TFLEX

LENSO FLEX™4

The all-rounder powerful tunnel lighting platform

TFLEX is a new, revolutionary, modular-based platform for enhanced road tunnel lighting experience.

TFLEX provides optimised, energy-efficient solutions for the various typical tunnel zones from entry to exit, taking into account all design factors and traffic conditions that affect safety, notably traffic characteristics, type of users, tunnel length and geometry. An advanced, fully integrated system with lighting and control, it guarantees the lowest energy consumption while respecting the most stringent tunnel lighting requirements and standards.

With the latest digital and optical technology, TFLEX ensures high visual performance for an improved driving experience.

IK 10

RoHS

CE

PLUS 02

Concept

The TFLEX platform was developed to maximise efficiency and flexibility in tunnels. This unique modular system offers design, mounting, cabling, photometrical and control consistency for three options: optical units (TFLEX MODULE) with remote gears (TFLEX DRIVE), complete assemblies with LED engine and gears in a whole pack (TFLEX COMBI) and dedicated luminaires (TFLEX BASE).

This flexible portfolio provides a homogeneous platform that meets all tunnel lighting requirements, irrespective of the zone (access, threshold, transition, interior and exit), the preferred lighting concept, the mounting requirements or the tunnel geometry.

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

The TFLEX range combines the energy efficiency of LED technology with the photometric performance of the latest LensoFlex®4 platform developed by Schréder. It integrates specific tunnel optics for symmetrical, pro-beam or counter-beam (CBL) lighting distributions to optimise lighting levels on road and wall surfaces while providing high visual comfort.

The TFLEX range has been developed to enable constant dimming with an optimised power factor. Designed with two electronic circuits, each TFLEX BASE or MODULE 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 is part of Schréder'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.

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
- High-power LED solution to replace HID luminaires in the entrance and interior zones
- Separate housings for gear (DRIVE) and optical units (MODULE/COMBI) for optimised thermal management in high-power applications
- Designed for long-lasting performance
- Tool-free access for easy maintenance

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

Preassembled tool-free fire rated cables and connectors used for TFLEX reduce the installation time and improve quality and reliability.

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

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

TFLEX | BASE (IP 66/69 / IK 10)

TFLEX | MODULE (IP 66/69 / IK 10)

TFLEX | DRIVE (IP 66/69 / IK 09)

TFLEX | MODULE 1 (with DRIVE)

TFLEX | MODULE 2 (with DRIVE)

TFLEX | MODULE 3 (with DRIVE)

TFLEX | COMBI 1 (IP 66/69 / IK 09)

TFLEX | COMBI 2 (IP 66/69 / IK 09)

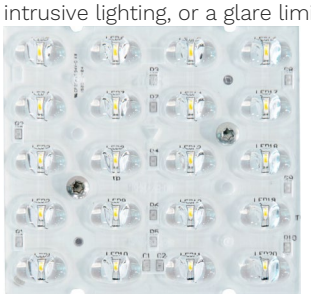
TFLEX | COMBI 3 (IP 66/69 / IK 09)

TFLEX | COMBI 1 + 1 remote module

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.

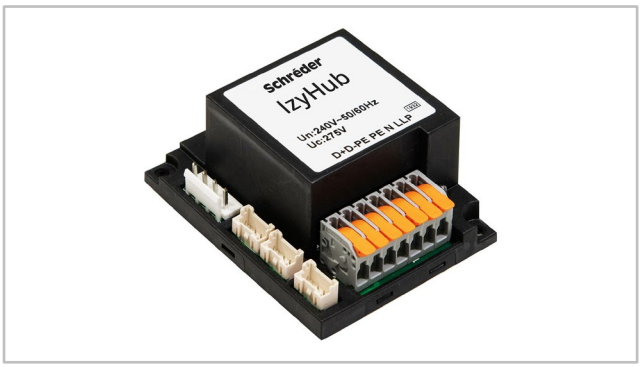
LensoFlex®4 optics can feature backlight control to prevent intrusive lighting, or a glare limiter for high visual comfort.



IzyHub

IzyHub is an innovative device that aims to keep luminaire installation and maintenance hassle-free. This single central connection hub distributes electricity and control information to all parts of the luminaire, ensuring that all components work together and offering reliable, long-term performance.

Its compact size and error-proof connections enable smaller and lighter luminaires that are easier to maintain and upgrade.



Surge Protection

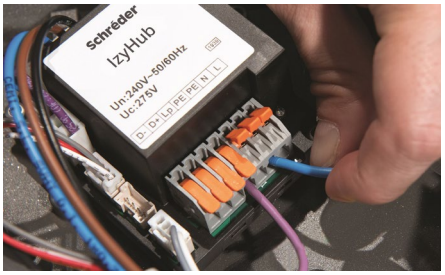
IzyHub features a built-in surge protection device. This prevents electrical surges resulting from lightning strikes and other transient voltages that originate from the mains network from damaging the luminaire, even in the most demanding conditions. The protective device also includes an end-of-life LED warning light, indicating that the luminaire is protected correctly.

User-friendly

Installing a luminaire has never been easier. IzyHub features tool-free connector as the main connection terminal. It enables 30% shorter installation times compared with standard solutions. Lever actuated spring-loaded electrical connectors provide optimal contact throughout the entire life of the product.

Easy maintenance

On the rare occasion that a component needs to be replaced in the luminaire, IzyHub makes sure that operations are carried out quickly and easily. Luminaire component connections are keyed so that mixing up electrical connections is physically impossible. Installers do not need to trace wires individually: plug it in, and it works straight away.



Versions and upgrades

IzyHub has several versions featuring different connectivity options.

IzyHub can include an SPD, can work with external dimming and operate with all type of control sockets. It is also able to provide bi-power control and to include fuse options.

These options provide flexibility for future upgrades by only having to replace the IzyHub to connect the new equipment. No complicated re-wiring needed.

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.

One Lumgate can control several luminaires.

