

# LED Driver

## EUCO ARENA SPORT Series

# EUCO ARENA SPORT



### Highlights & Features

- Dimmable built-in constant current 3-channel LED Driver with DALI 2 or DMX / RDM control interface
- Each channel independently programmable with output channels max output power of 500W (1500W total)
- Adjustable output current between 500mA to 1400 mA for each channel via I-programming tool
- Very low pk-pk current ripple to 1% for stadium lighting
- Dimming range 0.1% to 100 %
- Max remote distance 200 meters
- In compliance with Erp (EU) 2019/2020

### Safety Standards



**Model Number:** EUCO-□□□140G□A  
**Unit Weight:** 5.6kg  
**Dimensions (L x W x H):** 500x152x77 mm

### General Description

Delta EUCO ARENA SPORT series with DALI 2 / RDM / DMX control function are constant current non-isolated LED drivers. Compatible with wide input voltage range 220~400Vac for diverse applications from any system manufacturer in EU market's indoor and outdoor application. With IP66 ingress protection and wide operating temperature range from -40°C to +50°, the driver can fulfill any harsh condition. The extremely low output current ripple makes the driver a typical application for outdoor stadium lighting.

### Model Information

Model Number	Input Voltage Range	Rated Output Power	Output Current Channel	Control Interface
EUCO-1K5140GLA	220/400Vac Typical	1500W	3	DALI 2
EUCO-1K5140GDA	198~440Vac Range	1500W	3*	RDM/DMX

\*Default setting is a single address. Optionally, user could be able to assign a dedicated DMX address per each channel via GUI programming tool.

### Model Numbering

EU	C	O	1K5	□□□	G	□	A
Europe	Constant Current	Outdoor	Output power 1K5:1500W	Output Current 140:1400mA	i-Programming	Function L: DALI 2 D: RDM/DMX	Variable A - Standard

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### Specifications

<b>Model Number</b>	EUCO-1K5140GLA	EUCO-1K5140GDA
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### Input Ratings / Characteristics

Normal Input Voltage	220/400Vac	
Input Voltage Range	198-440Vac	
Normal Input Frequency	50/60 Hz	
Input Frequency Range	47-63 Hz	
Normal Input Current	220Vac	7.2A
	400Vac	4.1A
Efficiency <sup>1</sup> Typical	220Vac	95.2%
	400Vac	96%
Standby Power Consumption	<0.5W at 230Vac,in compliance with Erp (EU) 2019/2020	
Inrush Current (Apk / 50%-us)	<=25 A, pulse width<8mS @400Vac	
Power Factor	> 0.95 @ 198-440Vac, full load	
Total Harmonic Distortion	<20% @ 198-440Vac, full load	
Leakage Current	< 1mA @400Vac	

1. 100% Load (Typ) and tested after 30 minutes warming up.

### Output Ratings / Characteristics

Factory default output current	1400mA
Output Current Programmable Range	500-1400mA, refer to Appendix 1.
Typical Output Voltage	360Vdc
Output Voltage Range	260-500Vdc
Max. No Load Output Voltage	600Vdc
Max Output Power Range	500W per channel, 1.5kW total
Output Current Tolerance <sup>2</sup>	±3%
Line Regulation	±1%
Load Regulation	±3%
Output Current Ripple <sup>3</sup>	1% ( Typ ) , <2% (ripple = (pk-pk)/avg)
Max Output Remote Distance	200m, ensure a total voltage drop on the cable of each channel within 5V
Turn on Delay Time	< 1s
Rise Time	< 2s

2. Output Current Tolerance tested at 1400mA.

3. Output Current Ripple could be affected by the parasitic capacitance of LED fixture, more details are given in Appendix 8.

