CLARA AC COB DALI

CRYSTAL AC

CLARA AC OH

5W | 10W | 16W

Compact LED-module for downlights and spotlights.

No Driver is required!

Key features

Story

Dali (Digital Addressable Lighting Interface) is a protocol for light control in buildings. The Clara AC Dali and Crystal AC Dali is developed for professional use with Dali Light Control units.

The Clara family is extensive. Now added with a Dali AC-module that works together with all the lenses available for Clara AC COB, all designed for creating an ambient light where people dwell for business or social activities.

The LED modules or LED light engines for downlights and spotlights are designed with internal drivers and are easy to connect with different dimming scenarios. The light output efficiency is the highest among the market for such applications. DALI 2.0 makes it even more controllable and versatile.

Key features

- DALI 2.0
- High efficiency
- Available with 10 beam angles
- Optimized Uniformity
- Anti-glare
- Architectural Lighting
- Commercial Lighting

Content

Introduction

Clara package

The LED module and light engine is named Clara and it is a design for light fittings and luminaires aiming for various areas. It is designed to meet the demands for high optical performance in both light emitting and in colour rendering.

The same package platform applies for Downlight, Spotlight, Tasklight and Medical light fittings etc. The solution is developed to make it easy for designers and engineers to choose from low to high power, from AC to DC and choose between a variety of lenses in the same luminaire or in similar design.

AC and DALI 2.0 design

AC and DALI 2.0 is a unique combination. All driver and dimmer components are built-in. The light output efficiency is the highest among the market for such applications. DALI 2.0 makes it even more controllable and versatile.

The advantages with a combined AC driver and DALI package are:

- Less power consumption in public areas than other LED installations.
- DALI together with sensors and dimming scenario is the optimal solution for optimized energy savings, further decreasing the power consumption between 20-80%.
- Lower maintenance costs of LED lighting.
- Quicker pay back on the investment in LED, AC and DALI.
- Lifetime – Connected to a heat sink and therefore has a controlled environment
- Small – No extra boxes
- Simple – Easily adapted into to the production line

Light output

Colour stability is important to ensure that the installation has a uniform light output. Parameters such as binning, lifetime and thermal control are vital for good results.

Short form Characteristics

MODULE CHARACTERISTICS	5W version	10W version
Power	5 W +/-10% ea.	10 W +/-10% ea.
Voltage	230	
Number of LED's	1	
Colour Rendering Index	>Ra80, >Ra90	
Colour temperature	2700K, 3000K, 4000K	
Optics	50° and OH: 8°, 12°, 18°, 25°, 40°, 60°	

MECHANICAL	
Module dimension with cover	54.0x46.0 mm hexagonal (CLARA)
Height	
Weight	TBD
Assembly holes	2 x 3.8 mm (CLARA)
Wire connector	CviLux CP04-03S0 or JST BH

ELECTRICAL	
Input voltage range	220-240V
Dimmable	Yes
Power factor	0.98
Total harmonic distortion	<15%
Peak inrush current	600mA
Inrush current duration	< 35µs
Type of power	AC / DALI
Surge protection	1kV
Burst protection	2kV
Over temp. protection	150°C
Energy class	A+
DALI 2.0 System Voltage	9.5V – 22.5V, typically 16V
Clara DALI max power	0.70W
Clara DALI Standby power	< 0.25W

PHOTOMETRICAL		
Flux nominal	500lm	950lm
Efficiency		
SDCM (Mac Adam)	3	
Flicker percent	100%	
Flicker index	TBD	

ENVIRONMENTAL	
Temperature range	-40°C to 85°C (Absolute maximum temp Tc 85°C)
Relative Humidity	10-75%
Ambient air pressure	500-1060 HPa

LIFETIME	
Life length L70B10*	>50 000h (according to TM21 standard)

Article number structure CLARA AC COB DALI

CLARA AC.P.230.1.8YY-NN.DALI	
AC	AC= 230VAC, ED=External Driver required, ID=Internal Driver
P	Power (Watt)
V	Voltage: 230VAC
N	Amount of LEDs
8	CRI: 8=Ra>80, 9=Ra>90
YY	CCT: 27 =2700K, 30 =3000K, 40 =4000K
NN	Viewing angle code

Article name and versions

ARTICLE NAME	POWER	CURRENT	LEDS	CRI	CCT	LENS
Clara AC.5.230.1.827-OH.DALI	5	230	1	80	2700	OH
Clara AC.5.230.1.830-OH.DALI	5	230	1	80	3000	OH
Clara AC.5.230.1.840-OH.DALI	5	230	1	80	4000	OH
Clara AC.10.230.1.827-OH.DALI	10	230	1	80	2700	OH
Clara AC.10.230.1.830-OH.DALI	10	230	1	80	3000	OH
Clara AC.10.230.1.840-OH.DALI	10	230	1	80	4000	OH

