

TUNNEL



Malux





TUNNEL PORTFOLIO - CHARACTERISTICS

		TYPICAL LUMINAIRE OUTPUT FLUX (RANGE)	COLOUR TEMPERATURE	TIGHTNESS LEVEL	IMPACT RESISTANCE	NOMINAL VOLTAGE	ELECTRICAL CLASS	MATERIAL - BODY	MATERIAL - PROTECTOR	COLOUR / FINISH
	104 OMNISTAR	6,900 to 62,800lm	Neutral, warm or cool white	IP 66 (*)	IK 08 (**)	120 - 277V 347 - 480V 50 - 60Hz	EU I or II US 1 (*)	High- pressure die-cast aluminium	Glass	AKZO grey 900 sanded (***)
	106 CONTILED	1,000 to 15,300lm	Neutral or cool white	IP 66 (*)	IK 08 (**)	230V 50Hz	EU II (*)	Extruded aluminium Die-cast aluminium	Glass	Anodised aluminium + Painted aluminium
	108 GL2 COMPACT	2,100 to 23,600lm	Neutral white	IP 66 (*)	IK 08 (**)	120 - 277V 347 - 480V 50 - 60Hz	EU I or II US 1 (*)	Extruded aluminium Die-cast aluminium	Glass	Anodised aluminium + Painted aluminium
	110 FV32 LED	3,500 to 32,100lm	Neutral or warm white	IP 66 (*)	IK 08 (**)	120 - 277V 347 - 480V 50 - 60Hz	EU I US 1 (*)	Extruded aluminium Die-cast aluminium	Glass	Anodised aluminium + Painted aluminium
	112 BEACONS	-	Amber, blue or green	IP 67 (*)	IK 08 IK 09 IK 10 (**)	230V / 24V	EU I (*)	PC or die-cast aluminium	PC or glass	-

(*) According to IEC - EN 60598 | (**) According to IEC - EN 62262 | (***) Any other RAL or AKZO colour upon request

