



LILLY AC



LILLY60 AC

120VAC
4W | 6W | 8W

Compact round LED-light engine for pendants.

No driver is required!



Key features

Story

Designed for pendants and places where the need is to create a good atmosphere for people to dwell in whether they take care of business or socialize.

These AC LED –light engines or LED modules are designed with internal drivers and are therefore very easy to connect into applications with different dimming scenarios. The light output efficiency is the highest available on the market for these types of applications.

Key features

- High efficiency
- Optimized Uniformity
- Lens with Connector
- Anti-glare
- Architectural Lighting
- Commercial Lighting





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Introduction

Lilly package

The light-engine is a round LED-light engine for pendants with a centered hole for wires. Wires are easily inserted into poke-in connectors.

AC design

All driver and dimmer components are built-in.

The advantage with an AC driver that has been built-in is:

- Lifetime – Connected to a heat sink and therefore has a controlled environment
- Dimming – Dimming via standard trailing edge dimmers
- 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.



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Short form Characteristics

MODULE CHARACTERISTICS	4W version	6 W	8W
Power	4W +/-10% ea.	6W +/-10% ea.	8W +/-10% ea.
Voltage	120		
Number of LED's	24		
Colour Rendering Index	>Ra80, >Ra90		
Colour temperature	2700K, 3000K, 4000K		
Optics	130°		

MECHANICAL

Module dimension with cover	Round Ø 60mm
Inner diameter hole	13mm
Height	8mm
Weight	19g
Assembly holes	3 x 3.5 mm
Wire connector	Poke in

ELECTRICAL

Input voltage range	100-140V
Dimmable	Yes
Power factor	0.98
Total harmonic distortion	<15%
Type of power	AC
Surge protection	1kV
Burst protection	2kV
Over temp. protection	150°C
Energy class	A+

PHOTOMETRICAL

Flux nominal	400 lm	600 lm	800 lm
Efficiency	105lm/W		
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)
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Article number structure

LILLY60 AC.P.230.24.XYY-130

Name	Lilly
Size	80 or 60mm
AC	AC= 120VAC, ED=External Driver required, ID=Internal Driver
P	Power (Watt)
V	Voltage: 120VAC
N	Amount of LEDs
X	CRI: 8=Ra>80, 9=Ra>90
YY	CCT: 27 =2700K, 30 =3000K, 40 =4000K
NN	Viewing angle code

