

### EM ready2apply SELFTEST 4 W SM EM ready2apply

#### Product description

- LED emergency module suitable for surface mounted installation
- Complete set with integrated electronics, LED module, heat sink, optics and battery
- Includes click-in multi-lens option for anti-panic, escape route and spot illumination
- Emergency lighting with self-test function
- BESA compatible mounting

#### Properties

- Luminous flux 400lm
- Very low stand-by power loss
- Non-maintained variants
- 1 or 3 h rated duration (separate variants)
- Simple connection of Lithium Iron Phosphate battery with plug-in system
- White or black housing color options
- 5 years guarantee (conditions at [www.tridonic.com](http://www.tridonic.com)) electronic (LED Driver)
- 5 years guarantee for LiFePO<sub>4</sub> batteries (conditions at [www.tridonic.com](http://www.tridonic.com))



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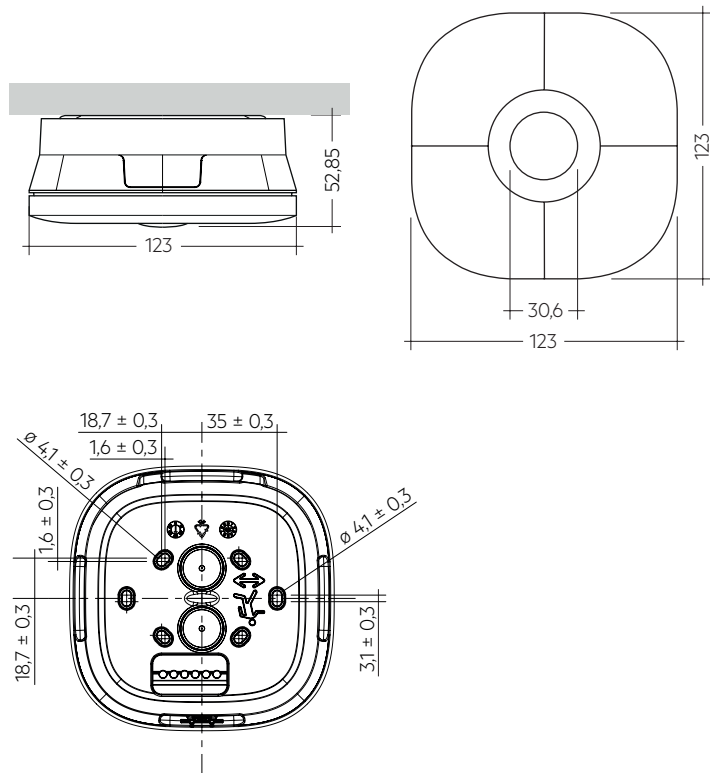
SELV      

### EM ready2apply SELFTEST 4 W SM

EM ready2apply

#### Technical data

Rated supply voltage AC	220 – 240 V
Input voltage range AC (tolerance for safety)	198 – 264 V
Input voltage range AC (tolerance for performance)	198 – 254 V
Mains frequency	50 / 60 Hz
Overvoltage protection	320 V (for 48 h)
Time to light (emergency operation)	< 0.5 s from detection of emergency event
Output current tolerance	± 5 %
LF current ripple	± 5 %
Ambient temperature $t_a$	+5 ... +40 °C
Mains voltage changeover threshold	According to EN 60598-2-22
Type of protection	IP20
Impact protection rating <sup>①</sup>	IK07
Protection class	II
Colour temperature	6,500 K
Colour tolerance	Mac Adams 3
Colour rendering index CRI	> 80
Lifetime	up to 50,000 h



