

Engine QLE PREMIUM system data sheet
QLE PREMIUM

Product description

- Square Tunable White system with adjustable colour temperature from 3,000 to 6,000 K at constant luminous flux
- Precalibrated set to ensure premium light quality and colour consistency, consisting of LED Driver and 4, 5 or 6 LED modules with luminous flux of 1,250 lm per pc.^①
- Outstanding system colour tolerance MacAdam 3 over the full operating area
- Dimming range 10 – 100 % without change of colour temperature
- High system efficiency up to 132 lm/W at tp = 45 °C
- Low-profile LED Driver with digital interface (DALI Device Type 8, DSI, switchDIM, colourTEMPERATURE)
- Self cooling (no additional heat sink required)
- Long life-time of 50,000 h and 5-year system guarantee



Ordering data

Type	Article number	System components
TW QLE G1 270mm 4x1250lm 830-860 PRE KIT	89600647	1 LED Driver + 4 LED modules at 1,250 lm
TW QLE G1 270mm 5x1250lm 830-860 PRE KIT	89602481	1 LED Driver + 5 LED modules at 1,250 lm
TW QLE G1 270mm 6x1250lm 830-860 PRE KIT	89602482	1 LED Driver + 6 LED modules at 1,250 lm



Technical data Module QLE PREMIUM, page 2

Product description Module QLE PREMIUM, page 4

Technical data Driver LCAI TW Ip, page 3

Product description Driver LCAI TW Ip, page 8

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



Module QLE PREMIUM

QLE PREMIUM

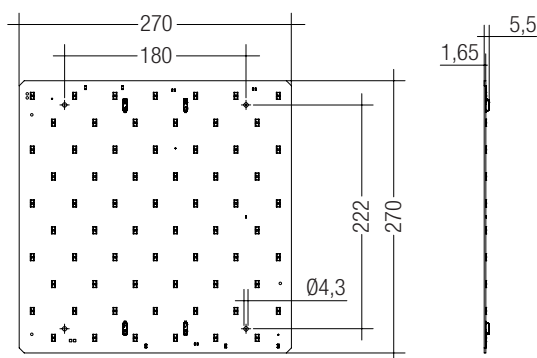
Product description

- Tunable White LED module with adjustable colour temperature
- High colour rendering index CRI > 80
- Small colour tolerance MacAdam 3
- Low light current tolerances
- Excellent thermal management[®]
- Ideal for panel lights
- Long life-time: 50,000 hours
- 5-year guarantee



Technical data

Beam characteristic	120°
Ambient temperature range [®]	-25 ... +55 °C
tp rated	45 °C
tc	85 °C
ESD classification	severity level 4
Risk group (EN 62471:2008)	1
Type of protection	IP00



Standards, page 4

Colour temperatures and tolerances, page 7

Product description, page 4

Specific technical data

Type	Photometric code	Typ. forward current [®]	Typ. luminous flux at tp = 25 °C ^{① ④}	Typ. luminous flux at tp = 45 °C ^{① ④}	Typ. power consumption at tp = 45 °C [®]	Efficacy of the system at tp = 25 °C	Efficacy of the system at tp = 45 °C	Colour rendering index CRI, 3,000 – 6,000 K ^④	Energy classification
TW QLE G1 270mm 4x1250lm 830-860 PRE	830/349 – 860/349	250 mA	5,280 lm	5,120 lm	38.7 W	134 lm/W	132 lm/W	> 80	A+
TW QLE G1 270mm 5x1250lm 830-860 PRE	830/349 – 860/349	250 mA	6,600 lm	6,400 lm	48.5 W	133 lm/W	132 lm/W	> 80	A+
TW QLE G1 270mm 6x1250lm 830-860 PRE	830/349 – 860/349	250 mA	7,920 lm	7,680 lm	57.8 W	134 lm/W	133 lm/W	> 80	A+

^① Tolerance range for optical data over the CCT range: ±5 %.

^② Tolerance range for electrical data: ±5 %.

^③ If the max. temperature limits are exceeded, the life of the system will be greatly reduced or the system may be damaged.

The temperature of the Module QLE at the tc-point is to be measured in the thermally stable state with a temperature sensor or a temperature sensitive sticker according to EN 60598-1. For the precise position of the tc point see the above diagram.

