



## Features

- Compact design, long life and high reliability
- Vertical and horizontal mount versions
- Flatted and knurled shaft styles
- Variety of LED colors available
- Bushing and bushingless options



# PEL12S - 12 mm Encoder with Illuminated Shaft

### Electrical Characteristics

|                                 |                       |
|---------------------------------|-----------------------|
| Output.....                     | 2-bit quadrature code |
| Closed Circuit Resistance ..... | 3 ohms maximum        |
| Contact Rating.....             | 0.5 mA @ 5 VDC        |
| Insulation Resistance .....     | 100 megohms @ 250 VDC |
| Dielectric Withstanding Voltage |                       |
| Sea Level.....                  | 300 VAC minimum       |
| Electrical Travel .....         | Continuous            |
| Contact Bounce (15 RPM).....    | 2.0 ms. maximum**     |
| RPM (Operating) .....           | 100 maximum**         |

### Environmental Characteristics

|                                   |                                      |
|-----------------------------------|--------------------------------------|
| Operating Temperature Range ..... | -10 °C to +70 °C (+14 °F to +158 °F) |
| Storage Temperature Range .....   | -40 °C to +85 °C (-40 °F to +185 °F) |
| Operating Humidity.....           | 25 % to 85 % R.H.                    |
| Rotational Life.....              | 30,000 cycles minimum                |
| IP Rating.....                    | IP 40                                |

### Mechanical Characteristics

|                            |   |
|----------------------------|---|
| Mechanical Angle .....     | 360 ° continuous  |
| Detent Torque .....        | .30 to 200 g-cm (0.42 to 2.77 oz.-in.)                                      |
| Running Torque .....       | 50 g-cm (0.69 oz-in.) maximum   |
| Shaft Strength (Push)..... | 5 kgf (11.0 lbs.)   |
| Shaft Strength (Pull)..... | 10 kgf (22.0 lbs.)  |
| Weight .....               | 3 gm (0.1 oz.) maximum  |
| Terminals .....            | Printed circuit board terminals   |
| Soldering Condition        |   |
| Wave Soldering.....        | Sn95.5/Ag2.8/Cu0.7 solder with no-clean flux: 260 °C max. for 5 ± 1 seconds |
| Hand Soldering .....       | Not recommended   |
| Hardware .....             | No hardware supplied  |

### How To Order

**PEL12S - 4 0 20 F - N 1 024**

Model \_\_\_\_\_

Terminal Configuration \_\_\_\_\_  
 2 = Vertical Mount/Side Exit PC Pin      4 = Horizontal Mount/Rear Exit PC Pin

Detent Option \_\_\_\_\_  
 0 = No Detents      2 = 24 Detents

Standard Shaft Length \_\_\_\_\_  
 Flatted:      Knurled:  
 15 = 15.0 mm      25 = 25.0 mm      24 = 24.0 mm  
 17 = 17.5 mm      30 = 30.0 mm  
 20 = 20.0 mm

Shaft Style \_\_\_\_\_  
 F = Insulated Flatted Shaft      S = Insulated Knurled Shaft (18 Teeth)  
 G = Insulated Flatted Shaft w/Bushing\*\*\*      T = Insulated Knurled Shaft (18 Teeth) w/Bushing

Switch Configuration \_\_\_\_\_  
 N = No Switch

LED Color \_\_\_\_\_  
 Single:  
 1 = Red      3 = Blue      5 = White  
 2 = Green      4 = Orange

Resolution \_\_\_\_\_  
 024 = 24 Pulses per 360 ° Rotation

\*\*\* Available in 17.5, 20 and 25 mm shaft lengths.

\*RoHS Directive 2002/95/EC Jan. 27, 2003 including annex and RoHS Recast 2011/65/EU June 8, 2011.

\*\*Devices are tested using standard noise reduction filters. For optimum performance, designers should use noise reduction filters in their circuits. Specifications are subject to change without notice.

Customers should verify actual device performance in their specific applications.

