**Description:**

Low profile emergency lighting modules with DALI interface and automatic testing facility to cover 1 hour and 3 hour duration operating from NiCd and NiMh batteries. All modules incorporate five pole technology for use with HF ballasts and have preheat starting and permanent cathode heating during the emergency operation. Boost starting for 65 seconds at higher power levels is provided for all lamps to ensure rapid warm up, optimised lamp life and improved initial visibility during an emergency operation. Power control technology ensures maximum emergency ballast lumen factors for all lamps on a given module.

**Features:**

**Module**
- DALI interface for control and reporting
- Low profile cross section (21 mm x 30 mm)
- 5 pole technology
- For use with HF ballasts
- NiCd or NiMh battery options
- 10–15 hour accu recharge time
- 3 hour and 1 hour operation
- High and standard BLF for 1 hour versions
- Bi-colour LED to indicate status
- AC operation of lamps
- Pre-heating of cathodes during emergency operation
- Permanent cathode heating during emergency operation
- Boost starting facility for all lamps
- Rest mode function
- Electronic multilevel charging system
- Deep discharge protection
- Testing
  - Battery condition
  - Lamp condition
  - Charge condition
- Patented EZ easy addressing feature using LED

**Batteries**
- NiCd or NiMh options
- D or Cs cells
- High temperature cells
- Spade terminals for easy connection

**Standards**
- EN 55015
- EN 61347-2-7
- EN 60925
- IEC 60334
- Allows compliance with EN 60598-2-22
- DALI standard EN 62386-102
- EN 62386-202
- EN 61000-3-2
- EN 61547
- IEC 60068-2-64
- IEC 60068-2-29
- IEC 60068-2-30

**EM PRO EZ 220–240 V 50/60 Hz**

**Data sheet 12/10-757-6** We reserve the right to make technical changes without prior notice.
Emergency lighting modules with DALI interface
T5, T8, TC-DD, TC-F, TC-L linear and compact lamps

Technical data:

<table>
<thead>
<tr>
<th>EM PRO EZ</th>
<th>3 hour</th>
<th>1 hour</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated mains supply voltage</td>
<td>220 – 240 V</td>
<td>220 – 240 V</td>
</tr>
<tr>
<td>Mains frequency</td>
<td>50/60 Hz</td>
<td>50/60 Hz</td>
</tr>
<tr>
<td>Mains supply current</td>
<td>60 mA max</td>
<td>60 mA max</td>
</tr>
<tr>
<td>Mains supply power</td>
<td>&lt; 10.5 W</td>
<td>&lt; 10.5 W</td>
</tr>
<tr>
<td>Overvoltage protection</td>
<td>320 V for 1 hour</td>
<td>320 V for 1 hour</td>
</tr>
<tr>
<td>Max. working voltage U-DUT</td>
<td>480 V</td>
<td>480 V</td>
</tr>
<tr>
<td>Output frequency range</td>
<td>20 – 72 kHz</td>
<td>20 – 72 kHz</td>
</tr>
<tr>
<td>Recharge period</td>
<td>15 hours</td>
<td>15 hours</td>
</tr>
<tr>
<td>Discharge current</td>
<td>1.1 A</td>
<td>1.1 A</td>
</tr>
<tr>
<td>Charge current: initial</td>
<td>330 mA</td>
<td>130 mA</td>
</tr>
<tr>
<td>Fast</td>
<td>330 mA</td>
<td>210 mA</td>
</tr>
<tr>
<td>Trickle</td>
<td>130 mA</td>
<td>50 mA</td>
</tr>
<tr>
<td>Earth leakage current</td>
<td>&lt; 0.5 mA</td>
<td>&lt; 0.5 mA</td>
</tr>
<tr>
<td>Ambient temperature range</td>
<td>-5 °C to +60 °C</td>
<td>-5 °C to +60 °C</td>
</tr>
<tr>
<td>Maximum case temperature tc</td>
<td>70 °C</td>
<td>70 °C</td>
</tr>
<tr>
<td>Mains change over voltage</td>
<td>in accordance with EN 60598-2-22</td>
<td>in accordance with EN 60598-2-22</td>
</tr>
<tr>
<td>Min. lamp starting temperature (emergency mode)</td>
<td>+5 °C</td>
<td>+5 °C</td>
</tr>
<tr>
<td>Ingress protection</td>
<td>IP20</td>
<td>IP20</td>
</tr>
<tr>
<td>Protection class</td>
<td>class I</td>
<td>class I</td>
</tr>
<tr>
<td>Function test</td>
<td>30 seconds via DALI command</td>
<td>30 seconds via DALI command</td>
</tr>
<tr>
<td>Duration test</td>
<td>3 hr via DALI command</td>
<td>1 hr via DALI command</td>
</tr>
<tr>
<td>Timer</td>
<td>crystal controlled</td>
<td>crystal controlled</td>
</tr>
<tr>
<td>Boost starting time</td>
<td>55 seconds</td>
<td>55 seconds</td>
</tr>
</tbody>
</table>

