TRIDONIC



EM powerLED ST FX C 45 W Combined emergency lighting LED Driver

Product description

- Dimmable built-in LED Driver
- Emergency lighting LED Driver with automatic selftest functionality
- For self-contained emergency lighting
- For LED modules with a forward voltage of 20 50 V $\,$
- SELV for output voltage < 60 V DC
- Compact plastic casing

Properties

- Output power 6 45 W
- Constant current LED operation
- 300 1,400 mA output current in mains operation, adjustable with I-SELECT 2 PLUG in steps of 25 mA
- Integrated emergency lighting unit
- 1, 2 or 3 h rated duration
- Operating time selectable with dip switch (2-way)
- Automatic shutdown of output if the forward voltage of the LED is out of range
- Two-colour status display LED
- Electronic multi-level charge system
- Pulse current charging for NiMH batteries
- Polarity reversal protection for battery
- Deep discharge protection
- Short-circuit-proof battery connection
- 5 years guarantee

Interfaces

- switchDIM
- corridorFUNCTION
- Rest mode
- Terminal blocks: 45° push terminals

Batteries

- High-temperature cells
- NiCd or NiMH batteries
- D, Cs, LA or LAL cells
- Battery box for independent use
- 4-year design life
- 2 years guarantee (conditions at www.tridonic.com)
- For battery compatibility refer to chapter 8.1 "Battery selection"

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Standards, page 7

Wiring diagrams and installation examples, page 8





TRIDONIC

EM powerLED ST FX C 45 W

Combined emergency lighting LED Driver

Technical data

Rated supply voltage	220 – 240 V
Mains frequency	50 / 60 Hz
Typ. λ (at 230 V, 50 Hz, normal ope- ration)	0.95
Leakage current (PE)	< 0.5 mA
Overvoltage protection	320 V (for 48 h)
Max. open circuit voltage	60 V
Time to light	< 0.5 s from detection of emergency event
Output LF current ripple (< 120 Hz)	< 2 %
Output current tolerance	7 %
THD normal operation	< 10 %
Ambient temperature ta at > 40 W output power	-5 +45 °C
Ambient temperature ta at ≤ 40 W output power	-5 +50 °C
Max. casing temperature tc	75 ℃
Dimensions LxBxH	183 x 82 x 34 mm
Mains voltage changeover threshold	according to EN 60598-2-22
Type of protection	IP20
Lifetime	up to 50,000 h
Guarantee	5 years



Note: LED Driver supplied with duration dip switch (2-way) in 3 hours position. Duration dip switch and I-SELECT 2 PLUG must be set before battery and mains connection.

Туре [℗]	Article number	Rated duration	Number of cells	Packaging, carton	Packaging, pallet	Weight per pc.
EM powerLED ST FX 103 C NiCd 45W 50V	89800431	1/2/3 h	3	10 pc(s).	400 pc(s).	0.227 kg
EM powerLED ST FX 104 C NiCd 45W 50V	89800413	1/2/3 h	4	10 pc(s).	400 pc(s).	0.227 kg