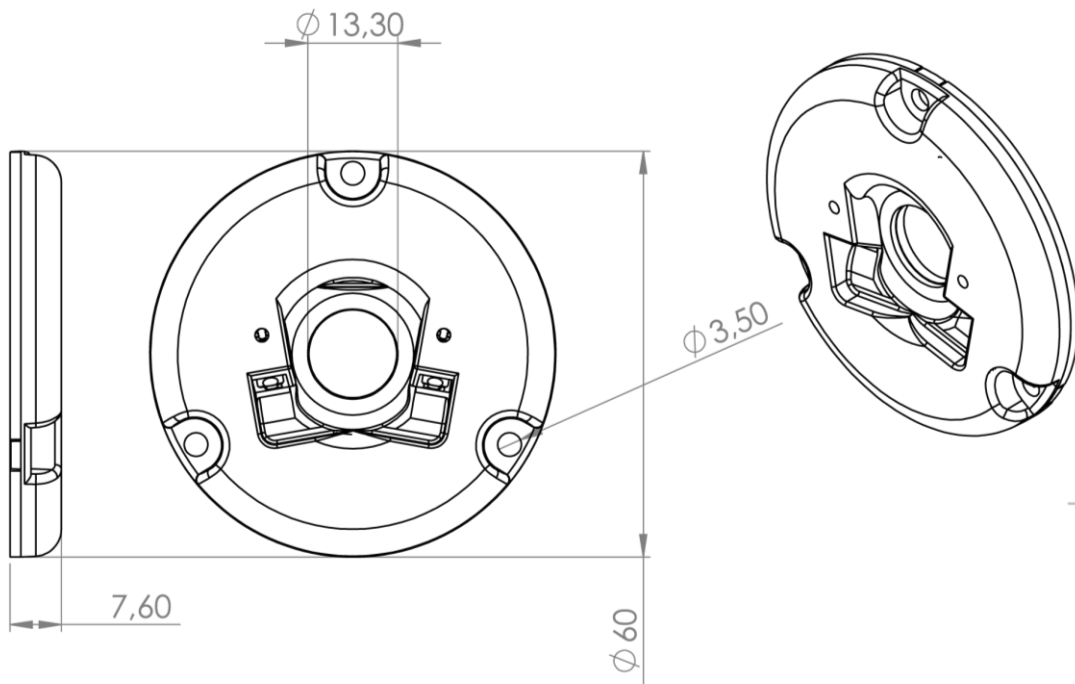
Article name and versions

ARTICLE NAME	POWER	VOLTAGE	LEDS	CRI	CCT	LENS
Lilly60 AC.4.120.24.827-130	4	120	24	80	2700	130°
Lilly60 AC.4.120.24.830-130	4	120	24	80	3000	130°
Lilly60 AC.4.120.24.840-130	4	120	24	80	4000	130°
Lilly60 AC.4.120.24.927-130	4	120	24	90	2700	130°
Lilly60 AC.4.120.24.930-130	4	120	24	90	3000	130°
Lilly60 AC.4.120.24.940-130	4	120	24	90	4000	130°
Lilly60 AC.6.120.24.827-130	6	120	24	80	2700	130°
Lilly60 AC.6.120.24.830-130	6	120	24	80	3000	130°
Lilly60 AC.6.120.24.840-130	6	120	24	80	4000	130°
Lilly60 AC.6.120.24.927-130	6	120	24	90	2700	130°
Lilly60 AC.6.120.24.930-130	6	120	24	90	3000	130°
Lilly60 AC.6.120.24.940-130	6	120	24	90	4000	130°
Lilly60 AC.8.120.24.827-130	8	120	24	80	2700	130°
Lilly60 AC.8.120.24.830-130	8	120	24	80	3000	130°
Lilly60 AC.8.120.24.840-130	8	120	24	80	4000	130°
Lilly60 AC.8.120.24.927-130	8	120	24	90	2700	130°
Lilly60 AC.8.120.24.930-130	8	120	24	90	3000	130°
Lilly60 AC.8.120.24.940-130	8	120	24	90	4000	130°

Lilly AC – Packaging information

Description	Qty (pcs)	Dimension (cm)			GW (kg)
		Length	Width	Height	
Inner box	40	35.6	22.7	9.6	
Outer box	TBD	46.5	37.5	39.6	

Dimensions LED Module:

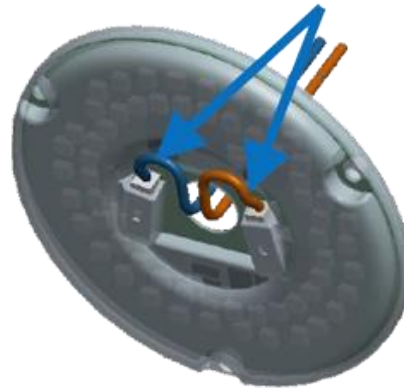


Mounting instructions

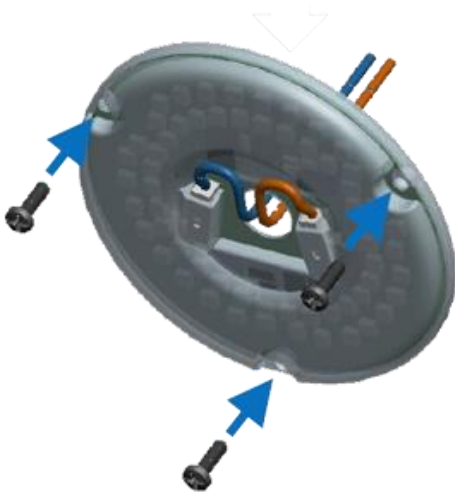
Mounting



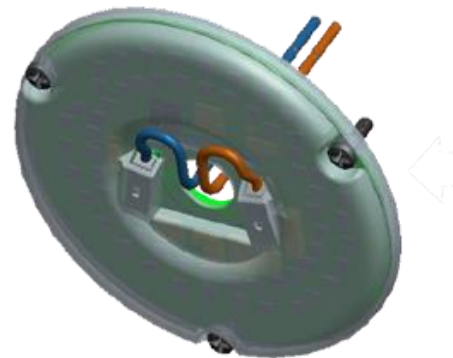
1 Insert the AC wire into the cover hole.



