

LLE G2 premium system

LLE premium system



Product description

- _ Linear Tunable White system with adjustable colour temperature from 2,700 to 6,500 K at constant luminous flux
- _ Precalibrated set to ensure light quality and high colour consistency, consisting of linear low-profile LED driver and 3 to 6 LED modules (700 lm) or 2 to 6 LED modules (1,500 lm) ^①
- _ High colour rendering index CRI > 90
- _ Outstanding system colour tolerance
- _ High system efficacy up to 126 lm/W at tp = 65 °C
- _ Linear LED modules with 700 or 1,500 lm
- _ Dimming range 3 – 100 % without change of colour temperature
- _ Long lifetime of 50,000 h and 5 years system guarantee (conditions at

<https://www.tridonic.com/en/int/services/manufacturer-guarantee-conditions>)

Interfaces

- _ one4all (DALI DT8, DSI, switchDIM, corridorFUNCTION V2)
- _ colourSWITCH
- _ Push terminals for simple wiring

Functions

- _ Constant light output function (CLO)
- _ colourSWITCH with predefined colours
- _ switchDIM and colourSWITCH with memory function
- _ Power-up fading and fade2zero
- _ Configurable via DALI
- _ Protective features (overtemperature, short-circuit, overload, no-load, reduced surge amplification)
- _ Suitable for emergency escape lighting systems acc. to EN 50172

Typical applications

- _ For linear lighting in office applications
- _ Tunable white application

^① Mixing of components from different sets is not allowed due to the pre-calibration of the system.

Website

<http://www.tridonic.com/89602931>



Linear



High bay



Decorative



Downlights



Spotlights



Free-standing



Area



Floor | Wall



Street

LLE G2 premium system
LLE premium system

Ordering data

| Type | Article number | System components |
|---|----------------|--|
| LLE G2 24X280MM 3X700LM 927-965 LV PRE | 89602931 | LCA 50W PRE + 3 LED modules at 700 lm |
| LLE G2 24X280MM 4X700LM 927-965 LV PRE | 89602932 | LCA 50W PRE + 4 LED modules at 700 lm |
| LLE G2 24X280MM 5X700LM 927-965 LV PRE | 89602933 | LCA 50W PRE + 5 LED modules at 700 lm |
| LLE G2 24X280MM 6X700LM 927-965 LV PRE | 89602934 | LCA 50W PRE + 6 LED modules at 700 lm |
| LLE G2 24X280MM 2X1500LM 927-965 LV PRE | 89602935 | LCA 50W PRE + 2 LED modules at 1,500 lm |
| LLE G2 24X280MM 3X1500LM 927-965 LV PRE | 89602936 | LCA 50W PRE + 3 LED modules at 1,500 lm |
| LLE 24X280MM 4X1500LM 927-965 LV PRE2 | 28003303 | LCA 85W PRE + 4 LED modules at 1,500 lm |
| LLE 24X280MM 5X1500LM 927-965 LV PRE2 | 28003304 | LCA 85W PRE + 5 LED modules at 1,500 lm |
| LLE G2 24X280MM 6X1500LM 927-965 LV PRE | 89602939 | LCA 100W PRE + 6 LED modules at 1,500 lm |

Specific technical data

| Type | Useful luminous flux at $t_p = 25\text{ }^\circ\text{C}$ | Expected luminous flux at t_p rated ^② | Power consumption P_{con} at $t_p = 25\text{ }^\circ\text{C}$ | Colour rendering index CRI | Energy classification |
|---|--|--|---|----------------------------|-----------------------|
| 700 lm module | | | | | |
| LLE G2 24X280MM 3X700LM 927-965 LV PRE | 2,220 lm | 2,100 lm | 19.3 W | >90 | A+ |
| LLE G2 24X280MM 4X700LM 927-965 LV PRE | 2,960 lm | 2,800 lm | 24.8 W | >90 | A+ |
| LLE G2 24X280MM 5X700LM 927-965 LV PRE | 3,700 lm | 3,500 lm | 30.1 W | >90 | A+ |
| LLE G2 24X280MM 6X700LM 927-965 LV PRE | 4,440 lm | 4,200 lm | 36.1 W | >90 | A+ |
| 1,500 lm module | | | | | |
| LLE G2 24X280MM 2X1500LM 927-965 LV PRE | 3,170 lm | 3,000 lm | 26.9 W | >90 | A+ |
| LLE G2 24X280MM 3X1500LM 927-965 LV PRE | 4,760 lm | 4,500 lm | 38.6 W | >90 | A+ |
| LLE 24X280MM 4X1500LM 927-965 LV PRE2 | 6,340 lm | 6,000 lm | 48.1 W | >90 | A+ |
| LLE 24X280MM 5X1500LM 927-965 LV PRE2 | 7,920 lm | 7,500 lm | 59.7 W | >90 | A+ |
| LLE G2 24X280MM 6X1500LM 927-965 LV PRE | 9,510 lm | 9,000 lm | 77.1 W | >90 | A+ |

② Tolerance range for optical data over the CCT range: $\pm 5\%$.

③ Tolerance range for electrical data: $\pm 5\%$.

LINEAR COVER LLE

Accessory

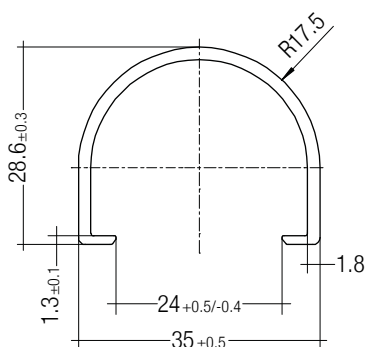


Product description

- _ LINEAR COVER for LLE
- _ Protection against direct touch for non-SELV applications (recommendation LLE 20: use all fixing points and screwed Endcap, recommendation LLE 24: use all fixing points)
- _ Fast snap on mounting on to LLE 20: with M4 screws and plastic washers, to LLE 24: with clips or plastic washers
- _ High transmission: transparent, semi-transparent and diffuse
- _ Material: PMMA
- _ Tolerances: ± 1 mm for 597 mm length (ends finished), + 10 mm from length 1,150 mm (ends raw)

Website

<http://www.tridonic.com/28000338>



Ordering data

| Type | Article number | Colour | Length L | Efficiency | Packaging, carton | Weight per pc. |
|------------------------------------|----------------|------------------|----------|------------|-------------------|----------------|
| LINEAR COVER SY Transparent 1600mm | 28000338 | Transparent | 1,600 mm | 94 % | 12 pc(s). | 0.272 kg |
| LINEAR COVER SY Frosted 1800mm | 28000437 | Semi-transparent | 1,800 mm | 87 % | 12 pc(s). | 0.308 kg |
| LINEAR COVER SY Frosted 1600mm | 28000339 | Semi-transparent | 1,600 mm | 87 % | 12 pc(s). | 0.272 kg |
| LINEAR COVER SY Frosted 1500mm | 28000435 | Semi-transparent | 1,500 mm | 87 % | 12 pc(s). | 0.244 kg |
| LINEAR COVER SY Frosted 1200mm | 28000422 | Semi-transparent | 1,200 mm | 87 % | 12 pc(s). | 0.205 kg |
| LINEAR COVER SY Frosted 597mm | 28000340 | Semi-transparent | 597 mm | 87 % | 12 pc(s). | 0.102 kg |
| LINEAR COVER SY Diffuse 1800mm | 28000438 | Diffuse | 1,800 mm | 76 % | 12 pc(s). | 0.308 kg |
| LINEAR COVER SY Diffuse 1600mm | 28000341 | Diffuse | 1,600 mm | 76 % | 12 pc(s). | 0.272 kg |
| LINEAR COVER SY Diffuse 1500mm | 28000436 | Diffuse | 1,500 mm | 76 % | 12 pc(s). | 0.257 kg |
| LINEAR COVER SY Diffuse 1200mm | 28000434 | Diffuse | 1,200 mm | 76 % | 12 pc(s). | 0.205 kg |
| LINEAR COVER SY Diffuse 597mm | 28000342 | Diffuse | 597 mm | 76 % | 12 pc(s). | 0.102 kg |

ACL ENDCAP LLE

Accessory

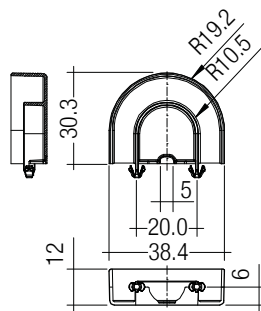


Product description

- _ ENDCAP for LLE
- _ PUSH-FIX: Fast snap on mounting (sheet thickness 0.5 – 1.0 mm), for drilling hole 4 mm
- _ SCREW-FIX: Screw mounting with EJOT Delta PT WN 5451 30x8 (not included), tightening torque 0.7 Nm
- _ Clip made of polycarbonate

Website

<http://www.tridonic.com/28001037>



Ordering data

| Type | Article number | Colour | Packaging, carton | Weight per pc. |
|----------------------------|----------------|--------|-------------------|----------------|
| ACL ENDCAP LLE24 PUSH-FIX | 28001037 | White | 480 pc(s). | 0.003 kg |
| ACL ENDCAP LLE24 SCREW-FIX | 28002315 | White | 480 pc(s). | 0.003 kg |

ACL LINEAR LENS 24mm

Accessory



Product description LINEAR LENS

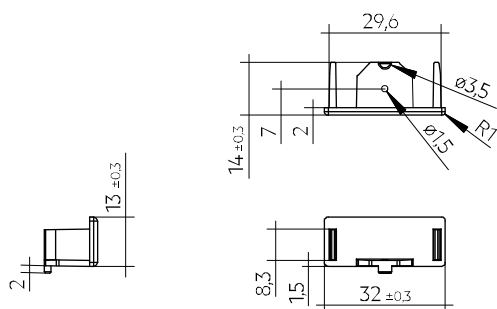
- _ Linear lens for LLE 20 / 24
- _ Available with different beam characteristics
- _ Protection against direct touch for non-SELV applications (recommendation: use all fixing points)
- _ Fast snap on mounting on to LLE 20: with M4 screws and plastic washers, to LLE 24: with clips or plastic washers
- _ Recommendation: Fastening with screws and plastic washers, see 2.3 Heat sink specifications in data sheet
- _ Material: PMMA
- _ Available lengths: 1,200, 1,500 and 1,800 mm, Tolerance: + 10 mm (ends raw)
- _ Max. permissible temperature 80 °C
- _ Photometric data available on website

