TRIDONIC

EM powerLED BASIC FX 80 W

Combined emergency lighting LED driver

Product description
_ Fixed output LED driver for mains operation with integrated Simple CORRIDOR FUNCTION (CF)
_ Emergency lighting LED driver with manual test function
_ For self-contained emergency lighting
_ For LED modules with a forward voltage of 50 – 230 V in normal operation
_ For LED modules with a forward voltage of 50 – 200 V in emergency operation
_ For luminaire installation
_ Low profile casing (21 x 30 mm cross-section)
_ 5 years guarantee (conditions at https://www.tridonic.com/manufacturer-guarantee-conditions)

Properties
_ 25 – 80 W output power
_ Constant current LED operation
_ 150 – 500 mA output current in mains operation selectable with I-SELECT PLUG in steps of 25 mA
_ Simple CORRIDOR FUNCTION (CF) with 10 % light level
_ Integrated emergency lighting unit
_ 1 or 3 h rated duration selectable with plug (duration link)
_ Standard or High output selectable with plug (output link)
_ Automatic shutdown of output if LED load is out of range
_ Green charge status display LED
_ Electronic charge system
_ Polarity reversal protection for battery
_ Deep discharge protection
_ Short-circuit-proof battery connection

Batteries
_ High-temperature cells
_ NiCd or NiMH batteries
_ D, Cs or LA cells
_ 4 year design life
_ 1 year guarantee (conditions at https://www.tridonic.com/manufacturer-guarantee-conditions)
_ For battery compatibility refer to data sheet

Website
http://www.tridonic.com/

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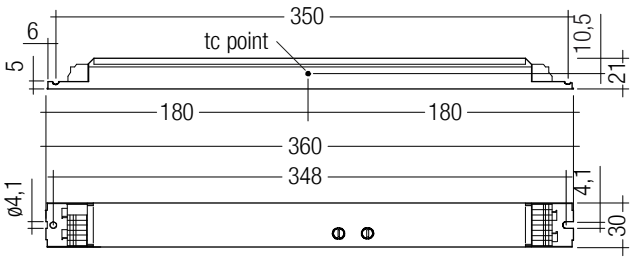


Supplied with duration link in 3 h pos. and standard/high output link in standard pos. Remove duration link for 1 h duration. Remove standard/high output link for high output config. Choose settings before battery and mains connection.

Approval marks

EL RoHS

Standards

EN 55015, EN 61000-3-2, EN 61000-3-3, EN 61347-2-13, EN 61547, EN 62384, according to EN 60598-2-22, according to EN 50172, EN 61347-2-7

Test switch EM3

Accessory

Product description
_ For connection to the emergency lighting unit
_ For checking the device function
_ Plug connection
_ Dielectric strength: 1,500 V AC for 60 seconds

Website
http://www.tridonic.com/89899956

Ordering data

Type	Article number	Packaging, bag	Packaging, carton	Weight per pc.
Test switch EM 3	**89899956**	25 pc(s).	200 pc(s).	0.01 kg

Approval marks

RoHS

Status indication green LED EM

Accessory

Product description
_ A green LED indicates that charging current is flowing into the battery

Website
http://www.tridonic.com/89899605

Ordering data

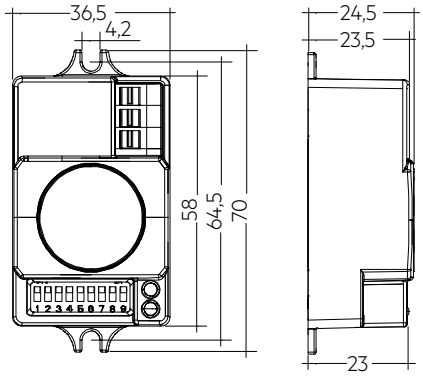
Type	Article number	Packaging, bag	Packaging, carton	Weight per pc.
LED EM green	**89899605**	25 pc(s).	200 pc(s).	0.011 kg
LED EM green, ultra high brightness	**89899756**	25 pc(s).	200 pc(s).	0.012 kg

Approval marks

RoHS

smartSWITCH HF 5DP f

Accessory



Product description

- Motion detector for luminaire installation
- Motion detection through glass and thin materials (except metal)
- For automatic on/off switching of luminaires with electronic ballasts and LED drivers
- Bright-out function: luminaire is not switched on if there is adequate brightness
- Delay time, detection range and light value for the bright-out function can be set via 9 dip switches
- Max. installation height 5 m
- Two housing options allowing flexible installation
- Variable detection area (100 – 10 %)
- Zero cross switching supported
- 5 years guarantee (conditions at https://www.tridonic.com/manufacturer-guarantee-conditions)

