

EM converterLED ONC 50V 3h

BASIC series

Product description

- Self contained emergency lighting LED driver for manual testing
- For LED modules with a forward voltage of 10 – 54 V
- SELV for output voltage < 60 V DC
- Low profile casing (21 x 30 mm cross-section)
- For luminaire installation
- Nominal lifetime up to 50,000 h
- 4 years guarantee (conditions at www.tridonic.com)



Properties

- Non maintained operation
- 3 h rated duration
- 3-pole technology: 2-pole LED module changeover and delayed power switching for the LED driver
- Automatic shutdown of output if LED load is out of range
- Constant power output
- Maximum light output for all LED modules
- Electronic charge system
- Deep discharge protection
- Short-circuit-proof battery connection
- Polarity reversal protection for battery provided by 3-pole connector

Batteries

- High-temperature cells
- LiFePO₄ batteries
- 26650 cell
- 4 – 8 years design life for LiFePO₄ batteries
- 4 years guarantee for LiFePO₄ batteries



Standards, page 5

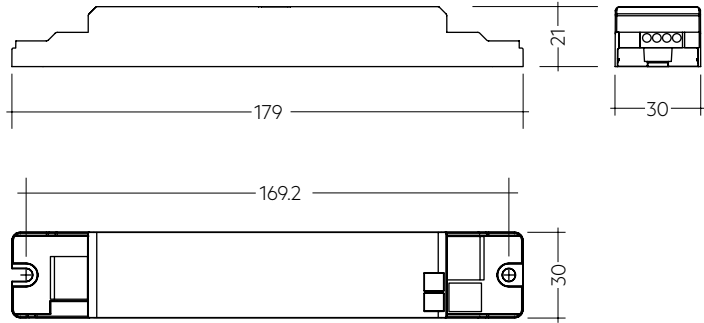
Wiring diagrams and installation examples, page 6



EM converterLED ONC 50V 3h BASIC series

Technical data

| | |
|---|---|
| Rated supply voltage | 220 – 240 V |
| AC voltage range | 198 – 264 V |
| Mains frequency | 50 / 60 Hz |
| LED module forward voltage range | 10 – 54 V |
| Output current | see chapter 5.3 |
| Starting time | < 0.5 s from detection of emergency event |
| Overvoltage protection | 320 V (for 48 h) |
| U-OUT (including open- / short-circuit and double load) | 60 V |
| Max. open circuit voltage | 60 V |
| Battery charging time [®] | 24 h |
| Ambient temperature range t_a | -5 ... + 55 °C |
| Max. casing temperature t_c | 75 °C |
| Mains voltage changeover threshold | according to EN 60598-2-22 |
| Mains surge capability (between L – N) | 1 kV |
| Mains surge capability (between L/N – PE) | 2 kV |
| Type of protection | IP20 |
| Lifetime | up to 50,000 h |
| Guarantee (conditions at www.tridonic.com) | 4 years |
| Dimensions LxWxH | 179 x 30 x 21 mm |



Ordering data

| Type [®] | Article number | Rated duration | Packaging, carton | Packaging, pallet | Weight per pc. |
|-----------------------------------|-----------------|----------------|-------------------|-------------------|----------------|
| EMcLED ONC 232 LiFePO4 50V | 89801160 | 3 h | 10 pc(s). | 1,600 pc(s). | 0.07 kg |

Specific technical data

| Type [®] | Battery technology | Rated duration | Typ. λ (at 230 V, 50 Hz) | Typ. output power P emergency | Mains current in charging operation | | | Rated power in charging operation | | |
|-----------------------------------|---------------------|----------------|----------------------------------|----------------------------------|-------------------------------------|---------------|----------------|-----------------------------------|---------------|----------------|
| | | | | | Initial charge | Fast recharge | Trickle charge | Initial charge | Fast recharge | Trickle charge |
| EMcLED ONC 232 LiFePO4 50V | LiFePO ₄ | 3 h | 0.60C | 1.8 W | 20 mA | 20 mA | 20 / 12 mA | 2.9 W | 2.9 W | 2.9 / 1.4 W |

[®] EM = Emergency.

[®] 12 h battery charging time for 2 h emergency lighting function when used with LiFePO₄ batteries.

