Product description
• LED emergency module suitable for direct installation in ceilings
• Complete set with integrated electronics, LED module, heat sink, optics and battery
• Includes click-in multi-lens option for anti-panic, escape route and spot illumination
• Emergency lighting function for manual testing
• Small size ceiling hole, 40 – 43 mm diameter, 80 mm height

Properties
• Output power 0.75 – 1.50 W
• Very low stand-by power loss
• Non-maintained variant
• 1 or 3 h rated duration (separate variants)
• White or black housing colour options
• Plug-in Lithium Iron Phosphate battery with strain-relief
• 5 years guarantee (conditions at www.tridonic.com) electronic (LED Driver)
• 3 years guarantee battery

Standards, page 4
Wiring diagrams and installation examples, page 4
Emergency lighting units
EM LED Light Engines

Technical data
Rated supply voltage AC 220 – 240 V
Input voltage range AC (tolerance for safety) 198 – 264 V
Input voltage range AC (tolerance for performance) 198 – 254 V
Mains frequency 50 / 60 Hz
Overvoltage protection 320 V (for 48 h)
Time to light (emergency operation) < 0.5 s from detection of emergency event
THD normal operation (maintained operation, at 230 V, 50 Hz, charging) 75 %
Output current tolerance ± 5 %
LF current ripple ± 5 %
Ambient temperature ta (insulated ceilings) +5 ... +30 °C
Ambient temperature ta (non-insulated ceilings) +5 ... +40 °C
Mains voltage changeover threshold According to EN 60598-2-22
Type of protection IP20
Impact protection rating® IK03
Protection class II
Colour temperature 6,500 K
Colour tolerance Mac Adams 3
Colour rendering index CRI > 80
Lifetime up to 50,000 h
EoF 1

Specific technical data

Ordering data
Type® Article number Colour Operating mode Rated duration Number of cells Packaging, carton Packaging, pallet Weight per pc.
EM R2A BASIC NM 111 2W 89800534 White Non-maintained 1 h 1 1 pc(s) 380 pc(s) 0.18 kg
EM R2A BASIC NM 131 1W 89800533 White Non-maintained 3 h 1 1 pc(s) 380 pc(s) 0.18 kg
EM R2A BASIC NM 132 2W 89800536 White Non-maintained 3 h 2 1 pc(s) 380 pc(s) 0.22 kg
EM R2A BASIC NM 132 2W B 89801051 Black Non-maintained 3 h 2 1 pc(s) 380 pc(s) 0.22 kg

© K rating valid for lens
® EM = Emergency
® RCM valid only for article 89800536

Data sheet 03/22-EM062-18
Subject to change without notice. Information provided without guarantee.
**Product description**

- Lithium Iron Phosphate replacement battery pack for use with EM ready2apply emergency lighting units
- 8-year design life (at up to 30 °C ambient, insulated ceilings)
- 6-year design life (at up to 40 °C ambient, non-insulated ceilings)
- 3 years guarantee

**Properties**

- Certified quality manufacturer
- Casing material made of polycarbonate
- Charge efficiency > 90%
- Low self discharge
- Compact micro USB type B connector providing polarity safe battery connection
- Protection and monitoring circuit built into battery enclosure
- Deep discharge protection
- Suitable for emergency lighting equipment as per IEC 60598-2-22

**Lithium Iron Phosphate Battery pack 1.5 – 3.0 Ah**

**Batteries**

**Product description**

- Lithium Iron Phosphate replacement battery pack for use with EM ready2apply emergency lighting units
- 8-year design life (at up to 30 °C ambient, insulated ceilings)
- 6-year design life (at up to 40 °C ambient, non-insulated ceilings)
- 3 years guarantee

**Properties**

- Certified quality manufacturer
- Casing material made of polycarbonate
- Charge efficiency > 90%
- Low self discharge
- Compact micro USB type B connector providing polarity safe battery connection
- Protection and monitoring circuit built into battery enclosure
- Deep discharge protection
- Suitable for emergency lighting equipment as per IEC 60598-2-22

**Ordering data**

<table>
<thead>
<tr>
<th>Type</th>
<th>Article number</th>
<th>Packaging, carton</th>
<th>Weight per pc.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Battery pack 1.5 Ah</td>
<td>89800555</td>
<td>75 pc(s)</td>
<td>0.064 kg</td>
</tr>
<tr>
<td>PACK-LiFePO4 1,5Ah R2A</td>
<td>89800555</td>
<td>75 pc(s)</td>
<td>0.104 kg</td>
</tr>
<tr>
<td>Battery pack 3.0 Ah</td>
<td>89800556</td>
<td>75 pc(s)</td>
<td>0.104 kg</td>
</tr>
<tr>
<td>PACK-LiFePO4 3,0Ah R2A</td>
<td>89800556</td>
<td>75 pc(s)</td>
<td>0.104 kg</td>
</tr>
</tbody>
</table>