Emergency lighting units

EM powerLED

Specific technical data

Type [®]	Number of battery	Output current	Min. output	Max. output	Min. output	Max. output	Input power (at 230 V, 50 Hz,	Input current (at 230 V, 50 Hz,	Efficiency (at 230 V,	λ (at 230 full I	V, 50 Hz, oad)	Ambient temperature	tc/ta for ≥ 50.000 h [®]
	cells		voltage	voltage	power	power	full load), fast / trickle charge	full load), fast / trickle charge	50 Hz), fast / trickle charge	Fast	Trickle	ta®	
Normal operation										charge	charge		
	-	300 mA	20 V	50 V	6.0 W	15.00 W	23.0 / 21.0 W	124 / 109 mA	71 / 75 %	0.81c	0.83c	-5 50 °C	50 / 75 °C
	_	325 mA	20 V	50 V	6.5 W	16.25 W	24.2 / 22.8 W	128 / 116 mA	72 / 73 %	0.82c	0.85c	-5 50 °C	50 / 75 °C
	_	350 mA	20 V	50 V	7.0 W	18.00 W	26.0 / 23.0 W	133 / 116 mA	74 / 79 %	0.84c	0.85c	-5 50 °C	50 / 75 °C
	-	375 mA	20 V	50 V	7.5 W	18.75 W	27.0 / 25.0 W	138 / 125 mA	74 / 77 %	0.85c	0.87c	-5 50 °C	50 / 75 °C
	-	400 mA	20 V	50 V	8.0 W	20.00 W	28.0 / 26.0 W	142 / 126 mA	76 / 81 %	0.86c	0.87c	-5 50 °C	50 / 75 °C
	_	425 mA	20 V	50 V	8.5 W	21.25 W	29.8 / 27.8 W	149 / 136 mA	75 / 78 %	0.87c	0.89c	-5 50 °C	50 / 75 °C
	_	450 mA	20 V	50 V	9.0 W	23.00 W	30.0 / 28.0 W	151 / 137 mA	78 / 82 %	0.87c	0.89c	-5 50 °C	50 / 75 °C
	_	475 mA	20 V	50 V	9.5 W	23.75 W	32.6 / 30.6 W	160 / 147 mA	77 / 79 %	0.87c	0.90c	-5 50 °C	50 / 75 °C
	_	500 mA	20 V	50 V	10.0 W	25.00 W	33.0 / 31.0 W	161 / 147 mA	80 / 83 %	0.89c	0.91c	-5 50 °C	50 / 75 °C
	_	525 mA	20 V	50 V	10.5 ´W	26.25 W	34.6 / 32.7 W	168 / 155 mA	80 / 82 %	0.90c	0.91c	-5 50 °C	50 / 75 °C
	_	550 mA	20 V	50 V	11.0 W	28.00 W	36.0 / 34.0 W	172 / 158 mA	81 / 84 %	0.90c	0.92c	-5 50 °C	50 / 75 °C
	-	575 mA	20 V	50 V	11.5 W	28.75 W	36.9 / 35.2 W	177 / 165 mA	82 / 83 %	0.91c	0.93c	-5 50 °C	50 / 75 °C
	-	600 mA	20 V	50 V	12.0 W	30.00 W	38.0 / 36.0 W	182 / 169 mA	82 / 85 %	0.92c	0.93c	-5 50 °C	50 / 75 °C
	_	625 mA	20 V	50 V	12.5 W	31.25 W	39.6 / 37.7 W	188 / 176 mA	82 / 84 %	0.92c	0.93c	-5 50 °C	50 / 75 °C
	_	650 mA	20 V	50 V	13.0 W	33.00 W	41.0 / 39.0 W	192 / 180 mA	83 / 86 %	0.92c	0.94c	-5 50 °C	50 / 75 °C
	_	675 mA	20 V	50 V	13.5 W	33.75 W	42.1 / 40.0 W	198 / 185 mA	83 / 86 %	0.93c	0.94c	-5 50 °C	50 / 75 °C
	_	700 mA	20 V	50 V	14.0 W	35.00 W	44.0 / 42.0 W	204 / 191 mA	84 / 86 %	0.93c	0.94c	-5 50 °C	50 / 75 °C
	_	725 mA	20 V	50 V	14.5 W	36.25 W	45.1 / 42.9 W	210 / 197 mA	83 / 86 %	0.93c	0.95	-5 50 °C	50 / 75 °C
	_	750 mA	20 V	50 V	15.0 W	38.00 W	46.0 / 44.0 W	215 / 203 mA	84 / 87 %	0.94c	0.95	-5 50 °C	50 / 75 °C
	_	775 mA	20 V	50 V	15.5 W	38.75 W	47.7 / 45.6 W	221 / 209 mA	84 / 86 %	0.94c	0.95	-5 50 °C	50 / 75 °C
	_	800 mA	20 V	50 V	16.0 W	40.00 W	49.0 / 47.0 W	225 / 212 mA	85 / 87 %	0.94c	0.95	-5 50 °C	50 / 75 °C
	_	825 mA	20 V	50 V	16.5 W	41.25 W	50.5 / 48.5 W	233 / 221 mA	84 / 86 %	0.95	0.96	-5 45 °C	45 / 75 °C
EM powerLED ST FX	_	850 mA	20 V	50 V	17.0 W	43.00 W	51.0 / 49.0 W	235 / 223 mA	86 / 88 %	0.95	0.96	-5 45 °C	45 / 75 °C
103 / 104 C 45W 50V	_	875 mA	20 V	50 V	175 W	4375 W	527/513W	241 / 229 mA	86 / 86 %	0.95	0.96	-5 45 °C	45 / 75 °C
		900 mA	20 V	50 V	18.0 W	45.00 W	540/520W	247 / 235 mA	86 / 88 %	0.95	0.76	-5 45 °C	45 / 75 °C
	_	925 mA	20 V	49 V	18.5 W	45.00 W	547/527W	250 / 238 mA	85 / 86 %	0.95	0.96	-5 45 °C	45 / 75 °C
	_	950 mA	20 V	47 V	19.0 W	45.00 W	540/520W	247 / 235 mA	86 / 88 %	0.95	0.96	-5 45 °C	45 / 75 °C
	_	975 mA	20 V	46 V	19.5 W	45.00 W	546/525W	250 / 238 mA	85 / 87 %	0.95	0.96	-5 45 °C	45 / 75 °C
	_	1000 mA	20 V	45 V	20.0 W	45.00 W	540/520W	247 / 235 mA	86 / 88 %	0.95	0.96	-5 45 °C	45 / 75 °C
	_	1025 mA	20 V	44 V	20.5 W	45.00 W	541/520W	247 / 235 mA	86 / 88 %	0.95	0.96	-5 45 °C	45 / 75 °C
		1050 mA	20 V	42 V	210 W	45.00 W	540/520W	247 / 235 mA	86 / 88 %	0.95	0.96	-5 45 °C	45 / 75 °C
		1075 mA	20 V	42 V	21.5 W	45.00 W	54.2 / 52.2 W	248 / 236 mA	86 / 87 %	0.95	0.96	-5 45 °C	45 / 75 °C
		1100 mA	20 V	40 V	22.0 W	45.00 W	54.0 / 52.0 W	247 / 235 mA	87 / 88 %	0.75	0.76	-5 45 °C	45 / 75 °C
		1125 mA	20 V	40 V	22.5 W	45.00 W	54.0 / 52.0 W	247 / 236 mA	86 / 88 %	0.75	0.76	-5 45 °C	45 / 75 °C
		1150 mA	20 V	30 V	23.0 W	45.00 W	54.0 / 52.0 W	247 / 235 mA	87 / 88 %	0.75	0.76	-5 45 °C	45 / 75 °C
		1175 mA	20 V	38 V	23.5 W	45.00 W	537/515W	246 / 233 mA	86 / 89 %	0.75	0.76	-5 45 °C	45 / 75 °C
		1200 mA	20 V	37 V	24.0 W	45.00 W	54.0 / 52.0 W	247 / 235 mA	87 / 88 %	0.75	0.76	-5 45 °C	45 / 75 °C
		1225 mA	20 V	37 V	24.5 W	45.00 W	54.0 / 52.0 W	247 / 235 mA	86 / 88 %	0.75	00.0	-5 45 °C	45 / 75 °C
		1250 mA	20 V	36 V	25.0 W	45.00 W	54.0 / 52.0 W	247 / 235 mA	87 / 88 %	0.75	0.76	=5 /5 °C	45 / 75 °C
		1275 mA	20 V	35 V	25.5 W	45.00 W	54.2 / 52.0 W	249 / 235 mA	86 / 88 %	0.75	0.70	-5 45 °C	45 / 75 °C
		1300 mA	20 V	36 V	25.5 W	45.00 W	54.0 / 52.0 W	240 / 230 mA	87 / 88 %	0.75	0.70	-5 45 °C	45 / 75 °C
		1325 mA	20 V	34 V	26.5 W	45.00 W	54.6 / 52.0 W	247 / 235 mA	85 / 87 %	0.75	0.70	-5 45 °C	45 / 75 °C
		1350 mA	20 V	37 V	20.5 W	45.00 W	54.0 / 52.0 W	240 / 230 mA	87/88%	0.75	0.70	-5 45 °C	45 / 75 °C
		1,550 mA	20 V	77.1/	27.0 W	45.00 W	54.0 / 52.0 W	247 / 255 mA	07/00 %	0.75	0.70	-5 45 C	45/75 C
		1,375 IIIA	20 V	33 V	27.5 W	45.00 W	54.2 / 52.1 W	246 / 230 IIIA	80/87%	0.95	0.90	-5 45 C	45/75 C
Emergency operation	-	1,400 (IIA	20 V	JZ V	∠0.U VV	4J.00 W	JH.U / JZ.U W	247 / 200 MA	01/70/6	0.90	0.90	-J 4J U	4J/J3 C
		see chan-											
103 C 45W 50V	3	ter 5.8	15 V	50 V	2.1 W	2.75 W	-	-	-	-		-	-
EM powerLED ST FX	,	see chap-	45.57	50.14	27.14	750.00							
104 C 45W 50V	4	ter 5.8	15 V	SU V	2.7 W	3.50 W	-	-	-	-		-	-

