

# 651 SERIES PANEL INDICATOR LED



## FEATURES

- Ø12.7mm (½") mounting
- Black anodised aluminium housing
- Sealed to IP67 - weatherproof
- Coloured diffused lens
- Internal potting
- Reverse protection diode fitted in all voltage models
- Range of LED colour options
- Range of voltage options

## BENEFITS

- Standard industrial mounting size
- Ideal for portable equipment
- Suitable for external applications
- Diffused lens gives wide viewing angle
- Suitable for high vibration applications
- Protects against wrong polarity installation (voltage models)
- Suitable for status panel indication
- Manufactured with internal resistor
- Outstanding reliability
- Vandal resistant

| Marl Part Number | LED Colour | Typical Voltage Vopr | Typical Current DC Iopr | Max. Reverse Voltage | Typical LED Luminous Intensity | Typical LED Wavelength λp | Operating Temp Topr * | Storage Temp Tstg |
|------------------|------------|----------------------|-------------------------|----------------------|--------------------------------|---------------------------|-----------------------|-------------------|
| 651-102-04       | Red 660nm  | 1.85 **              | 20                      | 3                    | 500                            | 660                       | -40 to +85            | -40 to +85        |
| 651-105-04       | Red 625nm  | 2.0 **               | 20                      | 3                    | 95                             | 625                       | -40 to +85            | -40 to +85        |
| 651-111-04       | Yellow     | 2.1 **               | 20                      | 3                    | 45                             | 590                       | -40 to +85            | -40 to +85        |
| 651-114-04       | Green      | 2.2 **               | 20                      | 3                    | 45                             | 565                       | -40 to +85            | -40 to +85        |
| 651-102-20       | Red 660nm  | 5-6                  | 11-17                   | 1000                 | 275-425                        | 660                       | -40 to +85            | -40 to +85        |
| 651-105-20       | Red 625nm  | 5-6                  | 10-16                   | 1000                 | 42-72                          | 625                       | -40 to +85            | -40 to +85        |
| 651-111-20       | Yellow     | 5-6                  | 10-16                   | 1000                 | 19-34                          | 590                       | -40 to +85            | -40 to +85        |
| 651-114-20       | Green      | 5-6                  | 9-15                    | 1000                 | 16-41                          | 565                       | -40 to +85            | -40 to +85        |
| 651-102-21       | Red 660nm  | 12                   | 20                      | 1000                 | 500                            | 660                       | -40 to +85            | -40 to +85        |
| 651-105-21       | Red 625nm  | 12                   | 19                      | 1000                 | 89                             | 625                       | -40 to +85            | -40 to +85        |
| 651-111-21       | Yellow     | 12                   | 19                      | 1000                 | 41                             | 590                       | -40 to +85            | -40 to +85        |
| 651-114-21       | Green      | 12                   | 19                      | 1000                 | 41                             | 565                       | -40 to +85            | -40 to +85        |
| 651-102-23       | Red 660nm  | 24-28                | 16-20                   | 1000                 | 400-500                        | 660                       | -40 to +85            | -40 to +85        |
| 651-105-23       | Red 625nm  | 24-28                | 16-20                   | 1000                 | 72-95                          | 625                       | -40 to +85            | -40 to +85        |
| 651-111-23       | Yellow     | 24-28                | 16-19                   | 1000                 | 34-41                          | 590                       | -40 to +85            | -40 to +85        |
| 651-114-23       | Green      | 24-28                | 16-19                   | 1000                 | 34-41                          | 565                       | -40 to +85            | -40 to +85        |
| 651-102-24       | Red 660nm  | 48                   | 17                      | 1000                 | 425                            | 660                       | -40 to +85            | -40 to +85        |
| 651-105-24       | Red 625nm  | 48                   | 17                      | 1000                 | 78                             | 625                       | -40 to +85            | -40 to +85        |
| 651-111-24       | Yellow     | 48                   | 17                      | 1000                 | 36                             | 590                       | -40 to +85            | -40 to +85        |
| 651-114-24       | Green      | 48                   | 17                      | 1000                 | 36                             | 565                       | -40 to +85            | -40 to +85        |
| 651-102-75       | Red 660nm  | 110 Vac              | 9                       | N/A                  | 225                            | 660                       | -40 to +85            | -40 to +85        |
| 651-105-75       | Red 625nm  | 110 Vac              | 9                       | N/A                  | 39                             | 625                       | -40 to +85            | -40 to +85        |
| 651-111-75       | Yellow     | 110 Vac              | 9                       | N/A                  | 17                             | 590                       | -40 to +85            | -40 to +85        |
| 651-114-75       | Green      | 110 Vac              | 9                       | N/A                  | 16                             | 565                       | -40 to +85            | -40 to +85        |
| 651-102-76       | Red 660nm  | 230 Vac              | 4                       | N/A                  | 100                            | 660                       | -40 to +85            | -40 to +85        |
| 651-105-76       | Red 625nm  | 230 Vac              | 4                       | N/A                  | 17                             | 625                       | -40 to +85            | -40 to +85        |
| 651-111-76       | Yellow     | 230 Vac              | 4                       | N/A                  | 8                              | 590                       | -40 to +85            | -40 to +85        |
| 651-114-76       | Green      | 230 Vac              | 4                       | N/A                  | 5                              | 565                       | -40 to +85            | -40 to +85        |
|                  |            | Vdc (unless stated)  | mA                      | V                    | mcd                            | nm                        | °C                    | °C                |