^④ Colour temperature and CRI according to CIE 1931.

IP20 

Driver LCAI TW Ip

Product description

- LED Driver for QLE PREMIUM modules
- Output power: 75 W
- Power input on standby < 0.3 W

Properties

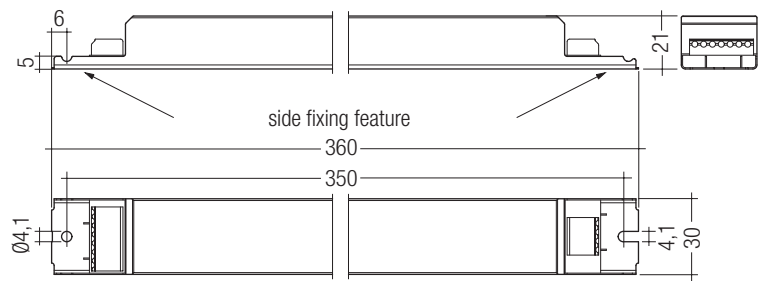
- Low-profile LED Driver with digital interface (DALI Device Type 8, DSI, switchDIM, colourTEMPERATURE)
- switchDIM and colourTEMPERATURE with memory function^{①②}
- Powerless switching via digital interface (no need for switching via mains)
- Intelligent Temperature Guard (protection against thermal damage)
- Short-circuit shutdown feature with one restart (after 0.5 s)
- Overload protection with one restart (after 0.5 s)

Technical data

Rated supply voltage	220 – 240 V
Input voltage range, AC	198 – 264 V
Input voltage range, DC	176 – 280 V
Rated current (at 230 V 50 Hz)	0.35 A
Mains frequency	0 / 50 / 60 Hz
Efficiency	93 %
λ (at 230 V 50 Hz, full load)	0.96
Control input ^{① ②}	DSI, DALI, switchDIM, colourTEMPERATURE
Stand-by power	< 0.3 W
Max. output voltage (no-load voltage)	270 V
Dimming range	10 – 100 %
PWM frequency	200 – 500 Hz
Set up time (at 230 V 50 Hz)	< 0.5 s
Switchover time AC/DC and DC/AC	< 1 s
Leakage current (PE)	150 μ A
t_a operating (at life-time 50,000 h)	-25 ... +55 °C
Max. casing temperature t_c (at life-time 50,000 h)	75 °C

^① In DC operation the last set colour is used.

^② No colourTEMPERATURE mode at DC operation.



Product description, page 8

Module QLE PREMIUM

Product description

Standards

IEC 62031
IEC 62471
IEC 61347-1
IEC 61547
IEC 61000-4-6

Photometric code

Key for photometric code, e. g. 830 / 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	McAdam initial	McAdam after 25% of the life-time (max.6000h)	Luminous flux after 25% of the life-time (max.6000h)
7 70 – 79				Code Luminous flux
8 80 – 89				7 ≥ 70 %
9 ≥90				8 ≥ 80 % 9 ≥ 90 %

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 QLE will be strongly reduced or even destroyed.

tc point, ambient temperature and life-time

The temperature at tp reference point is crucial for the light output and life-time of a QLE product.

For QLE a tp temperature of 45 °C has to be complied in order to achieve an optimum between heat sink requirements, light output and life-time.

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.

Mounting instruction

None of the components of the QLE (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 with 4 screws per module. In order not to damage the modules only rounded head screws and an additional plastic flat washer should be used.



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.

**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>

Selection of the LED Driver

The QLE PREMIUM can only be operated with the Driver LCAI TW Ip.



Only components out of a single set shall be connected. Mixing the sets will invalidate the system calibration and will decrease the system performance considerably.

Storage and humidity

Storage temperature	-30 ... +80 °C
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Operation only in non condensing environment.

Humidity during processing of the module should be between 30 to 70 %.

Life-time, lumen maintenance and failure rate

The light output of an LED module decreases over the life-time, 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 life-time of an LED module.