 $^{\textcircled{}}$ Ambient temperature range ta defined in normal operation

^② EM = Emergency

RoHS



Test switch EM2

Product description

- For connection to the emergency lighting LED Driver
- For checking the device function



Ordering data

Туре	Article number	Packaging, bag	Packaging, carton	Weight per pc.
Test switch EM 2	89805277	25 pc(s).	600 pc(s).	0.009 kg



Status indication bi-colour LED EM

Product description

- Two-colour status display LED
- Green: system OK, red: fault



Туре	Article number	Packaging, bag	Packaging, carton	Weight per pc.
LED EM bi-colour	89899720	25 pc(s).	200 pc(s).	0.017 kg
LED EM bi-colour high brightness	89899753	25 pc(s).	800 pc(s).	0.013 kg

ACCES-SORIES

I-SELECT 2 PLUG PRE / EXC

Product description

- Ready-for-use resistor to set output current value
- Compatible with LED Driver featuring I-select 2 interface; not compatible with I-select (generation 1)
- Resistor is base insulated
- Resistor power 0.25 W
- Current tolerance ± 2 % to nominal current value
- Compatible with LED Driver series PRE and EXC as well as with EM powerLED series PRO and ST

Example of calculation

- R [kΩ] = 5 V / I_out [mA] x 1000
- Resistor value tolerance ≤ 1 %; resistor power ≥ 0.1 W; base insulation necessary
- When using a resistor value beyond the specified range, the output current will automatically be set to the minimum value (resistor value too big), respectively to the maximum value (resistor value too small)





