RoHS

T5 T8 TC-DEL TC-SEL TC-TEL TC-F TC-L TC-DD T5c

EM SELFTEST, 220 – 240 V

SELFTEST version

Product description

- Emergency lighting supply unit with self-test function
- For linear and compact fluorescent lamps
- Low-profile casing (21 x 30 mm cross-section)

Properties

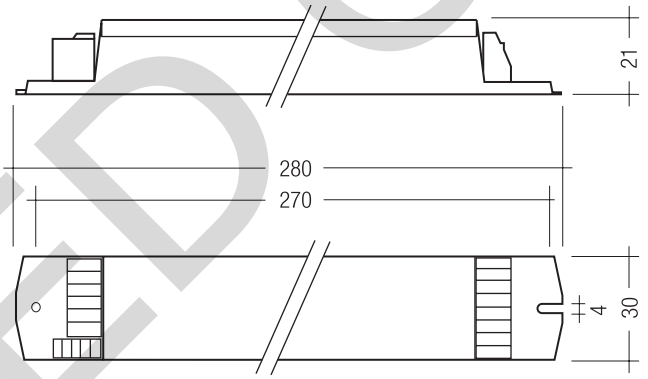
- Self-test as per IEC 62034
- 1 or 3 h rated duration
- Compatible with all electronic ballasts (dimmable and non-dimmable)
- 5-pole technology: 4-pole lamp changeover and delayed power switching for the ballast
- High-frequency ac operation of the lamp
- Power control technology ensures maximum emergency ballast lumen factors for all lamps on a given module
- Hot restart in emergency mode
- Gentle on the lamp thanks to permanent cathode heating in emergency mode
- 5,5 min. boost start for rapid heating of the lamp, more light in the startup phase and optimum lamp life
- Standard and high ballast lumen factor for 1-hour types
- Electronic multi-level charge system
- Deep discharge protection
- Short-circuit-proof battery connection
- Polarity reversal protection for battery
- „Rest mode“ function
- Simple set-up
- Automatic function and service life test at a risk-free time
- Two-colour status display LED

Self-test:

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

Batteries

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



Technical data

Rated supply voltage	220 – 240 V
Mains frequency	50 / 60 Hz
Mains current	60 mA, max.
Rated power	< 10 W
Overvoltage protection	320 V (for 1 h)
Maximum operating voltage (U-OUT of the ECG)	460 V
Battery charging time 3 / 1 h	15 / 10 h
Discharge current, Standard BLF	1.1 A
Discharge current, High Output BLF	2.2 A
Leakage current (PE)	< 0.5 mA
Ambient temperature ta	-5 ... +60 °C
Max. casing temperature tc	70 °C
Mains voltage changeover threshold	according to EN 60598-2-22
Min. lamp starting temperature (emergency operation)	-5 °C
Type of protection	IP20
Rest mode max. number of emergency units	100
Rest mode max. wiring distance	1,000 m

Ordering data

Type	Article number	Number of cells	Packaging, carton	Packaging, pallet	Weight per pc.
Rated operating time 3 h, Standard BLF					
EM 34 ST	**89899680**	4	25 pc(s).	475 pc(s).	0.229 kg
EM 35 ST	**89899681**	5	25 pc(s).	475 pc(s).	0.229 kg
EM 36 ST	**89899682**	6	25 pc(s).	475 pc(s).	0.229 kg
Rated operating time 1 h, Standard BLF					
EM 14 ST	**89899683**	4	25 pc(s).	475 pc(s).	0.229 kg
EM 15 ST	**89899684**	5	25 pc(s).	475 pc(s).	0.229 kg
EM 16 ST	**89899685**	6	25 pc(s).	475 pc(s).	0.229 kg

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Standards, page 7

For wiring diagrams and installation examples, page 9

Ordering data

Type	Article number	Number of cells	Packaging, carton	Packaging, pallet	Weight per pc.
Rated operating time 1 h, High Output BLF					
EM 14 HO ST	**89899686**	4	25 pieces	475 pieces	0.229 kg
EM 15 HO ST	**89899687**	5	25 pieces	475 pieces	0.229 kg
EM 16 HO ST	**89899688**	6	25 pieces	475 pieces	0.229 kg

