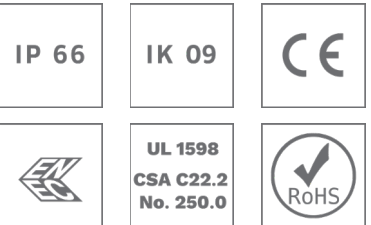# TFLEX STS MODULE



LENSO **FLEX**™4

## Flexible, highly corrosion-resistant lighting for your tunnel

TFLEX STS MODULE is a powerful optical unit dedicated to enhancing tunnel lighting in highly corrosive conditions.

As part of the TFLEX stainless steel solutions, TFLEX STS MODULE offers the most flexible optical unit that can adapt to all tunnel projects and environments, even the harshest ones.

The modularity of the optical modules offers the possibility of creating various lighting configurations to suit any tunnel requirements.

TFLEX STS MODULE has been designed to allow constant dimming to quickly adapt the light to any kind of situation. In combination with an advanced control management system, this innovative optical unit delivers adaptive lighting, with outstanding performance and unparalleled energy savings.

IP 66 | IK 09 | CE

ENEC | UL 1598 CSA C22.2 No. 250.0 | RoHS

TUNNELS & UNDERPASSES

# TFLEX STS MODULE | SUMMARY

**Schréder**

## Concept

TFLEX STS MODULE is the most flexible and complete optical unit on the market, offering modular corrosion-resistant lighting modules, smart cabling, quick connectors and an advanced control system all in one. Available with two types of heat sink, TFLEX STS MODULE adapts to the local requirements of each type of tunnel while ensuring optimal heat dissipation.

Available in two sizes, the modules can be used alone, directly or remotely assembled, making TFLEX STS MODULE a flexible system providing a consistent solution that meets the lighting requirements for various tunnel zones (threshold, transition, interior and exit) and tunnel geometries. The connection to its gear box, TFLEX STS DRIVE, is achieved via CPR-compliant, custom-length cables. These smart cables are equipped with toolless connectors to speed-up and facilitate installation time.

TFLEX STS DRIVE integrates the latest tunnel control technologies to significantly improve tunnel lighting management and minimise time response to any sudden event inside the tunnel.

Combining LED technology to optimise tunnel optics, TFLEX STS MODULE improves lighting levels on road and wall surfaces while providing high visual comfort.

Thanks to its innovative design, TFLEX STS MODULE has been developed to enable constant dimming with an optimised power factor.



TFLEX STS MODULE is a robust solution made of high grade corrosion-resistant stainless steel lighting modules.



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

## TYPES OF APPLICATION

- TUNNELS & UNDERPASSES

## KEY ADVANTAGES

- Flexibility: modular approach for high-power applications

- 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



TFLEX STS MODULE enables flexible dimming with an optimised power factor.



TFLEX STS MODULE uses tool-free, CPR-compliant smart cables, reducing installation time dramatically and improving quality and reliability.

**Schréder**

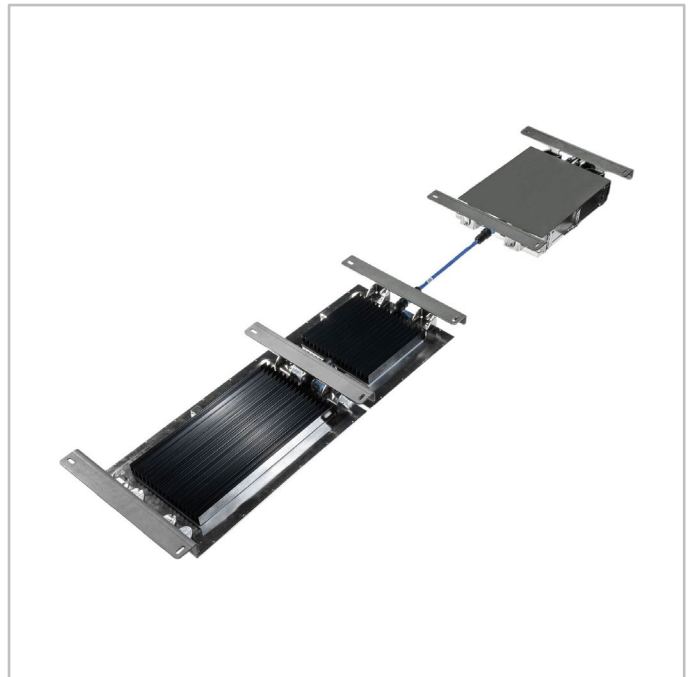## TFLEX STS MODULE | TFLEX STS MODULE 40/HD 40



## TFLEX STS MODULE | TFLEX STS MODULE 60/HD 60



## TFLEX STS MODULE | TFLEX STS MODULE 100/HD 100



## TFLEX STS MODULE | Heat sink with fins (HD version)

**Schréder**

## TFLEX STS MODULE | 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.

**Schréder**
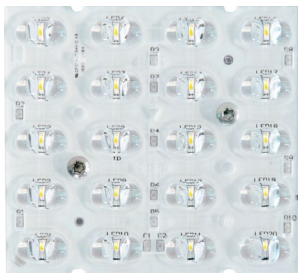
## Advanced Tunnel System 4 (ATS 4)

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.