Website

http://www.tridonic.com/28002214

Ordering data

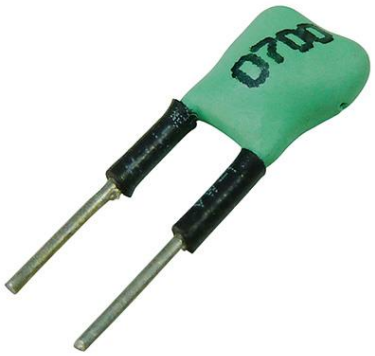
Type	Article number	Dimensions L x W x H	Packaging, carton	Weight per pc.
smartSWITCH HF 5DP f	**28002214**	70 x 36.5 x 24.5 mm	5 pc(s).	0.04 kg
smartSWITCH HF 5DP S f	**28002235**	58 x 52.0 x 24.5 mm	5 pc(s).	0.04 kg

Approval marks

RoHS

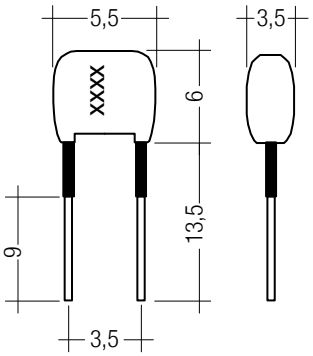
I-SELECT PLUG E

Accessory



Product description
_ Ready-for-use resistor to set output current value
_ Resistor is base insulated
_ Resistor power 0.25 W
_ Resistor value tolerance ± 1 %

