

EM powerLED BASIC CLE 232 LiFePO4 14W

LED Driver for AC power supplies



LiFeGuard

Product description

- _ LED driver for mains operation with integrated Simple CORRIDOR FUNCTION (CF)
- _ For luminaire installation
- _ For the use with CLE ADV5 EM
- _ EM = Emergency
- _ 5 years guarantee (conditions at <https://www.tridonic.com/en/int/services/manufacture-guarantee-conditions>)

Properties

- _ Constant current LED driver with 350 mA output current
- _ Simple CORRIDOR FUNCTION (CF) with 10 % light level
- _ Constant current mode
- _ Light output in DC operation (EoFI): 0.1 or 1
- _ SELV
- _ For emergency lighting systems as per EN 50172
- _ LED module and sensor available

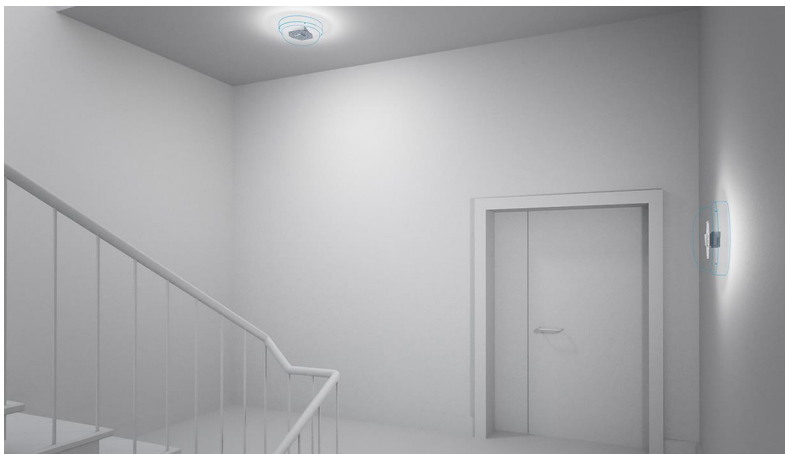
Battery management

- _ Intelligent charge system
- _ Deep discharge protection
- _ Temperature protection
- _ Polarity reversal protection for battery provided by 3-pole connector

Batteries

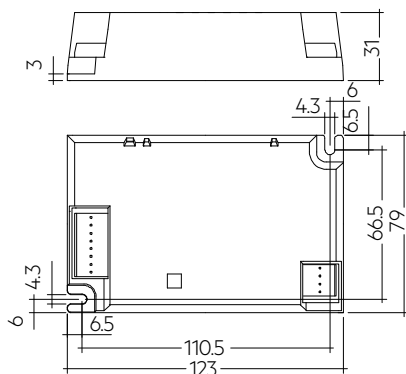
- _ LiFePO4 batteries with Tridonic LiFeGuard
- _ Temperature-protected
- _ Overcharge-/Overdischarge protection
- _ Ensures safety in use
- _ LiFePO4: up to 12 years design life
- _ 8 years guarantee for LiFePO4 batteries (conditions at <https://www.tridonic.com/en/int/services/manufacture-guarantee-conditions>)^①
- _ For battery compatibility refer to data sheet, battery selection

① 28005859 - 5 Jahre Garantie. 28006323 - 4 Jahre Garantie.

Website<http://www.tridonic.com/89801088>

EM powerLED BASIC CLE 232 LiFePO4 14W

LED Driver for AC power supplies

**Ordering data**

Type	Article number	Rated duration	Packaging, carton	Packaging, pallet	Weight per pc.
EMpLED BASIC CLE 232 C LiFePO4 14W	89801088	3 h	10 pc(s).	560 pc(s).	0.11 kg

Technical data

Rated supply voltage	220 – 240 V
AC voltage range	198 – 264 V
Mains frequency	50 / 60 Hz
U-OUT (including open- / short-circuit and double load)	48 V
Overvoltage protection	320 V (for 1 h)
Rated duration	3 h
Min. forward voltage	31 V
Max. forward voltage	40 V
Starting time (at 230 V, 50 Hz, full load)	250 ms
Switchover time from mains to emergency operation	< 75 ms
Switchover time from emergency to mains operation	< 300 ms
Ambient temperature t_a	0 ... +55 °C
Max. casing temperature t_c	85 °C
Dimensions L x W x H	123 x 79 x 31 mm
Type of protection	IP20
Lifetime	up to 100,000 h
Guarantee (conditions at www.tridonic.com)	5 Year(s)

