TRIDONIC

EM R2A PRO 48V T

EM ready2apply



Product description

_ Self-contained emergency luminaire for 48 V Stucchi EVO track system
_ Compact design
_ Suitable for anti-panic and escape route illumination
_ Escape route lens can be re-fitted at a 90° increment
_ Emergency lighting function with DALI-2 interface and automatic test function
_ Max. installation height 6 m
_ EM = Emergency

Properties

_ White or black housing colour options
_ Non maintained operation
_ 3 h rated duration
_ Integrated status LED
_ 5 years guarantee (conditions at https://www.tridonic.com/en/int/services/manufacturer-guarantee-conditions)
_ LiFePO4 battery with up to 10 years design lifetime

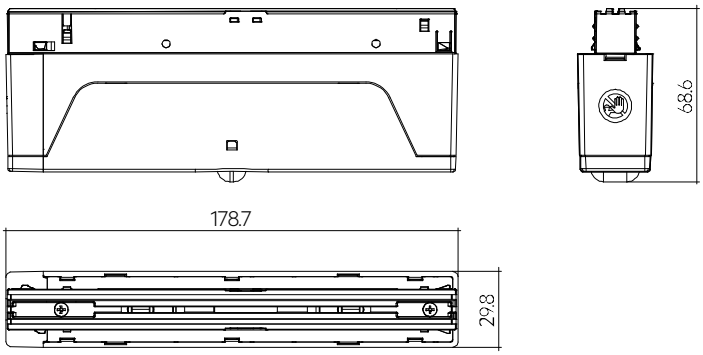
Website

http://www.tridonic.com/89801297



EM R2A PRO 48V T

EM ready2apply



Ordering data

Type	Article number	Colour	Packaging, carton	Packaging, pallet	Weight per pc.
EM R2A PRO NM 132 48V T AP	**89801297**	White	1 pc(s).	300 pc(s).	0.25 kg
EM R2A PRO NM 132 48V T AP BK	**89801305**	Black	1 pc(s).	300 pc(s).	0.25 kg
EM R2A PRO NM 132 48V T ER	**89801301**	White	1 pc(s).	300 pc(s).	0.25 kg
EM R2A PRO NM 132 48V T ER BK	**89801309**	Black	1 pc(s).	300 pc(s).	0.25 kg

Technical data

DC voltage input	48 V
DC voltage range	46 – 51 V
Mains frequency	0 Hz
Typ. current (48V, 0Hz, full load, charging)	55 mA
Typ. current (48V, 0Hz, full load, charger off)	13 mA
Max. input power	2 W
Output power	1.6 W
Typ. efficiency (full load)	43.2 %
Starting time (Emergency operation)	< 0.5 s from detection of emergency event
Output current tolerance	± 5 %
Mains voltage changeover threshold	According to EN 60598-2-22
Ambient temperature ta	5 … +40 °C
Type of protection	IP20
Impact protection degree	IK03
Protection class	III
Guarantee (conditions at www.tridonic.com)	5 Year(s)
Dimensions L x W x H	179 x 30 x 70 mm

Approval marks

DALI 2 | EL-T | CE | UKCA | RoHS

Standards

according to EN 50172, EN 55015, 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 61347-2-13, EN 61547, EN 62384, IEC 62620 (related to Lithium Iron battery), IEC 62133 (related to Lithium Iron battery), UN 38.3 (related to Lithium Iron battery), EN 62031, EN 62471, EN 62034, EN 60068-2-6, EN 62386-101, EN 62386-102, EN 62386-202, according to EN 60068-2-30

