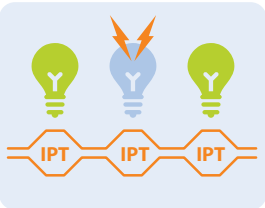
Wireless controllers control the lights individually. Inductive communication transfer, no wires.

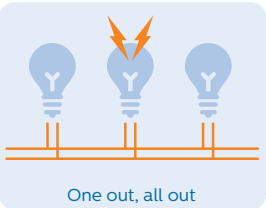




Independent power transfer

All units powered independently.

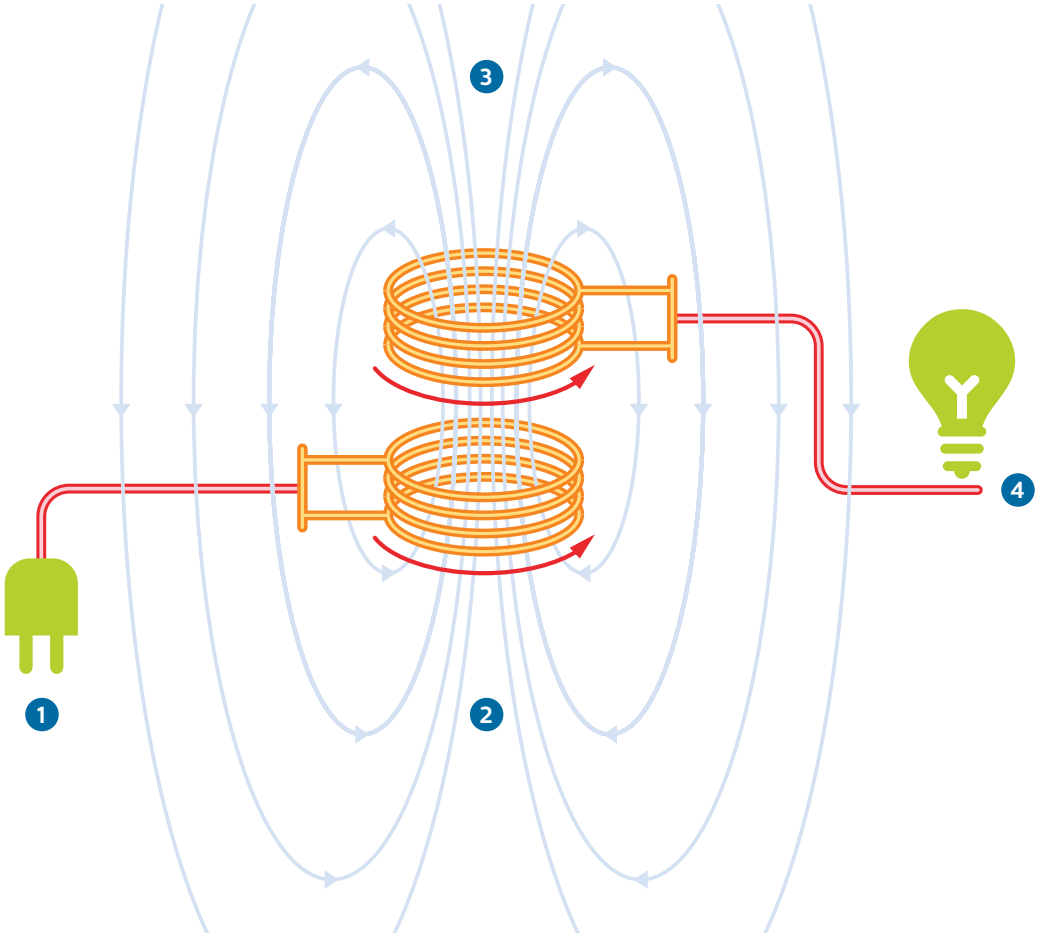




ONROADLED features

Inductive power

Inductive Power Technology (IPT) represents a breakthrough in product durability, control and electrical safety. IPT's wireless transfer of electricity using magnetic induction means that there is no need for a physical wire connection between the power source and light. The inductive system is very simple to use and install, with a minimum number of components. A single power supply can power and control up to 200 markers over a distance of 2.5 kilometres. The use of induction power reduces the total cost of ownership and enhances the return on the investment in LED lighting solutions.



