



EM powerLED PRO EZ-3

Emergency lighting supply units

Product description

- LED emergency lighting supply unit with DALI interface and automatic test function

Properties

- Mains and emergency operation
- DALI interface for controlled testing and monitoring
- DALI switchable in mains operation (on/off); the switched phase SL must be switched on
- Low-profile casing (21 x 30 mm cross-section)
- Constant current mode
- With either screw or clip fastening (clip-fix)
- 1, 2 or 3 h rated duration
- Selectable operating time (jumper)
- 1 or 2 W version
- Output power limitation
- Two-colour status display LED
- Automatic restart after LED replacement
- Electronic multi-level charge system
- SELV classified (outputs powerLED, battery, status LED, test switch)
- Polarity reversal protection for battery
- Deep discharge protection
- Short-circuit-proof battery connection
- Addressing function, patented („EZ easy addressing“)
- Emergency lighting LEDs available

Tests:

- Status of the battery
- Status of the LED
- Charge condition
- Function test
- Service life test

Batteries

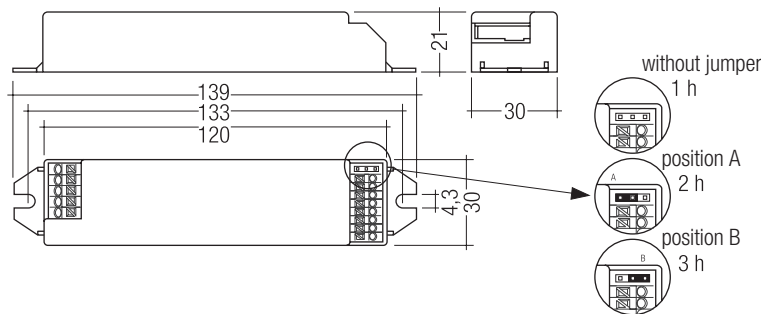
- High-temperature cells
- NiMH batteries
- Cs cells
- Blade terminals for simple connection



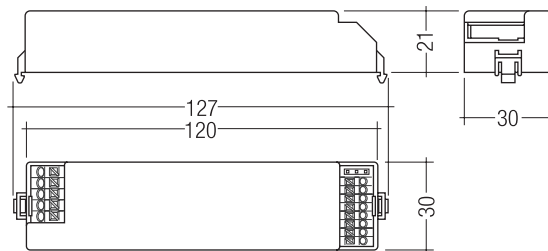
Screw-fix



Clip-fix



Screw-fix



Clip-fix



Standards, page 7

Batteries, page 5

Wiring diagrams and installation examples, page 8

Technical data

Rated supply voltage	220 – 240 V
Mains frequency	50 / 60 Hz
Mains current, 1 W device	30 mA
Mains current, 2 W device	42 mA
Power in mains operation, 1 W device	4 W
Power in mains operation, 2 W device	6 W
Maximum LED forward bias Vf	3.4 V
Overvoltage protection	320 V (for 1 h)
Battery charging time	12 h
Charge current, initial charge	125 mA
Charge current, power charge	210 mA
Charge current, trickle charge	50 mA
Battery discharge current	See page 5
Leakage current (PE)	< 0.5 mA
Ambient temperature ta	-25 ... +50 °C
Max. casing temperature tc	70 °C
Mains voltage changeover threshold	according to EN 60598-2-22
Ingress protection	IP20
Protection class	I
Weight	0.073 kg

Ordering data

Max. number of LEDs	Wattage	Type	Article number
Screw fastening version			
1	1.2 W	EM powerLED 1W PRO EZ-3	89800029
2	2.0 W	EM powerLED 2 W PRO EZ-3	89800030
Clip fastening version			
1	1.2 W	EM powerLED 1 W PRO EZ-3	89800031
2	2.0 W	EM powerLED 2 W PRO EZ-3	89800032

Packaging: 25 pieces/carton, 600 pieces/pallet

Specific technical data

Type	LED current in emergency operation		LED current in mains operation		Number of cells / jumper		
	1 x LED	2 x LED	1 x LED	2 x LED	1 h / removed	2 h / position A	3 h / position B
EM powerLED 1W PRO EZ-3	350 mA	–	350 mA	–	2	3	3
EM powerLED 2 W PRO EZ-3	600 mA	350 mA	350 mA	350 mA	3	4	5

Test switch EM2

Product description

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



Ordering data

Type	Article number
Test switch EM 2	89805277

Packaging: 25 pieces/bag, 200 pieces/carton

Status indication bi-colour LED

Product description

- Two-colour status display LED
- Green: system OK, red: fault



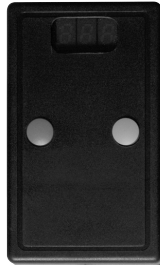
Ordering data

Type	Article number
LED EM bi-colour	89899720
LED EM bi-colour, high brightness	89899753

