

# TLI



## A range of tunnel luminaires made entirely of stainless steel and glass

TLI is a range of tunnel luminaires designed for performance, flexibility and easiness of installation.

This range of luminaires provides the ideal solution for extremely corrosive environments and countries where legislation imposes the use of stainless steel housings. Drivers, surge protection and control devices are integrated into a luminaire characterised by a high degree of ingress protection and impact resistance.

Available in two sizes (TLI 1 and TLI 4), TLI enables the number of LEDs to be adjusted, starting with 16 up to a maximum of 144 LEDs.

This range is suitable for surface mounting on to the ceiling or wall with brackets.



## Concept

Made of stainless steel and glass, the housing of the TLI luminaires can host two types of photometric engines: LensoFlex®2 with PMMA lenses or ReFlexo™ with aluminium reflectors. Reflectors provide optimal performance with high visual comfort for tunnel entrances.

Thanks to an optimised design, the thermal management of the TLI luminaires enables to maximise the luminance performance over time.

Designed for high efficiency and a long-life, the TLI is also an asset for installers thanks to its external tool free QPD connectors that can be combined with Schröder's smart cabling.

The TLI range has been developed to enable constant dimming with an optimised power factor. Designed with two electronic circuits, each TLI luminaire can either be dimmed completely, partially or even have 50% of its LEDs switched off. This possibility not only maximises energy savings. It also extends the lifetime of the complete installation and reduces the need for disruptive maintenance.

The TLI luminaires can be directly mounted on every support, thanks to their fixation brackets. The brackets are made of passivated stainless steel and are fixed to the luminaire body.



TLI is available with the ReFlexo™ photometric engine for counter beam lighting.



The TLI luminaires come with tool free QPD connectors for an easy and quick installation.

## TYPES OF APPLICATION

- TUNNELS & UNDERPASSES

## KEY ADVANTAGES

- High-power LED solution to replace HID luminaires in the entrance and interior zones
- Available in two sizes and in various configurations to cover all tunnel lighting requirements
- LensoFlex®2 and ReFlexo™ (counter beam lighting) photometric engines to provide flexible solutions
- Can be equipped with an integrated luminaire controller (Lumgate) for automated commissioning and bi-directional controls (option)
- Designed for long-lasting performance: high level of protection against corrosion and impacts
- Two electrical circuits for enhanced dimming possibilities, optimised power factor and longer lifespan
- Control system: can be adapted to customer requirements or integrated into a tunnel backbone system



The range features a double electronic circuit for extended dimming capacity with the highest efficiency.



TLI is installed using surface brackets.



LensoFlex®2

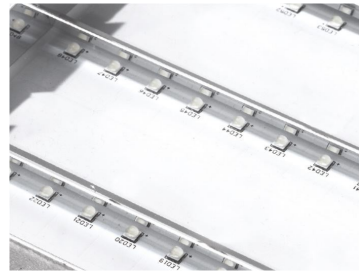
LensoFlex®2 is based upon the addition principle of photometric distribution. Each LED is associated with a specific PMMA lens that generates the complete photometric distribution of the luminaire. The number of LEDs in combination with the driving current determines the intensity level of the light distribution.



ReFlexo™

Using metal reflectors with a superior reflective co-efficient, the ReFlexo™ photometric engine delivers high performance for specific applications such as counter beam lighting in tunnels or very extensive light distributions for sports or apron lighting.

Another key advantage of the ReFlexo™ is its' ability to direct all the light to the front of the luminaire, ensuring that no back light is emitted. This photometric engine guarantees glare free lighting for excellent visual comfort and the creation of ambiance.



### Advanced Tunnel Solution (ATS)

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.).



### Luminance meter (L20)

The luminance meter measures the luminance provided by natural light in the access zone from the safe stopping distance. It sends the data to the ATS control system that adjusts the lighting levels to avoid any visual adaptation problems.



### Lumgate

The Lumgate is an RS485 closed-loop device connected to the luminaire drivers to control the light intensity and provide command/reporting features.



### Tunnel Control System (TCS)

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.

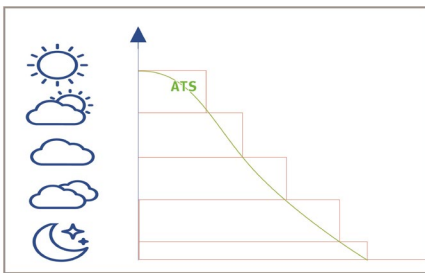




Jointly developed by Schröder and Phoenix Contact, the Advanced Tunnel Solution (ATS) has been designed to control every lighting point or clusters of luminaires to perfectly adapt the lighting level according to conditions in the tunnel, to monitor the power consumption and to report the burning hours or any failure to facilitate maintenance. The system includes a self-commissioning feature and enables scenarios to be adapted remotely at any moment.

### PRECISE AND CONTINUOUS DIMMING

ATS provides 25 different dimming levels to precisely adapt the lighting to the real needs. Without any over-lighting, the energy consumption is limited to what is absolutely necessary to ensure safe and comfortable driving conditions.



