

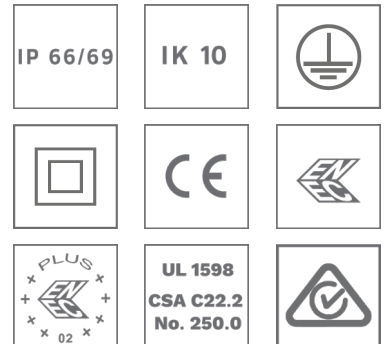
# TFLEX BASE



## The ideal solution for standard tunnel lighting

TFLEX BASE is part of the TFLEX tunnel lighting solutions, providing an energy efficient solution optimised for various typical tunnel areas, from entry to exit. It takes into account all design factors and traffic conditions that can potentially affect safety, in particular the characteristics of the traffic, the type of vehicles, length and geometry of the tunnel.

Equipped with the latest digital, electronic and optical technologies, TFLEX BASE ensures high visual performance and an optimised lighting management for a better driving experience in tunnels.



## Concept

TFLEX BASE has been designed to deliver the standard lighting needs for tunnel zones such as entrance, interior zone and exit in various environments.

Do not let its name fool you, TFLEX BASE is a completely versatile tunnel solution integrating the latest optical and digital technology. It is equipped with LensoFlex® photometric engines with high-power LEDs, to always provide the best performance and visibility inside the tunnel. In combination with specific tunnel optics, TFLEX BASE ensures optimised lighting levels on road and wall surfaces while providing high visual comfort and unrivaled uniformity.

Made of robust and sustainable materials (aluminium, steel and glass), TFLEX BASE ensures long-lasting performance in the harshest tunnel environments. With a tool-free philosophy for the opening/closing and smart cabling, TFLEX BASE facilitates installation and maintenance operations to minimise costs and traffic disruption.

TFLEX BASE has been developed to enable constant dimming with an optimised power factor. Designed with two electronic circuits, TFLEX BASE 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.

TFLEX BASE is available with various mounting options. An adjustable bracket available in stainless-steel or galvanised steel allows TFLEX BASE to be mounted on walls and ceiling, and tilted up to 90° for the most complex tunnel geometries. A bracket-free version is also available, allowing TFLEX BASE to be simply mounted on ceilings with threaded rods.

TFLEX BASE is part of Schröder's complete tunnel solution that includes robust luminaires, smart cabling with quick-on QPD connectors and advanced control systems to improve safety for drivers and to provide major operational benefits for tunnel managers.



TFLEX BASE is built around a tool-free philosophy for opening/closing as well as for the power, control and cabling.



Pre-assembled with tool-free, fire rated cables and connectors, TFLEX BASE reduces the installation time dramatically and improves quality and reliability.



Designed with two electronic circuits, TFLEX BASE enables constant dimming with an optimised power factor.



TFLEX BASE offers various mounting options for ceiling or wall mounting with fixed or tiltable fixations.

## TYPES OF APPLICATION

- TUNNELS & UNDERPASSES

## KEY ADVANTAGES

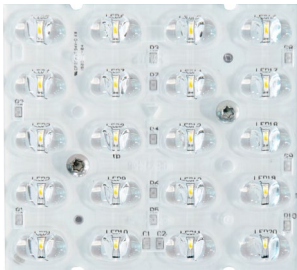
- Flexibility: modular approach with wide range of lighting distributions
- Compact, lightweight and easy to install
- Two electrical circuits for enhanced dimming possibilities, optimised power factor and longer lifespan
- Designed for long-lasting performance
- High quality and robust materials
- Tool-free access for easy maintenance



## 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.



## Lumgate V4

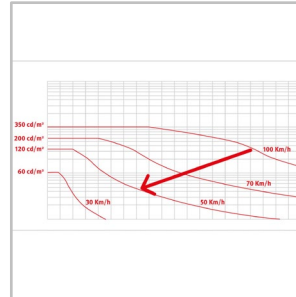
The Lumgate is a luminaire control unit that acts as an interface between the lighting management system and the tunnel luminaires or driver boxes. Connected to the luminaire drivers, it switches the drivers on/off, controls the light intensity and provides command/reporting features.