ARTICLE NAME	POWER	CURRENT	LEDS	CRI	CCT	LENS
Clara AC.5.230.1.827-50.DALI	5	230	1	80	2700	50°
Clara AC.5.230.1.830-50.DALI	5	230	1	80	3000	50°
Clara AC.5.230.1.840-50.DALI	5	230	1	80	4000	50°
Clara AC.10.230.1.827-50.DALI	10	230	1	80	2700	50°
Clara AC.10.230.1.830-50.DALI	10	230	1	80	3000	50°
Clara AC.10.230.1.840-50:DALI	10	230	1	80	4000	50°

Ordering data

Clara AC COB DALI 50° – Packaging information

Description	Qty (pcs)	Dimension (cm)			GW (kg)
		Length	Width	Height	
Inner box	45	35.6	22.7	9.6	
Outer box	360	46.5	37.5	39.6	13.92

Clara AC COB DALI OH – Packaging information

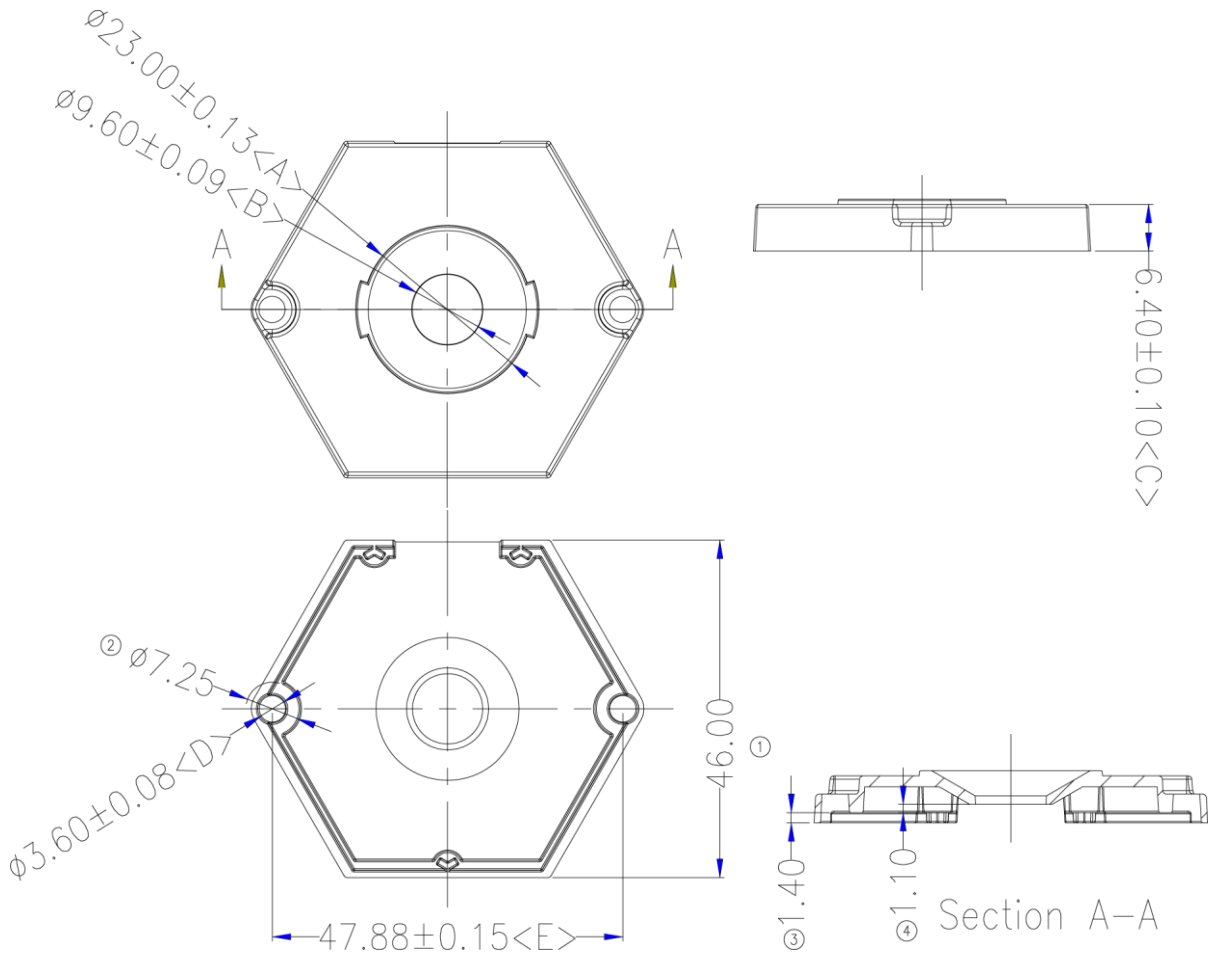
Description	Qty (pcs)	Dimension (cm)			GW (kg)
		Length	Width	Height	
Inner box	60	35.6	22.7	9.6	
Outer box	480	46.5	37.5	39.6	

