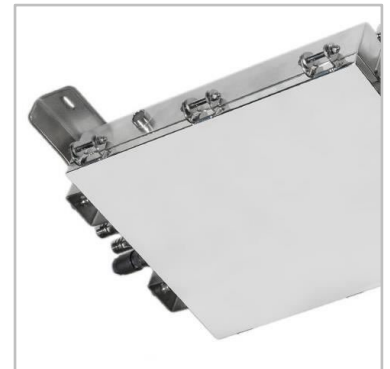


TFLEX STS COMBI



Modular-based, highly corrosion-resistant tunnel lighting solution

TFLEX STS COMBI is a modular-based lighting solution designed for enhancing and securing the road tunnel driving experience.

Part of the TFLEX stainless steel lighting concept, TFLEX STS COMBI is a combination of the TFLEX STS MODULE powerful lighting units and their connected driver box, TFLEX STS DRIVE. This association provides optimised, energy-efficient lighting solutions for all typical tunnel zones, from entry to exit. Made of highly corrosion-resistant stainless steel, TFLEX STS COMBI provides a powerful yet robust solution for tunnels with harsh environments.

TFLEX STS COMBI offers an advanced, fully integrated system with lighting, cabling and control, guaranteeing the lowest energy consumption while respecting the most stringent tunnel lighting requirements and standards.

IP 66	IK 09	UL 1598 CSA C22.2 No. 250.0
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Concept

TFLEX STS COMBI provides a homogeneous solution that meets the tunnel lighting requirements of various specific zones (threshold, transition, interior and exit).

Made of highly corrosion-resistant stainless steel grades (AISI 316L/1.4404 and AISI 316TI/1.4571), TFLEX STS COMBI provides a long-lasting low-maintenance lighting solution, even in the harshest tunnel environments. Available with two types of heat sink, TFLEX STS COMBI adapts to the local requirements of each type of tunnel while ensuring optimal heat dissipation.

TFLEX STS COMBI combines the energy efficiency of LED technology with improved tunnel optics, to optimise lighting levels on road and wall surfaces while providing high visual comfort.

The TFLEX STS COMBI lighting modules have been developed to enable constant dimming. They can either be dimmed or switched off completely or partially. This possibility maximises energy savings and extends the lifetime of the complete installation.

TFLEX STS COMBI is an all-in-one tunnel solution that includes lighting modules, a dedicated driver box, custom-length cables with tool-free connectors, and advanced control systems.



Made of high-grade stainless steel, TFLEX STS COMBI provides a long-lasting low-maintenance solution for tunnels with highly corrosive environments.



Available with two types of heat sink, TFLEX STS COMBI adapts to the local requirements of each type of tunnel.

TYPES OF APPLICATION

- TUNNELS & UNDERPASSES

KEY ADVANTAGES

- Flexibility: modular approach with wide range of lighting distributions
- High quality and robust materials
- Designed for long-lasting performance
- Tool-free access for easy maintenance
- Made of high-grade anti-corrosive stainless steel
- Optimised thermal dissipation that results in higher photometrical performance
- LensoFlex®4 versatile solutions for high-end photometries maximising comfort and safety



Integrating the latest remote control and optical technology, TFLEX STS COMBI ensures the best driving conditions for your tunnels.



Tool-free, CPR-compliant cables produced at custom lengths reduce mounting time and improve installation quality and reliability.

TFLEX STS COMBI | TFLEX STS COMBI 40/HD
40



TFLEX STS COMBI | TFLEX STS COMBI 60/HD
60



TFLEX STS COMBI | TFLEX STS COMBI
100/HD 100



TFLEX STS COMBI | Heat sink with fins (HD
version)



TFLEX STS COMBI | Flat heat sink

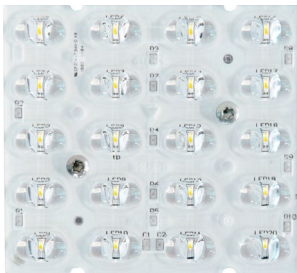




LensoFlex®4

LensoFlex®4 maximises the heritage of the LensoFlex® concept with a very compact yet powerful photometric engine based upon the addition principle of photometric distribution. The number of LEDs in combination with the driving current determines the intensity level of the light distribution. With optimised light distributions and very high efficiency, this fourth generation enables the products to be downsized to meet application requirements with an optimised solution in terms of investment.

LensoFlex®4 optics can feature backlight control to prevent intrusive lighting, or a glare limiter for high visual comfort.