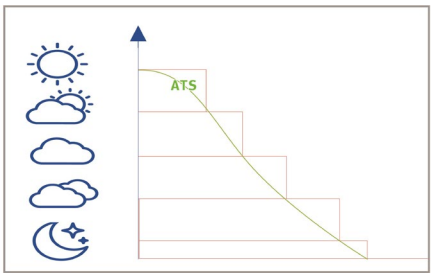
Tunnel Control System (TCS)

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 Schréder 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

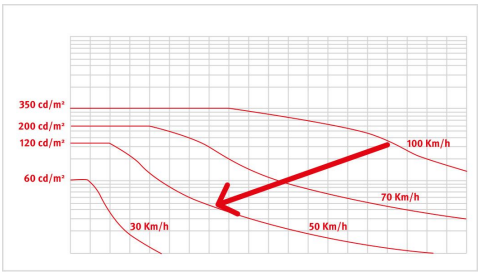
Every command or signal sent to or coming from a tunnel component (emergency exit, smoke extraction system, traffic management system...) can be used to trigger a responsive lighting scenario. All of the tunnel equipment can be controlled through the same bus command.

MAXIMISED SAFETY

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

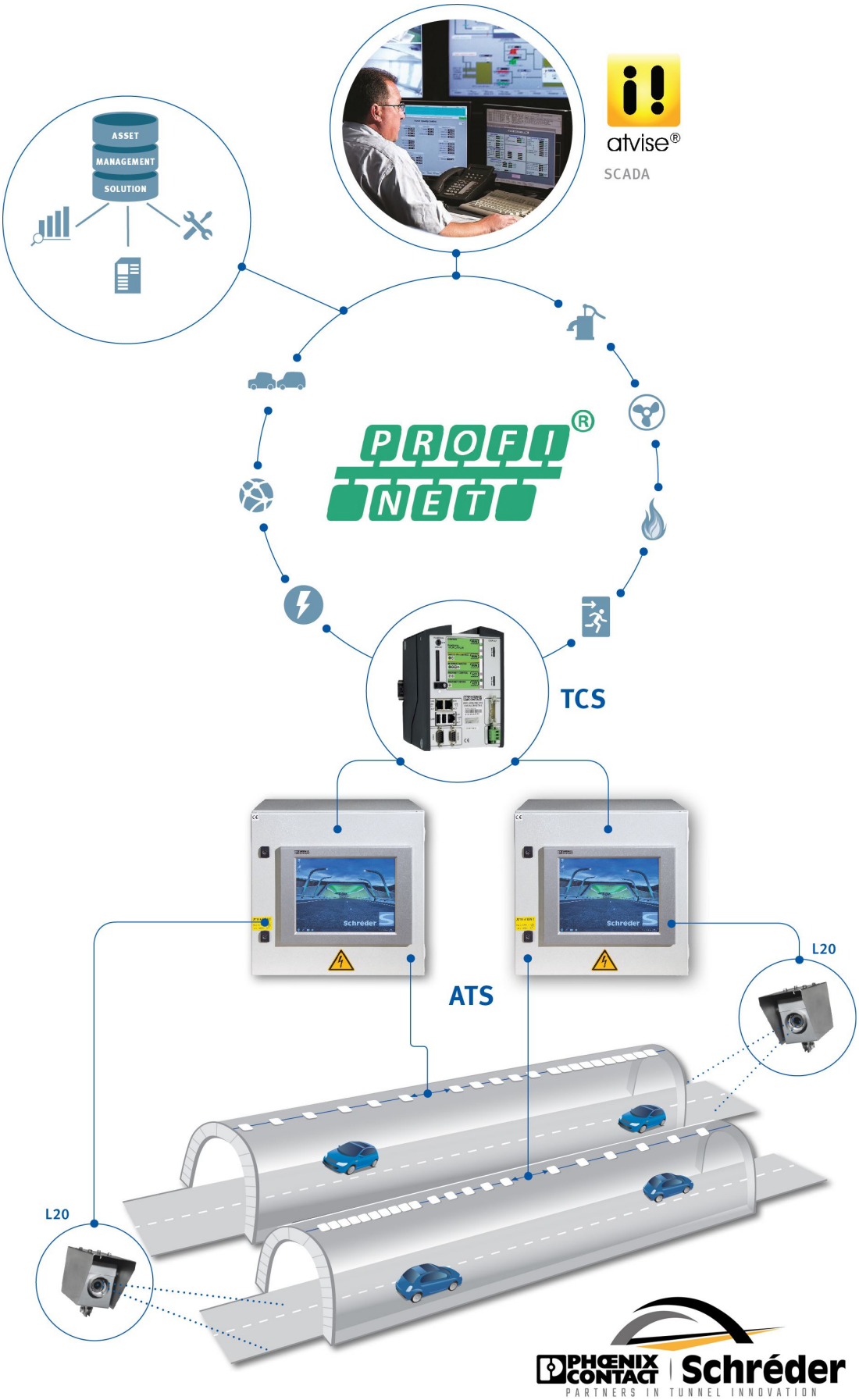
ADAPTIVE LIGHTING ACCORDING TO SPEED

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

Circle Light label	Score >90 - The product fully meets circular economy requirements
CE mark	Yes
ENEC certified	Yes
ENEC+ certified	Yes
ROHS compliant	Yes
Testing standard	LM 79-08 (all measurements in ISO17025 accredited laboratory)

HOUSING AND FINISH

Housing	Aluminium
Optic	PMMA
Protector	Tempered glass
Housing finish	TIKAL Tef-Gel® galvanic anti-corrosion treatment for screws 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
Access for maintenance	Tool-less access to gear compartment

OPERATING CONDITIONS

Operating temperature range (Ta)	-40 °C to +55 °C / -40 ° F to 131 °F

· 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 / EN 61547
Control protocol(s)	RS422 Closed Loop, 1-10V, DALI
Control options	Lumgate, Bi-power, Remote management
Associated control system(s)	Advanced Tunnel Solution (ATS)

· Electrical information given for the gear box

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 - L95

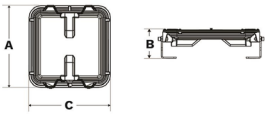
· Lifetime may be different according to the size/configurations. Please consult us.