SCHRÉDER TUNNELS

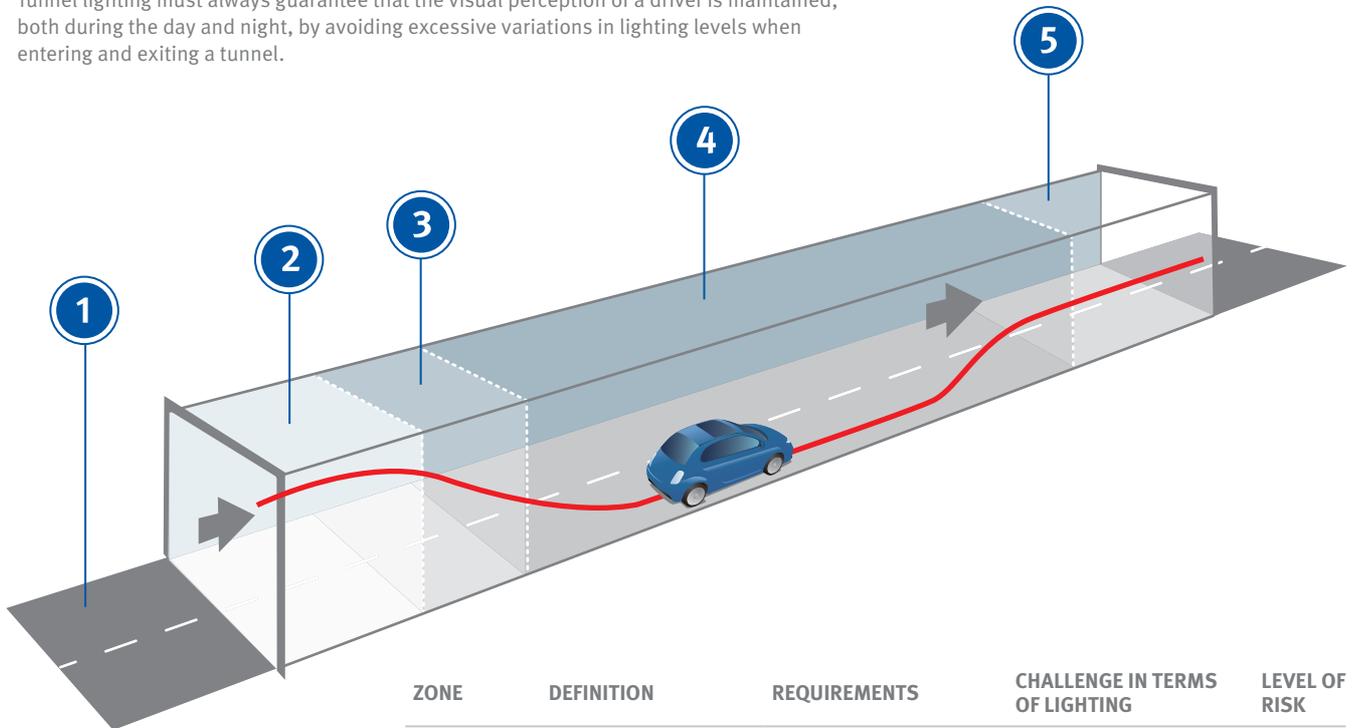
SAFE AND RELIABLE SOLUTIONS WITH HIGH ADDED-VALUE

Schröder provides efficient lighting solutions for tunnels and underpasses. Our offer covers the full scope of the project from design to after-sales services, including smart technology for a fast and easy installation, adaptive lighting, intelligent control systems and safety equipment.

Our dedicated solutions transform tunnels and underpasses into safe, comfortable, sustainable and intelligent routes with pleasant experiences for the users and operational benefits for the managers.

A CHALLENGING ENVIRONMENT

Tunnel lighting must always guarantee that the visual perception of a driver is maintained, both during the day and night, by avoiding excessive variations in lighting levels when entering and exiting a tunnel.



	ZONE	DEFINITION	REQUIREMENTS	CHALLENGE IN TERMS OF LIGHTING	LEVEL OF RISK
①	ACCESS	Area leading to the tunnel entrance	Drivers must be able to identify obstacles	- Light uniformity - Lay-out restrictions (wall mounting)	Medium
②	THRESHOLD	Tunnel entrance	Maintaining the uniformity in luminance between the access and this zone	- Avoiding the black hole effect coming from the contrast - Luminaires can create a glare effect	High
③	TRANSITION	Second part of the tunnel coming directly after the threshold zone	Progressively reducing the luminance to allow the human eye to adapt	Providing the right levels to enable the adaptation	Medium
④	INTERIOR	Interior zone of the tunnel leading to the exit zone	High uniformity to ensure safety	Avoiding the flickering effect	Low
⑤	EXIT	Last section of the tunnel	Increasing the luminance level to prepare the human eye to adapt to the external brightness	Avoiding the glare effect	High

DESIGNED TO PROVIDE A SUSTAINABLE PERFORMANCE

As tunnels and underpasses can be aggressive environments, our solutions are designed and tested to withstand harsh conditions and provide a sustainable performance.

CORROSION

All Schröder tunnel products undergo corrosion tests in laboratories and on-site.



FIRE

Our products are composed of non-flammable materials to comply with the most demanding requirements (M1, Vo, etc) and do not give off toxic fumes (0% halogen, F1, etc).



TIGHTNESS

Schröder products offer a high level of protection against micro-particles and water splashes (cleaning with high-pressure jets).



VIBRATIONS AND WIND

Each time vehicles pass, the luminaires are subjected to intense vibrations and gusts of air. In collaboration with universities, Schröder rigorously tests its tunnel products and mountings in laboratories and wind tunnels.



SHOCKS

Stones and unsecured truck loads can hit devices installed in a tunnel. Our products are duly tested to resist violent shocks.



PROTECTION

Schröder LED tunnel luminaires sealed with flat glass guarantee a more constant efficiency than luminaires where the lenses are in direct contact with the atmosphere. They minimise the amount of material needed, ensure better safety for users, reduce maintenance requirements and contribute to energy efficiency.



FULL-SCOPE SOLUTIONS

Schröder provides complete solutions to ensure perfectly safe and comfortable tunnels with a minimised total cost of ownership.

SENSORS



- Luminance meter
- Photocell
- Motion, presence and speed detection sensors



DRIVER BOXES



- Robust IP 66 boxes for installation in the tunnel itself
- Large IP 65 boxes for installation in service galleries



CABLES AND CONNECTORS



- Fire resistant cables with customised lengths to perfectly fit the tunnel layout
- Click-on impact resistant connectors
- T junction connectors with integrated phase shift



LUMINAIRE CONTROLLER



The Lumgate is an interbus device connected to the luminaire drivers to control the light intensity and provide command/reporting features. One Lumgate can control several luminaires.