Approval marks**Standards**

EN 55015, EN 61000-3-2, EN 61000-3-3, EN 61347-1, EN 61347-2-13, EN 61547, EN 62384, according to EN 60598-2-22, according to EN 50172

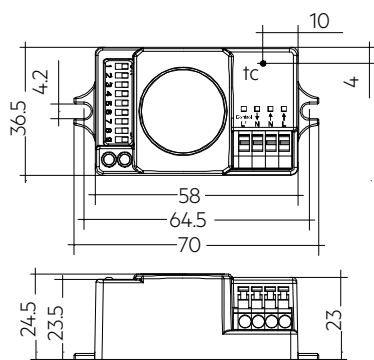
Specific technical data

Type [®]	Typ. output current	Output current tolerance	Min. output voltage ^③	Max. output voltage ^③	Typ. output power	Input power (at 230 V, 50 Hz, full load)	Input current (at 230 V, 50 Hz, full load)	Efficiency (at 230 V, 50 Hz, full load)	λ (at 230 V, 50 Hz, full load)
Normal operation at 100 %									
EMpLED BASIC CLE 232 C LiFePO4 14W	350 mA	10 %	31.0 V	40.0 V	14.00 W	18.1 W	115 mA	80 %	0.7C
CF operation at 10 %									
EMpLED BASIC CLE 232 C LiFePO4 14W	35 mA	10 %	31.0 V	40.0 V	1.98 W	3.8 W	42 mA	55 %	0.3C
Emergency operation at 100 %									
EMpLED BASIC CLE 232 C LiFePO4 14W	350 mA	10 %	2.4 V	3.4 V	1.05 W	-	-	-	-

^② EM = Emergency^③ Output voltage range defined in normal operation. LED forward voltage will decrease in CF operation.

smartSWITCH G2 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
- _ Second neutral terminal for easy wiring
- _ Optimised for applications and environments with other wireless communication systems
- _ 5 years guarantee (Conditions at

<https://www.tridonic.com/en/int/services/manufacture-guarantee-conditions>)

Website

<http://www.tridonic.com/28004370>



Ordering data

Type	Article number	Dimensions L x W x H	Packaging, carton	Weight per pc.
smartSWITCH G2 HF 5DP f	28004370	70 x 36.5 x 24.5 mm	100 pc(s).	0.036 kg
smartSWITCH G2 HF 5DP S f	28004371	58 x 52.0 x 24.5 mm	100 pc(s).	0.036 kg

Approval marks



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).	0.013 kg
LED EM green, ultra high brightness	89899756	25 pc(s).	200 pc(s).	0.013 kg

Approval marks
RoHS

Connection cable LiFePO4

Accessory



Product description
_ Extension cable for LiFePO4 batteries
_ Cable length 500 mm
_ 3-pole plug connection

Website
<http://www.tridonic.com/28002461>



Ordering data				
Type	Article number	Packaging, bag	Packaging, carton	Weight per pc.
EXTENSION CABLE LiFePO4 500mm	28002461	10 pc(s).	200 pc(s).	0.011 kg

1. Standards

- EN 55015
- EN 61000-3-2
- EN 61000-3-3
- EN 61347-1
- EN 61347-2-13
- EN 61547
- EN 62384
- EN 61347-2-7
- according to EN 60598-2-22
- according to EN 50172

Meaning of marking ☉

Double or reinforced insulation for built-in electronic LED Drivers. The control gear relies upon the luminaire enclosure for protection against accidental contact with live parts.

1.1 Glow-wire test

according to EN 61347-1 with increased temperature of 850 °C passed.

1.2 Insulation 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 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 MΩ.