OH Lens – Packaging information

Description	Qty (pcs)	Dimension (cm)			GW (kg)
		Length	Width	Height	
Inner box	100	30	30	23	3.15
Outer box	200	62	62	25	6.58

Dimensions LED Module CLARA

Clara Optical Holder



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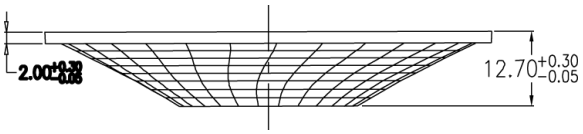
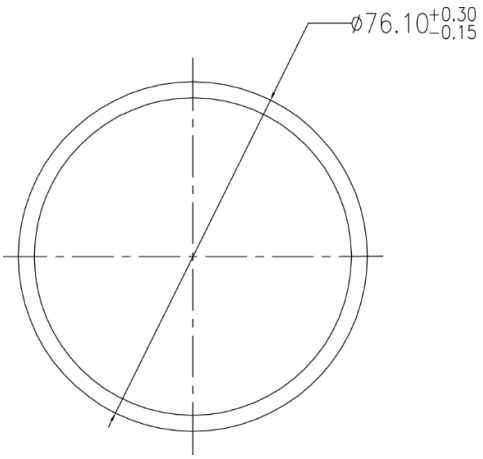
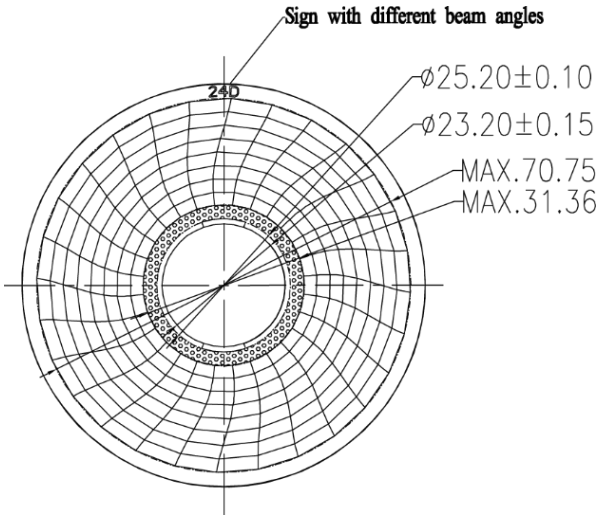
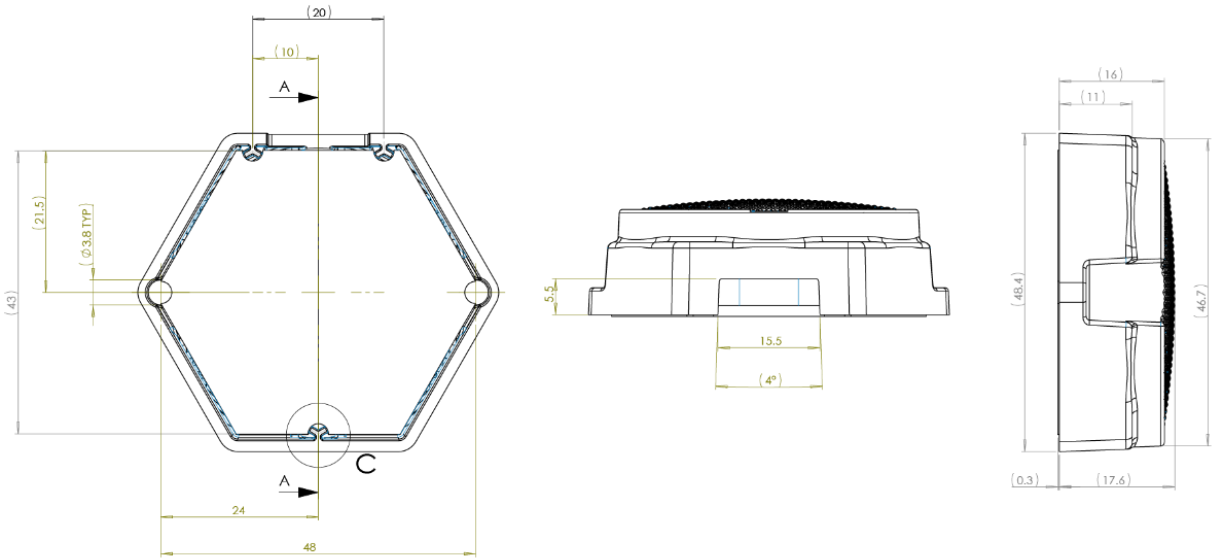
Lens for Clara Optical Holder