Туре	Article number	Colour	Marking	Current	Packaging	bag Weight per pc.
I-SELECT 2 PLUG 300MA BL	28001108	Blue	0300 mA	300 mA	10 pc(s).	0.001 kg
I-SELECT 2 PLUG 325MA BL	28001109	Blue	0325 mA	325 mA	10 pc(s).	0.001 kg
I-SELECT 2 PLUG 350MA BL	28001110	Blue	0350 mA	350 mA	10 pc(s).	0.001 kg
I-SELECT 2 PLUG 375MA BL	28001111	Blue	0375 mA	375 mA	10 pc(s).	0.001 kg
I-SELECT 2 PLUG 400MA BL	28001112	Blue	0400 mA	400 mA	10 pc(s).	0.001 kg
I-SELECT 2 PLUG 425MA BL	28001251	Blue	0425 mA	425 mA	10 pc(s).	0.001 kg
I-SELECT 2 PLUG 450MA BL	28001113	Blue	0450 mA	450 mA	10 pc(s).	0.001 kg
I-SELECT 2 PLUG 475MA BL	28001252	Blue	0475 mA	475 mA	10 pc(s).	0.001 kg
I-SELECT 2 PLUG 500MA BL	28001114	Blue	0500 mA	500 mA	10 pc(s).	0.001 kg
I-SELECT 2 PLUG 550MA BL	28001115	Blue	0550 mA	550 mA	10 pc(s).	0.001 kg
I-SELECT 2 PLUG 600MA BL	28001116	Blue	0600 mA	600 mA	10 pc(s).	0.001 kg
I-SELECT 2 PLUG 650MA BL	28001117	Blue	0650 mA	650 mA	10 pc(s).	0.001 kg
I-SELECT 2 PLUG 700MA BL	28001118	Blue	0700 mA	700 mA	10 pc(s).	0.001 kg
I-SELECT 2 PLUG 750MA BL	28001119	Blue	0750 mA	750 mA	10 pc(s).	0.001 kg
I-SELECT 2 PLUG 800MA BL	28001120	Blue	0800 mA	800 mA	10 pc(s).	0.001 kg
I-SELECT 2 PLUG 850MA BL	28001121	Blue	0850 mA	850 mA	10 pc(s).	0.001 kg
I-SELECT 2 PLUG 900MA BL	28001122	Blue	0900 mA	900 mA	10 pc(s).	0.001 kg
I-SELECT 2 PLUG 950MA BL	28001123	Blue	0950 mA	950 mA	10 pc(s).	0.001 kg
I-SELECT 2 PLUG 1000MA BI	28001124	Blue	1000 mA	1,000 mA	10 pc(s).	0.001 kg
I-SELECT 2 PLUG 1050MA BI	28001125	Blue	1050 mA	1,050 mA	10 pc(s).	0.001 kg
I-SELECT 2 PLUG 1100MA BL	28001126	Blue	1100 mA	1,100 mA	10 pc(s).	0.001 kg
I-SELECT 2 PLUG 1150MA BL	28001127	Blue	1150 mA	1,150 mA	10 pc(s).	0.001 kg
I-SELECT 2 PLUG 1200MA BI	28001128	Blue	1200 mA	1,200 mA	10 pc(s).	0.001 kg
I-SELECT 2 PLUG 1250MA BL	28001129	Blue	1250 mA	1,250 mA	10 pc(s).	0.001 kg
I-SELECT 2 PLUG 1300MA BL	28001130	Blue	1300 mA	1,300 mA	10 pc(s).	0.001 kg
I-SELECT 2 PLUG 1350MA BL	28001131	Blue	1350 mA	1,350 mA	10 pc(s).	0.001 kg
I-SELECT 2 PLUG 1400MA BI	28001132	Blue	1400 mA	1,400 mA	10 pc(s).	0.001 kg
I-SELECT 2 PLUG MAX BL	28001099	Blue	MAX	MAX	10 pc(s).	0.001 kg

RoHS



NiCd Battery pack 1.8 – 4.5 Ah

Batteries

Product description

- High-temperature NiCd battery pack for use with emergency lighting units
- 4-year design life
- 1-year guarantee

Properties

- Constant high-temperature operation depending on the emergency lighting unit used (refer to respective emergency control gear datasheet)
- Good charging properties at high temperature
- High energy maintenance of the charged battery
- Certified quality manufacturer
- Casing material made of polycarbonate
- 0.2 m double-insulated cable with plug connection
- 0.8 m double-insulated cable with plug and pre-stripped ends for connection with the emergency unit
- 1.0 mm² solid wire, pre-stripped
- Suitable for emergency lighting equipment as per

IEC 60598-2-22



Туре	Article number	Packaging, carton	Weight per pc.
Battery pack 1.8 Ah with plug			
Pack-NiCd 3C CON	28001221	5 pc(s).	0.270 kg
Pack-NiCd 4C CON	28001222	5 pc(s).	0.320 kg
Battery pack 4.5 Ah with plug			
Pack-NiCd 3D CON	89800389	5 pc(s).	0.534 kg
Pack-NiCd 4D CON	89800390	5 pc(s).	0.661 kg

1. Standards

- EN 55015
- EN 60068-2-64
- EN 60068-2-29
- EN 60068-2-30
- EN 61000-3-2
- EN 61000-3-3
- EN 61347-1
- EN 61347-2-7
- EN 61347-2-13
- EN 61547
- EN 62384
- according to EN 50172
- according to EN 60598-2-22
- according to EN 62034

1.1 Glow-wire test

according to EN 60598-1 with increased temperature of 850 °C passed.

