EM converterLED BASIC MH/LiFePO4 250 V

BASIC series

Product description

- Self contained emergency lighting LED Driver for manual testing
- For LED modules with a forward voltage of 50 – 250 V
- Low profile casing (21 x 30 mm cross-section)
- For luminaire installation
- 5-year guarantee

Properties

- Non maintained operation
- 1 or 3 h rated duration
- Operating time selectable with plug (duration link)
- Compatible with all dimmable and non-dimmable constant current LED Driver (see chapter 5.3)
- 3-pole technology: 2-pole LED module changeover and delayed power switching for the LED Driver
- Automatic shutdown of output if LED load is out of range
- Constant power output
- Maximum light output for all LED modules
- Electronic charge system
- Deep discharge protection
- Short-circuit-proof battery connection
- Polarity reversal protection for battery provided by 3-pole connector
- Automatic detection of the connected battery technology (NiMH or $LiFePO_4$ batteries)

Batteries

- High-temperature cells
- NiMH or $LiFePO_4$ batteries
- LA or 18650 cells
- 4-year design life for NiMH batteries
- 1-year guarantee for NiMH batteries
- 4 – 8 years design life for $LiFePO_4$ batteries
- 3-year guarantee for $LiFePO_4$ batteries
- For battery compatibility refer to chapter 7.1

→

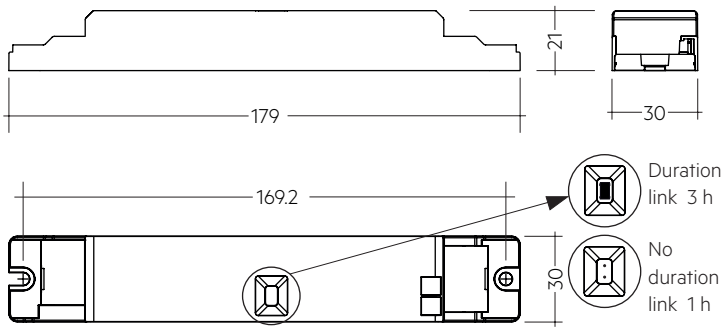
Standards, page 5

Wiring diagrams and installation examples, page 6

SELV RoHS

EM converterLED BASIC MH/LiFePO4 250 V

BASIC series



Note: LED Driver supplied with duration link in 3 hours position. Remove duration link for 1 hour duration. Duration link must be set before battery and mains connection.

Technical data

Rated supply voltage	220 – 240 V
Mains frequency	50 / 60 Hz
LED module forward voltage range	50 – 250 V
Output current	see chapter 5.2
Time to light	< 0.5 s from detection of emergency event
Overvoltage protection	320 V (for 48 h)
U-OUT	280 V
Battery charging time	24 h[①]
Ambient temperature range ta	-5 … + 55 °C
Max. casing temperature tc	75 °C
Mains voltage changeover threshold	according to EN 60598-2-22
Type of protection	IP20
Dimensions LxWxH	179 x 30 x 21 mm

Ordering data

Type	Article number	Rated duration	Packaging, carton	Packaging, pallet	Weight per pc.
EM converterLED BASIC 203 MH/LiFePO4 250V	**89800592**	1/3 h	10 pc(s).	1,600 pc(s).	0.07 kg
EM converterLED BASIC 204 MH/LiFePO4 250V	**89800581**	1/3 h	10 pc(s).	1,600 pc(s).	0.07 kg
EM converterLED BASIC 205 MH/LiFePO4 250V	**89800582**	1/3 h	10 pc(s).	1,600 pc(s).	0.07 kg

Specific technical data

Type	Battery technology	Rated duration	Typ. λ (at 230 V, 50 Hz)	Typ. output power	Mains current in charging operation			Rated power in charging operation		
					Initial charge	Fast recharge	Trickle charge[②]	Initial charge	Fast recharge	Trickle charge[②]
EM converterLED BASIC 203 MH/LiFePO4 250V	NiMH	1h	0.60C	2.5 W	17 mA	17 mA	17 mA / 12 mA	2.4 W	2.4 W	2.4 W / 1.4 W
		3h	0.60C	2.5 W	19 mA	19 mA	19 mA / 12 mA	2.9 W	2.9 W	2.9 W / 1.4 W
	$LiFePO_4$	1h	0.60C	2.5 W	20 mA	20 mA	20 mA / 12 mA	2.8 W	2.8 W	2.8 W / 1.4 W
		3h	0.60C	2.5 W	25 mA	25 mA	25 mA / 12 mA	3.9 W	3.9 W	3.9 W / 1.4 W
EM converterLED BASIC 204 MH/LiFePO4 250V	NiMH	1h	0.65C	3.5 W	18 mA	18 mA	18 mA / 12 mA	2.5 W	2.5 W	2.5 W / 1.4 W
		3h	0.65C	3.5 W	21 mA	21 mA	21 mA / 12 mA	3.2 W	3.2 W	3.2 W / 1.4 W
	$LiFePO_4$	1h	0.65C	3.5 W	20 mA	20 mA	20 mA / 12 mA	2.8 W	2.8 W	2.8 W / 1.4 W
		3h	0.65C	3.5 W	26 mA	26 mA	26 mA / 12 mA	3.9 W	3.9 W	3.9 W / 1.4 W
EM converterLED BASIC 205 MH/LiFePO4 250V	NiMH	1h	0.65C	4.5 W	19 mA	19 mA	19 mA / 12 mA	2.7 W	2.7 W	2.7 W / 1.4 W
		3h	0.65C	4.5 W	22 mA	22 mA	22 mA / 12 mA	3.3 W	3.3 W	3.3 W / 1.4 W
	$LiFePO_4$	1h	0.65C	4.5 W	20 mA	20 mA	20 mA / 12 mA	2.8 W	2.8 W	2.8 W / 1.4 W
		3h	0.65C	4.5 W	26 mA	26 mA	26 mA / 12 mA	3.9 W	3.9 W	3.9 W / 1.4 W