2 Slot in AC cable into AC connector.



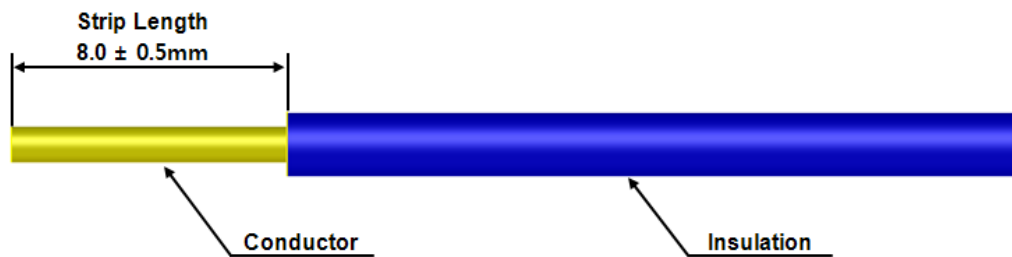
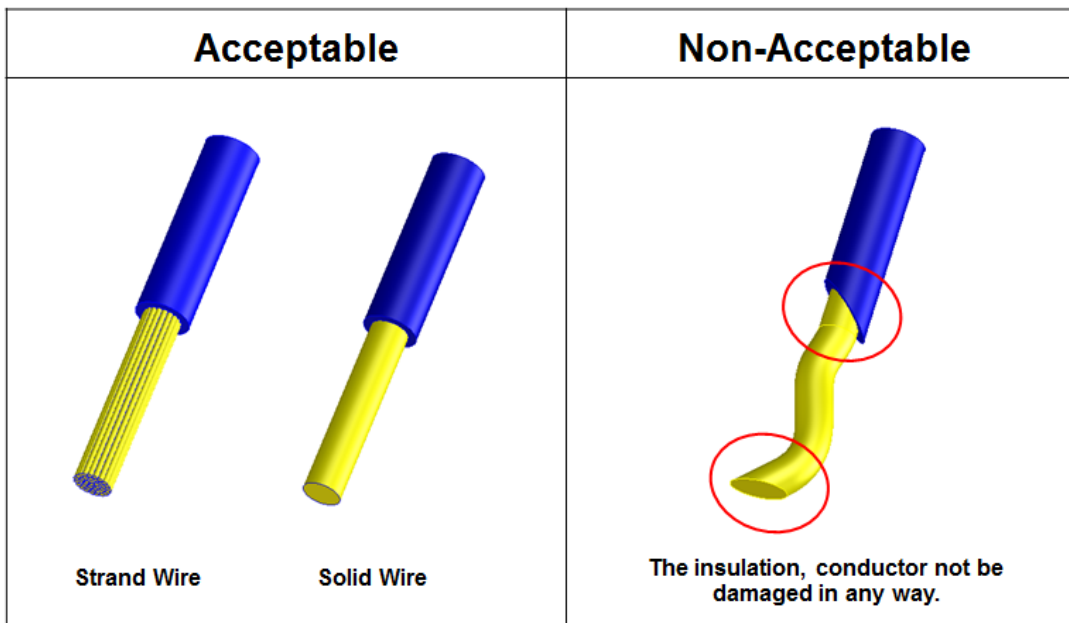
3 Mount the screws to fixate module.