1.2 Insulation and electric strength testing of luminaires

Electronic LED Driver 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 insulation test with 500 V_{DC} for 1 second. This test voltage should be connected between the interconnected phase and neutral terminals and the earth terminal. The insulation resistance must be at least 2 M Ω .

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

2. Thermal data

2.1 Expected lifetime

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

Expected lifetime

Туре	Output power	ta	40 °C	50 °C
EM powerLED ST FX	10 W	tc	56 °C	66 ℃
	10 W	lifetime	> 100,000 h	> 100,000 h
	20 W	tc	59 °C	69 °C
	20 W	lifetime	> 100,000 h	> 100,000
	70.14	tc	63 °C	73 °C
103 / 104 C 45W 50V	50 W	lifetime	> 100,000 h	> 100,000 h
	(0))//	tc	65 °C	75 °C
	40 VV	lifetime	> 100,000 h	80,000 h
		tc	70 °C	х
	43 VV	lifetime	80.000 h	x

x = not permitted

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., ta temperature should be checked and eventually critical components (e.g. ELCAP) measured. Detailed information on request.

2.2 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.

3. Installation / Wiring

3.1 Wiring diagrams



switchDIM wiring



3.2 Wiring type and cross-section

Wiring

Mains (N, L, Earth , S/L) Rest (Rest/N, Rest/L) LED (LED +, LED -) Batteries (Bat +, Bat -) I sel 2



0.5 – 1.5 mm² solid or fine-stranded





Test switch Indication LED



Use one wire for each terminal connector only. Use each strain relief channel for one cable only.



max. Ø = 10 mm min. Ø = 6,3 mm

Max. lead insulation diam	eter
Battery	2.1 mm
Test switch	2.1 mm
Indicator LED	2.1 mm

	Maximi
m	LED
m	status ii
m	batterie

3 m 1 m 1.3 m

I	Maximum lead length
I	_ED
9	status indication LED
l	patteries

3.3 Release of the wiring

Press down the "push button" and remove the cable from front.



Installation instruction

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

3.4 Fixing conditions

Dry, acidfree, oilfree, fatfree. It is not allowed to exceed the maximum ambient temperature (ta) stated on the device.

3.5 Wiring guidelines

- The cables should be run separately from the mains connections and mains cables to ensure good EMC conditions.
- The LED wiring should be kept as short as possible to ensure good EMC. The max. secondary cable length is 2 m (4 m circuit), this applies for LED output as well as for I-select 2.
- The secondary wires (LED module) should be routed in parallel to ensure good EMC performance.
- Secondary switching is not permitted.
- The LED Driver has no inverse-polarity protection on the secondary side.
 Wrong polarity can damage LED modules with no inverse-polarity protection.
- Wrong wiring of the LED Driver can lead to malfunction or irreparable damage.
- 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.
- If the optional mains switch is not used, connect S/L to L.
- 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.

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

3.6 Hot plug-in

Hot plug-in is not supported due to residual output voltage of > 0 V. If a LED load is connected the device has to be restarted before the output will be activated again.

This can be done via mains reset or via interface (DALI, DSI, switchDIM).

3.7 Earth connection

The earth connection is conducted as protection earth (PE). The LED Driver can be earthed via earth terminal. 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.

3.8 External I-select 2 resistors on LED modules

LED modules with on-board I-select 2 resistors may cause irreparable damages, caused by surge / burst peaks.

4. Mechanical data

4.1 Mechanical data accessories

- LED status indicator
- Bi-colour
- Mounting hole 6.5 mm diameter, 1 1.6 mm thickness
- Lead length 1.0 m
- Insulation rating: 90 °C

Test switch

- Mounting hole 7.0 mm diameter
- Lead length 0.55 m

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.

Emergency lighting units

5.4 THD vs load

EM powerLED

5. Electrical data





1400 mA

Make sure that the LED Driver is operated within the given window under all operating conditions, also in dimming operation. Otherwise certain limitations may occur. This is due to the nature of amplitude modulation dimming. The stated minimum output voltage shall not be undercut as this may cause the device to shut-down.

100 % load corresponds to the max. output power (full load) according to the table on page 2.

5.2 Efficiency vs load



5.3 Power factor vs load



Emergency lighting units

EM powerLED

5.5 Maximum loading of automatic circuit breakers

Automatic circuit breaker type	C10	C13	C16	C20	B10	B13	B16	B20	Inrush	current
Installation Ø	1.5 mm ²	1.5 mm ²	2.5 mm ²	4 mm ²	1.5 mm ²	1.5 mm ²	2.5 mm ²	4 mm ²	l max	time
EM powerLED ST FX C	18	26	30	36	9	13	15	18	23.9 A	187 µs

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

	THD	3.	5.	7.	9.	11.
EM powerLED ST FX C	< 10	< 9	< 3	< 3	< 2	< 1

5.7 Insulation matrix

	Mains	Earth	Switched Live	Battery, LED, Test switch, Indicator LED	REST	I-SELECT
Mains	-	•	•	• •	•	•
Earth	•	-	•	•	•	•
Switched Live	•	•	-	••	•	•
Battery, LED, Test switch, Indicator LED	••	•	••	_	•	••
REST	•	•	•	•	-	•
I-SELECT	•	•	•	••	•	-

• Represents basic insulation

•• Represents double or reinforced insulation

5.8 Dimming

Dimming range 1% to 100 %

Dimming curve is adapted to the eye sensitiveness. Dimming is realized by amplitude dimming.