LOCAL CONTROL SYSTEM



The ATS (Advanced Tunnel Solution) is a control system that manages luminaire controllers (Lumgates) to deploy pre-defined lighting scenarios or to take charge of the lighting installation at any moment. The ATS controller can operate as a standalone unit or can be linked to the main tunnel control system to interact with features not directly related to lighting (traffic management, ventilation, fire detection etc.).

TUNNEL CONTROL SYSTEM



The Tunnel Control System (TCS) is a gateway ensuring the connection/control of the multiple ATS controllers as well as the communication with the central management system of the tunnel infrastructure (SCADA) if applicable.



atvise®
SPS ATVISE®
SCADA SERVER



TRAFFIC FUNCTIONS



NETWORK
INFRASTRUCTURE



ENERGY SUPPLY



The Schröder tunnel solutions are based on the Profinet technical standard for data communication over Industrial Ethernet, designed for collecting data from, and controlling, equipment in industrial systems.

UTILITIES



VENTILATION



FIRE DETECTION



SAFETY



**TCS (REDUNDANT)
CONTROL OF TUNNEL
COMPLEX**

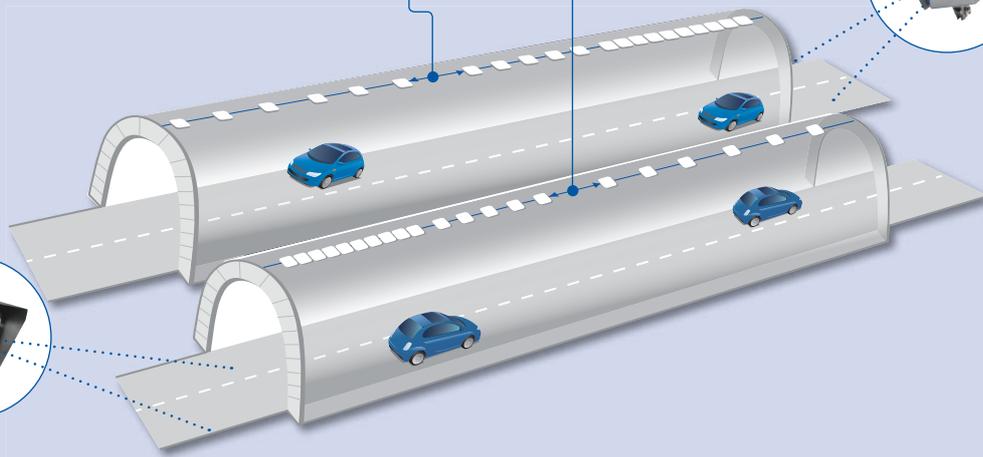


**ATS
INTELLIGENT CONTROL OF TUNNEL LIGHTING**

L20
LUMINANCE
METER



L20
LUMINANCE
METER



SMART TUNNELS: 3 LEVELS OF SOLUTIONS

	MATERIAL INCLUDED	FEATURES	KEY BENEFITS
<p>ENTRY TUNNEL SOLUTION</p> <p>Ideally suited for underpasses and short tunnels with very sporadic use</p>	<ul style="list-style-type: none"> • LED luminaires with programmable drivers • Sensors (PIR, radar or camera) 	<ul style="list-style-type: none"> • Bi-power dimming • Custom dimming profile • Dynamic dimming: detection with PIR sensor, radar or camera 	<ul style="list-style-type: none">  Energy savings of up to 40%  Maintenance savings of up to 60% thanks to long lasting luminaires
<p>BASIC TUNNEL SOLUTION</p> <p>Perfectly adapted to urban and suburban tunnels to ensure a fluid mobility</p>	<ul style="list-style-type: none"> • LED luminaires with smart drivers • LED beacons • Luminance meters • Sensors (PIR, radar or camera) • Central Processing Unit (CPU) • Smart cabling/connectors 	<ul style="list-style-type: none"> • Custom dimming profile with 8 different levels • Dynamic dimming: detection with PIR sensor, radar or camera • Visual guidance • Safety tunnel service lighting • Creation of identity with dynamic RGB lighting 	<ul style="list-style-type: none">  Energy savings of up to 60%  Easy installation with savings of up to 50%  Maintenance savings of up to 60% thanks to long lasting luminaires