### FLEXIBILITY

Flexible redundancy offers security on multi-level applications, not only for the lighting.

### PLUG AND PLAY COMMISSIONING

The tunnel lighting study can be directly imported into the ATS control system.

This unique feature, in combination with the auto-addressing of the Lumgates, leads to an extremely short commissioning time once the fixtures have been installed.

Each luminaire or cluster of luminaires is attributed the precise dimming profile linked to its position and characteristics.

### INTERACTION WITH THIRD PARTY SYSTEMS

Every command or signal sent to or coming from a tunnel component (emergency exit, smoke extraction system, traffic management system...) can be used to trigger a responsive lighting scenario. All of the tunnel equipment can be controlled through the same bus command.

### MAXIMISED SAFETY

The system enables the easy set-up of emergency and disaster management scenarios.

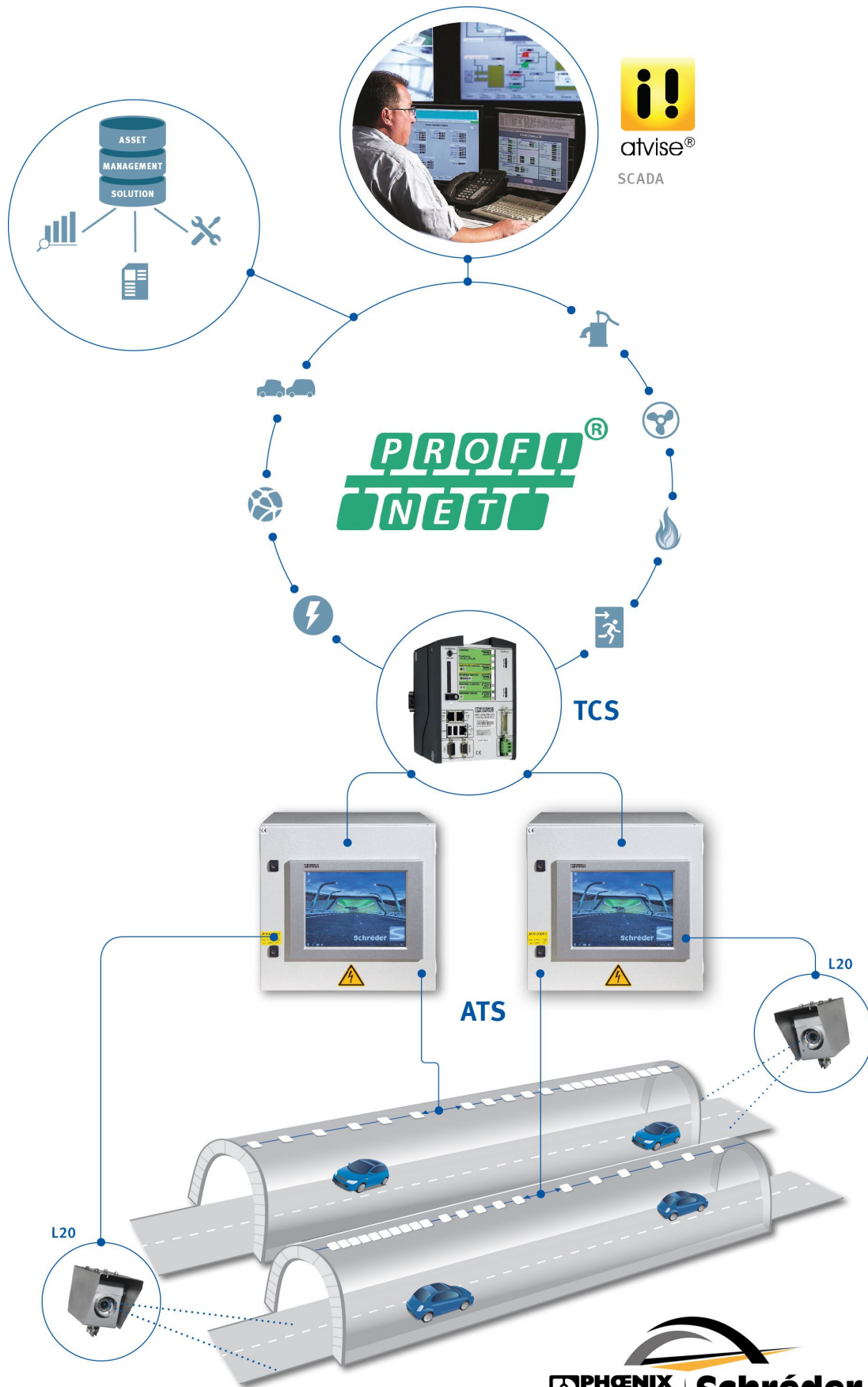
### ADAPTIVE LIGHTING ACCORDING TO SPEED

The ATS can be linked to a traffic monitoring system to obtain data regarding speed or density to adapt the lighting level according to safety standards. This option further reduces energy consumption and increases the lifetime of the installation while ensuring the best driving conditions for motorists.



