Module CLE PRE2

CLE premium

Product description

- Ideal for round shaped ceiling and pendant luminaires
- Optimal solution for Tunable White applications together with LCA PRE DT8 or 2 channel low profile LED drivers
- This article contains 4 slices of CLE 261 / 401 or 8 slices CLE 541 to equip one luminaire of 360 degrees
- Long lifetime of up to 50,000 h
- 5-year guarantee (conditions at www.tridonic.com)

Optical properties

- Circular Tunable White LED module with 2,700 and 6,500 K SMT packages
- Efficacy of the LED module up to 198 lm/W at 6,500 K, Irated and tp = 45 °C
- High colour rendering index CRI > 90
- Small colour tolerance MacAdam 3①
- Small luminous flux tolerances

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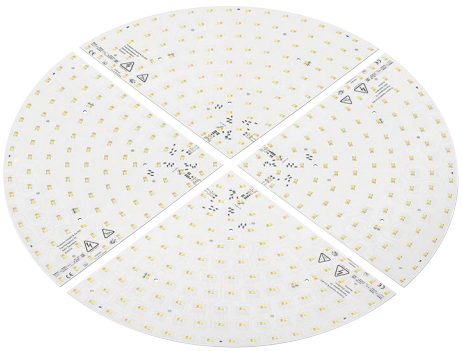
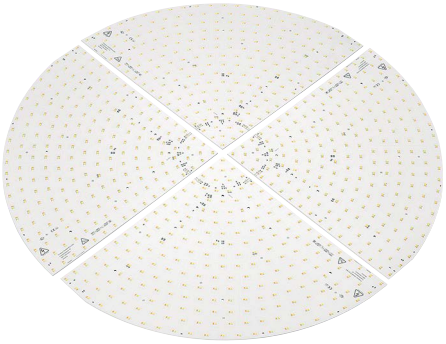
Standards, page 4

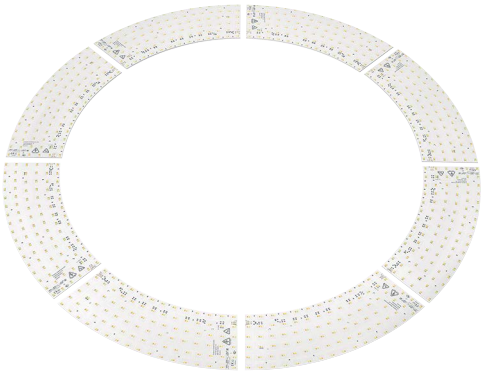
Colour temperatures and tolerances, page 10



CLE 261mm 1150lm 927-965 4T PRE2 QTY4



CLE 401mm 2450lm 927-965 4T PRE2 QTY4



CLE 541mm 900lm 927-965 4T PRE2 QTY8

RoHS

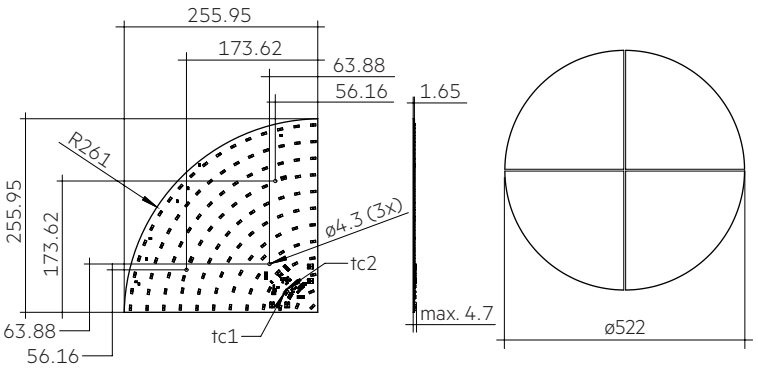
Module CLE PRE2

CLE premium

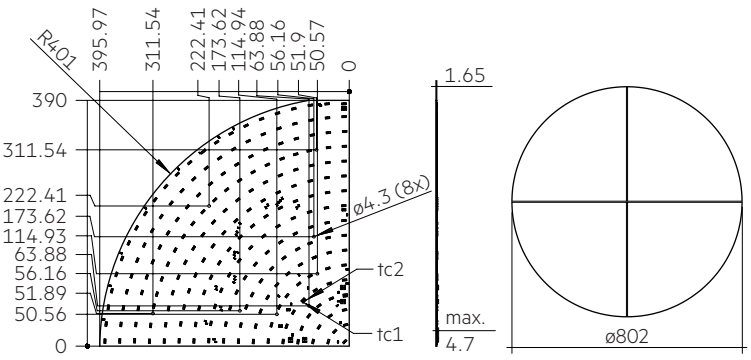
Technical data

Colour consistancy[1]	3 SDCM
ESD classification	severity level 1
Classification acc. to IEC 62031	Built-in
Type of protection	IP00
Lumen maintenance L70B50	50,000 h
Guarantee	5 year(s)

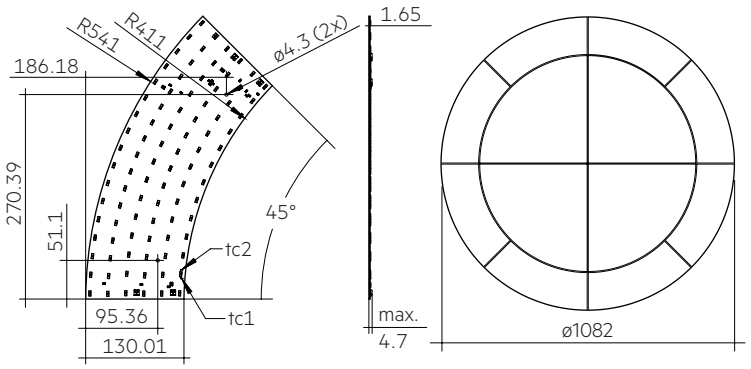
[1] Integral measurement over the complete module.