[①] 16 h battery charging time for 2 h emergency lighting function according to AS 2293.

[②] In case of NiMH batteries: Intermittent charge is used. Value 1 is for 4 min. charge on / Value 2 is for 16 min. charge off. In case of $LiFePO_4$ batteries voltage dependent constant current charging is used.

RoHS

ACCES-SORIES

Test switch EM3

Product description

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

Ordering data

Type	Article number	Packaging, bag	Packaging, carton	Weight per pc.
Test switch EM 3	**89899956**	25 pc(s).	200 pc(s).	0.013 kg

ACCES-SORIES

Status indication green LED

Product description

- A green LED indicates that charging current is flowing into the battery
- Plug connection

Ordering data

Type	Article number	Packaging, bag	Packaging, carton	Weight per pc.
LED EM green, 1.0 m CON	**89800269**	25 pc(s).	200 pc(s).	0.015 kg
LED EM green, HO 1.0 m CON	**89800271**	25 pc(s).	200 pc(s).	0.015 kg
LED EM green, 0.6 m CON	**89800472**	25 pc(s).	200 pc(s).	0.009 kg
LED EM green, HO 0.6 m CON	**89800473**	25 pc(s).	200 pc(s).	0.009 kg
LED EM green, 0.3 m CON	**89800270**	25 pc(s).	200 pc(s).	0.005 kg
LED EM green, HO 0.3 m CON	**89800272**	25 pc(s).	200 pc(s).	0.005 kg

ACCES-SORIES

Extension Cable LiFePO4

Product description

- Extension cable for $LiFePO_4$ batteries
- Cable length 500 mm
- 3-pole plug connection

Ordering data

Type	Article number	Packaging, bag	Packaging, carton	Weight per pc.
EXTENSION CABLE LiFePO4 500mm	**28002461**	10 pc(s).	200 pc(s).	0.01 kg

ACCES-SORIES

Connection Cable NiMH

Product description

- Connection cable for NiMH batteries
- Cable length 500 mm
- 2-pole plug connection for batteries and 3-pole plug connection for LED Driver

Ordering data

Type	Article number	Packaging, bag	Packaging, carton	Weight per pc.
CONNECTION CABLE NiMH 500mm	**28002462**	10 pc(s).	200 pc(s).	0.015 kg

1. Standards

- according to EN 50172
- according to EN 60598-2-22
- EN 61347-1
- EN 61347-2-13
- EN 61347-2-7
- EN 55015
- EN 61000-3-2
- EN 61000-3-3
- EN 61547
- EN 60068-2-64
- EN 60068-2-29
- EN 60068-2-30
- EN 62384

1.1 Glow-wire test

according to EN 61347-1 with increased temperature of 850 °C passed.

1.2 Isolation and electric strength testing of luminaires

Electronic LED-Drivers 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 VDC 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 VDC). To avoid damage to the electronic devices this test **must not be conducted**.

2. Thermal details and life-time

2.1 Life-time

Average life-time 50,000 hours under rated conditions with a failure rate of less than 10 %. Average failure rate of 0.2 % per 1000 operating hours.

Expected life-time with NiMH batteries

Type	ta	40 °C	50 °C	55 °C
EM converterLED BASIC 203	tc	65 °C	70 °C	75 °C
MH/LiFePO4 250V	life-time	> 100,000 h	> 100,000 h	87,000 h
EM converterLED BASIC 204	tc	65 °C	70 °C	75 °C
MH/LiFePO4 250V	life-time	> 100,000 h	> 100,000 h	84,000 h
EM converterLED BASIC 205	tc	65 °C	70 °C	75 °C
MH/LiFePO4 250V	life-time	> 100,000 h	> 100,000 h	80,000 h

Expected life-time with $LiFePO_4$ batteries

Type	ta	40 °C	50 °C	55 °C
EM converterLED BASIC 203	tc	65 °C	70 °C	75 °C
MH/LiFePO4 250V	life-time	> 100,000 h	> 100,000 h	82,000 h
EM converterLED BASIC 204	tc	65 °C	70 °C	75 °C
MH/LiFePO4 250V	life-time	> 100,000 h	> 100,000 h	82,000 h
EM converterLED BASIC 205	tc	65 °C	70 °C	75 °C
MH/LiFePO4 250V	life-time	> 100,000 h	> 100,000 h	81,000 h