DIMENSIONS AND MOUNTING

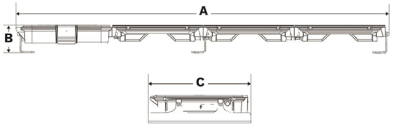
AxBxC (mm | inch)	TFLEX BASE - 488x244x415 | 19.2x9.6x16.3 TFLEX MODULE 1 - 385x69x389 | 15.2x2.7x15.3 TFLEX MODULE 2 - 385x69x788 | 15.2x2.7x31.0 TFLEX MODULE 3 - 385x69x1177 | 15.2x2.7x46.3 TFLEX COMBI 1 - 440x117x786 | 17.3x4.6x30.9 TFLEX COMBI 2 - 440x117x1175 | 17.3x4.6x46.3 TFLEX COMBI 3 - 440x117x1564 | 17.3x4.6x61.6
Weight (kg | lbs)	TFLEX BASE - 11 | 24.2 TFLEX MODULE 1 - 8 | 17.6 TFLEX MODULE 2 - 15 | 33.0 TFLEX MODULE 3 - 23 | 50.6 TFLEX COMBI 1 - 16 | 35.2 TFLEX COMBI 2 - 23 | 50.6 TFLEX COMBI 3 - 32 | 70.4
Mounting possibilities	Bracket enabling adjustable inclination Suspended mounting Surface mounting

TFLEX BASE

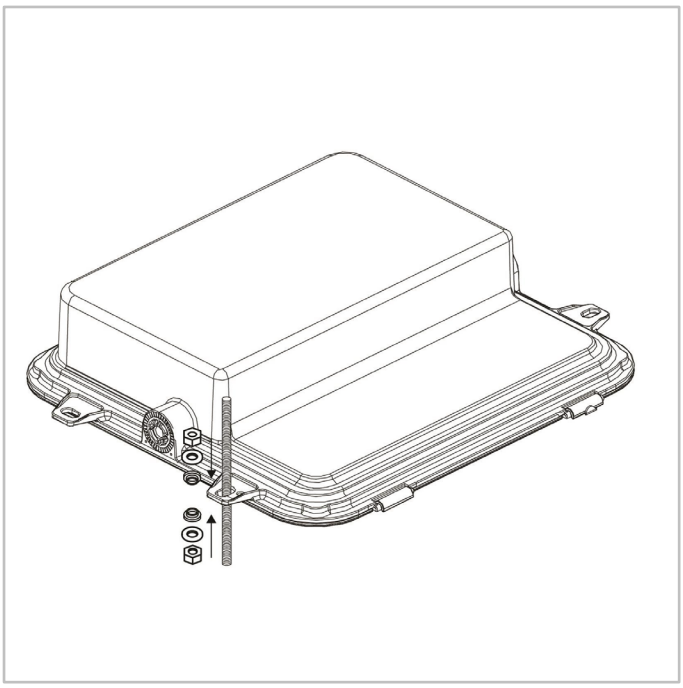
TFLEX MODULE



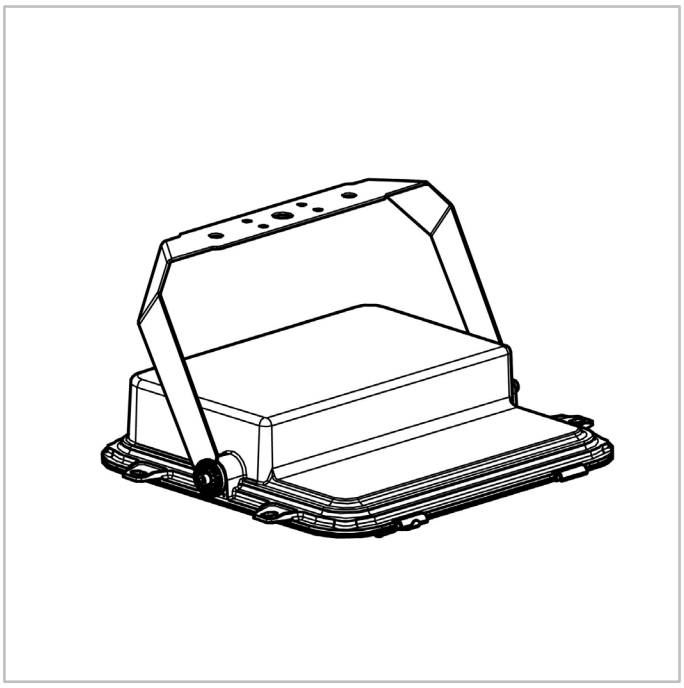
TFLEX COMBI



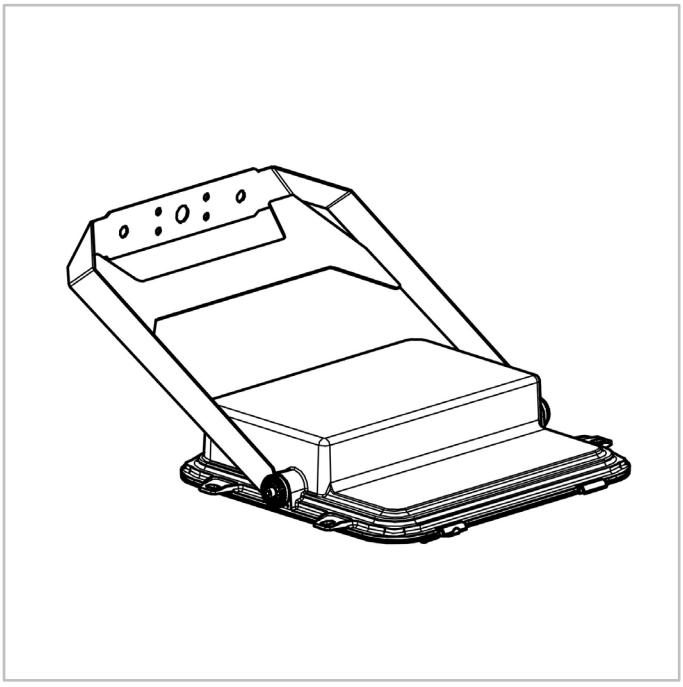
TFLEX | BASE - 4 slots for tie-rod mounting - more details in the TFLEX BASE installation sheet.



