



### FEATURES

- Ø13.0mm mounting
- Stainless steel housing
- Sealed to IP67 - weatherproof
- Coloured diffused lens
- Internal potting
- Reverse protection available
- Range of LED colour options
- Range of voltage options

### BENEFITS

- Standard industrial mounting size
- Suitable for harsh environments
- Suitable for external applications
- Diffused lens gives wide viewing angle
- Suitable for high vibration applications
- Protects against wrong polarity installation (see table)
- Suitable for status panel indication
- Manufactured with internal resistor
- Outstanding reliability
- Vandal resistant

Marl Part Number	LED Colour	Typical Voltage DC Vopr	Max. Reverse Voltage	Typical Current DC Iopr	Typical LED Luminous Intensity	Typical LED Wavelength λp	Operating Temp Topr *	Storage Temp Tstg
528-501-04	Red	2.1 Typical **	3	20	458	625	-40 to +75	-40 to +100
528-521-04	Yellow	2.1 Typical **	3	20	440	590	-40 to +75	-40 to +100
528-532-04	Green	3.4 Typical **	3	20	2157	520	-40 to +75	-40 to +100
528-930-04	Blue	3.4 Typical **	3	20	452	470	-40 to +75	-40 to +100
528-997-04	Cool White	3.4 Typical **	3	20	1359	See Below	-40 to +75	-40 to +100
528-501-20	Red	5/6	1000	13-24	458	625	-40 to +75	-40 to +100
528-521-20	Yellow	5/6	1000	13-24	440	590	-40 to +75	-40 to +100
528-532-20	Green	5/6	1000	13-24	2157	520	-40 to +75	-40 to +100
528-930-20	Blue	5/6	1000	13-24	452	470	-40 to +75	-40 to +100
528-997-20	Cool White	5/6	1000	13-24	1359	See Below	-40 to +75	-40 to +100
528-501-21	Red	12	1000	20	458	625	-40 to +75	-40 to +100
528-521-21	Yellow	12	1000	20	440	590	-40 to +75	-40 to +100
528-532-21	Green	12	1000	17	2157	520	-40 to +75	-40 to +100
528-930-21	Blue	12	1000	17	452	470	-40 to +75	-40 to +100
528-997-21	Cool White	12	1000	17	1359	See Below	-40 to +75	-40 to +100
528-501-23	Red	24/28	1000	14-21	346	625	-40 to +75	-40 to +100
528-521-23	Yellow	24/28	1000	14-21	330	590	-40 to +75	-40 to +100
528-532-23	Green	24/28	1000	14-21	1815	520	-40 to +75	-40 to +100
528-930-23	Blue	24/28	1000	14-21	364	470	-40 to +75	-40 to +100
528-997-23	Cool White	24/28	1000	14-21	1063	See Below	-40 to +75	-40 to +100
528-501-24	Red	48	1000	17	236	625	-40 to +75	-40 to +100
528-521-24	Yellow	48	1000	17	217	590	-40 to +75	-40 to +100
528-532-24	Green	48	1000	17	1360	520	-40 to +75	-40 to +100
528-930-24	Blue	48	1000	17	270	470	-40 to +75	-40 to +100
528-997-24	Cool White	48	1000	17	743	See Below	-40 to +75	-40 to +100
		Vdc	Vdc	mA	mcd	nm	°C	°C

#### Typical Emission Colours Cool White LED

	X	Y
0.275	0.28	0.29
0.27	0.28	0.30

### OPTIONAL FLYING LEAD TERMINATORS

Marl Part No Suffix	Wire Length	Wire Colour	No/Diameter of Conductors	Diameter of Insulation	Wire Specification
528-501-04-15	150mm	Red - Anode	19/0.16mm	1.2mm	Type 44, 22 Gauge
528-501-04-19	1000mm	Black - Cathode			High Performance Wire

### NOTES

Intensities (Iv) and colour shades of white (X-Y co-ordinates) may vary between LEDs within a batch. Additional LED Colours, Voltage Options and Flying Lead lengths available for semi-custom projects. Please contact our Sales Team. All LED components are supplied in anti-static packaging.

\* For operating temperature derating graphs, please refer to sheet 2.