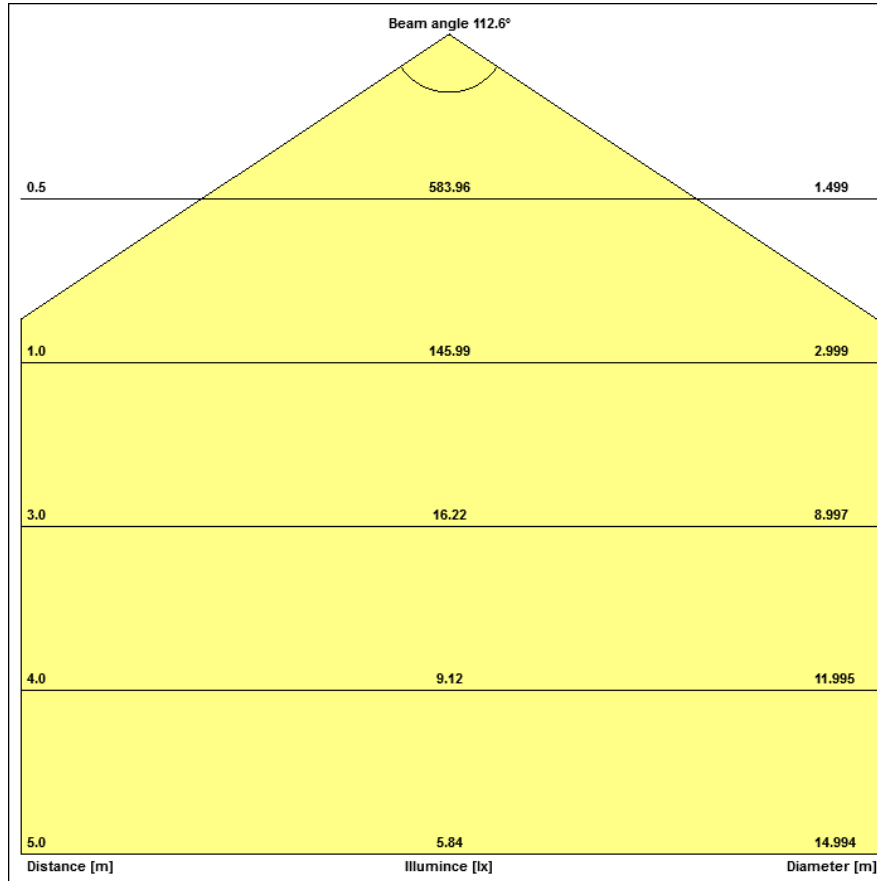
4 Mounted.

Wiring

Type of wire	AWG	mm ²
Stranded	22-18	0.32-0.8mm ²
Solid	24-18	0.51-1.02∅ (0.2-0.8mm ²)
Insulation diameter	Max 2.1 mm	



Parameters of the lens system



Parameters of the Light Output

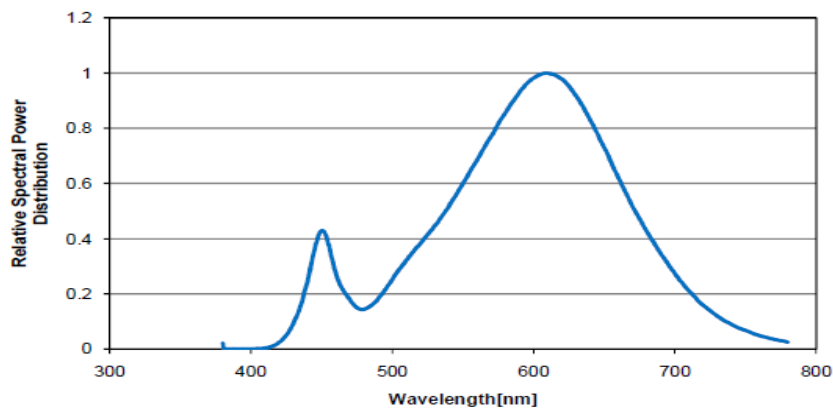
LUMEN OUTPUT LILLY60 AC

Parameter		Symbol	Value			Unit
			Min	Typ	Max	
Luminous Flux	4W	Φ_V	400	430	500	lm
	6W	Φ_V	580	630	750	lm
	8W	Φ_V	780	830	1000	lm
Correlated Colour Temperature	27 ^{*(2)}	CCT		2700		K
	30 ^{*(2)}	CCT		3000		K
	40 ^{*(2)}	CCT		4000		K
CRI		R _a	80	84	-	-
		R _a	90	94		
Power		P _o	3.6	4	4.4	W
		P _o	5.4	6	6.6	W
		P _o	7.2	8	8.8	W