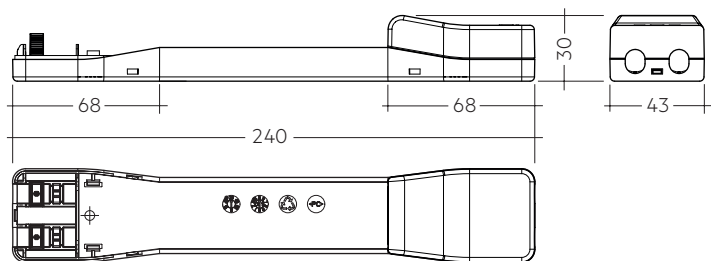
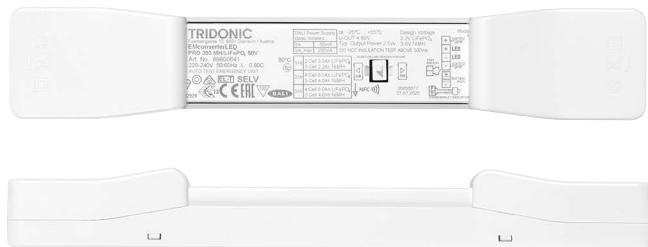
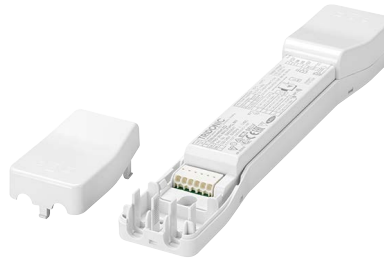


ACCES-
SORIES

EMcLED Strain-relief set 240x43x30mm

Product description

- Optional strain-relief set for independent applications
- Transforms the LED driver into a fully class II compatible LED driver (e.g. ceiling installation)
- Easy and tool-free mounting to the LED driver, screwless cable-clamp channels with strain-relief (240 x 43 x 30 mm)



Permissible cable jacket diameter 2.2 – 9 mm

Ordering data

| Type | Article number | Packaging, carton | Packaging, pallet | Weight per pc. |
|-----------|----------------|-------------------|-------------------|----------------|
| EMcLED SR | 28003813 | 10 pc(s). | 1,260 pc(s). | 0.08 kg |

Status indication green LED

Product description

- A green LED indicates that charging current is flowing into the battery
- Plug connection



Ordering data

| Type | Article number | Packaging, bag | Packaging, carton | Weight per pc. |
|----------------------------|----------------|----------------|-------------------|----------------|
| LED EM green, 1.0 m CON | 89800269 | 25 pc(s). | 200 pc(s). | 0.015 kg |
| LED EM green, HO 1.0 m CON | 89800271 | 25 pc(s). | 200 pc(s). | 0.015 kg |
| LED EM green, 0.6 m CON | 89800472 | 25 pc(s). | 200 pc(s). | 0.009 kg |
| LED EM green, HO 0.6 m CON | 89800473 | 25 pc(s). | 200 pc(s). | 0.009 kg |
| LED EM green, 0.3 m CON | 89800270 | 25 pc(s). | 200 pc(s). | 0.005 kg |
| LED EM green, HO 0.3 m CON | 89800272 | 25 pc(s). | 200 pc(s). | 0.005 kg |

Extension Cable LiFePO4

Product description

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




Ordering data

| Type | Article number | Packaging, bag | Packaging, carton | Weight per pc. |
|-------------------------------|----------------|----------------|-------------------|----------------|
| EXTENSION CABLE LiFePO4 500mm | 28002461 | 10 pc(s). | 200 pc(s). | 0.01 kg |

1. Standards

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

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 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 with LiFePO₄ batterie

| | t _c | 65 °C | 70 °C | 75 °C |
|--|----------------|------------|------------|------------|
| EMcLED ONC 232 LiFePO₄ 50V | lifetime | > 50,000 h | > 50,000 h | > 50,000 h |

The emergency lighting LED driver is designed for a lifetime stated above under reference conditions and with a failure probability of less than 10 %.

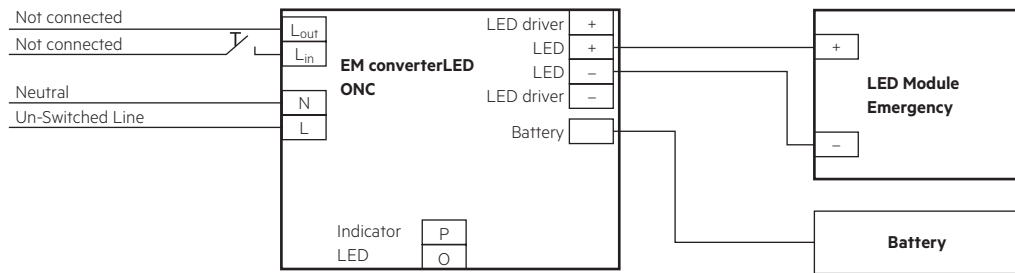
The relation of t_c to t_a temperature depends also on the luminaire design. If the measured t_c temperature is approx. 5 K below t_c max., t_a temperature should be checked and eventually critical components (e.g. ELCAP) measured. Detailed information on request.