Subject to change without notice. Information provided without guarantee.
1. Standards

according to EN 50172
EN 55015
EN 60068-2-6
according to EN 60068-2-30
EN 60598-1
EN 60598-2-2
EN 60598-2-22
EN 61000-3-2
EN 61347-1
EN 61347-2-7
EN 61347-2-13
EN 61547
EN 62384
IEC 62133 (related to Lithium Iron battery)
UN 38.3 (related to Lithium Iron battery)
EN 62031
EN 62471

1.1 Glow-wire test

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

2. Thermal data

2.1 Temperature range

According to the standard IEC 60598-1 a LED Driver for remote installation has a max. case temperature of 90 °C. The ambient temperature range ta for the EM R2A BASIC is defined to meet this requirement.

2.2 Expected lifetime

2.2.1 Electronics

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>Type</th>
<th>Ta temperature</th>
<th>25 °C</th>
<th>30 °C</th>
<th>40 °C</th>
</tr>
</thead>
<tbody>
<tr>
<td>EM R2A BASIC</td>
<td>lifetime</td>
<td>&gt; 50,000 h</td>
<td>50,000 h</td>
<td>50,000 h</td>
</tr>
</tbody>
</table>

2.2.2 Lifetime, lumen maintenance and failure rate for LED module

The light output of an LED module decreases over the lifetime, this is characterized with the L value. L70 means that the LED module will give 70 % of its initial luminous flux. This value is always related to the number of operation hours and therefore defines the lifetime of an LED module.

As the L value is a statistical value the lumen maintenance may vary over the delivered LED modules. The B value defines the amount of modules which are below the specific L value, e.g. L70B10 means 10 % of the LED modules are below 70 % of the initial luminous flux, respectively 90 % will be above 70 % of the initial value.

Lifetime declarations are informative and represent no warranty claim.

3. Installation / Wiring

3.1 Lens assembly

- Wear gloves when mounting the lens
- Take care of the mounting direction of the escape route lens
- Use screwdriver for replacing/removing lens
1. + 2. Push lens clips with screwdriver via openings on both sides
3. Remove lens
3.2 Wiring diagrams

220–240 V
50/60 Hz

L
N

EM R2A BASIC

Battery

Note: Battery must be connected before mains connection.

3.3 Wiring type and cross-section

Wiring
Mains (N, L): brown, blue

Cable length: 250mm with strain relief at the R2A BASIC module
Cable: low smoke, halogen free

0.75 mm² fine-stranded
8 ± 1 mm

250 ± 3
39 ± 2
8 ± 1
Ø 6.5

Blue
Brown

Recommended connector with strain-relief (plug and socket): to be defined

No terminal block included. The installation of the terminal block has to be done by a qualified person.

Only a terminal complying with EN 60998-2-1 or EN 60998-2-2 shall be used

Note: If mains cable or battery strap are damaged the luminaire must be disposed.

4. Mechanical data

4.1 Housing properties

- Polycarbonate white RAL 9016
- Polycarbonate black RAL 9005

4.2 Battery connection

Battery pack end termination
Compact micro USB type B connector providing safe battery connection

Module end termination
- Battery strap with compact micro USB type B connector
- Strain relief at the module casing and locking clip for secure connection of the battery pack
- Battery strap: low smoke, halogen free

Note: Strap not suitable for connection of any other micro USB device other than the ready2apply battery pack

4.3 Fixing

Spring fixing through hole in ceiling

- Hole diameter: 4.0 – 4.3 mm
- Ceiling thickness: 1 – 25 mm
- Ceiling void height: > 80 mm

5. Electrical data

5.1 Maximum loading of automatic circuit breakers

<table>
<thead>
<tr>
<th>Automatic circuit breaker type</th>
<th>C10</th>
<th>C13</th>
<th>C16</th>
<th>C20</th>
<th>B10</th>
<th>B13</th>
<th>B16</th>
<th>B20</th>
<th>Inrush current</th>
</tr>
</thead>
<tbody>
<tr>
<td>Installation Ø</td>
<td>1.5 mm²</td>
<td>1.5 mm²</td>
<td>2.5 mm²</td>
<td>4 mm²</td>
<td>15 mm²</td>
<td>15 mm²</td>
<td>2.5 mm²</td>
<td>4 mm²</td>
<td>Iₘₚₚ, time</td>
</tr>
<tr>
<td>EM R2A BASIC</td>
<td>80</td>
<td>260</td>
<td>260</td>
<td>260</td>
<td>90</td>
<td>130</td>
<td>130</td>
<td>130</td>
<td>10 A, 120 μs</td>
</tr>
</tbody>
</table>