CLE 261mm 1150lm 927-965 4T PRE2 QTY4



CLE 401mm 2450lm 927-965 4T PRE2 QTY4



CLE 541mm 900lm 927-965 4T PRE2 QTY8

Ordering data

Type	Article number	Packaging	Weight per pcs.
CLE 261mm 1150lm 927-965 4T PRE2 QTY4	**28004931**	1 pc(s).	0.632 kg
CLE 401mm 2450lm 927-965 4T PRE2 QTY4	**28004932**	1 pc(s).	1.412 kg
CLE 541mm 900lm 927-965 4T PRE2 QTY8	**28004933**	1 pc(s).	1.176 kg

Photometric data

Type	Colour temperature	Photometric Code[1]	Useful luminous flux at tp = 25 °C[2]	Luminous flux at tp rated[3]			Efficacy of the module at tp = 25 °C	Expected efficacy of the module at tp rated	Beam characteristic	Colour rendering index CRI
				Min.	Typ.	Max.				
CLE 261mm 1150lm 927-965 4T PRE2 QTY4	2,700 K	927/349	1,090 lm	990 lm	1,080 lm	1,180 lm	173 lm/W	174 lm/W	120°	> 90
	6,500 K	965/349	–	1,125 lm	1,230 lm	1,340 lm	–	198 lm/W	120°	> 90
CLE 401mm 2450lm 927-965 4T PRE2 QTY4	2,700 K	927/349	2,385 lm	2,140 lm	2,345 lm	2,550 lm	173 lm/W	171 lm/W	120°	> 90
	6,500 K	965/349	–	2,445 lm	2,670 lm	2,900 lm	–	195 lm/W	120°	> 90
CLE 541mm 900lm 927-965 4T PRE2 QTY8	2,700 K	927/349	885 lm	800 lm	880 lm	955 lm	174 lm/W	173 lm/W	120°	> 90
	6,500 K	965/349	–	915 lm	1,000 lm	1,090 lm	–	196 lm/W	120°	> 90

[1] The detailed explanation, see data sheet section 1.1.

[2] Tolerance of useful light flux - 0 % / + 15 %. Measurement uncertainty ± 10 %.

[3] Measurement uncertainty ± 10 %. Based on calculation.

Electrical data

Type	Forward current	Min. forward voltage at tp rated	Typ. forward voltage at tp rated	Max. forward voltage at tp = 25 °C	Power consumption Pon at tp = 25 °C[1]	Energy classification	Energy consumption	Type of light source
CLE 261mm 1150lm 927-965 4T PRE2 QTY4	150 mA	39.9 V	41.4 V	43.5 V	6.3 W	C	7 kWh / 1,000 h	ungebündelt
CLE 401mm 2450lm 927-965 4T PRE2 QTY4	350 mA	37.6 V	39.1 V	41.1 V	13.8 W	C	14 kWh / 1,000 h	ungebündelt
CLE 541mm 900lm 927-965 4T PRE2 QTY8	150 mA	32.4 V	33.7 V	35.4 V	5.1 W	C	6 kWh / 1,000 h	ungebündelt

[1] Tolerance of power consumption Pon ± 10 %. Measurement uncertainty ± 5 %.

Specific technical data

Type	Irated	Imax	Max. permissible LF current ripple	Max. permissible peak current / max. pulse width	Max. working voltage for insulation SELV	Electrical strength	ta	tp rated	tc
CLE 261mm 1150lm 927-965 4T PRE2 QTY4	150 mA	220 mA	245 mA	500 mA / 10 ms	60 V	0.5 kV	-25 … +55 °C	45 °C	95 °C
CLE 401mm 2450lm 927-965 4T PRE2 QTY4	350 mA	550 mA	605 mA	1,000 mA / 10 ms	60 V	0.5 kV	-25 … +55 °C	45 °C	95 °C
CLE 541mm 900lm 927-965 4T PRE2 QTY8	150 mA	220 mA	245 mA	500 mA / 10 ms	60 V	0.5 kV	-25 … +55 °C	45 °C	95 °C

1. Standards

EN 61000-4-2
EN 61547
EN 62031
EN 62471
EN 62778

1.1 Photometric code

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

1st digit		2nd + 3rd digit	4th digit	5th digit	6th 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)	
					Code	Luminous flux
7	70 – 79				7	≥ 70 %
8	80 – 89				8	≥ 80 %
9	≥90				9	≥ 90 %

1.2 Risk group

Forward current	Risk group (IEC 62471)	Risk group (IEC 62778)
Imax	RG0	RG2 (Ethr = 200 lx, dthr = 395 mm)

1.3 Energy classification

Type	Colour temperature	Forward current	Energy classification	Energy consumption
CLE 261mm 1150lm 927-965 4T PRE2 QTY4	2,700 – 6,500 K	150 mA	C	7 kWh / 1,000 h
CLE 401mm 2450lm 927-965 4T PRE2 QTY4	2,700 – 6,500 K	350 mA	C	14 kWh / 1,000 h
CLE 541mm 900lm 927-965 4T PRE2 QTY8	2,700 – 6,500 K	150 mA	C	6 kWh / 1,000 h

Energy label and further information at www.tridonic.com in the certificates tab of the corresponding product page and at the EPREL data base https://eprel.ec.europa.eu/

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 CLE a tp temperature of 45 °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 CLE will be strongly reduced or or even destroyed.

