Product description
• Emergency lighting LED driver with DALI interface and automatic test function
• For self-contained emergency lighting
• For LED modules with a forward voltage of 48 – 250 V
• Low profile casing (21 x 30 mm cross-section)
• For luminaire installation
• Nominal lifetime up to 100,000 h
• 5 years guarantee (conditions at www.tridonic.com)

Properties
• Non maintained operation
• DALI interface for controlled testing and monitoring
• 1, 2 or 3 h rated duration
• Operating time selectable with plug (duration link)
• Compatible with most constant current LED drivers (see 5.4)
• 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
• Addressing function, patented („EZ easy addressing“)
• Two-colour status display LED
• Electronic charge system
• Deep discharge protection
• Short-circuit-proof battery connection
• Polarity reversal protection for battery provided by 3-pole connector

Tests:
• Status of the battery
• Status of the LED
• Function test
• Duration test

Batteries
• LiFePO₂ batteries with Tridonic LiFeGuard
• High-temperature cells
• 26650 cells
• 4 years design life
• 3 years guarantee
• For battery compatibility refer to chapter „Battery selection“

Standards, page 5
Wiring diagrams and installation examples, page 6
EM converterLED PRO HP 6/9 W 250 V
PRO 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 48 – 250 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) 290 V
Max. open circuit voltage 290 V
Ambient temperature range ta 25 – +65 °C
Max. casing temperature tc 80 °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
Rest mode max. number of emergency units 100
Rest mode max. wiring distance 1,000 m
Functional test Weekly 5s test
Duration test Yearly 1 h / 2 h / 3 h test
Lifetime up to 100,000 h
Guarantee (conditions at www.tridonic.com) 5 years
Dimensions LxWxH 179 x 30 x 21 mm

Specific technical data

| Type                  | Battery technology | Rated supply voltage | AC voltage range | Mains frequency | LED module forward voltage range | Output current | Starting time | Overvoltage protection | U-OUT (including open- / short-circuit and double load) | Max. open circuit voltage | Ambient temperature range ta | Max. casing temperature tc | Mains voltage changeover threshold | Mains surge capability (between L – N) | Mains surge capability (between L/N – PE) | Type of protection | Rest mode max. number of emergency units | Rest mode max. wiring distance | Functional test | Duration test | Lifetime | Guarantee (conditions at www.tridonic.com) | Dimensions LxWxH |
|-----------------------|--------------------|----------------------|------------------|----------------|-----------------------------------|----------------|---------------|------------------------|------------------------------------------------|--------------------------|---------------------------------|----------------|--------------------------------|--------------------------------|----------------|----------------|----------|----------------|--------------------------|------------------|
| EMcLED PRO HP 6W 250V | LiFePO4             |                      |                  |                |                                   |                |               |                        |                                               |                          |                                 |                |                               |                               |                |                |          |                           |                          |                |
|                       |                    | 2 h                  | 0.65C            | 6 W            | 31 mA                             | 31 mA          | 31 / 12 mA   | 4.7 W                  | 4.7 W                          | 4.7 W                  |                                 |                |                               |                               |                |                |          |                           |                          |                |
|                       |                    |                      |                  |                |                                   |                |               |                        |                                               |                          |                                 |                |                               |                               |                |                |          |                           |                          |                |
| EMcLED PRO HP 9W 250V | LiFePO4             |                      |                  |                |                                   |                |               |                        |                                               |                          |                                 |                |                               |                               |                |                |          |                           |                          |                |
|                       |                    | 3 h                  | 0.65C            | 6 W            | 31 mA                             | 31 mA          | 31 / 12 mA   | 4.7 W                  | 4.7 W                          | 4.7 W                  |                                 |                |                               |                               |                |                |          |                           |                          |                |
|                       |                    | 2 h                  | 0.70C            | 9 W            | 39 mA                             | 39 mA          | 39 / 12 mA   | 6.1 W                  | 6.1 W                          | 6.1 W                  |                                 |                |                               |                               |                |                |          |                           |                          |                |
|                       |                    |                      |                  |                |                                   |                |               |                        |                                               |                          |                                 |                |                               |                               |                |                |          |                           |                          |                |
|                       |                    | 3 h                  | 0.70C            | 9 W            | 39 mA                             | 39 mA          | 39 / 12 mA   | 6.1 W                  | 6.1 W                          | 6.1 W                  |                                 |                |                               |                               |                |                |          |                           |                          |                |

Note: LED driver supplied with duration link in 3 hours position. Duration link must be set before battery and mains connection.