Product description Endcap

- _ ENDCAP for LINEAR LENS 24mm INTENSE, ASY and DASY
- _ Mounting by clipping in and screwing from below using screw EJOT Delta PT WN 5451 20x4, tightening torque 0.7 Nm
- _ Made of Polyamide UL94 V0

Website

<http://www.tridonic.com/28001428>



Ordering data

| Type | Article number | Length L | Beam characteristic | Efficiency | Packaging, carton | Weight per pc. |
|-----------------------------------|----------------|----------|---------------------|------------|-------------------|----------------|
| ACL LINEAR LENS 24x1200mm 60° | 28001428 | 1,200 mm | 60° | 97 % | 21 pc(s). | 0.196 kg |
| ACL LINEAR LENS 24x1200mm 90° | 28001429 | 1,200 mm | 90° | 97 % | 21 pc(s). | 0.165 kg |
| ACL LINEAR LENS 24x1500mm 60° | 28000953 | 1,500 mm | 60° | 97 % | 21 pc(s). | 0.261 kg |
| ACL LINEAR LENS 24x1500mm 90° | 28000955 | 1,500 mm | 90° | 97 % | 21 pc(s). | 0.221 kg |
| ACL LINEAR LENS 24x1200mm INTENSE | 28002024 | 1,200 mm | 40° | 95 % | 18 pc(s). | 0.261 kg |
| ACL LINEAR LENS 24x1500mm INTENSE | 28002025 | 1,500 mm | 40° | 95 % | 18 pc(s). | 0.326 kg |
| ACL LINEAR LENS 24x1800mm INTENSE | 28002026 | 1,800 mm | 40° | 95 % | 18 pc(s). | 0.392 kg |
| ACL LINEAR LENS 24x1200mm BATWING | 28002027 | 1,200 mm | batwing | 95 % | 18 pc(s). | 0.275 kg |
| ACL LINEAR LENS 24x1500mm BATWING | 28002028 | 1,500 mm | batwing | 95 % | 18 pc(s). | 0.344 kg |
| ACL LINEAR LENS 24x1800mm BATWING | 28002029 | 1,800 mm | batwing | 95 % | 18 pc(s). | 0.412 kg |
| ACL LINEAR LENS 24x1200mm ASY | 28002030 | 1,200 mm | asymmetric | 95 % | 18 pc(s). | 0.250 kg |
| ACL LINEAR LENS 24x1500mm ASY | 28002031 | 1,500 mm | asymmetric | 95 % | 18 pc(s). | 0.312 kg |
| ACL LINEAR LENS 24x1800mm ASY | 28002032 | 1,800 mm | asymmetric | 95 % | 18 pc(s). | 0.375 kg |
| ACL LINEAR LENS 24x1200mm DASY | 28002033 | 1,200 mm | double asymmetric | 92 % | 18 pc(s). | 0.249 kg |
| ACL LINEAR LENS 24x1500mm DASY | 28002034 | 1,500 mm | double asymmetric | 92 % | 18 pc(s). | 0.311 kg |
| ACL LINEAR LENS 24x1800mm DASY | 28002035 | 1,800 mm | double asymmetric | 92 % | 18 pc(s). | 0.373 kg |
| ACL Endcap LENS 24mm PSF | 28002669 | - | - | - | 3,600 pc(s). | 0.003 kg |

ACL CLIP 4.3mm

Accessory

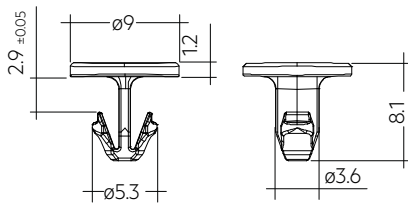


Product description

- _ Clip for fixation of LED modules with 4.3 mm holes
- _ Fast snap on mounting (sheet thickness 0.5 – 1.0 mm for PUSH-FIX and 1 – 2 mm for PUSH-FIX Long)
- _ For drilling hole 4 mm
- _ Clip made of polycarbonate
- _ Minimum sales quantity 500 pcs.

Website

<http://www.tridonic.com/28001036>



Ordering data

| Type | Article number | Colour | Packaging, bag ^① | Weight per pc. |
|------------------------------|----------------|-------------|-----------------------------|----------------|
| ACL CLIP 4.3mm PUSH-FIX | 28001036 | White | 500 pc(s). | 0.001 kg |
| ACL CLIP 4,3mm PUSH-FIX Long | 28002314 | Transparent | 500 pc(s). | 0.001 kg |

① Minimum sales quantity 500 pcs.

Module LLE G2 premium

Product description

1. Standards

EN 61000-4-6
EN 61347-1
EN 61547
EN 62031
EN 62471
EN 62778

1.1 Photometric code

Key for photometric code, e. g. 930 / 349

| 1 st digit | 2 nd + 3 rd digit | 4 th digit | 5 th digit | 6 th digit |
|-----------------------|---|-----------------------|---|---|
| Code CRI | Colour temperature in Kelvin x 100 | MacAdam initial | MacAdam after 25% of the lifetime (max.6000h) | Luminous flux after 25% of the lifetime (max.6000h) |
| 7 70 – 79 | | | | Code Luminous flux |
| 8 80 – 89 | | | | 7 ≥ 70 % |
| 9 ≥90 | | | | 8 ≥ 80 % 9 ≥ 90 % |

2. Thermal details

2.1 tc point, ambient temperature and lifetime

The temperature at tp reference point is crucial for the light output and lifetime of a LED product.

For LLE a tp temperature of 65°C has to be complied in order to achieve an optimum between heat sink requirements, light output and lifetime.

Compliance with the maximum permissible reference temperature at the tc point must be checked under operating conditions in a thermally stable state. The maximum value must be determined under worst-case conditions for the relevant application.

The tc and tp temperature of LED modules from Tridonic are measured at the same reference point.

2.2 Storage and humidity

| | |
|---------------------|---------------|
| Storage temperature | -30... +80 °C |
|---------------------|---------------|

Operation only in non condensing environment.
Humidity during processing of the module should be between 30 to 70 %.

2.3 Thermal design and heat sink

The rated life of LED products depends to a large extent on the temperature. If the permissible temperature limits are exceeded, the life of the LLE will be greatly reduced or the LLE may be destroyed.

Therefore the LLE needs to be mounted onto a heat sink.

Tridonic's excellent thermal design for the LED products provides the lowest thermal resistance and therefore allowing new compact designs without sacrificing quality, safety and lifetime.

2.4 Heat sink values

TW LLE G2 24x280MM 700LM 927-965 PRE

| ta | tp | Forward current | R _{th, hs-a} | Cooling area |
|-------|-------|-----------------|-----------------------|---------------------|
| 25 °C | 65 °C | 125 mA | 11.8 K/W | 57 cm ² |
| 35 °C | 65 °C | 125 mA | 8.8 K/W | 75 cm ² |
| 45 °C | 65 °C | 125 mA | 5.9 K/W | 113 cm ² |
| 55 °C | 65 °C | 125 mA | 2.9 K/W | 226 cm ² |

TW LLE G2 24x280MM 1500LM 927-965 PRE

| ta | tp | Forward current | R _{th, hs-a} | Cooling area |
|-------|-------|-----------------|-----------------------|---------------------|
| 25 °C | 65 °C | 275 mA | 5.2 K/W | 128 cm ² |
| 35 °C | 65 °C | 275 mA | 3.9 K/W | 171 cm ² |
| 45 °C | 65 °C | 275 mA | 2.6 K/W | 256 cm ² |
| 55 °C | 65 °C | 275 mA | 1.3 K/W | 514 cm ² |

Notes

These values apply to a single LED module.
The actual cooling surface can differ because of the material, the structural shape, outside influences and the installation situation. The LED modules must rest flat on the heat sink.

3. Installation / wiring

3.1 Electrical supply/choice of LED driver

LLE modules must be operated with SELV LED drivers.

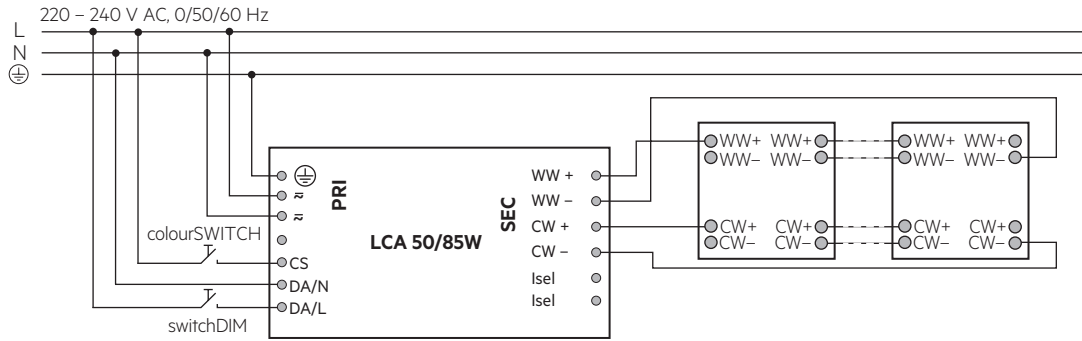


LLE modules are basic insulated up to 60 V SELV against ground and can be mounted directly on earthed metal parts of the luminaire. If the max. output voltage of the LED driver (also against earth) is above 60 V SELV, an additional insulation between LED module and heat sink is required (for example by insulated thermal pads) or by a suitable luminaire construction.