Packaging: 25 pieces/bag, 200 pieces/carton

Product description

- Provides simple addressing for the EM powerLED PRO units
- Uses the bi-colour LED for the EM powerLED PRO device identification
- Converts the LED binary identification signal to a DALI address of between 0 to 63
- The tool is powered from a 9 V battery (not supplied)



Ordering data

Type	Article number
EM PRO addressing tool	89899836

Batteries

NiMh 2.0 Ah, Cs cells	Type	Number of cells	Article number
Akku-NiMh C 2A	Stick	2	89899755
Akku-NiMh C 3A	Stick	3	89899744
Akku-NiMh C 4A	Stick	4	89899700
Akku-NiMh C 5A	Stick	5	89899703
Akku-NiMh C 5B *	Side by side	5	89899704

Further technical data

Battery discharge current

	1 W		2 W	
	1 LED	1 LED	2 LED	2 LED
1 h	790 mA	850 mA	830 mA	
2 h	440 mA	610 mA	600 mA	
3 h	440 mA	480 mA	480 mA	

Type	Number of LED	LED current mains mode	LED current emergency mode	Nominal output power
1 W	1 x LED	350 mA	350 mA	1.2 W
2 W	1 x LED	350 mA	600 mA	2.0 W
2 W	2 x LED	350 mA	350 mA	2.0 W

The EM powerLED PRO EZ-3 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 excessively high forward voltages (Vf).

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 PRO EZ-3 to have minimum battery count for a given range of LED's.

At a low charge state of the battery (<1.5V at the 1 W driver and <3V at the 2 W driver) the LED will not be driven in maintained mode via the switched line until the rated battery voltage levels are exceeded.

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 powerLED PRO EZ-3 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 powerLED PRO EZ-3 does not revert to self-testing mode.

Addressing

The EM powerLED PRO EZ-3 includes the new EZ easy addressing system which allows addressing and identification by using the bi-colour LED in conjunction with the EM PRO addressing 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 ident 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.

Commissioning

After installation of the luminaire and initial connection of the mains supply and battery supply to the EM powerLED PRO EZ-3 the unit will commence charging the batteries for 20 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 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 0 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 powerLED PRO EZ-3 does support the re-light command via the DALI bus.

Test switch

An optional test switch can be wired to each EM powerLED PRO EZ-3. This can be used to initiate a 5 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 10 %. Average failure rate of 0.2 % per 1000 operating hours.

Technical data Accu-NiMh

case temperature range to ensure 4 years design life	0 °C to +45 °C
storage life in temperate conditions	4 years
battery voltage	1.2 V per cell
capacity Cs	2.0 Ah

Storage

- Batteries should be stored within the specified temperature range in low humidity conditions. Optimal storage conditions are
 - temperature: +5 °C to +25 °C
 - humidity: 65 % ±20 %
- Avoid atmosphere with corrosive gas
- It is recommended to disconnect the battery before store or delivery
- Avoid to store the batteries discharged
- A long term storage in open circuit leads to battery self discharge and deactivation of chemical components. It could be required to charge and discharge the batteries a few times to recover the initial performance.

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.

Mechanical details

Case manufactured from polycarbonate.

LED bi-colour status indicator

- Green / red
- Mounting hole 6.5 mm dia
- Lead length 1,000 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: 1,300 mm
- Wire type: 0.5 mm² solid conductor
- Insulation rating: 90 °C

Battery end termination

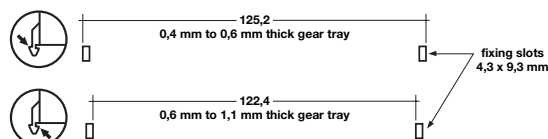
Push on 4.8 mm receptacle to suit battery spade fitted with insulating cover

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.

Recommended fixing details for clip fixing



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 ENEC 303-Annex A, each luminaire should be submitted to an isolation 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 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 V_{AC} (or 1,414 x 1,500 V_{DC}). To avoid damage to the electronic devices this test must not be conducted.

Note:

Basic insulation between supply and battery circuit.

Wiring type and cross section

The wiring can be in flexible cable or solid. Strip 8.5–9.5 mm of insulation from the cables to ensure perfect operation of the push-wire terminals.