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

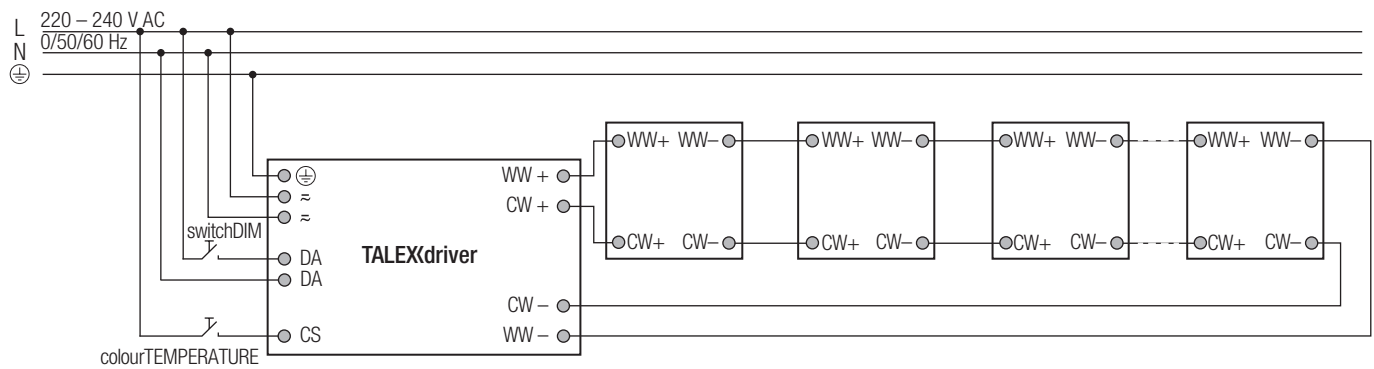
The B value defines the amount of modules which are below the specific L value, e.g. L70B10 means 10 % of the LED modules are below 70 % of the initial luminous flux, respectively 90 % will be above 70 % of the initial value. In addition the percentage of failed modules (fatal failure) is characterized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

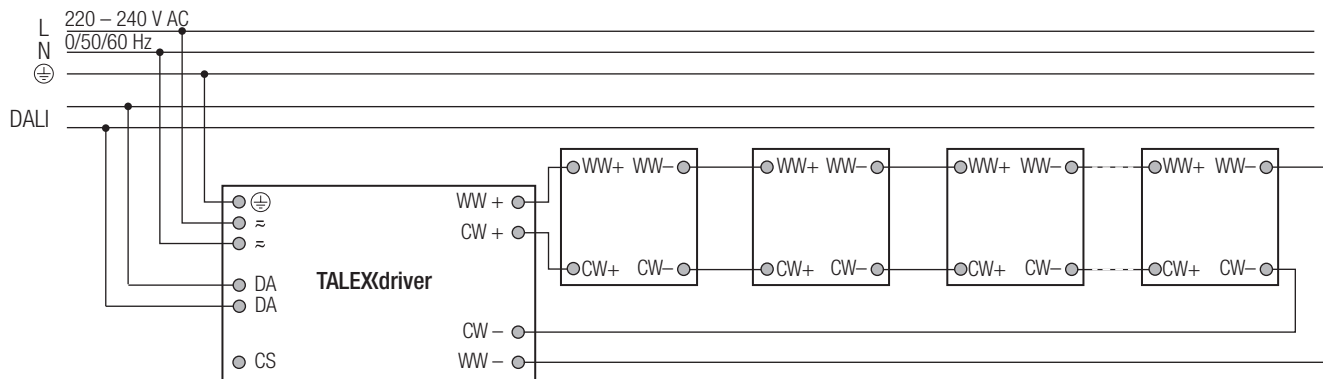
Lumen maintenance for QLE PREMIUM

Forward current	tp temperature	L90 / F10	L90 / F50	L80 / F10	L80 / F50	L70 / F10	L70 / F50
250 mA	45 °C	>50,000 h	>50,000 h	>50,000 h	>50,000 h	>50,000 h	>50,000 h
	65 °C	33,000 h	>50,000 h	>50,000 h	>50,000 h	>50,000 h	>50,000 h

Wiring diagram for switchDIM and colourTEMPERATURE for the Engine QLE PREMIUM (with 4, 5 or 6 modules)