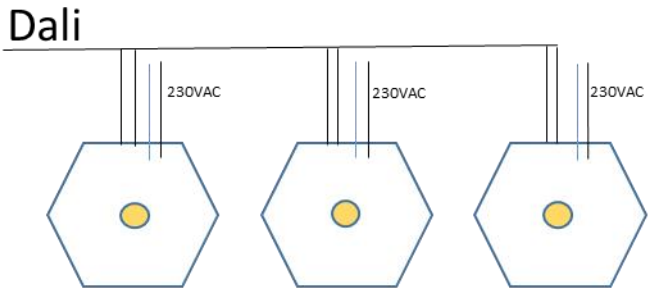




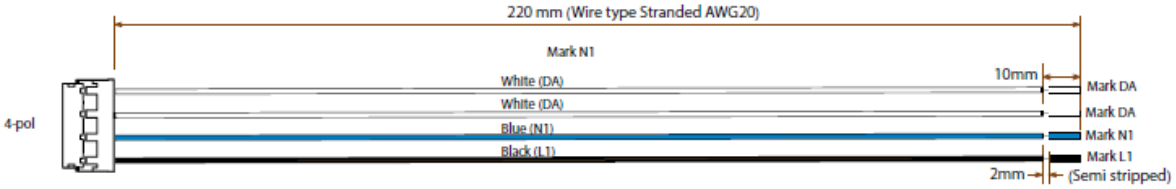
Clara 50° lens



Mounting instructions



Wiring diagram



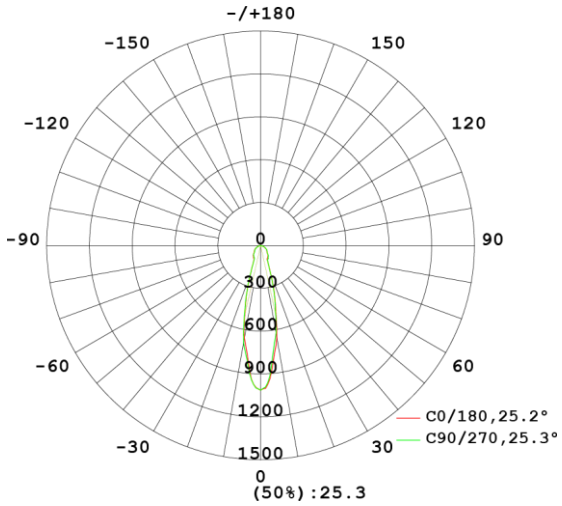
ARTICLE NUMBER	ARTICLE NAME	LENGTH
104930	AC wire 4-pol DALI AWG20 4/4	220 mm (std)

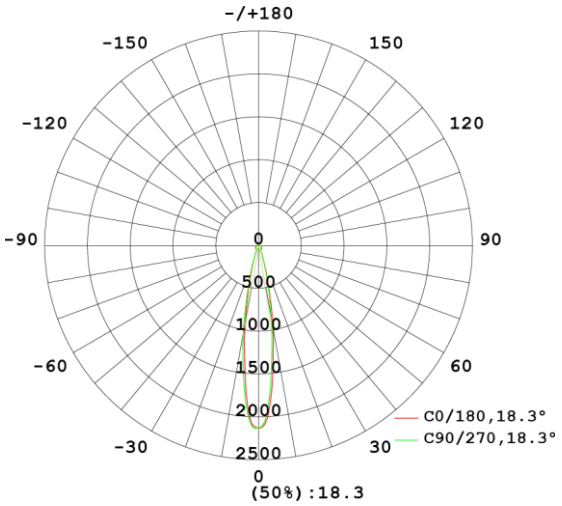
See separate wiring diagram documentation in Datasheet Accessories AC.