## 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.

## 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.
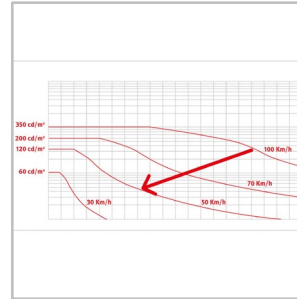
## Sensors and cameras

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.

Jointly developed by Schréder 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.

## PRECISE AND CONTINUOUS DIMMING
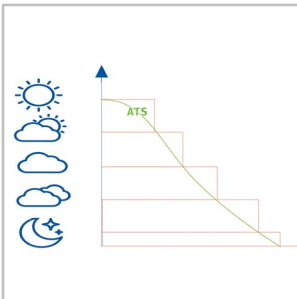


ATS 4 provides 25 different dimming levels to precisely adapt the lighting to the real needs. Without any over-lighting, the energy consumption is limited to what is absolutely necessary to ensure safe and comfortable driving conditions.

## 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
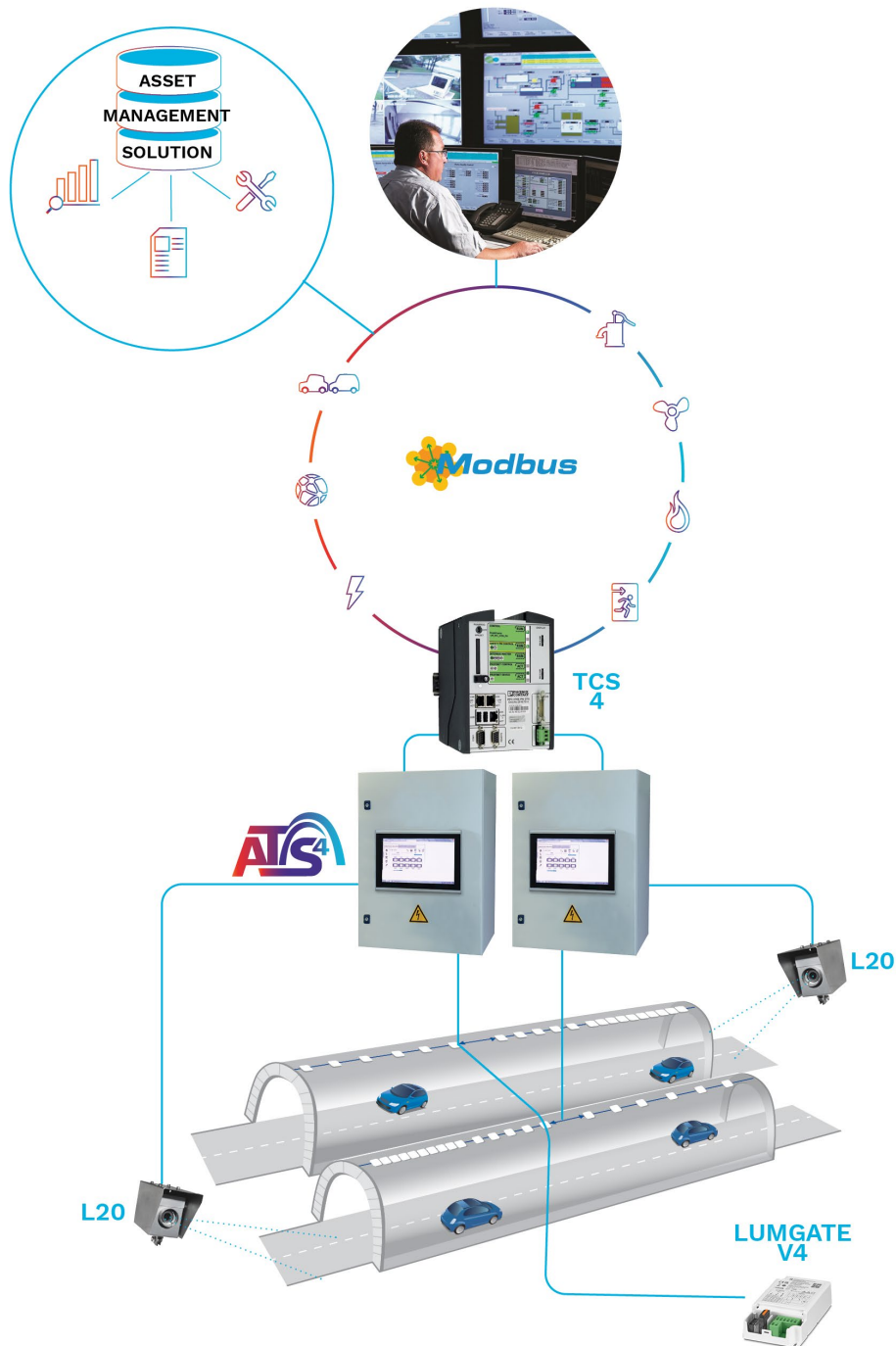
## INTERACTION WITH THIRD PARTY SYSTEMS

