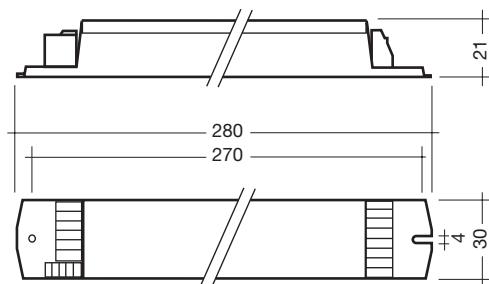


EM PRO EZ 220–240 V 50/60 Hz



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 55 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.

DALI interface terminals are provided to allow control and monitoring via a separate controller.

When the EM PRO EZ operates in Selftest mode testing is being conducted on a default weekly functional and 13 weeks duration basis with adaptive duration testing feature to minimise risk.

Fitted with the unique EZ easy addressing feature which uses the LED to indicate the DALI address during commissioning.

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 601347-2-7
- EN 60925
- IEC 62034
- 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 3 h duration – NiCd 4.0 Ah D cells or NiMh 4.0 Ah Cs cells

type	article number	number of cells
EM 34 PRO EZ	89899827	4
EM 35 PRO EZ	89899828	5
EM 36 PRO EZ	89899829	6

EM PRO EZ 1 h duration standard BLF – NiCd 1.5 Ah or NiMh 2.0 Ah Cs cells

type	article number	number of cells
EM 14 PRO EZ	89899830	4
EM 15 PRO EZ	89899831	5
EM 16 PRO EZ	89899832	6

EM PRO HO EZ 1 h duration “high output” – NiCd 4.0 Ah D cells or NiMh 4.0 Ah Cs cells

type	article number	number of cells
EM 14 HO PRO EZ	89899833	4
EM 15 HO PRO EZ	89899834	5
EM 16 HO PRO EZ	89899835	6

NiCd 1.5 Ah Cs cells	type	number of cells	article number
Accu-NiCd C 4A	stick	4	89899692
Accu-NiCd C 4B *	side by side	4	89899693
Accu-NiCd C 4C *	stick + stick	2 + 2	89899694
Accu-NiCd C 5A	stick	5	89899695
Accu-NiCd C 5B *	side by side	5	89899696
Accu-NiCd C 5C *	stick + stick	3 + 2	89899697
Accu-NiCd C 6A	stick	6	89899698
Accu-NiCd C 6C	stick + stick	3 + 3	89899699

NiMh 2.0 Ah Cs cells	type	number of cells	article number
Accu-NiMh C 4A	stick	4	89899700
Accu-NiMh C 5A	stick	5	89899703
Accu-NiMh C 5B *	side by side	5	89899704
Accu-NiMh C 6A	stick	6	89899706
Accu-NiMh C 6C	stick + stick	3 + 3	89899707

NiCd 4.0 Ah D cells	type	number of cells	article number
Accu-NiCd 4A	stick	4	89895961
Accu-NiCd 4B	side by side	4	89895977
Accu-NiCd 4C	stick + stick	2 + 2	89895978
Accu-NiCd 5A	stick	5	89895973
Accu-NiCd 5B	stick + stick	3 + 2	89895962
Accu-NiCd 6A	stick + stick	3 + 3	89895963

NiMh 4.0 Ah Cs cells	type	number of cells	article number
Accu-NiMh C 4A	stick	4	89899850
Accu-NiMh C 5A	stick	5	89899851
Accu-NiMh C 6A	stick	6	89899852
Accu-NiMh C 6C	stick + stick	3 + 3	89899853

* on request

type	article number
LED bi-colour	89899720
LED bi-colour high brightness	89899753
type	article number
Test switch EM 2	89805277

Technical data:

EM PRO EZ	3 hour	1 hour
Rated mains supply voltage	220–240 V	220–240 V
Mains frequency	50/60 Hz	50/60 Hz
Mains supply current	60 mA max	60 mA max
Mains supply power	< 10.0 W	< 10.0 W
Overvoltage protection	320 V for 1 hour	320 V for 1 hour
Max. working voltage U-OUT	460 V	460 V
Output frequency range	20–72 kHz	20–72 kHz
Recharge period	15 hours	10 hours
Discharge current	1.1 A	1.1 A
Charge current: Initial	330 mA	130 mA
Fast	330 mA	210 mA
Trickle	130 mA	50 mA
Earth leakage current	< 0.5 mA	< 0.5 mA
Ambient temperature range	-5 °C to +60 °C	-5 °C to +60 °C
Maximum case temperature tc	70 °C	70 °C
Mains change over voltage	in accordance with EN 60598-2-22	in accordance with EN 60598-2-22
Min. lamp starting temperature (emergency mode)	-5 °C	-5 °C
Ingress protection	IP20	IP20
Protection class	class I	class I
Function test	30 seconds via DALI command	30 seconds via DALI command
Duration test	3 hr via DALI command	1 hr via DALI command
Timer	crystal controlled	crystal controlled
Boost starting time	55 seconds	55 seconds

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 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 10 %. 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 +50 °C
4.0 Ah Cs	
storage life in temperate conditions	4 years
battery voltage	1.2 V
capacity Cs	2.0 Ah
	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.