Ordering data

| Type                  | Article number | Rated supply voltage | AC voltage range | Mains frequency | LED module forward voltage range | Output current | Starting time | Overvoltage protection | U-OUT (including open- / short-circuit and double load) | Max. open circuit voltage | Ambient temperature range ta | Max. casing temperature tc | Mains voltage changeover threshold | Mains surge capability (between L – N) | Mains surge capability (between L/N – PE) | Type of protection | Rest mode max. number of emergency units | Rest mode max. wiring distance | Functional test | Duration test | Lifetime | Guarantee (conditions at www.tridonic.com) | Dimensions LxWxH |
|-----------------------|----------------|----------------------|------------------|----------------|-----------------------------------|----------------|---------------|------------------------|------------------------------------------------|--------------------------|---------------------------------|----------------|--------------------------------|--------------------------------|----------------|----------------|----------|----------------|--------------------------|------------------|
| EMcLED PRO HP 6W 250V | 89800833       | 1/2/3 h              | 10 pc(s)         | 1,600 pc(s)    | 0.07 kg                           |                |               |                        |                                               |                          |                                 |                |                               |                               |                |                |          |                           |                          |                |
| EMcLED PRO HP 9W 250V | 89800835       | 1/2/3 h              | 10 pc(s)         | 1,600 pc(s)    | 0.07 kg                           |                |               |                        |                                               |                          |                                 |                |                               |                               |                |                |          |                           |                          |                |
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)

Ordering data

<table>
<thead>
<tr>
<th>Type</th>
<th>Article number</th>
<th>Packaging, carton</th>
<th>Packaging, pallet</th>
<th>Weight per pc.</th>
</tr>
</thead>
<tbody>
<tr>
<td>EMcLED SR</td>
<td>28003813</td>
<td>90 pc(s)</td>
<td>1,260 pc(s)</td>
<td>0.08 kg</td>
</tr>
</tbody>
</table>
**Accessories**

**Test switch EM3**

**Product description**
- For connection to the emergency lighting unit
- For checking the device function
- Plug connection

**Ordering data**

<table>
<thead>
<tr>
<th>Type</th>
<th>Article number</th>
<th>Packaging, bag</th>
<th>Packaging, carton</th>
<th>Weight per pc.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test switch EM 3</td>
<td>89899956</td>
<td>25 pc(s)</td>
<td>200 pc(s)</td>
<td>0.013 kg</td>
</tr>
</tbody>
</table>