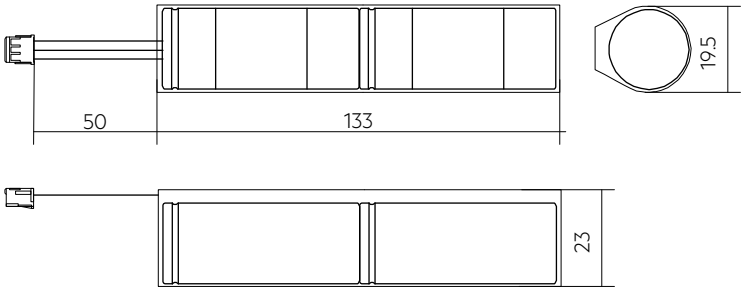
Specific technical data

Type	Number of battery cells	Rated duration	Typ. output current	Typ. forward voltage	Output power
Normal operation					
EM R2A PRO NM 132 48V T AP	2	3 h	–	–	–
EM R2A PRO NM 132 48V T AP BK	2	3 h	–	–	–
EM R2A PRO NM 132 48V T ER	2	3 h	–	–	–
EM R2A PRO NM 132 48V T ER BK	2	3 h	–	–	–
Emergency operation					
EM R2A PRO NM 132 48V T AP	2	3 h	145 mA	10.7 V	1.55 W
EM R2A PRO NM 132 48V T AP BK	2	3 h	145 mA	10.7 V	1.55 W
EM R2A PRO NM 132 48V T ER	2	3 h	145 mA	10.7 V	1.55 W
EM R2A PRO NM 132 48V T ER BK	2	3 h	145 mA	10.7 V	1.55 W

LiFePO4 Accus 3,0 Ah

Accessory





Product description
_ High temperature LiFePO4 cells for use with EM ready2apply 48V luminaires
_ Up to 10 year design life
_ 5 years guarantee (conditions at https://www.tridonic.com/en/int/services/manufacturer-guarantee-conditions)

Properties
_ Environmental friendly technology
_ High energy density
_ Constant high-temperature operation
_ Good charging properties at high temperature
_ Electronic thermal battery management
_ High energy maintenance of the charged battery
_ Long shelf life
_ Integrated electronics
_ Safety features incorporated
_ Certified quality manufacturer
_ In various configurations
_ Simple connection with plug-in system
_ Suitable for emergency lighting equipment as per IEC 60598-2-22

Website
http://www.tridonic.com/28006672

Ordering data

Type	Article number	Number of cells	Capacity	Packaging, carton	Packaging, outer box	Weight per pc.
ACCU-LiFePO4 3.0Ah 2A	**28006672**	1 x 2	3 Ah	5 pc(s).	60 pc(s).	0.095 kg

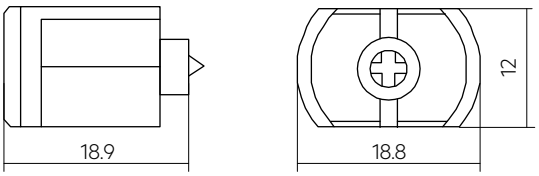
EM r2a 48V lock clip

Accessory



Product description
_ Kit with safety blocks for Multisystem EVO adapter
_ Two colour options white (RAL 9010) or black (RAL 9005)

Website
http://www.tridonic.com/28006705



Ordering data

Type	Article number	Colour	Packaging, carton	Weight per pc.
EM R2A 48V LOCK WH	**28006705**	White	50 pc(s).	0.004 kg
EM R2A 48V LOCK BK	**28006706**	Black	50 pc(s).	0.004 kg

1. Standards

according to EN 50172
EN 55015
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 61347-2-13
EN 61547
EN 62384
IEC 62620 (related to Lithium Iron battery)
IEC 62133 (related to Lithium Iron battery)
UN 38.3 (related to Lithium Iron battery)
EN 62031
EN 62471
EN 62034
EN 60068-2-6
EN 62386-101
EN 62386-102
EN 62386-202
according to EN 60068-2-30

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 ta for the EM R2A PRO 48V is defined to meet this requirement.