Specific technical data

Type	Battery charge time	Charge current		
		Initial charge	Fast charge	Trickle charge
Rated operating time 3 h, Standard BLF				
EM 34 ST	15 h	330 mA	330 mA	130 mA
EM 35 ST	15 h	330 mA	330 mA	130 mA
EM 36 ST	15 h	330 mA	330 mA	130 mA
Rated operating time 1 h, Standard BLF				
EM 14 ST	10 h	130 mA	210 mA	50 mA
EM 15 ST	10 h	130 mA	210 mA	50 mA
EM 16 ST	10 h	130 mA	210 mA	50 mA
Rated operating time 1 h, High Output BLF				
EM 14 HO ST	15 h	330 mA	330 mA	130 mA
EM 15 HO ST	15 h	330 mA	330 mA	130 mA
EM 16 HO ST	15 h	330 mA	330 mA	130 mA

ACCESSO-RIES

Test switch EM2

Product description

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

Ordering data

Type	Article number	Packaging, bag	Packaging, carton	Weight per pc.
Test switch EM 2	**89805277**	25 pc(s).	600 pc(s).	0.011 kg

ACCESSO-RIES

Status indication bi-colour LED

Product description

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

Ordering data

Type	Article number	Packaging, bag	Packaging, carton	Weight per pc.
LED EM bi-colour	**89899720**	25 pc(s).	200 pc(s).	0.017 kg
LED EM bi-colour, high brightness	**89899753**	25 pc(s).	800 pc(s).	0.013 kg

Ballast Lumen Factor (BLF) in %

EM SELFTEST for linear lamps, 3 h oder 1 h

	Duration	3 h			Standard 1 h			High Output 1 h		
	Cells	4 cells	5 cells	6 cells	4 cells	5 cells	6 cells	4 cells	5 cells	6 cells
	Type	EM 34 ST	EM 35 ST	EM 36 ST	EM 14 ST	EM 15 ST	EM 16 ST	EM 14 HO ST	EM 15 HO ST	EM 16 HO ST
	Article no.	89899680	89899681	89899682	89899683	89899684	89899685	89899686	89899687	89899688
Lamp type	Wattage	BLF in emergency lighting mode in % for rated operating time								
T5	4 W									
	6 W	39			39			70		
	8 W	40			40			68		
	13 W	24			24			55		
T5 FH	14 W	24			24			47		
	21 W		18			18			43	
	28 W			15			15			39
	35 W			11			11			30
T5 FQ	24 W	13,5			13,5			29		
	39 W			8,2			8,2			30
	49 W			6,7			6,7			22
	54 W			5,3			5,3			23
	80 W			4,6			4,6			14
T8	15 W	18			18			36		
	18 W	18			18			36		
	30 W	11			11			24		
	36 W	9,5			9,5			20		
	38 W		12			12				
	58 W		7,5			7,5			17	
	70 W			4,5			4,5			

Technology and capacity	Design	Number of cells	Type	Article number	Assignable batteries								
NiCd 4 Ah D-cells	Stick	4	**Accu-NiCd 4A 55**	89800089	•						•		
	side by side	4	**Accu-NiCd 4B**	89895977	•						•		
	Stick + Stick	2 + 2	**Accu-NiCd 4C**	89895978	•						•		
	Stick	5	**Accu-NiCd 5A**	89895973		•						•	
	Stick + Stick	3 + 2	**Accu-NiCd 5C 55**	89800090		•						•	
	Stick + Stick	3 + 3	**Accu-NiCd 6A**	89895963			•						•
NiMH 2 Ah Cs-cells	Stick	4	**Accu-NiMH C 4A**	89899700				•					
	Stick	5	**Accu-NiMH C 5A**	89899703					•				
	Stick	6	**Accu-NiMH C 6A**	89899706						•			
	Stick + Stick	3 + 3	**Accu-NiMH C 6C**	89899707						•			
NiMH 4 Ah Cs-cells ①	Stick	4	**Accu-NiMH 4 Ah C 4A**	89899850	•						•		
	Stick	5	**Accu-NiMH 4 Ah C 5A**	89899851		•						•	
	Stick	6	**Accu-NiMH 4 Ah C 6A**	89899852			•						•
	Stick + Stick	3 + 3	**Accu-NiMH 4 Ah C 6C**	89899853			•						•

Note: 50°C batteries also available (see seperate datasheet at www.tridonic.com)

① Maximum battery housing temperature 50 °C.