Website
http://www.tridonic.com/28000612



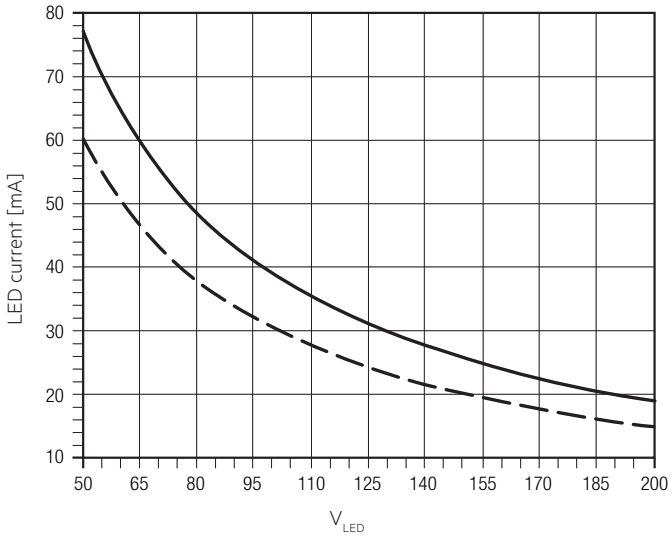
Battery selection

EM powerLED BASIC FX 80 W, 1 / 3 h

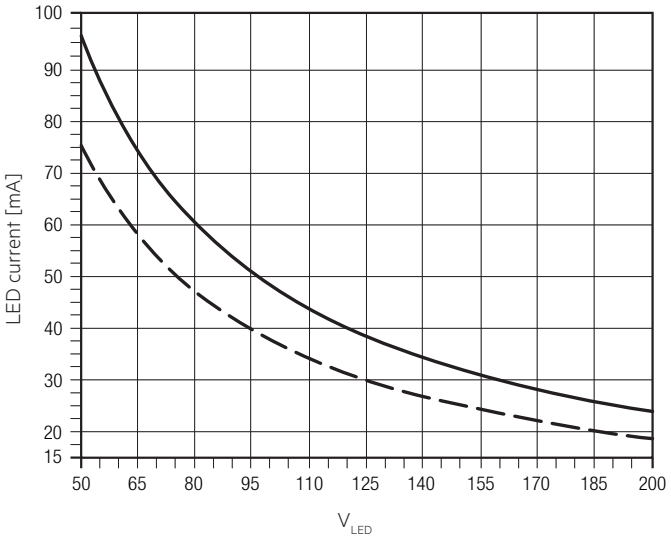
				Type	**EM powerLED BASIC FX 104 LP 80W 200V**		**EM powerLED BASIC FX 104 LP 80W 200V**	
				Article no.	**89800393**		**89800393**	
				Cells	**4 cells**		**5 cells**	
				Output link	**in**		**remove**	
				Duration	**1 h**	**3 h**	**1 h**	**3 h**
Technology and capacity	Design	Number of cells	**Type**	**Article no.**	**Assignable batteries**			
NiCd 1.6 Ah Cs cells	stick	1 x 4	**Accu-NiCd C 4A**	**89899692**	•			
	stick	1 x 5	**Accu-NiCd C 5A**	**89899695**			•	
	stick + stick	2 + 2	**Accu-NiCd C 4C**	**89899694**	•			
	stick + stick	2 + 3	**Accu-NiCd C 5C**	**89899697**			•	
	side by side	4 x 1	**Accu-NiCd C 4B**	**89899693**	•			
	side by side	5 x 1	**Accu-NiCd C 5B**	**89899696**			•	
NiCd 4 Ah D cells	stick	1 x 4	**Accu-NiCd 4A 55**	**89800089**		•		
	stick	1 x 5	**Accu-NiCd 5A 55**	**28002774**				•
	stick + stick	2 + 2	**Accu-NiCd 4C 55**	**28002775**		•		
	stick + stick	2 + 3	**Accu-NiCd 5C 55**	**89800090**				•
	side by side	4 x 1	**Accu-NiCd 4B 55**	**89800385**		•		
NiMH 2.2 Ah Cs cells	stick	1 x 4	**Accu-NiMH 4A**	**28002089**	•			
	stick	1 x 5	**Accu-NiMH 5A**	**28002090**			•	
	side by side	5 x 1	**Accu-NiMH 5B**	**28002093**			•	
NiMH 4 Ah LA cells	stick	1 x 4	**Accu-NiMH 4Ah 4A CON**	**89800442**		•		
	stick + stick	2 + 2	**Accu-NiMH 4Ah 4C CON**	**89800438**		•		
	stick + stick	2 + 3	**Accu-NiMH 4Ah 5C CON**	**89800439**				•

Typ. LED current/voltage characteristics
The LED current in emergency mode is automatically adjusted by the EM powerLED module based on the total forward voltage of the LED modules connected and the associated battery.

EM powerLED BASIC FX 104 LP 80W 200V – 4 cells
Article number: 89800393
4.8 V battery voltage
750 – 960 mA battery discharge current (tolerance)



EM powerLED BASIC FX 104 LP 80W 200V – 5 cells
Article number: 89800393
6.0 V battery voltage
750 – 960 mA battery discharge current (tolerance)



LED current at nominal battery voltage and min. battery discharge current

LED current at nominal battery voltage and max. battery discharge current

LED peak current at start in emergency mode – 4 cells

Voltage	Inrush current	Duration
50 V	160 mA	20 ms
75 V	131 mA	10 ms
100 V	110 mA	8 ms
125 V	100 mA	6 ms
150 V	85 mA	4 ms
175 V	75 mA	3 ms
200 V	55 mA	3 ms

LED peak current at start in emergency mode – 5 cells

Voltage	Inrush current	Duration
50 V	175 mA	20 ms
75 V	140 mA	13 ms
100 V	125 mA	10 ms
125 V	110 mA	8 ms
150 V	100 mA	6 ms
175 V	90 mA	5 ms
200 V	75 mA	3 ms

Note: LED peak current is measured at the max. battery discharge current.

Output current setting
Output current can be set by connecting a resistor between the 2 "I set" terminals. Relationship between output current and resistor value can be found at the table "Specific technical data". Resistor values specified from standardised resistor value ranges.
Resistor value tolerance has to be ≤ 1 %.
Resistor power has to be ≥ 0.1 W.
Resistor detection at each start.
Change of the resistor value during the operation will be not considered.
Resistors for the main output current values can be ordered from Tridonic (see accessories).

Note: The I SET terminals are rated as Non-SELV

Overload protection
LED Driver will switch off at overload operation. Mains reset is required to restart the LED Driver.

Underload operation
LED Driver will switch off at underload operation. Mains reset is required to restart the LED Driver.

Short-circuit behaviour
In case of a short circuit the unit switches to shut down mode. After elimination of the short circuit a mains reset (SL off/on) is necessary.