<p>ADVANCED TUNNEL SOLUTION</p> <p>Designed for strategic tunnels (motorway or high traffic density) where operations are managed with a large SCADA system</p>	<ul style="list-style-type: none"> • LED luminaires with smart drivers and Lumgates • LED beacons • Luminance meters • Sensors (PIR, radar or camera) • ATS systems • TCS system • Smart cabling/connectors 	<ul style="list-style-type: none"> • Plug and play commissioning • Remote system updates • Custom dimming profile with 25 different levels • Dynamic dimming: detection with PIR sensor, radar or camera • Constant adaptive dimming in line with traffic monitoring (respect CIE standards) • Responsive lighting scenarios for emergency situations • Visual guidance • Safety tunnel service lighting • Creation of identity with dynamic RGB lighting 	<ul style="list-style-type: none">  Energy savings of up to 70%  Easy installation with savings of up to 80%  Maintenance savings of up to 80% thanks to long lasting luminaires





OMNISTAR



A POWERFUL TOOL TO PROVIDE A COMPLETE SOLUTION FOR YOUR TUNNEL LIGHTING NEEDS

The OMNISTAR is a real alternative to high-intensity discharge (HID) lamps for providing the required lighting levels for the critical areas of a tunnel.

The OMNISTAR is designed to meet the different light requirements of tunnels with easy eye adaptation and excellent visibility for safety while offering a low total cost of ownership.

The design of the LensoFlex^{®2} and LensoFlex^{®3} photometric engines and the flexibility of the photometric distributions ensure that motorists can enter in the tunnel in safe and pleasant conditions. In addition, the OMNISTAR can be fitted with a reflector to provide a counter beam lighting solution (ReFlexo[™] photometries). Composed of robust materials, the OMNISTAR is highly resistant to shocks and corrosion within harsh tunnel environments.

6,900 to 62,800lm	76W to 547W	NEUTRAL WARM OR COOL WHITE	OPTICAL COMPARTMENT IP 66	CONTROL GEAR IP 65
CONTROL GEAR IP 66	IK 08	120-277V 347-480V 50-60Hz		
 10kV	CE			

OPTIONS

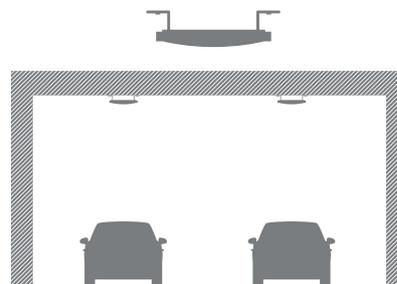
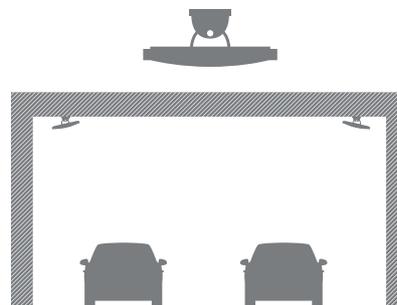
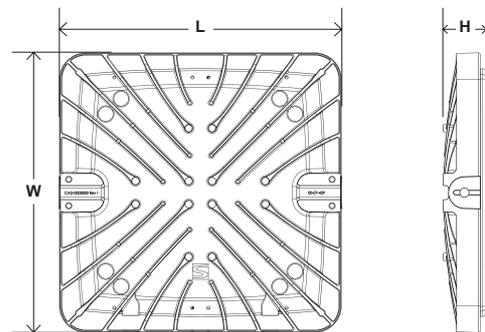
- Various types of mounting systems can be accommodated with tilting mechanism
- IP 66 driver box and optical compartment equipped with all the cables and fast connectors for an easy installation

KEY ADVANTAGES

- High-power LED solution to replace HID luminaires in the entrance zone
- Wide range of lighting distributions including counter beam lighting (CBL)
- Easy to dim:
 - can adapt to the different lighting regimes required
 - reduces the quantity of luminaires to be installed
- Various mounting options and inclination possibilities on-site for optimal photometry
- Compact size: for tunnels with restrictive heights and to avoid any damage
- Control system can be integrated into the full backbone system