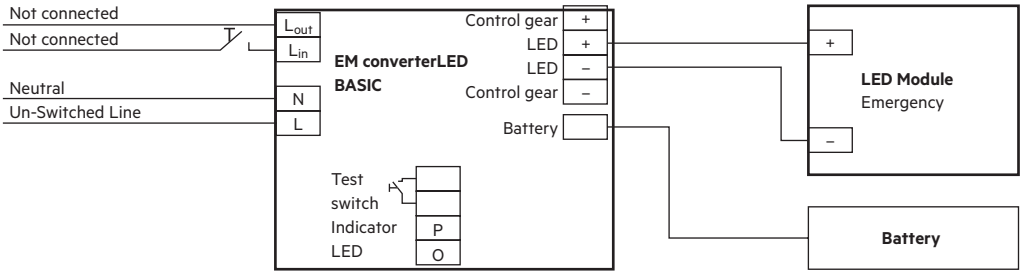
3. Installation / Wiring

3.1 Wiring diagram

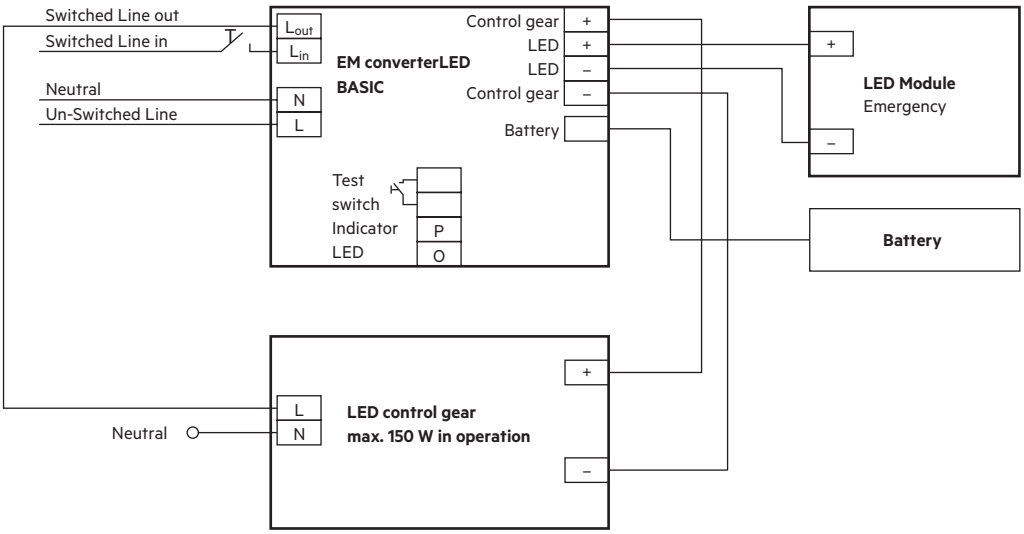
One or more LED modules with a total forward voltage of 50 to 250 V can be connected to the EM converterLED 250V module. These LED module(s), marked with “Emergency” are operated in emergency mode from the associated battery. In normal mains mode all LED modules are operated by the LED Driver from the mains supply.

Use of the test switch:
For checking the device function press the test switch for a minimum of 3 seconds.

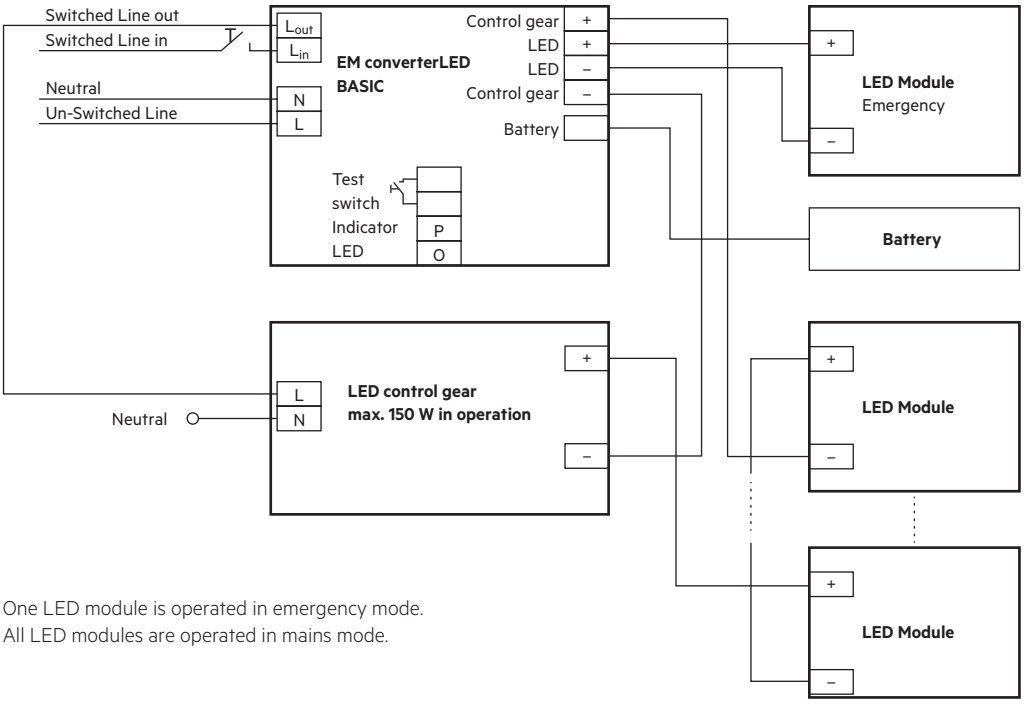
EM converterLED BASIC with one LED module for non-maintained emergency operation