Forward voltage out of range
If the forward voltage is out of range the unit switches to shut down mode. After elimination of the short circuit a mains reset (SL off/on) is necessary.

No-load operation or load loss during operation
LED Driver will detect a load loss during operation. In this case and no-load operation the max. output voltage can apply at the LED output for max. 5 s before LED Driver shuts down. Mains reset is required to restart the LED Driver.

Temperature range
The LED Driver life duration is related to the ambient temperature ta.
The relation of tc to ta temperature depends also on the luminaire design. If the measured tc temperature is approx. 5 K below tc max. or higher, ta temperature should be checked and eventually critical components (e.g. ELCAP) measured.
Detailed information on request.

Standards
- EN 55015
- EN 61000-3-2
- EN 61000-3-3
- EN 61347-2-13
- EN 61547
- EN 62384
- EN 61347-2-7
- according to EN 50172
- according to EN 60598-2-22

Isolation and electric strength testing of luminaires
Electronic LED Drivers can be damaged by high voltage. This has to be considered during the routine testing of the luminaires in production.

According to IEC 60598-1 Annex Q (informative only!) or ENEC 303-Annex A, each luminaire should be submitted to an isolation test with 500 VDC for 1 second. This test voltage should be connected between the interconnected phase and neutral terminals and the earth terminal. The isolation resistance must be at least 2 MΩ.

As an alternative, IEC 60598-1 Annex Q describes a test of the electrical strength with 1,500 VAC (or 1,414 x 1,500 VDC). To avoid damage to the electronic devices this test **must not be conducted**.

Technical data batteries

Accu-NiCd
1.6 Ah

Battery voltage/cell	1.2 V
Cell type	Cs
Case temperature range to ensure 4 years design life	+5 °C to +55 °C
Max. short term temperature (reduced life-time)	70 °C
Max. number discharge cycles	12 cycles per year plus 4 cycles during comissioning
Max. storage time	6 months

4.2 / 4.5 Ah

Battery voltage/cell	1.2 V
Cell type	D
Case temperature range to ensure 4 years design life	+5 °C to +55 °C
Max. short term temperature (reduced life-time)	70 °C
Max. number discharge cycles	12 cycles per year plus 4 cycles during comissioning
Max. storage time	6 months

Accu-NiMh
2.2 Ah

Battery voltage/cell	1.2 V
Cell type	Cs
Case temperature range to ensure 4 years design life	+5 °C to +50 °C
Max. short term temperature (reduced life-time)	70 °C
Max. number discharge cycles	4 cycles per year plus 30 cycles during comissioning
Max. storage time	12 months

4.0 Ah

Battery voltage/cell	1.2 V
Cell type	LA
Case temperature range to ensure 4 years design life	+5 °C to +45 °C
Max. short term temperature (reduced life-time)	70 °C
Max. number discharge cycles	4 cycles per year plus 30 cycles during comissioning
Max. storage time	12 months

Batteries
Connection method: 4.8 x 0.5 mm spade tag welded to end of cell

For stick packs this connection is accessible after the battery caps have been fitted.

To inhibit inverter operation disconnect the batteries by removing the connector from the battery spade tag.

For further information refer to corresponding battery datasheet.

Storage, installation and commissioning
Relevant information about storage conditions, installation and commissioning are provided in the battery datasheets.

Mechanichal details
Channel manufactured from galvanised steel.
Cover manufactured from white pre-coated steel.

LED status indicator
- Green
- Mounting hole 6.5 mm diameter, 1 – 1.6 mm thickness
- Lead length 0.3 m / 1.0 m
- Insulation rating: 90 °C
- Plug connection

Test switch
- Mounting hole 7.0 mm diameter
- Lead length 0.55 m
- Plug connection

Battery leads
- Quantity: 1 red and 1 black
- Length: 1.3 m
- Wire type: 0.5 mm² solid conductor
- Insulation rating: 90 °C

Battery end termination
Push on 4.8 mm receptacle to suit battery spade fitted with insulating cover

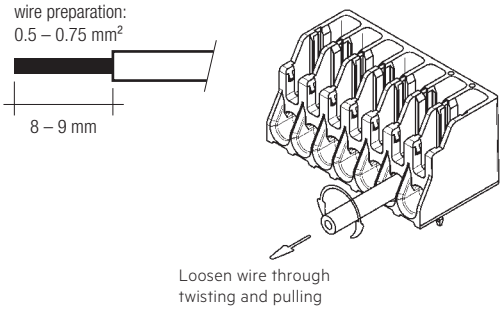
Module end termination
8.0 mm stripped insulation

Two-piece batteries are supplied with a 200 mm lead with 4.8 mm receptacle at each end and insulting covers to connect the separate sticks together.