2.2 Expected lifetime

Average lifetime 100,000 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	ta	25 °C	30 °C	40 °C
EM R2A PRO 48V	lifetime	> 100,000 h	> 100,000 h	88,000 h

2.3 Storage conditions

- Humidity 5 % up to max. 85 %, not condensed (max. 56 days/year at 85 %)

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

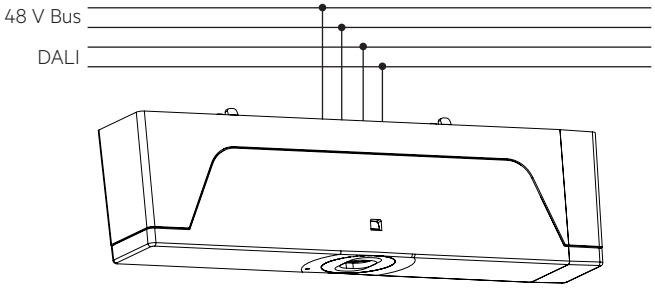
- Store batteries within the specified temperature range in low humidity conditions. Optimal storage conditions are:
  – Temperature: -20 … +35 °C for up to 15 months
  – Relative humidity: 65 % ±5 %
- Avoid atmosphere with corrosive gas
- Disconnect batteries before store or delivery
- Avoid storage of discharged batteries

3. Installation / Wiring



Emergency luminiare – not to be adjusted by unauthorised persons

3.1 Wiring diagram



EM R2A PRO 48V T

Note: Battery must be connected before mains connection.

3.2 Installation

- Remove the end cap.
- Connect the battery plug to the socket on the luminaire.
- Reinsert the end cap.
- Insert the luminaire into the track:
  Align the luminaire's adapter with the track.
  Push the luminaire into place.
  Note: On EM r2a 48V ER version allign lens to the escape route if necessary by rotating the lens. Details see „Lens rotation".
- Install the locking clips (if necessary):
  Insert a locking clip into the track on both sides of the luminaire.
  Rotate the clip body 90° until it lies flat in its final position.
  Use a Philips screwdriver to tighten the screw until the clip cannot move.
  Repeat this step for the second locking clip.

3.2.1 Removal

- Remove the end cap.
- Insert flat-head screwdriver into locking screw on adapter and rotate to release adapter while pulling.

3.2.2 Lens rotation

- Release the lens-locking clips on both sides using a small screwdriver.
- Pull the locking clip and lens out of the luminaire.
- Rotate the lens 90° as required and reinsert it into the luminaire.
- Clean the lens with a soft cloth after adjusting to avoid trapped dirt.

3.2.3 Battery maintenance

- Remove the luminaire from the track.
- Disconnect the battery plug from the socket on the luminaire.
- Slide out the battery.
- Insert the new battery.
- Reconnect the battery plug to the socket on the luminaire.
- Reinsert the end cap.
- Reinstall the luminaire into the track and secure it with the locking clips.

3.3 Compatible track adapter

Adapters are pre-fitted on EM R2A 48V T:
EVO Adapter (Pre Fitted)
9529-166-M/B-E (black)
9529-166-M/W-E (white)

Compatible EVO Tracks:
9500-_ / _ - ST1-E
9500-_ / _ - ST3-E
9500-_ / _ - ST6-E
9500-_ / _ - ST7-E
9500-_ / _ - ST8-E
9500-_ / _ - ST13-E
9500-_ / _ - ST15-E

3.4 Suggested AC / DC driver

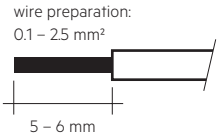
Article number	Type name
28005711	LC 220W 48V DS L
28005712	LC 440W 48V DS L
28005713	LC 660W 48V DS L

U_{OUT} for the AC/DC driver must be 48 V DC.

The track must be powered by a SELV-compliant device on both the 48V and DALI lines.

3.5 Terminals

For wiring use stranded wire with ferrules or solid wire from 0.1 – 2.5 mm².
For perfect function of the push-wire terminals (WAGO 256) the strip length should be 5 – 6 mm.



Use one wire for each terminal connector only.
Use each strain relief channel for one cable only.

4. Mechanical data

4.1 Housing properties

- Polycarbonate white RAL 9016
- Polycarbonate black RAL 9005

4.2 Battery connection

Battery pack connection
Simple connection with plug-in system (polarity reversal protection)

Module connection
Insert the battery in the designated position in the luminaire, plug the connector into the EM ready2apply 48V and attach the end cap.

5. Electrical data

5.1 Insulation matrix

	Mains	Battery
Mains	–	• •
Battery	• •	–

- • Represents basic insulation
- • • Represents double or reinforced insulation

DALI supply must be basic insulation minimum.