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

2. Thermal details and lifetime

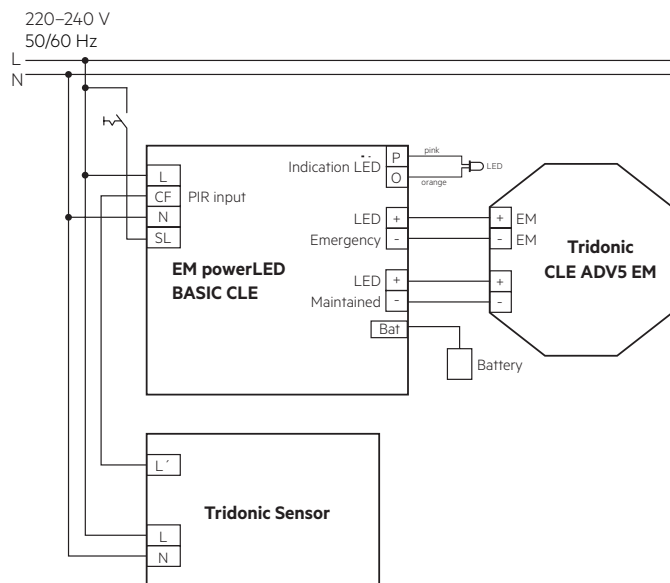
2.1 Expected lifetime

Expected lifetime		ta = 25 °C	ta = 35 °C	ta = 40 °C	ta = 45 °C	ta = 50 °C	ta = 55 °C
Type							
EM pLED BASIC CLE 232 LiFePO4 14W	tc	60 °C	65 °C	70 °C	75 °C	80 °C	85 °C
	Lifetime	>100,000 h	>100,000 h	>100,000 h	>100,000 h	>100,000 h	96,000 h

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.

3. Installation / wiring

3.1 Wiring diagram EM powerLED with sensor

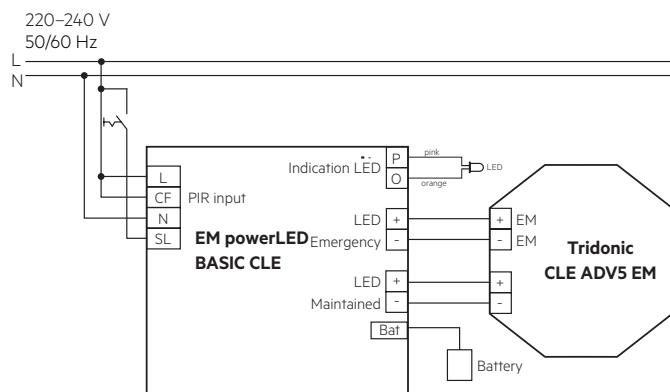


PIR input $\triangleq$ 230 V

Switching behaviour

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

3.2 Wiring diagram EM powerLED



PIR input $\triangleq$ 230 V

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

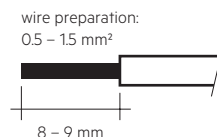
Secondary switching of LEDs is not allowed and may cause damage to the LEDs.

The hot plug-in of LEDs during normal operation may result in current peaks of up to 50% above the typical output current.

3.3 Wiring type and cross section

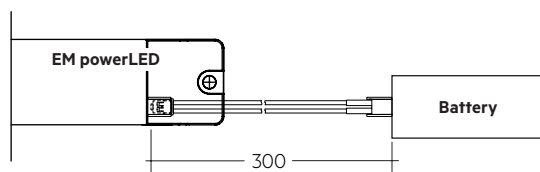
Solid wire with a cross section of 0.5 – 1.5 mm². Strip 8 – 9 mm of insulation from the cables to ensure perfect operation of terminals.

Wiring: LED module/LED Driver/supply

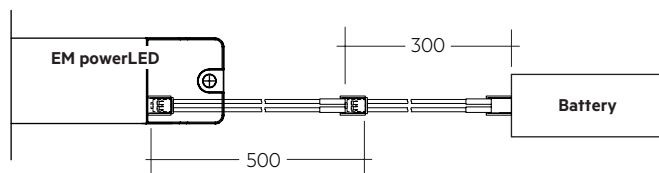


3.4 Battery connection

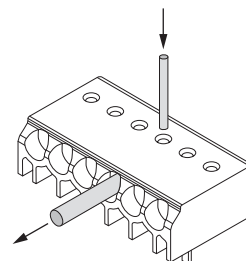
LiFePO₄: Direct connection



LiFePO₄: Connection with extension



3.5 Loose wiring



Loosen wire through twisting and pulling or using a Ø 1mm release tool

3.6 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.