Electrical connections

Wiring

LED module/LED Driver/supply



IDC interface
- solid wire with a cross section of 0.5 mm² according to the specification from IDC terminals

Earth connection

The earth connection is conducted as protection earth (PE). The LED Driver can be earthed via earth terminal or metal housing. If the LED Driver will be earthed, protection earth (PE) has to be used. There is no earth connection required for the functionality of the LED Driver.
Earth connection is recommended to improve following behaviour.

- Electromagnetic interferences (EMI)
- LED glowing at standby
- Transmission of mains transients to the LED output

In general it is recommended to earth the LED Driver if the LED module is mounted on earthed luminaire parts respectively heat sinks and thereby representing a high capacity against earth.

Wiring type and cross section
Solid wire with a cross section of 0.5 – 0.75 mm². Strip 8 – 9 mm of insulation from the cables to ensure perfect operation of terminals.

Installation instruction
Max. torque for the mounting screws: 0.5 Nm / M4.

You must make sure that the LED is connected with the correct polarity. LEDs that are connected to EM powerLED should have polarity reversal protection such as a Schottky diode. There may be irreversible damage if the LED is connected with the wrong polarity. The protection device must be capable of handling a load of more than 700 mA.

Life-time
Average life-time 50,000 hours under rated conditions with a failure rate of less than 10 %. Average failure rate of 0.2 % per 1000 operating hours.

Maximum lead length
LED 3 m
Status indication LED 1 m
Batteries 1.3 m

Storage conditions
Humidity: 5 % up to max. 85 %, not condensed (max. 56 days/year at 85 %)

Storage temperature: -40 °C up to max. +80 °C

The devices have to be within the specified temperature range (ta) before they are operated.

Expected life-time

Type	Output power	**ta**	**40 °C**	**50 °C**	**55 °C**
EM powerLED BASIC FX 104 LP 80W 200V	25 W	tc	57 °C	60 °C	72 °C
		life-time	> 100,000 h	> 100,000 h	85,000 h
	45 W	tc	61 °C	71 °C	71 °C
		life-time	> 100,000 h	75,000 h	55,000 h
	65 W	tc	63 °C	70 °C	73 °C
		life-time	> 100,000 h	70,000 h	70,000 h
	80 W	tc	67 °C	70 °C	x
		life-time	> 100,000 h	50,000 h	x

x = not permitted

Maximum loading of automatic circuit breakers

Automatic circuit breaker type	C10	C13	C16	C20	B10	B13	B16	B20	Inrush current	
Installation Ø	1.5 mm²	1.5 mm²	2.5 mm²	2.5 mm²	1.5 mm²	1.5 mm²	2.5 mm²	2.5 mm²	I_{max}	time
EM powerLED BASIC FX 104 LP 80W 200V	12	18	24	28	6	9	12	14	32.6 A	260 µs

Harmonic distortion in the mains supply (at 230 V / 50 Hz and full load) in %

Type	THD	3	5	7
EM powerLED BASIC FX 104 LP 80W 200V	10 %	8 %	3 %	3 %

Duration link selection

Duration	Usage duration link
3 h	With link
1 h	Without link

Standard/High output selection

Output	Usage link
Standard output 4 cells	With link
High output 5 cells	Without link

Note: LED Driver supplied with duration link in 3 hours position and standard/high output link in standard output position. Remove duration link for 1 hour duration. Remove standard/high output link for high output configuration. Duration link and standard/high output link must be set before battery and mains connection.

Wiring guidelines

- The output to the LED is DC but has high frequency content, which should be considered for good EMC compliance.
- LED leads should be separated from the mains connections and wiring for good EMC performance.
- Maximum lead length on the LED terminals is 3 m. For a good EMC performance keep the LED wiring as short as possible.
- The secondary wires (LED module) should be routed in parallel to ensure good EMC performance.
- Maximum lead length for the Test switch and Indicator LED connection is 1 m. The test switch and Indicator LED wiring should be separated from the LED leads to prevent noise coupling.
- Battery leads are specified with 0.5 mm cross section and a length of 1.3 m.
- To avoid the damage of the control gear, the wiring must be protected against short circuits to earth (sharp edged metal parts, metal cable clips, louver, etc.).