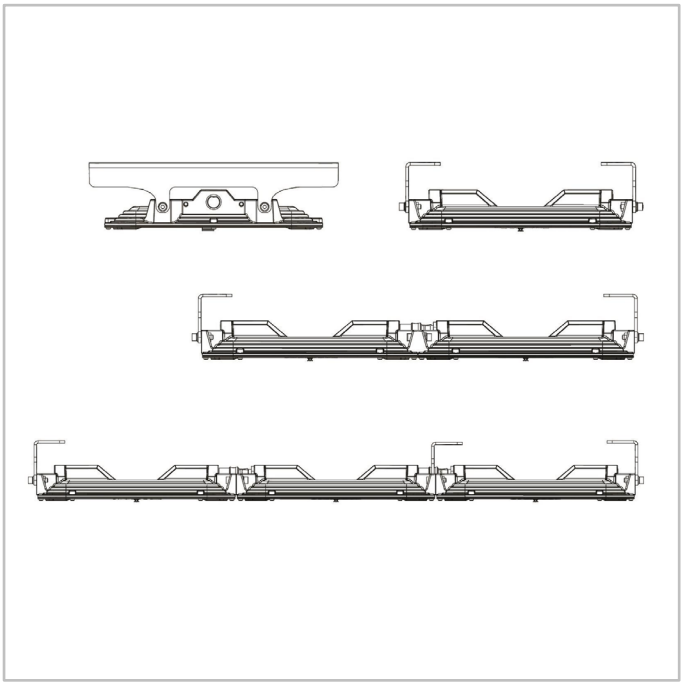
TFLEX | BASE - short bracket - more details in the TFLEX BASE installation sheet.



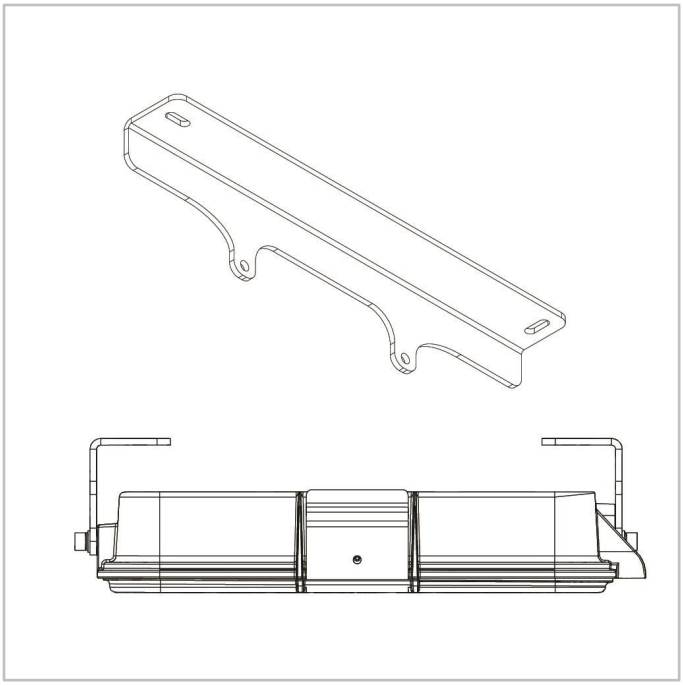
TFLEX | BASE - long bracket, ANSI 3G certified - more details in the TFLEX BASE installation sheet.



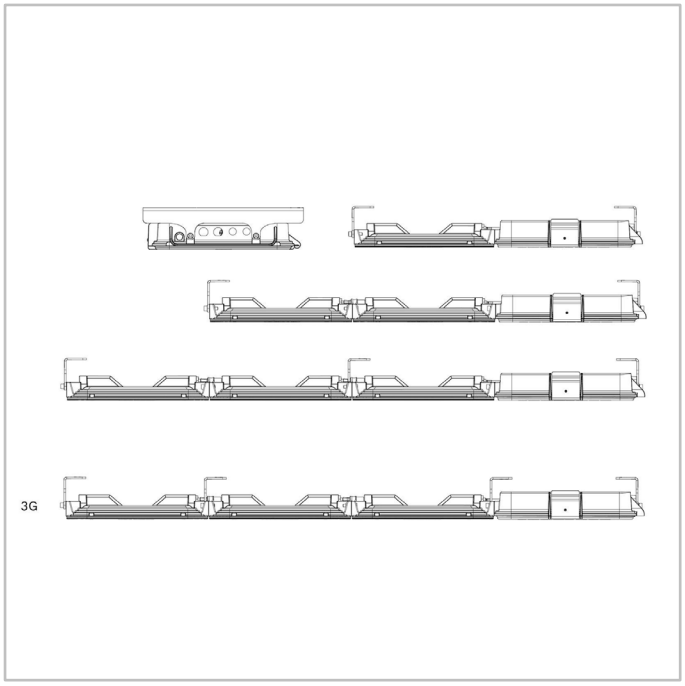
TFLEX | MODULE - standard fixed brackets DRIVE - more details in the TFLEX MODULE installation sheet.



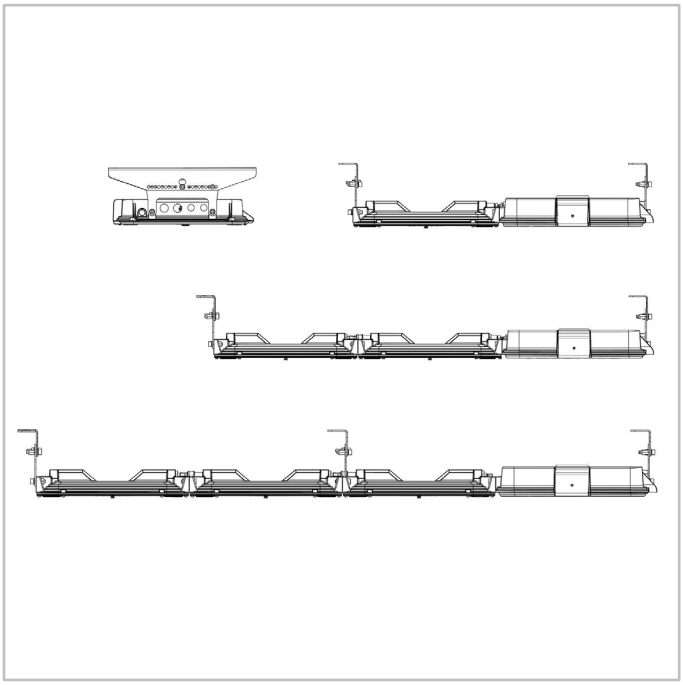
TFLEX | DRIVE - standard fixed brackets - more details in the TFLEX DRIVE installation sheet.