5.2 Harmonic distortion in the mains supply (at 230 V / 50 Hz and 2-cell maintained charging) in %

<table>
<thead>
<tr>
<th>THD</th>
<th>3</th>
<th>5</th>
<th>7</th>
<th>9</th>
<th>11</th>
</tr>
</thead>
<tbody>
<tr>
<td>EM R2A BASIC</td>
<td>&lt; 75</td>
<td>&lt; 62</td>
<td>&lt; 33</td>
<td>&lt; 19</td>
<td>&lt; 13</td>
</tr>
</tbody>
</table>
5.3 Insulation matrix

<table>
<thead>
<tr>
<th>Type</th>
<th>Mains</th>
<th>Battery</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mains</td>
<td>–</td>
<td>• •</td>
</tr>
<tr>
<td>Battery</td>
<td>• •</td>
<td>–</td>
</tr>
</tbody>
</table>

- Represents basic insulation
- • • Represents double or reinforced insulation

5.4 Battery charge regime / discharge

<table>
<thead>
<tr>
<th>Type</th>
<th>EM R2A BASIC 2 W</th>
<th>EM R2A BASIC 2 W</th>
<th>EM R2A BASIC 1 W</th>
</tr>
</thead>
<tbody>
<tr>
<td>Article no.</td>
<td>89800534</td>
<td>89800536, 89801051</td>
<td>89800533</td>
</tr>
<tr>
<td>Cells</td>
<td>1 cells</td>
<td>2 cells</td>
<td>1 cells</td>
</tr>
<tr>
<td>Duration</td>
<td>1 h</td>
<td>3 h</td>
<td>3 h</td>
</tr>
</tbody>
</table>

- Battery charge regime / discharge:
  - Initial: 20 h
  - Recharge: 12 h
  - trickle charge: continuously and battery voltage controlled

<table>
<thead>
<tr>
<th>Type</th>
<th>EM R2A BASIC 2 W</th>
<th>EM R2A BASIC 2 W</th>
<th>EM R2A BASIC 1 W</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial charge</td>
<td>140 mA</td>
<td>290 mA</td>
<td>140 mA</td>
</tr>
<tr>
<td>Recharge</td>
<td>140 mA</td>
<td>290 mA</td>
<td>140 mA</td>
</tr>
<tr>
<td>trickle charge</td>
<td>140 mA / 0 mA</td>
<td>290 mA / 0 mA</td>
<td>140 mA / 0 mA</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Mains power consumption</th>
<th>EM R2A BASIC 2 W</th>
<th>EM R2A BASIC 2 W</th>
<th>EM R2A BASIC 1 W</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial charge</td>
<td>&lt; 1.095 W</td>
<td>&lt; 1.095 W</td>
<td>&lt; 1.095 W</td>
</tr>
<tr>
<td>Recharge</td>
<td>&lt; 1.095 W</td>
<td>&lt; 1.095 W</td>
<td>&lt; 1.095 W</td>
</tr>
<tr>
<td>trickle charge</td>
<td>&lt; 1.095 W / 0 W</td>
<td>&lt; 1.095 W / 0 W</td>
<td>&lt; 1.095 W / 0 W</td>
</tr>
</tbody>
</table>

- Discharge current at 3.2 V (nominal): 625 mA
- 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)

5.5 Battery selection for replacement

<table>
<thead>
<tr>
<th>Type</th>
<th>EM R2A BASIC 2 W</th>
<th>EM R2A BASIC 2 W</th>
<th>EM R2A BASIC 1 W</th>
</tr>
</thead>
<tbody>
<tr>
<td>Article no.</td>
<td>89800534</td>
<td>89800536, 89801051</td>
<td>89800533</td>
</tr>
<tr>
<td>Cells</td>
<td>1 cells</td>
<td>2 cells</td>
<td>1 cells</td>
</tr>
<tr>
<td>Duration</td>
<td>1 h</td>
<td>3 h</td>
<td>3 h</td>
</tr>
</tbody>
</table>

- Technology and capacity:
  - Lithium Iron Phosphate 15 Ah single cell 1 PACK-LiFePO4 1,5Ah R2A 89800555 •
  - Lithium Iron Phosphate 3 Ah side by side 1+1 PACK-LiFePO4 3,0Ah R2A 89800556 •

Note: If the rated duration of operation cannot be reached the battery must be replaced. Remove mains during battery replacement.
6. Functions

6.1 Status indication

The indication LED is integrated in the bezel. A green LED indicates that charging current is flowing into the battery.