### ADAPTIVE LIGHTING ACCORDING TO POLLUTION

Based on cleaning cycles, the ATS can take into account the depreciation of the flux due to dirt accumulation to continuously provide the requested lighting level in the tunnel. No more, no less. This feature offers additional energy savings while providing safety and comfort for users.



**GENERAL INFORMATION**

Driver included	Yes
CE Mark	Yes
ENEC certified	Yes
Testing standard	LM 79-08 (all measurements in ISO17025 accredited laboratory)

**HOUSING AND FINISH**

Housing	Stainless steel
Optic	Aluminium reflector PMMA
Protector	Tempered glass
Tightness level	IP 66
Impact resistance	IK 08
Vibration test	Compliant with modified IEC 68-2-6 (0.5G)

**OPERATING CONDITIONS**

Operating temperature range (Ta)	-30 °C up to +35 °C / -22 °F up to 95°F
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· Depending on the luminaire configuration. For more details, please contact us.

**ELECTRICAL INFORMATION**

Electrical class	Class I EU
Nominal voltage	220-240V – 50-60Hz
Power factor (at full load)	0.9
Surge protection options (kV)	10
Electromagnetic compatibility (EMC)	EN 55015 / EN 61000-3-2 / EN 61000-3-3
Control protocol(s)	1-10V
Control options	Lumgate, Remote management
Associated control system(s)	Advanced Tunnel Solution (ATS)

**OPTICAL INFORMATION**

LED colour temperature	4000K (Neutral White 740)
Colour rendering index (CRI)	>70 (Neutral White 740)

**LIFETIME OF THE LEDS @ TQ 25°C**

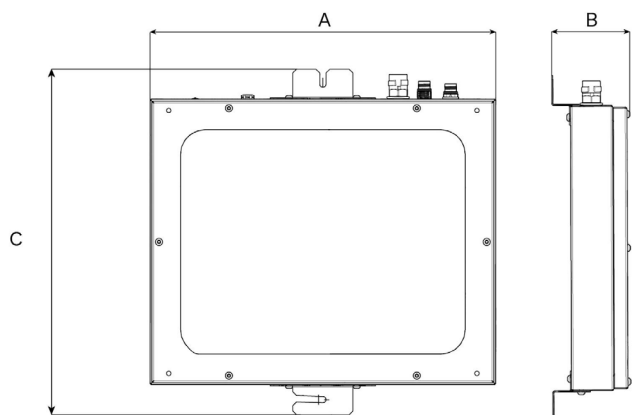
All configurations	100,000h - L90
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· Lifetime may be different according to the size/configurations. Please consult us.



DIMENSIONS AND MOUNTING

AxBxC (mm   inch)	TLI-1 - 460x104x460   18.1x4.1x18.1 TLI-4 - 660x104x560   26.0x4.1x22.0
Weight (kg   lbs)	TLI-1 - 9   19.8 TLI-4 - 14.5   31.9
Mounting possibilities	Surface mounting







Luminaire	Number of LEDs	Current (mA)	Luminaire output flux (lm) Neutral White 740		Power consumption (W)	Luminaire efficacy (lm/W)	
			Min	Max		Up to	Photometry
TLI-1	16	200	1200	1300	11	118	
	16	300	1800	2000	15.6	128	
	16	400	2300	2500	20.4	123	
	16	500	2700	3000	25.4	118	
	24	200	1900	2000	15.9	126	
	24	300	2700	3000	22.9	131	
	24	400	3500	3800	30.1	126	
	32	200	2500	2700	20.9	129	
	32	300	3600	4000	30.1	133	
	32	450	5100	5600	44.5	126	
	32	500	5500	6000	49.5	121	
	40	200	3100	3400	25.5	133	
	40	360	5300	5800	44	132	
	40	400	5800	6300	49	129	
	40	500	6900	7600	61.5	124	
	48	200	3800	4100	30.2	136	
	48	300	5500	6000	44.5	135	
	48	400	7000	7600	59	129	
	48	500	8300	9100	74	123	
	64	200	4100	4300	39.8	108	
64	350	6700	7000	67.5	104		

Tolerance on LED flux is ± 7% and on total luminaire power ± 5 %



Luminaire	Number of LEDs	Current (mA)	Luminaire output flux (lm) Neutral White 740		Power consumption (W)	Luminaire efficacy (lm/W)	
			Min	Max		Up to	Photometry
TLI-4	64	200	5300	5700	43	150	
	64	350	8500	9200	71	138	
	80	200	6700	7200	52.5	153	
	80	350	10700	11500	87	140	
	96	200	8000	8600	62	152	
	96	350	12800	13800	104	141	
	112	200	9300	10100	67	151	
	112	350	15000	16200	116	140	
	128	200	8400	11500	76	151	
	128	350	13500	18500	133	139	
	144	200	12000	13000	85	153	

Tolerance on LED flux is ± 7% and on total luminaire power ± 5 %