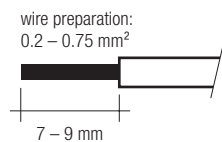


Wiring diagram for DALI for the Engine QLE PREMIUM (with 4, 5 or 6 modules)

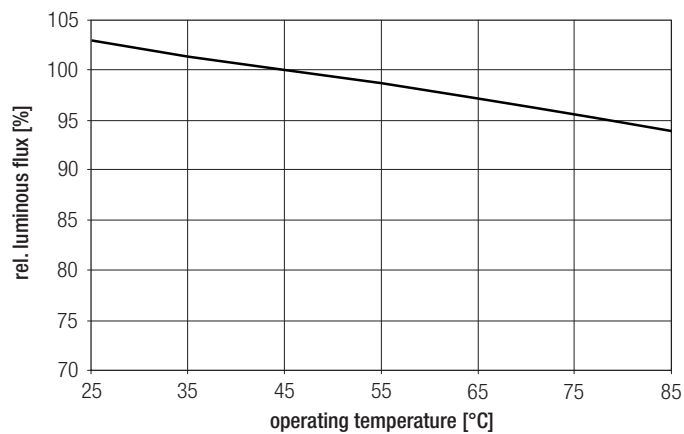


Wiring type and cross section

The wiring can be solid cable with a cross section of 0.2 to 0.75 mm².
For the push-wire connection you have to strip the insulation (7–9 mm).



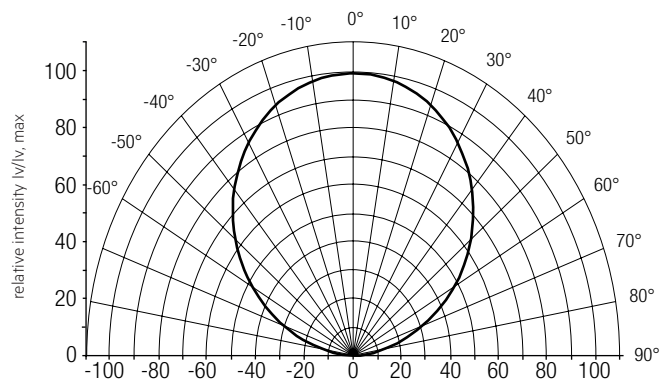
Inserting stranded wires / removing wires by lightly pressing on the push button.

Relative light flux vs. operating temperature

The diagrams are based on statistic values.

Optical characteristics QLE PREMIUM

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

Light distribution

The colour temperature is measured integral over the complete module.

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

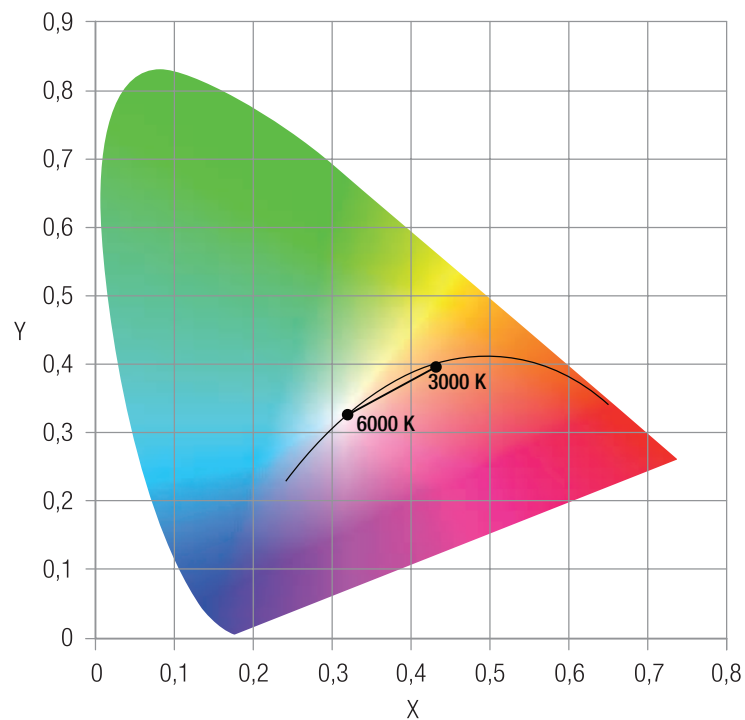
For further information see Design-in Guide, 3D data and photometric data on www.tridonic.com or on request.

