Product description
- Emergency lighting LED Driver for manual testing
- For self-contained emergency lighting
- SELV for output voltage < 60 V DC
- Low profile casing (21 x 30 mm cross-section)
- 5 years guarantee

Properties
- Non maintained operation
- Constant current mode
- With either screw or clip fastening (clip-fix)
- 1, 2 or 3 h rated duration
- Selectable operating time (jumper)
- Green charge status display LED
- Output power limitation
- Automatic restart after LED replacement
- Electronic multi-level charge system
- SELV (outputs powerLED, battery, status LED, test switch)
- Polarity reversal protection for battery
- Deep discharge protection
- Very low energy consumption from the battery after activation of the deep discharge protection
- Short-circuit-proof battery connection
- Emergency lighting LEDs available

Batteries
- High-temperature cells
- NiCd or NiMH batteries
- 4-year design life
- 1-year guarantee
- For battery compatibility refer to table „Battery selection“

Standards, page 5
Wiring diagrams and installation examples, page 7
**Emergency lighting units**

**EM powerLED**

Combined emergency lighting LED Driver 1 – 4 W

---

### Technical data

- **Rated supply voltage**: 220 – 240 V
- **Mains frequency**: 50 / 60 Hz
- **Typ. λ (at 230 V, 50 Hz)**: 0.34
- **Forward voltage range LED module (1 x LED)**: 2.8 – 3.4 V
- **Forward voltage range LED module (2 x LED)**: 5.6 – 6.8 V
- **Max. open circuit voltage**: 10 V
- **LED current in emergency operation (1 x LED)**: 700 mA
- **LED current in emergency operation (2 x LED)**: 700 mA
- **Typ. output power (1 x LED)**: 3.4 W
- **Typ. output power (2 x LED)**: 4.5 W
- **Time to light**: 0.23 s from detection of emergency event
- **Overvoltage protection**: 320 V (for 1 h)
- **Battery discharge current**: See page 4
- **Max. casing temperature tc**: 70 °C
- **Ambient temperature ta**: -25 ... +45 °C
- **Mains voltage changeover threshold according to EN 60598-2-22**:
- **Type of protection**: IP20
- **Lifetime**: up to 50,000 h
- **Guarantee**: 5 years

### Ordering data

**Screw fastening version**

- **EM powerLED 4W BASIC**
  - Article number: 89800122
  - Dimensions: 139 x 30 x 21 mm
  - Packaging, carton: 25 pc(s).
  - Packing, pallet: 1,200 pc(s).
  - Weight per pc.: 0.068 kg
  - Max. number of LED: 2

**Clip fastening version**

- **EM powerLED 4W BASIC**
  - Article number: 89800121
  - Dimensions: 127 x 30 x 21 mm
  - Packaging, carton: 25 pc(s).
  - Packing, pallet: 1,200 pc(s).
  - Weight per pc.: 0.068 kg
  - Max. number of LED: 2

### Specific technical data

**Type**

<table>
<thead>
<tr>
<th>Type</th>
<th>Article number</th>
<th>Dimensions L x W x H</th>
<th>Packaging, carton</th>
<th>Packing, pallet</th>
<th>Weight per pc.</th>
<th>Max. number of LED</th>
<th>Power of LED</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>EM powerLED 4W BASIC</strong></td>
<td>89800122</td>
<td>139 x 30 x 21 mm</td>
<td>25 pc(s)</td>
<td>1,200 pc(s)</td>
<td>0.068 kg</td>
<td>2</td>
<td>4 W</td>
</tr>
<tr>
<td><strong>EM powerLED 4W BASIC NiMH</strong></td>
<td>89800444</td>
<td>139 x 30 x 21 mm</td>
<td>25 pc(s)</td>
<td>1,200 pc(s)</td>
<td>0.068 kg</td>
<td>2</td>
<td>4 W</td>
</tr>
</tbody>
</table>

---

**Type**

- **EM powerLED 4W BASIC**: 1 h
- **EM powerLED 4W BASIC**: 2 h
- **EM powerLED 4W BASIC**: 3 h
- **EM powerLED 4W BASIC NiMH**: 1 h
- **EM powerLED 4W BASIC NiMH**: 2 h
- **EM powerLED 4W BASIC NiMH**: 3 h