EM converterLED BASIC with a standard LED Driver and one LED module for mains and emergency operation

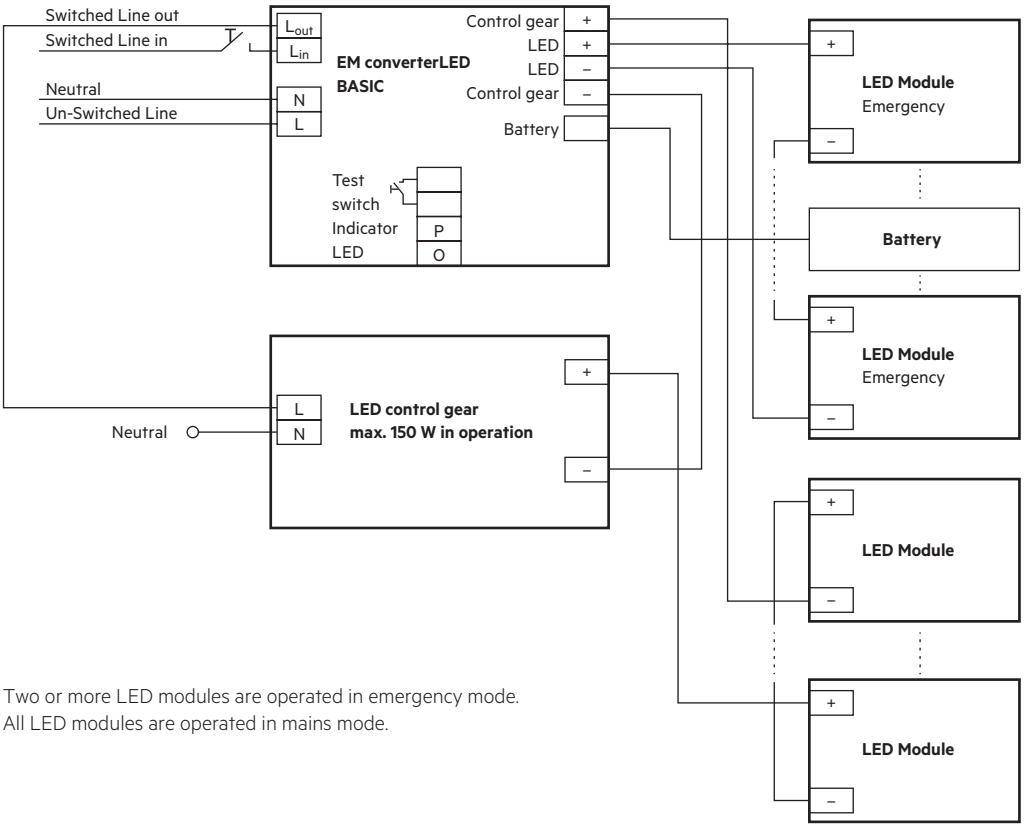


EM converterLED BASIC with a standard LED Driver and <u>series</u> operation of LED modules



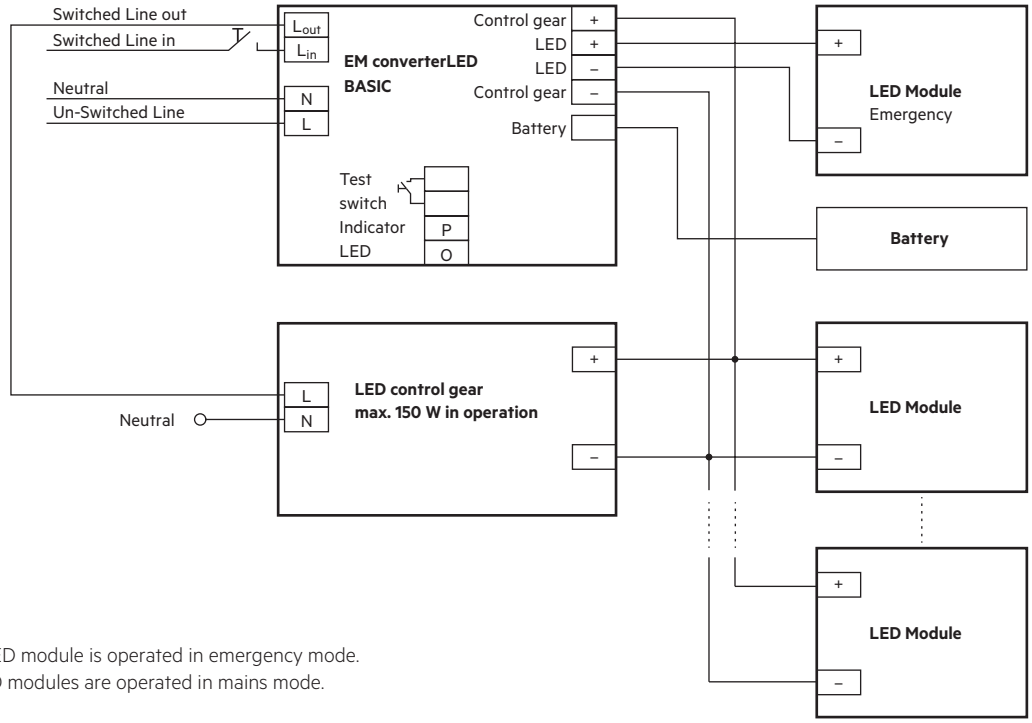
One LED module is operated in emergency mode.
All LED modules are operated in mains mode.