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.

3. Installation / wiring

3.1 Electrical supply/choice of LED driver

CLE modules from Tridonic are not protected against overvoltages, overcurrents, overloads or short-circuit currents. Safe and reliable operation can only be guaranteed in conjunction with a LED driver which complies with the relevant standards. The use of LED driver from Tridonic in combination with CLE modules guarantees the necessary protection for safe and reliable operation.

If a LED driver other than Tridonic is used, it must provide the following protection:
- Short-circuit protection
- Overload protection
- Overtemperature protection

CLE modules must be supplied by a constant current LED driver. Operation with a constant voltage LED driver will lead to an irreversible damage of the module.

Wrong polarity can damage the CLE.

With parallel wiring tolerance-related differences in output are possible (thermal stress of the module) and can cause differences in brightness.

If a wire breaks or a complete module fails then the current passing through the other module increases. This may reduce its life considerably.

Permissible number of LED modules per LED driver:

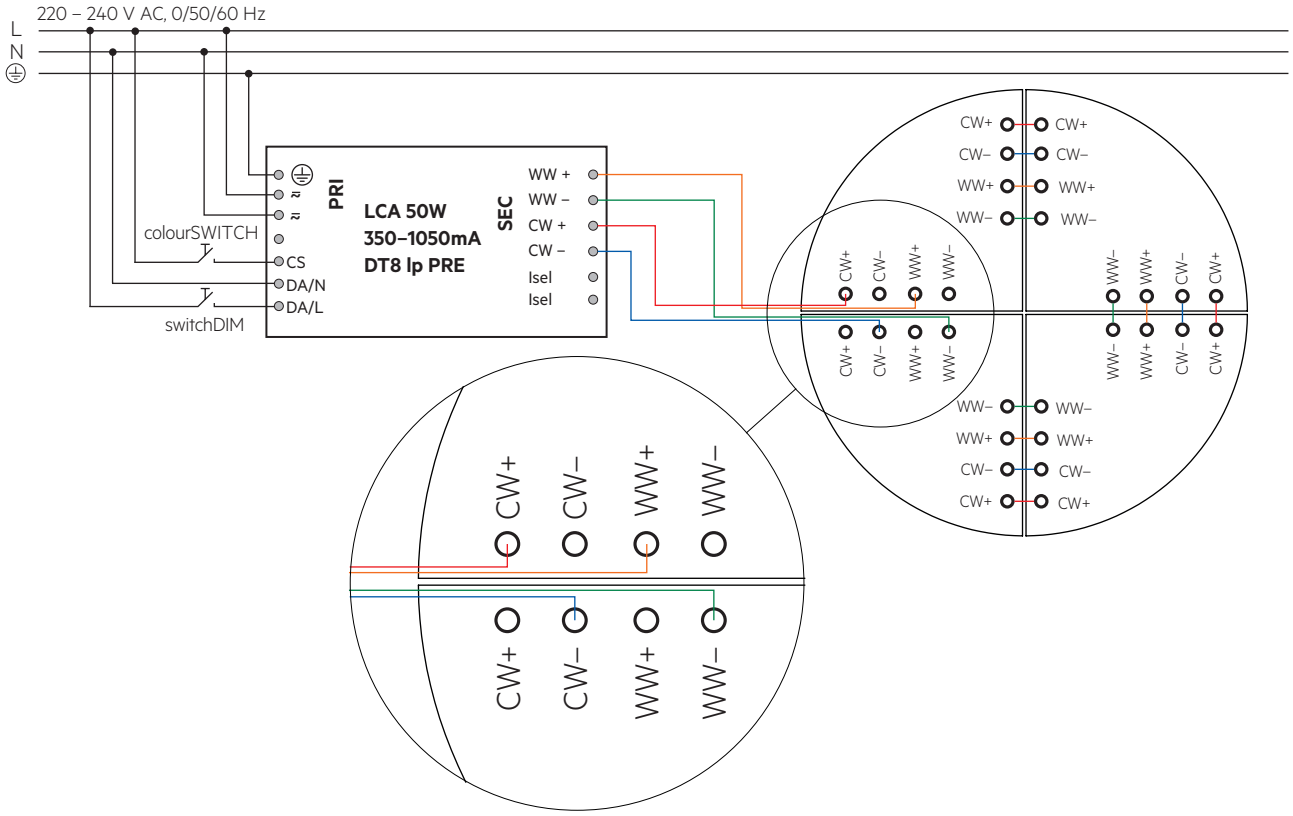
Type	max. number of sets	corresponds to number of modules
CLE 261	2	8
CLE 401	1	4
CLE 541	1	8

CLE have to be operated with SELV LED drivers.