### Dimming Control

Control Interface	DALI 2	RDM/DMX
Dimming Range	0.1%-100%	0.4%-100%

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### Mechanical

Casing	Aluminum case, Color : Dark Gray	
Dimensions (L x W x D)	500x152x77 mm	
Unit Weight	5.6 kg	
Cooling System	Natural Convection	
INPUT	Wago 264-103	With the sign of L, N, PE
OUTPUT	Wago 264-111	With the sign of PE, NTC, V3+ V3-, V2+, V2-, V1+, V1-
DIMMING		With the sign of DA+,DA-      With the sign of COM,D1+,D1-

### Environment

Ambient Temperature	Operating	-40 ~+50°C
	Storage	-40°C to +85°C
Maximum Case Temperature	+85°C	
Lifetime Case Temperature	+80°C	
Relative Humidity	Operating	10 to 100% RH (Non-Condensing)
	Storage	10 to 100% RH (Non-Condensing)
Audible Noise (30cm distance)	Sound Pressure Level (SPL) < 24dBA	
Ingress Protection classification	IP66	
Impact Protection classification	IK08	
Drop Test (Non-Operating)	<p>According to ASTM D-775, 40cm height drop to concrete floor as below drawing, total 10 times.</p>	
Vibration (Non-Operating)	IEC 60068-2-6, Random: 5 Hz to 10 Hz (1G); 30 min per axis for all X, Y, Z direction	
Packing	1pcs per carton	

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### Protections

Over Voltage	Output voltage limited, 600Vdc
Over Load	Output power limited, 520W(Typ)
Output Short Circuit	Auto-Recovery when the fault is removed
Driver Over Temperature	Output power derating, auto-recovery.
LED Fixtures Over Temperature	Output power derating, auto-recovery when the fault is removed, refer to Appendix 7 "Over Temperature Protection on LED fixtures"
Suitable for Luminaires Class	Class I. Insulation Class according to IEC60598

### Reliability Data

Lifetime	50,000 hours applicable for 220Vac to 400Vac(50/60Hz) @100% of load, @ ta 45°C
MTBF	475khrs. at ta=+45°C Telcordia SR-332

### Safety

Safety Approvals	<p>ENEC —IEC/EN61347-2-13 electronic control gear for LED Modules, independent type. —IEC/EN62384 DC or AC supplied electronic control gear for LED modules.</p> <p>CE Declaration of Conformity.</p> <p>CB report.</p>
Material and Parts	RoHS 2.0 Directive (EU) 2015/863
Isolation	Class I, input/output non-isolation

### Electro-Magnetic Compatibility (EMC)

EMC-Emission Characteristics		
Radiated Emission	EN55015	Test at 230Vac/400Vac
Conducted Emission	EN55015	Test at 230Vac/400Vac
Harmonic Current Emission	EN61000-3-2	
Voltage Fluctuation & Flicker	EN61000-3-3	
EMC-Immunity Characteristics		
Electrostatic Discharge(ESD)	EN 61000-4-2	
Radio Frequency Electromagnetic Fields	EN 61000-4-3	
Electrical Fast Transient (EFT)	EN 61000-4-4	
Surge(AC Mains)	EN 61000-4-5	- Common Mode: 10kV <sup>4</sup> (Line to Earth, Neutral to Earth) - Differential Mode: 10kV <sup>4</sup> (Line to Neutral )
Surge(Output)	EN 61000-4-5	- Common Mode: 3kV (V1+/V2+/V3+ to Earth, V1-/V2-/V3- to Earth) - Differential Mode: 1kV (V1+ to V1-/ V2+ to V2-/ V3+ to V3- )
Surge(Control terminal)	EN 61000-4-5	- Common Mode: 3kV (DA+ to Earth, DA- to Earth)

