#D0404401

972 Series

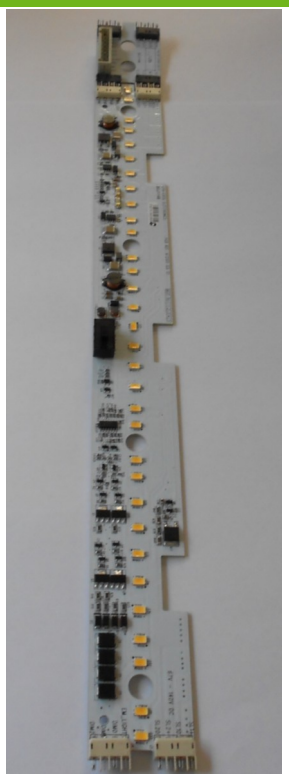
110VDC LED Module (400mm)

Long Life Reliability does not cost the earth

LPA-EXCIL ELECTRONICS

Feature Summary

- High reliability lighting grade chip LED technology.
- LED life expectancy greater than 80,000hrs to 70% of initial light output*.
- Ultra-high reliability design - 147,000 hours MTBF**.
- Zero maintenance costs.
- Reduced weight compared to fluorescent luminaires.
- Illumination levels exceed industry requirements.
- Offers energy savings compared to conventional light sources.
- Integrated power supply for direct connection to vehicle 110V DC systems.
- Two independent LED circuits offer redundancy.
- Emergency mode dimming



Product Codes

Individual products in the 972 series range are referred to by product code.

972 Product Range Standard Features	
Input Voltage Range	67-140Vdc
Input/Output Connectors	4 x 4 Way Tyco hermaphroditic

	Product Code #
400mm LED Module	972100
50mm Connection Module	972101

* When mounted to an appropriate heat sink @25°C

** MTBF calculated using US MIL-217F GM standard @ 40°C

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Input Specification

Acceptable Input Supply Voltage Range (Supply and Control lines)		67-140VDC
Input Voltage Limit Without Damage		154VDC
Input Current (maximum load @ 110VDC)	100%	93mA
	85%	81mA
	72%	71mA
	61%	59mA
	52%	51mA
	44%	44mA
	37%	37mA
	31%	29mA
	17% (EM)	20mA
Input Power (@ 110VDC)	100%	10.5W
	85%	9W
	72%	8W
	61%	6.5W
	52%	5.8W
	44%	5W
	37%	4.2W
	31%	3.2W
	17% (EM)	2.2W
Input Current (maximum load @ 67VDC)		157mA
Input Power (maximum load @ 67VDC)		10.5W
Power Converter Efficiency		87%
Line Regulation (Percentage Illuminance change due to Supply variation from nominal) @100% Intensity		<5%
Peak Inrush Current (@ Peak Sine)		46A
Time to Half Value (@ T=25°C)		7.5us
Dimming Control Line Input Current		1mA

Output Specification

Dim Level	LED Colour Classification	Colour Temperature Range	LED Manufacturer	Intensity Bin	Source Luminous Flux lm/W	Total Luminous Flux lm
100%	Warm White	2900k-3200k	Seoul Semiconductor	S5	93	848
85%	Warm White	2900k-3200k	Seoul Semiconductor	S5	93	720
72%	Warm White	2900k-3200k	Seoul Semiconductor	S5	93	610
61%	Warm White	2900k-3200k	Seoul Semiconductor	S5	93	517
52%	Warm White	2900k-3200k	Seoul Semiconductor	S5	93	440
44%	Warm White	2900k-3200k	Seoul Semiconductor	S5	93	373
37%	Warm White	2900k-3200k	Seoul Semiconductor	S5	93	313
31%	Warm White	2900k-3200k	Seoul Semiconductor	S5	93	262
17% (EM)	Warm White	2900k-3200k	Seoul Semiconductor	S5	93	144