3.7 Wiring guidelines

- The LED terminals, battery and indicator LED terminals are classified as SELV (output voltage < 60 V DC). Keep the wiring of the input terminals separated from the wiring of the SELV classified terminals or consider special wiring (double insulation, 6 mm creepage and clearance) when these connections should be kept SELV.
- 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 Indicator LED connection is 1 m. The 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 0.8 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.

3.8 Maximum lead length

LED	3 m (6 m loop) [®]
Status indication LED	1 m
Batteries	0.8 m

[®] Note: Do not exceed the length of LED leads to the LED module. Leads should always be kept as short as possible.

4. Mechanical values

4.1 Housing properties

- Casing manufactured from polycarbonate.
- Type of protection: IP20
- Max. torque at the mounting screws: 0.5 Nm / M4

4.2 Mechanical data accessories

LED status indicator

- Green
- Mounting hole 6.5 mm diameter, 1 – 1.6 mm thickness
- Lead length 0.3 m / 0.6 m / 1.0 m
- Insulation rating: 90 °C

Battery connection

- Plug connection 0.3 m
- Extension 0.5 m

5. Electrical values

5.1 Maximum loading of automatic circuit breakers

Automatic circuit breaker type	B10	B13	B16	B20	C10	C13	C16	C20	Inrush current	
Installation Ø	1.5 mm ²	1.5 mm ²	2.5 mm ²	2.5 mm ²	1.5 mm ²	1.5 mm ²	2.5 mm ²	2.5 mm ²	I _{max}	time
EM pLED BASIC CLE 232 LiFePO4 14W	90	130	130	130	150	216	216	216	7.72 A	292 µs

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

Type	THD	3	5	7	9	11	13
EM pLED BASIC CLE 232 LiFePO4 14W	33	28	19	6	14	7	13

5.3 Insulation matrix

	Mains	Switched Live	Battery, LED, Indicator LED
Mains	–	•	••
Switched Live	•	–	••
Battery, LED, Indicator LED	••	••	–

• Represents basic insulation

•• Represents double or reinforced insulation

6. Functions

6.1 Short-circuit behaviour

In case of a short-circuit at the LED output the LED output is switched off. After restart of the LED Driver the output will be activated again.
The restart can be done via mains reset.

6.2 No-load operation

The LED Driver will not be damaged in no-load operation. The output will be deactivated and is therefore free of voltage. If a LED load is connected the device has to be restarted before the output will be activated again.

6.2 Status indication LED

System status is indicated by a green LED.

Note:

The status indication LED switches off if the battery does not reach the full capacity (3.6V battery voltage) within 20 – 24 hours.

If this occurs disconnect the mains voltage and operate the device in emergency mode for approximately one hour. Afterwards apply the mains voltage again and recharge the battery for 24 hours.

If the failure occurs again replace the battery.

7. Battery data

7.1 Battery selection

EM pLED BASIC CLE 232 LiFePO₄ 14W, 3 h

				Type	EM pLED BASIC CLE 232 LiFePO4 14W
				Article no.	89801088
				Duration	3 h
				Cells	2
Technology andDesign capacity		Number of cells	Type	Article no.	Assignable batteries
LiFePO ₄ 1.5 Ah	stick	1 x 2	Accu-LiFePO4 2A CON	28002318	•
	side by side	2 x 1	Accu-LiFePO4 2B CON	28002319	•
	remote box	1 x 2	PACK-LiFePO4 3.0Ah 2 CON	28005854	•
	stick	1S1P	Accu-LiFePO4 1A CON	28006323	•
	remote box	1S1P	PACK-LiFePO4 3.3Ah 1 CON	28005859	•

7.2 Battery charge / discharge data

EM pLED BASIC CLE 232 LiFePO₄ 14W, 3 h

		Type	EM pLED BASIC CLE 232 LiFePO ₄ 14W
		Article no.	89801088
		Duration	3 h
Battery charge time	Initial charge	24 h	
	Trickle charge	continuously	
Charging current	Initial charge	160 – 200 mA	
	Trickle charge ^①	160 – 200 mA / 0 mA	
Discharge current ^②		420 – 580 mA	
Charge voltage range ^③		2.0 – 3.6 V per cell	
Discharge voltage range		2.6 – 3.6 V per cell	

^① Automatic recharge when battery voltage falls below 3.4 V. Charger off (0 mA) when battery voltage exceeds 3.6 V.