EM converterLED BASIC with a standard LED Driver and <u>series</u> operation of LED modules



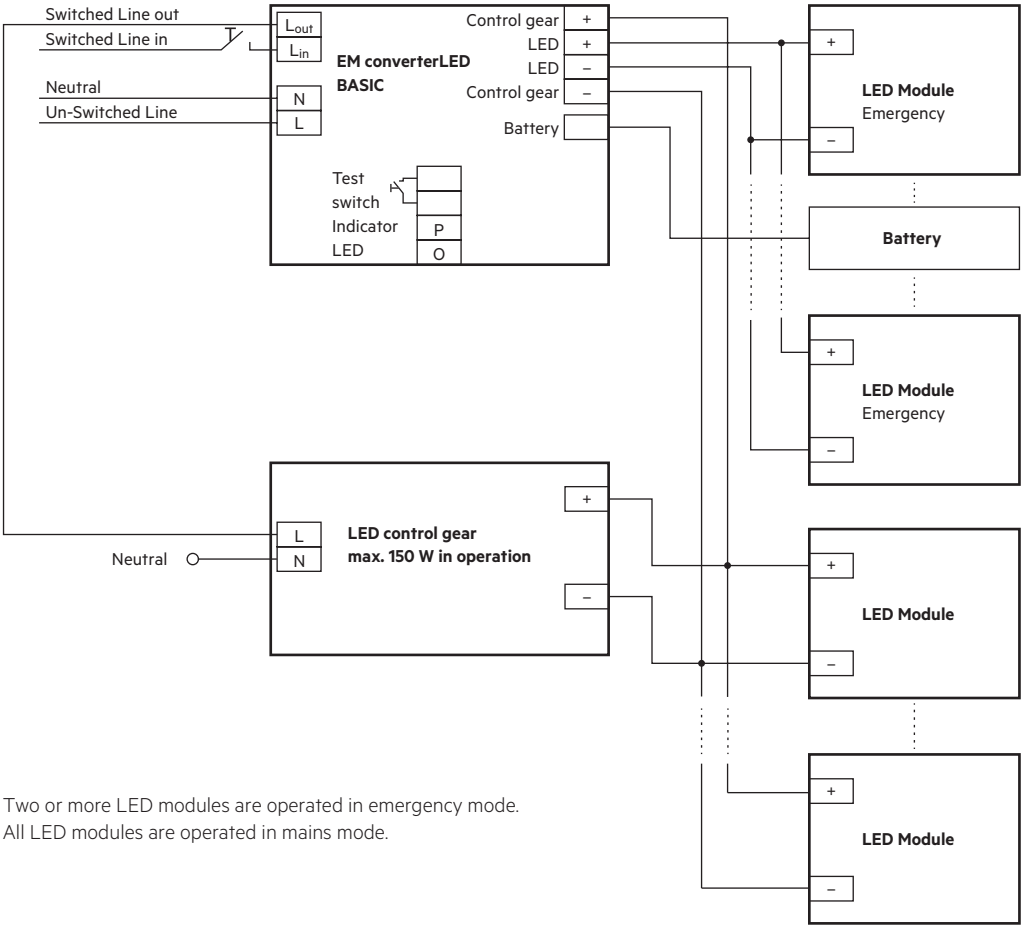
Two or more LED modules are operated in emergency mode.
All LED modules are operated in mains mode.

EM converterLED BASIC with a standard LED Driver and <u>parallel</u> operation of LED modules



One LED module is operated in emergency mode.
All LED modules are operated in mains mode.

EM converterLED BASIC with a standard LED Driver and <u>parallel</u> operation of LED modules

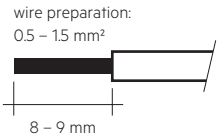


Two or more LED modules are operated in emergency mode.
All LED modules are operated in mains mode.

3.2 Wiring type and cross section

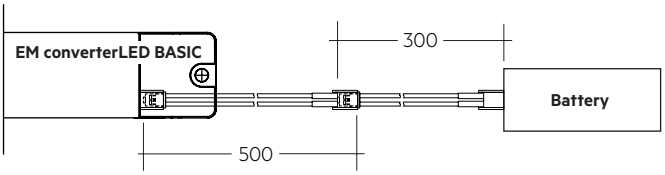
Solid wire with a cross section of 0.5 – 1.5 mm². Strip 8 – 9 mm of insulation from the cables to ensure perfect operation of terminals.