**Accessories**

**Status indication bi-colour LED**

**Product description**
- Two-colour status display LED
- Green: system OK, red: fault
- Plug connection

**Ordering data**

<table>
<thead>
<tr>
<th>Type</th>
<th>Article number</th>
<th>Packaging, bag</th>
<th>Packaging, carton</th>
<th>Weight per pc.</th>
</tr>
</thead>
<tbody>
<tr>
<td>LED EM bi-colour, 1.0 m CON</td>
<td>89800273</td>
<td>25 pc(s)</td>
<td>200 pc(s)</td>
<td>0.015 kg</td>
</tr>
<tr>
<td>LED EM bi-colour, high brightness HO 1.0 m CON</td>
<td>89800275</td>
<td>25 pc(s)</td>
<td>200 pc(s)</td>
<td>0.015 kg</td>
</tr>
<tr>
<td>LED EM bi-colour, 0.6 m CON</td>
<td>89800474</td>
<td>25 pc(s)</td>
<td>200 pc(s)</td>
<td>0.005 kg</td>
</tr>
<tr>
<td>LED EM bi-colour, high brightness HO 0.6 m CON</td>
<td>89800475</td>
<td>25 pc(s)</td>
<td>200 pc(s)</td>
<td>0.005 kg</td>
</tr>
<tr>
<td>LED EM bi-colour, 0.3 m CON</td>
<td>89800274</td>
<td>25 pc(s)</td>
<td>200 pc(s)</td>
<td>0.005 kg</td>
</tr>
<tr>
<td>LED EM bi-colour, high brightness HO 0.3 m CON</td>
<td>89800276</td>
<td>25 pc(s)</td>
<td>200 pc(s)</td>
<td>0.005 kg</td>
</tr>
</tbody>
</table>

**Extension Cable LiFePO4**

<table>
<thead>
<tr>
<th>Type</th>
<th>Article number</th>
<th>Packaging, bag</th>
<th>Packaging, carton</th>
<th>Weight per pc.</th>
</tr>
</thead>
<tbody>
<tr>
<td>EXTENSION CABLE LiFePO4 500mm</td>
<td>28002461</td>
<td>10 pc(s)</td>
<td>200 pc(s)</td>
<td>0.01 kg</td>
</tr>
</tbody>
</table>
Product description

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

Ordering data

<table>
<thead>
<tr>
<th>Type</th>
<th>Article number</th>
<th>Packaging, bag</th>
<th>Packaging, carton</th>
<th>Weight per pc</th>
</tr>
</thead>
<tbody>
<tr>
<td>EXTENSION CABLE LiFePO4 500mm</td>
<td>28002461</td>
<td>10 pc(s)</td>
<td>200 pc(s)</td>
<td>0.01 kg</td>
</tr>
</tbody>
</table>
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
- DALI standard EN 62386-202
- according to EN 50172
- according to EN 60598-2-22
- according to EN 62034

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.

<table>
<thead>
<tr>
<th>EMcLED PRO HP 6W 250V</th>
<th>tc 70 °C</th>
<th>75 °C</th>
<th>80 °C</th>
</tr>
</thead>
<tbody>
<tr>
<td>lifetime</td>
<td>+100,000 h</td>
<td>+100,000 h</td>
<td>+100,000 h</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>EMcLED PRO HP 9W 250V</th>
<th>tc 70 °C</th>
<th>75 °C</th>
<th>80 °C</th>
</tr>
</thead>
<tbody>
<tr>
<td>lifetime</td>
<td>+100,000 h</td>
<td>+100,000 h</td>
<td>93,000 h</td>
</tr>
</tbody>
</table>

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 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

One or more LED modules with a total forward voltage of 68 to 250 V can be connected to the EMcLED. 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 mains LED driver.
EM converterLED PRO with one LED module for non-maintained emergency operation

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

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

One LED module is operated in emergency mode.
All LED modules are operated in mains mode.
Emergency lighting units
EM converterLED

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

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

Wireless set-up for EM converterLED PRO with a DALI LED driver and one LED module for mains and emergency operation

Data sheet 0722-EM123-1
Subject to change without notice. Information provided without guarantee.
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 Ø 1 mm release tool

3.5 Wiring guidelines
- The LED terminals, battery, indicator LED and test switch 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 Test switch and Indicator LED connection is 1 m. Separate the test switch and 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
- DALI terminals are mains proof.
- 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.

3.6 Maximum lead length
LED  3 m (6 m loop)⁰
Status indication LED  1 m
Batteries  0.8 m

⁰ Note: The length of LED leads to the LED module must not be exceeded. Note that the length of the EM converter(LED leads to the LED module is added to the length of the leads from the LED driver to the EM converter(LED 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
- Bi-colour
- Mounting hole 6.5 mm diameter, 1 – 16 mm thickness
- Lead length 0.3 m / 0.6 m / 1.0 m
- Insulation rating: 90 °C
- Plug connection

Test switch
- Mounting hole 7.0 mm diameter
- Lead length 0.95 m
- Plug connection

Battery connection
- Plug connection 0.3 m
- Extension 0.5 m

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 converter(LED leads to the LED module is added to the length of the leads from the LED driver to the EM converter(LED module when considering max. permitted lead length of the LED driver.