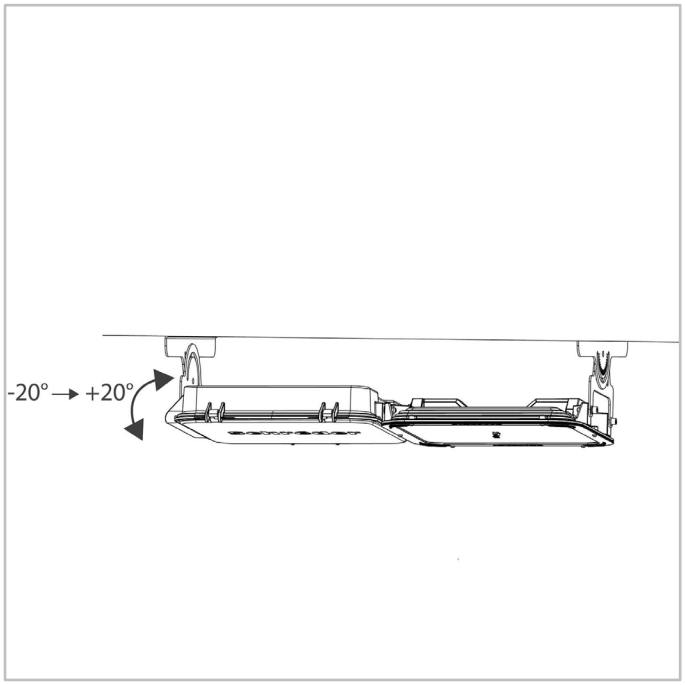
TFLEX | COMBI - standard brackets (ANSI 1G and 3G options) - more details in the TFLEX COMBI installation sheet.



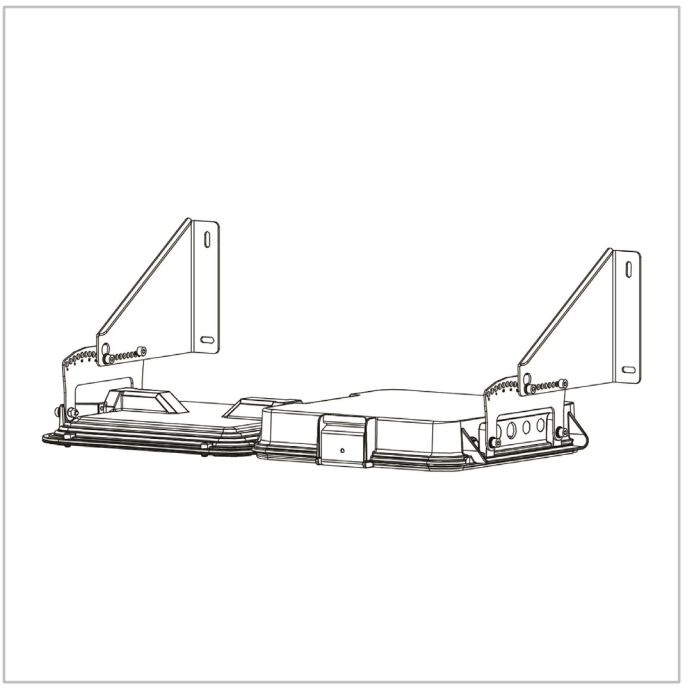
TFLEX | COMBI - pull-out swivelling mounting - more details in the TFLEX COMBI installation sheet.



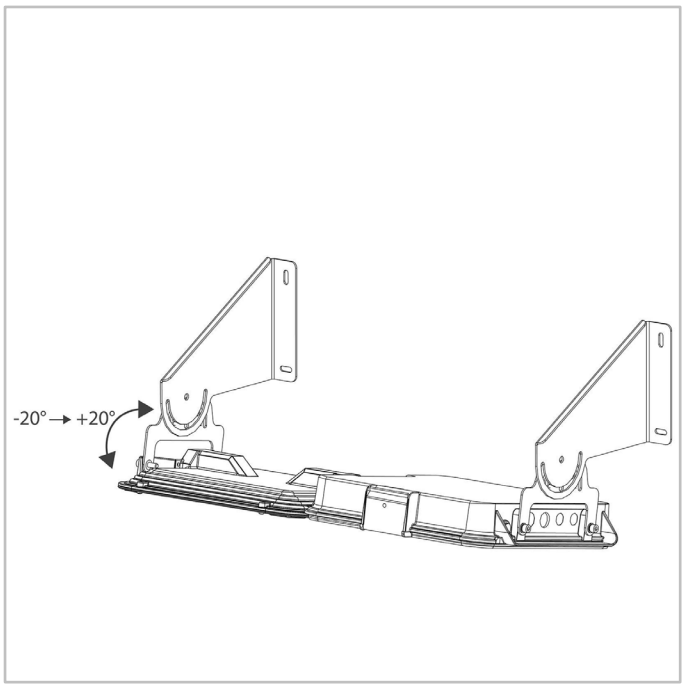
TFLEX | COMBI - adjustable swivelling mounting - more details in the TFLEX COMBI installation sheet.



TFLEX | COMBI - pull-out swivelling wall mounting - more details in the TFLEX COMBI installation sheet.



TFLEX | COMBI - adjustable swivelling wall mounting - more details in the TFLEX COMBI installation sheet.



Luminaire	Number of LEDs	Current (mA)	Luminaire output flux (lm) Neutral White 740 Min	Luminaire output flux (lm) Neutral White 740 Max	Power consumption (W)	Luminaire efficacy (lm/W) Up to	Photometry
TFLEX BASE	20	350	3300	3500	22.9	153	LENSO FLEX 4
	20	400	3700	3900	26.1	149	LENSO FLEX 4
	20	500	4500	4800	32.7	147	LENSO FLEX 4
	20	600	5300	5500	39.2	140	LENSO FLEX 4
	20	670	5700	6000	44	136	LENSO FLEX 4
	20	700	5900	6300	45.5	138	LENSO FLEX 4
	40	350	6600	7000	46	165	LENSO FLEX 4
	40	400	7500	7900	52	160	LENSO FLEX 4
	40	500	9100	9600	65	154	LENSO FLEX 4
	40	630	11100	11700	82	146	LENSO FLEX 4
	40	670	11600	12300	88	145	LENSO FLEX 4
	40	700	12000	12700	91	144	LENSO FLEX 4
	60	350	10000	10600	64	168	LENSO FLEX 4
	60	400	11300	11900	73	163	LENSO FLEX 4
	60	500	13600	14400	93	157	LENSO FLEX 4
	60	610	16100	16900	114	148	LENSO FLEX 4
	60	700	17900	18900	135	145	LENSO FLEX 4