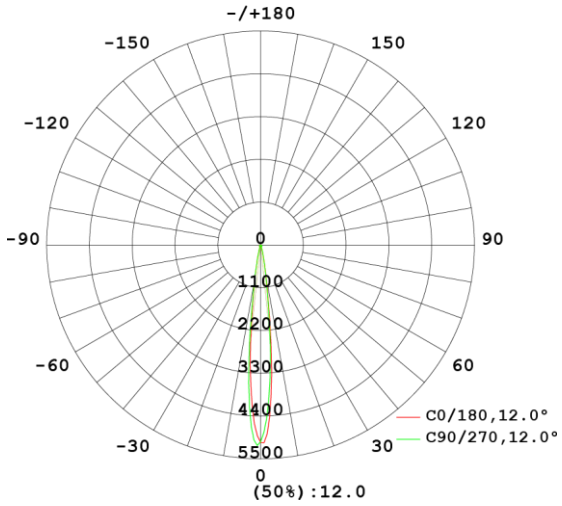
Parameters of the Lens system

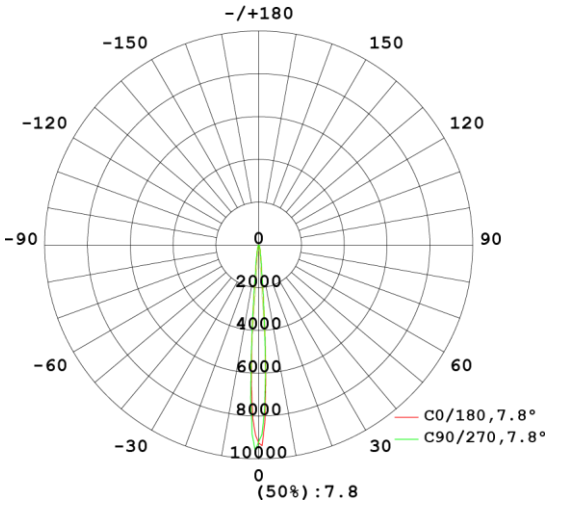
Clara OH system

Version	Viewing angle	FWHM angle
Clara OH Version 60	60°	
Clara OH Version 40	40°	
Clara OH Version 38	25°	
Clara OH Version 24	18°	
Clara OH Version 15	12°	
Clara OH Version 12	8°	









Lens Material	PC LEV1700
Connector Material	PBT4815
Feature	Vacuum metalizaing on the back of lens
Operating Temperature range	40℃~+85℃(upper limit +85℃)
Storage Temperature range	-40℃~+85℃(upper limit +85℃).

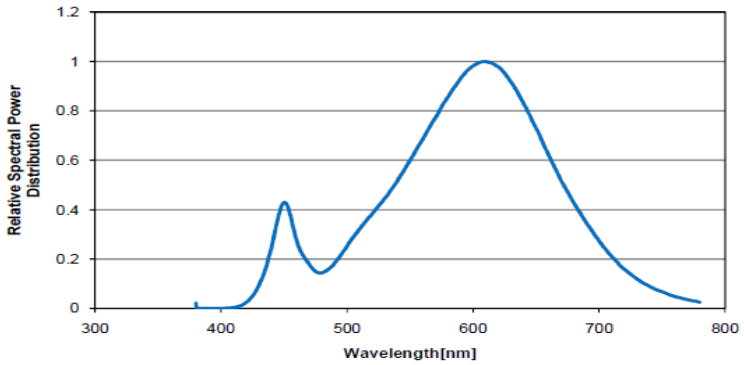
Photometrical

Flux

Parameter		Symbol	Value			Unit
			Min	Typ	Max	
Luminous Flux	5W	Φ_V		500		lm
	10W	Φ_V		950		lm
Correlated Colour Temperature	27*(2)	CCT		2700		K
	30*(2)	CCT		3000		K
	40*(2	CCT		4000		K
CRI		R_a	80	84	-	-
Power		Po		5		W
		Po		10		W

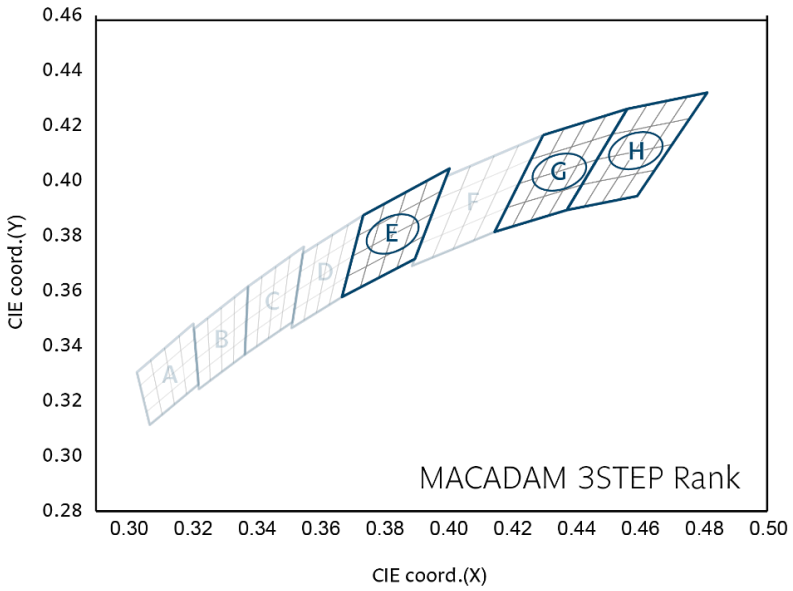
Electro-Optical characteristics LED module at I_F=xxmA, 230VAC, T_A=25ºC
(2)See detailed information in chapter" Binning structure graphical representation"

Colour Spectrum



CCT structure graphical representation

Binning structure graphical representation IEC 1976



* Note that the Blue boxes represent Energy Star Rank

Short form in diagram	Colour Code	CCT
H	27	2700K
G	30	3000K
E	40	4000K

Colour Rendering Index (CRI)