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 PRO EZ 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 13 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 PRO EZ does not revert to self-testing mode.

Addressing
The EM PRO EZ includes the new EZ easy-addressing system which allows addressing and identification by using the bi-colour LED in conjunction with the EZ PRO ADDRESS tool. 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 idle command every 3 to 9 seconds. During this command the main fluorescent lamp will be switched off and the LED will flash the 6 bit binary address preceded by a 3 second start indication period.

Functional test
The time of day and frequency of the 30 seconds function test can be set by the DALI controller. The default setting is a 30 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 13 weeks.

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 2 minutes as specified within the DALI standard.

Rest Mode
Rest mode can be initiated by the DALI controller. The appropriate command should be sent after the mains supply has been disconnected and whilst the module is in emergency operation. A mains reset is required to exit the rest mode. EM PRO EZ does not support the re-light command via the DALI bus.

Test switch
An optional test switch can be wired to each EM ... PRO EZ. This can be used to initiate a 30 seconds function test by a short press < 1 second.

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

Service life
Average service life 50,000 hours under rated conditions with a failure rate of less than 1%. Average failure rate of 0.2 % per 1000 operating hours.

Accu-NiCd
- case temperature range 0 °C to +55 °C to ensure 4 years design life
- storage life in temperate conditions 4 years
- battery voltage/cell 1.2 V
- capacity D 4.0 Ah
- capacity Cs 1.5 Ah

Accu-NiMh
- case temperature range 0 °C to +55 °C (to ensure 4 years design life)
  - 2.0 Ah Cs 0 °C to +55 °C
  - 4.0 Ah Cs 0 °C to +55 °C
- storage life in temperate conditions 4 years
- battery voltage 1.2 V
- capacity Cs 2.0 Ah
- capacity Cs 4.0 Ah

Mechanical details
Channel manufactured from galvanised steel.
Cover manufactured from white pre-coated steel.

LED bi-colour status indicator
- Green / red
- Mounting hole 6.5 mm dia
- Lead length 1000 mm
- Insulation rating: 90 °C

Test switch
- Mounting hole 7.0 mm dia
- Lead length 550 mm

Battery leads
- Quantity: 1 red and 1 black
- Length: 1300 mm
- 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.

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**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 battery data see separate data sheet.

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**Emergency light output factors (BLF) in %:**

<table>
<thead>
<tr>
<th>Type</th>
<th>3 hours</th>
<th>1 hour</th>
<th>1 hour &quot;high output&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>EM 34 PRO EZ</td>
<td>EM 35 PRO EZ</td>
<td>EM 36 PRO EZ</td>
</tr>
<tr>
<td>TC-DD</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TC-SEL</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TC-DEL</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TC-TEL</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TC-F</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TC-L</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TS FH</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TS FQ</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TS C</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TS</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Status indication**

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

<table>
<thead>
<tr>
<th>LED</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Permanent green</td>
<td>System OK</td>
</tr>
<tr>
<td>Fast flashing green</td>
<td>Function test underway</td>
</tr>
<tr>
<td>Slow flashing green</td>
<td>Duration test underway</td>
</tr>
<tr>
<td>Permanent red</td>
<td>Lamp fault</td>
</tr>
<tr>
<td>Fast flashing red</td>
<td>Charging fault</td>
</tr>
<tr>
<td>Slow flashing red</td>
<td>Battery fault</td>
</tr>
<tr>
<td>Double pulsing green</td>
<td>Inhibit mode</td>
</tr>
</tbody>
</table>

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Emergency lighting modules with DALI interface
T5, T8, TC-DD, TC-F, TC-L linear and compact lamps

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Isolation and electric strength testing of luminaires
Electronic devices 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 EN 303-Annex A, each luminaire should be submitted to an isolation test with 500 Vac for 1 second. This test voltage should be connected between the interconnected phase and neutral terminals and the earth terminal. The isolation 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 Vac (or 1,414 x 1,500 Vac). To avoid damage to the electronic devices this test must not be conducted.