#### Ordering data

Type <sup>®</sup>	Article number	Colour	Design	Rated duration	Number of cells	Packaging, carton	Packaging, pallet	Weight per pc.
EM R2A ST NM 114 SMh	89800985	White	high	1 h	2	1 pc(s).	400 pc(s).	0.274 kg
EM R2A ST NM 134 SMh	89800986	White	high	3 h	4	1 pc(s).	400 pc(s).	0.360 kg
EM R2A ST NM 114 SMh-B	89800991	Black	high	1 h	2	1 pc(s).	400 pc(s).	0.300 kg
EM R2A ST NM 134 SMh-B	89800992	Black	high	3 h	4	1 pc(s).	400 pc(s).	0.390 kg

#### Specific technical data

Type <sup>®</sup>	Number of battery cells	Rated duration	Mains current (230 V, 50 Hz), non-maintained		Mains power (230 V, 50 Hz), non-maintained		Typ. λ (at 230 V, 50 Hz, charging)	Typ. output current	Typ. forward voltage	Output power
			Charging	Charger off	Charging	Charger off				
Normal operation										
EM R2A ST NM 114 SMh	2	1 h	21 mA	11 mA	2.5 W	0.7 W	0.50c	–	–	–
EM R2A ST NM 134 SMh	4	3 h	21 mA	11 mA	2.5 W	0.7 W	0.50c	–	–	–
EM R2A ST NM 114 SMh-B	2	1 h	21 mA	11 mA	2.5 W	0.7 W	0.50c	–	–	–
EM R2A ST NM 134 SMh-B	4	3 h	21 mA	11 mA	2.5 W	0.7 W	0.50c	–	–	–
Emergency operation										
EM R2A ST NM 114 SMh	2	1 h	–	–	–	–	–	254 mA	12 V	3 W
EM R2A ST NM 134 SMh	4	3 h	–	–	–	–	–	254 mA	12 V	3 W
EM R2A ST NM 114 SMh-B	2	1 h	–	–	–	–	–	254 mA	12 V	3 W
EM R2A ST NM 134 SMh-B	4	3 h	–	–	–	–	–	254 mA	12 V	3 W

<sup>①</sup> IK rating valid for lens

<sup>®</sup> EM = Emergency

## Lithium Iron Phosphate Battery pack 3.0 – 6.0 Ah

Batteries

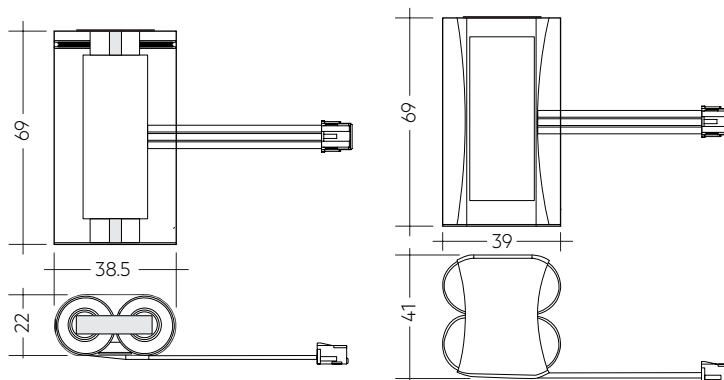
### Product description

- High temperature LiFePO<sub>4</sub> cells for use with EM ready2apply surface mounted emergency lighting units
- 6-year design life (up to 30°C ambient temperature)
- 4-year design life (up to 40°C ambient temperature)
- 3 years guarantee battery for EM R2A BASIC
- 4 years guarantee battery for EM R2A SELFTEST/PRO



### Properties

- Certified quality manufacturer
- Charge efficiency > 90 %
- Low self discharge
- Simple connection with plug-in system
- Protection and monitoring circuit built into battery sleeve
- Deep discharge protection
- Suitable for emergency lighting equipment as per IEC 60598-2-22



### Ordering data

Type	Article number	Packaging, carton	Weight per pc.
ACCU-LiFePO <sub>4</sub> 3.0Ah 2B CON R2A SM	28003554	1 pc(s).	0.09 kg
ACCU-LiFePO <sub>4</sub> 6.0Ah 2B CON R2A SM	28004233	1 pc(s).	0.18 kg