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

			Luminaire output flux (lm) Neutral White 740		Power consumption (W)	Luminaire efficacy (lm/W)	
Luminaire	Number of LEDs	Current (mA)	Min	Max		Up to	Photometry
TFLEX MODULE 1	80	350	12800	13800	87	164	
	80	400	14400	15500	99	157	
	80	500	17400	18600	125	154	
	80	600	20200	21600	152	143	
	80	630	21000	22500	160	142	
	80	700	22700	24400	178	139	
	80	880	26700	28600	224	129	
	80	900	27100	29100	231	127	
	80	1000	29000	31100	264	120	

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

			Luminaire output flux (lm) Neutral White 740		Power consumption (W)	Luminaire efficacy (lm/W)	
Luminaire	Number of LEDs	Current (mA)	Min	Max		Up to	Photometry
TFLEX MODULE 2	120	350	19300	20700	128	164	LENSO FLEX 4
	120	400	21600	23200	146	159	LENSO FLEX 4
	120	500	26100	28000	186	152	LENSO FLEX 4
	120	610	30700	32900	228	144	LENSO FLEX 4
	120	700	34100	36600	266	141	LENSO FLEX 4
	120	800	37600	40400	304	133	LENSO FLEX 4
	120	900	40700	43600	342	127	LENSO FLEX 4
	120	1000	43500	46600	388	120	LENSO FLEX 4
	160	350	25700	27600	172	164	LENSO FLEX 4
	160	400	28800	31000	198	157	LENSO FLEX 4
	160	500	34800	37300	248	154	LENSO FLEX 4
	160	600	40400	43300	302	143	LENSO FLEX 4
	160	700	45500	48800	356	137	LENSO FLEX 4
	160	880	53500	57400	444	129	LENSO FLEX 4
	160	900	54200	58200	456	128	LENSO FLEX 4
	160	1000	58000	62200	518	122	LENSO FLEX 4

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

			Luminaire output flux (lm) Neutral White 740		Power consumption (W)	Luminaire efficacy (lm/W)	
Luminaire	Number of LEDs	Current (mA)	Min	Max		Up to	Photometry
TFLEX MODULE 3	240	700	68300	73300	524	140	LENSO FLEX 4

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

			Luminaire output flux (lm) Neutral White 740		Power consumption (W)	Luminaire efficacy (lm/W)	
Luminaire	Number of LEDs	Current (mA)	Min	Max		Up to	Photometry
TFLEX COMBI 1	80	350	12800	13800	87	164	LENSO FLEX 4
	80	400	14400	15500	99	157	LENSO FLEX 4
	80	500	17400	18700	125	155	LENSO FLEX 4
	80	600	20200	21700	152	144	LENSO FLEX 4
	80	630	21000	22600	160	142	LENSO FLEX 4
	80	700	22800	24500	178	139	LENSO FLEX 4
	80	800	25200	27000	204	134	LENSO FLEX 4
	80	880	26900	28900	224	130	LENSO FLEX 4
	80	900	27300	29300	228	129	LENSO FLEX 4
	80	1000	29200	31300	264	121	LENSO FLEX 4

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

			Luminaire output flux (lm) Neutral White 740		Power consumption (W)	Luminaire efficacy (lm/W)	
Luminaire	Number of LEDs	Current (mA)	Min	Max		Up to	Photometry
TFLEX COMBI 2	120	350	19300	20700	128	164	LENSO FLEX 4
	120	400	21700	23200	146	159	LENSO FLEX 4
	120	500	26200	28100	186	153	LENSO FLEX 4
	120	600	30500	32700	224	146	LENSO FLEX 4
	120	610	30800	33000	228	145	LENSO FLEX 4
	120	700	34300	36800	266	142	LENSO FLEX 4
	120	800	37800	40600	304	134	LENSO FLEX 4
	120	900	41000	44000	342	129	LENSO FLEX 4
	120	1000	43800	47000	388	121	LENSO FLEX 4
	160	350	25700	27600	172	164	LENSO FLEX 4
	160	400	28900	31000	198	157	LENSO FLEX 4
	160	500	35000	37500	248	155	LENSO FLEX 4
	160	600	40600	43600	302	144	LENSO FLEX 4
	160	700	45800	49100	356	138	LENSO FLEX 4
	160	800	50400	54100	402	135	LENSO FLEX 4
	160	880	53800	57800	444	130	LENSO FLEX 4
	160	900	54700	58600	456	129	LENSO FLEX 4
	160	1000	58500	62700	518	123	LENSO FLEX 4

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

			Luminaire output flux (lm) Neutral White 740		Power consumption (W)	Luminaire efficacy (lm/W)	
Luminaire	Number of LEDs	Current (mA)	Min	Max		Up to	Photometry
TFLEX COMBI 3	240	700	68700	73700	524	141	LENSO FLEX 4

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

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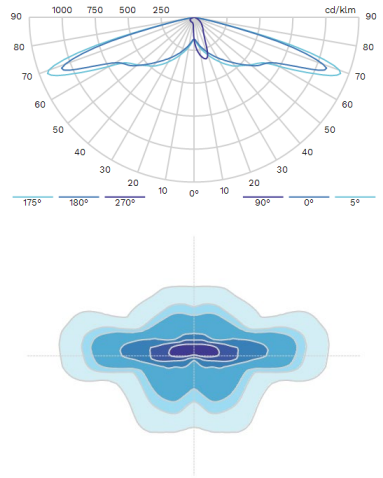

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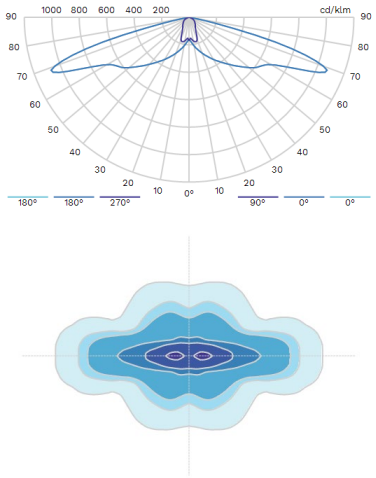
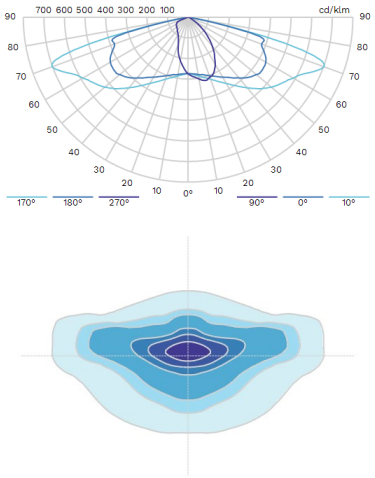
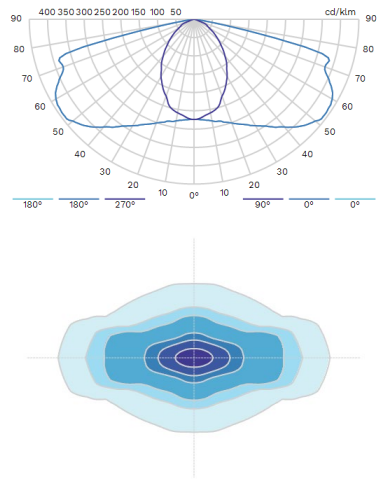