5.2 Battery charge regime / discharge

EM R2A PRO 48V, 3 h

	Type	**EM R2A PRO 48V**
	Article no.	**89801297, 89801301 89801305, 89801309**
	Cells	**2 cell**
	Duration	**3 h**
Battery charge time	Initial	20 h
	Recharge	20 h
	Trickle charge	continuously and battery voltage controlled
Typ. charge current[1]	Initial charge	270 mA
	Recharge	270 mA
	Trickle charge	270 mA / 0 mA
Mains power consumption	Initial charge	1.99 W
	Recharge	1.99 W
	Trickle charge	1.99 W / 0 W
Discharge current at 3.2 V (nominal)		610 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 < 0 °C or > 60 °C)

5.3 Battery selection for replacement

EM R2A PRO 48V, 3 h

				Type	**EM R2A PRO 48V**
				Article no.	**89801297, 89801301 89801305, 89801309**
				Cells	**2 cell**
				Duration	**3 h**
Technology and capacity	Design	Number of cells	**Type**	**Article no.**	**Assignable batteries**
Lithium Iron Phosphate 3.0 Ah	stick	2	**ACCU-LiFePO4 3.0Ah 2A**	**28006672**	•

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

6. Interfaces / communication

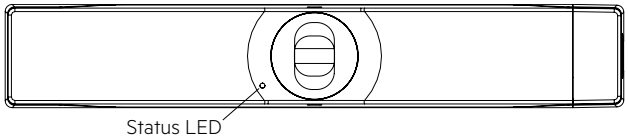
6.1 Control input (DALI DT1)

The control input is non-polar for digital control signals (DALI).

7. Functions

7.1 Status indication

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



LED indiction	Status	Comment
Permanent green	System OK	DC 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	DALI Inhibit	Switching into DALI 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)

7.2 Testing

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

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 R2A PRO 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 52 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 R2A PRO does not revert to self-testing mode.

Note: If the battery is connected the DALI communication is only possible after power reset.

Addressing
The EM R2A PRO includes the EZ easy addressing system which allows addressing and identification by using the bi-colour LED. 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 LEDs will be switched off and the indication 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 R2A PRO 48V 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 52 weeks.

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.

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.
Indicator LED will stay off for the duration of the prolong time.

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. After a mains reset the EM R2A PRO 48V exits the rest mode. EM R2A PRO 48V supports the re-light command via the DALI bus.
Max. rest mode duration: 21 days from fully charged battery

DALI Controller
DALI controllers and hardware/software solutions are available from Tridonic. Please refer to the Lighting controls section.

7.3 Technical data batteries

Accu Lithium Iron Phosphate

Capacity 3.0 Ah

International designation	IFpR 19/66
Battery voltage/cell	3.2 V
Cell type	18650
Single cell dimensions	
Diameter	18 mm
Height	65 mm
Max. short term temperature (reduced lifetime)	70 °C
Max. number discharge cycles	50 cycles total
Max. storage time	15 months at -20 °C to +25 °C
Packing quantity	1 pc. per carton

Only use Tridonic batteries.

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.

8. Optical properties

8.1 Anti panic

EM R2A PRO 48V – Max. spacing for >0.5 lux[1]

Height	Centre to end[2]		Centre to centre[3]	
	Trans	Longitudinal	Trans	Longitudinal
2.0 m	3.45 m	3.45 m	9.80 m	9.80 m
2.5 m	3.80 m	3.80 m	11.05 m	11.05 m
3.0 m	4.15 m	4.10 m	12.10 m	12.05 m
3.5 m	4.40 m	4.35 m	12.95 m	12.95 m
4.0 m	4.60 m	4.60 m	13.80 m	13.75 m
5.0 m	4.80 m	4.75 m	15.20 m	15.15 m
6.0 m	2.80 m	2.95 m	16.40 m	16.40 m