Advanced Tunnel System 4 (ATS 4)

The ATS 4 (Advanced Tunnel System 4) is a powerful tunnel lighting control system for precise remote dimming and switching of each individual connected luminaire, based on various tunnel parameter inputs (emergency exits, smoke extraction system, traffic cameras, etc.).

The ATS 4 permanently communicates with the Lumgates, an RS422 closed-loop device connected to the luminaire drivers, to control the light intensity and provide command/reporting features.



Advanced Tunnel System 4 DALI (ATS 4 DALI)

The Advanced Tunnel System 4 DALI provides the essential functions of the ATS 4 over a DALI network protocol, enabling dimming of luminaire clusters to be controlled collectively.

The ATS 4 DALI is the ideal solution to implement a reliable and powerful tunnel lighting control system with streamlined features and optimised costs.



Sensors and cameras

The ATS 4 can be connected to various sensors and cameras to permanently adjust the lighting levels to indoor and outdoor conditions and avoid any visual adaptation problems.



Tunnel Control System 4 (TCS 4)

The Tunnel Control System 4 (TCS 4) is a gateway ensuring the connection/control of the multiple ATS 4 controllers as well as the communication with the central management system of the tunnel infrastructure (SCADA) if applicable.



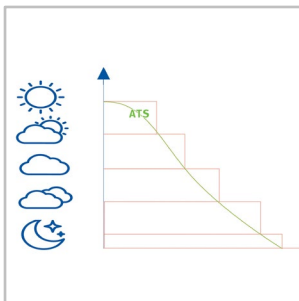
Jointly developed by Schröder and Phoenix Contact, the Advanced Tunnel System 4 (ATS 4) has been designed to control every lighting point or clusters of luminaires to perfectly adapt the lighting level according to conditions in the tunnel, to monitor the power consumption and to report the burning hours or any failure to facilitate maintenance. The system includes a self-commissioning feature and enables scenarios to be adapted remotely at any moment.

ADAPTIVE LIGHTING ACCORDING TO SPEED



The ATS 4 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.

PRECISE AND CONTINUOUS DIMMING



ATS 4 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.

ADAPTIVE LIGHTING ACCORDING TO POLLUTION

Based on cleaning cycles, the ATS 4 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.

FLEXIBILITY

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

PLUG AND PLAY COMMISSIONING

This control system is easy to install and configure. The tunnel lighting study can be directly imported into the ATS 4 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.

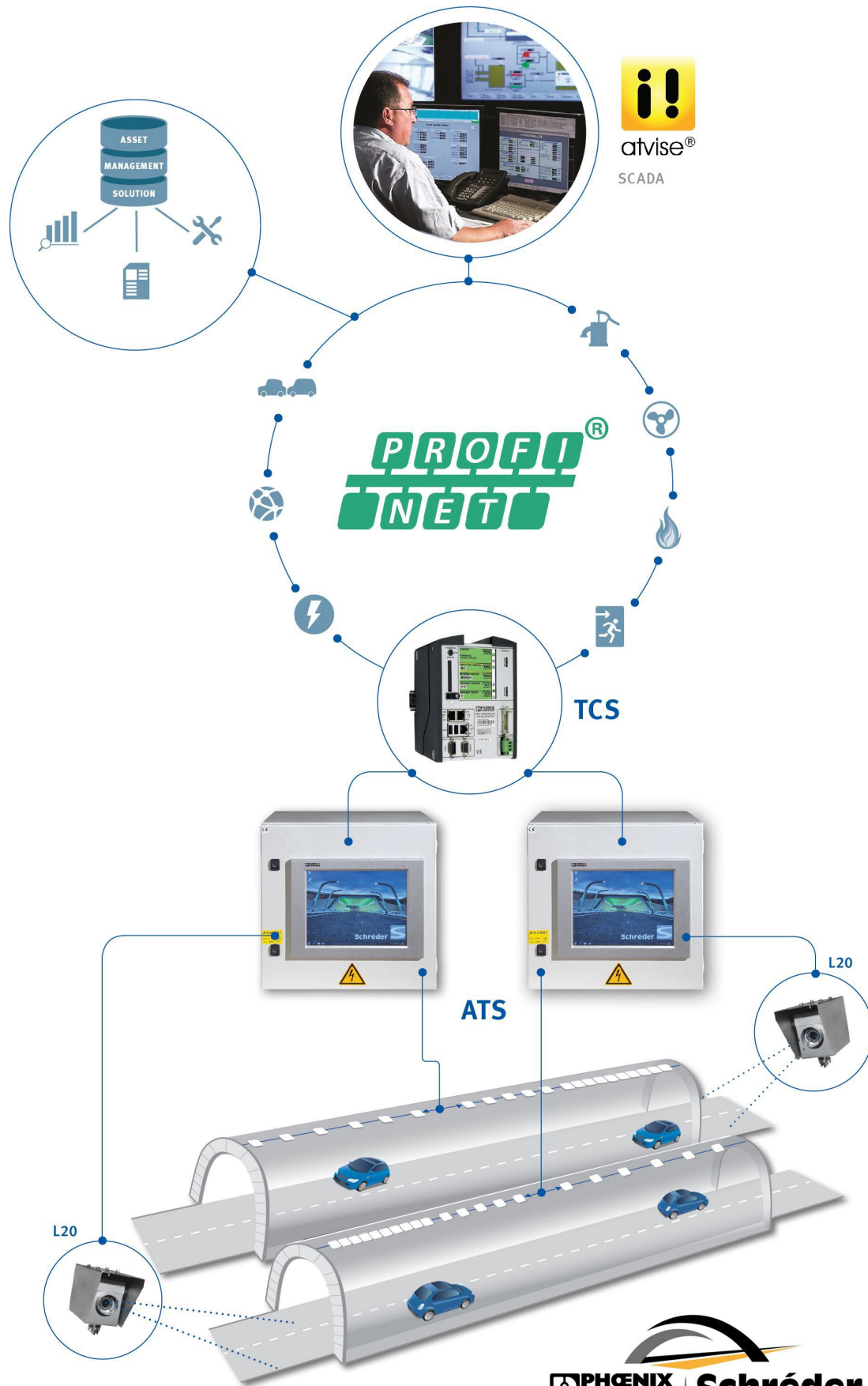
The ATS 4 benefits from a complete set of toolless smart cables and connectors, allowing installers to speed up cabling and save valuable time on-site