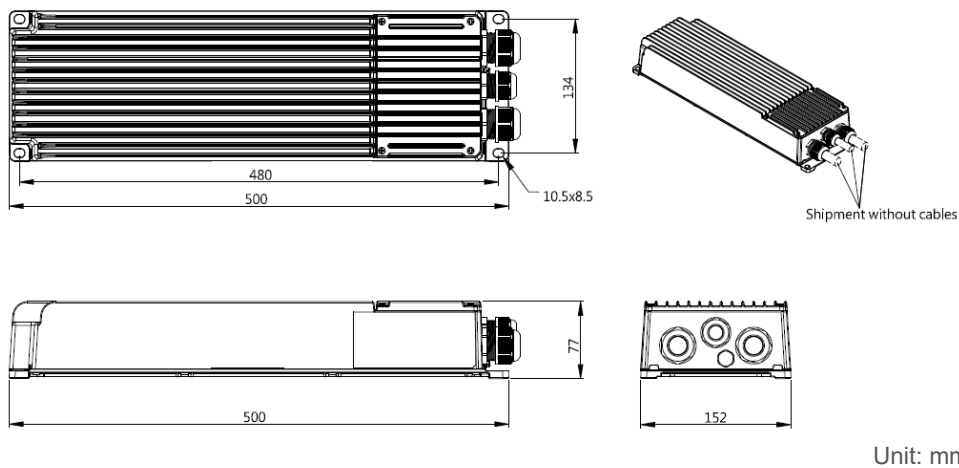
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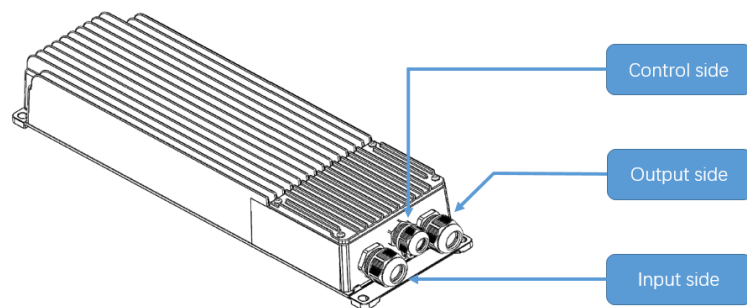
		- Common Mode: 3kV (D1+ to Earth, D1- to Earth, COM to Earth,) - Differential Mode: 1kV (DA+ to DA- ) - Differential Mode: 1kV (D1+ to D1-, D1+ to Com,D1- to Com )
Surge(NTC)	EN 61000-4-5	- Common Mode: 3kV (NTC to Earth) - Differential Mode: 1kV (NTC to V1+/V2+/V3+)
Conducted Disturbance	EN61000-4-6	
Voltage Dip & Interruptions	EN 61000-4-11	

4. Level B within three times, additional external SPD in AC mains is recommended for the LED fixture common mode surge protection, details refer to Appendix 10.

### Physical Dimensions



### Electrical Connection



Connection	Pole	Input side	Control side	Output side
L,N,PE	3	M25 Cable Gland	-	-
DA+,DA- (DALI 2 Version) D1+,D1-,COM (DMX/RDM Version)	3	-	M20 Cable Gland	-
V1+,V1-,V2+,V2-,V3+,V3-,NTC,PE	8	-	-	M25 Cable Gland

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### Torque Force Requirement for IP66

M4 six-pointed star head cap screws  
for junction box cover.(4x)  
Material : stainless steel  
Tightening force: 1.6 Nm

Input Section  
M25 cable gland to cable  
Clamping cable : 10-16.3mm  
Tightening force: 5 Nm

Control Section  
M20 cable gland to cable  
Clamping cable : with plug  
Tightening force: 1 Nm

Clamping cable : 6.3-11.3mm  
Tightening force: 3.5 Nm

Output Section  
M25 cable gland to cable  
Clamping cable : 10-16.3mm  
Tightening force: 5 Nm

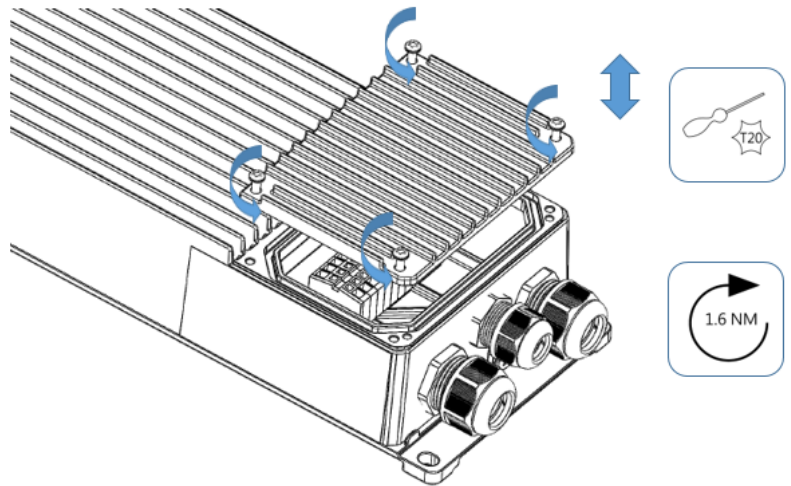
M25 cable gland to Chassis  
Tightening force: 3.43 Nm