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.

## 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.

## 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.

ASSET MANAGEMENT SOLUTION

Modbus

TCS 4

ATS 4

L20

L20

LUMGATE V4

PHŒNIX CONTACT | Schréder
PARTNERS IN TUNNEL INNOVATION

## 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<br>EN 62262<br>UL 1598<br>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<br>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 |

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

## ELECTRICAL INFORMATION

| | |
|---|---|
| Electrical class | Class 1 US, Class I |
| Nominal voltage | 220-240V – 50-60Hz<br>347-480V – 50-60Hz<br>277V - 50-60Hz |
| Surge protection options (kV) | 10<br>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)<br>Advanced Tunnel System 4 DALI (ATS 4 DALI) |

· Electrical information given for the gear box

## 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 (high-power LEDs) |

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

## DIMENSIONS AND MOUNTING

| | |
|---|---|
| AxBxC (mm \| inch) | TFLEX STS MODULE 40 : 440x122x468 \| 17.3x4.8x18.4<br>TFLEX STS MODULE HD40 : 440x122x468.4 \| 17.3x4.8x18.4<br>TFLEX STS MODULE 60 : 440x122x698 \| 17.3x4.8x27.5<br>TFLEX STS MODULE HD60 : 440x122x698.4 \| 17.3x4.8x27.5<br>TFLEX STS MODULE 100 : 440x122x1093 \| 17.3x4.8x43.0<br>TFLEX STS MODULE HD100 : 440x122x1093.4 \| 17.3x4.8x43.0 |
| Weight (kg \| lbs) | TFLEX STS MODULE 40 : 12.2 \| 26.8<br>TFLEX STS MODULE HD40 : 12.3 \| 27.1<br>TFLEX STS MODULE 60 : 16.2 \| 35.6<br>TFLEX STS MODULE HD60 : 17.3 \| 38.1<br>TFLEX STS MODULE 100 : 26.8 \| 59.0<br>TFLEX STS MODULE HD100 : 28.0 \| 61.6 |
| Mounting possibilities | Surface mounting<br>Wall-mounted |