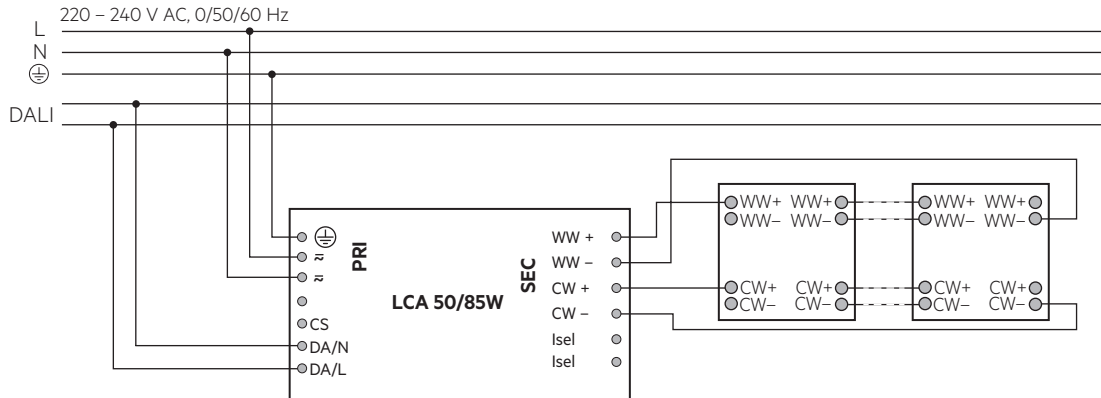
At voltages > 60 V an additional protection against direct touch (test finger) to the light emitting side of the module has to be guaranteed. This is typically achieved by means of a non removable light distributor over the module.

3.2 Wiring

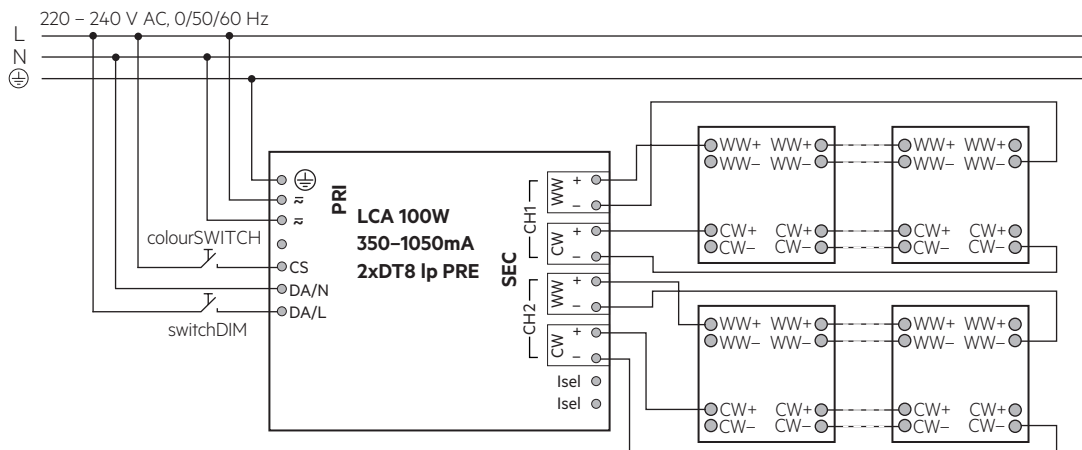
Wiring diagram for switchDIM and colourSWITCH for LLE premium (700lm: 3 to 6 modules, 1500lm: 2 to 5 modules)



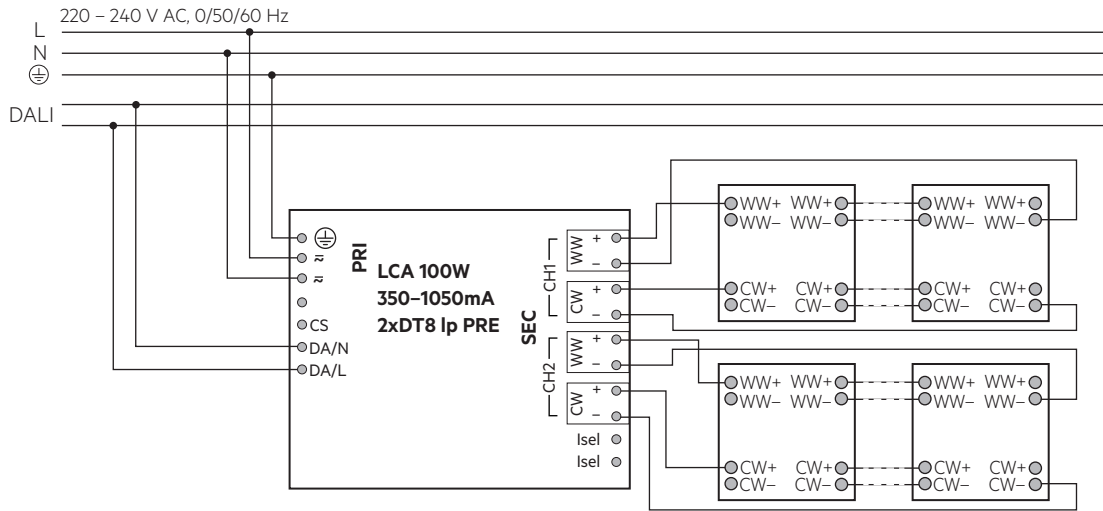
Wiring diagram for DALI for LLE premium (700lm: 3 to 6 modules, 1500lm: 2 to 5 modules)



Wiring diagram for switchDIM and colourSWITCH for LLE premium (1500lm: 6 modules)



Wiring diagram for DALI for LLE premium (1500lm: 6 modules)

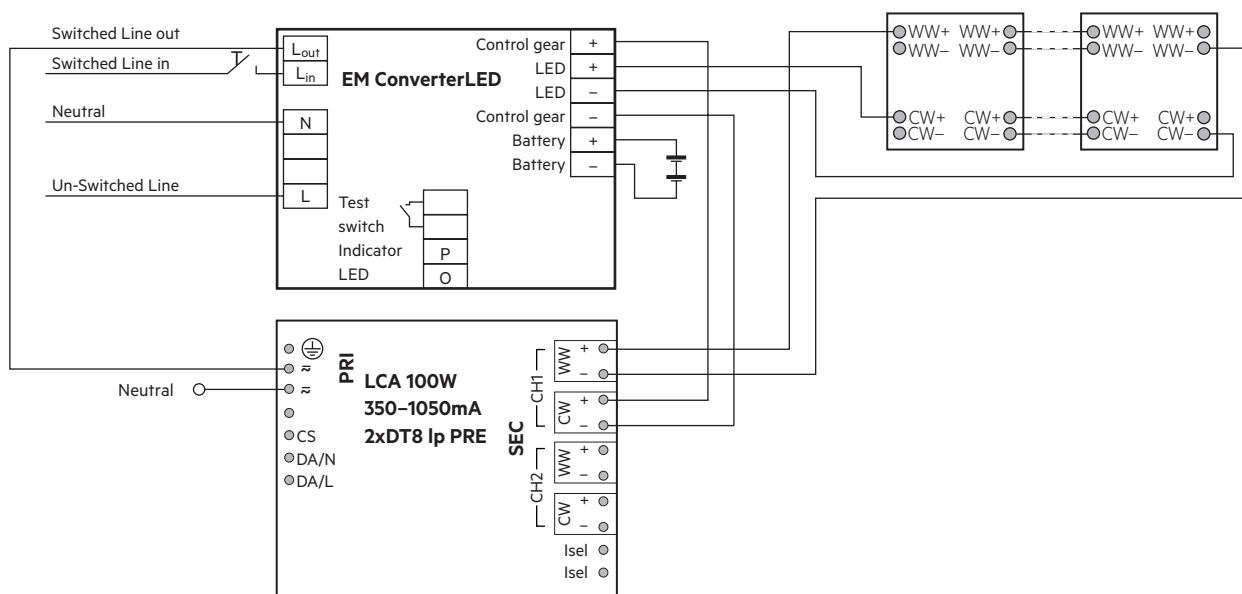


! Mixing of components from different sets is not allowed due to the pre-calibration of the system. With the LCA 100W 350 – 1050mA 2xDT8 Ip PRE connect the module according to the label information of the LED driver.

Type: LLE G2 24X280MM 6X1500LM 927-965 LV PRE
Art. No.: 89609999 **CCT:** 2700 - 6500K
System Batch: 875682 **Module Batch:** 655728
Channel 1: **Use only with matching LED!**
Module Nr.: 101.20/120.20/103.20/106.31/105.31/555.40/
 558.40/555.38/556.11/556.14
Channel 2:
Module Nr.: 105.23/122.22/105.10/104.21/108.21/556.41/
 548.30/455.38/546.11/546.18

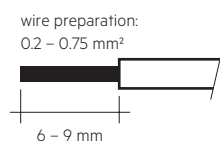
! The LED modules must be connected from both sides as shown in the wiring diagram.

Wiring diagram for emergency



3.3 Wiring type and cross section

For wiring use stranded wire with ferrules or solid wire from 0.2 to 0.75 mm².
For the push-wire connection you have to strip the insulation (6–9 mm).



To remove the wires use a suitable tool (e.g. Microcon release pin) or through twist and pull.

3.4 Mounting instruction



None of the components of the LLE (substrate, LED, electronic components etc.) may be exposed to tensile or compressive stresses.

Max. torque for fixing: 0.5 Nm.

The LED modules are mounted onto a heat sink with min. 3 screws per module or ACL CLIP 4.3mm.



Chemical substance may harm the LED module. Chemical reactions could lead to colour shift, reduced luminous flux or a total failure of the module caused by corrosion of electrical connections.

Materials which are used in LED applications (e.g. sealings, adhesives) must not produce dissolver gas. They must not be condensation curing based, acetate curing based or contain sulfur, chlorine or phthalate.