Electro-Optical characteristics LED module at I_F=xxmA, 120VAC, T_A=25°C

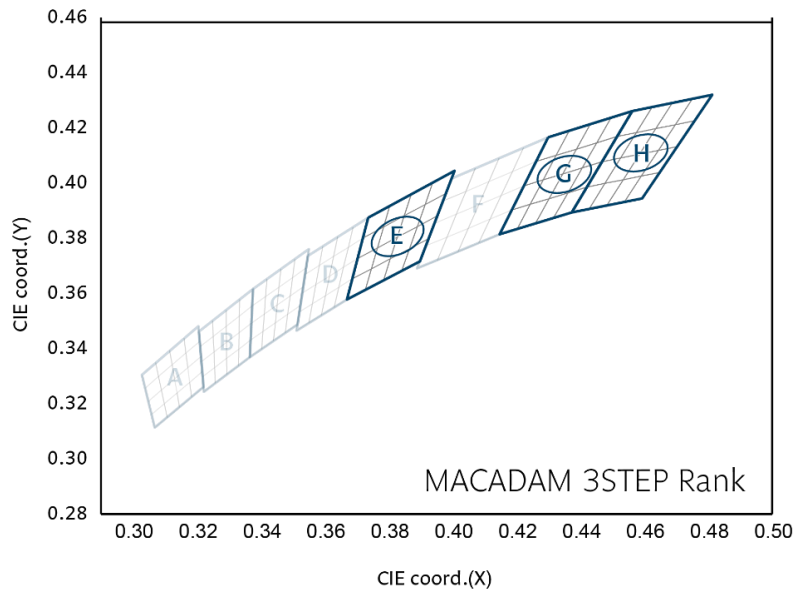
(2)See detailed information in chapter "Binning structure graphical representation"

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

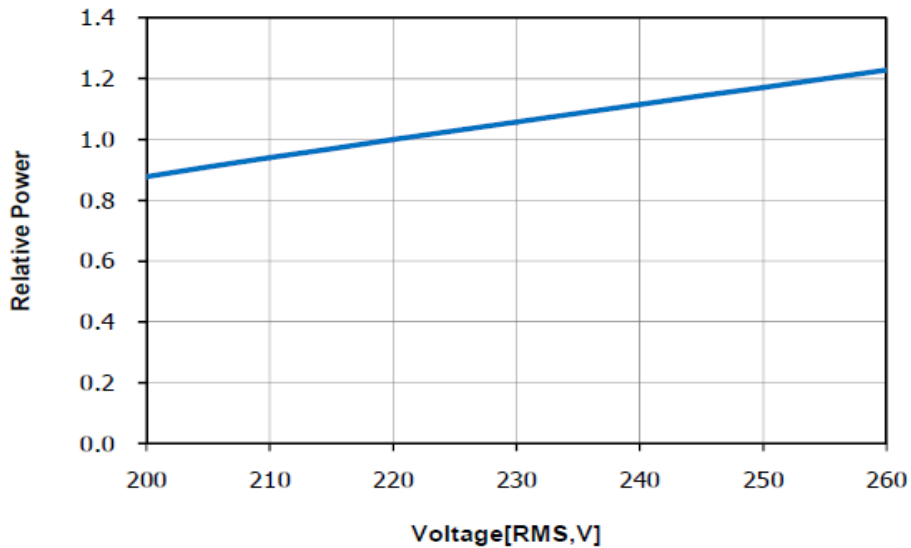
Short form letters for CCT (K)