DIMENSIONS | MOUNTING

L	530mm 20.9"
H	80mm 3.1"
W	532mm 20.9"
	14kg 30.9lbs



MAIN APPLICATIONS



CENTRAL LIGHTING REINFORCEMENT ENTRANCE AND EXIT



BILATERAL LIGHTING REINFORCEMENT ENTRANCE AND EXIT



CONTILED



CONTINUOUS LED LINE IN TUNNEL LIGHTING

The ContiLED is designed to replace luminaires fitted with fluorescent lamps for continuous line lighting in tunnels and underpasses.

The ContiLED not only provides the required lighting levels with significant energy savings but also great visual comfort to guide motorists safely.

The ContiLED is an IP 66 sealed luminaire offering variable combinations of modules equipped with 8 LEDs (up to 64 LEDs) and optics to fully meet the specific needs of many different tunnel applications.

The LED modules are located on an internal slider which can be easily removed, allowing replacement at the end of its service life in order to take advantage of future technological improvements.

ContiLED 1 1,000 to 7,600lm	ContiLED 2 2,000 to 15,300lm	ContiLED 1 8W to 65W	ContiLED 2 16W to 129W	NEUTRAL OR COOL WHITE
IP 66	IK 08	230V 50Hz		10kV
	CE			

OPTIONS

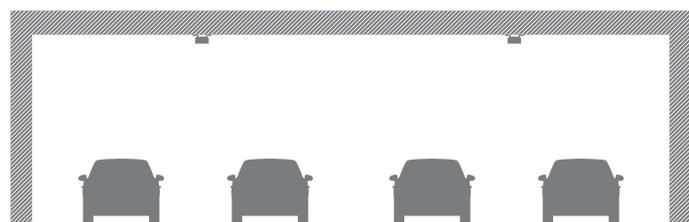
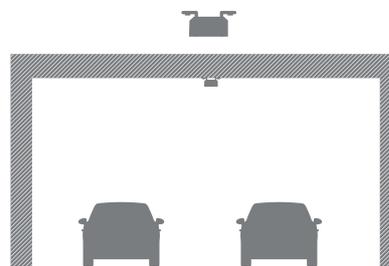
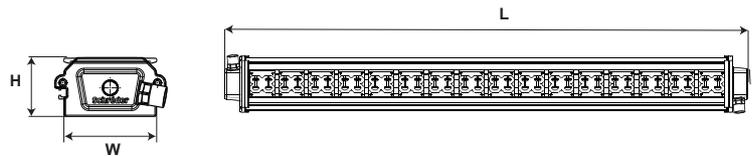
- External power supply - driver box
- Assembly kit for luminaire lateral clamping
- Connectors including a shunt

KEY ADVANTAGES

- High visual comfort through continuous line lighting
- Proven photometry with LensoFlex®2
- Flexible number of LED modules and photometry
- Easy to dim
- Savings in energy and maintenance costs
- ThermiX® to maintain performance over time
- FutureProof

DIMENSIONS

	ContiLED 1	ContiLED 2
L	602mm 23.7"	1,202mm 47.3"
W	124mm 4.9"	124mm 4.9"
H	67mm 2.6"	67mm 2.6"
	7kg 15.4lbs	14kg 30.9lbs



MAIN APPLICATIONS



CONTINUOUS CENTRAL LIGHTING



CONTINUOUS BILATERAL LIGHTING



GL2 COMPACT

Malux

KEY ADVANTAGES

- Maximised savings in energy and maintenance costs
- High tightness level and excellent heat extraction for long lasting performance
- High level of protection against corrosion, impact and vibrations
- LensoFlex®2 engines providing performance, comfort and safety
- Wide range of lumen packages
- Excellent luminance uniformity
- On-site adjustment for optimal photometry
- Surge protection 10kV



COMPACT, POWERFUL AND EFFICIENT LED SOLUTION

The GL2 Compact offers a unique combination of features in a slender housing for lighting the entrance, threshold and interior zones.