Avoid corrosive atmosphere during usage and storage.

3.5 EOS/ESD safety guidelines



The device / module contains components that are sensitive to electrostatic discharge and may only be installed in the factory and on site if appropriate EOS/ESD protection measures have been taken. No special measures need be taken for devices/modules with enclosed casings (contact with the pc board not possible), just normal installation practice. Please note the requirements set out in the document EOS / ESD guidelines (Guideline_EOS_ESD.pdf) at: <http://www.tridonic.com/esd-protection>

4. Lifetime

4.1 Lifetime, lumen maintenance and failure rate

The light output of an LED module decreases over the lifetime, this is characterized with the L value.

L70 means that the LED module will have 70 % of its initial luminous flux after the stated operating time. This value is always related to the number of operation hours and therefore defines the lifetime of an LED module.

As the L value is a statistical value the lumen maintenance may vary over the delivered LED modules.

The B value defines the amount of modules which are below the specific L value, e.g. L70B10 means 10 % of the LED modules are below 70 % of the initial luminous flux, respectively 90 % will be above 70 % of the initial value. In addition the percentage of failed modules (fatal failure) is characterized by the C value.

The F value is the combination of the B and C value. That means for F degradation and complete failures are considered, e.g. L70F10 means 10 % of the LED modules may fail or be below 70 % of the initial luminous flux.

4.2 Lumen maintenance for LLE premium

Lifetime declarations are informative and represent no warranty claim.

LLE G2 24x280MM 700LM PRE

| Forward current | tp temperature | L90 / F10 | L90 / F50 | L80 / F10 | L80 / F50 | L70 / F10 | L70 / F50 |
|-----------------|----------------|-----------|-----------|-----------|-----------|-----------|-----------|
| | | 55 °C | 30,000 h | >50,000 h | >50,000 h | >50,000 h | >50,000 h |
| 125 mA | 60 °C | 22,000 h | >50,000 h | 41,000 h | >50,000 h | >50,000 h | >50,000 h |
| | 65 °C | 16,000 h | 37,000 h | 31,000 h | >50,000 h | 46,000 h | >50,000 h |
| | 70 °C | 12,000 h | 27,000 h | 23,000 h | >50,000 h | 35,000 h | >50,000 h |

LLE G2 24x280MM 1500LM PRE

| Forward current | tp temperature | L90 / F10 | L90 / F50 | L80 / F10 | L80 / F50 | L70 / F10 | L70 / F50 |
|-----------------|----------------|-----------|-----------|-----------|-----------|-----------|-----------|
| | | 55 °C | 30,000 h | >50,000 h | >50,000 h | >50,000 h | >50,000 h |
| 330 mA | 60 °C | 22,000 h | >50,000 h | 41,000 h | >50,000 h | >50,000 h | >50,000 h |
| | 65 °C | 16,000 h | 37,000 h | 31,000 h | >50,000 h | 46,000 h | >50,000 h |
| | 70 °C | 12,000 h | 27,000 h | 23,000 h | >50,000 h | 35,000 h | >50,000 h |

Lumen maintenance values are based on LM80 data.

Values may be updated when more recent results are available.

5. Photometric characteristics

5.1 Coordinates and tolerances according to CIE 1931

The specified colour coordinates are integral measured by a current impulse of 100 ms.

The ambient temperature of the measurement is $t_a = 25^\circ\text{C}$.

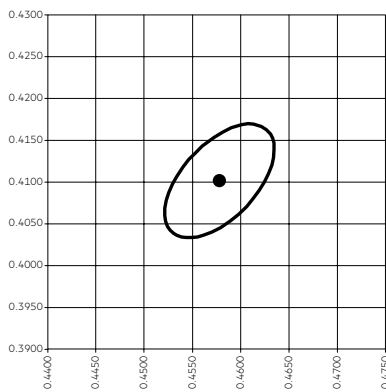
The measurement tolerance of the colour coordinates are ± 0.01 .

| Module type | Current impulse |
|----------------------------|-----------------|
| LLE G2 24x280MM 700LM PRE | 65 mA |
| LLE G2 24x280MM 1500LM PRE | 130 mA |

2,700 K

| | x0 | y0 |
|--------|--------|--------|
| Centre | 0.4578 | 0.4101 |

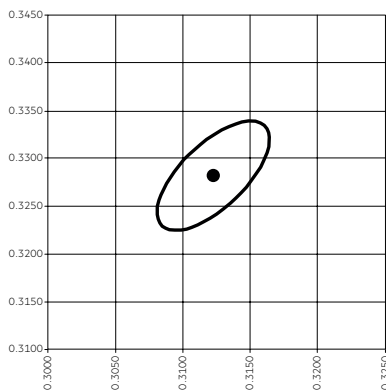
MacAdam ellipse: 3SDCM



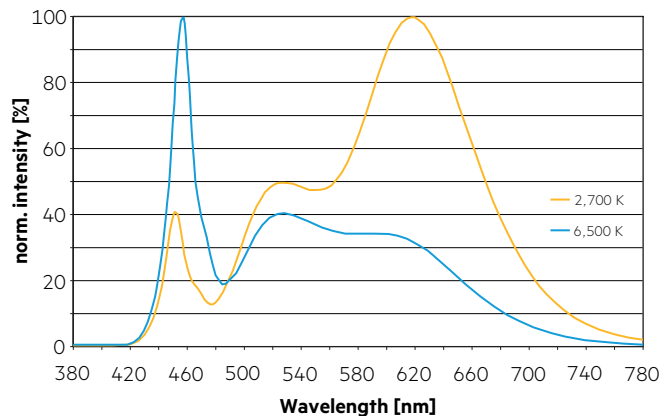
6,500 K

| | x0 | y0 |
|--------|--------|--------|
| Centre | 0.3123 | 0.3281 |

MacAdam ellipse: 3SDCM



Colour spectrum at different colour temperatures



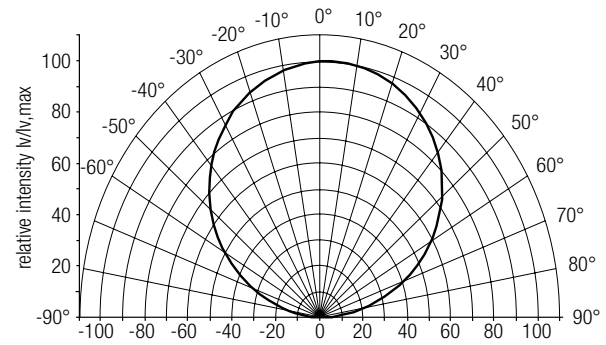
5.2 Light distribution

The optical design of the LLE product line ensures optimum homogeneity for the light distribution.



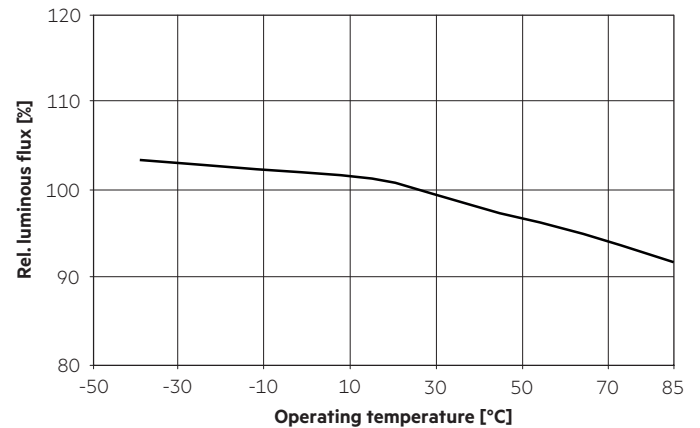
The colour temperature is measured integral over the complete module.

To ensure an ideal mixture of colours and a homogeneous light distribution a suitable optic (e. g. PMMA diffuser) and a sufficient spacing between module and optic (typ. 6 cm) should be used.



The diagrams are based on statistic values.

5.3 Relative luminous flux vs. operating temperature



6. Miscellaneous

6.1 Additional information

Additional technical information Design-in Guide, 3D data, photometric data and Guarantee conditions at www.tridonic.com