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.



GENERAL INFORMATION

Recommended installation height	3m to 7m 10' to 23'
Circle Light label	Score ≥90 - The product fully meets circular economy requirements
CE mark	Yes
ENEC certified	Yes
UL certified	Yes
ROHS compliant	Yes
Testing standard	EN 60598-1 EN 62262 UL 1598 ANSI C 136-31

HOUSING AND FINISH

Housing	Stainless steel (AISI 316L / 1.4404 or 316TI / 1.4571)
Optic	PMMA
Protector	Tempered glass
Tightness level	IP 66
Impact resistance	IK 09
Vibration test	Compliant with ANSI C 136-31 standard, 3G load Compliant with modified IEC 68-2-6 (0.5G)
Access for maintenance	Tool-less access to gear compartment

OPERATING CONDITIONS

Operating temperature range (Ta)	-30°C up to +45°C / -22°F up to 113°F
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· Depending on the luminaire configuration. For more details, please contact us.

ELECTRICAL INFORMATION

Electrical class	Class 1 US, Class I EU
Nominal voltage	220-240V – 50-60Hz 347-480V – 50-60Hz 277V - 50-60Hz
Surge protection options (kV)	10 20
Electromagnetic compatibility (EMC)	EN 55015 / EN 61000-3-2 / EN 61000-3-3 / EN 61547
Control protocol(s)	1-10V, DALI
Control options	Lumgate, Remote management
Associated control system(s)	Advanced Tunnel System 4 (ATS 4) Advanced Tunnel System 4 DALI (ATS 4 DALI)

OPTICAL INFORMATION

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

LIFETIME OF THE LEDS @ TQ 25°C

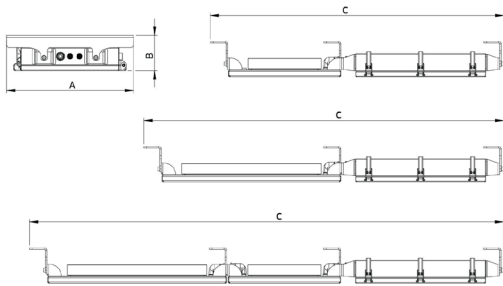
All configurations	100,000h - L95
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· Lifetime may be different according to the size/configurations. Please consult us.