5.9 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 ST FX 103 C 45W 50V – 3 cells Article number: 89800431 3.6 V battery voltage 750 – 960 mA battery discharge current (tolerance)



EM powerLED ST FX 104 C 45W 50V – 4 cells Article number: 89800413 4.8 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 – 3 cells

Voltage	Inrush current	Duration
19.8 V	329 mA	12.9 ms
22.6 V	297 mA	12.0 ms
25.3 V	265 mA	11.5 ms
28.0 V	244 mA	10.8 ms
30.7 V	234 mA	10.3 ms
33.4 V	216 mA	10.1 ms
36.1 V	202 mA	9.8 ms
38.8 V	192 mA	9.7 ms
41.5 V	183 mA	9.1 ms
44.2 V	174 mA	8.8 ms
47.0 V	168 mA	8.1 ms
49.7 V	161 mA	6.9 ms

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

LED peak current at start in emergency mode - 4 cells

Voltage	Inrush current	Duration
19.8 V	395 mA	16.5 ms
22.6 V	360 mA	15.3 ms
25.3 V	338 mA	14.5 ms
28.0 V	308 mA	14.0 ms
30.7 V	293 mA	13.8 ms
33.4 V	270 mA	12.7 ms
36.1 V	263 mA	12.1 ms
38.8 V	248 mA	11.7 ms
41.5 V	242 mA	9.8 ms
44.2 V	225 mA	8.9 ms
47.0 V	218 mA	7.8 ms
49.7 V	211 mA	7.5 ms

6. Interfaces / communication

6.1 Control input (Rest/N, Rest/L)

A standard switch (switchDIM) or a rest mode controller can be wired on the terminals Rest/N and Rest/L.

The control signal is not SELV. Install control cables in accordance to the requirements of low voltage installations. Different functions depending on each module.

6.2 switchDIM

Integrated switchDIM function allows a direct connection of a pushbutton for dimming and switching.

Brief push (< 0.6 s) switches LED Driver ON and OFF. The dimm level is saved at power-down and restored at power-up.

When the pushbutton is held, LED modules are dimmed. After repush the LED modules are dimmed in the opposite direction.

In installations with LED Drivers with different dimming levels or opposite dimming directions (e.g. after a system extension), all LED Drivers can be synchronized to 50 % dimming level by a 10 s push.

Use of pushbutton with indicator lamp is not permitted.

7. Functions

7.1 Output current setting

Output current can be set by connecting a resistor between the 2 "I sel 2" 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 \leq 1 %.

Resistor power has to be \ge 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).

7.2 Overload protection

LED Driver will switch off at overload operation. Mains reset (switched life) is required to restart the LED Driver.

7.3 Underload operation

LED Driver will switch off at underload operation. Mains reset (switched life) is required to restart the LED Driver.

7.4 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.

7.5 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.

7.6 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 (switched life) is required to restart the LED Driver.

7.7 Function: adjustable current

The output current of the LED Driver can be adjusted in a certain range. For adjustment there are three options available.

I-select 2:

By inserting a suitable resistor into the I-select 2 interface, the current value can be adjusted. The relationship between output current and resistor value can be found in the chapter "Accessories I-SELECT 2 Plugs".

If the resistor is connected by wires a consistent base insulation must be ensured. Furthermore, a max. wire length of 2 m may not be exceeded and potential interferences have to be avoided.



Please note that the resistor values for I-select 2 are not compatible with I-select (generation 1). Installation of an incorrect resistor may cause irreparable damage to the LED module(s).

Resistors for the main output current values can be ordered from Tridonic (see accessories).

The priority for current adjustment methods is the use of I-select 2.

7.8 Status indication

System status is indicated by a bi-colour LED and by a DALI status flag.

LED indiction	Status	Comment
Permanent green	System OK	AC mode
Fast flashing green	Function test	
(0,1 sec on – 0,1 sec off)	underway	
Slow flashing green	Duration test	
(1 sec on – 1 sec off)	underway	
Red LED on	Load failure	Open circuit / Short circuit / LED failure
Classification and	Detter feilure	Battery failed the duration test or function
Slow flashing red	Battery failure	test / Battery is defect or deep discharged/
(1 sec on – 1 sec off)		Incorrect battery voltage
Fast flashing red	Charging failure	Incorrect charging current
(0,1 sec on – 0,1 sec off)		
Double pulsing green	Inhibit mode	Switching into inhibit mode via controller
Binary transmission of address	Address	Duving address identification mode
via green/red LED	identification	During address identification mode
Green and red off	DC mode	Battery operation (emergency mode)

7.9 corridorFUNCTION

The corridorFUNCTION can be programmed in two different ways. To program the corridorFUNCTION by means of software a DALI-USB interface is needed in combination with a DALI PS. The software can be the masterCONFIGURATOR.

To activate the corridorFUNCTION without using software a voltage of 230 V has to be applied for five minutes at the switchDIM connection. The unit will then switch automatically to the corridorFUNCTION.