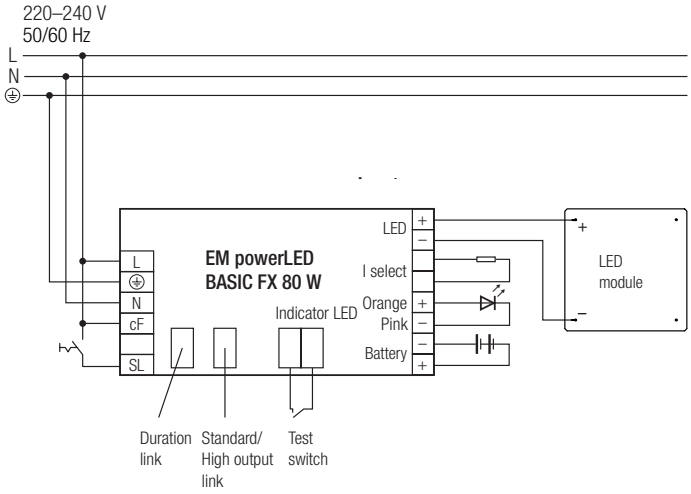
To ensure that a luminaire containing LED emergency units complies with EN 55015 for radio frequency conducted interference in both normal and emergency mode it is essential to follow good practice in the wiring layout.

Within the luminaire the switched and unswitched 50 Hz supply wiring must be routed as short as possible and be kept as far away as possible from the LED leads.Through wiring may affect the emc performance of the luminaire.

The length of LED leads must not be exceeded.

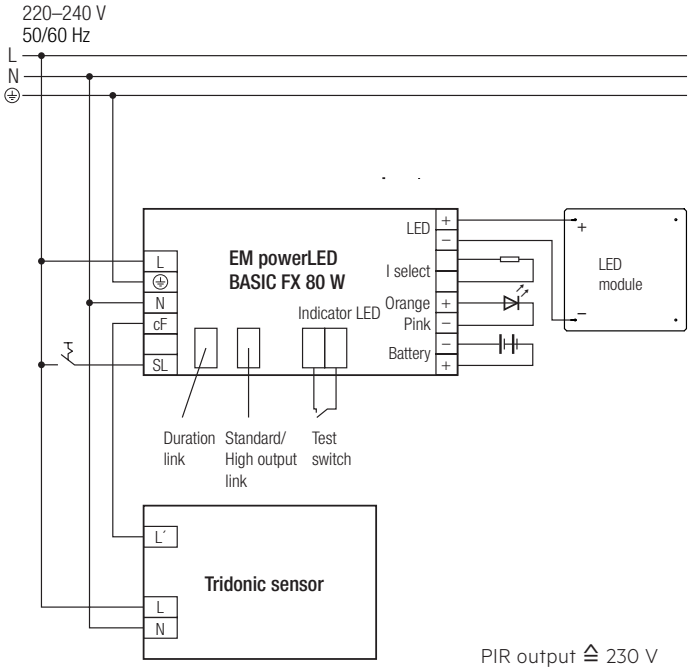
The output current depends on the forward voltage and the tolerance of the LED modules.

Wiring diagram EM powerLED BASIC FX 80 W without sensor



The connected LED module will be used for mains and emergency operation.

Wiring diagram EM powerLED BASIC FX 80 W with sensor



PIR output ≙ 230 V

Switching behaviour

SL	CF	LED
off	off	off
off	on	off
on	off	10 %
on	on	100 %

The mains power must be removed before changing the LED load.

Secondary switching of LEDs is not allowed and may cause damage to the LEDs. The hot plug-in of LEDs during normal operation may result in high current peaks.

Note

The EM powerLED BASIC FX 80W uses pulse width modulation (PWM) for the LED operation in CORRIDOR mode. This can have an adverse effect on video recording equipment e.g. cctv.
Caution should be observed when using the CORRIDOR FUNCTION in cctv monitored areas.

Maximum number of switching cycles

All LED Drivers are tested with 50,000 switching cycles.
The actually achieved number of switching cycles is significantly higher.

Additional information

Additional technical information at www.tridonic.com → Technical Data

Guarantee conditions at www.tridonic.com → Services

Life-time declarations are informative and represent no warranty claim.
No warranty if device was opened.