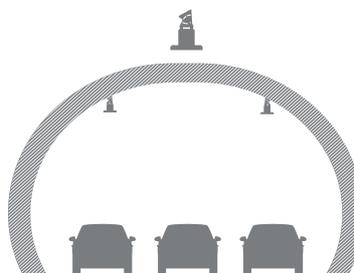
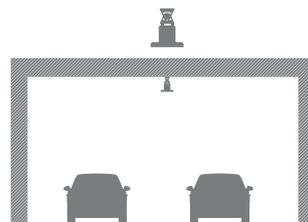
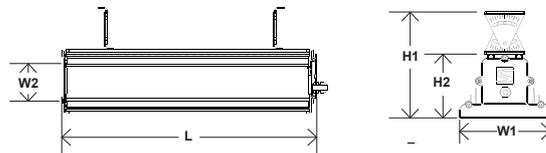
The GL2 Compact is an IP 66 luminaire providing a flexible solution to cover the lighting requirements of different areas. The design of the LensoFlex®2 photometric engine offers maximum versatility for lighting town and motorway tunnels, underpasses, sport facilities and industrial buildings. The photometry of the GL2 Compact can be either symmetrical or asymmetrical to adapt to the place to be lit. The luminaire offers several mounting possibilities. For example, it can be fixed directly onto a cable rack.

The photometry can be adjusted on-site thanks to a tiltable bracket (from -60° to +60°). The GL2 Compact guarantees long lasting performance with minimum maintenance. A door on one of the covers provides access to the electronic compartment.

GL2 size 1 2,100 to 3,600lm	GL2 size 2 4,300 to 7,300lm	GL2 size 3 6,500 to 11,000lm	GL2 size 4 8,600 to 14,700lm	GL2 size 5 10,800 to 23,600lm
GL2 size 1 19W to 38W	GL2 size 2 36W to 71W	GL2 size 3 53W to 106W	GL2 size 4 70W to 139W	GL2 size 5 86W to 213W
NEUTRAL WHITE	IP 66	IK 08	120-277V 347-480V 50-60Hz	
	10kV	CE		

DIMENSIONS

	GL2 Compact 1	GL2 Compact 2	GL2 Compact 3	GL2 Compact 4	GL2 Compact 5
H1	228mm 9"	228mm 9"	228mm 9"	228mm 9"	228mm 9"
H2	137mm 5.4"	137mm 5.4"	137mm 5.4"	137mm 5.4"	137mm 5.4"
W1	193mm 7.6"	193mm 7.6"	193mm 7.6"	193mm 7.6"	193mm 7.6"
W2	60mm 2.4"	60mm 2.4"	60mm 2.4"	60mm 2.4"	60mm 2.4"
L	338mm 13.3"	468mm 18.4"	538mm 21.2"	718mm 28.3"	1,058mm 41.6"
	4kg 8.8lbs	5.3kg 11.7lbs	6kg 13.2lbs	7.5kg 16.5lbs	11.5kg 25.3lbs



MAIN APPLICATIONS



CENTRAL LIGHTING



BILATERAL LIGHTING

SMART

ROAD

TUNNEL

AREA

DECORATIVE

ILLUMINATION



FV32 LED



A FLEXIBLE TOOL TO LIGHT ALL AREAS OF THE TUNNEL ENVIRONMENT

The FV32 LED provides a flexible solution to cover different enclosed areas and meet tunnel lighting requirements.

The design of the LensoFlex®2 photometric engine and the flexibility of the photometric distributions makes the FV32 LED range an ideal instrument for lighting town and motorway tunnels or underpasses.

The extruded aluminium profile enables the number of LEDs to be adjusted in multiples of 8, starting with 32 up to a maximum of 240 LEDs.

Drivers, remote control systems and electrical connections are integrated into the luminaire. The front opening door allows access to the components when the luminaires are installed.