CRI Code	CRI (min) Ra
8	>80
9	>90

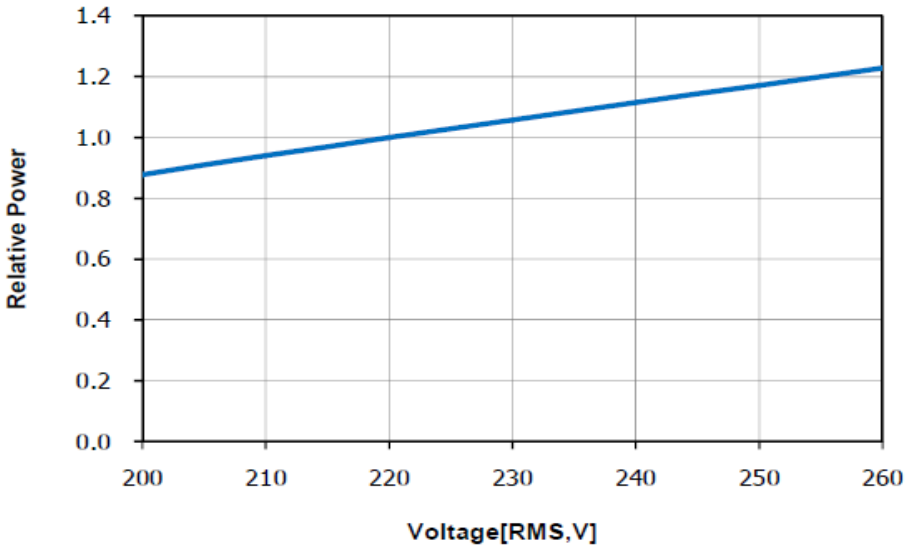
Short form letters for CCT (K)

Colour Code	CCT
27	2700K
30	3000K
40	4000K

Electro Optical data

Current vs. Voltage

With increasing voltage the light output and the heat increases.



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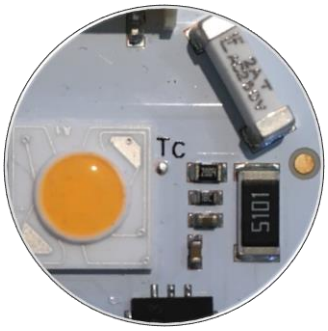
Lifetime (Calculated)

Measurement points

When the measurement takes place you verify that the temperature on the marked measurement points is satisfying. Pending on the result you know what lifetime to expect from the module. This step will be implemented after the heat sink has been connected properly!



The lifetime is calculated at the maximum temperature recommended at the Tc (measuring point). It is important not to exceed this recommendation.

Projected lifetime based on TM-21

The power load used with the LED module is according to the “lumen maintenance projection”. It is a LM80 projected lifetime based on discreet LEDs tested in the stated temperature environment at a 30mA power load.

	55°C	65°C	75°C	85°C
L70B10	>50 000h	>50 000h	>50 000h	>50 000h
L80B10	>50 000h	>50 000h	>50 000h	>50 000h
L90B10	44 000h	44 000h	44 000h	44 000h

Measurement Control

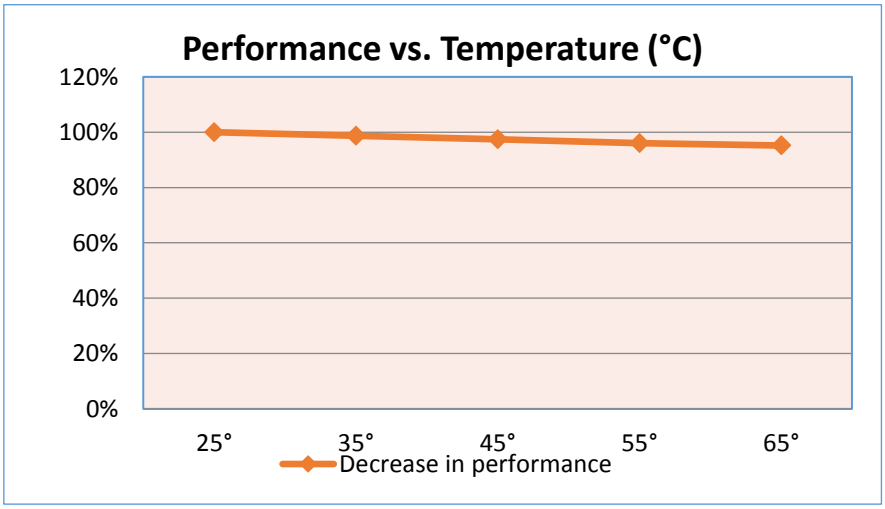
The recommended maximum value is 85°C on Tc or measuring point. If this value is exceeded we cannot guarantee the function and the lifetime of the product. The purpose of the measurement is to control the Junction (Tj) temperature of the LED and also in order to control the performance on the complete setup. By measuring the junction temperature (Tj) the average lifetime of the product is known.

The thermal connection is measured in temperature vs. Power.

Maximum Temperature

Secure the temperature in your application not to exceed 85°C. Read more in the section "Measurement control".