## 1. Standards

according to EN 50172  
EN 55015  
EN 60068-2-6  
according to EN 60068-2-30  
EN 60598-1  
EN 60598-2-2  
EN 60598-2-22  
EN 61000-3-2  
EN 61000-3-3  
EN 61347-1  
EN 61347-2-7  
EN 61347-2-7/A1  
EN 61347-2-13  
EN 61347-2-13/A1  
EN 61547  
according to EN 62034  
EN 62384  
EN 62386-101  
EN 62386-102  
EN 62386-202  
IEC 62133 (related to Lithium Iron battery)  
UN 38.3 (related to Lithium Iron battery)  
EN 62031  
EN 62471

### 1.1 Glow-wire test

according to EN 60598-1 with increased temperature of 850 °C passed.

## 2. Thermal data

### 2.1 Temperature range

According to the standard IEC 60598-1 a LED Driver for remote installation has a max. case temperature of 90 °C. The ambient temperature range  $t_a$  for the EM R2A ST is defined to meet this requirement.

### 2.2 Expected lifetime

Average lifetime 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 lifetime				
Type	$t_a$	25 °C	35 °C	40 °C
EM R2A ST	lifetime	> 100,000 h	> 50,000 h	50,000 h

### 2.3 Storage conditions

- Humidity: max. 60 % relative humidity not condensed

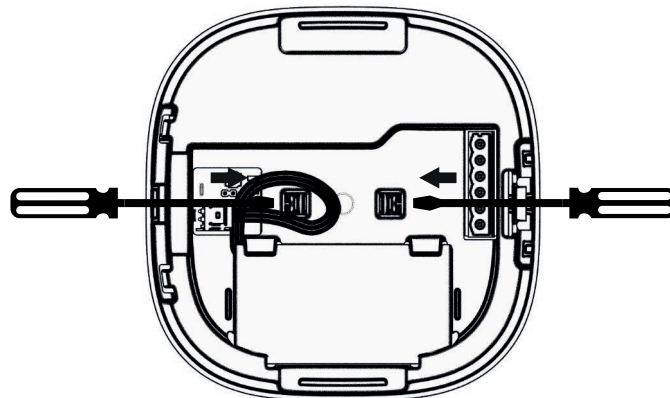
Note: The devices have to be within the specified temperature range ( $t_a$ ) before they are operated.

- Store batteries within the specified temperature range in low humidity conditions. Optimal storage conditions are:
  - Temperature: -20 ... +25 °C for up to 12 months  
-20 ... +35 °C for up to 6 months
  - Relative humidity: 65 %  $\pm$  5 %
- Avoid atmosphere with corrosive gas
- Disconnect batteries before store or delivery
- Avoid storage of discharged batteries

## 3. Installation / Wiring

### 3.1 Lens assembly

- Wear gloves when mounting the lens
- Take care of the mounting direction of the escape route lens
- Use screwdriver for replacing/removing lens
  - + 2. Push lens clips with screwdriver via openings on both sides
  3. Remove lens