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


5. Electrical values

5.1 Maximum loading of automatic circuit breakers

<table>
<thead>
<tr>
<th>Automatic circuit breaker type</th>
<th>Ø10</th>
<th>Ø13</th>
<th>Ø16</th>
<th>Ø20</th>
<th>ØC10</th>
<th>ØC13</th>
<th>ØC16</th>
<th>ØC20</th>
<th>Inrush current</th>
</tr>
</thead>
<tbody>
<tr>
<td>Installation</td>
<td>1.5 mm²</td>
<td>1.5 mm²</td>
<td>1.5 mm²</td>
<td>2.5 mm²</td>
<td>1.5 mm²</td>
<td>1.5 mm²</td>
<td>1.5 mm²</td>
<td>2.5 mm²</td>
<td>10 A</td>
</tr>
<tr>
<td>EMcLED PRO</td>
<td>90</td>
<td>130</td>
<td>130</td>
<td>130</td>
<td>180</td>
<td>260</td>
<td>260</td>
<td>260</td>
<td></td>
</tr>
</tbody>
</table>

5.2 Insulation matrix

<table>
<thead>
<tr>
<th></th>
<th>Mains</th>
<th>Switched Live</th>
<th>Battery, LED, Test switch, Indicator LED</th>
<th>DALI</th>
<th>LED driver</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mains</td>
<td>–</td>
<td>–</td>
<td>•</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Switched Live</td>
<td>•</td>
<td>–</td>
<td>•</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Battery, LED, Test switch, Indicator LED</td>
<td>• •</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td></td>
</tr>
<tr>
<td>DALI</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>LED driver</td>
<td>–</td>
<td>–</td>
<td>•</td>
<td>–</td>
<td>–</td>
</tr>
</tbody>
</table>

- Represents basic insulation
- • Represents double or reinforced insulation

When using a non-SELV LED driver insulate the battery, LED, test switch and indicator LED in the luminaire according to the U-OUT rating of the LED driver.
DALI terminals are not SELV. Wire the terminals in accordance with the requirements of low voltage installations.

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 PRO HP 6W 250V
Article number: 89800833
1 h application
LiFePO4 battery 2S1P, 6.4 V battery voltage
3 h application
LiFePO4 battery 2S2P, 6.4 V battery voltage

EMcLED PRO HP 9W 250V
Article number: 89800833
1 h application
LiFePO4 battery 2S1P, 6.4 V battery voltage
3 h application
LiFePO4 battery 3S2P, 9.6 V battery voltage
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 peak (current rating of the terminals of EM converterLED).
- The max. allowed inrush current rating of the associated LED driver is 60 A peak for 1 ms or 120 A for 250 μs (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 500 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 300 W in operation. The load must be an LED module.

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

6. Functions

6.1 Duration link selection

<table>
<thead>
<tr>
<th>Duration</th>
<th>Link position</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 hr</td>
<td>Position A</td>
</tr>
<tr>
<td>2 hr</td>
<td>No duration link</td>
</tr>
<tr>
<td>1 hr</td>
<td>Position B</td>
</tr>
</tbody>
</table>

Emergency lighting LED driver supplied with duration link in 3 hours position (position A).

The position of the link will only be read on first power up. If it is changed afterwards both the battery and mains supply must be disconnected for 10 seconds to enable the EM converterLED to read the new link position on reconnection of the battery and mains. It will lead to a false battery failure indication if the link is changed after installation without this reset.

6.2 Status indication

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

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

6.3 Testing

DALI Control

A DALI command from a suitable control unit can be used to initiate function and duration tests at individually selected times. Status flags are set for report back and data logging of results.