3. Installation / Wiring

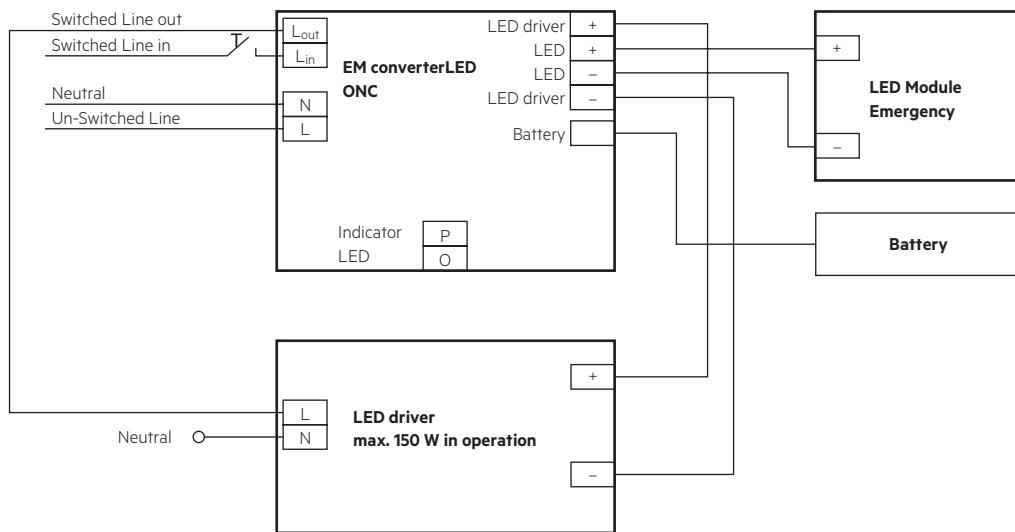
3.1 Wiring diagram

One or more LED modules with a total forward voltage of 10 to 54 V can be connected to the EM converterLED 50V module. These LED module(s), marked with "Emergency" are operated in emergency mode from the associated battery. In normal mains mode all LED modules are operated by the LED driver from the mains supply.

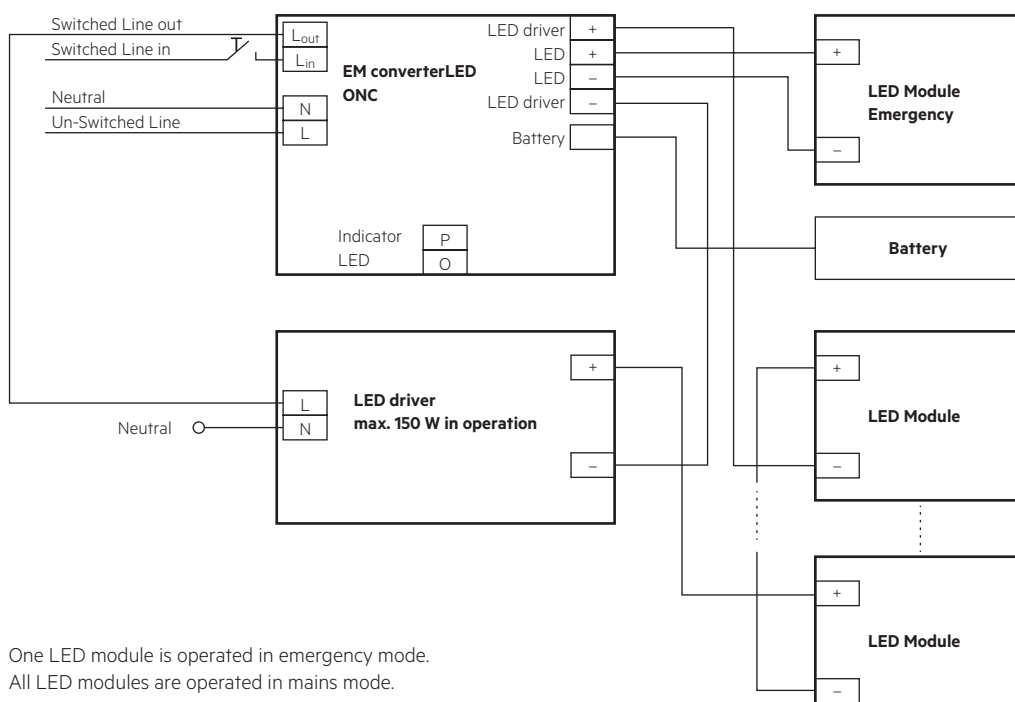
EM converterLED BASIC with one LED module for non-maintained emergency operation