Ballast Lumen Faktor (BLF) in %

EM SELFTEST for compact lamps, 3 h oder 1 h

	Duration	3 h			Standard 1 h			High Output 1 h		
	Cells	4 cells	5 cells	6 cells	4 cells	5 cells	6 cells	4 cells	5 cells	6 cells
	Type	EM 34 ST	EM 35 ST	EM 36 ST	EM 14 ST	EM 15 ST	EM 16 ST	EM 14 HO ST	EM 15 HO ST	EM 16 HO ST
	Article no.	89899680	89899681	89899682	89899683	89899684	89899685	89899686	89899687	89899688
Lamp type	Wattage	BLF in emergency lighting mode in % for rated operating time								
TC-DD	10 W	33			33					
	16 W	24			24					
	21 W	17			17					
	28 W	14			14					
	38 W			7,5			17,5			
	55 W			5,2			5,2			
TC-SEL	5 W									
	7 W	24			24			54		
	9 W	28			28			45		
	11 W	31			31			57		
TC-DEL	10 W	30			30			44		
	13 W	26			26			46		
	18 W	17			17			34		
	26 W	14,4			14,4			28		
TC-TEL ②	13 W	26			26					
	18 W	17,5 / 16,0	/ 20,5 (GE)		17,5 / 16,0	/ 20,5 (GE)		32 / 30		
	26 W ③	11,5 / 10,4	/ 15	/ 14,0	11,5 / 10,4	/ 15	/ 14,0	23 / 26		
	32 W ③		14 / 5,6	/ 8,0		14 / 5,6	/ 8,0		21 / 21	
	42 W			7,4 / 7,3			7,4 / 7,3		18 / 19	
	57 W			5,1 / 5,2			5,1 / 5,2			17,5 / 16,5
T5c	22 W	13,5			13,5			28		
	40 W			6,5			6,5			26
	55 W			5,4			5,4			21
TC-F	18 W	18			18			33		
	24 W		21			21			34	
	36 W		13			13			25	
TC-L	18 W	18			18			30		
	24 W		17			17			34	
	36 W		12			12			24	
	40 W		8,8			8,8			23	
	55 W			4,5			4,5			19

Technology and capacity	Design	Number of cells	Type	Article number	Assignable batteries								
NiCd 4 Ah D-cells	Stick	4	**Accu-NiCd 4A 55**	**89800089**	•						•		
	side by side	4	**Accu-NiCd 4B**	**89895977**	•						•		
	Stick + Stick	2 + 2	**Accu-NiCd 4C**	**89895978**	•						•		
	Stick	5	**Accu-NiCd 5A**	**89895973**		•						•	
	Stick + Stick	3 + 2	**Accu-NiCd 5C 55**	**89800090**		•						•	
	Stick + Stick	3 + 3	**Accu-NiCd 6C**	**89895963**			•						•
NiMH 2 Ah Cs-cells	Stick	4	**Accu-NiMH C 4A**	**89899700**				•					
	Stick	5	**Accu-NiMH C 5A**	**89899703**					•				
	Stick	6	**Accu-NiMH C 6A**	**89899706**						•			
	Stick + Stick	3 + 3	**Accu-NiMH C 6C**	**89899707**						•			
NiMH 4 Ah Cs-cells ①	Stick	4	**Accu-NiMH 4 Ah C 4A**	**89899850**	•						•		
	Stick	5	**Accu-NiMH 4 Ah C 5A**	**89899851**		•						•	
	Stick	6	**Accu-NiMH 4 Ah C 6A**	**89899852**			•						•
	Stick + Stick	3 + 3	**Accu-NiMH 4 Ah C 6C**	**89899853**			•						•

Note: 50°C batteries also available (see seperate datasheet at www.tridonic.com)

① Maximum battery housing temperature 50 °C.

② The first figure is related to non-amalgam lamps, the second figure is realted to amalgam lamps (e.g. 14 / 9,5).

③ For best performance of 26W and 32W TC lamps, and especially amalgam filled lamps, we recommend the use of EM 36 ST resp. EM 16 ST.