### 3.2 Luminaire assembly

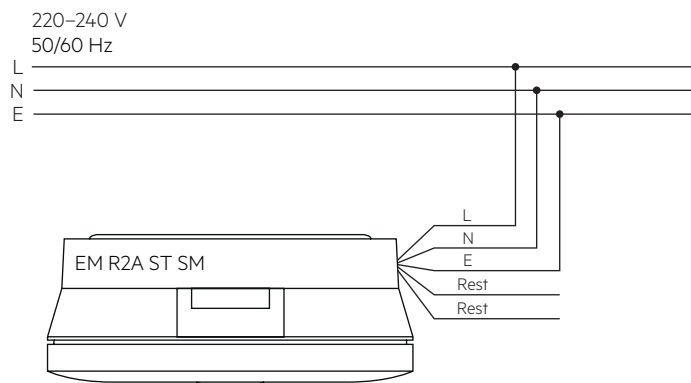
- Back box preparation:
  - For rear entry: 2 drill locations are provided for a 20 mm hole
  - For side entry (use of deep back box): 3 locations are provided for use with 20 mm cable glands.
- If required a M3 x 10 self tapping screw (not supplied) can be used to secure the front plate to the back box. Drill a 3 mm hole in the back box indent.
- Fix the back plate to the ceiling (BESA compatible mounting)  
Note: direction arrows allowing correct orientation for corridor lens.
- Change lenses if required (pre-fitted with anti panic lens)
- Wiring of the mains terminal block will require a suitable tool to open the cage clamp (size 3.5 x 0.5 mm blade)
- Plug battery into connector
- Fix front plate to back box: locating battery side tabs first, push home, a positive click will be heard when front plate is inserted correctly
- Apply power and the green charge indicator LED will be illuminated
- The deep back box has a parking facility for up to 6 Wago 2773 series connectors (not supplied) to aid through wiring cable management



When drilling prevent damage to internal components.  
Do not damage any components during battery replacement.

If an impact protecting rating of above IK03 to a max. of IK07 is required, use an M3x10 self-tapping screw for the assembly.

### 3.3 Wiring diagrams



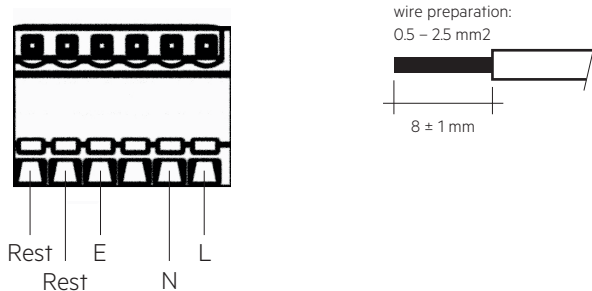
Note: Battery must be connected before mains connection.

### 3.4 Wiring type and cross-section

#### Wiring

Mains (N, L): blue, brown  
Earth terminal (E)  
Rest: orange, orange

Cable: low smoke, halogen free



The installation of the luminaire has to be done by a qualified person.

### 3.5 Earth terminal (E)

The earth terminal is a loose connection without function. Use it to connect the earth wire to prevent it being loose in the luminaire. There is no earth connection required for the functionality of the EM ready2apply.

## 5. Electrical data

### 5.1 Maximum loading of automatic circuit breakers

Automatic circuit breaker type	C10	C13	C16	C20	B10	B13	B16	B20	Inrush current	
Installation Ø	1.5 mm <sup>2</sup>	1.5 mm <sup>2</sup>	2.5 mm <sup>2</sup>	4 mm <sup>2</sup>	1.5 mm <sup>2</sup>	1.5 mm <sup>2</sup>	2.5 mm <sup>2</sup>	4 mm <sup>2</sup>	$I_{\text{max}}$	time
<b>EM R2A ST</b>	180	260	260	260	90	130	130	130	10 A	120 µs

### 5.2 Insulation matrix

	Mains	Battery	Rest
Mains	–	• •	•
Battery	• •	–	•
Rest	•	•	–

- Represents basic insulation
- • Represents double or reinforced insulation

## 4. Mechanical data

### 4.1 Housing properties

- Polycarbonate white RAL 9016
- Polycarbonate black RAL 9005

### 4.2 Battery connection

Battery pack connection  
3-pole plug connection

### 4.3 Fixing

Surface Mount with options for cable entry by BESA, rear and side entry. To minimise dust ingress used cable entry holes will be drill out. Screw holes for BESA and general mounting are oval shape to allow adjustment and are pre-drilled to simplify the final installation.