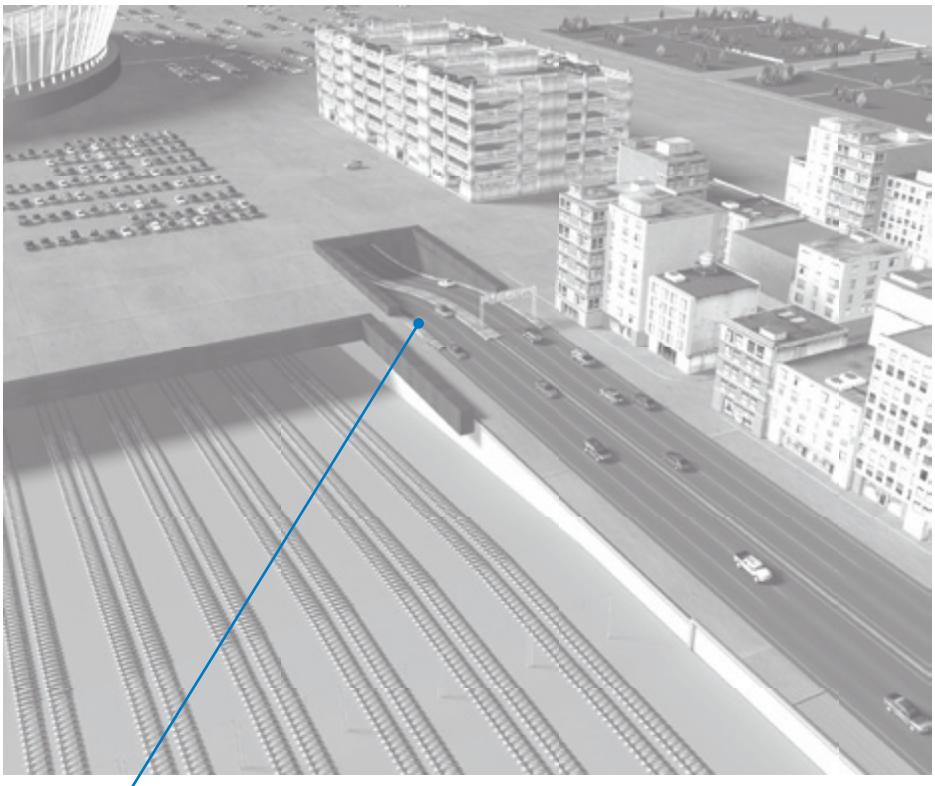
Electric transmission by means of electromagnetic induction

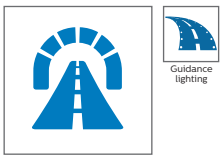
1. ONROADLED Power Supply – Electricity is applied to the wires around the node
2. ONROADLED Node – A magnetic field generated by the node in the ground
3. 4. ONROADLED Marker – The magnetic field passes through the marker coil and creates an electric current that powers the LEDs.

Applications

The ONROADLED product range provides a solution for all manners of applications of on-road guidance and emergency evacuation lighting for tunnels. For example, it:

- improves driver guidance
- improves pedestrian guidance for evacuation
- maintains lane separation both inside the tunnel and on the tunnel
- approaches
- enforces lane discipline
- enables emergency teams to find their way in smoke-filled conditions and localise fire sources faster.





Tunnel and Underpass

Application examples

Road edge delineation

Guidance lights

LED markers provide high-contrast delineation to warn drivers of road edges and shoulders. The LED markers improve pedestrian guidance for emergency evacuations.

Centre line delineation

Lane lights

LED markers provide high-contrast delineation to prevent accidental lane changes as well as head-on collisions. The intelligent tunnel lane markers, for instance, are ideal for tidal flow applications.

Exit door delineation

Exit door lights

Exit doors need to be clearly marked with dedicated emergency exit lighting. This will help and encourage vehicle occupants to leave their vehicles when necessary.

Outside weather conditions also place tough demands on the marker system inside the tunnel
Tanzenberg Tunnel, Styria, Austria

Tunnel standards

Emergency lighting in traffic tunnels

Emergency lighting performs two main functions, providing:
- guidance and visibility to help drivers to exit the tunnel in their vehicles (standby lighting)
- guidance and visibility to help people who leave their vehicles to evacuate the tunnel on foot.

When is emergency lighting required in traffic tunnels?

Emergency lighting is required for tunnels longer than 500 metres in order to facilitate the safe evacuation of drivers in emergency situations such as a fire. The recommendations may apply to tunnels less than 500 metres in length where there is a high volume of traffic, a severe curvature or gradient.

Emergency lighting at the side of the road in a traffic tunnel

Tunnel evacuation lighting

Pedestrian guidance

In the event of an emergency, the main tunnel carriageway becomes a pathway for pedestrians heading towards the emergency exits. In any emergency, and especially in situations where visibility is impaired, there is a need for evacuation route marker lights – in addition to normal lighting or standby lighting – to provide guidance to help tunnel users to evacuate the tunnel on foot via the emergency exits.