The battery is protected against operation at excessive temperatures (charging stops and indication LED turns off when battery cell temperature < 0 °C or > 60 °C).

6.2 Test switch

Test switch is integrated in the bezel. This can be used to execute function test as long as the switch pressed > 1 s.

To initiate a test use a suitable tool, refer to drawing below.

![Test Switch and Status LED](image)

Note: Press test switch carefully to avoid damaging it.

6.3 Technical data batteries

**Accu Lithium Iron Phosphate**

- Case temperature range to ensure 8 years design life: +5 °C to +35 °C
- Case temperature range to ensure 6 years design life: +5 °C to +45 °C
- International designation: IFpR 19/66
- Battery voltage/cell: 3.2 V
- Single cell dimensions:
  - Diameter: 18 mm
  - Height: 65 mm
- Capacity one cell: 1.5 Ah
- Capacity two cell pack: 3.0 Ah
- Max. short term temperature (reduced lifetime): 55 °C
- Max. number discharge cycles: 50 cycles total
- Packing quantity: 1 pc. per carton

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.

For battery data see separate data sheet.

7. Optical properties

7.1 Anti panic

**EM R2A BASIC 1W – Max. spacing for >0.5 lux**

<table>
<thead>
<tr>
<th>Height (m)</th>
<th>Centre to end</th>
<th>Centre to centre</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.5</td>
<td>2.85</td>
<td>9.40</td>
</tr>
<tr>
<td>3.0</td>
<td>2.75</td>
<td>10.40</td>
</tr>
<tr>
<td>3.5</td>
<td>2.70</td>
<td>10.95</td>
</tr>
<tr>
<td>4.0</td>
<td>2.50</td>
<td>11.25</td>
</tr>
<tr>
<td>5.0</td>
<td>2.40</td>
<td>11.25</td>
</tr>
</tbody>
</table>

All values for ta = 30 °C.

Luminous flux: 121 lm

* Maintenance factor = 0.8, photometric data available on request
* Distance between module and wall
* Distance between two modules

**EM R2A BASIC 2W – Max. spacing for >0.5 lux**

<table>
<thead>
<tr>
<th>Height (m)</th>
<th>Centre to end</th>
<th>Centre to centre</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.5</td>
<td>3.85</td>
<td>10.90</td>
</tr>
<tr>
<td>3.0</td>
<td>3.80</td>
<td>11.90</td>
</tr>
<tr>
<td>3.5</td>
<td>3.80</td>
<td>12.90</td>
</tr>
<tr>
<td>4.0</td>
<td>3.70</td>
<td>13.90</td>
</tr>
<tr>
<td>5.0</td>
<td>3.60</td>
<td>14.90</td>
</tr>
<tr>
<td>6.0</td>
<td>3.10</td>
<td>15.05</td>
</tr>
</tbody>
</table>

All values for ta = 30 °C.

Luminous flux: 200 lm

* Maintenance factor = 0.8, photometric data available on request
* Distance between module and wall
* Distance between two modules

**Light distribution**

![Light distribution diagram](image)
### 7.2 Escape route

**EM R2A BASIC 1W – Max. spacing for >1.0 lux**

<table>
<thead>
<tr>
<th>Height (m)</th>
<th>Centre to end&lt;sup&gt;α&lt;/sup&gt;</th>
<th>Centre to centre&lt;sup&gt;α&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.5</td>
<td>4.75 m</td>
<td>2.75 m</td>
</tr>
<tr>
<td>3.0</td>
<td>5.05 m</td>
<td>1.65 m</td>
</tr>
<tr>
<td>3.5</td>
<td>5.50 m</td>
<td>1.80 m</td>
</tr>
<tr>
<td>4.0</td>
<td>5.70 m</td>
<td>1.90 m</td>
</tr>
<tr>
<td>5.0</td>
<td>5.95 m</td>
<td>1.90 m</td>
</tr>
<tr>
<td>6.0</td>
<td>6.05 m</td>
<td>1.85 m</td>
</tr>
<tr>
<td>7.0</td>
<td>6.55 m</td>
<td>1.75 m</td>
</tr>
</tbody>
</table>