It is suitable for installation in driver boxes or directly in the luminaire. It communicates with the driver via 0-10V or DALI command. This brand new interface includes advanced Inrush Current Limitation Features and a 24 hour fail-safe repeat mode.



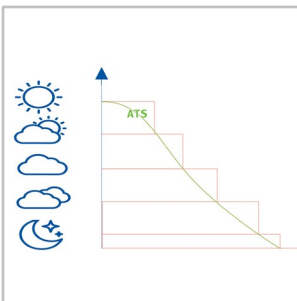
Jointly developed by Schröder and Phoenix Contact, the Advanced Tunnel System 4 (ATS 4) has been designed to control every lighting point or clusters of luminaires to perfectly adapt the lighting level according to conditions in the tunnel, to monitor the power consumption and to report the burning hours 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

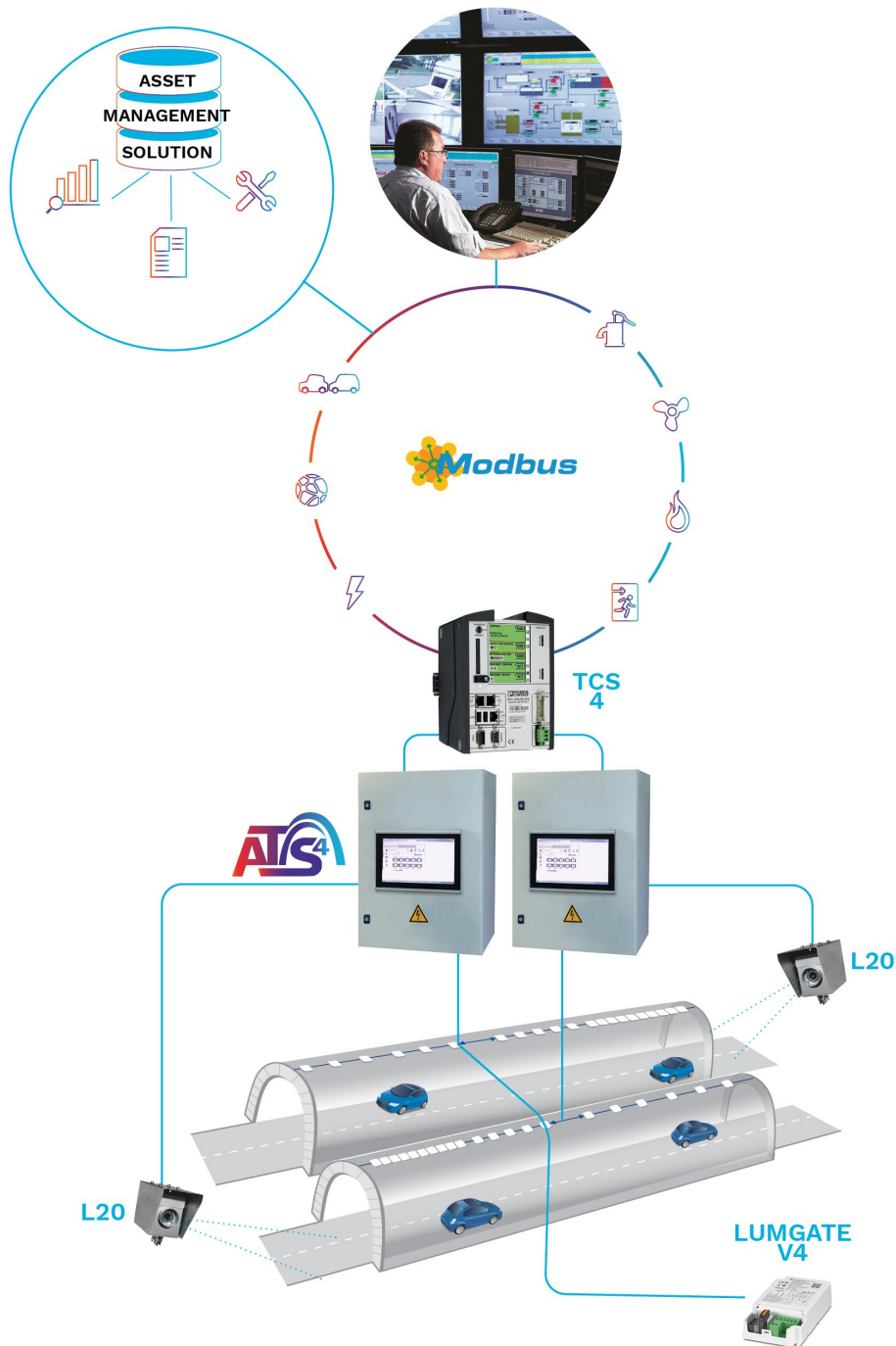
This control system is easy to install and configure. The tunnel lighting study can be directly imported into the ATS 4 control system. This unique feature, in combination with the auto-addressing of the Lumgates, leads to an extremely short commissioning time once the fixtures have been installed. The 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