<table>
<thead>
<tr>
<th>Type</th>
<th>Rated duration</th>
<th>Mains current in charging operation</th>
<th>Mains current in charging operation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Initial charge</td>
<td>Fast recharge</td>
</tr>
<tr>
<td><strong>EM powerLED 4W BASIC</strong></td>
<td>1 h</td>
<td>210 mA</td>
<td>275 mA</td>
</tr>
<tr>
<td><strong>EM powerLED 4W BASIC</strong></td>
<td>2 h</td>
<td>275 mA</td>
<td>324 mA</td>
</tr>
<tr>
<td><strong>EM powerLED 4W BASIC</strong></td>
<td>3 h</td>
<td>275 mA</td>
<td>324 mA</td>
</tr>
<tr>
<td><strong>EM powerLED 4W BASIC NiMH</strong></td>
<td>1 h</td>
<td>190 mA</td>
<td>24.0 mA</td>
</tr>
<tr>
<td><strong>EM powerLED 4W BASIC NiMH</strong></td>
<td>2 h</td>
<td>300 mA</td>
<td>320 mA</td>
</tr>
<tr>
<td><strong>EM powerLED 4W BASIC NiMH</strong></td>
<td>3 h</td>
<td>300 mA</td>
<td>320 mA</td>
</tr>
</tbody>
</table>

**Note:**

- For EM powerLED 4 W BASIC NiMH average over 20 min. (4 min. charge / 16 min. off)
- EM = Emergency
Product description

• For connection to the emergency lighting unit
• For checking the device function

Test switch EM2

<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 2</td>
<td>89805277</td>
<td>25 pc(s)</td>
<td>200 pc(s)</td>
<td>0.011 kg</td>
</tr>
</tbody>
</table>

Status indication green LED

Product description

• A green LED indicates that charging current is flowing into the battery

<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 green</td>
<td>89899605</td>
<td>25 pc(s)</td>
<td>200 pc(s)</td>
<td>0.011 kg</td>
</tr>
<tr>
<td>LED EM green, ultra high brightness</td>
<td>89899756</td>
<td>25 pc(s)</td>
<td>200 pc(s)</td>
<td>0.012 kg</td>
</tr>
</tbody>
</table>
Battery selection
EM powerLED 4W BASIC, 1 / 2 / 3 h

<table>
<thead>
<tr>
<th>Type</th>
<th>EM powerLED 4W BASIC</th>
<th>EM powerLED 4W BASIC NiMH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Article no.</td>
<td>89800121 / 89800122</td>
<td>89800444</td>
</tr>
<tr>
<td>Cells</td>
<td>5 cells</td>
<td>5 cells</td>
</tr>
<tr>
<td>Duration</td>
<td>1 h</td>
<td>2 / 3 h</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Technology and capacity</th>
<th>Design</th>
<th>Number of cells</th>
<th>Type</th>
<th>Article no.</th>
<th>Assignable batteries</th>
</tr>
</thead>
<tbody>
<tr>
<td>NiCd 4 Ah D cells</td>
<td>stick</td>
<td>1 x 5</td>
<td>Accu-NiCd 5A S5</td>
<td>28002274</td>
<td>+</td>
</tr>
<tr>
<td></td>
<td>stick + stick</td>
<td>3 + 2</td>
<td>Accu-NiCd 5C S5</td>
<td>89800090</td>
<td>+</td>
</tr>
<tr>
<td>NiMH 2.2 Ah Cs cells</td>
<td>stick</td>
<td>1 x 5</td>
<td>Accu-NiMH 5A</td>
<td>28002090</td>
<td>+</td>
</tr>
<tr>
<td></td>
<td>side by side</td>
<td>5 x 1</td>
<td>Accu-NiMH 5B</td>
<td>28002093</td>
<td>+</td>
</tr>
<tr>
<td>NiMH 4 Ah LA cells</td>
<td>stick + stick</td>
<td>2 + 3</td>
<td>Accu-NiMH 4Ah 5C CON</td>
<td>89800439</td>
<td>+</td>
</tr>
</tbody>
</table>