M20 cable gland to Chassis  
Tightening force: 3.43 Nm

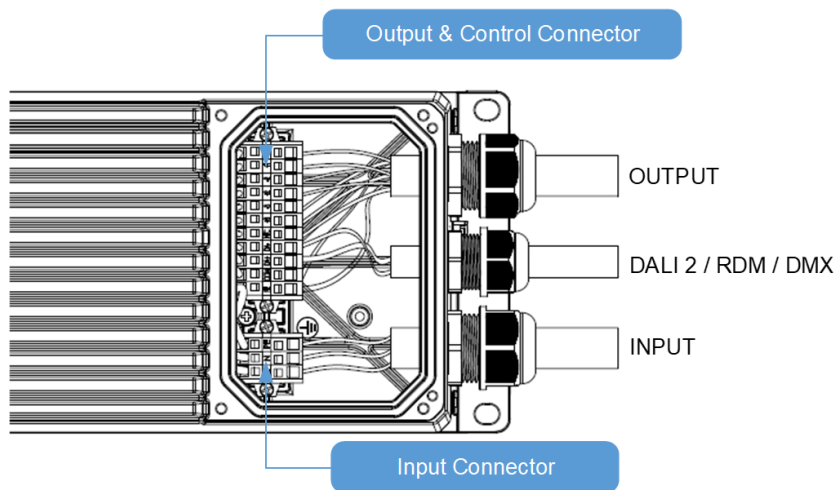
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### The Feature of Junction Box



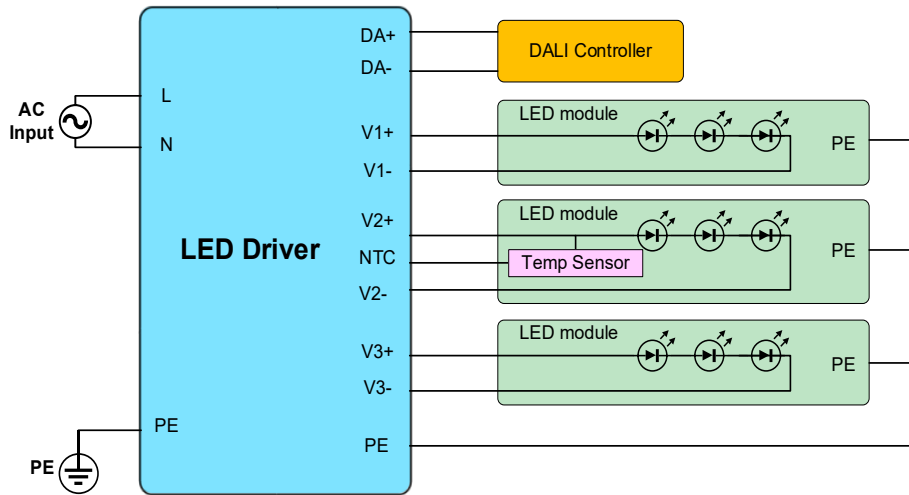
**Note:** The cap and fastening 4 screws all have the function of anti-falling off.



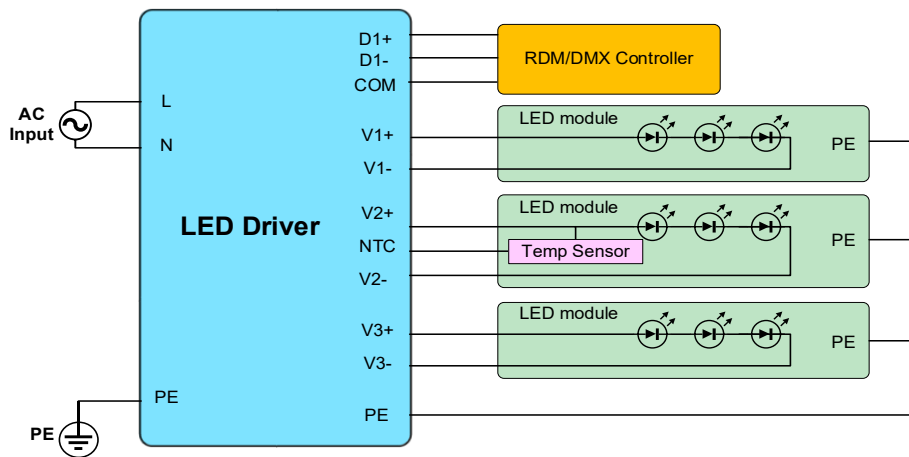
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### Connection Schematic