Emergency Ballast Lumen Factor (EBLF) in % ①

EM SELFTEST for linear lamps, 3 or 1 h

	Duration	3 h			Standard 1 h			High Output 1 h		
	Cells	4 cells	5 cells	6 cells	4 cells	5 cells	6 cells	4 cells	5 cells	6 cells
	Type	EM 34 ST	EM 35 ST	EM 36 ST	EM 14 ST	EM 15 ST	EM 16 ST	EM 14 HO ST	EM 15 HO ST	EM 16 HO ST
	Article no.	89899680	89899681	89899682	89899683	89899684	89899685	89899686	89899687	89899688
Lamp type	Wattage	EBLF in emergency lighting mode in % for rated operating time								
T5	6W	35			35			61		
	8W	36			36			62		
	13W	22			22			48,5		
T5 FH	14W	22			22			43		
	21W		17			17			38	
	28W			14			14			36
	35W			10,5			10,5			27
T5 FQ	24W	12,3			12,3			26		
	39W			8,3			8,3			28
	49W			6,4			6,4			18
	54W			5,7			5,7			17
	80W			4,7			4,7			13
T8	15W	16,5			16,5			32		
	18W	16,5			16,5			32		
	30W	9,5			9,5			23		
	36W	8			8			19		
	38W		10,5			10,5				
	58W		6,5			6,5			15,5	
	70W			3,7			3,7			
TC-DD	10W	29			29					
	16W	22,5			22,5					
	21W	15			15					
	28W	12,5			12,5					
	38W			6,5			6,5			
	55W			5,3			5,3			
TC-SEL	7W	22			21,5			44		
	9W	25,5			25			42		
	11W	28			27,5			54		
TC-DEL	10W	21,5			21,5			29		
	13W	23			23			34		
	18W	15,5			15,5			30		
	26W	13			13			23,5		
TC-TEL ②	13W	23			23					
	18W	16/10,7	/12		16/10,7	/12		26 / 11		
	26W ③	10,4/8,9	/9,2	/ 11,2	10,4/8,9	/ 9,2	/ 11,2	21 / 15		
	32W ③		12,8/4,8	/7,7		12,8/4,8	/7,7		18 / 11	
	42W			7,2/6,7			7,2/6,7		16 / 9	
	57W			5,0/3,2			5,0/3,2			16 / 5,7
T5c	22W	11,5			11,5			26		
	40W			6			6			23,5
	55W			5,5			5,5			19,5
TC-F	18W	16,5			16,5			31,5		
	24W		19,5			19,5			30,5	
	36W		12			12			23,5	
TC-L	18W	16			16			27		
	24W		15,5			15,5			28,5	
	36W		10,5			10,5			22	
	40W		8,4			8,4			21	
	55W			4,8			4,8			17,5

① According to EN 61347-2-7: 2006

② The first figure is related to non-amalgam lamps, the second figure is realted to amalgam lamps (e.g. 14 / 9,5).

③ For best performance of 26W and 32W TC lamps, and especially amalgam filled lamps, we recommend the use of EM 36 ST resp. EM 16 ST.

Standards
- according to EN 50172
- according to EN 60598-2-22
- EN 61347-2-7
- EN 60929
- EN 62034
- EN 55015
- EN 61000-3-2
- EN 61000-3-3
- EN 61547
- EN 60068-2-64
- EN 60068-2-29
- EN 60068-2-30

Testing:

Commissioning test
A full commissioning test is carried out automatically after permanent connection of the supply. The easy commissioning feature will set the initial test day and time to ensure random testing of units.

Functional test
Functional tests are carried out for 30 seconds on a weekly basis under the control of the Micro controller. Initiation and timing of these tests is set during the commissioning of the luminaire.

Duration test
A full duration test (3 hr. resp. 1 hr.) is carried out yearly to check the capacity of the batteries. For a full description of commissioning and test features please refer to application notes.

Test switch
An optional test switch can be wired to the EM SELFTEST. This can be used to to:
- initiate a 30 seconds function test < 1 second press
- adjust local timing > 10 second press

For a full description of the test switch function refer to application notes.

Status indication
System status is indicated by a bi-colour LED.