Battery charge / discharge data
EM powerLED 4W BASIC, 1 / 2 / 3 h

<table>
<thead>
<tr>
<th>Type</th>
<th>EM powerLED 4W BASIC</th>
<th>EM powerLED 4W BASIC NiMH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Article no.</td>
<td>89800121 / 89800122</td>
<td>89800444</td>
</tr>
<tr>
<td>Cells</td>
<td>5 cells</td>
<td>5 cells</td>
</tr>
<tr>
<td>Duration</td>
<td>1 h</td>
<td>2 / 3 h</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Battery charge / discharge data</th>
<th>EM powerLED 4W BASIC</th>
<th>EM powerLED 4W BASIC NiMH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>Article no.</td>
<td>Cells</td>
</tr>
<tr>
<td>Initial charge</td>
<td>20 h</td>
<td>1 h</td>
</tr>
<tr>
<td>Fast recharge</td>
<td>10 h</td>
<td>15 h</td>
</tr>
<tr>
<td>Trickle charge</td>
<td>Continuously</td>
<td></td>
</tr>
<tr>
<td>Charge current</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Initial charge</td>
<td>130 mA</td>
<td>130 mA</td>
</tr>
<tr>
<td>Fast recharge</td>
<td>250 mA</td>
<td>210 mA</td>
</tr>
<tr>
<td>Trickle charge</td>
<td>60 mA</td>
<td>127 mA / 4 min / 0 mA / 16 min</td>
</tr>
<tr>
<td>Discharge current</td>
<td>1,100 mA</td>
<td>1,100 mA</td>
</tr>
<tr>
<td>Charge voltage range</td>
<td>107 – 16 V per cell</td>
<td></td>
</tr>
<tr>
<td>Discharge voltage range</td>
<td>16 – 107 V per cell</td>
<td></td>
</tr>
</tbody>
</table>

1 The battery will be charged below 1.07 V. The EM powerLED will indicate a battery fault. The emergency lighting LED Driver will recharge the battery normally after running the test of 61347-2-7 CL 22.3 (abnormal operating conditions).
Emergency lighting units
EM powerLED

Technical data batteries
Accu-NiCd
4.2 / 4.5 Ah
Battery voltage/cell 12 V
Cell type D
Case temperature range to ensure 4 years design life +5 °C to +55 °C
Max. short term battery case temperature (shorter than 1 month over the battery lifetime) 70 °C
Max. number discharge cycles 12 cycles per year plus 4 cycles during commissioning
Max. storage time 6 months

Accu-NiMH
2.2 Ah
Battery voltage/cell 12 V
Cell type Cs
Case temperature range to ensure 4 years design life +5 °C to +50 °C
Max. short term battery case temperature (shorter than 1 month over the battery lifetime) 70 °C
Max. number discharge cycles 4 cycles per year plus 30 cycles during commissioning
Max. storage time 12 months

4.0 Ah
Battery voltage/cell 12 V
Cell type LA
Case temperature range to ensure 4 years design life when used with EM powerLED 4 W BASIC +5 °C to +45 °C
when used with EM powerLED 4 W BASIC NiMH +5 °C to +50 °C
Max. short term battery case temperature (shorter than 1 month over the battery lifetime) 70 °C
Max. number discharge cycles 4 cycles per year plus 30 cycles during commissioning
Max. storage time 12 months

Batteries
Connection method: 4.8 x 0.5 mm spade tag welded to end of cell
For stick packs this connection is accessible after the battery caps have been fitted.
To inhibit inverter operation disconnect the batteries by removing the connector from the battery spade tag.
For further information refer to corresponding battery datasheet.

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

Duration link selection

<table>
<thead>
<tr>
<th>Duration</th>
<th>Link Position</th>
</tr>
</thead>
</table>
| 1 hr     | without jumper
| 2 hr     | position A    |
| 3 hr     | position B    |

Jumper selection
Module supplied with jumper in 3 hours position (position B).
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 powerLED 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.