Circle Light label	Score $\geq 90$ - The product fully meets circular economy requirements
CE mark	Yes
ENEC certified	Yes
ENEC+ certified	Yes
UL certified	Yes
RCM mark	Yes

## HOUSING AND FINISH

Housing	Aluminium
Optic	PMMA
Protector	Tempered glass
Housing finish	Standard polyester powder coating (C2-C3 according to the ISO 9223-2012 standard) Optional "seaside" polyester powder coating (C4 according to the ISO 9223-2012 standard) Optional "seafront" polyester powder coating with anodisation (C5-CX according to the ISO 9223-2012 standard)
Standard colour(s)	AKZO grey 900 sanded
Tightness level	IP66/IP69
Impact resistance	IK 10
Vibration test	Compliant with modified IEC 68-2-6 (0.5G)
Access for maintenance	Tool-less access to gear compartment

## OPERATING CONDITIONS

Operating temperature range (Ta)	-20°C up to +50°C / -4°F up to 122°F
----------------------------------	--------------------------------------

· Depending on the luminaire configuration. For more details, please contact us.

## ELECTRICAL INFORMATION

Electrical class	Class 1 US, Class I EU, Class II 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, Bi-power, 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 (Neutral White NW 740)
Colour rendering index (CRI)	>70 (Neutral White NW 740)

## LIFETIME OF THE LEDS @ TQ 25°C

All configurations	100,000h - L95
--------------------	----------------

· Lifetime may be different according to the size/configurations. Please consult us.