\*\* These are Current models and the voltage shown is Vf at 20mA, not Vopr. Additionally, there is no reverse protection diode in Current models.

To order please contact us on +44 (0) 1229 582 430

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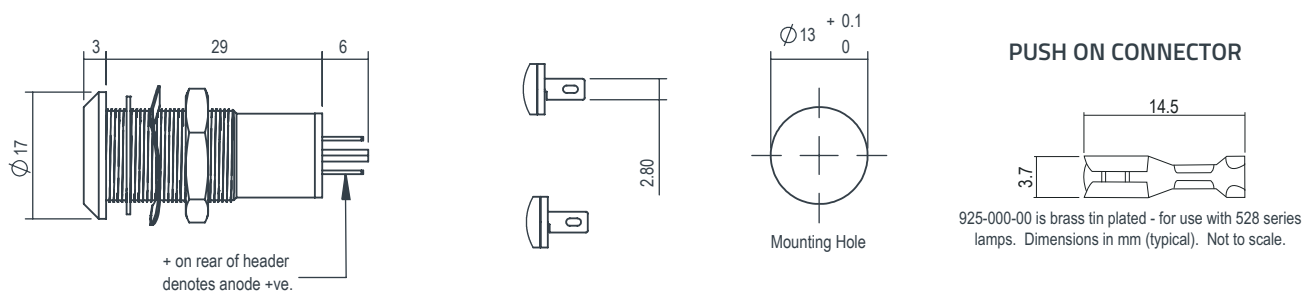
### TECHNICAL CHARACTERISTICS

Series	Max. Power Dissipation	Panel Cutout	Nut Mounting Torque	Min. Mounting Centres	Min. - Max. Panel Thickness
528	825	13.0	1.0	26.0	2.0 - 10.0
	mW	mm	Nm	mm	mm

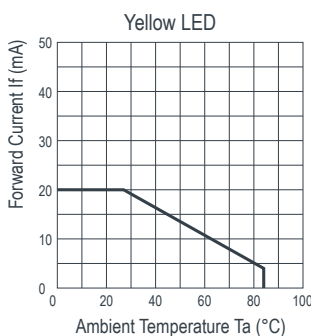
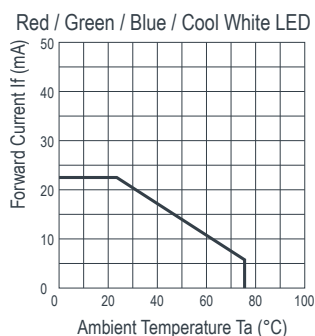
### TECHNICAL DRAWING

Weight (including fixing kit) (g): 20

Dimensions in mm (typical). Not to scale. Mounting hole to be clean and burr free.



### DE-RATING GRAPHS



### MATERIALS

Body	Stainless Steel Grade 303
Nut	Stainless Steel Grade 303
Panel Seal	Viton
Lens	Polycarbonate
Encapsulation	Black Polyurethane
Lock Washer	Stainless Steel
Termination	Silver Flash Coated Brass
Header	Nylon 66 A82

### DESIGN CONSIDERATIONS

#### Electro-Static Discharge (ESD)

Build up of electro-static discharge occurs in many situations involving people moving and handling products. The range of possible situations is very diverse but voltage levels as high as several thousand volts can and do arise in many individual situations. When an operator charged up to these levels handles a static sensitive device, there is a very probable likelihood that the device will be irreversibly damaged. It is essential that precautions are taken at all stages during manufacture and assembly of these products. Although LEDs were never considered to be static sensitive

devices, changes in manufacturing technology and materials used to produce higher intensity products over a large range of the wavelength spectrum have changed this. Marl has an approved system of ESD control from goods in, through production and into final packing and despatch. Marl recommend all users of LED based products follow the guidelines of BS 100015.

#### Voltage, Current and Temperature

The forward voltage / current value of an LED is dependent upon the ambient temperature of the environment in which

it is operated. Therefore, care must be taken to operate the LED at the correct voltage / current values, depending upon the ambient temperature.

Marl should be contacted if the device is to be operated outside the temperature range specified. Marl accept no liability for any product that is operated outside the stated voltage or temperature range.

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