Note:

If the corridorFUNCTION is wrongly activated in a switchDIM system (for example a switch is used instead of pushbutton), there is the option of installing a pushbutton and deactivating the corridorFUNCTION mode by five short pushes of the button within three seconds.

switchDIM and corridorFUNCTION are very simple tools for controlling gears with conventional pushbuttons or motion sensors.

To ensure correct operation a sinusoidal mains voltage with a frequency of 50 Hz or 60 Hz is required at the control input.

Special attention must be paid to achieving clear zero crossings. Serious mains faults may impair the operation of switchDIM and corridorFUNCTION.

7.10 Testing:

Commissioning test

A full commissioning test is carried out automatically after permanent connection of the supply for 5 days. The easy commissioning feature will set the initial test day and time to ensure random testing of units.

Functional test

Functional tests are carried out for 5 seconds on a weekly basis under the control of the Micro controller. Initiation and timing of these tests is set during the commissioning of the luminaire.

Duration test

A full duration test is carried out yearly to check the capacity of the batteries.

For 2 h operation:

The first commissioning duration test has a time of 120 minutes, subsequent through life tests are conducted for 90 minutes. When the battery is changed or disconnected and re-connected the unit will next conduct a 120 minute test.

For a full description of commissioning and test features please refer to application notes.

Test switch

An optional test switch can be wired to each EM converterLED ST. This can be used to to:

- initiate a 5 seconds function test: press 200 ms < T < 1s
- execute function test as long as switch pressed: press > 1s
- reset selftest timer (adjust local timing): press > 10 s

Timer reset functionality

The timer for function and duration test can be set to a particular time of the day by either pressing the test switch for longer than 10 seconds or cycling the unswitched line supply 5 times within 1 minute. The timer adjustment will enable the test start time to be defined manually at time in day when the timer was reset. It will also disable the adaptive test algorithm thereby forcing the unit to perform the test at the same time rather than it being defined by the adaptive algorithm. This function will only work provided the interval time is greater than zero (automatic test mode enabled). The delay timer value set when the unit was commissioned will be reloaded in order to randomise the tests between adjacent units.

Rest Mode / Inhibit Mode

Emergency operation is automatically started when the mains supply is switched off. If the Rest Mode is activated, the discharging of the battery will be minimized by switching off the LED output. If the Inhibit Mode has been activated before the mains supply is switched off, Rest Mode will be automatically activated if the mains supply is switched off within 15 minutes. Rest Mode and Inhibit Mode can be initiated by applying a short pulse between 9.5 and 22.5 V_{DC} in amplitude for a period of 150 to 1,000 ms. This pulse shall be applied to terminals marked Rest.

After a mains reset the EM powerLED ST exits the Rest Mode. Rest Mode and Inhibit Mode can both be disabled by applying a voltage pulse of 1,000 to 2,000 ms to the terminals marked as Rest to send the RE-LIGHT/ RESET INHIBIT command.

Pulse/Mode	Standby	Emergency	Rest
150 – 1,000 ms	Inhibit	Rest	-
1,000 – 2,000 ms	Cancel inhibit	-	Re-light

8. Battery data

8.1 Battery selection

EM powerLED ST FX 45 W 50 V, 1 / 3 h

				Туре	EM power 103 C NiCo	LED ST FX I 45W 50V	EM power 104 C NiCo	LED ST FX d 45W 50V
				Article no.	8980	0431	8980	0413
				Cells	3 c	ells	4 c	ells
				Duration	1 h	2 / 3 h	1 h	2 / 3 h
Technology and capacity	Design	Number of cells	Туре	Article no.		Assignabl	e batteries	
	stick	1 x 3	Accu-NiCd 3A 55	28002773		•		
NiCd 4 Ah D cells [®]	stick	1 x 4	Accu-NiCd 4A 55	89800089				•
	stick + stick	2 + 2	Accu-NiCd 4C 55	28002775				•
	side by side	3 x 1	Accu-NiCd 3B 55	89800384		•		
	side by side	4 x 1	Accu-NiCd 4B 55	89800385				•
NiCd 1.8 Ah	remote box	1 x 3	Pack-NiCd 3C CON	28001221	•			
Cs cells	remote box	1 x 4	Pack-NiCd 4C CON	28001222			•	
NiCd 4.5 Ah	remote box	1 x 3	Pack-NiCd 3D CON	89800389		•		
D cells	remote box	1 x 4	Pack-NiCd 4D CON	89800390				•
NiMH 2.2 Ah	stick	1 x 3	Accu-NiMH 3A	28002088	•			
Cs cells	stick	1 x 4	Accu-NiMH 4A	28002089			•	
	stick	1 x 3	Accu-NiMH 4Ah 3A CON	89800441		•		
NiMH 4 Ah L A cells	stick	1 x 4	Accu-NiMH 4Ah 4A CON	89800442				•
	stick + stick	2 + 2	Accu-NiMH 4Ah 4C CON	89800438				•