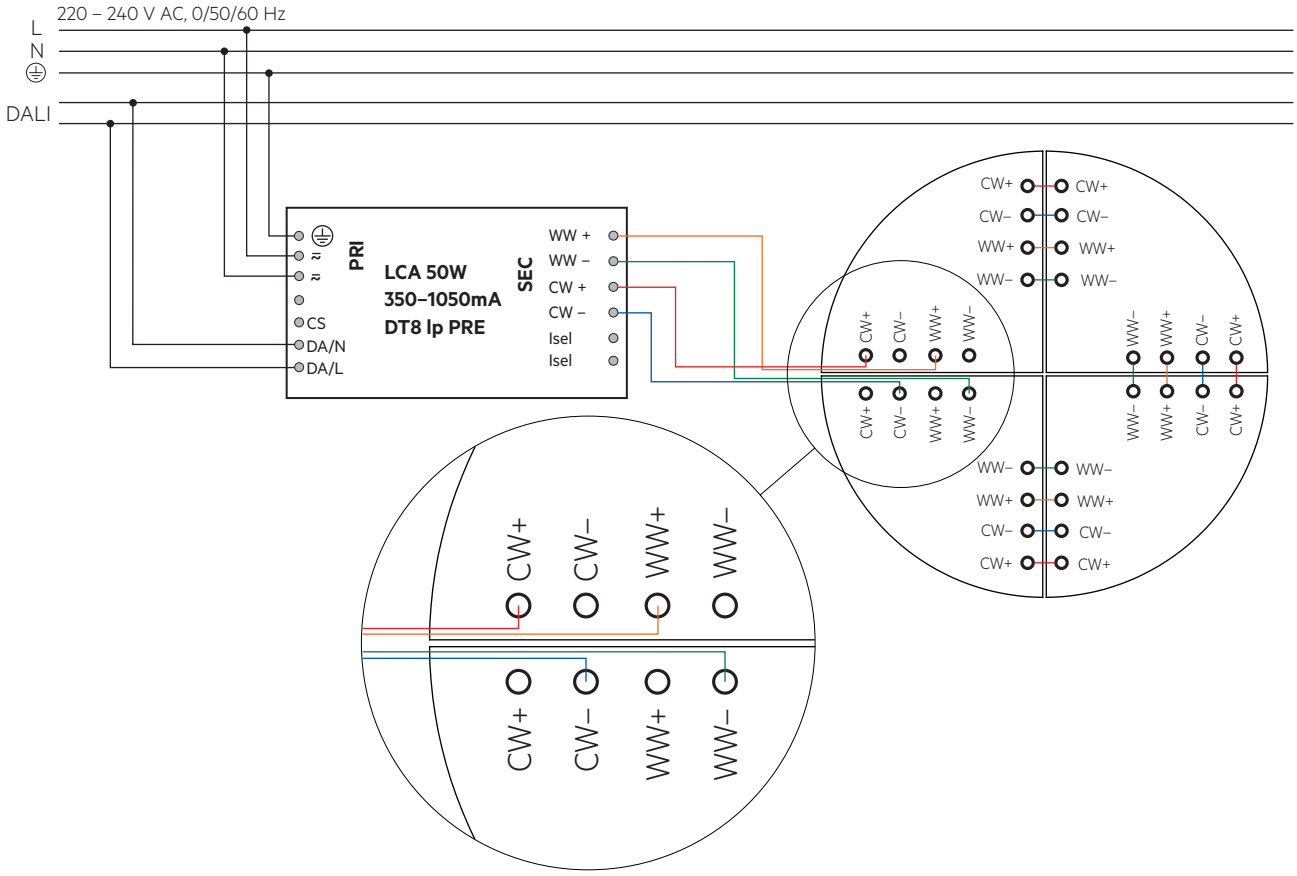
CLE are basic insulated up to 60 V SELV (if mounted with M4 screws with head diameter 8 mm) against ground and can be mounted directly on earthed metal parts of the luminaire. If the max. output voltage of the LED driver (also against earth) is above 60 V SELV, an additional insulation between LED module and heat sink is required (for example by insulated thermal pads) or by a suitable luminaire construction.

3.2 Wiring

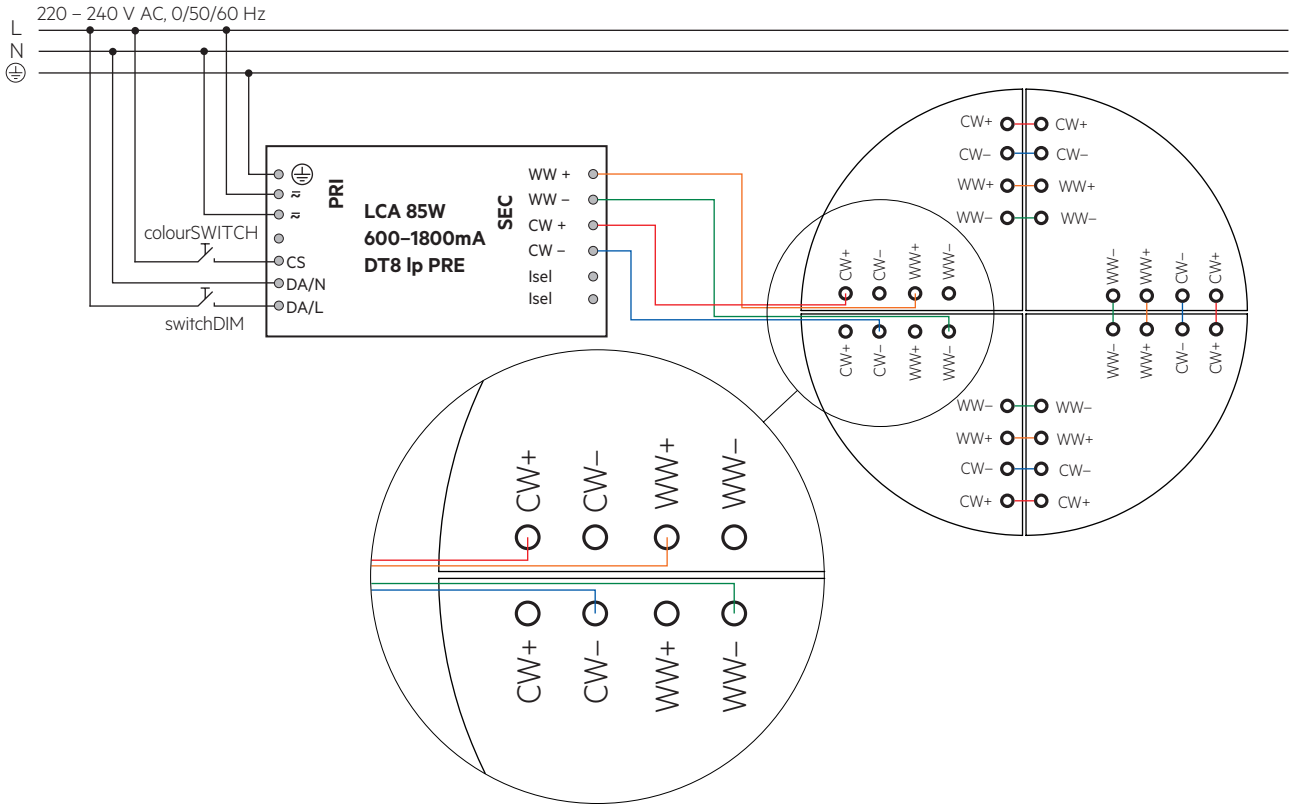
Wiring diagram for switchDIM and colourSWITCH for CLE 261 PRE2