### 5.3 Battery charge regime / discharge

#### EM R2A ST 4 W SM, 1 / 3 h

	Type	EM R2A ST 4 W SM
	Article no.	89800985-86 / 89800991-92
	Cells	2 cells / 4 cells
	Duration	1 / 3 h
Battery charge time	Initial	24 h
	Recharge	24 h
	Trickle charge	continuously and battery voltage controlled
Typ. charge current <sup>®</sup>	Initial charge	320 mA
	Recharge	320 mA
	Trickle charge	320 mA / 0 mA
Discharge current at 3.2 V (nominal)		1,250 mA

<sup>®</sup> 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 < 0 °C or > 60 °C)

### 5.4 Battery selection for replacement

#### EM R2A ST 4 W, 1 / 3 h

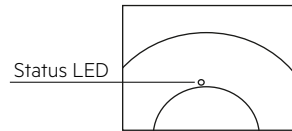
				Type	EM R2A ST NM 114	EM R2A ST NM 134
				Article no.	89800985, 89800991	89800986, 89800992
				Cells	2 cells	4 cells
				Duration	1	3 h
Technology and capacity	Design	Number of cells	Type	Article no.	Assignable batteries	
LiFePO <sub>4</sub> 3 Ah	side by side	1 + 1	ACCU-LiFePO <sub>4</sub> 3.0Ah 2B CON R2A SM	28003554	•	
LiFePO <sub>4</sub> 6 Ah	side by side	2 + 2	ACCU-LiFePO <sub>4</sub> 6.0Ah 2B CON R2A SM	28004233		•

Note: If the rated duration of operation cannot be reached the battery must be replaced. Remove mains during battery replacement.

## 6. Functions

### 6.1 Status indication

System status is indicated by a bi-colour LED. The indication LED is integrated in the bezel.



LED indication	Status	Comment
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
Slow flashing red (1 sec on – 1 sec off)	Battery failure	Battery failed the duration test or function test / Battery is defect or deep discharged / Incorrect battery voltage / Battery is outside of its temperature range for charging (0 – 60 °C)
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
Green and red off	DC mode	Battery operation (emergency mode)

### 6.2 Testing

Emergency operation can be manually tested by removal of the mains supply.

#### Commissioning test

A full commissioning test is carried out automatically after permanent connection of the supply for 5 days. 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 5 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 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.

#### Timer reset functionality

The timer for function and duration test can be set to a particular time of the day by cycling the unswitched line supply 5 times within 1 minute. The timer adjustment will enable the test start time to be defined manually at time in day when the timer was reset. It will also disable the adaptive test algorithm thereby forcing the unit to perform the test at the same time rather than it being defined by the adaptive algorithm. This function will only work provided the interval time is greater than zero (automatic test mode enabled). The delay timer value set when the unit was commissioned will be reloaded in order to randomise the tests between adjacent units.

### Rest mode

Rest mode can be initiated by applying a short pulse of between 9.5 V<sub>DC</sub> and 22.5 V<sub>DC</sub> in amplitude for a period of between 150 ms and 1.0 s. This should be applied to terminals marked Rest after the mains supply has been disconnected and whilst the module is in emergency operation. Terminals are not sensitive to polarity.

After a mains reset the EM R2A ST exits the rest mode. The EM R2A ST supports the re-light function.

Pulse/Mode	Standby	Emergency	Rest
150 – 1,000 ms	Inhibit	Rest	–
1,001 – 2,000 ms	Cancel inhibit	–	re-light

### 6.3 Technical data batteries

#### Accu Lithium Iron Phosphate

International designation	IFpR 19/66
Battery voltage/cell	3.2 V
Single cell dimensions	
Diameter	18 mm
Height	65 mm
Capacity two cell pack	3.0 Ah
Capacity four cell pack	6.0 Ah
Max. short term temperature (reduced lifetime)	70 °C
Max. number discharge cycles	50 cycles total
Packing quantity	1 pc. per carton

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.

For battery data see separate data sheet.