Coordinates and tolerances according to CIE 1931

The specified colour coordinates are central measured by a current impulse with typical values of module and a duration 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 .



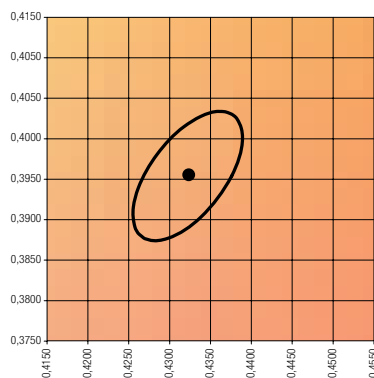
3,000 K

	x0	y0
Centre	0.4325	0.3955

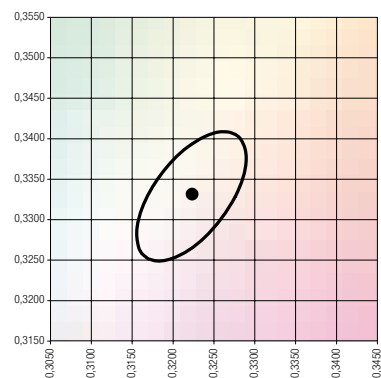
6,000 K

	x0	y0
Centre	0.3220	0.3330

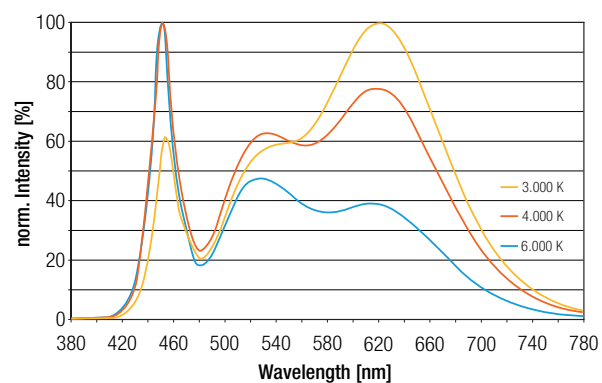
MacAdam ellipse: 3SDCM



MacAdam ellipse: 3SDCM



Colour spectrum at different colour temperatures



Driver LCAI TW Ip

Product description

Standards

EN 61347-1
 EN 61347-2-13
 EN 62384
 EN 61000-3-2
 EN 61547
 EN 55015
 EN 62493
 EN 62386-101
 EN 62386-102
 EN 62386-209 (DALI DEVICE Type 8)

Control input (DA/D1, DA/D2)

Digital DALI/DSI signal or switchDIM can be wired on the same terminals (DA/D1 and DA/D2).

Digital signal DALI/DSI

The control input is non-polar and protected against accidental connection with a mains voltage up to 264 V. 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.

Colour types

Supported colour types according to DALI Device Type 8:

- colour temperature (colourTEMPERATURE)

Thermal protection of the unit

The unit also has an ITG (Intelligent Temperature Guard). This protects the LCAI TW Ip from thermal overload by reducing the output power or switching off in case of operation above the thermal limits of the luminaire or ballast. Depending on the luminaire design, the ITG operates at about 12 °C (±5 °C) above tc temperature.

Control via switchDIM and colourTEMPERATURE

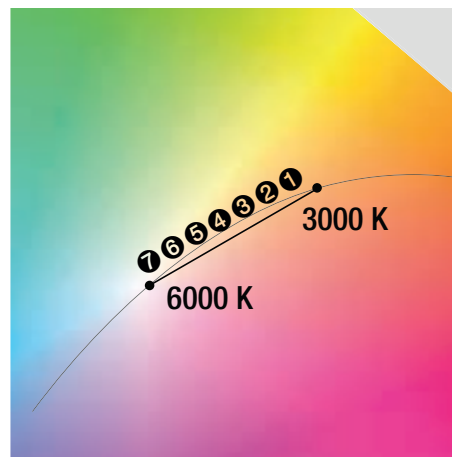
A conventional double pushbutton can be used to control the system via switchDIM and colourTEMPERATURE. One of the pushbuttons is used to set the colour temperature, the other to set the dimming level.