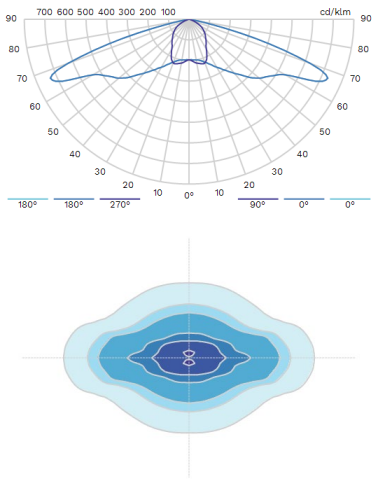
5301



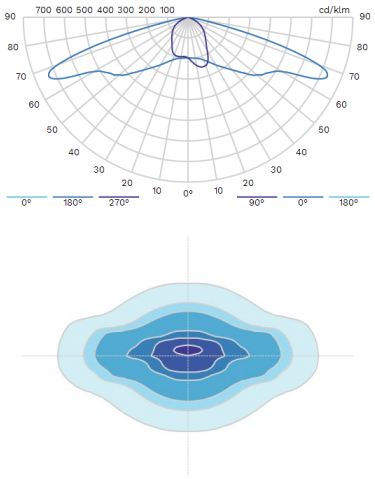
5301 SY



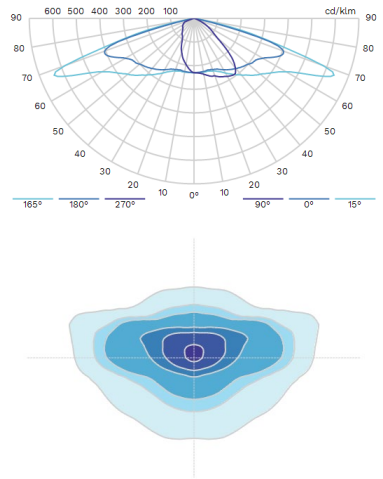
5302 SY



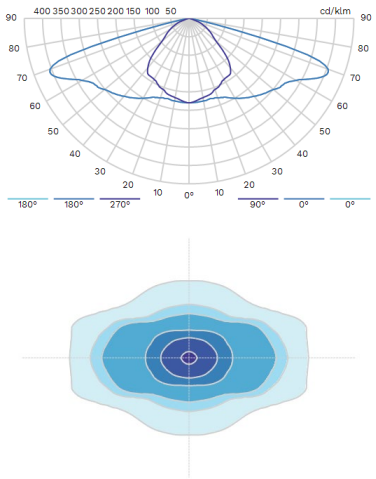
5302 Wall-mounted 2/3 Front 1/3 Rear



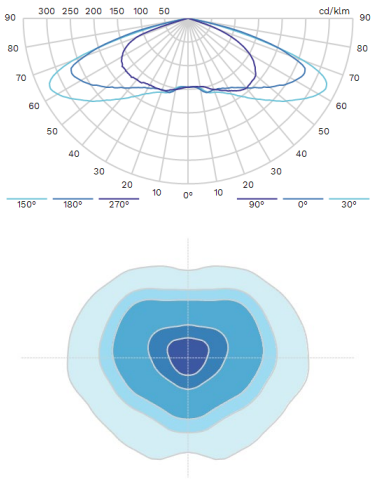
5303



5303 SY

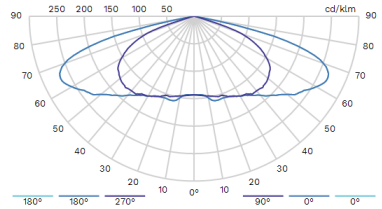


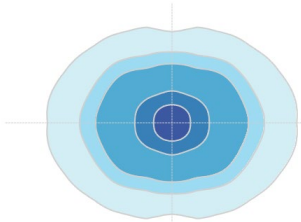
5304



LENSO FLEX 4

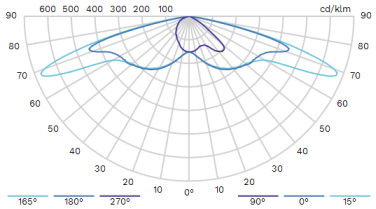
5304 SY

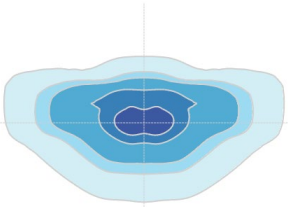




LENSO FLEX 4

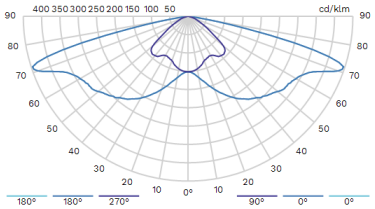
5305

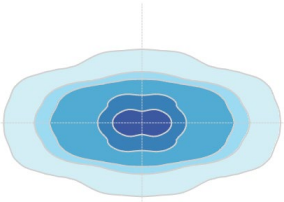




LENSO FLEX 4

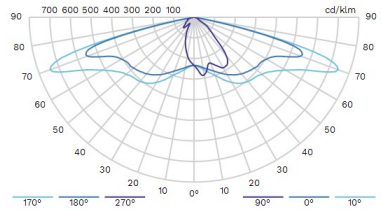
5305 SY

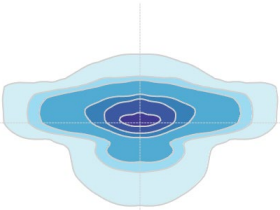




LENSO FLEX 4

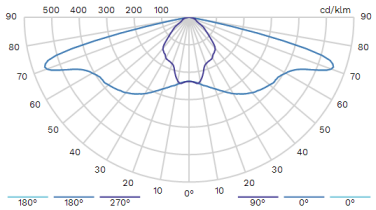
5306

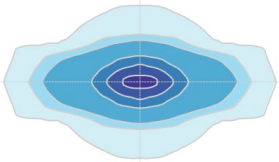




LENSO FLEX 4

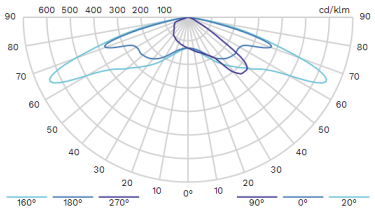
5306 SY

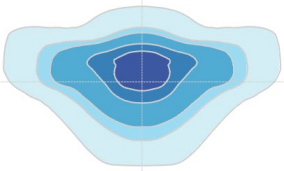




LENSO FLEX 4

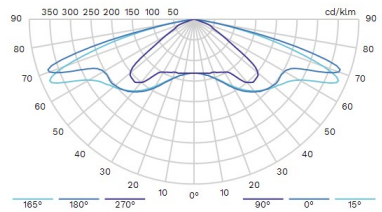
5307

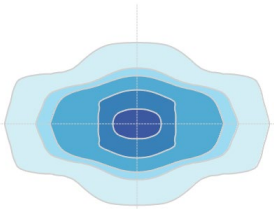




LENSO FLEX 4

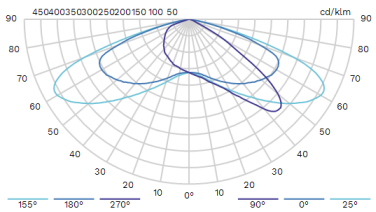
5307 SY