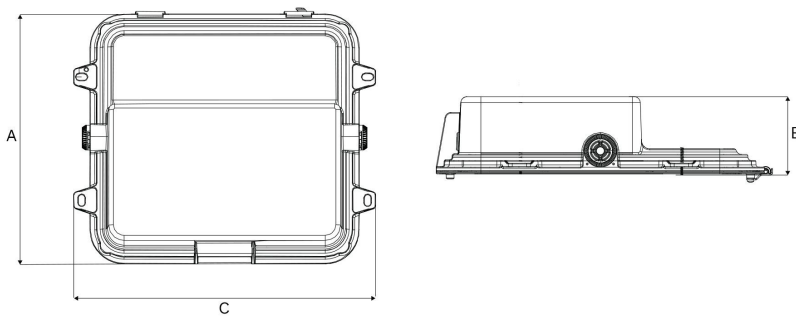
## DIMENSIONS AND MOUNTING

AxBxC (mm | inch) 415x96x488 | 16.3x3.8x19.2

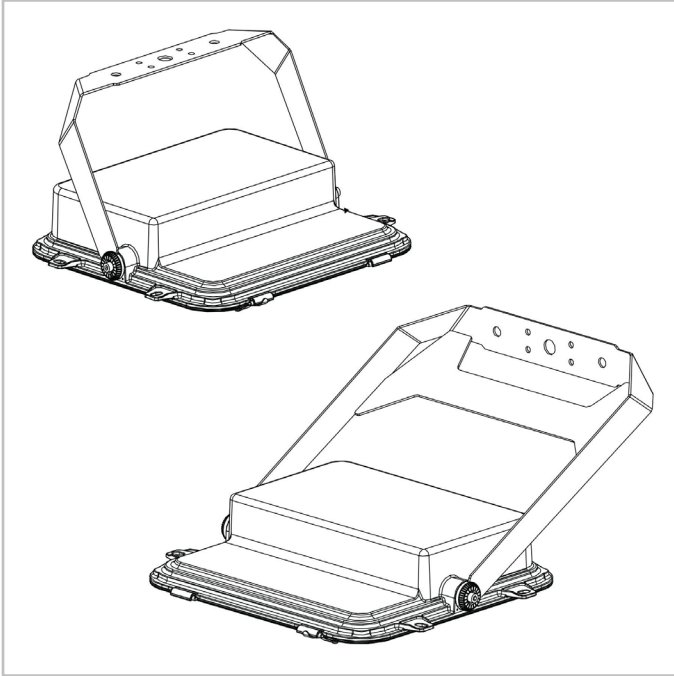
Weight (kg | lbs) 10.7-12.0 | 23.5-26.4

Mounting possibilities  
Hook(s) for suspension  
Surface mounting  
Direct mounting on ceiling  
Wall-mounted

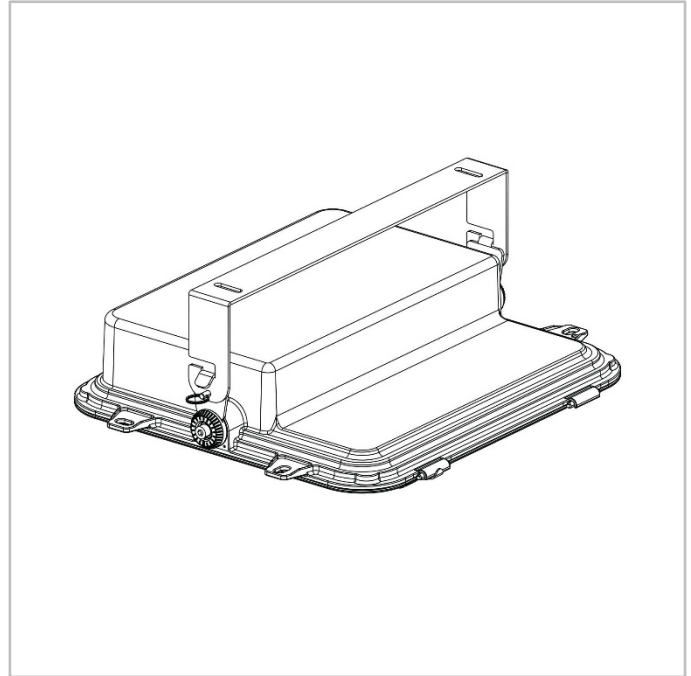
- For more information about mounting possibilities, please consult the installation sheet.
- Size and weight may be different according to the configuration. Please consult us for more information.



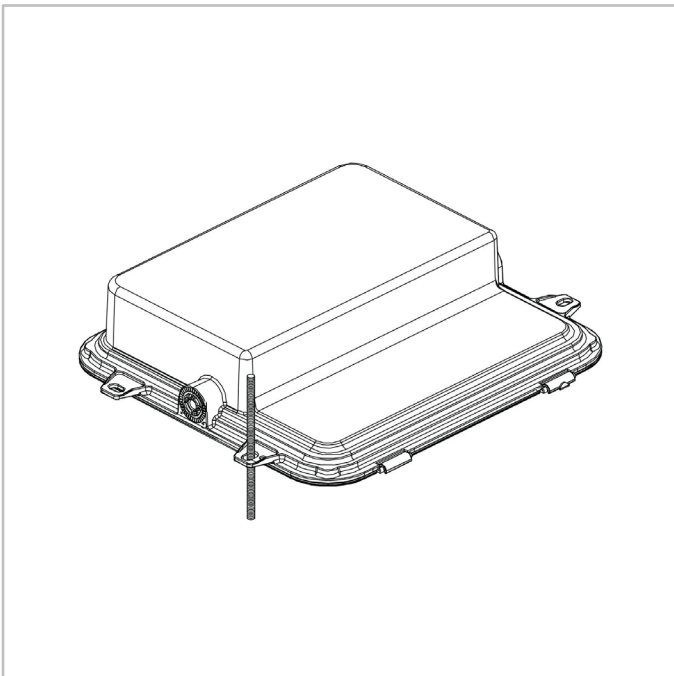
TFLEX BASE | Adjustable bracket – standard and long version