EM converterLED BASIC with a standard LED driver and one LED module for mains and emergency operation

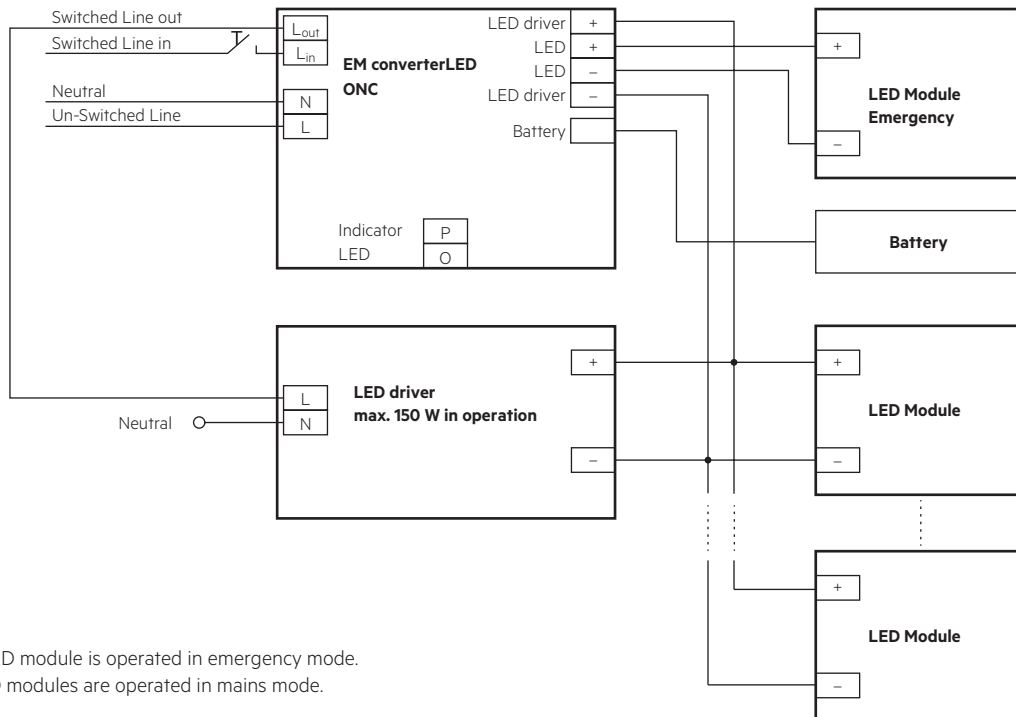


EM converterLED BASIC with a standard LED driver and series operation of LED modules



One LED module is operated in emergency mode.
All LED modules are operated in mains mode.

EM converterLED BASIC with a standard LED driver and parallel operation of LED modules

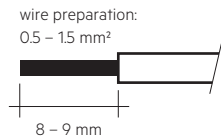


One LED module is operated in emergency mode.
All LED modules are operated in mains mode.

3.2 Wiring type and cross section

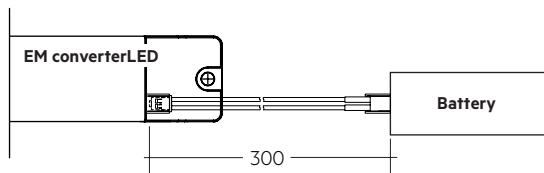
Solid wire with a cross section of 0.5 – 1.5 mm². Strip 8 – 9 mm of insulation from the cables to ensure perfect operation of terminals.