7. Photometric characteristics system

7.1 Coordinates and tolerances according to CIE 1931

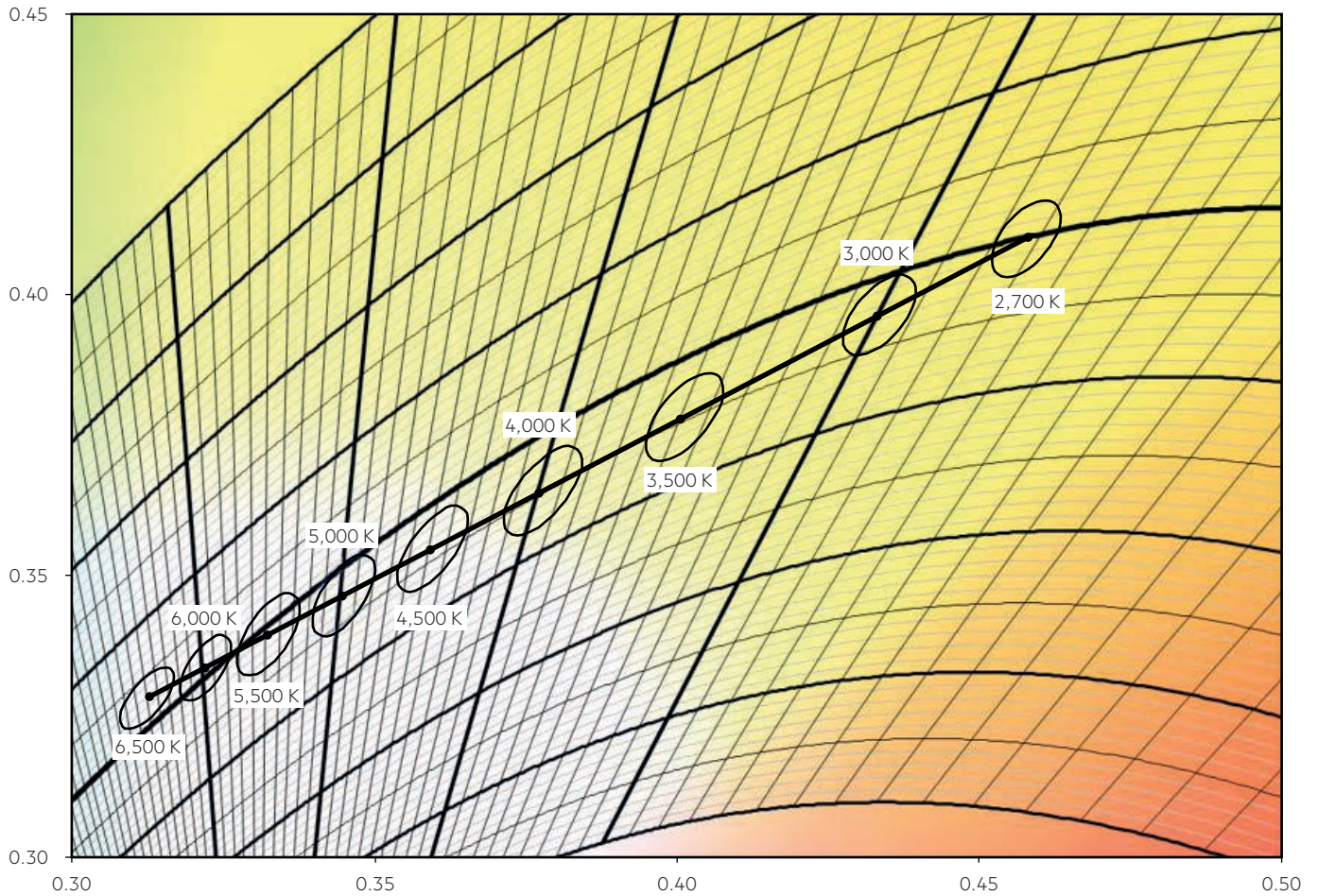
The specified colour coordinates are integral measured by a current impulse of 100 ms.

The ambient temperature of the measurement is $t_a = 25^\circ\text{C}$.

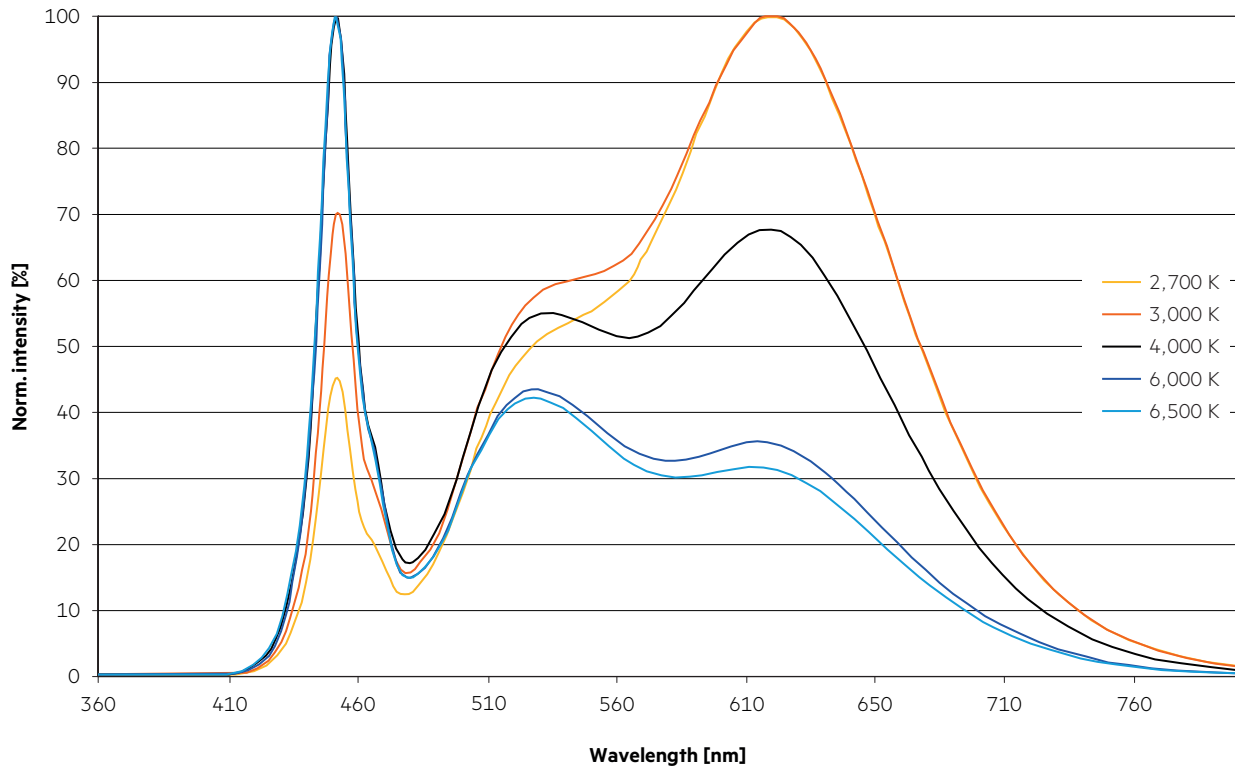
The measurement tolerance of the colour coordinates are ± 0.01 .

| Module type | Current impulse |
|----------------------------|-----------------|
| LLE G2 24x280MM 700LM PRE | 65 mA |
| LLE G2 24x280MM 1500LM PRE | 130 mA |

| | 2,700 K | | 3,000 K | | 3,500 K | | 4,000 K | | 4,500 K | | 5,000 K | | 5,500 K | | 6,000 K | | 6,500 K | |
|--|---------|--------|---------|--------|---------|--------|---------|--------|---------|--------|---------|--------|---------|--------|---------|--------|---------|--------|
| | x0 | y0 | x0 | y0 | x0 | y0 | x0 | y0 | x0 | y0 | x0 | y0 | x0 | y0 | x0 | y0 | x0 | y0 |
| Centre | 0.4578 | 0.4101 | 0.4335 | 0.3964 | 0.4013 | 0.3783 | 0.3778 | 0.3651 | 0.3596 | 0.3548 | 0.3448 | 0.3465 | 0.3324 | 0.3395 | 0.3220 | 0.3336 | 0.3123 | 0.3282 |
| MacAdam ellipse 100 – 50 % dimming level | 3 SDCM | | | | | | | | | | | | | | | | | |
| MacAdam ellipse 50 – 10 % dimming level | 4 SDCM | | | | | | | | | | | | | | | | | |
| MacAdam ellipse 10 – 3 % dimming level | 6 SDCM | | | | | | | | | | | | | | | | | |



7.2 Colour spectrum at different colour temperatures



Driver LCA 50W, 85W and 100W DT8 Ip PRE
Product description

1. Standards

EN 55015
EN 61000-3-2
EN 61000-3-3
EN 61347-1
EN 61347-2-13
EN 62384
EN 61547
EN 62386-101 (according to DALI standard V2)
EN 62386-102
EN 62386-207
According to EN 50172 for use in central battery systems
According to EN 60598-2-22 suitable for emergency lighting installations

2. Thermal details and lifetime

2.1 Expected lifetime

| Type | Output current | ta | 30 °C | 40 °C | 45 °C | 50 °C | 55 °C |
|-------------------------------|----------------|----------|-------------|-------------|-----------|----------|----------|
| LCA 50W 350-1050mA DT8 Ip PRE | 350 – 700 mA | tc | 50 °C | 60 °C | 65 °C | 70 °C | 75 °C |
| | | Lifetime | > 100,000 h | > 100,000 h | 100,000 h | 75,000 h | 50,000 h |
| | 700 – 1,050 mA | tc | 55 °C | 65 °C | 70 °C | 75 °C | 80 °C |
| | | Lifetime | > 100,000 h | > 100,000 h | 75,000 h | 50,000 h | 40,000 h |

| Type | Output current | ta | 35 °C | 40 °C | 45 °C | 50 °C | 55 °C | 60 °C |
|-------------------------------|-------------------|-------------|-------------|-------------|-------------|-----------|----------|----------|
| LCA 85W 600-1800mA DT8 Ip PRE | 600 – 1,000 mA | tc | 50 °C | 55 °C | 60 °C | 65 °C | 70 °C | 75 °C |
| | | Lifetime | > 100,000 h | > 100,000 h | > 100,000 h | 100,000 h | 90,000 h | 60,000 h |
| | >1,000 – 1,400 mA | tc | 55 °C | 60 °C | 65 °C | 70 °C | 75 °C | 80 °C |
| | | Lifetime | > 100,000 h | > 100,000 h | > 100,000 h | 80,000 h | 60,000 h | 40,000 h |
| >1,400 – 1,800 mA | tc | 60 °C | 65 °C | 70 °C | 83 °C | – | – | |
| | Lifetime | > 100,000 h | > 100,000 h | 80,000 h | 50,000 h | – | – | |

| Type | Output current (CH1 = CH2 = 4,000 K) | ta | 30 °C | 35 °C | 40 °C | 50 °C | 55 °C |
|----------------------------------|---|-------------|-------------|-------------|-----------|----------|----------|
| LCA 100W 350-1050mA 2xDT8 Ip PRE | 350 – 700 mA | tc | 50 °C | 55 °C | 65 °C | 75 °C | 80 °C |
| | | Lifetime | > 100,000 h | > 100,000 h | 100,000 h | 75,000 h | 50,000 h |
| | 700 – 900 mA | tc | 55 °C | 60 °C | 70 °C | 80 °C | 85 °C |
| | | Lifetime | > 100,000 h | > 100,000 h | 75,000 h | 50,000 h | 30,000 h |
| 900 – 1,050 mA | tc | 60 °C | 65 °C | 70 °C | 80 °C | – | |
| | Lifetime | > 100,000 h | 90,000 h | 65,000 h | 40,000 h | – | |

The LED driver is designed for a lifetime stated above under reference conditions and with a failure probability of less than 10 %.