· *For more information about mounting possibilities, please consult the installation sheet.*
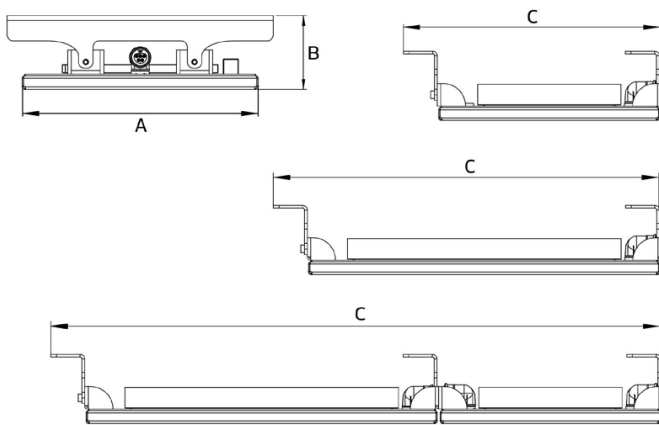
## TFLEX STS MODULE | Fixed brackets - more details in the installation sheet
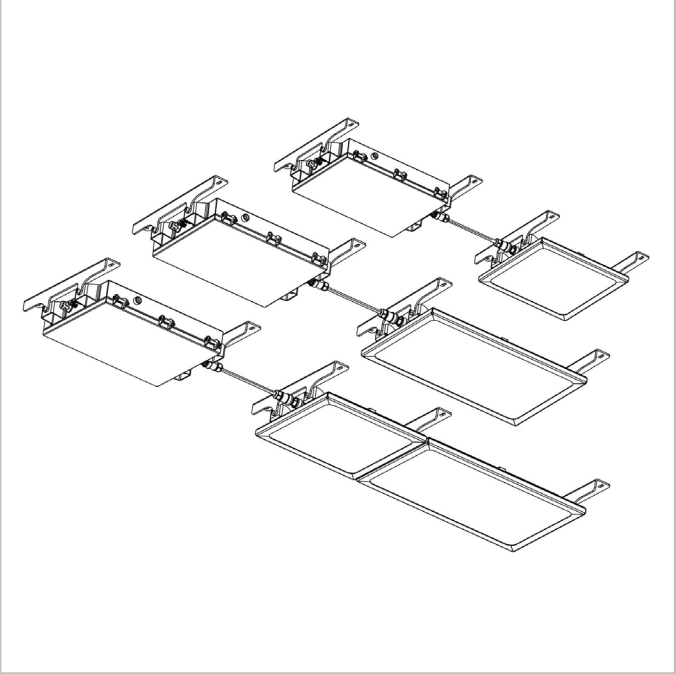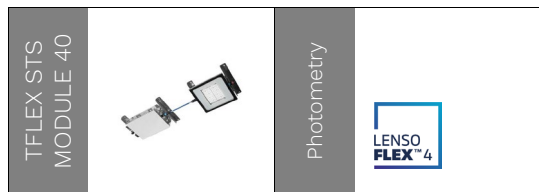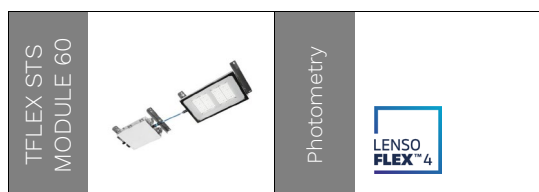
**Schréder**

### TFLEX STS MODULE 40

Photometry

LENSO FLEX™ 4

| | Luminaire output flux (lm) | | Power consumption (W) | | Luminaire efficacy (lm/W) |
|---|---|---|---|---|---|
| | Neutral White NW 740 | | | | |
| Number of LEDs | Min | Max | Min | Max | Up to |
| 80 | 13100 | 23500 | 86 | 164 | 171 |

Tolerance on LED flux is ± 7% and on total luminaire power ± 5 %
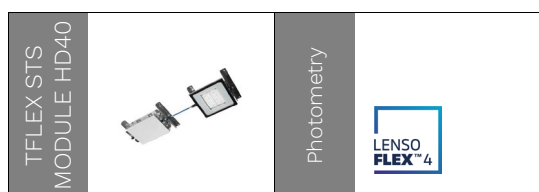
### TFLEX STS MODULE HD40

Photometry

LENSO FLEX™ 4

| | Luminaire output flux (lm) | | Power consumption (W) | | Luminaire efficacy (lm/W) |
|---|---|---|---|---|---|
| | Neutral White NW 740 | | | | |
| Number of LEDs | Min | Max | Min | Max | Up to |
| 80 | 13100 | 28600 | 86 | 204 | 171 |

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

### TFLEX STS MODULE 60

Photometry

LENSO FLEX™ 4

| | Luminaire output flux (lm) | | Power consumption (W) | | Luminaire efficacy (lm/W) |
|---|---|---|---|---|---|
| | Neutral White NW 740 | | | | |
| Number of LEDs | Min | Max | Min | Max | Up to |
| 160 | 26300 | 47100 | 172 | 328 | 171 |

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

**Schréder**

## TFLEX STS MODULE HD60

Photometry

LENSO FLEX™ 4

| | Luminaire output flux (lm) | | Power consumption (W) | | Luminaire efficacy (lm/W) |
|---|---|---|---|---|---|
| | Neutral White NW 740 | | | | |
| Number of LEDs | Min | Max | Min | Max | Up to |
| 160 | 26300 | 54800 | 172 | 408 | 171 |

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

## TFLEX STS MODULE 100

Photometry

LENSO FLEX™ 4

| | Luminaire output flux (lm) | | Power consumption (W) | | Luminaire efficacy (lm/W) |
|---|---|---|---|---|---|
| | Neutral White NW 740 | | | | |
| Number of LEDs | Min | Max | Min | Max | Up to |
| 240 | 63200 | 70700 | 472 | 472 | 150 |

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

## TFLEX STS MODULE HD100

Photometry

LENSO FLEX™ 4

| | Luminaire output flux (lm) | | Power consumption (W) | | Luminaire efficacy (lm/W) |
|---|---|---|---|---|---|
| | Neutral White NW 740 | | | | |
| Number of LEDs | Min | Max | Min | Max | Up to |
| 240 | 69200 | 85900 | 508 | 602 | 152 |

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