Wiring: LED module/LED driver/supply

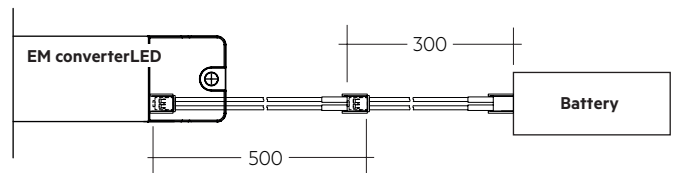


3.3 Battery connection

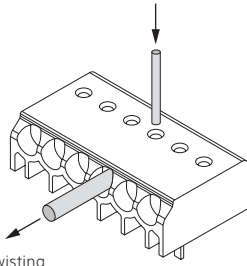
LiFePO₄: Direct connection



LiFePO₄: Connection with extension



3.4 Loose wiring



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

3.5 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.
- Separate LED leads from the mains and DALI 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.
- Route the secondary wires (LED module) in parallel to ensure good EMC performance.
- Maximum lead length for the Indicator LED connection is 1 m. Separate the Indicator LED wiring 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
- Protect the wiring against short circuits to earth (sharp edged metal parts, metal cable clips, louver, etc.) to avoid the damage of the control gear.

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 route the switched and unswitched 50 Hz supply wiring as short as possible and keep it as far away as possible from the LED leads. Through wiring may affect the EMC performance of the luminaire.

Do not exceed the max. length of LED leads to the LED module. Note that the length of the EM converterLED leads to the LED module is added to the length of the leads from the LED driver to the EM converterLED module when consider-

ing the max. permitted lead length of the LED driver.

3.6 Maximum lead length

| | |
|-----------------------|-----------------------------|
| LED | 3 m (6 m loop) ^① |
| Status indication LED | 1 m |
| Batteries | 0.8 m |

^① Note: The length of LED leads to the LED module must not be exceeded. Note that the length of the EM converterLED leads is added to the length of the leads from the LED driver to the EM converterLED module when considering max. permitted lead length of the LED driver. Leads should always be kept as short as possible.

3.7 Use of different phases

The use of different phases for switched line and unswitched line is allowed. When using different phases, the unswitched line must fail if the switched line fails. This is required to assure correct switching into emergency mode. It can be realised with a relay.

4. Mechanical values

4.1 Housing properties

- Casing manufactured from polycarbonate.
- Type of protection: IP20
- Max. torque at the mounting screws: 0.8 Nm

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
- Plug connection

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 \varnothing | 1.5 mm ² | 1.5 mm ² | 1.5 mm ² | 2.5 mm ² | 1.5 mm ² | 1.5 mm ² | 1.5 mm ² | 2.5 mm ² | I_{max} | time |
| EMcLED ONC 232 LiFePO₄ 50V | 90 | 130 | 130 | 130 | 180 | 260 | 260 | 260 | 10 A | 120 μ s |

5.2 Insulation matrix

| | Mains | Switched Live | Battery, LED, Indicator LED | LED driver |
|-----------------------------|-------|---------------|-----------------------------|------------|
| Mains | - | • | •• | •• |
| Switched Live | • | - | •• | •• |
| Battery, LED, Indicator LED | •• | •• | - | • |
| LED driver | •• | •• | - | - |

• Represents basic insulation

•• Represents double or reinforced insulation

When using a non-SELV LED driver insulate the battery, LED and indicator LED in the luminaire according to the U-OUT rating of the LED driver.

5.3 Typ. LED current/voltage characteristics

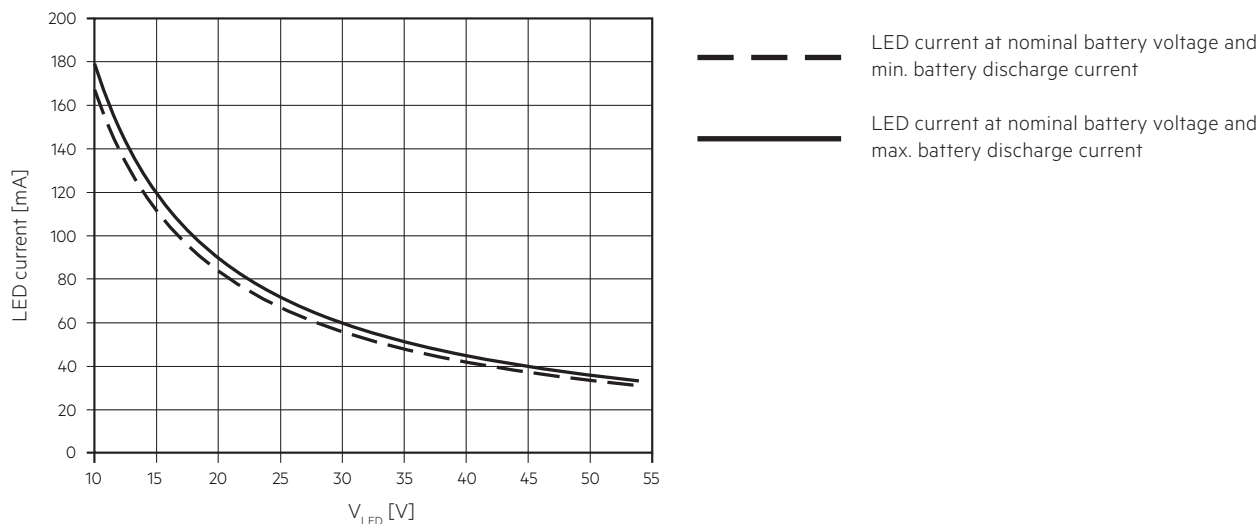
The LED current in emergency mode is automatically adjusted by the EM converterLED module based on the total forward voltage of the LED modules connected and the associated battery. The start of the LED in emergency mode does not result in a current peak.