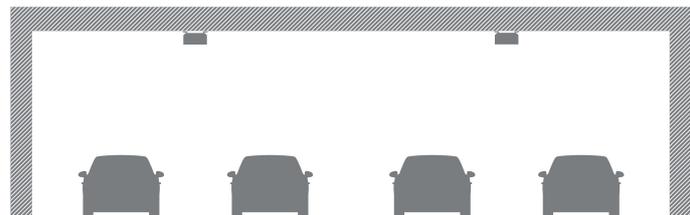
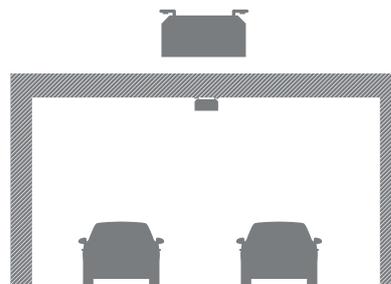
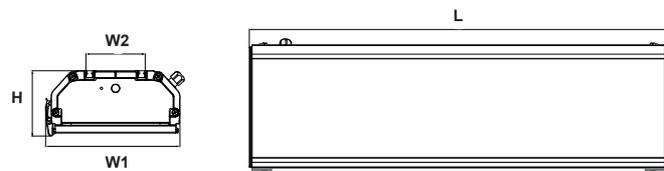
FV32 size 1 2,100 to 3,600lm	FV32 size 2 4,300 to 7,300lm	FV32 size 3 6,500 to 11,000lm	FV32 size 1 35W to 86W	FV32 size 2 106W to 168W
FV32 size 3 185W to 257W	NEUTRAL WHITE	IP 66	IK 08	120-277V 347-480V 50-60Hz
10kV				

KEY ADVANTAGES

- Adapted to a wide range of different tunnel applications to provide safety in all driving conditions
- High level of protection against corrosion, impact and vibrations
- FutureProof: easy replacement of photometric engine and power supply
- ThermiX®: maintains high performance over time
- Easy to dim
- Various inclination possibilities on-site for optimal photometry
- Control system: can be adapted to customer requirements or integrated into the backbone system

DIMENSIONS

	FV32 LED 1	FV32 LED 2	FV32 LED 3
L	560mm 22"	888mm 35"	1,265mm 49.8"
H	135mm 5.3"	135mm 5.3"	135mm 5.3"
W1	272mm 10.7"	272mm 10.7"	272mm 10.7"
W2	110mm 4.3"	110mm 4.3"	110mm 4.3"
	10kg 22lbs	17kg 37.5lbs	23kg 50.7lbs



MAIN APPLICATIONS



CENTRAL LIGHTING



BILATERAL LIGHTING



BEACONS



GUIDING MOTORISTS SAFELY THROUGH TUNNELS

The Schröder range of beacons guide motorists safely through tunnels. They provide visual guidance without glare and act as reference points for the safety distance between vehicles. In case of a fire with dense smoke, these LED beacons clearly show drivers, passengers and the emergency services the way to the exit and the sheltered areas.

Due to the particularly humid and corrosive atmosphere of tunnels, the BalPlast and BalJal are composed of robust materials that have a high resistance to shocks and vibrations.

They fully comply with the most severe fire resistance requirements and the nature of the smoke produced in case of fire. Thanks to its modular design, the BalPast can be rapidly mounted on the ground, walls or on a handrail using two M6 screws. The BalJal is attached by using 2 stainless steel screws.

AMBER BLUE OR GREEN	IP 67	BALPLAST IK 09	BALJAL GLASS IK 08	BALJAL PC IK 10
230V 24V				

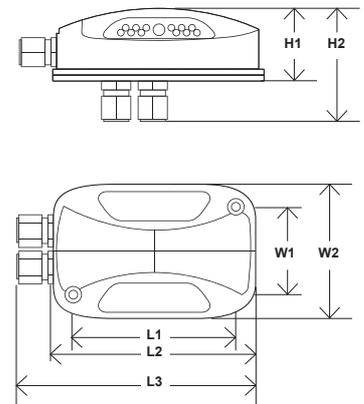
KEY ADVANTAGES

- Highly resistant to corrosion, shocks and vibrations - ideal for harsh tunnel environments
- Flexible mounting: on the ground, tunnel walls or a handrail system
- Complies with standards EN 60598-1, EN 60598-2-22 and flammability UL94
- Maintenance free

DIMENSIONS

	BalPlast	BalJal
H1	56mm 2.2"	33mm 1.3"
H2	88mm 3.5"	82mm 3.2"
W1	69mm 2.7"	N/A
W2	106mm 4.2"	98mm 3.8"
L1	128mm 5"	135mm 5.3"
L2	163mm 6.4"	188mm 7.4"
L3	189mm 7.4"	N/A
KG	0.5kg 1.1lb	0.5kg 1.1lb

BALPLAST



BALJAL