Temperature Characteristics

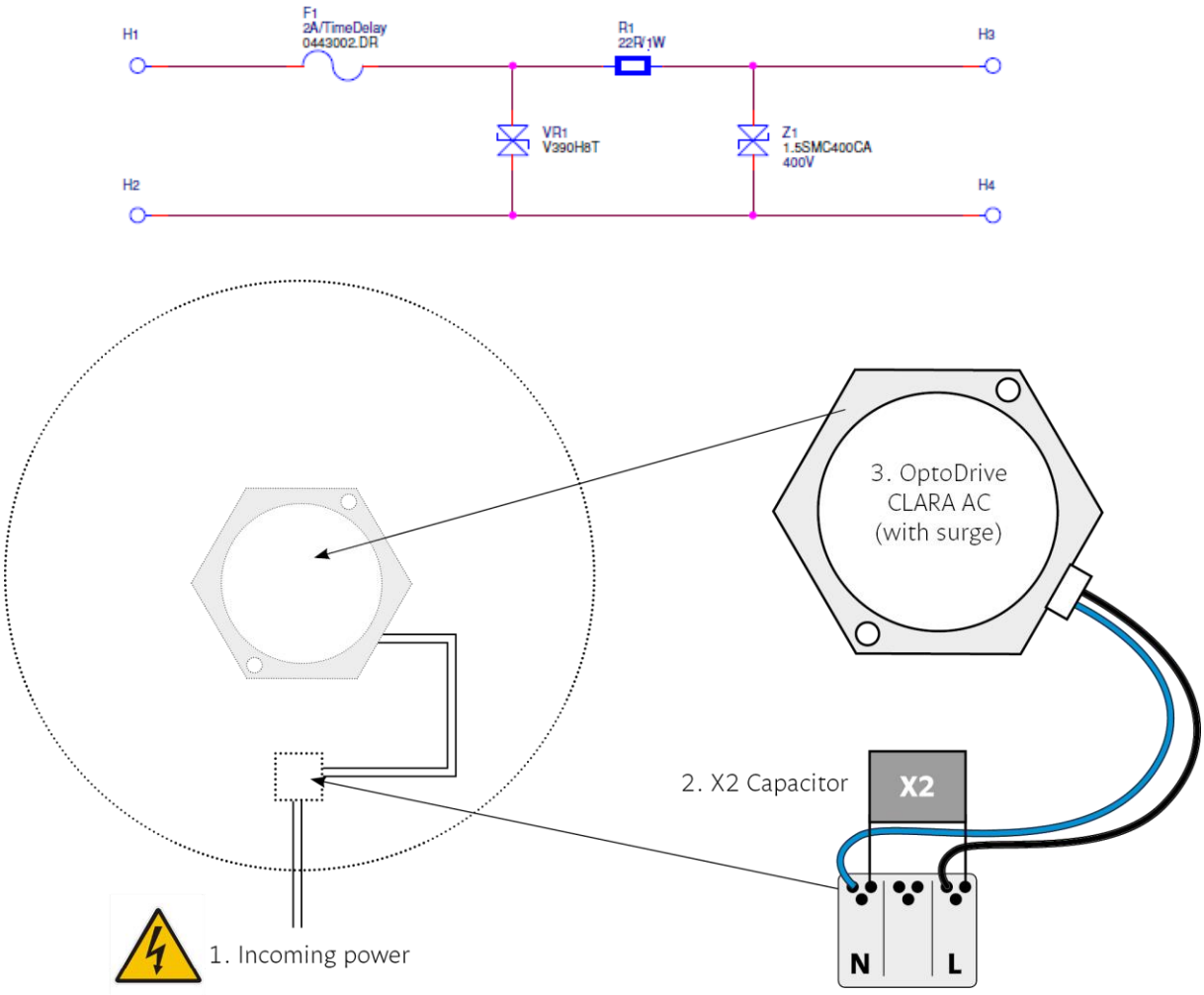


Consider the thermal capabilities of where the LED module is to be fitted. The temperature is an important factor for light output as well as for long time light output degradation.

Surge

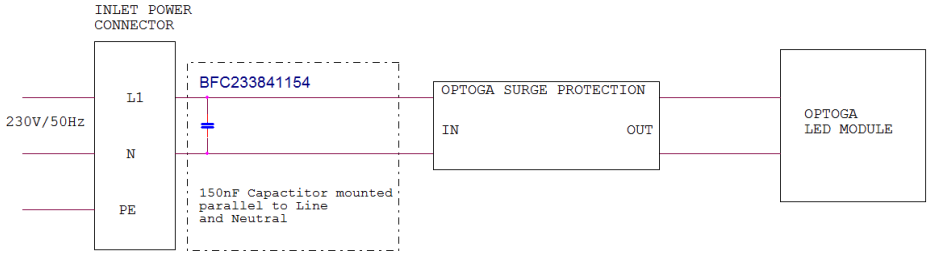
Surge

This document specifies how to connect Optodrive AC modules to achieve long life installation both with Surge, Burst and other problematic installation questions:



The installation set up requires an X2 Capacitor parallel to L1 and N to handle the fast and high voltage transients generated by the magnetic ballast.