## 7. Optical properties

### 7.1 Anti panic

#### Max. spacing for >0.5 lux<sup>®</sup>

Height	Centre to end <sup>®</sup>		Centre to centre <sup>®</sup>	
	Trans	Axial	Trans	Axial
2.5 m	3.30	3.30	7.85	7.85
3.0 m	3.80	3.80	9.25	9.25
3.5 m	4.20	4.20	10.50	10.50
4.0 m	4.55	4.55	11.65	11.65
5.0 m	5.25	5.25	13.65	13.65
6.0 m	4.55	4.55	15.15	15.15
7.0 m	4.75	4.75	16.70	16.70
8.0 m	4.85	4.85	17.85	17.85
9.0 m	4.90	4.90	18.05	18.05
10.0 m	5.00	5.00	18.70	18.70
11.0 m	5.05	5.05	18.10	18.10
12.0 m	5.05	5.05	18.10	18.10
13.0 m	5.05	5.05	18.50	18.50
14.0 m	5.05	5.05	18.95	18.95

All values for  $t_a = 25^\circ\text{C}$

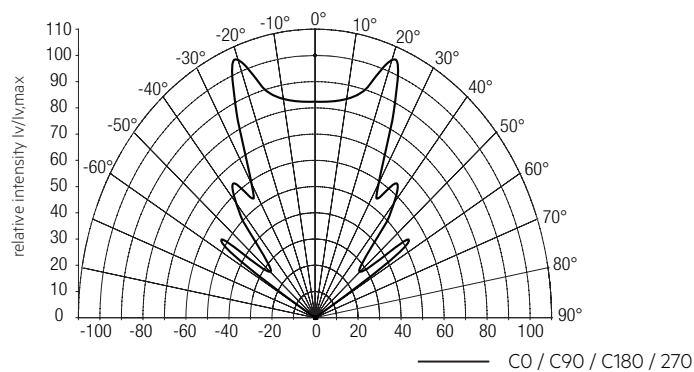
Luminous flux: 400 lm

<sup>®</sup> Maintinance factor = 0.8, photometric data available on request

<sup>®</sup> Distance between module and wall

<sup>®</sup> Distance between two modules

#### Light distribution



### 7.2 Escape route

#### Max. spacing for >1.0 lux<sup>®</sup>

Height	Centre to end <sup>®</sup>		Centre to centre <sup>®</sup>	
	Trans	Axial	Trans	Axial
2.5 m	5.50	3.15	11.95	6.95
3.0 m	6.35	3.65	13.90	8.05
3.5 m	7.00	4.00	15.70	9.00
4.0 m	7.20	4.20	17.35	9.90
5.0 m	6.95	4.05	19.15	11.25
6.0 m	7.20	2.15	20.05	10.05
7.0 m	7.40	2.30	19.70	9.35
8.0 m	7.65	2.45	20.20	8.70
9.0 m	7.80	2.55	20.55	6.25
10.0 m	7.75	2.60	21.05	6.60
11.0 m	7.55	2.65	21.55	6.90
12.0 m	7.25	2.60	21.95	7.20
13.0 m	6.75	2.40	22.15	7.35
14.0 m	6.10	2.10	21.95	7.40