EUCO-1K5140GLA



EUCO-1K5140GDA

**Note:** All the output channels are independent. The user should follow the Connection Schematic. Please refer to Appendix 9 for misconnection examples.

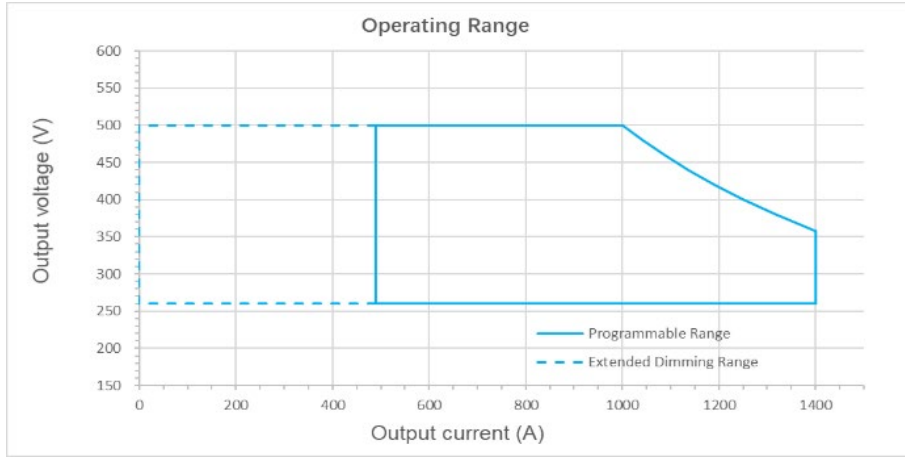


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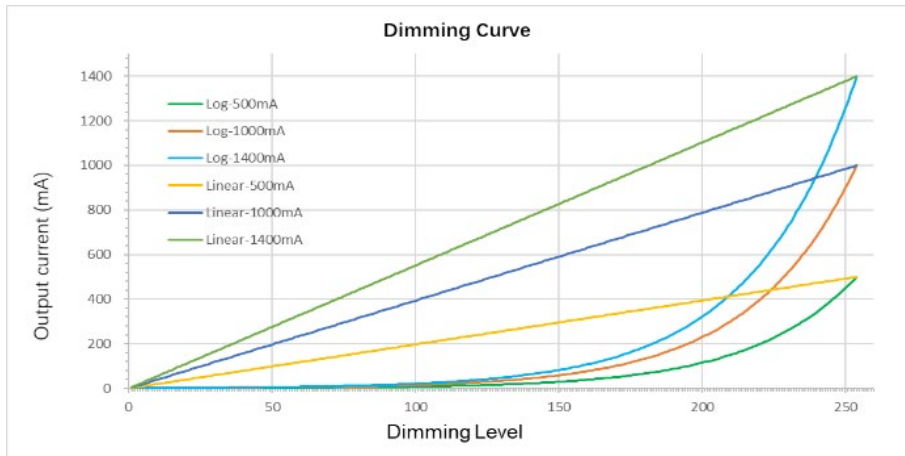
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### Appendix

#### 1. Operating Range Curve

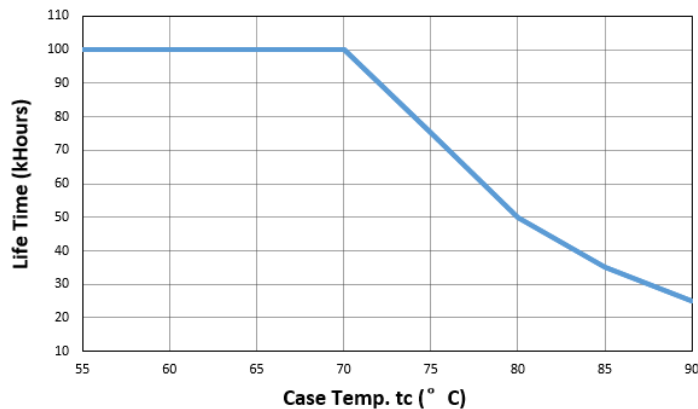


#### 2. Dimming Range Curve



**Note:** EUCO ARENA SPORT series can program the output current through computer and programming tool. More details please refer to DALI programming User Manual or RDM/DMX programming User Manual.