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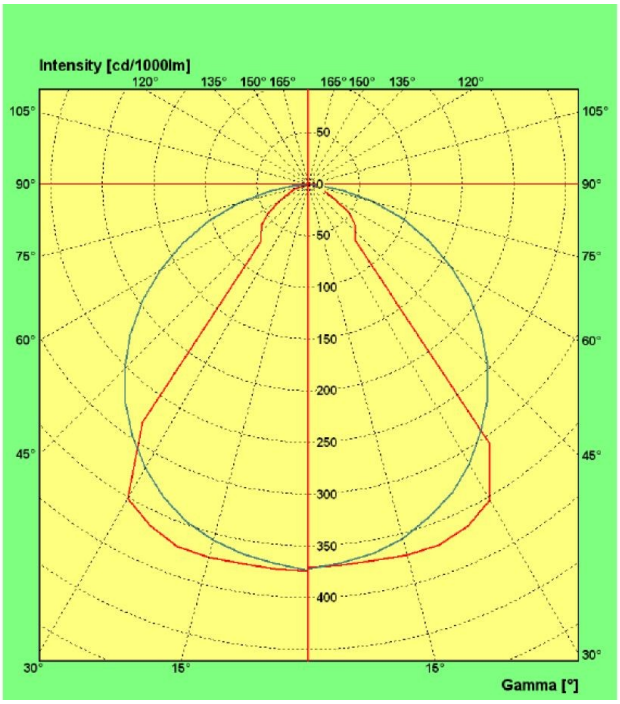
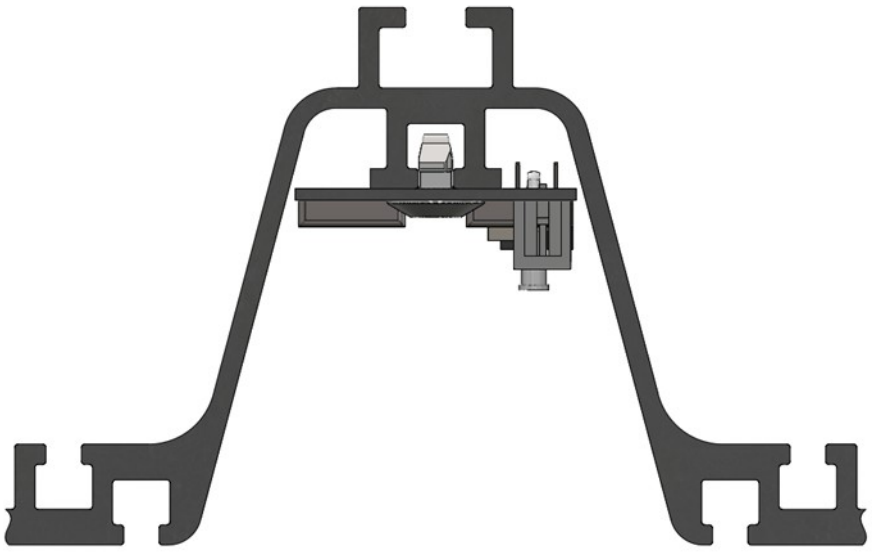
Photometric Results



Without Diffuser, mounted to an aluminium extruded profile, see below:



Environmental Specification

All Variants		
Shock and Vibration	EN50155 & EN61373	
Operating Temperature Range	-40 to 55	**°C**
Weight	84 (LED Module) 14 (Connection Module)	**g**
Lumen Maintenance (LED Life to 70% of the initial light output)	>80,000	**Hrs**
MTBF Ground Mobile 40°C	148,000 (Complete)	**Hrs**

Compliance

The 972 Series LED Module complies with the following standards:

- EN61373:1999 — Rolling stock equipment. Shock and vibration.
- EN50121-3-2:2006 — Rolling stock equipment. Electromagnetic compatibility.
- EN50155:2007 — Electronic equipment used on rolling stock.

Safety Specification

All 972 Series LED Modules come equipped with the following protection circuitry as standard:

- DC input voltage reversal (Non destructive) for supply and control lines.
- Input transient protection for supply and control lines.
- Under voltage protection.
- Input fuse per LED driver to protect against consequential failures or damage.
- The failure of one LED circuit will not effect the operation of the remaining LED circuit.