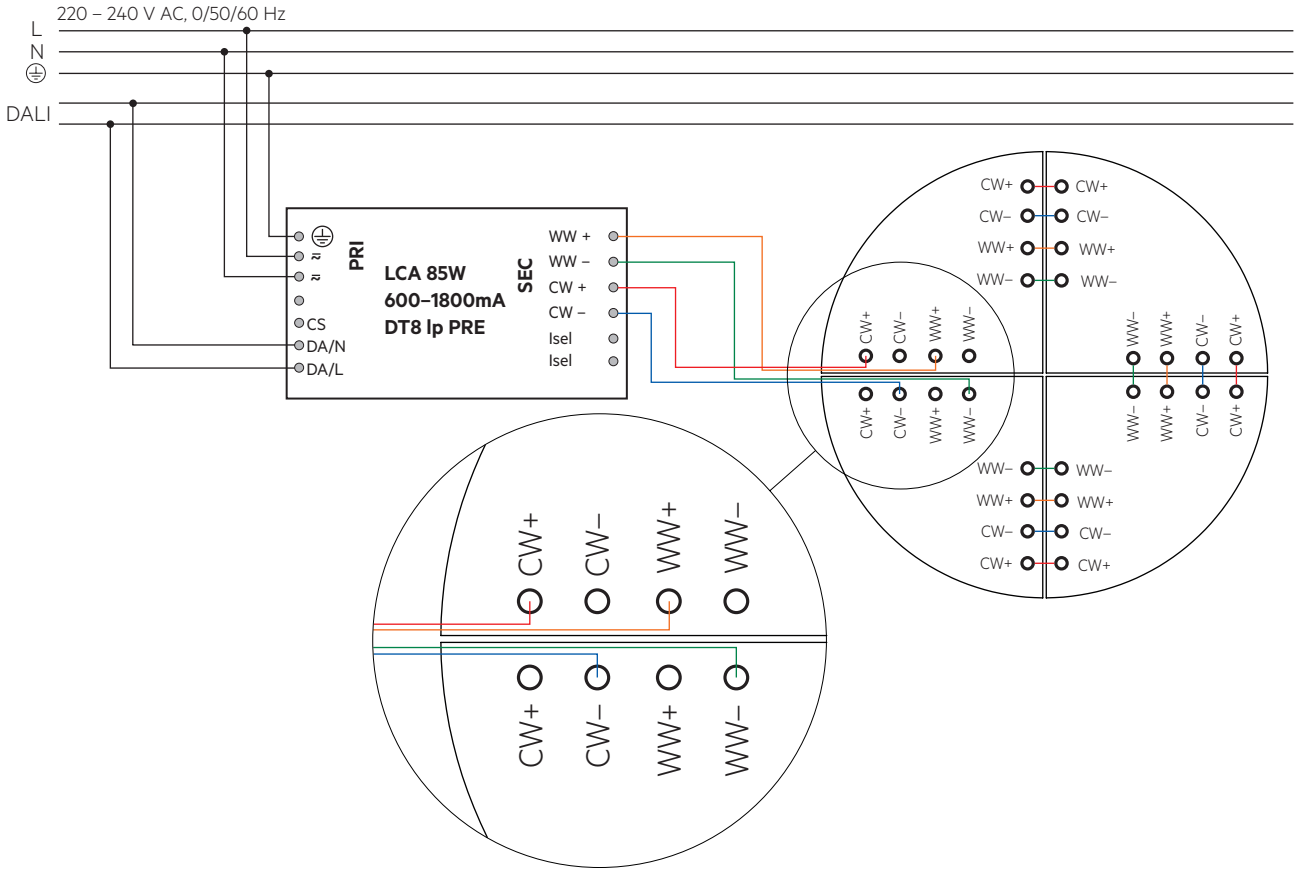
Wiring diagram for DALI forCLE 261 PRE2



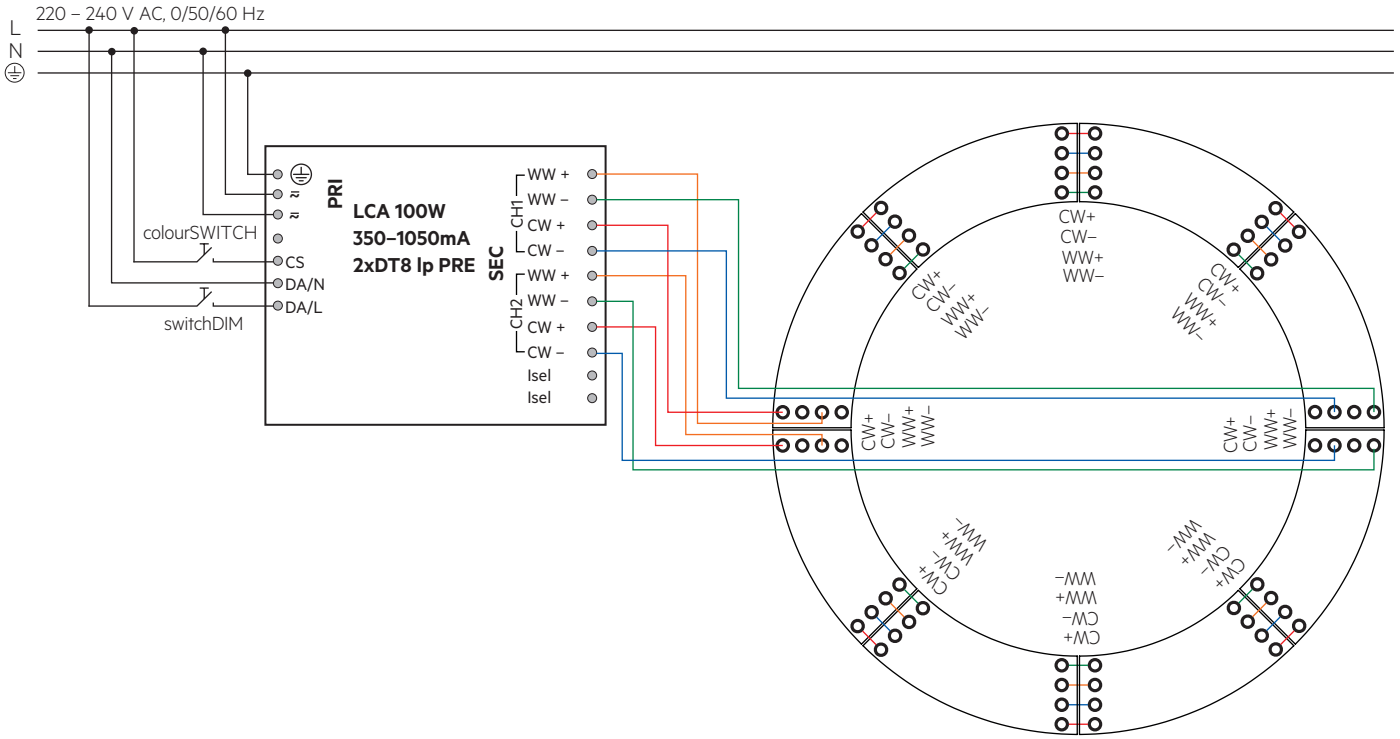
Wiring diagram for switchDIM and colourSWITCH for CLE 401 PRE2