8.2 Battery charge / discharge

EM powerLED ST FX 45 W 50 V, 1 / 2 / 3 h

	Туре	EM power 103 C NiCo	LED ST FX i 45W 50V	EM powerLED ST FX 104 C NiCd 45W 50V 89800413		
	Article no.	8980	0431			
	Cells	3 c	ells	4 cells		
	Duration	1 h	2 / 3 h	1 h	2 / 3 h	
	Initial charge		20) h		
Battery charge time	Fast recharge	10 h	15 h	10 h	15 h	
	Trickle charge		continuously			
	Initial charge	130 mA	300 mA	130 mA	300 mA	
Charge current	Fast recharge	210 mA	330 mA	210 mA	330 mA	
	Trickle charge	50 mA	130 mA	50 mA	130 mA	
	Initial charge	2.2 W	3.7 W	2.5 W	4.4 W	
Power consumption	Fast recharge	2.9 W	4.0 W	3.4 W	4.8 W	
	Trickle charge	1.6 W	2.2 W	1.7 W	2.5 W	
Discharge current		850 – 960 mA	850 – 960 mA	850 – 960 mA	850 – 960 mA	

EM powerLED

8.3 Accu-NiCd

8.6 Accupack-NiMH

4.2 / 4.5 Ah		2.2 Ah	
Battery voltage/cell	1.2 V	Battery voltage/cell	1.2 V
Cell type	D	Cell type	Cs
Case temperature range		Ambient temperature range	
to ensure 4 years design life	+5 °C to +55 °C	to ensure 4 years design life	+5 °C to +35 °C
Max. short term battery case temperature		tc point	+40 °C
(shorter than 1 month over the battery lifetime)	70 °C	Max. short term battery case temperature	
Max. number discharge cycles	4 cycles per year plus	(shorter than 1 month over the battery lifetime)	70 °C
	4 cycles during	Max. number discharge cycles	4 cycles per year plus
	comissioning	с ,	4 cycles during
Max. storage time	6 months		comissionina
5		Max. storage time	12 months
8.4 Accu-NiMh		-	
		4.0 Ah	
2.2 Ah		Battery voltage/cell	1.2 V
Battery voltage/cell	1.2 V	Cell type	LAL
Cell type	Cs	Ambient temperature range	
Case temperature range		to ensure 4 years design life	+5 °C to +35 °C
to ensure 4 years design life	+5 °C to +50 °C	tc point	+40 °C
Max. short term battery case temperature		Max. short term battery case temperature	
(shorter than 1 month over the battery lifetime)	70 °C	(shorter than 1 month over the battery lifetime)	70 °C
Max. number discharge cycles	4 cycles per year plus	Max. number discharge cycles	4 cycles per year plus
	30 cycles during		4 cycles during
	comissioning		comissioning
Max storage time	12 months	Max storage time	12 months
	12 111011110		12 111011110
4.0 Ah		8.7 Batteries	
Battery voltage/cell	1.2 V		
Cell type	LA	Connection method: 4.8 x 0.5 mm spade tag welded	to end of cell
Case temperature range			
to ensure 4 years design life	+5°C to +45°C	For stick packs this connection is accessible after t	he battery caps have been
Max. short term battery case temperature		fitted.	,
(shorter than 1 month over the battery lifetime)	70 °C		
Max. number discharge cycles	4 cycles per year plus	To inhibit inverter operation disconnect the batter	ies by removing the con-
<u> </u>	30 cycles during	nector from the battery spade tag	
	comissioning	neeler nem me barrery opade lag.	
Max. storage time	12 months	For further information refer to corresponding batt	tery datasheet.
8.5 Accupack-NiCd		8.8 Storage, installation and commissioning	
1.8 Ah		Relevant information about storage conditions instal	llation and commissioning
Battery voltage/cell	12 V	are provided in the battery dataspects	
Cell type	(s	are provided in the barrery datasticers.	
Ambient temperature range	00		
to opsuro (; yoars dosign life	+5 °C to +40 °C		
to point	+/F °C	0 Missellensens	
Nav, short term batterik sasa temperatura	+43 C	9. Miscellaneous	
Max. Short term ballery case temperature	70.%		
(snorter than I month over the battery lifetime)	/0 ⁻ C	9.1 Maximum number of switching cycles	
Max. number discharge cycles	4 cycles per year plus		
	4 cycles during	All LED Drivers are tested with 50,000 switching c	ycles.
	comissioning	The actually achieved number of switching cycles i	is significantly higher.
Max. storage time	6 months		
4 E A b		9.2 Additional information	
A.3 All Pattery voltage/cell	12\/		
	1.2 V	Additional technical information at <u>www.tridonic.cc</u>	$M \rightarrow$ Lechnical Data
Ambient temperature range	U		
Ampient temperature range	+ E °C to + / 0 °C	Guarantee conditions at <u>www.tridonic.com</u> \rightarrow Serv	ICES
to ensure 4 years design life	+3 C 10 +40 C		
ic point May about tame betters and tame and the	+43 L	Litetime declarations are informative and represen	t no warranty claim.
Max. snort term pattery case temperature	70.00	No warranty if device was opened.	
(snorter than I month over the battery lifetime)	/U~C		
Max. number discharge cycles	4 cycles per year plus		
	4 cycles during		
	comissioning		
Max. storage time	6 months		

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