Electrical connections:
An earthed starting aid is recommended. The module should be earthed by the fixings used to attach it to the luminaire.

Wiring:
Lamp/ballast/supply

- wire preparation: 0.5 – 0.75 mm²
- 8 – 9 mm

Loosen wire through twisting and pulling

EM FLT1 filter

When the EM PRO EZ is used in a remote application, where the lamp leads and LED indicator leads are routed together in close proximity, it is possible to have electrical interference picked up in the indicator leads.

Under certain conditions this interference can cause a lock-up of the EM PRO EZ micro-controller.

To overcome this problem in such applications it is necessary to fit the filter EM FLT1 between the indicator LED and the EM PRO EZ unit. To be effective the filter must be connected close to the EM PRO EZ module.

For further information please contact Tridonic.

Technical data:
Push wire terminals 0.5–1.5 mm² solid conductor

IDC interface
- solid wire with a cross section of 0.5 mm² according to the specification from WAGO
- alternatively a flexible lead with a cross section of 0.75 mm²

Horizontal interface
- solid wire with a cross section of 0.5–0.75 mm² according to the specification from WAGO
- solid wire with a cross section of 1.0 mm² with an insulation diameter up to 2.5 mm
- strip 9 mm of insulation from the cables
- Loosen wire through twisting and pulling

Batteries/LED/Test switch
push terminal with button release: 0.5 mm² 6.5 mm strip

Maximum lamp lead capacitance
- terminals 5 and 6 (* hot leads): 100 pF
- terminals 3 and 4: 200 pF

Note: care should be taken not to exceed the total maximum lamp lead capacitance for HF ballast. Leads should always be kept as short as possible.

The high frequency emergency lamp wiring contains “hot” leads at pins 1 and 6, which have high voltage to earth. These should be kept as short as possible and separated from other wiring to minimize coupling. They also have a restriction on capacitance to other wiring and earth of 100 pF, which must be observed to ensure good lamp starting.

With an earth connection of the metal case of the emergency module the noise suppression can be further improved. The wiring of the earth should be kept as short as possible.

Through wiring may affect the EMC performance of the luminaire.

Wiring guidelines
To ensure that a luminaire containing high frequency emergency units complies with EN 55015 for radio frequency conducted interference in both normal and emergency mode it is essential to follow good practice in the wiring layout.

Within the luminaire the switched and unswitched 50 Hz supply wiring must be routed as short as possible and be kept as far away as possible from the lamp leads.

This means, for example, in a linear T8 or T5 luminaire the mains wiring should be routed along one side of the luminaire body, while the wires to the emergency lamp from the emergency module are routed along the other side.

EM FLT1 filter
dispensable filter for wide application to avoid interference

- Screened wire 0.5 mm² solid conductor
- Connect to the luminaire.

Circuit diagram with EM FLT1 filter

<table>
<thead>
<tr>
<th>Product</th>
<th>article number</th>
</tr>
</thead>
<tbody>
<tr>
<td>EM FLT1</td>
<td>89899942</td>
</tr>
</tbody>
</table>

Tridonic reserves the right to make technical changes without prior notice.
EM ... PRO EZ emergency module wiring diagrams
Not for use with magnetic ballasts and switch start circuits

Addressing Tool
An addressing tool is available to convert the LED binary identification signal to a DALI address of between 0 to 63. This simple tool is powered from a 9 V battery (not supplied).

Packing quantities:
EM ... PRO EZ: Accu NiCd: EM FLT1: Accu NiMh:
25 units per carton 25 pieces per box 25 pieces per box
25 pieces per bag

Note: All hot leads normally marked with an * should be kept as short as possible.
For comprehensive wiring diagrams and instructions consult the TridonicAtco website
www.tridonicatco.com

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