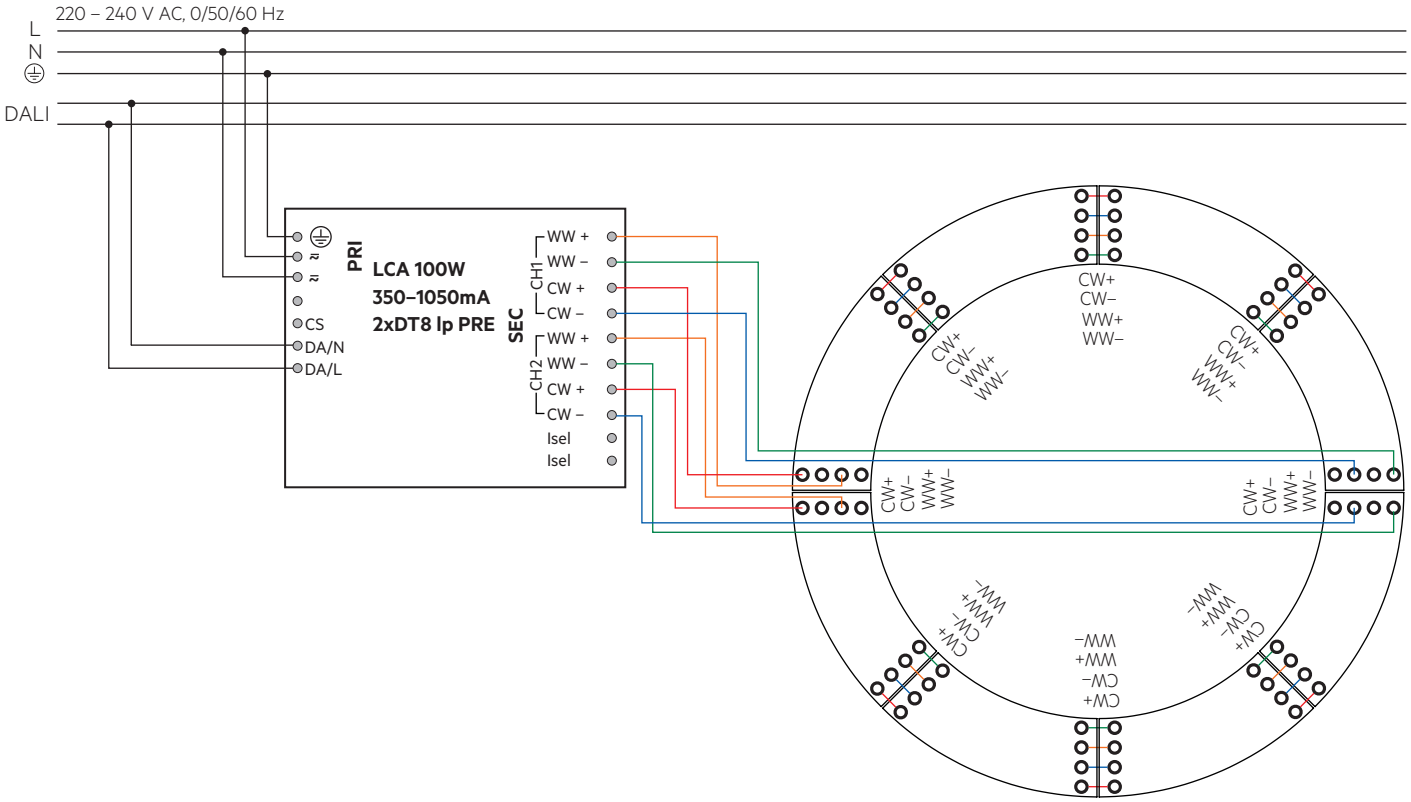
Wiring diagram for DALI forCLE 401 PRE2



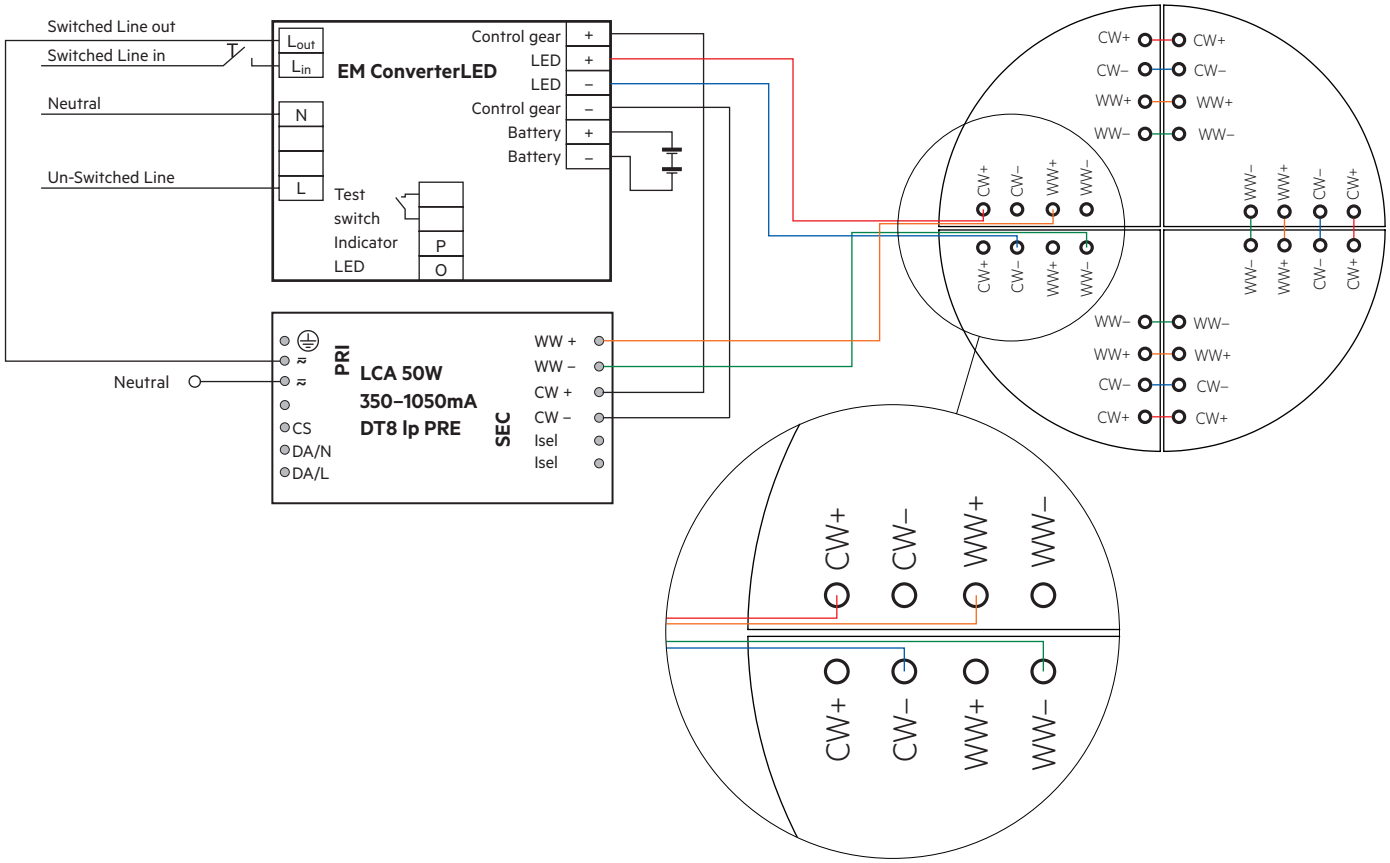
Wiring diagram for switchDIM and colourSWITCH for CLE 541 PRE2



Wiring diagram for DALI for CLE 541 PRE2

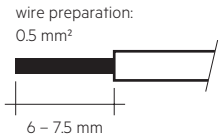


Wiring diagram for emergency



3.3 Wiring type and cross section

For wiring use solid wire of 0.5 mm².
For the push-wire connection you have to strip the insulation (6–7.5 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 CLE (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 CLE premium