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

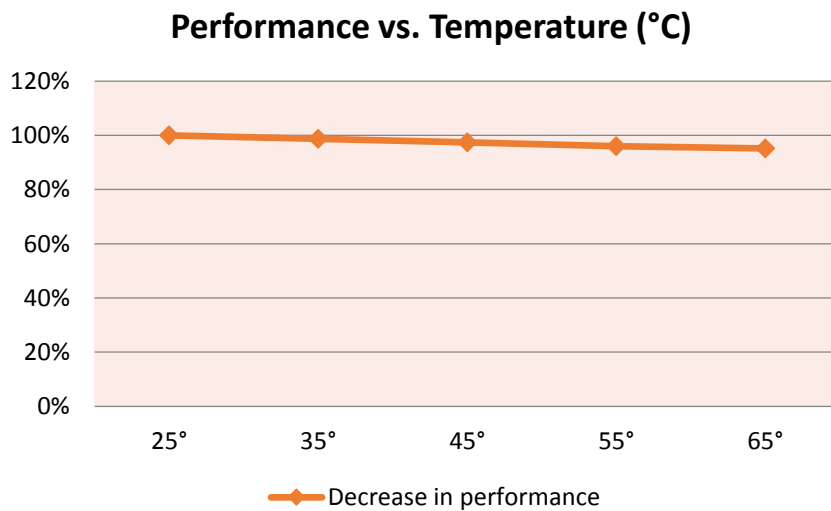
Electro Optical data

Current vs. Voltage

With increasing voltage the light output and the heat increases.



Temperature Characteristics



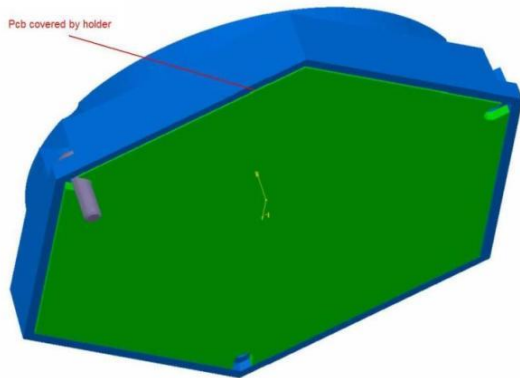
Consider the thermal capabilities of where the LED module is to be fitted. The temperature is an important factor for light output as well as for long time light output degradation.

Thermal information

The thermal area (green) should be properly connected to an even and fine surface of a heat sink. Without this arrangement the unit will be overheated and will not be able to survive.

Maximum Temperature

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



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.

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.

Measurement points



This step will be implemented after the heat sink has been connected properly!



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Projected lifetime based on TM-21