EMcLED ONC 232 LiFePO₄ 50V

Article number: 89801160

LiFePO₄ battery, 3.2 V battery voltage

700 – 750 mA battery discharge current (tolerance)



5.4 LED driver compatibility

The EM converterLED emergency unit use 3 pole technology and is compatible with most LED drivers on the market, however it is important to check that the rating of the LED driver does not exceed the values specified below:

- The max. allowed output current rating of the associated LED driver is 2 A eff (current rating of the terminals of EM converterLED) and 2.4 A peak (current rating of switching relays of EM converterLED)
- The max. allowed inrush current rating of the associated LED driver is 60 A peak for 1 ms or 84 A for 255 μ s (inrush current rating of switching relay of EM converterLED)
- The max. allowed output voltage (U-OUT) of the associated LED driver applied to the EM converterLED output is 450 V (voltage withstand between adjacent contact of the single switching relay of the EM converterLED)
- The max. allowed LED load of the associated LED driver is 150 W in operation. The load must be an LED module.

Check compatibility with short function tests (duration of several seconds).

6. Functions

6.1 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

EMcLED ONC 232 LiFePO₄ 50V, 3 h

| | | | Type | EMcLED ONC 232 LiFePO ₄ 50V | |
|---|-----------|-----------------|-------------------------------------|--|----------------------|
| | | | Article no. | 89801160 | |
| | | | Duration | 3 h | |
| Technology and capacity | Design | Number of cells | Type | Article no. | Assignable batteries |
| LiFePO ₄ 3,3 Ah 26650 cell | soft pack | 1 x 1 | Accu-LiFePO ₄ 3.3Ah 1S1P | 05529134 | • |

7.2 Battery charge / discharge data

EMcLED ONC 232 LiFePO₄ 50V, 3 h, LiFePO₄

| | | Type | EMcLED ONC 232 LiFePO ₄ 50V | |
|--------------------------------------|-----------------------------|---|--|--|
| | | Article no. | 89801160 | |
| | | Duration | 3 h | |
| Battery charge time | Initial charge | 24 h | | |
| | Fast recharge | 24 h | | |
| | Trickle charge | continuously and battery voltage controlled | | |
| Charging current | Initial charge | 250 – 290 mA | | |
| | Fast recharge | 250 – 290 mA | | |
| | Trickle charge [®] | 250 – 290 mA / 0 mA | | |
| Discharge current range [®] | | 700 - 750 mA | | |
| Charge voltage range [®] | | 2.0 – 3.65 V per cell | | |
| Discharge voltage range | | 3.65 – 2.60 V per cell | | |

[®] 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 < -5 °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).

[®] The battery will not be charged below 2.0 V.

[®] The discharge current varies depending on the battery voltage and the LED voltage to maintain the constant output power.

7.3 Accu-LiFePO₄

Capacity 3.3 Ah

| | |
|--|---------------------------------|
| International designation | IFpR 27/67 |
| Battery voltage/cell | 3.2 V |
| Cell type | 26650 |
| Case temperature range to ensure 4 years design life | +55 °C |
| Max short term battery case tc point temperature (reduced lifetime) | 70 °C |
| Max. number discharge cycles | 50 cycles total |
| Max. storage time | 12 months at +5 °C to +25 °C |

Only use Tridonic batteries.

7.4 Wiring batteries

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

For further informations refer to corresponding battery datasheet.

7.5 Storage, installation and commissioning

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

8. Miscellaneous

8.1 Maximum number of switching cycles

EM converterLEDs are tested with 50,000 mains switching cycles of the associated LED driver.

8.2 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.

8.3 Mains-connected transformers

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

8.4 Additional information

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

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