Set-up



Surge protection IEC 61000-4-5
The LED module passed the test at 1250V Surge

Limitations

Notification about System Failure

Since our module is 230VAC and there is no driver, the platform of the Clara AC DALI 2.0 can only be powered by the DALI Bus, not by any other driver options. Hence, the DALI 2.0 system will not be able to detect if any modules encounter system failure.
Based on the above, please note that this IEC62386-102:2014 – 9.12 Notification of System Failure is not applicable in our set up, which is in accordance with the DALI standard.

Saving variables Manually

Please note that the Clara AC DALI 2.0 does not automatically save into the NVM memory. If variables need to be stored, the saving process must be manually monitored. The master needs to send command manually ”SAVE PERSISTENT VARIABLES”, which completes the task of storing all variables in NVM and saving to internal FLASH memory.
Please be aware of this important additional procedure when commissioning changes in scenes and groups etc.

Verification of Conformity

The module are under testing at Intertek Semco according to IEC 62031.

SAFETY (LVD)	IEC 62031:2008	
SURGE	IEC 61000-4-5	1 kv
Fast transient BURST	IEC 61000-4-5	2 kv
ESD*	IEC 61000-4-2	8 kv Air discharge 4 kv Contact discharge
Radio Disturbance	IEC 55015:2006 + A1:2007 + A2:2009	
Photo Biological Safety	IEC 62471:2008	
Flicker	IEC 61547	N/A

** Please consult the document ESD standards on Optodrive ED, ID and AC*

Production Setup

Production in accordance with IPC-6012-B and IPC-A-600G class 2

The LED Module is in accordance to EU Directive 2002/95/EC (ROHS)

The bare PCB is isolation tested with 3000VDC/10mA for 10 seconds

PCB Material Setup

In all questions regarding the bare PCB please use “Material Data sheet Optodrive” as a guideline.

Light fittning

Light fitting standard according to EN/IEC-60598-1 production control specifications function test. The insulation test of 500Vdc should be performed 1s with min 2MΩ. No dielectric test should be performed.

Precautions for use

- This device should not be used in any type of fluids such as water, oil, organic solvent etc.
- When cleaning is required, use only water together with mild soap on the outside of the lens. Cleaning inside of the LED module is strictly prohibited.
- The appearance and specifications of the product may be modified for improvement without notice.
- Long time exposure of sunlight or occasional UV exposure will cause lens discoloration.
- Opening of the LED module is prohibited due to risk of EMC, dust, grease and other exposures that will damage it.
- The LED Module should always be mounted to a proper heat sink before it's connected with its proper leads.

Handling in regards to static electricity

- The Optodrive products have integrated circuits (IC) on board that may be damaged if exposed to static electricity. Please handle the products only while using equipment that prevents static electricity. Do not handle them without having ESD protection.
- The Optodrive products are not be installed into the end product without proper ESD protection.
- Optodrive LED Modules meet IEC61547:2009 and IEC61000-4-2. We recommend the light fixture manufacturer to take the mentioned standards under consideration.

Storage before use

- Use only properly rated test equipment and tools for the rated voltage and current of the product being tested.
- It is strongly suggested to wear rubber insulated gloves and rubber bottom shoes while handling the product.
- Do not wear any conductive items (such as jewelry) which could accidentally contact electric circuits.
- Faults, lightning, or switching transients can cause voltage surges in excess of the normal ratings.
- Internal component failure can cause excessive voltages.
- Stored or residual electricity in long wire could be hazardous.

ROHS II Compliant

All our LED modules meet the Restrictions of Hazardous Substances (RoHS II)!

There has been a growing consensus that Lead Free Systems should increase for the safety of our environment. It is a very serious problem that lead and other harmful materials are being used in commercial and industrial products, causing more and more environmental problems. This has led to regulations such as RoHS (Restriction of the use of certain Hazardous Substances) from the EU and the Japan Ministry of Trade and Industry (MITI). All LED module makers providing products to these countries should comply with these restrictions. In order to meet the RoHS II regulation, Optoga is strictly implementing a ban on lead and other hazardous materials in its products. This is in compliance with our responsibilities as good corporate citizens.

Design for Environment:

According to the EU-directive 2011/65/EU (RoHS II) the following substances must not be used in this product

- Lead (Pb) alloys
- Mercury (Hg)
- Cadmium (Cd)
- Chromium (6+) compounds
- Polybrominated biphenyls (PBB)
- Polybrominated diphenyl ethers (PBDE)

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Do you want to know more about benefits of OptoDrive LED?

Read more about OptoDrive at www.optoga.com.
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Optoga AB
Optoga was founded in November 2004 in Arboga, Sweden and has many years of experience in electronics design. The company developes and supplies LEDs and LED-module solutions for the lighting industry, vehicle manufacturers and electronics companies.

With the OptoDrive LED-module, Optoga has taken the initiative to replace strip lights, incandescent and halogen bulbs with LED-based sources.

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