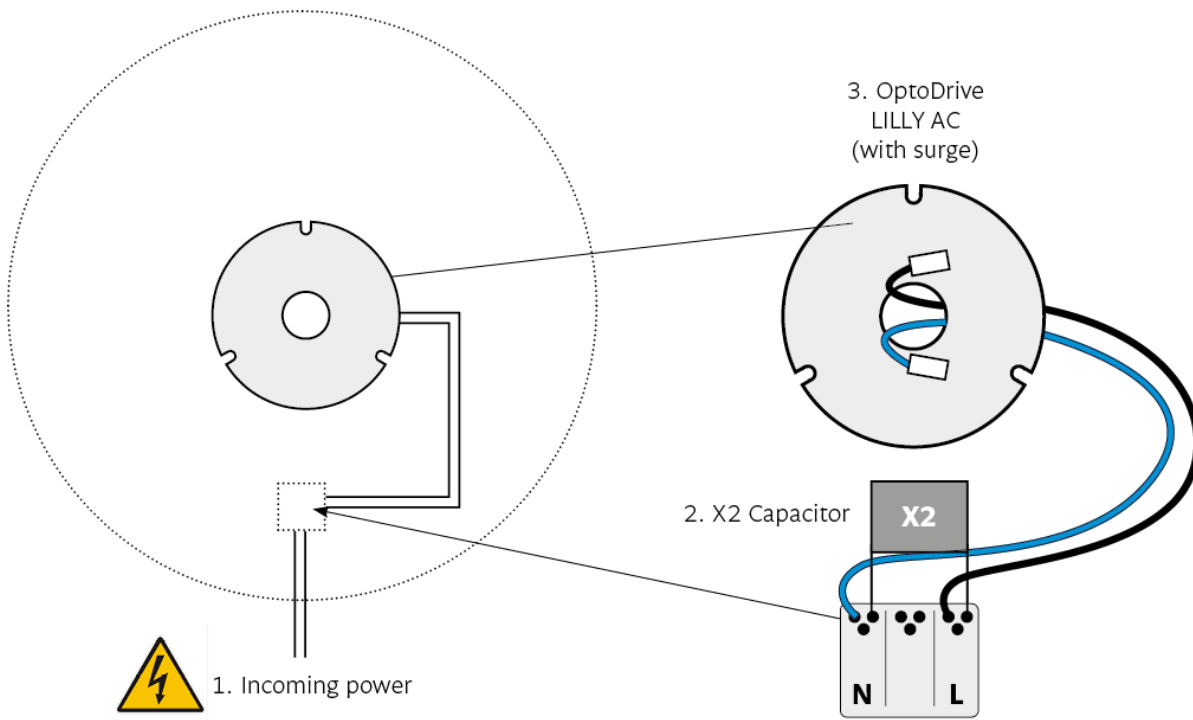
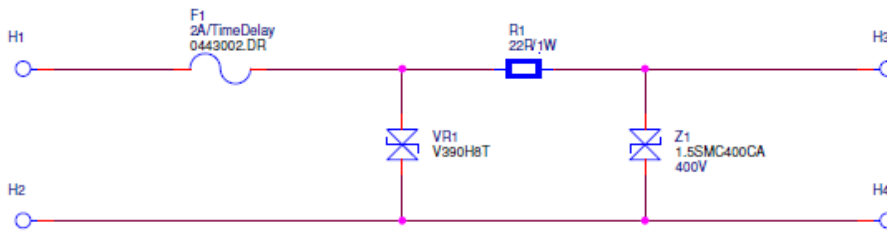
The power load used with the LED module is according to the “lumen maintenance projection”. It is a LM80 projected lifetime based on discreet LEDs tested in the stated temperature environment at a 30mA power load.

	55°C	65°C	75°C	85°C
L70B10	>50 000h	>50 000h	>50 000h	>50 000h
L80B10	>50 000h	47 000h	38 000h	33 000h
L90B10	28 000h	24 000h	20 000h	18 000h