#### 3. Life Time VS Case Temperature Curve

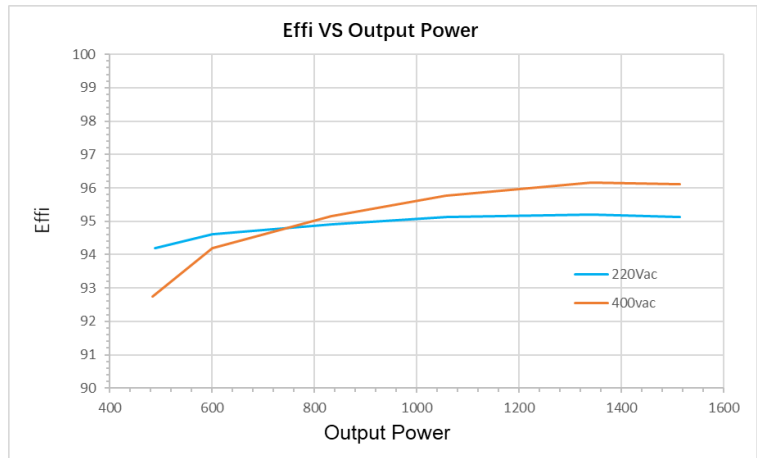


**Note:** Test at input voltage 220Vac & 400Vac, at full Load with 1.4A/360V.

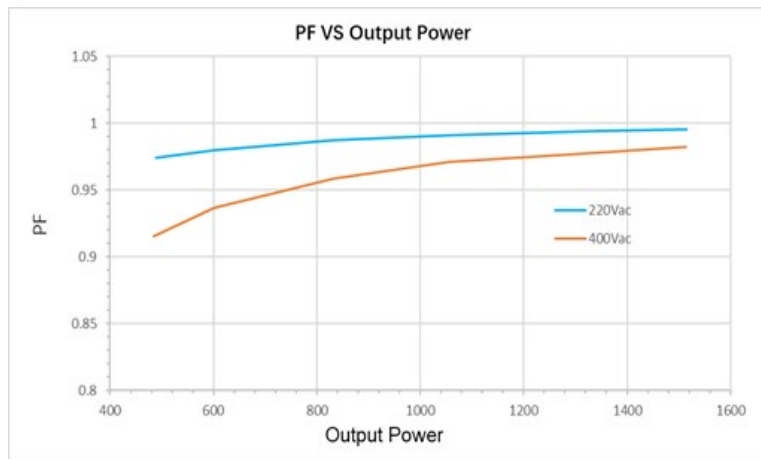
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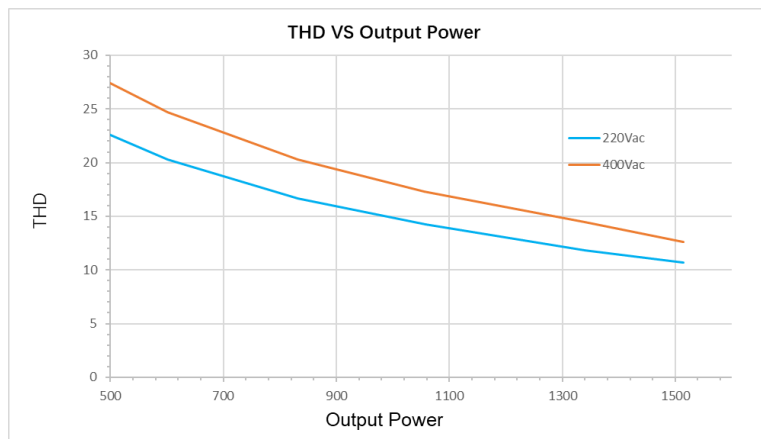
### 4. Efficiency versus Output Power