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	Rest mode

Accu-NiCd

Case temperature range to ensure 4 years design life	0 °C to +55 °C
Battery voltage/cell	1.2 V
Capacity D	4.2 / 4.5 Ah
Max. short term temperature (reduced lifetime)	70 °C
Packing quantity	5 pcs. per carton

Accu-NiMh

Case temperature range (to ensure 4 years design life)	
2.0 Ah Cs	0 °C to +55 °C
4.0 Ah Cs	0 °C to +50 °C
Battery voltage	1.2 V
Capacity Cs	2.0 Ah 4.0 Ah
Max. short term temperature (reduced lifetime)	70 °C
Packing quantity	5 pcs. per carton

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 mm^2 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.

Rest mode
Rest mode can be initiated by applying a short pulse of between 9.5 V_{DC} and 22.5 V_{DC} in amplitude for a period of between 200 ms and 1.0 second. This should be applied to terminals marked Rest 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. The Rest mode terminals are not sensitive to polarity.

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.

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.

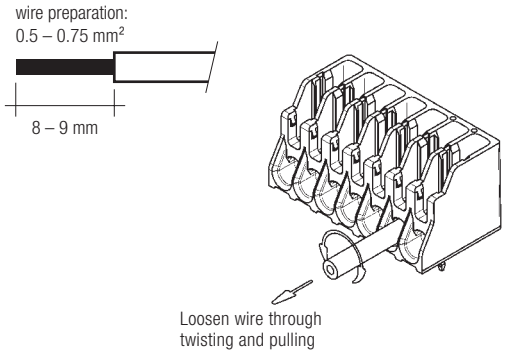
To inhibit inverter operation disconnect the batteries by removing the connector from the battery spade tag.

For battery data see separate data sheet.

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.

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



Note:
Basic insulation between supply and battery circuit.

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.

EM FLT1 filter

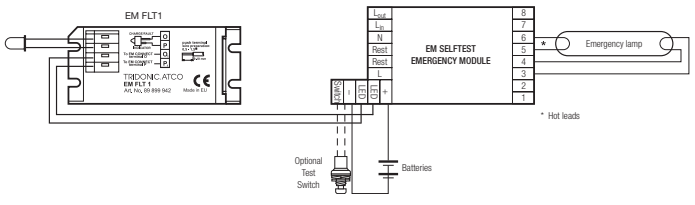
When the EM SELFTEST is used in a remote appli-cation, where the lamp leads and LED indicator leads are routed together in close proximity, it is possible to have electrical interference picked up in the indicator leads.

Under certain conditions this interference can cause a lock-up of the EM SELFTEST 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 SELFTEST unit. To be effective the filter must be connected close to the EM SELFTEST module.

For further information please contact Tridonic.

Circuit diagram with EM FLT1 filter



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

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 [1)]
terminals 3 and 4 200 pF [1)]

[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.

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 SELFTEST module when considering ballast loading.

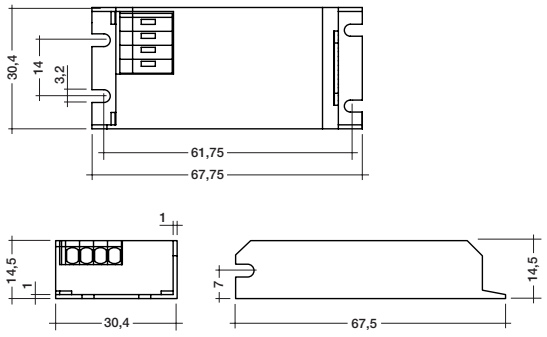
The LED and test switch wiring should be routed separately and kept as far away as possible from the high frequency lamp leads to avoid coupling.

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

Ordering data

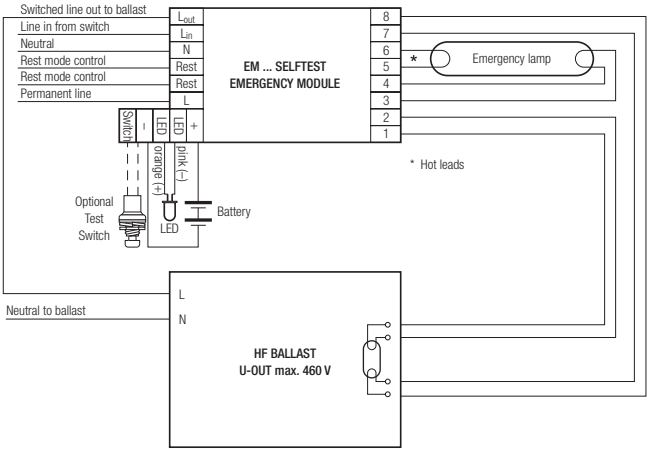
Type	Article number	Packaging, carton	Packaging, pallet	Weight per pcs.
EM FLT1	89899942	50 pieces	1,000 pieces	0.022 kg