Wiring: LED module/LED Driver/supply

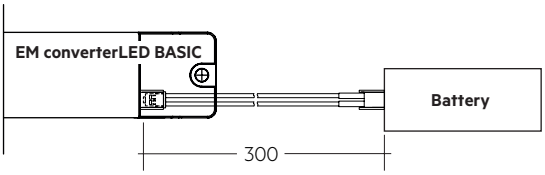


3.3 Battery connection

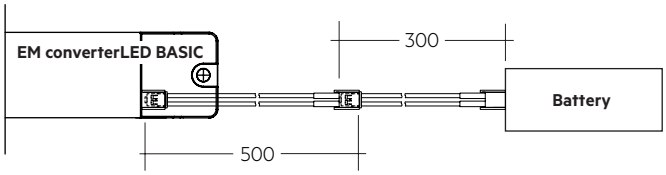
NiMH: Connection with extension



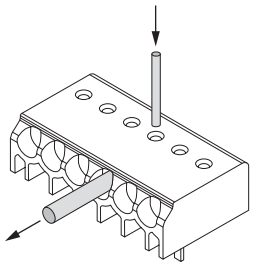
$LiFePO_4$: Direct connection



$LiFePO_4$: Connection with extension



3.4 Loose wiring



Loosen wire through twisting and pulling or using a Ø 1 mm release tool

3.5 Wiring guidelines

- The output to the LED is DC but has high frequency content, which should be considered for good EMC compliance.
- LED leads should be separated from the mains connections and wiring for good EMC performance.
- Maximum lead length on the LED 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 LED leads to prevent noise coupling.
- Battery leads are specified with 0.5 mm cross section and a length of 0.8 m
- To avoid the damage of the control gear, the wiring must be protected against short circuits to earth (sharp edged metal parts, metal cable clips, louver, etc.)

To ensure that a luminaire containing LED 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 LED leads.Through wiring may affect the EMC performance of the luminaire.

The length of LED leads must not be exceeded. Note that the length of the leads from the EM converterLED to the LED modules is added to the length of the leads from the LED Driver to the EM converterLED module when considering the max. permitted lead length of the LED Driver. Leads should always be kept short as possible.

3.6 Maximum lead length

LED	3 m
Status indication LED	1 m
Batteries	0.8 m

3.7 Use of different phases

The use of different phases for switched line and unswitched line is allowed. When using different phases, the unswitched line must fail if the switched line fails. This is required to assure correct switching into emergency mode. It can be realised with a relay.

4. Mechanical values

4.1 Housing properties

- Casing manufactured from polycarbonate.
- Type of protection: IP20

4.2 Mechanical data accessories

LED status indicator
- Green
- Mounting hole 6.5 mm dia
- Lead length 0.3 m / 0.6 m / 1.0 m
- Insulation rating: 90 °C
- Plug connection

Test switch
- Mounting hole 7.0 mm dia
- Lead length 0.55 m
- Plug connection

Battery connection
- Plug connection 0.3 m
- Optional extension 0.5 m

Two-piece batteries are supplied with a 200 mm lead with 4.8 mm receptacle at each end and insulting covers to connect the separate sticks together.

5. Electrical values

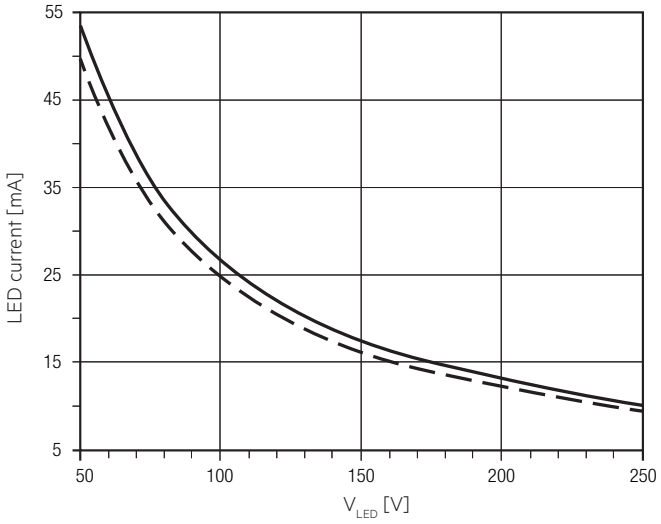
5.1 Maximum loading of automatic circuit breakers

Automatic circuit breaker type	B10	B13	B16	B20	C10	C13	C16	C20	Inrush current	
Installation Ø	1.5 mm²	1.5 mm²	1.5 mm²	2.5 mm²	1.5 mm²	1.5 mm²	1.5 mm²	2.5 mm²	I_{max}	time
EM converterLED BASIC 203 MH/LiFePO4 250V	90	130	130	130	180	260	260	260	10 A	120 µs
EM converterLED BASIC 204 MH/LiFePO4 250V	90	130	130	130	180	260	260	260	10 A	120 µs
EM converterLED BASIC 205 MH/LiFePO4 250V	90	130	130	130	180	260	260	260	10 A	120 µs