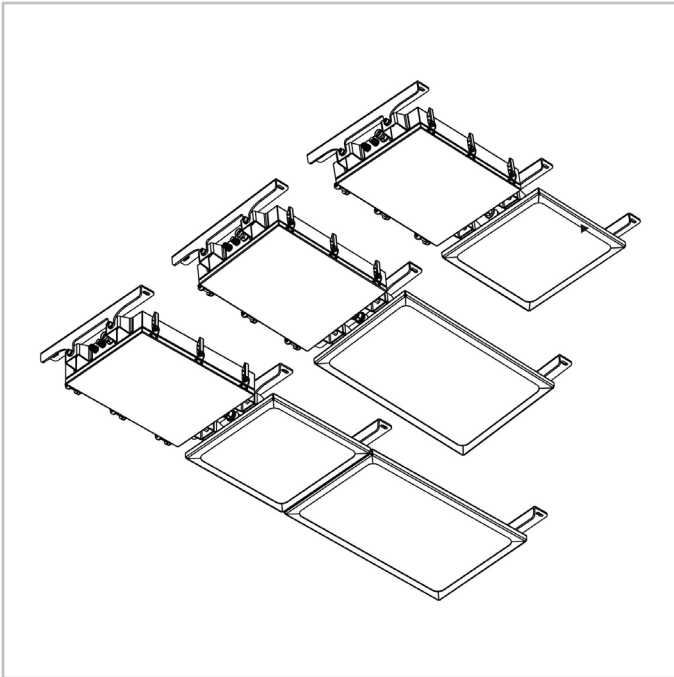
DIMENSIONS AND MOUNTING

AxBxC (mm inch)	TFLEX STS COMBI 40 : 440x122x1016 17.3x4.8x40.0 TFLEX STS COMBI HD40 : 440x122x1016.4 17.3x4.8x40.0 TFLEX STS COMBI 60 : 440x122x1246 17.3x4.8x49.1 TFLEX STS COMBI HD60 : 440x122x1246.4 17.3x4.8x49.1 TFLEX STS COMBI 100 : 440x122x1641 17.3x4.8x64.6 TFLEX STS COMBI HD100 : 440x122x1641.4 17.3x4.8x64.6
Weight (kg lbs)	TFLEX STS COMBI 40 : 24.9 54.8 TFLEX STS COMBI HD40 : 25.0 55.0 TFLEX STS COMBI 60 : 28.9 63.6 TFLEX STS COMBI HD60 : 30.0 66.0 TFLEX STS COMBI 100 : 39.8 87.6 TFLEX STS COMBI HD100 : 41.0 90.2
Mounting possibilities	Surface mounting Wall-mounted

· For more information about mounting possibilities, please consult the installation sheet.



TFLEX STS COMBI | Fixed brackets (ANSI 3G validated) - more details in the installation sheet





Luminaire output flux (lm)		Power consumption (W)		Luminaire efficacy (lm/W)	
					Neutral White 740
Number of LEDs	Min	Max	Min	Max	Up to
	80	13200	23800	86	

Tolerance on LED flux is $\pm 7\%$ and on total luminaire power $\pm 5\%$



Luminaire output flux (lm)		Power consumption (W)		Luminaire efficacy (lm/W)	
					Neutral White 740
Number of LEDs	Min	Max	Min	Max	Up to
	80	13200	28900	86	

Tolerance on LED flux is $\pm 7\%$ and on total luminaire power $\pm 5\%$



Luminaire output flux (lm)		Power consumption (W)		Luminaire efficacy (lm/W)	
					Neutral White 740
Number of LEDs	Min	Max	Min	Max	Up to
	160	26500	47600	172	

Tolerance on LED flux is $\pm 7\%$ and on total luminaire power $\pm 5\%$



		Luminaire output flux (lm)		Power consumption (W)		Luminaire efficacy (lm/W)
		Neutral White 740				
Number of LEDs	Min	Max	Min	Max	Up to	
	160	26500	57800	172	408	173

Tolerance on LED flux is $\pm 7\%$ and on total luminaire power $\pm 5\%$



		Luminaire output flux (lm)		Power consumption (W)		Luminaire efficacy (lm/W)
		Neutral White 740				
Number of LEDs	Min	Max	Min	Max	Up to	
	240	63800	71400	472	472	151

Tolerance on LED flux is $\pm 7\%$ and on total luminaire power $\pm 5\%$



		Luminaire output flux (lm)		Power consumption (W)		Luminaire efficacy (lm/W)
		Neutral White 740				
Number of LEDs	Min	Max	Min	Max	Up to	
	240	69900	86700	508	602	154

Tolerance on LED flux is $\pm 7\%$ and on total luminaire power $\pm 5\%$