# Applications

Level control, tuning and timer settings in:

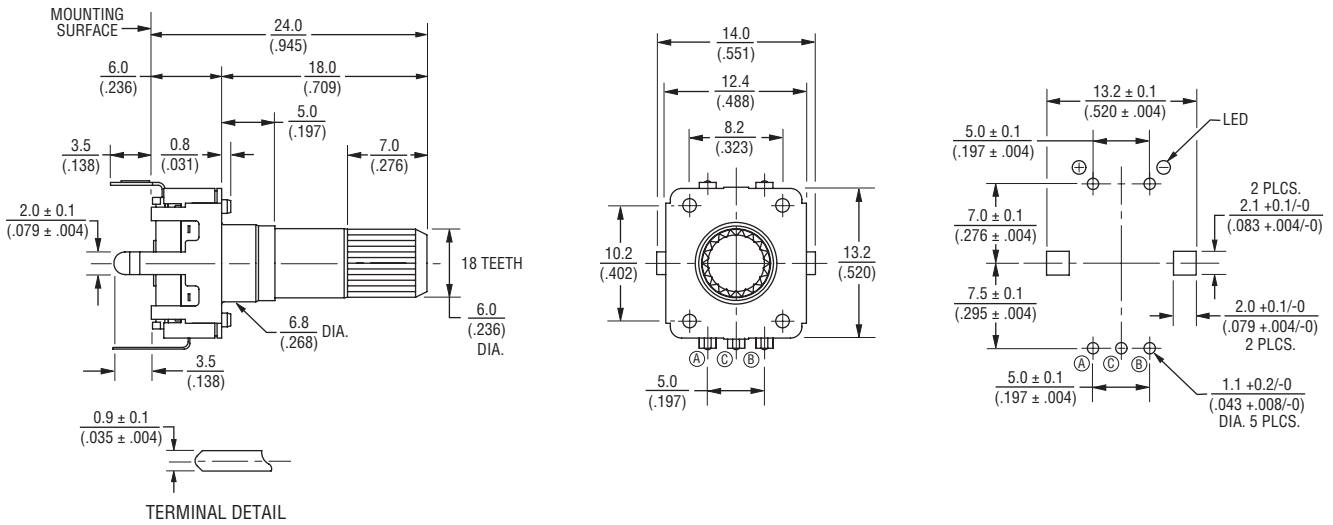
- Audio-visual equipment
- Consumer electric appliances
- Musical instrumentation
- Communications equipment

## PEL12S - 12 mm Encoder with Illuminated Shaft

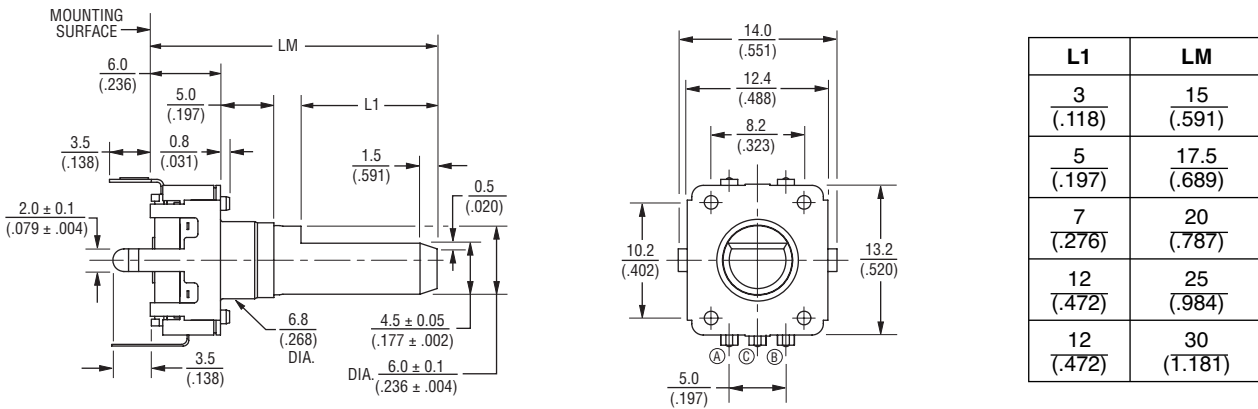


### Product Dimensions

PEL12S-4xxxS-Nxxxx (Horizontal Mount w/Single LED, No Switch, Knurled Shaft)



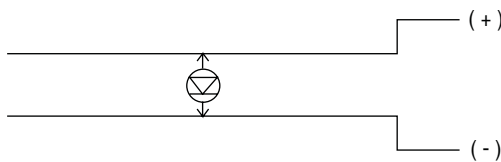
PEL12S-4xxxF-Nxxxx (Horizontal Mount w/Single LED, No Switch, Flatted Shaft)



| L1           | LM             |
|--------------|----------------|
| 3<br>(.118)  | 15<br>(.591)   |
| 5<br>(.197)  | 17.5<br>(.689) |
| 7<br>(.276)  | 20<br>(.787)   |
| 12<br>(.472) | 25<br>(.984)   |
| 12<br>(.472) | 30<br>(1.181)  |