Surge

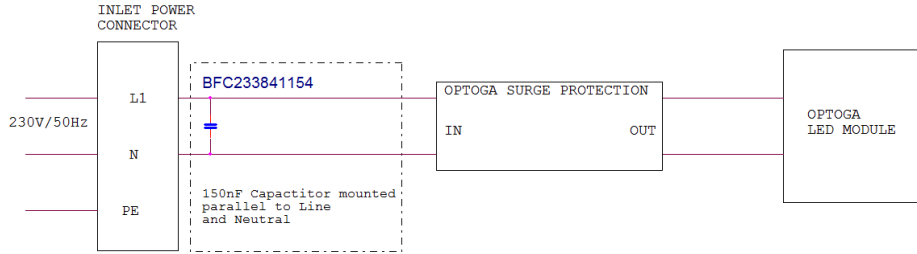
1. Surge

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



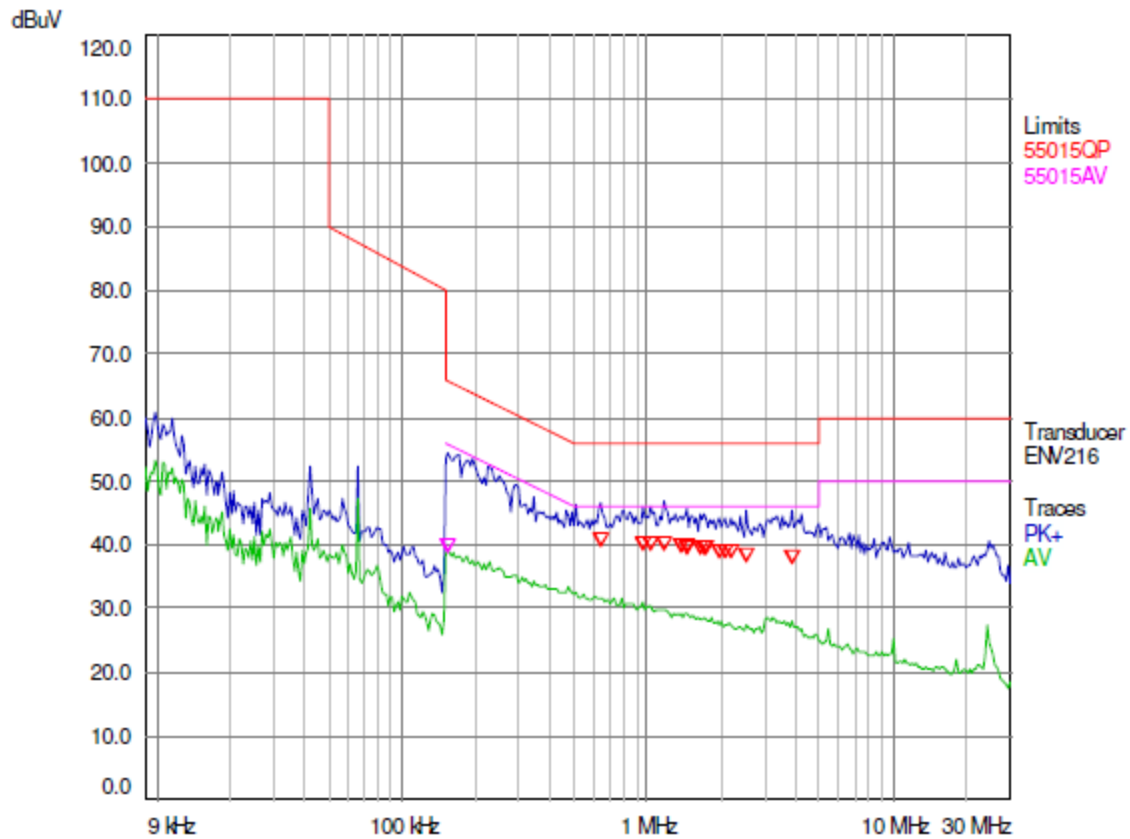
The installation set up requires an X2 Capacitor parallel to L1 and N to handle the fast and high voltage transients generated by the magnetic ballast.

2. Set-up



3. EMC

Pre-measurement Graph





Verification of Conformity

The module are tested at Intertek Semco according to IEC 62031 at 230VAC and in 120VAC it is tested according to UL8750.

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

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

IEC Protection Classes

The Clara Optodrive module is designed to be built in directly to a Class I fixture.

For Class II fixture use, an electrical insulating pad is needed between the module and the fixture. The pad needs to be minimum 2.5mm wider than the module in all directions; insulating screws such as nylon or plastic must be used when assembling the module to the fixture.



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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 fitting routine tests

According to EN/IEC 60598-1 should the routine test be performed as a dielectric strength test or insulation test. Only the insulation test of 500Vdc should be performed according to standard, 1s with min 2MΩ.

No dielectric tests are allowed to be performed on OptoDrive LED Modules.



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 Compliant

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

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 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 2002/95/EC (RoHS) the following substances must not be used in this product

- Lead (Pb) alloys
- Mercury (Hg)
- Cadmium (Cd)
- Chromium (6+) compounds



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

Read more about OptoDrive at www.optodrive.se. You can contact us via info@optoga.com. Obviously, you can also call us on +46 (0)589 490 950.

Optoga AB

Optoga was founded in November 2004 in Arboga, Sweden and has many years of experience in electronics design. The company develops 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.



Köpingsvägen 4 • SE-732 31 Arboga • SWEDEN
Tel +46 (0) 589 490 950 • Fax +46 (0) 589 197 80
info@optoga.com • www.optoga.com

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