Pushbuttons with glow lamps affect the switchDIM and colourTEMPERATURE and should therefore not be used for this purpose.

For control via a double pushbutton different settings can be made:

- Setting the colour temperature via colourTEMPERATURE mode with 7 predefined values between 3,000 and 6,000 K.
- Stepless setting of the dimming level between 10 and 100 %.
- These values can be changed via masterCONFIGURATOR.

colourTEMPERATURE mode**Location of the predefined colour temperatures**

1	3.000 K
2	3.500 K
3	4.000 K
4	4.500 K
5	5.000 K
6	5.500 K
7	6.000 K

Setting the colour temperature

The procedure for setting the colour temperature mode (colourTEMPERATURE):

- Press the pushbutton briefly (approx. 1 s) to advance the colour temperature by one step



When reaching the maximum value the LED module will flash shortly. Another press on the pushbutton will switch the colour temperature immediately to the minimum value.

- Alternatively the colour temperature can be changed via DALI device type 8 control system.

Light level in DC operation

The LED Driver is designed for operation on DC voltage and pulsed DC voltage.

Light output level in DC operation: programmable 10 – 100 % (EOFx = 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.

For further information please refer to the brochure entitled "Technical Design-In-Guide QLE PREMIUM".

Dimming

Dimming range 10 % to 100 %

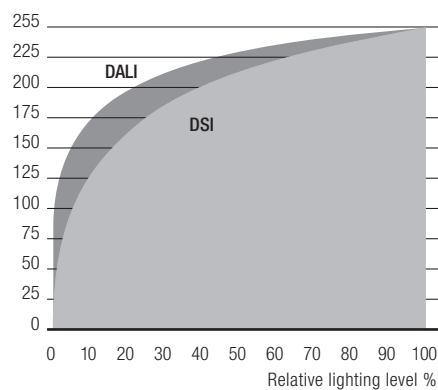
Digital control with:

- DSI signal: 8 bit Manchester Code
Speed 10 % to 100 % in 1.4 s
- DALI signal: 16 bit Manchester Code
Speed 10 % to 100 % in 0.1 s
Programmable parameter:
Minimum dimming level
Maximum dimming level
Default minimum = 10 %
Programmable range $10 \% \leq \text{MIN} \leq 100 \%$
Default maximum = 100 %
Programmable range $100 \% \geq \text{MAX} \geq 10 \%$

Dimming curve is adapted to the eye sensitiveness.

Dimming characteristics

Digital dimming value



Dimming characteristics as seen by the human eye

Maximum loading of automatic circuit breakers

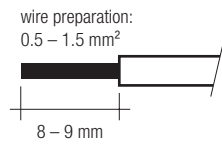
Automatic circuit breaker type	C10	C13	C16	C20	B10	B13	B16	B20	Inrush current	
Installation Ø	1.5 mm ²	1.5 mm ²	1.5 mm ²	2.5 mm ²	1.5 mm ²	1.5 mm ²	1.5 mm ²	2.5 mm ²	I _{max}	time
LCAI 75 W 250 mA TW Ip	14	20	25	30	7	10	14	19	26 A	350 µs

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

Type	THD	3	5	7	9	11
LCAI 75 W 250 mA TW Ip	< 9	6	5	4	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 instructions**

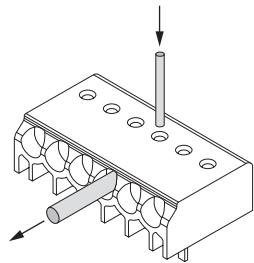
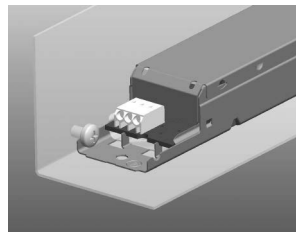
The secondary leads should be separated from the mains connections and wiring for good EMC performance.

The maximum lead length on secondary side is 1.5 m. For a good EMC performance keep the LED wiring as short as possible.

Furthermore, the wiring of the individual channels has to be separated and the use of twisted pairs is not recommended.

Release of the wiring

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

**Side fixing feature**

Screw M4, screw head diameter 8–10 mm