DIMENSIONS:  $\frac{\text{MM}}{\text{INCHES}}$

### Single LED Circuit



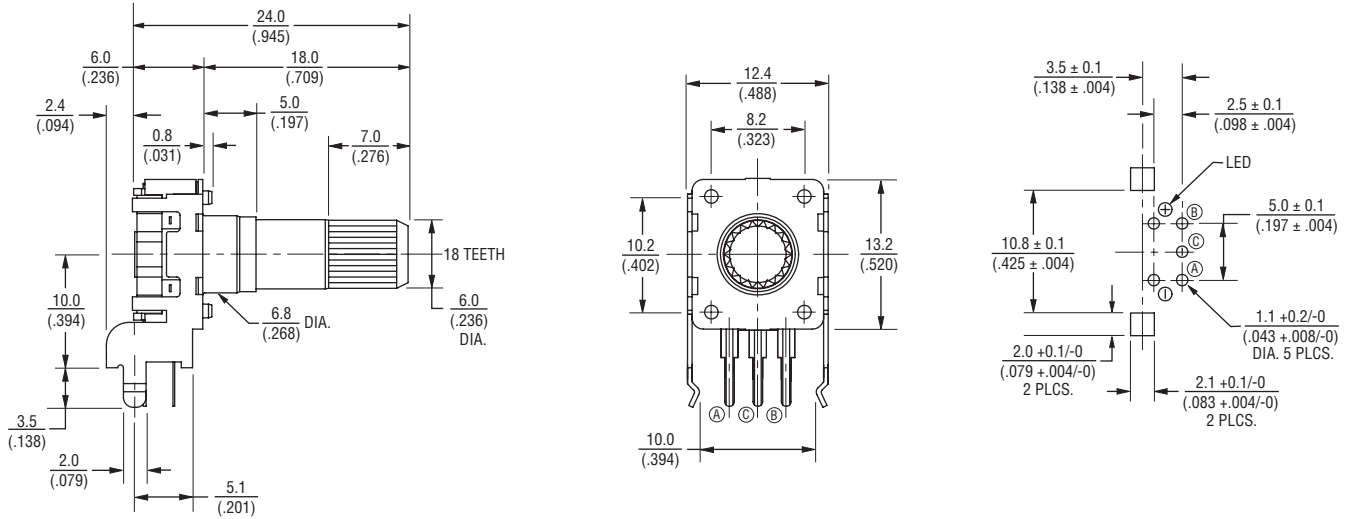
TOLERANCES:  
 UNDER  $\frac{10.0}{(.394)} = \frac{\pm 0.3}{(\pm .012)}$   $\frac{10.0 - 100}{(.394 - 3.937)} = \frac{\pm 0.5}{(\pm .020)}$

# PEL12S - 12 mm Encoder with Illuminated Shaft

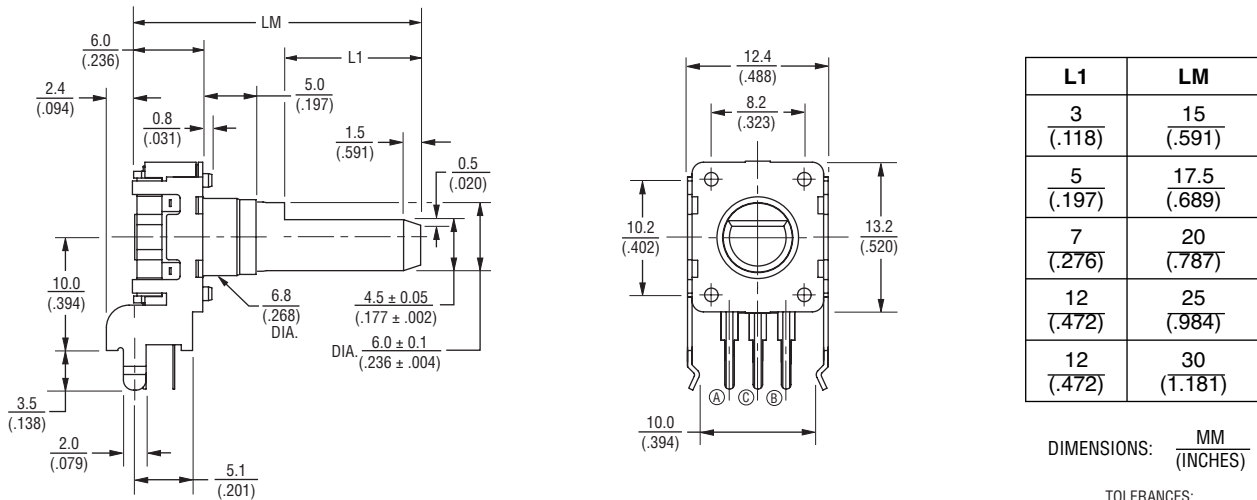
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## Product Dimensions