Further technical data
The EM powerLED has a unique power regulation circuit; this is designed to limit the total power drawn from the battery in the event of using LED’s with a forward voltage (Vf) higher than 3.4 V.
In such cases the unit will reduce the LED current in order to maintain an acceptable drain current from the battery and hence meet the required duration time. This feature enables the EM powerLED to have minimum battery count for a given range of LED’s.

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.
Mechanical details
Case manufactured from polycarbonate.

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

LED status indicator
• Green
• Mounting hole 6.5 mm diameter, 1 – 1.6 mm thickness
• Lead length 1000 mm

Test switch
• Mounting hole 7.0 mm diameter
• Lead length 550 mm

Battery leads
• Quantity: 1 red and 1 black
• Length: 1m
• 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 receptacles at each end and insulating covers to connect the separate sticks together.

Recommended fixing details for clip fixing

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 LED Drivers this test must not be conducted.

Maximum loading of automatic circuit breakers

<table>
<thead>
<tr>
<th>Automatic circuit breaker type</th>
<th>B10</th>
<th>C10</th>
<th>B13</th>
<th>C13</th>
<th>B16</th>
<th>C16</th>
<th>B20</th>
<th>C20</th>
<th>Inrush current</th>
</tr>
</thead>
<tbody>
<tr>
<td>Installation Ø</td>
<td>15 mm²</td>
<td>15 mm²</td>
<td>15 mm²</td>
<td>15 mm²</td>
<td>2.5 mm²</td>
<td>2.5 mm²</td>
<td>2.5 mm²</td>
<td>2.5 mm²</td>
<td>10 A</td>
</tr>
<tr>
<td>EM powerLED 4 W BASIC</td>
<td>90</td>
<td>180</td>
<td>130</td>
<td>260</td>
<td>130</td>
<td>260</td>
<td>130</td>
<td>260</td>
<td>10 A</td>
</tr>
<tr>
<td>EM powerLED 4 W BASIC NiMH</td>
<td>90</td>
<td>180</td>
<td>130</td>
<td>260</td>
<td>130</td>
<td>260</td>
<td>130</td>
<td>260</td>
<td>10 A</td>
</tr>
</tbody>
</table>
Insulation matrix

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

* Represents basic insulation
** Represents double or reinforced insulation

Wiring diagrams

Wiring diagram for one LED or two LED in series

Take care that the LED is connected with the right polarity. LED that are connected to the EM powerLED devices should have a reverse polarity protection device such as a schottky diodes fitted, otherwise irreversible damage could occur if the LED is connected in reverse polarity. Any protection device must be capable of handling in excess of 1,000 mA.

Note: Please ensure that at the terminal of the EM powerLED module the battery negative is not connected to the negative of the LED load.

Manually tested emergency lighting with combined LED modules for general and emergency lighting (e.g. STARK QLE CLASSIC EM, STARK LLE 24-280-1250 EM, STARK CLE CLASSIC EM, STARK SLE CLASSIC EM):

Due to the fact that independent circuits are used for general and emergency lighting it is important that the normal supply of the mains LED Driver is switched off together with the permanent emergency supply prior to checking the operation of the emergency LEDs.

If this is not done then it may not be possible to see that the emergency LEDs are operating.

Use a circuit similar to that shown next.
Wiring instructions

- The EM powerLED terminals, battery, indicator LED and test switch terminals are classified as SELV. Keep the wiring of the input terminals separated from the wiring of the SELV 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 at 125 kHz, which should be considered for good EMC compliance.
- EM powerLED leads should be separated from the mains connections and wiring for good EMC performance. With some luminaires it may be necessary to add a ferrite bead inductor to obtain satisfactory EMC performance.
- Maximum lead length on the EM powerLED terminals is 3 m. For a good EMC performance keep the LED wiring as short as possible.
- The secondary wires (LED module) should be routed in parallel to ensure good EMC performance.
- Maximum lead length for the test switch and Indicator LED connection is 1 m. The test switch and Indicator LED wiring should be separated from the EM powerLED leads to prevent noise coupling.
- Battery leads are specified with 0.5 mm² cross section and a length of < 1.3 m.
- To avoid the damage of the control gear, the wiring must be protected against short circuits to earth (sharp edged metal parts, metal cable clips, louver, etc.).

Mains-connected transformers

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

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.