When a DALI bus has not been connected or when a DALI bus is connected but the DALI default DELAY and INTERVAL times have not been re-set by sending appropriate DALI commands, then the EM converterLED PRO will conduct self-tests in accordance with the default times set within the EEPROM.

These default times are factory pre-set, in accordance with the DALI standard EN 62386-202, to conduct an automatic function test every 7 days and a duration test every 52 weeks. Since the DELAY time is factory pre-set to Zero, all units are tested at the same time. Test times can be changed with a command over the DALI bus.

The DELAY and INTERVAL time values must be re-set when the emergency system test times are to be scheduled by a DALI control and monitoring system.

Note that once the default values have been set to Zero, tests will only be conducted following a command from the control system. If the DALI bus is disconnected the EM converterLED PRO does not revert to self-testing mode.

Addressing

The EM converterLED PRO includes the EZ easy addressing system which allows addressing and identification by using the bi-colour LED. Binary address codes given by the LED can be simply converted to the DALI addresses 0 to 63. For single handed addressing using this method it is necessary to send a broadcast ident command every 3 to 9 seconds. During this command the LEDs will be switched off and the indication LED will flash the 6 bit binary address preceded by a 3 second start indication period.
Commissioning
After installation of the luminaire and initial connection of the mains supply and battery supply to the EM converterLED PRO the unit will commence charging the batteries for 24 hours (initial charge). Afterwards the module will conduct a commissioning test for the full duration. The 20 hours recharge occurs also if a new battery is connected or the module exits the rest mode condition. The following automatic commissioning duration test is only performed when a battery is replaced and fully charged (after 20 hrs) and the interval time is not set to zero, otherwise the system is expected to perform the testing.

Functional test
The time of day and frequency of the 5 seconds function test can be set by the DALI controller. The default setting is a 5 seconds test on a weekly basis.

Duration test
The time of day and frequency of the duration test can be set by the DALI controller. The default setting is a duration test conducted every 52 weeks.

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.

Prolong time
Prolong time can be set by the DALI controller. This is the delay time between return of the mains supply and the end of the emergency operation. The default prolong time is set as 0 minutes as specified within the DALI standard.

Test switch
An optional test switch can be wired to each EM converterLED. This can be used to:
- Initiate a 5 seconds function test: press $200 \text{ ms} < T < 1 \text{ s}$
- Execute function test as long as switch pressed: press $>1 \text{ s}$
- Reset selftest timer (adjust local timing): press $>10 \text{ s}$

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 switched on if the mains supply is switched off within 15 minutes. Rest Mode and Inhibit Mode can be initiated by the DALI controller. The REST command has to be sent after the mains supply has been disconnected and whilst the EM converterLED PRO is in emergency operation. The INHIBIT command has to be sent while the EM converterLED PRO is supplied by mains.

After a mains reset the EM converterLED PRO exits the Rest Mode. Rest Mode and Inhibit Mode can both be disabled by sending the RE-LIGHT/RESET INHIBIT command.

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.

DALI Controller
DALI controllers and hardware/software solutions are available from Tridonic. Please refer to the Lighting controls section.
7. Battery data

7.1 Battery selection

<table>
<thead>
<tr>
<th>Technology and Design capacity</th>
<th>Number of cells</th>
<th>Type</th>
<th>Article no.</th>
<th>Assignable batteries</th>
</tr>
</thead>
<tbody>
<tr>
<td>LiFePO4, 3.6 Ah, 2x18650 cells</td>
<td>Soft pack 2 x 1</td>
<td>ACCU-LiFePO4 3.6Ah 2A 2S1P CON</td>
<td>28003814</td>
<td>•</td>
</tr>
<tr>
<td></td>
<td>Soft pack 2 x 2</td>
<td>ACCU-LiFePO4 7.2Ah 4A 2S2P CON</td>
<td>28003815</td>
<td>•</td>
</tr>
<tr>
<td></td>
<td>Soft pack 3 x 2</td>
<td>ACCU-LiFePO4 7.2Ah 6A 3S2P CON</td>
<td>28003816</td>
<td>•</td>
</tr>
<tr>
<td></td>
<td>Hard pack 2 x 2</td>
<td>PACK-LiFePO4 7.2Ah 2S2P CON</td>
<td>28003809</td>
<td>•</td>
</tr>
<tr>
<td></td>
<td>Hard pack 3 x 2</td>
<td>PACK-LiFePO4 7.2Ah 3S2P CON</td>
<td>28003810</td>
<td>•</td>
</tr>
</tbody>
</table>