Note: Battery protected against operation at excessive temperatures (charging stopped when battery cell temperature < 0 °C or > 60 °C).

The emergency lighting LED Driver will recharge the battery normally after running the test of 61347-2-7 CL 22.3 (abnormal operating conditions).

^② The battery will not be charged below 2.0 V.

^③ Measured at 3.2 V battery.

7.3 Accu-LiFePO₄

Capacity two cell accu 3.0 Ah	
International designation	IFpR 19/66
Battery voltage/cell	3.2 V
Cell type	18650
Case temperature range to ensure	
4 years design life	+55 °C
6 years design life	+45 °C
8 years design life	+35 °C
Max. short term battery case temperature (shorter than 1 month over the battery lifetime)	70 °C
Max. number discharge cycles	50 cycles total
Max. storage time	15 months at -20 °C to +35 °C

7.4 Accu-LiFePO₄**Capacity 1.5 Ah**

International designation	IFpR 19/66
Battery voltage/cell	3.2 V
Cell type	18650
Case temperature range to ensure	
5 years design life	+5 °C to +60 °C
7 years design life	+5 °C to +55 °C
10 years design life	+5 °C to +45 °C
12 years design life	+5 °C to +35 °C
Max. short term battery case temperature (shorter than 1 month over the battery lifetime)	70 °C
Max. number discharge cycles	50 cycles total
Max. storage time	15 months at -20 °C to +35 °C

Comply with UN 38.3 and IEC 62133 (safety testing) protected against over charge, over discharge, charging at excessive temperatures, short-circuit and over current.

Only use Tridonic batteries.

7.5 Accu / Accupack-LiFePO₄**Capacity 3.3 Ah**

International designation	IFpR 27/66
Battery voltage/cell	3.2 V
Cell type	26650
Case temperature range to ensure	
4 years design life	+5 °C to +45 °C
6 years design life	+5 °C to +35 °C
8 years design life	+5 °C to +25 °C
Max short term battery case tc point temperature (reduced lifetime)	70 °C
Max. number discharge cycles	50 cycles total
Max. storage time	15 months at -20 °C to +35 °C

7.6 Safety

Note: LiFeGuard ensures safe and reliable battery operation by offering a comprehensive three-layered safety system. It addresses the cell, battery pack and emergency driver.

7.6.1 Deep discharge protection

When the battery remains connected without charging for a long period of time after the battery cut off of the driver the battery voltage can still drop. To make sure the cells are not damaged by this voltage drop, the battery protection prevents the battery from further discharge below 2.0 V.

7.6.2 Overcharge protection

If in case of an error or the use of a wrong driver the battery gets overcharged the battery protection will disconnect the battery from the driver at a voltage of 3.9 V. A discharge of the battery is still possible after the protection circuit was triggered to guarantee emergency operation.

7.6.3 Short-circuit protection

In case of a short circuit the battery protection opens the connection to the driver and the output is therefore free of voltage. The output will be reactivated again when the short circuit is removed.

7.6.4 Temperature protection

The battery is protected against temporary thermal overheating. If the temperature limit is exceeded the further charging of the battery is no longer possible. The temperature protection is activated below approx. 0 °C and above approx. +60 °C. The discharging of the battery is still possible to guarantee emergency operation. The charging is automatically activated when the temperature is within the range of 0 to 60°C again.



Battery has built in thermal sensor for safe charging. Mount battery away from heat source.

Positioning of the thermal sensor see battery data sheet.

7.7 Wiring batteries

To inhibit inverter operation disconnect the batteries by removing the connection at battery side.

For further informations refer to corresponding battery datasheet.

7.8 Storage, installation and commissioning

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

8. Miscellaneous

8.1 Battery replacement

After a battery replacement and a subsequent full charge cycle (24 h) a duration test is mandatory to prove that with the new battery the rated duration is achieved.

8.2 Mains-connected transformers

The EM powerLED does not contain mains-connected windings of transformers.

8.4 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.

8.5 Additional information

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

Guarantee conditions at www.tridonic.com → Services

Lifetime declarations are informative and represent no warranty claim.
No warranty if device was opened.