### 5. Power Factor versus Output Power



### 6. THD versus Output Power

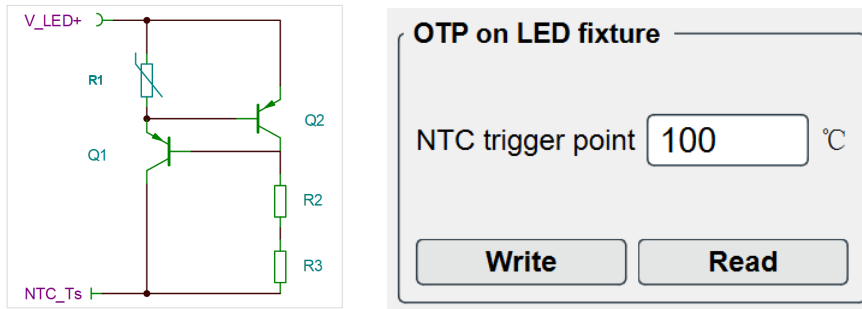


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### 7. Over Temperature Protection on LED Fixtures

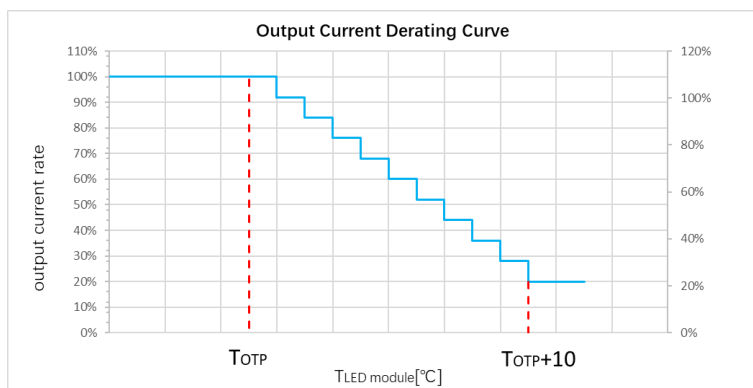
This protection is an optional feature and user can ignore it without connecting to NTC connector in the junction box. An external temperature detection circuit as shown below is required to achieve the NTC terminal function to prevent the LED fixture from overheating. Strongly recommended that the temperature detection circuit be placed on the hottest LED module in the three channels to monitor its temperature.



Bill of recommended materials

Reference	Part	Manufacturer	Description
Q1/Q2	PBHV9050T	NEXPERIA	500V 150 mA PNP high-voltage low VCEsat transistor
R1	TSM1A333F3952RZA	THINKING	RES NTC 33Kohm F 3950K +/-1% SMD 0603 TP
R2/R3	RC1206FR-07 5M1L	YAGEO	RES SMD 1/4W 5.1Mohm F 1206

The trigger point of this protection can be set easily according to the actual conditions of the LED fixtures, the user can set the trigger point between 80 °C and 110 °C by the tool (from Delta), and the default value is 100 °C. When the temperature exceeds the trigger point ( $T_{OTP}$ ), the output current of each channel will decrease automatically to bring the temperature of the LED module back to safe value. Note that the temperature measurement accuracy depends on the load condition. More details about parameter setting please refer to DALI programming User Manual or RDM/DMX programming User Manual.

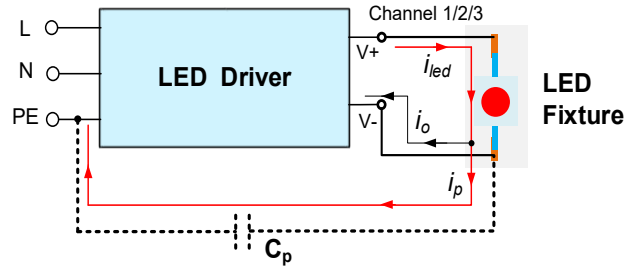
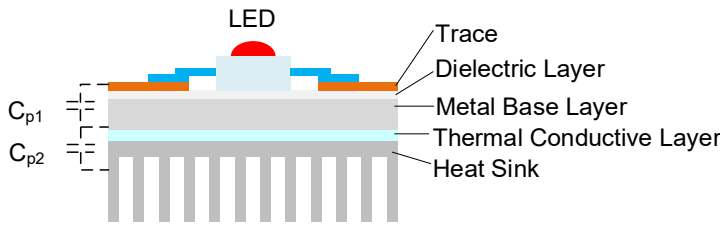