The relation of tc to ta temperature depends also on the luminaire design.

If the measured tc temperature is approx. 5 K below tc max., ta temperature should be checked and eventually critical components (e.g. ELCAP) measured. Detailed information on request.

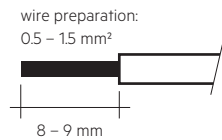
3. Installation / wiring

3.1 Wiring type and cross section

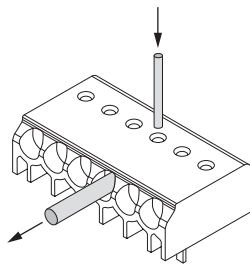
For wiring use solid wire from 0.5 – 1.5 mm².

Strip 8 – 9 mm of insulation from the cables to ensure perfect operation of terminals.

LED module/LED driver/supply



3.2 Loose wiring



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

3.3 Wiring guidelines

- The cables should be run separately from the mains connections and mains cables to ensure good EMC conditions.
- The LED wiring should be kept as short as possible to ensure good EMC. The max. secondary cable length is 2 m (4 m circuit), this applies for LED output and not for I-SELECT 2.
- Secondary switching is not permitted.
- The LED driver has no inverse-polarity protection on the secondary side. Wrong polarity can damage LED modules with no inverse-polarity protection.
- Wrong wiring of the LED driver can lead to malfunction or irreparable damage.
- In case of protection class II applications it's recommended to separate the lamp wires of the different channels. Depending onto the luminaire construction additional actions, such as equipotential connection between driver and LED or a toroidal ferrite at the lamp wires are recommended.

3.4 Hot plug-in

Hot plug-in is not supported due to residual output voltage of > 0 V.

If a LED load is connected the device has to be restarted before the output will be activated again.

This can be done via mains reset or via interface (DALI, DSI, switchDIM).

3.5 Earth connection

The earth connection is conducted as protection earth (PE). The LED driver can be earthed via earth terminal or metal housing. If the LED driver will be earthed, protection earth (PE) has to be used. There is no earth connection required for the functionality of the LED driver.

Earth connection is recommended to improve following behaviour:

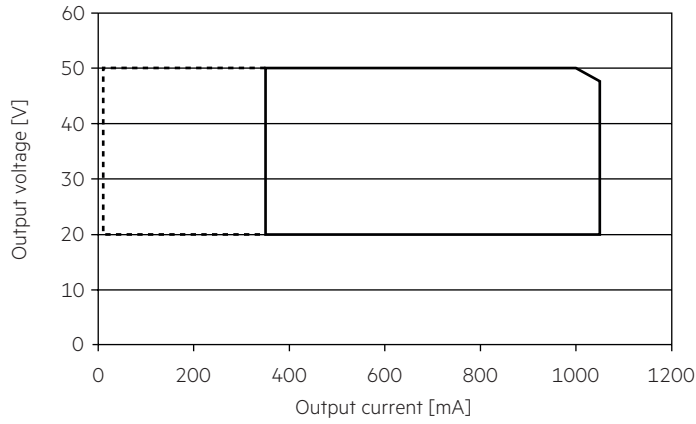
- Electromagnetic interferences (EMI)
- LED glowing at stand-by
- Transmission of mains transients to the LED output

In general it is recommended to earth the LED driver if the LED module is mounted on earthed luminaire parts respectively heat sinks and thereby representing a high capacity against earth.

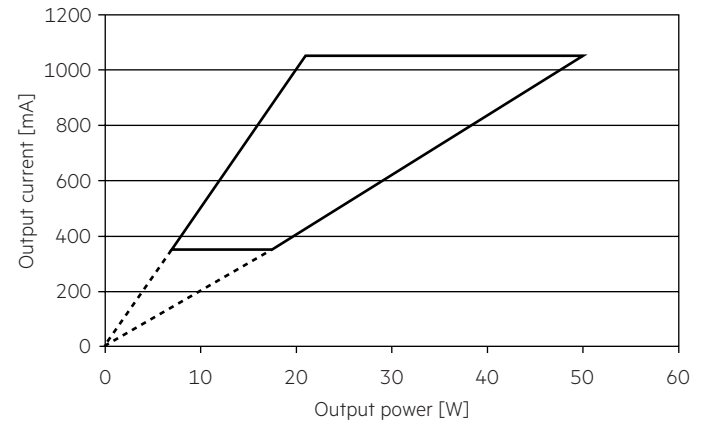
4. Electrical values

4.1 Operating window

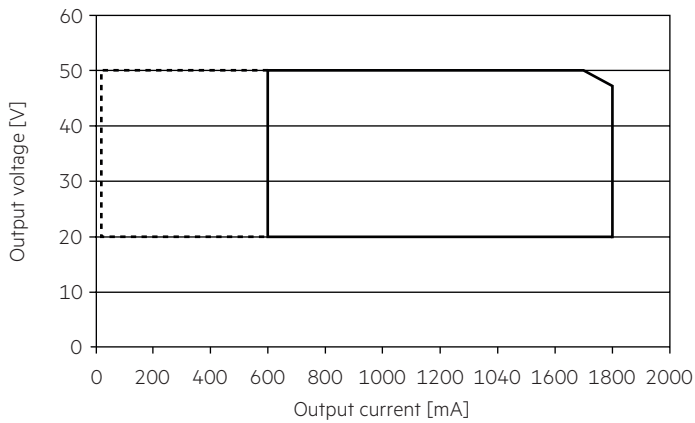
LCA 50W 350-1050mA DT8 Ip PRE



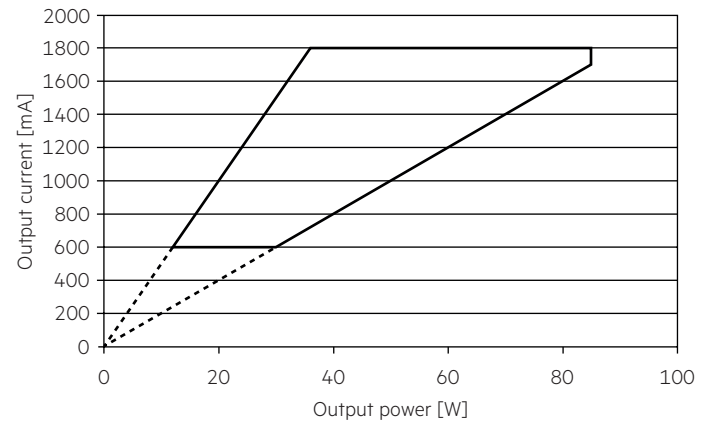
LCA 50W 350-1050mA DT8 Ip PRE



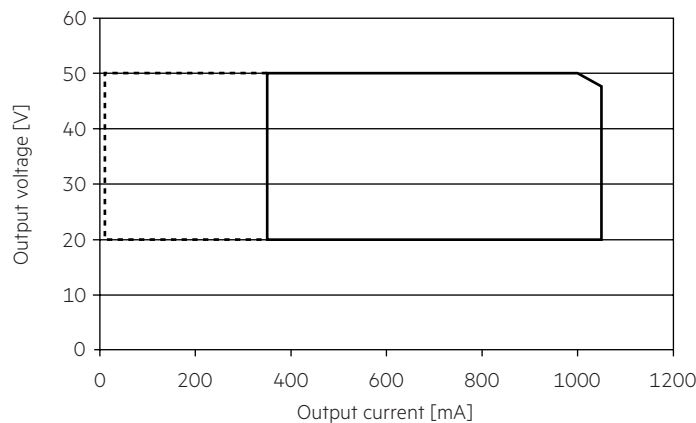
LCA 85W 600-1800mA DT8 Ip PRE



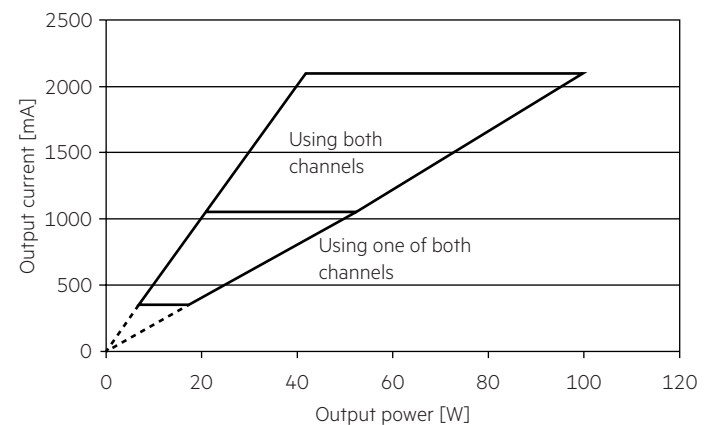
LCA 85W 600-1800mA DT8 Ip PRE



LCA 100W 350-1050mA 2xDT8 Ip PRE



LCA 100W 350-1050mA 2xDT8 Ip PRE

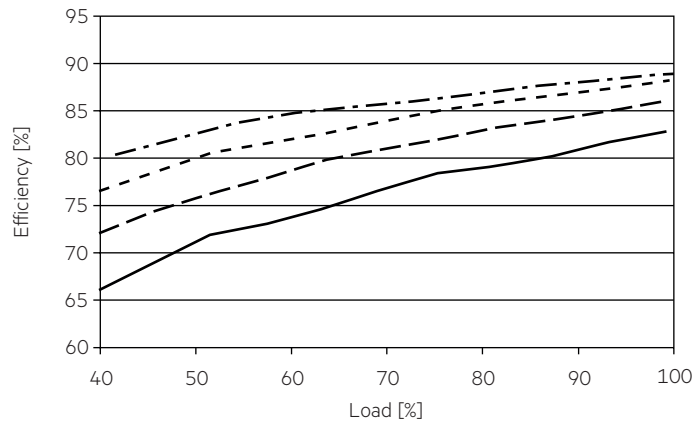


— Operating window 100 %
- - - - - Operating window dimmed

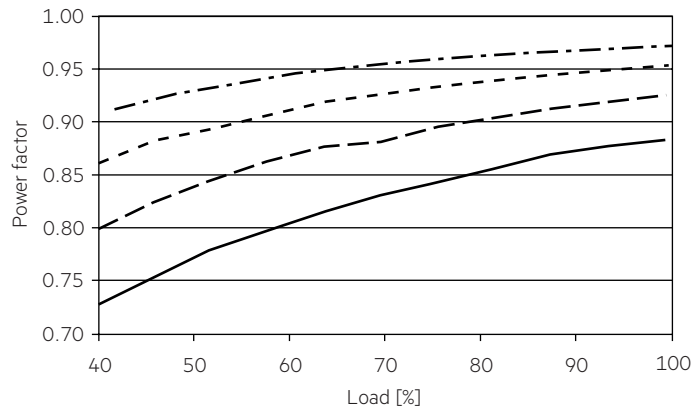
Make sure that the LED driver is operated within the given window under all operating conditions. Special attention needs to be paid at dimming and DC emergency operation as the forward voltage of the connected LED modules varies with the dimming level, due to the implemented amplitude dimming technology. Coming below the specified minimum output voltage of the LED driver may cause the device to shut-down. See chapter "6.9 Light level in DC operation" for more information.