## OPTIONAL FLYING LEAD TERMINATORS

| Marl Part No. Suffix | Wire Length | Wire Colour                    | No/Diameter of Conductors | Diameter of Insulation | Wire Specification                         |
|----------------------|-------------|--------------------------------|---------------------------|------------------------|--|
| 651-102-04-15        | 150mm       | Red - Anode<br>Black - Cathode | 19/0.16mm                 | 1.2mm                  | Type 44, 22 Gauge<br>High Performance Wire |
| 651-102-04-19        | 1000mm      |                                |                           |                        |  |

## NOTES

Intensities (Iv) 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.

\* Characteristics at Ta = 25°C. 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.

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# 651 SERIES PANEL INDICATOR LED



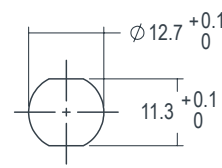
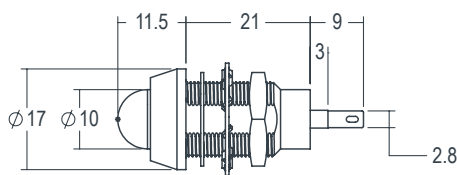
## TECHNICAL CHARACTERISTICS

| Series | Max. Power Dissipation | Panel Cutout | Nut Mounting Torque | Min. Mounting Centres | Min - Max. Panel Thickness |
|--------|------------------------|--------------|---------------------|-----------------------|----------------------------|
| 651    | 1000                   | 12.7         | 1.0                 | 19.5                  | 1.5 - 8.0                  |
|        | mW                     | mm           | Nm                  | mm                    | mm                         |

## TECHNICAL DRAWING

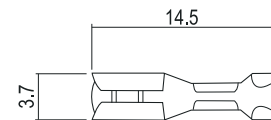
Weight (g): 13.1

Dimensions in mm (typical). Not to scale. Mounting hole to be clean and burr free. Anode termination (DC model) denoted by red sleeve.



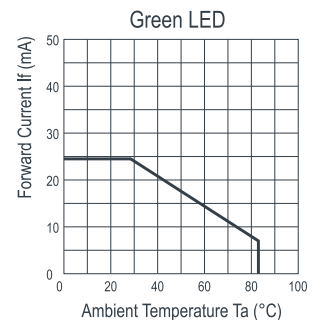
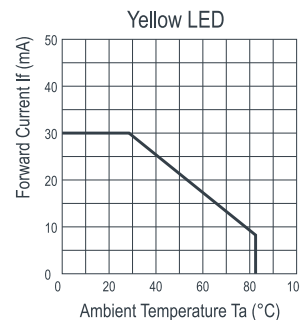
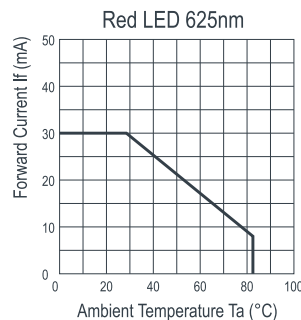
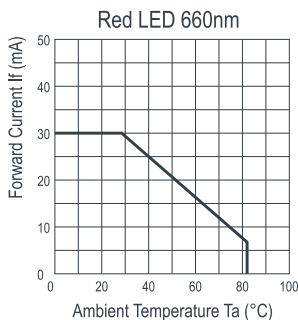
Mounting Hole

### PUSH ON CONNECTOR



925-000-00 is brass tin plated - for use with 651 series lamps. Dimensions in mm (typical). Not to scale.

## DE-RATING GRAPHS



## MATERIALS

|               |                           |
|---------------|---------------------------|
| Body          | Black Anodised Aluminium  |
| Nut           | Nickel Plated Brass       |
| Panel Seal    | Viton                     |
| Lens          | Polycarbonate             |
| Encapsulation | Black Polyurethane        |
| Lock Washer   | Spring Steel              |
| Termination   | Silver Flash Coated Brass |

## 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 dispatch. Marl recommend all users of LED based products follow the current BSI guidelines for protection of electronic devices from electrostatic phenomena.

### 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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