PEL12S-2xxxS-Nxxxx (Vertical Mount w/Single LED, No Switch, Knurled Shaft)



PEL12S-2xxxF-Nxxxx (Vertical Mount w/Single LED, No Switch, Flatted Shaft)



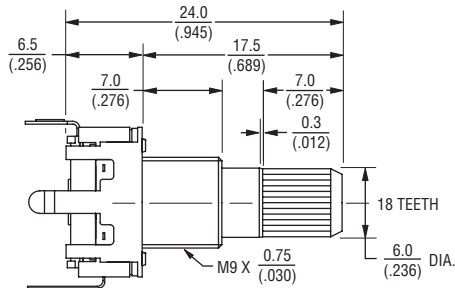
Specifications are subject to change without notice.  
 Customers should verify actual device performance in their specific applications.

# PEL12S - 12 mm Encoder with Illuminated Shaft

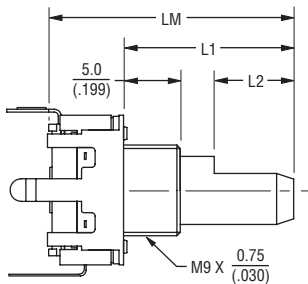
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## Product Dimensions

PEL12S-4xxxT-Nxxxx (Horizontal Mount w/Single LED, No Switch, Knurled Shaft w/Bushing)



PEL12S-4xxxG-Nxxxx (Horizontal Mount w/Single LED, No Switch, Flatted Shaft w/Bushing)

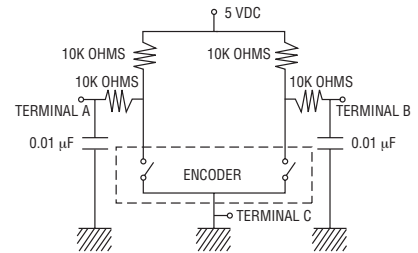


| L2           | L1             | LM             |
|--------------|----------------|----------------|
| 5<br>(.197)  | 11<br>(.433)   | 17.5<br>(.689) |
| 7<br>(.276)  | 13.5<br>(.532) | 20<br>(.787)   |
| 12<br>(.472) | 18.5<br>(.728) | 25<br>(.984)   |

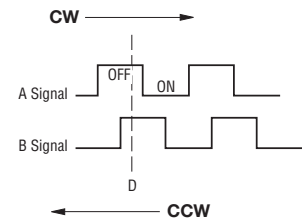
DIMENSIONS:  $\frac{\text{MM}}{\text{(INCHES)}}$

TOLERANCES:  
 UNDER  $\frac{10.0}{(.394)} = \frac{\pm 0.3}{(\pm 0.012)}$   $\frac{10.0 \sim 100}{(.394 \sim 3.937)} = \frac{\pm 0.5}{(\pm 0.020)}$

## Suggested Filter Circuit



## Quadrature Output Table



## LED Characteristics (Single)

| LED Color | Power Dissipation (mW) | DC Forward Current (mA) | Forward Voltage (V) |      |
|-----------|------------------------|-------------------------|---------------------|------|
|           |                        |                         | Typ.                | Max. |
| Red       | 58                     | 25                      | 1.8                 | 2.3  |
| Green     | 53                     | 25                      | 2.0                 | 2.5  |
| Blue      | 80                     | 20                      | 3.5                 | 4.0  |
| Orange    | 100                    | 30                      | 2.2                 | 2.6  |
| White     | 120                    | 30                      | 3.4                 | 4.0  |

Notes:

Reverse Current: 10 µA  
 Reverse Voltage: 5 VDC  
 Test Condition (IF): 20 mA

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REV. 05/12

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