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Installation Guide

General Installation Notes: 972 Series Products

Maximum PCB Impedance (Per Input)		
SL1+	0.043	Ohms
SL10	0.056	Ohms
SL2+	0.051	Ohms
SL20	0.057	Ohms
EM_LIGHT	0.29	Ohms
DIM 1	0.24	Ohms
DIM 2	0.21	Ohms
DIM 3	0.17	Ohms

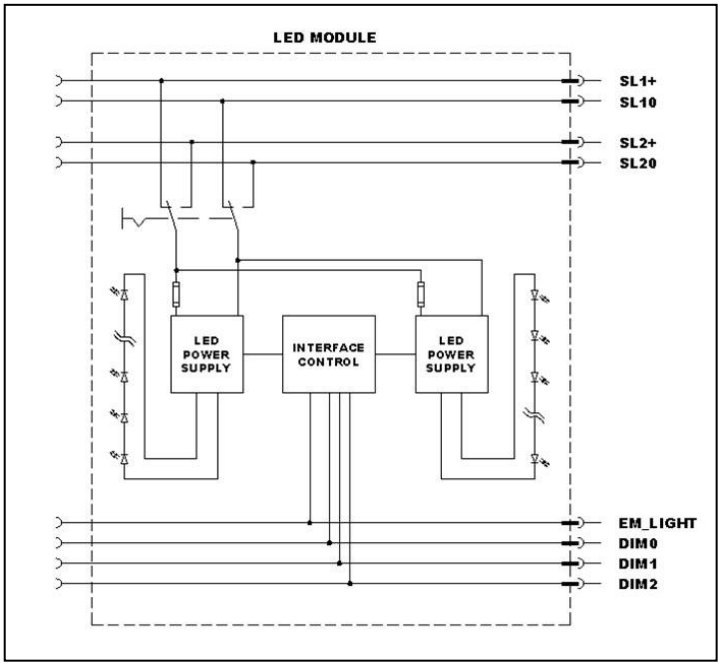
Maximum Continuous Loop in/out Current	6	**A**
Maximum Number of LED Modules connected in series from one supply source	25	

Each LED module has 4 110V logic level inputs.

EM_Light	Emergency Light conditions, output dimmed to 10%
DIM0	LSB bit 1 binary code input for dimming signal
DIM1	Bit 2 binary code input for dimming signal
DIM2	MSB bit 3 binary code input for dimming signal

These inputs are individually protected against indirect transients. An on board control interface, using a small processor, such is used to convert the 3 bit binary input signals to a reference levels that determines the output current.

The emergency control is achieved in hardware only and independent of the microprocessor derived dimming control. The removal of the EM_light input disables any pre-set dim level and sets the LED drive current to 17% of the maximum.



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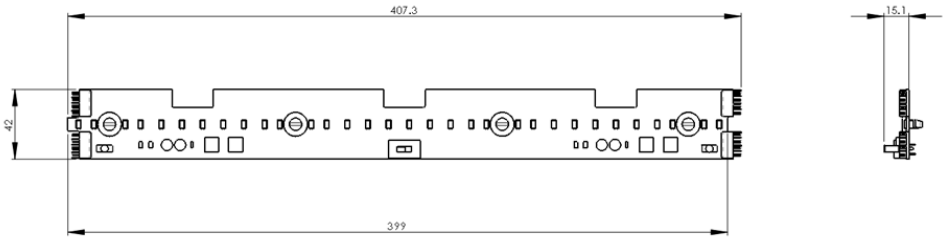
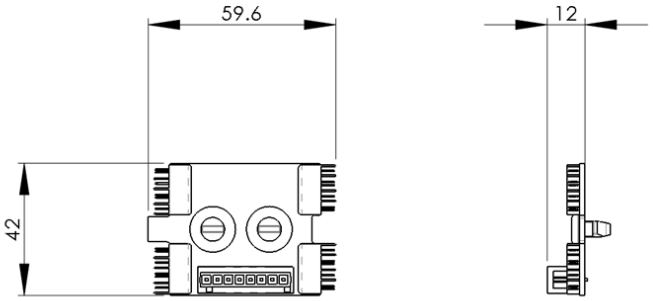
Mechanical Specification





LPA-Excil makes every effort to ensure the accuracy of the information contained within this datasheet. However we reserve the right to withdraw and re-issue this datasheet at a later date.

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