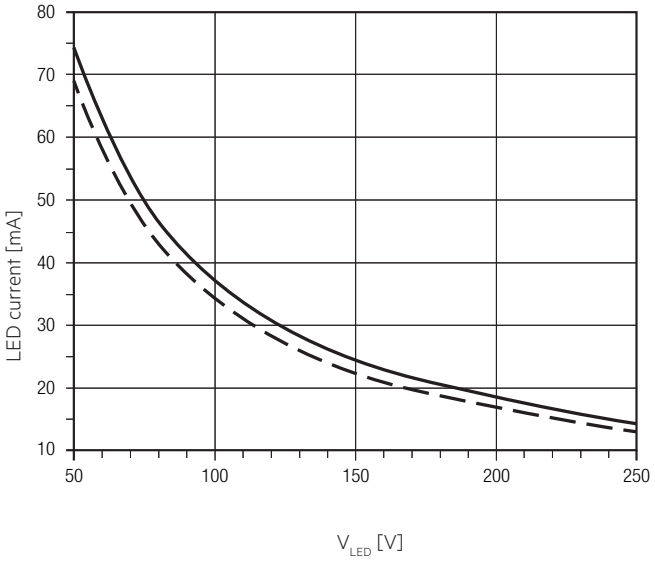
5.2 Typ. LED current/voltage characteristics

The LED current in emergency mode is automatically adjusted by the EM converterLED module based on the total forward voltage of the LED modules connected and the associated battery. The start of the LED in emergency mode does not result in a current peak.

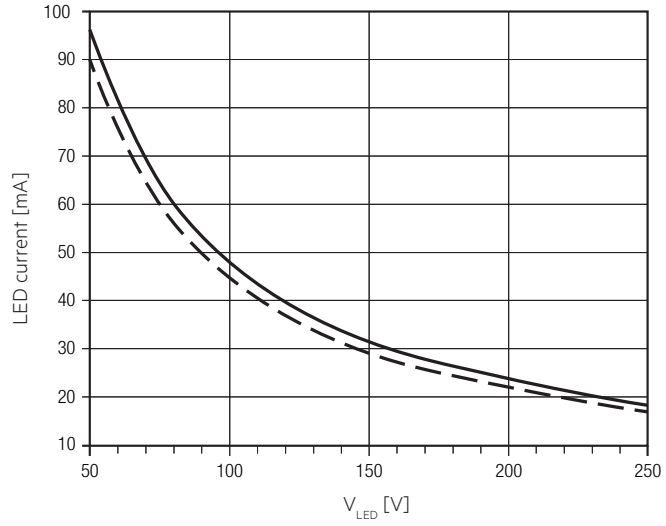
EM converterLED BASIC 203 MH/LiFePO4 250V
Article number: 89800592
NiMH batteries, 3,6 V battery voltage
840 – 900 mA battery discharge current (tolerance)
$LiFePO_4$ batteries, 3,2 V battery voltage
955 – 1025 mA battery discharge current (tolerance)



EM converterLED BASIC 204 MH/LiFePO4 250V
Article number: 89800581
NiMH batteries, 4,8 V battery voltage
850 – 910 mA battery discharge current (tolerance)
$LiFePO_4$ batteries, 3,2 V battery voltage
1350 – 1450 mA battery discharge current (tolerance)



EM converterLED BASIC 205 MH/LiFePO4 250V
Article number: 89800582
NiMH batteries, 6,0 V battery voltage
860 – 920 mA battery discharge current (tolerance)
$LiFePO_4$ batteries, 3,2 V battery voltage
1770 – 1900 mA battery discharge current (tolerance)



LED current at nominal battery voltage and min. battery discharge current

LED current at nominal battery voltage and max. battery discharge current

5.3 LED Driver compatibility

The EM converterLED emergency unit use 3 pole technology and is compatible with most LED Drivers on the market, however it is important to check that the rating of the LED Driver does not exceed the values specified below:

- The max. allowed output current rating of the associated LED Driver is 2.4 A peak (current rating of switching relays of EM converterLED)
- The max. allowed inrush current rating of the associated LED Driver is 60 A peak for 1 ms or 84 A for 255 µs (inrush current rating of switching relay of EM converterLED)
- The max. allowed output voltage of the associated LED Driver applied to the EM converterLED output is 450V (voltage withstand between adjacent contact of the single switching relay of the EM converterLED)
- The max. allowed LED load of the associated LED Driver is 150 W in operation. The load must be an LED module.

6. Functions

6.1 Duration link selection

Duration	Usage duration link
3 h	 With link
1 h	 Without link

Emergency lighting LED Driver supplied with duration link in 3 hours position.

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 converterLED 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.