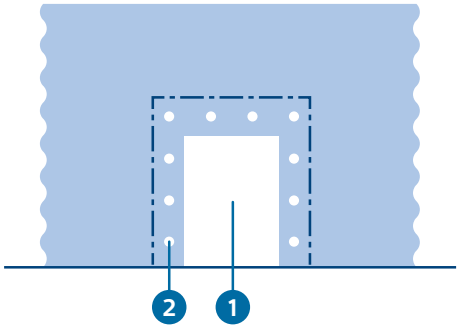
Evacuation route marker lights along the evacuation route must be operational at all times, either in standby mode so that they are ready to be switched on in an emergency or permanently lit.

Delineation should be used at the roadside edge. The evacuation route must be clearly marked with evacuation route marker lights.

Emergency exits

Exits clearly identified by dedicated emergency exit lighting will help to encourage vehicle occupants to leave their vehicles when necessary.

In addition to emergency door lighting (general lighting), green emergency exit markers must be positioned around or on both sides of the exit door. An example of such an arrangement is shown in the figure below.



1. Emergency exit
2. Green emergency exit marker light

During an emergency, it is recommended that the lights flash to attract the attention of fleeing pedestrians. A flashing frequency of between 0.5 Hz and 2 Hz can be effective.

ONROADLED in control

The ONROADLED system is compatible with most standard control systems. The power supplies feature a potential-free I/O system which can be integrated with control systems such as SCADA, PLCs, timer relays, light sensors, push buttons etc.

The inputs on the power supply I/O control panel all relate to different ONROADLED marker states. Each input will result in a different function, for example flashing or a preset dimming level of the markers. Once an input is triggered, for example, by a push of a button, the power supply will send out a signal to all of the markers to update their state.

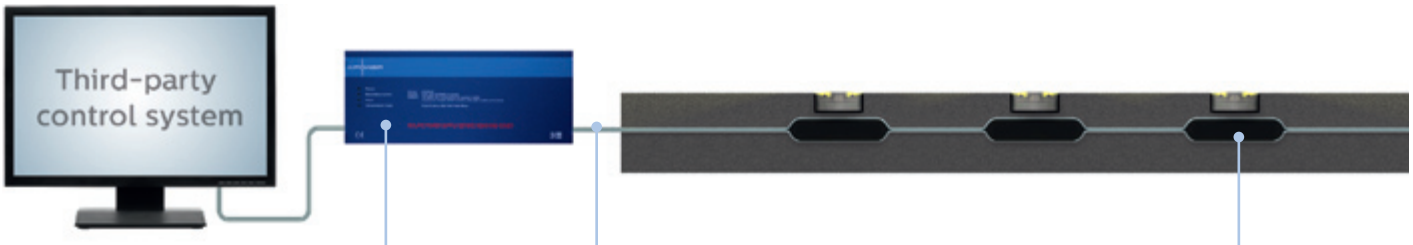
Philips can provide customised interfaces for most applications, including custom software to communicate with the ONROADLED markers via the RS232 serial port on the power supply.

Typical applications and control systems:

- **Tunnel guidance lighting systems:** controlled via a relay or SCADA interface through the tunnel lighting control panel
- **Tunnel emergency lighting systems:** controlled via a relay or SCADA interface through the tunnel lighting control panel
- **Pedestrian crosswalk lighting systems:** controlled via Smartped, push buttons or camera pedestrian detectors
- **Bus lane or school zone lighting systems:** controlled via PLCs, clocks or timer relays
- **General outdoor lighting systems:** controlled via light sensors
- Junction lighting systems: controlled via relays connected to the existing traffic signals or overhead lights
- **Dangerous curve lighting systems:** controlled via inductive loops,
- radar or other vehicle detectors.