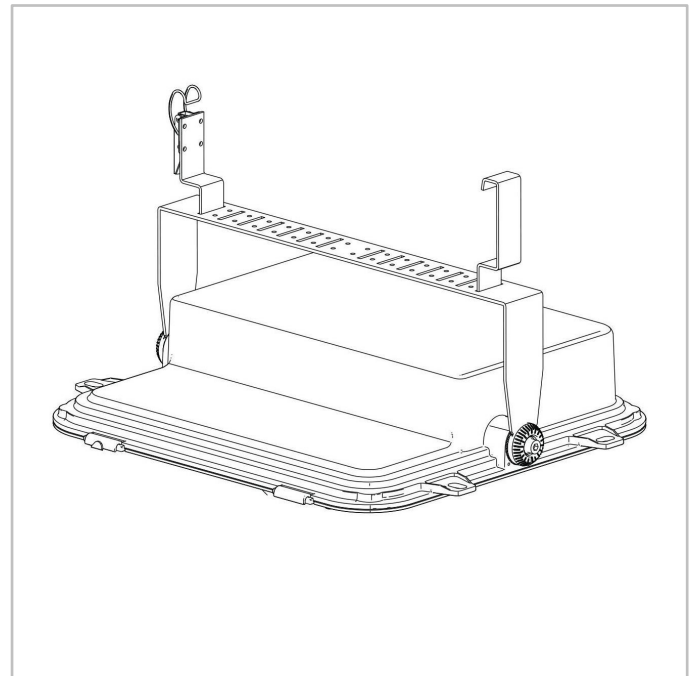
TFLEX BASE | Unpluggable bracket



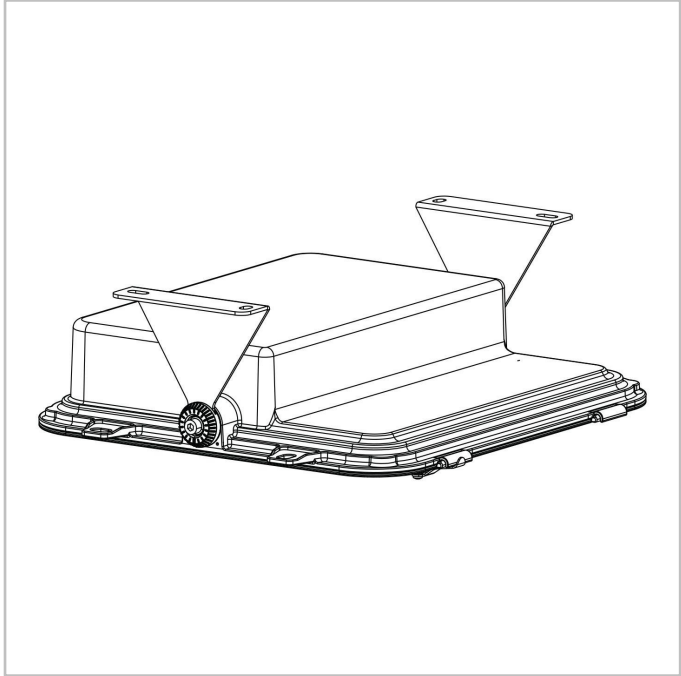
TFLEX BASE | Threaded rod fixation



TFLEX BASE | Hook fixation



TFLEX BASE | Adjustable fixation - ANSI 3G compliant





	Luminaire output flux (lm)		Power consumption (W)		Luminaire efficacy (lm/W)
	Neutral White NW 740		Min	Max	
Number of LEDs	Min	Max	Min	Max	Up to
20	3200	7100	23	52	159
40	6400	14100	44	105	167
60	9600	21300	64	152	170

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