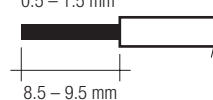
Wiring

mains (SL, N, L)

DALI (DA)

LED (LED +, LED –)

wire preparation:
0.5 – 1.5 mm²



Maximum lead length

LED	3 m
status indication LED	1 m
batteries	1,3 m

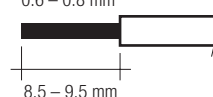
Wiring

batteries (Bat +, Bat –)

test switch (switch)

status indication LED (status K, A)

wire preparation:
0.6 – 0.8 mm²

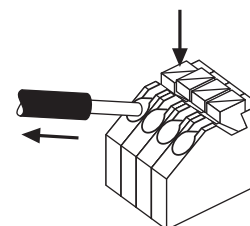


Max. lead insulation diameter

Battery	2.1 mm
Test switch	2.1 mm
Indicator LED	2.1 mm

Release of the wiring

Press down the “push button” and remove the cable from front.



Status indication

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




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

① If the EM powerLED is operated in non-maintained mode and an LED fault is detected, the red indicator LED will be illuminated and the output will be stopped. The unswitched mains supply must be switched off before the LED is changed in order that the new LED can be detected. A function or duration test will not reset the fault indication.

Standards

- EN 55015
- EN 60068-2-64
- EN 60068-2-29
- EN 60068-2-30
- EN 61000-3-2
- EN 61000-3-3
- EN 61347-2-13
- EN 62034
- EN 61547
- EN 62384
- according to EN 50172
- according to EN 60598-2-22

Link positions for duration and cell count

Duration	Link Position	1 W Power	2 W Power
1 hr	 without jumper	2 cell	3 cell
2 hr	 position A	3 cell	4 cell
3 hr	 position B	3 cell	5 cell

Jumper selection

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

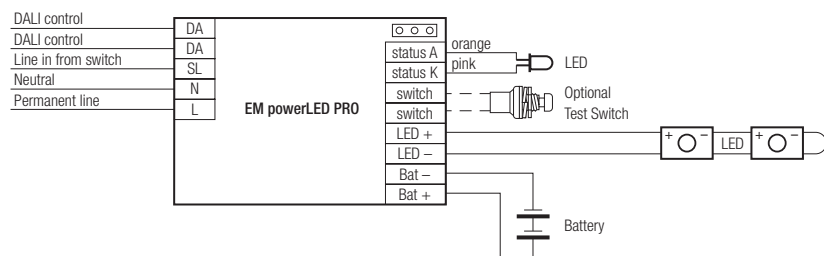
The position of the link will only be read on first power up. If it is changed afterwards both the battery and mains supply must be disconnected for 10 seconds to enable the EM powerLED EZ-3 to read the new link position on reconnection of the battery and mains. It will lead to a false battery failure indication if the link is changed after installation without this reset.

Packing quantities

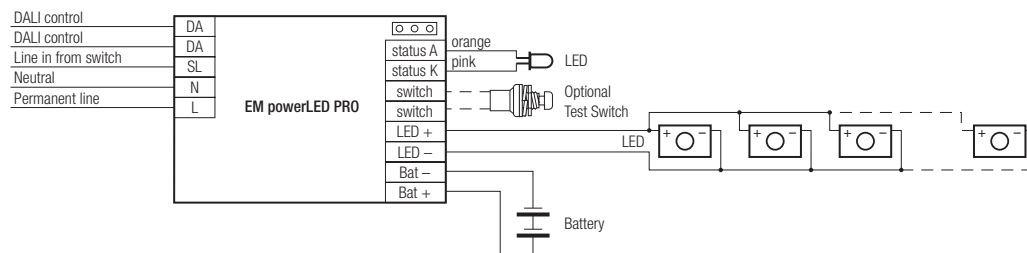
EM powerLED PRO EZ-3	25 pieces per carton	475 pieces per pallet
LED bi-colour	25 pieces per bag	200 pieces per box
Test switch EM2	25 pieces per bag	200 pieces per box
NiMh batteries	25 pieces per box	450 pieces per pallet

Wiring diagram

Wiring diagram for one LED or two LED in series



Wiring diagram for multiple LED (3–12) in parallel



Take care that the LED is connected with the right polarity.

LED that are connected to the EM powerLED PRO EZ-3 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 700 mA.

Note: The Tridonic Emergency-LED is therefore fitted with a protection diode across the powerLED.

Wiring instructions

- The powerLED terminals, battery, indicator LED and test switch terminals are classified as SELV. Keep the wiring of the DALI and the input terminals separated from the wiring of the SELV equivalent 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.
- powerLED leads should be separated from the mains and DALI connections and wiring for good EMC performance.
- Maximum lead length on the powerLED terminals is 3 m. For a good EMC performance keep the LED wiring as short as possible.
- 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 powerLED leads to prevent noise coupling.
- Battery leads are specified with 0.8 mm cross section and a length of < 1.3 m
- DALI terminals are mains proof.
- Switched live and unswitched live supplies must be off the same phase.

① For comprehensive instructions consult the Tridonic website www.tridonic.com