7.2 Battery charge / discharge data

<table>
<thead>
<tr>
<th>Type</th>
<th>EMcLED PRO HP 6W 250V</th>
<th>EMcLED PRO HP 9W 250V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Article no.</td>
<td>89800833</td>
<td>89800835</td>
</tr>
<tr>
<td>Duration</td>
<td>1 h</td>
<td>2/3 h</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Battery charge time</th>
<th>Initial charge</th>
<th>Fast recharge</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>24 h</td>
<td>24 h</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Charging current</th>
<th>Initial charge</th>
<th>Fast recharge</th>
<th>Trickle charge</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>350 – 390 mA</td>
<td>350 – 390 mA</td>
<td>350 – 390 mA</td>
</tr>
<tr>
<td></td>
<td>350 – 390 mA</td>
<td>350 – 390 mA</td>
<td>350 – 390 mA</td>
</tr>
<tr>
<td></td>
<td>350 – 390 mA / 0 mA</td>
<td>350 – 390 mA</td>
<td>350 – 390 mA / 0 mA</td>
</tr>
<tr>
<td>Discharge current range</td>
<td>885 - 1400 mA</td>
<td>885 - 1400 mA</td>
<td>1,365 - 2,135 mA</td>
</tr>
<tr>
<td>Charge voltage range</td>
<td>2.0 – 3.65 V per cell</td>
<td>3.65 – 2.60 V per cell</td>
<td></td>
</tr>
</tbody>
</table>

7.3 Accu-LiFePO4

<table>
<thead>
<tr>
<th>Capacity 3.6 Ah</th>
</tr>
</thead>
<tbody>
<tr>
<td>International designation</td>
</tr>
<tr>
<td>Battery voltage/cell</td>
</tr>
<tr>
<td>Cell type</td>
</tr>
<tr>
<td>Case temperature range to ensure 4 years design life</td>
</tr>
<tr>
<td>Max short term battery case tc point temperature (reduced lifetime)</td>
</tr>
<tr>
<td>Max number discharge cycles</td>
</tr>
<tr>
<td>Max. storage time</td>
</tr>
</tbody>
</table>

Only use Tridonic batteries.

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.

7.4 Safety

7.4.1 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.

7.4.2 Overcharge protection

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 39 V. A discharge of the battery is still possible after the protection circuit was triggered to guarantee emergency operation.
7.4.3 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.

7.4.4 Overtemperature 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.

7.5 Wiring batteries

For further information refer to corresponding battery datasheet.

7.6 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 FELV control terminals

FELV control terminals marked „Risk of electric shock“ are not safe to touch. Insulate circuits connected to any FELV control terminal for the Low Voltage supply voltage of the control gear. Protect terminals connected to the FELV circuit against accidental contact.

8.5 BlackBox data recording

Several parameters in respect to the application and use of the product are stored in the EM converterLED. The parameters provide information about the mains, battery, LED output and emergency operation. The BlackBox can be read out with the masterCONFIGURATOR and deviceANALYSER.

In order to allow a safe detection of a battery replacement through the “Black Box data recording” follow the below described process.

1. Disconnect mains
2. Disconnect battery
3. Reconnect and disconnect mains while no battery is not connected®
4. Connect new battery
5. Connect mains®

® Battery fault is safely recorded by the EM converterLED
® Connection of new battery is recorded by the EM converterLED

8.6 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.