Batteries

Connection method: 4.8x0.5 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.

Status indication

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

LED	Status
Permanent green	System OK
Fast flashing green	Function test underway
Slow flashing green	Duration test underway
Permanent red	Lamp fault
Fast flashing red	Charging fault
Slow flashing red	Battery fault
Double pulsing green	Inhibit mode

Emergency light output factors (BLF) in %:

Type	3 hours			1 hour			1 hour "high output"		
	EM 34 PRO EZ	EM 35 PRO EZ	EM 36 PRO EZ	EM 14 PRO EZ	EM 15 PRO EZ	EM 16 PRO EZ	EM 14 HO PRO EZ	EM 15 HO PRO EZ	EM 16 HO PRO EZ
TC-DD	10	37		37					
	16	25		25					
	21	19		19					
	28	14		14					
	38		10			10			
	55		4			4			
TC-SEL	5	40		40			53		
	7	39		39			53		
	9	39		39			53		
	11	34		34			53		
TC-DEL	10	31		31			51		
	13	26		26			47		
	18	21		21			34		
	26	14		14			27		
TC-TEL	18	21		21			36		
	26	14		14			25		
	32		11		11			28	
	42		7		7			24	
	57		5		5		19		19
TC-F	18	18		18			32		
	24		12		12			33	
	36		11		11			26	
TC-L	18	18		18			32		
	24		12		12			33	
	36		11		11			26	
	40		5		5			24	
	55			6		6			21
T5 FH	14	24		24			47		
	21		16		16			44	
	28		14			14			42
	35		12			12			36
T5 FQ	24	13		13			30		
	39		8			8			31
	49		6			6			22
	54		6			6			23
	80		5			5			15
T5 C	22	14		14			30		
	40		7			7			27
	55		7			7			23
T5	4	38		38			70		
	6	43		43			73		
	8	40		40			68		
	13	27		27			52		
T8	15	20		20			36		
	18	16		16			33		
	30	12		12			27		
	36	10		10			23		
	38		10		10				
	58		8		8			18	
	70		6						

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.

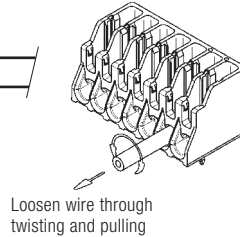
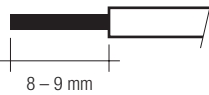
As an alternative, IEC 60598-1 Annex Q describes a test of the electrical strength with 1,500 V_{AC} (or 1,414 x 1,500 V_{DC}). To avoid damage to the electronic devices this test must not be conducted.

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



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 pF¹⁾
terminals 3 and 4 200 pF¹⁾

¹⁾ 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.

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.

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.

With the use of the fifth pole possible compatibility problems between the products can be prevented. Depending on the luminaire wiring the radio suppression in the emergency mode of operation can be further improved.

Capacitive loading limits of lamp leads must not be exceeded. Note the capacitance of the emergency lamp leads adds to the capacitance of the leads from the ballast to the EM BASIC module when considering ballast loading.

The LED and test switch wiring should be routed separately and kept as far away as possible from the high frequency lamp leads to avoid coupling.

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.

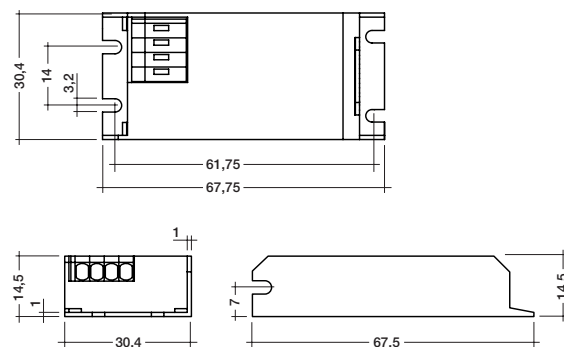
For further information please contact Tridonic.

Technical data:

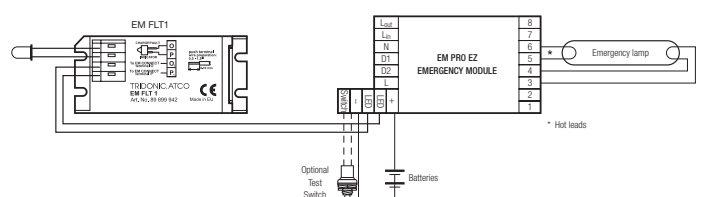
Push wire terminals 0.5–1.5 mm² solid conductor