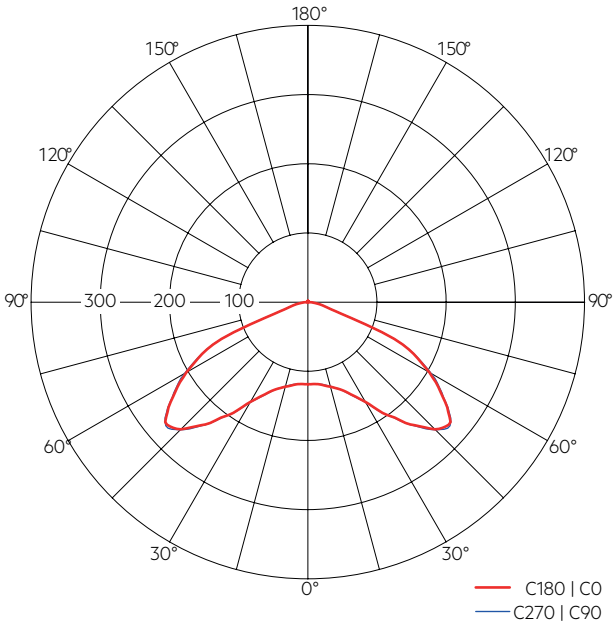
Luminous flux: 212 lm.

[1] Maintainance factor = 0.80, photometric data available on request.

[2] Distance between module and wall.

[3] Distance between two modules.

Light distribution



8.2 Escape route

EM R2A PRO 48V – Spacing data for 2m escape route[1]

Height	Centre to end[2]		Centre to centre[3]	
	Max. spacing	Diversity	Max. spacing	Diversity
Transversal > 1 lux				
2.0 m	1.20 m	0.102	3.70 m	0.097
2.5 m	1.25 m	0.159	3.55 m	0.151
3.0 m	1.35 m	0.229	3.35 m	0.218
3.5 m	1.45 m	0.306	3.55 m	0.291
4.0 m	1.45 m	0.415	3.70 m	0.305
5.0 m	1.25 m	0.622	4.10 m	0.594
6.0 m	0.65 m	0.904	4.05 m	0.829
Longitudinal > 1 lux				
2.0 m	6.75 m	0.099	16.45 m	0.100
2.5 m	7.35 m	0.156	18.10 m	0.156
3.0 m	7.80 m	0.225	19.55 m	0.223
3.5 m	7.20 m	0.307	20.70 m	0.303
4.0 m	6.80 m	0.402	21.65 m	0.393
5.0 m	6.00 m	0.621	20.35 m	0.588
6.0 m	2.05 m	0.898	19.05 m	0.784

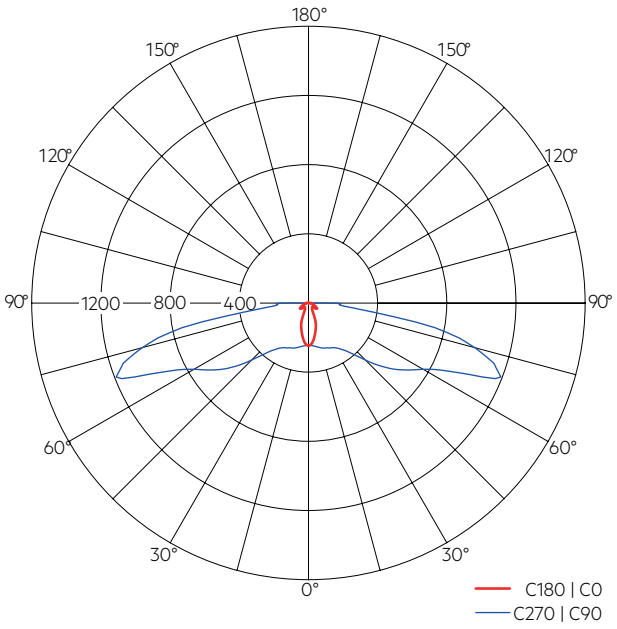
Luminous flux: 206 lm.

[1] Maintainance factor = 0.80, photometric data available on request.

[2] Distance between module and wall.

[3] Distance between two modules.

Light distribution



9. Miscellaneous

9.1 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.

9.2 Black Box data recording

Recording of several parameters only accessable for Tridonic.

9.3 Additional information

Additional technical information at 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.