Lifetime declarations are informative and represent no warranty claim.

tp temperature	L90 / F10	L90 / F50	L80 / F10	L80 / F50	L70 / F10	L70 / F50
45 °C	>50,000 h	>50,000 h	>50,000 h	>50,000 h	>50,000 h	>50,000 h
50 °C	49,000 h	>50,000 h	>50,000 h	>50,000 h	>50,000 h	>50,000 h
55 °C	43,000 h	>50,000 h	>50,000 h	>50,000 h	>50,000 h	>50,000 h
60 °C	38,000 h	46,000 h	>50,000 h	>50,000 h	>50,000 h	>50,000 h
65 °C	34,000 h	42,000 h	>50,000 h	>50,000 h	>50,000 h	>50,000 h
70 °C	30,000 h	37,000 h	>50,000 h	>50,000 h	>50,000 h	>50,000 h
75 °C	26,000 h	33,000 h	>50,000 h	>50,000 h	>50,000 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

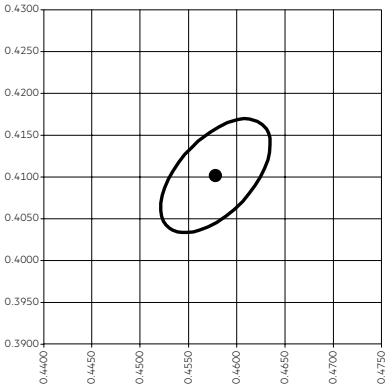
The specified colour coordinates are integral measured by a current impulse of 100 ms.
The ambient temperature of the measurement is ta = 25 °C.
The measurement tolerance of the colour coordinates are ± 0.01.

Module type	Current impulse
CLE 261mm 4600lm PRE2	455 mA
CLE 401mm 2450lm PRE2	910 mA
CLE 541mm 900lm PRE2	455 mA

2,700 K

	x0	y0
Centre	0.4578	0.4101

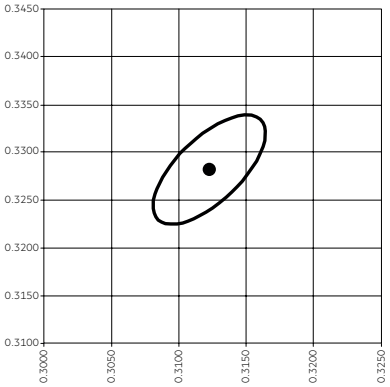
MacAdam ellipse: 3SDCM



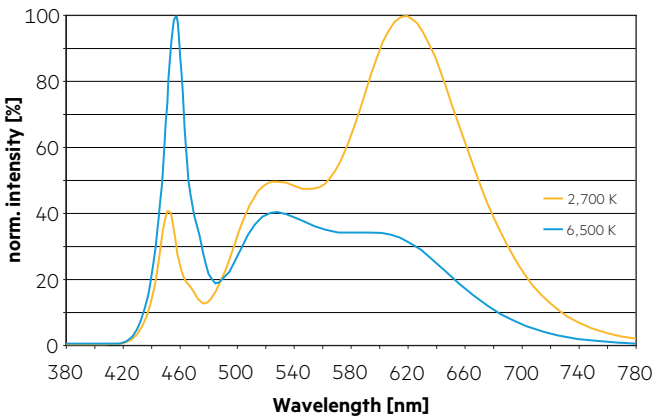
6,500 K

	x0	y0
Centre	0.3123	0.3281

MacAdam ellipse: 3SDCM



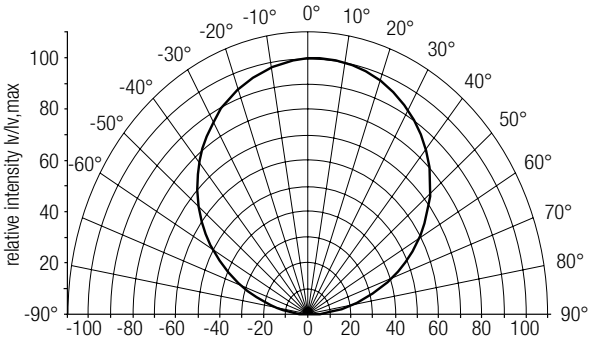
Colour spectrum at different colour temperatures



5.2 Light distribution

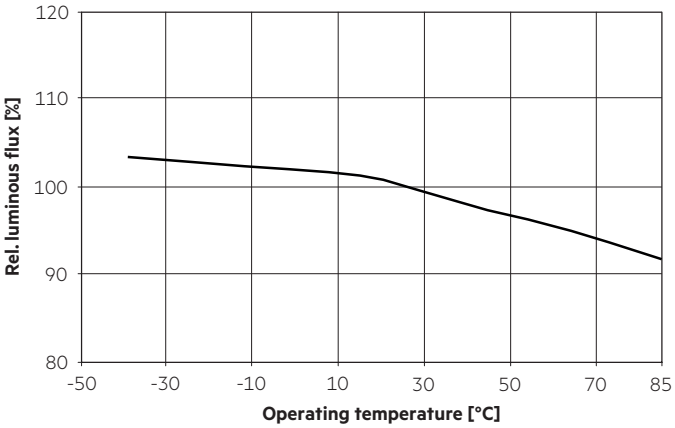
The optical design of the CLE product line ensures optimum homogeneity for the light distribution.

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



7. Miscellaneous

7.1 Additional information

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

Guarantee conditions at www.tridonic.com → Services

Lifetime declarations are informative and represent no warranty claim.