Product	article number
EM FLT1	89899942

EM FLT1 filter

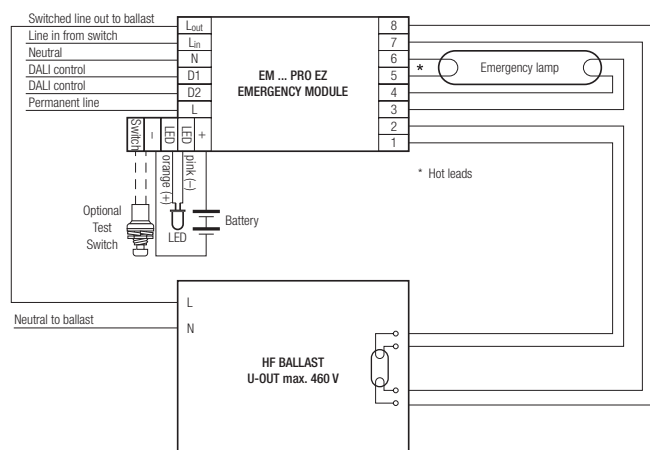


Circuit diagram with EM FLT1 filter

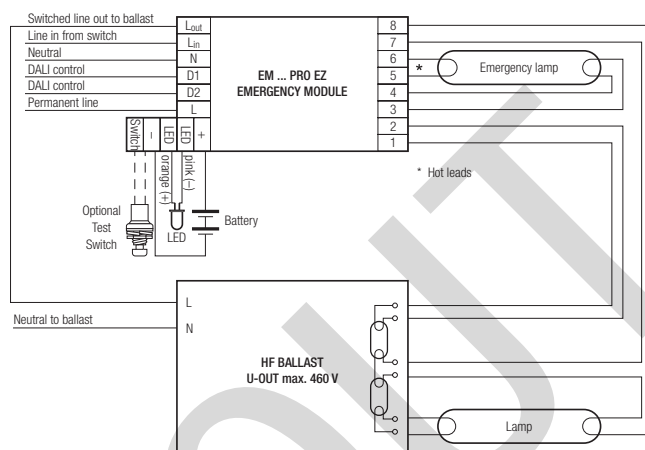


EM ... PRO EZ emergency module wiring diagrams

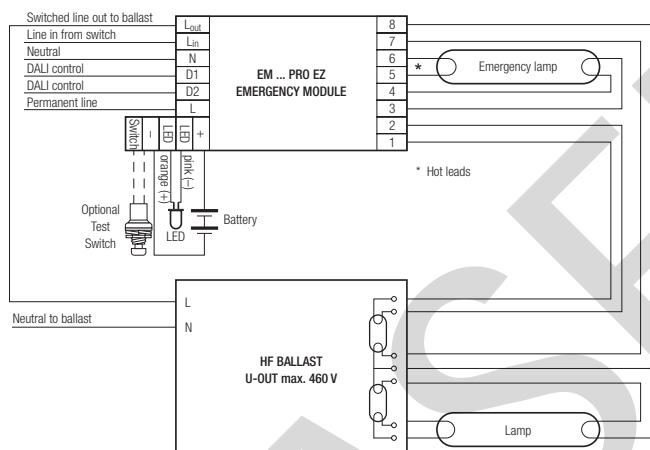
Not for use with magnetic ballasts and switch start circuits



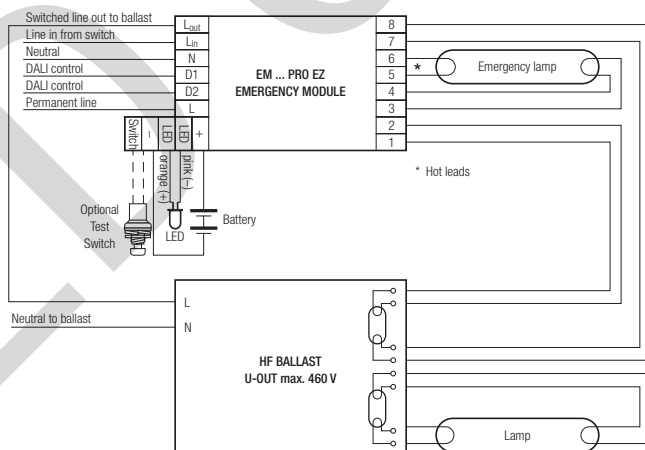
Wiring diagram for single lamp high frequency ballasts



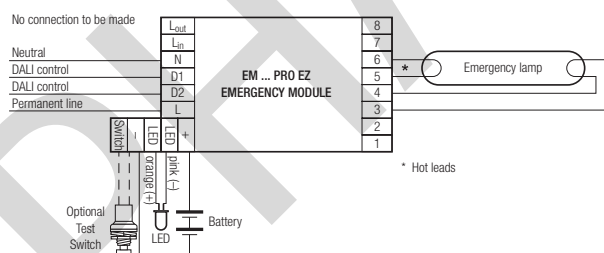
Wiring diagram for twin lamp high frequency ballasts with 6 terminals



Wiring diagram for twin lamp high frequency ballasts with 7 terminals



Wiring diagram for twin lamp high frequency ballasts with 8 terminals



Wiring diagram for non-maintained operation

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

Packing quantities:

EM ... PRO EZ: 25 units per carton Accu NiCd: 25 pieces per box EM FLT1: 25 pieces per box

Bi-colour LED: 25 pieces per bag Accu NiMh: 25 pieces per box

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).



EZ PRO ADDRESS: 89899836