4.2 LCA 50W 350-1050mA DT8 Ip PRE

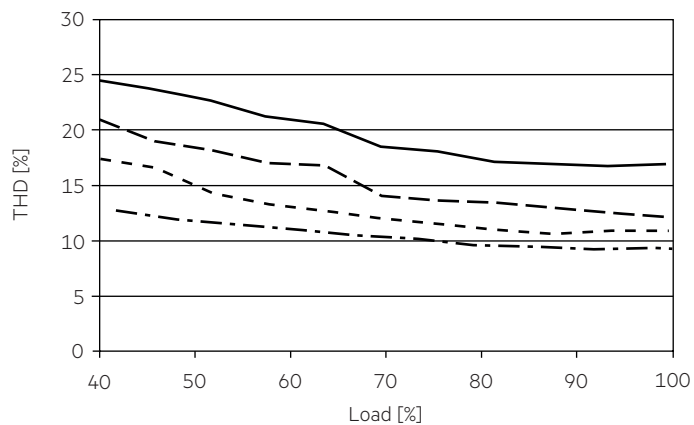
Efficiency vs load



Power factor vs load



THD vs load

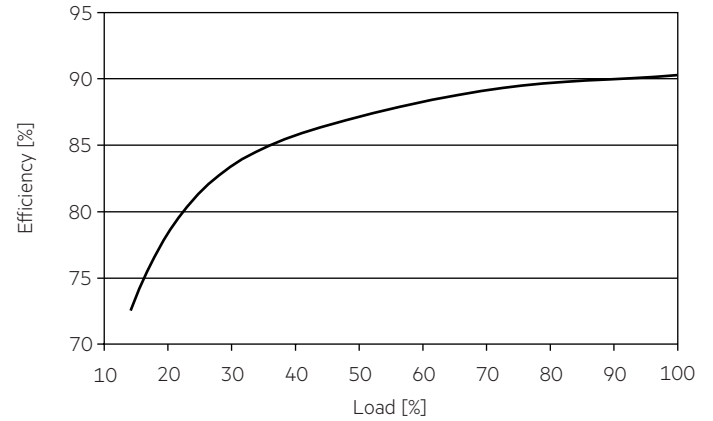


- 350 mA
- - - 500 mA
- · - · 700 mA
- · · · 1050 mA

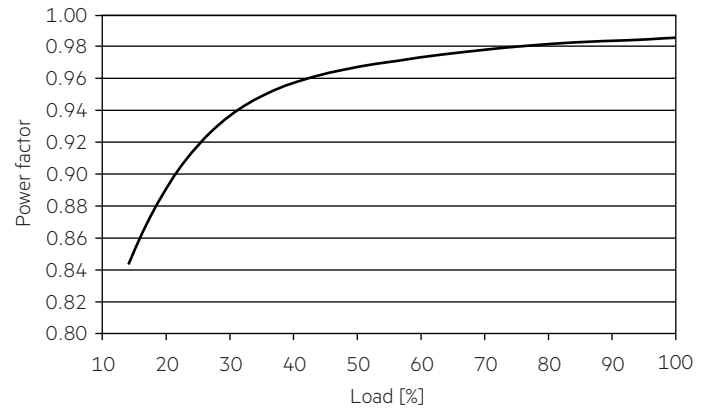
100 % load corresponds to the max. output power (full load) according to the table on page 4.

4.3 LCA 85W 600-1800mA DT8 Ip PRE

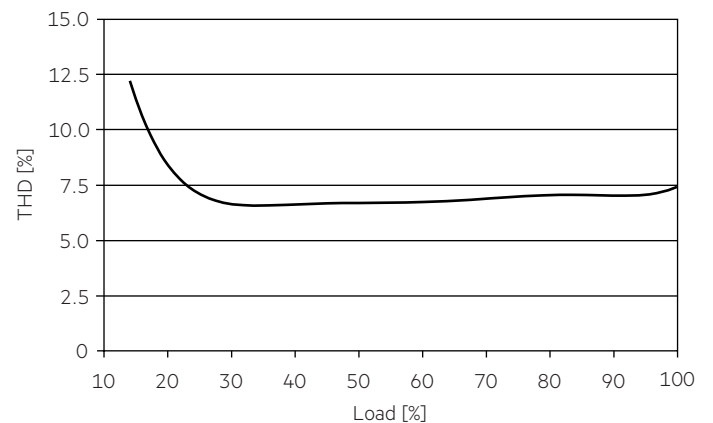
Efficiency vs load



Power factor vs load



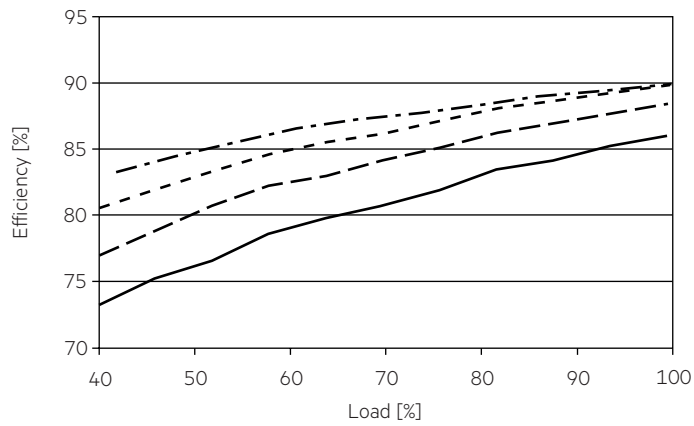
THD vs load



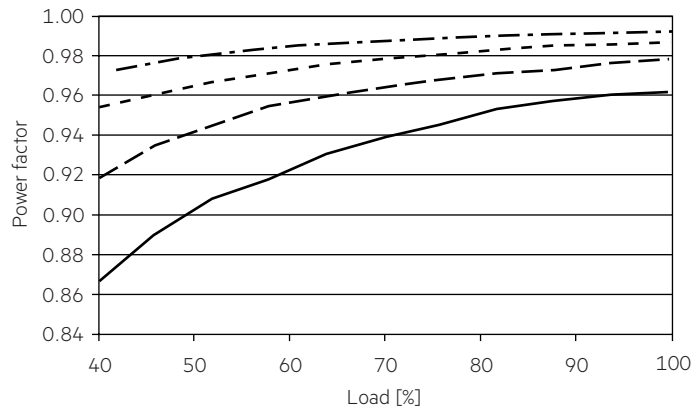
100 % load corresponds to the max. output power (full load) according to the table on page 6.

4.4 LCA 100W 350-1050mA 2xDT8 Ip PRE

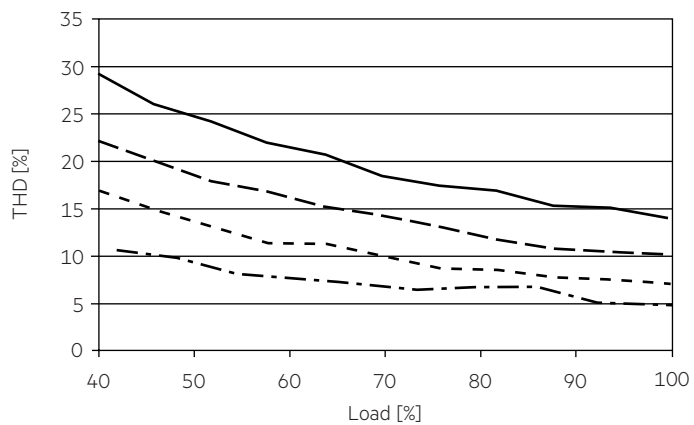
Efficiency vs load



Power factor vs load



THD vs load



- 350 mA
- - - 500 mA
- - - - 700 mA
- · - · 1050 mA

100 % load corresponds to the max. output power (full load) according to the table on page 7.