All values for ta = 30 °C

Luminous flux: 117 lm

<sup>α</sup> Distance between module and wall

<sup>β</sup> Distance between two modules

**EM R2A BASIC 2W – Max. spacing for >1.0 lux**

<table>
<thead>
<tr>
<th>Height (m)</th>
<th>Centre to end&lt;sup&gt;α&lt;/sup&gt;</th>
<th>Centre to centre&lt;sup&gt;α&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.5</td>
<td>10.5 m</td>
<td>190 m</td>
</tr>
<tr>
<td>3.0</td>
<td>13.0 m</td>
<td>125 m</td>
</tr>
<tr>
<td>3.5</td>
<td>150 m</td>
<td>145 m</td>
</tr>
<tr>
<td>4.0</td>
<td>160 m</td>
<td>160 m</td>
</tr>
<tr>
<td>5.0</td>
<td>180 m</td>
<td>180 m</td>
</tr>
<tr>
<td>6.0</td>
<td>2.00 m</td>
<td>195 m</td>
</tr>
<tr>
<td>7.0</td>
<td>210 m</td>
<td>205 m</td>
</tr>
<tr>
<td>8.0</td>
<td>2.35 m</td>
<td>210 m</td>
</tr>
</tbody>
</table>

All values for ta = 30 °C

Luminous flux: 200 lm

<sup>α</sup> Distance between module and wall

<sup>β</sup> Distance between two modules

### 7.3 Spot

**EM R2A BASIC 1W – Max. spacing for >0.5 lux / > 5 lux**

<table>
<thead>
<tr>
<th>Height (m)</th>
<th>Minimum illuminance</th>
<th>Centre to end&lt;sup&gt;α&lt;/sup&gt;</th>
<th>Centre to centre&lt;sup&gt;α&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.5</td>
<td>0.50 m</td>
<td>105 m</td>
<td>4.50 m</td>
</tr>
<tr>
<td>3.0</td>
<td>0.70 m</td>
<td>130 m</td>
<td>5.35 m</td>
</tr>
<tr>
<td>3.5</td>
<td>0.70 m</td>
<td>150 m</td>
<td>6.25 m</td>
</tr>
<tr>
<td>4.0</td>
<td>0.70 m</td>
<td>160 m</td>
<td>6.85 m</td>
</tr>
<tr>
<td>5.0</td>
<td>0.70 m</td>
<td>180 m</td>
<td>6.00 m</td>
</tr>
<tr>
<td>6.0</td>
<td>0.70 m</td>
<td>200 m</td>
<td>5.85 m</td>
</tr>
<tr>
<td>7.0</td>
<td>0.70 m</td>
<td>210 m</td>
<td>6.00 m</td>
</tr>
</tbody>
</table>

All values for ta = 30 °C

Luminous flux: 117 lm

<sup>α</sup> Distance between module and wall

<sup>β</sup> Distance between two modules

**EM R2A BASIC 2W – Max. spacing for >0.5 lux / > 5 lux**

<table>
<thead>
<tr>
<th>Height (m)</th>
<th>Minimum illuminance</th>
<th>Centre to end&lt;sup&gt;α&lt;/sup&gt;</th>
<th>Centre to centre&lt;sup&gt;α&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.5</td>
<td>0.70 m</td>
<td>105 m</td>
<td>4.50 m</td>
</tr>
<tr>
<td>3.0</td>
<td>0.70 m</td>
<td>130 m</td>
<td>5.35 m</td>
</tr>
<tr>
<td>3.5</td>
<td>0.70 m</td>
<td>150 m</td>
<td>6.25 m</td>
</tr>
<tr>
<td>4.0</td>
<td>0.70 m</td>
<td>160 m</td>
<td>6.85 m</td>
</tr>
<tr>
<td>5.0</td>
<td>0.70 m</td>
<td>180 m</td>
<td>6.00 m</td>
</tr>
<tr>
<td>6.0</td>
<td>0.70 m</td>
<td>200 m</td>
<td>5.85 m</td>
</tr>
<tr>
<td>7.0</td>
<td>0.70 m</td>
<td>210 m</td>
<td>6.00 m</td>
</tr>
</tbody>
</table>

All values for ta = 30 °C

Luminous flux: 200 lm

<sup>α</sup> Distance between module and wall

<sup>β</sup> Distance between two modules

### Light distribution

![Light distribution diagram](image-url)
8. Miscellaneous

8.1 Black Box data recording

Recording of several parameters only accessible for Tridonic.

8.2 Additional information

Additional technical information at [www.tridonic.com](http://www.tridonic.com) → Technical Data

The light source of this luminaire is not replaceable; when the light source reaches its end of life replace the whole luminaire. Lifetime declarations are informative and represent no warranty claim. No warranty if device was opened.