All values for  $t_a = 25^\circ\text{C}$

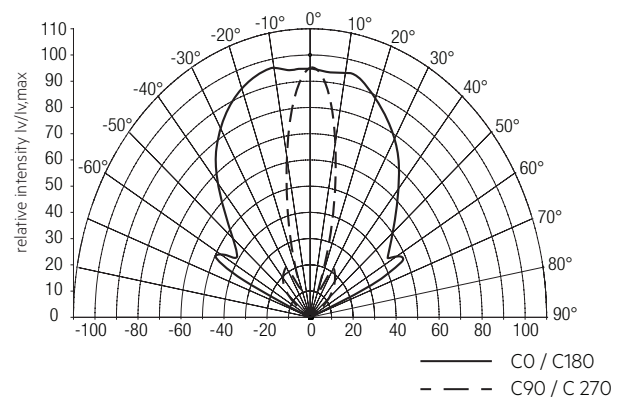
Luminous flux: 400 lm

<sup>®</sup> Maintinance factor = 0.8, photometric data available on request

<sup>®</sup> Distance between module and wall

<sup>®</sup> Distance between two modules

#### Light distribution



### 7.3 Spot

#### Max. spacing for >0.5 lux / > 5 lux<sup>®</sup>

Minimum illuminance	Height	Centre to end <sup>®</sup>		Centre to centre <sup>®</sup>	
		Trans	Axial	Trans	Axial
0.5	2.5 m	1.65	1.65	7.90	7.90
	3.0 m	1.95	1.95	7.90	7.90
	3.5 m	2.30	2.30	7.90	7.90
	4.0 m	2.60	2.60	8.05	8.05
	5.0 m	3.90	3.90	10.05	10.05
	6.0 m	3.90	3.90	12.10	12.10
	7.0 m	4.55	4.55	14.10	14.10
	8.0 m	4.35	4.35	15.10	15.10
	9.0 m	3.55	3.55	15.90	15.90
	10.0 m	3.40	3.40	16.75	16.75
	11.0 m	3.45	3.45	17.45	17.45
	12.0 m	3.55	3.55	17.80	17.80
	13.0 m	3.65	3.65	17.05	17.05
	14.0 m	3.75	3.75	16.05	16.05
5.0	2.5 m	1.40	1.40	4.70	4.70
	3.0 m	1.05	1.05	5.15	5.15
	3.5 m	1.10	1.10	5.50	5.50
	4.0 m	1.15	1.15	5.45	5.45
	5.0 m	1.25	1.25	4.95	4.95
	6.0 m	1.30	1.30	4.25	4.25
	7.0 m	1.30	1.30	4.35	4.35
	8.0 m	1.20	1.20	4.55	4.55
	9.0 m	1.15	1.15	4.75	4.75
	10.0 m	1.05	1.05	4.95	4.95
	11.0 m	0.95	0.95	5.05	5.05
	12.0 m	0.85	0.85	5.15	5.15
	13.0 m	0.60	0.60	5.10	5.10
	14.0 m	0.20	0.20	5.00	5.00

All values for  $t_a = 25^\circ\text{C}$

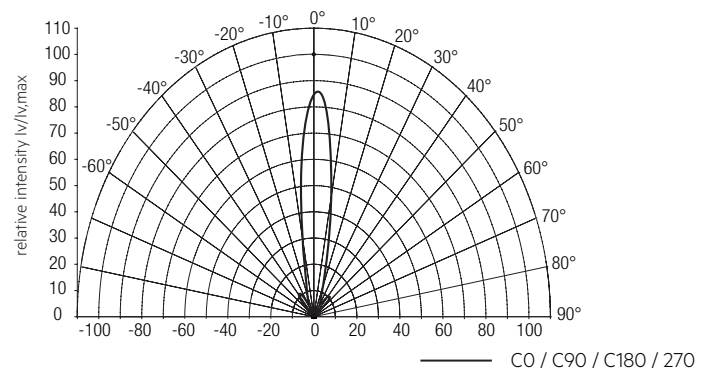
Luminous flux: 400 lm

<sup>®</sup> Maintinance factor = 0.8, photometric data available on request

<sup>®</sup> Distance between module and wall

<sup>®</sup> Distance between two modules

#### Light distribution



## **8. Miscellaneous**

### **8.1 Battery replacement**

After a battery replacement and a subsequent full charge cycle (24 h) a duration test is mandatory to prove that with the new battery the rated duration is achieved.



Do not damage battery and other components during battery replacement.

### **8.2 Black Box data recording**

Recording of several parameters only accessible for Tridonic.

### **8.3 Additional information**

Additional technical information at [www.tridonic.com](http://www.tridonic.com) → Technical Data

The light source of this luminaire is not replaceable; when the light source reaches its end of life replace the whole luminaire. Lifetime declarations are informative and represent no warranty claim. No warranty if device was opened.