### 8. Effect of Parasitic Capacitance in LED Fixture

The simplified structure of LED fixtures and leakage current effect are illustrated as following figures. As the driver is non-isolated between input and output, there could be an inevitable leakage current path through LED and equivalent parasitic capacitor  $C_p$  ( $C_{p1}$  and  $C_{p2}$ ) to the PE (protective earth) in case that Heat Sink of the LED fixture grounds to the PE. This leakage current  $i_p$  could impact on the output current ripple and the performance at low dimming level or dimming OFF. The equivalent  $C_p$  should be kept as low as possible for low leakage current and accordingly optimized performance of the driver.

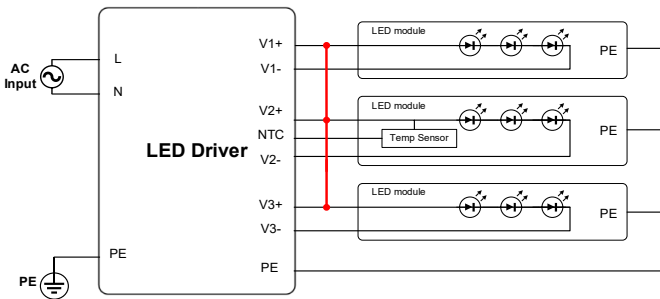
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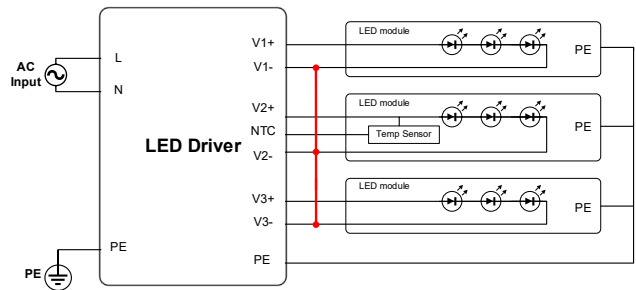


### 9. Misconnection Warning

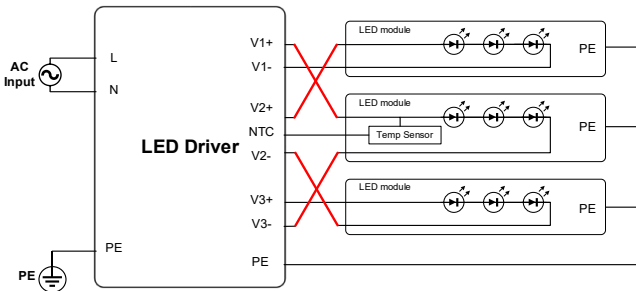
Since the output channels of the driver are independent with each other, any wiring misconnection should not be allowed, otherwise the driver could perform abnormally or even fail after a period of operation. Following are some examples of misconnections.



Misconnection of any 2 or all 3 output positive terminals together.



Misconnection of any 2 or all 3 output negative terminals together.



Cross misconnections between any 2 or all 3 channels.

### 10. External SPD requirement for extra LED fixture common mode surge protection

Although the EUCO Arena Sport driver features a common mode surge protection capability of 10kV against surge pulses from AC mains. The residual common mode voltage pulses between the LED+ and PE or LED- and PE terminals of the luminaire could be still over 5kV and could eventually damage safety insulation in the LED module board, especially the LED to heat sink insulation. Therefore, Delta Electronics recommends that in a Class I luminaire without enough common mode surge capability an external surge protector class I device be installed. In this way, the luminaire would retain the common mode surge residual voltage within LED fixture's capability and it can be easily marketed globally by attaching different surge protection modules to meet differing surge level requirements.

### 11. Others

#### Warranty Policy

Please reach out our [Warranty Policy](#) should you require any further clarification.