7. Battery data

7.1 Battery selection

EM converterLED BASIC, 1 / 3 h

				Type	EM converterLED BASIC 203 MH/LiFePO4 250V		EM converterLED BASIC 204 MH/LiFePO4 250V		EM converterLED BASIC 205 MH/LiFePO4 250V	
				Article no.	89800592		89800581		89800582	
				Duration	1 h	3 h	1 h	3 h	1 h	3 h
Technology and capacity	Design	Number of cells	**Type**	**Article no.**	**Assignable batteries**					
NiMH 4 Ah LA cells	stick	1 x 3	**Accu-NiMH 4Ah 3A CON**	**89800441**		•				
	stick	1 x 4	**Accu-NiMH 4Ah 4A CON**	**89800442**				•		
	stick + stick	2 + 2	**Accu-NiMH 4Ah 4C CON**	**89800438**				•		
	stick + stick	2 + 3	**Accu-NiMH 4Ah 5C CON**	**89800439**						•
$LiFePO_4$ 1.5 Ah 18650 cells	stick	1 x 1	**Accu-LiFePO4 1A CON**	**28002317**						
	stick	1 x 2	**Accu-LiFePO4 2A CON**	**28002318**	•		•		•	
	stick	1 x 4	**Accu-LiFePO4 4A CON**	**28002322**		•				
	stick	1 x 5	**Accu-LiFePO4 5A CON**	**28002325**				•		
	stick	1 x 6	**Accu-LiFePO4 6A CON**	**28002328**						•
	stick + stick	2 + 2	**Accu-LiFePO4 4C CON**	**28002324**		•				
	stick + stick	2 + 3	**Accu-LiFePO4 5C CON**	**28002327**				•		
	stick + stick	3 + 3	**Accu-LiFePO4 6C CON**	**28002330**						•
	side by side	2 x 1	**Accu-LiFePO4 2B CON**	**28002319**	•		•		•	
	side by side	4 x 1	**Accu-LiFePO4 4B CON**	**28002323**		•				
	side by side	5 x 1	**Accu-LiFePO4 5B CON**	**28002326**				•		
	side by side	6 x 1	**Accu-LiFePO4 6B CON**	**28002329**						•

7.2 Battery charge / discharge data

EM converterLED BASIC, 1 / 3 h, NiMH

	Type	EM converterLED BASIC 203 MH/LiFePO4 250V		EM converterLED BASIC 204 MH/LiFePO4 250V		EM converterLED BASIC 205 MH/LiFePO4 250V	
	Article no.	89800592		89800581		89800582	
	Duration	1 h	3 h	1 h	3 h	1 h	3 h
Battery charge time	Initial charge	24 h					
	Fast recharge	24 h					
	Trickle charge	continuously					
Charging current	Initial charge	130 mA	210 mA	130 mA	210 mA	130 mA	210 mA
	Fast recharge	130 mA	210 mA	130 mA	210 mA	130 mA	210 mA
	Trickle charge	130 mA / 4 min. 0 mA / 16 min.	210 mA / 4 min. 0 mA / 16 min.	130 mA / 4 min. 0 mA / 16 min.	210 mA / 4 min. 0 mA / 16 min.	130 mA / 4 min. 0 mA / 16 min.	210 mA / 4 min. 0 mA / 16 min.
Discharge current		840 – 900 mA	840 – 900 mA	850 – 910 mA	850 – 910 mA	860 – 920 mA	860 – 920 mA

EM converterLED BASIC, 1 / 3 h, LiFePO$_4$

	Type	EM converterLED BASIC 203 MH/ LiFePO4 250V		EM converterLED BASIC 204 MH/LiFePO4 250V		EM converterLED BASIC 205 MH/ LiFePO4 250V	
	Article no.	**89800592**		**89800581**		**89800582**	
	Duration	**1 h**	**3 h**	**1 h**	**3 h**	**1 h**	**3 h**
Battery charge time	Initial charge	24 h					
	Fast recharge	24 h					
	Trickle charge	continuously and battery voltage controlled					
Charging current	Initial charge	270 mA	450 mA	270 mA	450 mA	270 mA	450 mA
	Fast recharge	270 mA	450 mA	270 mA	450 mA	270 mA	450 mA
	Trickle charge[1]	270 mA / 0 mA	450 mA / 0 mA	270 mA / 0 mA	450 mA / 0 mA	270 mA / 0 mA	450 mA / 0 mA
Discharge current		955 – 1,025 mA	955 – 1,025 mA	1,350 – 1,450 mA	1,350 – 1,450 mA	1,770 – 1,900 mA	1,770 – 1,900 mA

[1] 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 < -5 °C or > 60 °C)

7.3 Accu-NiMH

4.0 Ah

Battery voltage/cell	1.2 V
Cell type	LA
Case temperature range to ensure 4 years design life	+5 °C to +45 °C
Max. short term temperature (reduced life-time)	70 °C
Max. number discharge cycles	4 cycles per year plus 30 cycles during comissioning
Max. storage time	12 months at +5 °C to +25 °C

7.4 Accu-LiFePO4

1.5 Ah

Battery voltage/cell	3.2 V
Cell type	18650
Case temperature range to ensure	
4 years design life	+55 °C
6 years design life	+45 °C
8 years design life	+35 °C
Max. short term temperature (reduced life-time)	70 °C
Max. number discharge cycles	50 cycles total
Max. storage time	12 months at +5 °C to +25 °C

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.

7.5 Wiring batteries

To inhibit inverter operation disconnect the batteries by removing the connection at battery side.

For further informations refer to corresponding battery datasheet.

7.6 Storage, installation and commissioning

Relevant information about storage conditions, installation and commissioning are provided in the battery datasheets.

8. Miscellaneous

8.1 Additional information

Additional technical information at www.tridonic.com → Technical Data

Guarantee conditions at www.tridonic.com → Services

Life-time declarations are informative and represent no warranty claim. No warranty if device was opened.