4.5 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 ² | 1.5 mm ² | 2.5 mm ² | 4 mm ² | 1.5 mm ² | 1.5 mm ² | 2.5 mm ² | 4 mm ² | I _{max} | time |
| LCA 50W 350-1050mA DT8 Ip PRE | 21 | 28 | 36 | 45 | 13 | 17 | 22 | 27 | 29 A | 180 µs |

| Automatic circuit breaker type | C10 | C13 | C16 | C20 | B10 | B13 | B16 | B20 | Inrush current | |
|--------------------------------------|---------------------|---------------------|---------------------|-------------------|---------------------|---------------------|---------------------|-------------------|------------------|--------|
| Installation Ø | 1.5 mm ² | 1.5 mm ² | 2.5 mm ² | 4 mm ² | 1.5 mm ² | 1.5 mm ² | 2.5 mm ² | 4 mm ² | I _{max} | time |
| LCA 85W 600-1800mA DT8 Ip PRE | 15 | 20 | 25 | 32 | 9 | 12 | 15 | 19 | 31.5 A | 215 µs |

| Automatic circuit breaker type | C10 | C13 | C16 | C20 | B10 | B13 | B16 | B20 | Inrush current | |
|---|---------------------|---------------------|---------------------|-------------------|---------------------|---------------------|---------------------|-------------------|------------------|--------|
| Installation Ø | 1.5 mm ² | 1.5 mm ² | 2.5 mm ² | 4 mm ² | 1.5 mm ² | 1.5 mm ² | 2.5 mm ² | 4 mm ² | I _{max} | time |
| LCA 100W 350-1050mA 2xDT8 Ip PRE | 10 | 13 | 16 | 21 | 6 | 8 | 10 | 13 | 39 A | 286 µs |

Calculation uses typical values from ABB series S200 as a reference.
Actual values may differ due to used circuit breaker types and installation environment.

4.6 Harmonic distortion in the mains supply (at 230 V / 50 Hz and full load) in %

| | THD | 3. | 5. | 7. | 9. | 11. |
|--------------------------------------|------|-----|-----|-----|-----|-----|
| LCA 50W 350-1050mA DT8 Ip PRE | < 10 | < 9 | < 3 | < 3 | < 2 | < 1 |

| | THD | 3. | 5. | 7. | 9. | 11. |
|--------------------------------------|------|------|-----|-----|-----|-----|
| LCA 85W 600-1800mA DT8 Ip PRE | < 10 | < 10 | < 3 | < 2 | < 2 | < 2 |

| | THD | 3. | 5. | 7. | 9. | 11. |
|---|-----|-----|-----|-----|-----|-----|
| LCA 100W 350-1050mA 2xDT8 Ip PRE | < 6 | < 5 | < 1 | < 1 | < 1 | < 1 |

4.7 Dimming

Dimming range 3% to 100%

Digital control with:

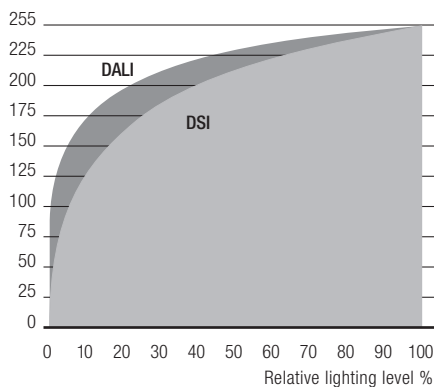
- DSI signal: 8 bit Manchester Code
Speed 3% to 100% in 1.4 s
- DALI signal: 16 bit Manchester Code
Speed 3% to 100% in 0.2 s
Programmable parameter:
Minimum dimming level
Maximum dimming level
Default minimum = 3%
Programmable range $3\% \leq \text{MIN} \leq 100\%$
Default maximum = 100%
Programmable range $100\% \geq \text{MAX} \geq 3\%$

Dimming curve is adapted to the eye sensitiveness.

Dimming is realized by amplitude dimming.

4.8 Dimming characteristics

Digital dimming value



Dimming characteristics as seen by the human eye

5. Interfaces / communication

5.1 Control input (DA/N, DA/L)

Digital DALI signal or switchDIM can be wired on the same terminals (DA/N and DA/L).

The control input is non-polar for digital control signals (DALI, DSI). The control signal is not SELV. Control cable has to be installed in accordance to the requirements of low voltage installations.

Different functions depending on each module.

5.2 switchDIM

Integrated switchDIM function allows a direct connection of a pushbutton for dimming and switching.

Brief push (< 0.6 s) switches LED driver ON and OFF. The dim level is saved at power-down and restored at power-up.

When the pushbutton is held, LED modules are dimmed. After releasing and pushing the LED modules are dimmed in the opposite direction.

In installations with LED drivers with different dimming levels or opposite dimming directions (e.g. after a system extension), all LED drivers can be synchronized to 50% dimming level by a 10 s push.

Use of pushbutton with indicator lamp is not permitted.

5.3 colourSWITCH

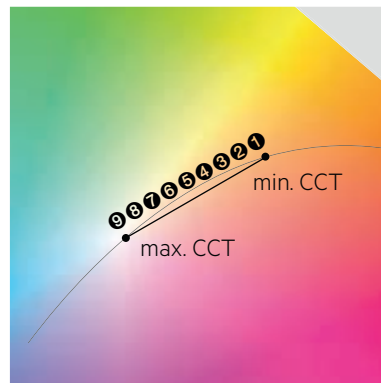
A conventional pushbutton can be used to control the system via colourSWITCH.

Use of pushbutton with indicator lamp is not permitted.

For control via a pushbutton different settings can be made:

- Short press: Setting the colour temperature via colourSWITCH mode with 9 values between 2,700 and 6,500 K.
- Long press (> 1 s): Stepless setting of colour temperature. After completion the colour temperature direction will be inverted.
- These values can be changed via masterCONFIGURATOR.
- Alternatively the colour temperature could be changed via DALI device type 8 control system.

In installations with LED drivers with different colour temperature or opposite colour temperature directions (e.g. after a system extension), all LED drivers can be synchronized to 4,500 K by a 10 s push.



6. Functions

6.1 Short-circuit behaviour

In case of a short-circuit at the LED output the LED output is switched off. After restart of the LED driver the output will be activated again. The restart can either be done via mains reset or via interface (DALI, DSI, switchDIM).

6.2 No-load operation

The LED driver will not be damaged in no-load operation. The output will be deactivated and is therefore free of voltage. If a LED load is connected the device has to be restarted before the output will be activated again.

6.3 Overload protection

If the output voltage range is exceeded the LED driver turns off the LED output. After restart of the LED driver the output will be activated again. The restart can either be done via mains reset or via interface (DALI, DSI, switchDIM).

6.4 Overtemperature protection

The LED driver is protected against temporary thermal overheating. If the temperature limit is exceeded the output current of the LED module(s) is reduced. The temperature protection is activated approx. +5 °C above $t_{c \text{ max}}$ (see page 2). On DC operation this function is deactivated to fulfill emergency requirements.

6.5 corridorFUNCTION

The corridorFUNCTION can be programmed in two different ways. To program the corridorFUNCTION by means of software a DALI-USB interface is needed in combination with a DALI PS. The software can be the masterCONFIGURATOR.

To activate the corridorFUNCTION without using software a voltage of 230 V has to be applied for five minutes at the switchDIM connection. The unit will then switch automatically to the corridorFUNCTION.

Note:

If the corridorFUNCTION is wrongly activated in a switchDIM system (for example a switch is used instead of pushbutton), there is the option of installing a pushbutton and deactivating the corridorFUNCTION mode by five short pushes of the button within three seconds.

switchDIM and corridorFUNCTION are very simple tools for controlling gears with conventional pushbuttons or motion sensors.

To ensure correct operation a sinusoidal mains voltage with a frequency of 50 Hz or 60 Hz is required at the control input.

Special attention must be paid to achieving clear zero crossings. Serious mains faults may impair the operation of switchDIM and corridorFUNCTION.

6.6 Constant light output (CLO)

The luminous flux of a LED decreases constantly over the lifetime. The CLO function ensures that the emitted luminous flux remains stable. For that purpose the LED current will increase continuously over the LED lifetime. In masterCONFIGURATOR it is possible to select a start value (in percent) and an expected lifetime. The LED driver adjusts the current afterwards automatically.

6.7 Power-up/-down fading

The power-up/-down function offers the opportunity to modify the on-/off behaviour. The time for fading on or off can be adjusted in a range of 0.2 to 16 seconds. According to this value, the device dims either from 0 % up to the power-on level or from the current set dim level down to 0 %.

This feature applies while operating via switchDIM and when switching the mains voltage on or off.

By factory default no fading time is set (= 0 seconds).

6.8 Light level in DC operation

The LED driver is designed to operate on DC voltage and pulsed DC voltage. For a reliable operation, make sure that also in DC emergency operation the LED driver is run within the specified conditions as stated in chapter "4.1 operating window".

Light output level in DC operation: programmable 3 – 100 % (EOFi = 0.13). Programming by DALI.

In DC operation dimming mode can be activated.

The voltage-dependent input current of Driver incl. LED module is depending on the used load.

The voltage-dependent no-load current of Driver (without or defect LED module) is for:

AC: 21.8 mA (at 230 V, 50 Hz)

DC: 5 – 7 mA (at 275 – 186 V, 0 Hz)

6.9 Software / programming

With appropriate software and an interface different functions can be activated and various parameters can be configured in the LED driver. To do so, a DALI-USB and the software (masterCONFIGURATOR) are required.

6.10 masterCONFIGURATOR

From version 2.8:

For programming functions (CLO, I-SELECT 2, power-up fading, corridorFUNCTION, colourSWITCH) and device settings (fade time, ePowerOnLevel, DC level, etc.).

For further information see masterCONFIGURATOR manual.

6.11 deviceCONFIGURATOR

PC (windows) based software application to transfer parameters into our drivers.

Workflow optimised for the use in OEM production line.

For further information see deviceCONFIGURATOR manual.

7. Miscellaneous

7.1 Insulation 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 insulation 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 insulation resistance must be at least 2 MΩ.

As an alternative, IEC 60598-1 Annex Q describes a test of the electrical strength with 1500 V_{AC} (or 1.414 x 1500 V_{DC}). To avoid damage to the electronic devices this test must not be conducted.

7.2 Conditions of use and storage

Environmental conditions: 5% up to max. 85%,
not condensed
(max. 56 days/year at 85%)

Storage temperature: -40 °C up to max. +80 °C

The devices have to be acclimatised to the specified temperature range (ta) before they can be operated.

7.3 Additional information

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

Guarantee conditions at www.tridonic.com → Services

Lifetime declarations are informative and represent no warranty claim. No warranty if device was opened.