ONROADLED for underpass and traffic guidance

ONROADLED system



Power supplies for inductively powered ONROADLED systems

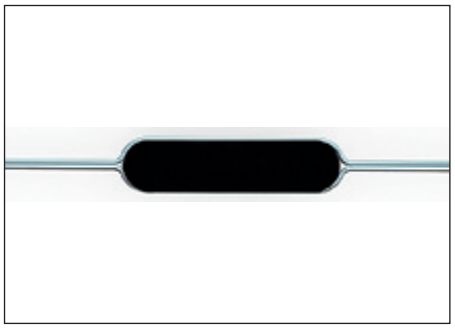
- Intelligent control or manual control.
- Switching and dimming capabilities
- Fully programmable light sequencing
- Capable of powering up to 2,500 metres of cable and up to 250 markers

IPL/IPH cable

Dual-core, stranded copper wire, special PE insulated (halogen-free) flat cable

IPL/IPH Node/Nodex

Plastic cable separator at ONROADLED marker location. Each marker requires a node/nodex to separate the cable wires in order to inductively couple power from the cable to the LED marker

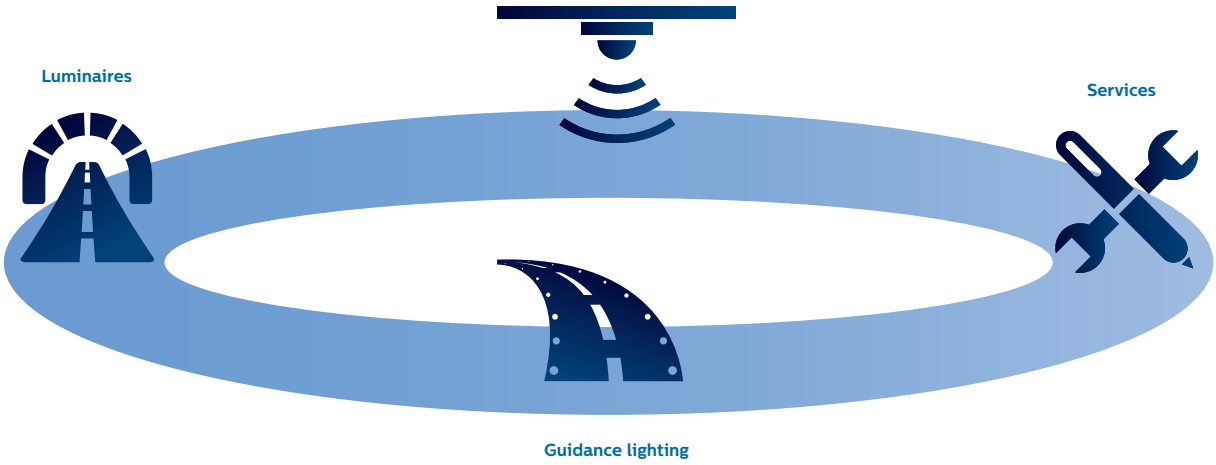


TotalTunnel approach

ONROADLED is part of our TotalTunnel programme, which embodies our holistic approach to tunnel lighting. TotalTunnel enables us to channel our expertise in LED into bespoke solutions for our customers. By combining our four building blocks for success, we can create lighting solutions that offer precise levels of quality, guidance, control and service support.

Building blocks for success

The key building blocks for a tunnel lighting solution are:



- Luminaires – to support tunnel-specific lighting techniques
- Guidance lighting – to guide the traffic and secure a safe exit
- Controls – from basic controls to elaborate monitoring systems, to give you full control over the lighting system
- Services – from concept design and commissioning to lifecycle services.
- We take the strain by delivering the complete project and protecting your investment

Within each building block, Philips offers a range of products, from simple solutions that deliver unbeatable value to high-performance alternatives. We select the components according to your specific needs, then combine them to create a total lighting system that is unique to your project. So, whether your focus is on the cost of the initial investment or on the total cost of ownership over the entire lifetime, Philips can build the right solution for you.

ONROADLED reference projects

Elbtunnel in Hamburg, Germany

- ONROADLED markers are being used to increase tunnel safety through traffic delineation and supporting exit and emergency signage.
- The system uses intelligent Smartstud® LED on-road markers.

Saltash Tunnel in Cornwall, United Kingdom

- This project involved the replacement of a hard-wired on-road lighting system which had reached the end of its serviceable life and was affected by water ingress and corrosion. This was due to the characteristics of wired systems which can be avoided by using an inductively powered system. The electrical joints in the wiring in particular were prone to problems caused by the ingress of road surface water.
- The system uses intelligent Smartstud® LED on-road markers.

Tanzenberg Tunnel in Styria, Austria

- The Tanzenberg Tunnel in Austria was the first to have an intelligent two-way communication installation. The road markers can feed back information, e.g. diagnostic information from sensors and status information.
- The system uses intelligent Smartstud® LED on-road markers.

Terrace Tunnel in Wellington, New Zealand

- The inductively powered system comprises flush-mounted road markers with uni/bi-directional light and red and white LEDs.
- The intelligent road markers provide dimming functions for daytime and nighttime adaption as well as emergency functions with all sides (light directions) switched on.

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