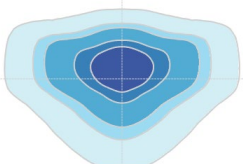




LENSO FLEX 4

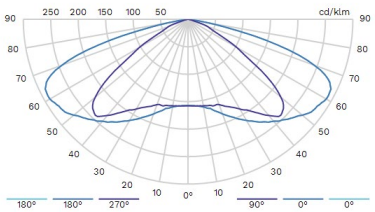
5308

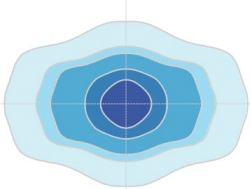




LENSO FLEX 4

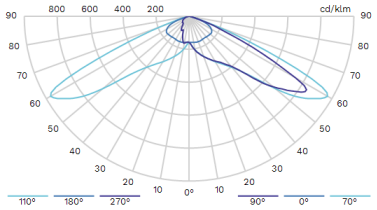
5308 SY

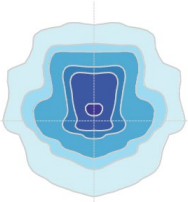




LENSO FLEX™4

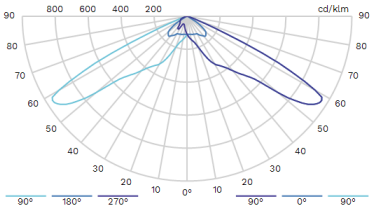
5351

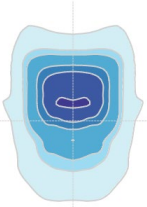




LENSO FLEX™4

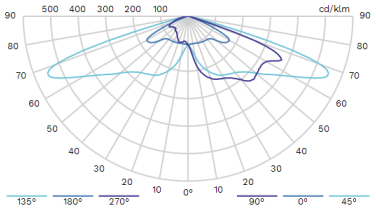
5352

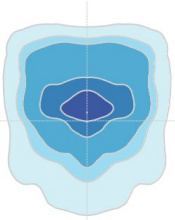




LENSO FLEX™4

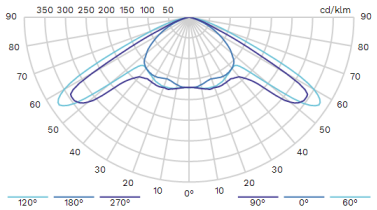
5353

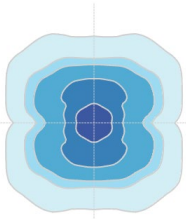




LENSO FLEX™4

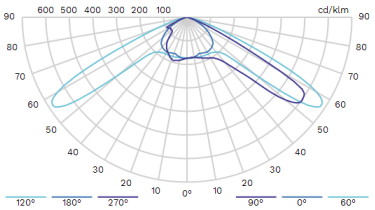
5366 SY

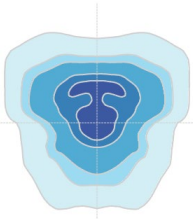




LENSO FLEX™4

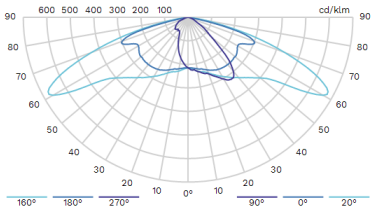
5366 Wall-mounted

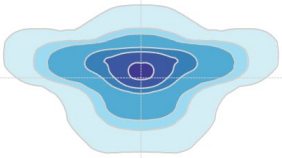




LENSO FLEX™4

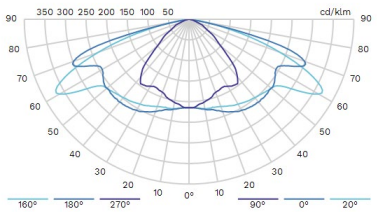
5367

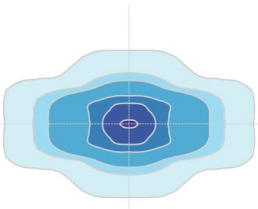




LENSO FLEX™4

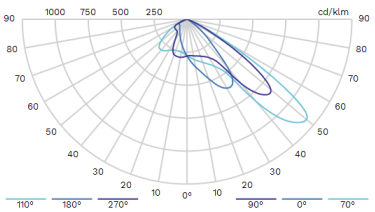
5367 SY

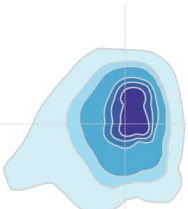




LENSO FLEX™4

5369 Wall mounted + Zebra right





LENSO FLEX™4

5370 Wall mounted + Zebra left