EM FLT1 filter

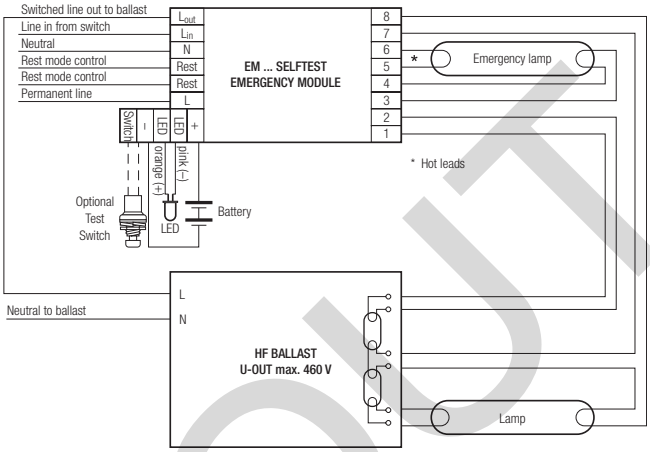


EM ... SELFTEST emergency module wiring diagrams

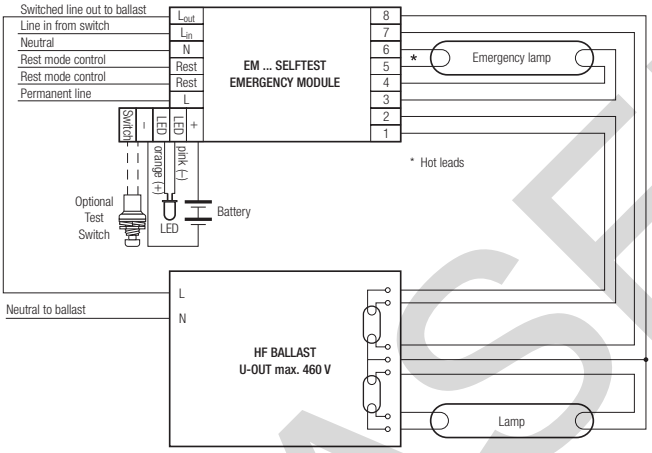
Not for use with magnetic ballasts and switch start circuits



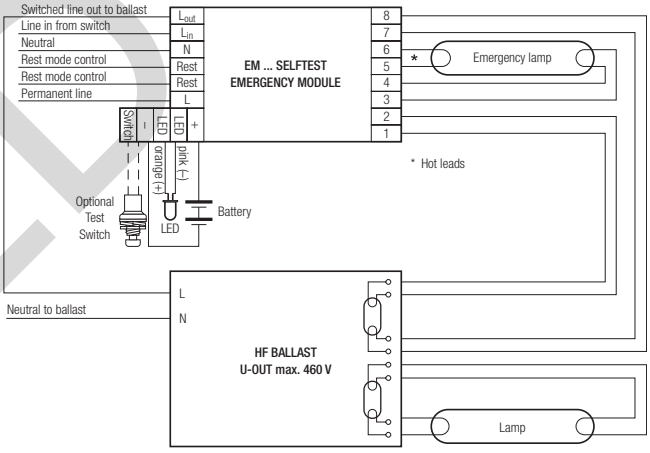
Wiring diagram for single lamp high frequency ballasts



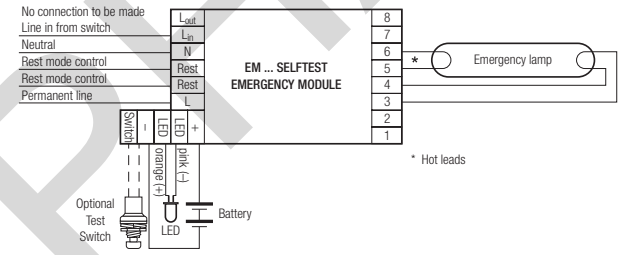
Wiring diagram for twin lamp high frequency ballasts with 6 terminals



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 Tridonic website www.tridonic.com