

## 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 .....	One flat washer and one mounting nut supplied with each encoder with bushing

### 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 2015/863, Mar 31, 2015 and Annex.

\*\*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. Users should verify actual device performance in their specific applications.

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**WARNING**  
**Cancer and Reproductive Harm**  
[www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov)

# Applications

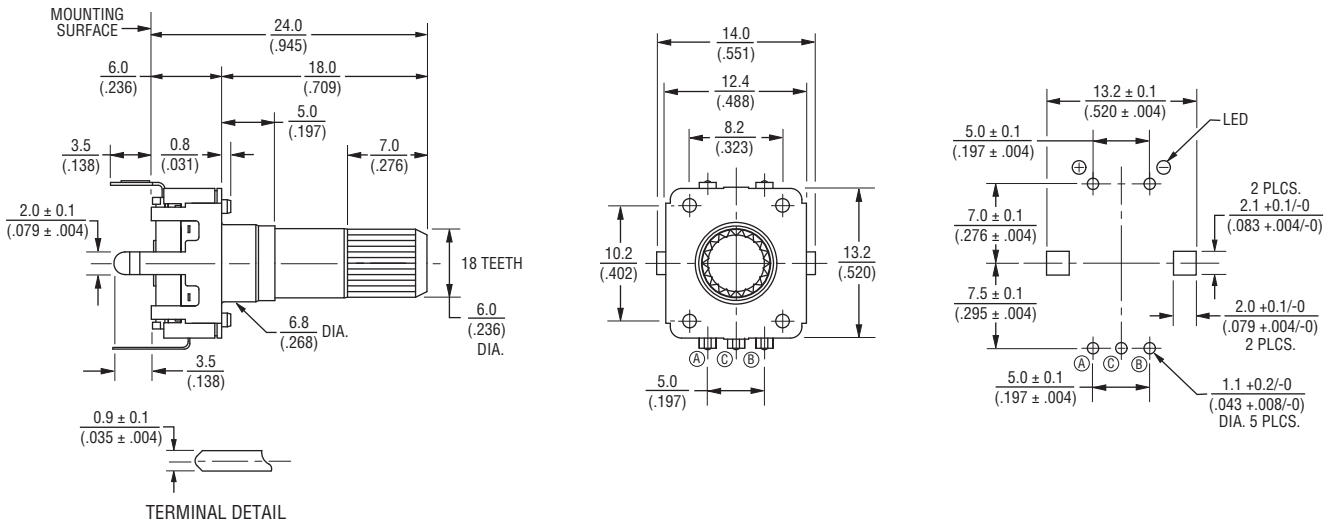
Level control, tuning and timer settings in:

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

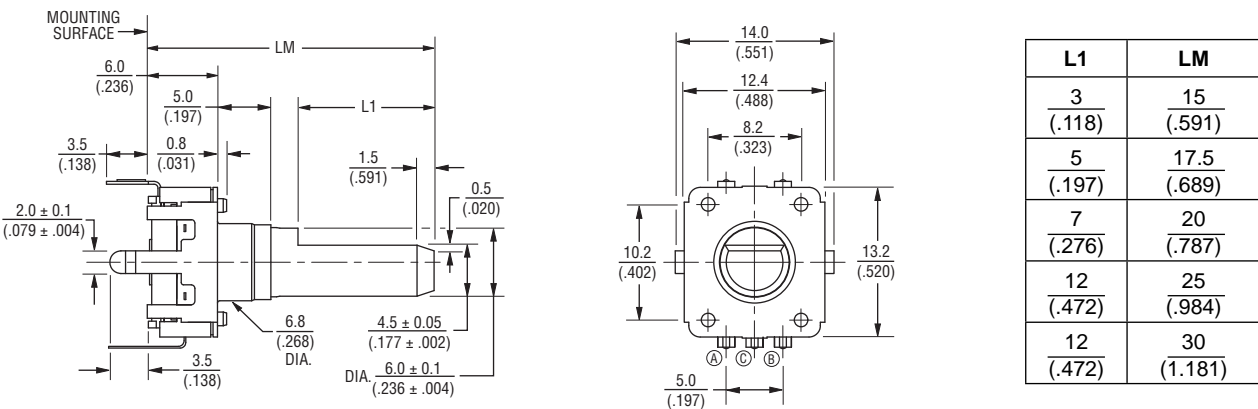
## PEL12S - 12 mm Encoder with Illuminated Shaft **BOURNS®**

### Product Dimensions

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



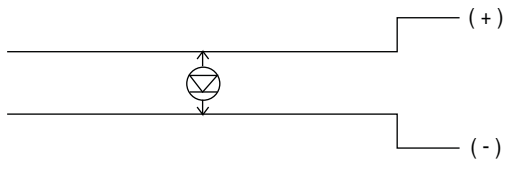
PEL12S-4xxxF-Nxxxx (Horizontal Mount w/Single LED, No Switch, Flatted Shaft)



L1	LM
$\frac{3}{(.118)}$	$\frac{15}{(.591)}$
$\frac{5}{(.197)}$	$\frac{17.5}{(.689)}$
$\frac{7}{(.276)}$	$\frac{20}{(.787)}$
$\frac{12}{(.472)}$	$\frac{25}{(.984)}$
$\frac{12}{(.472)}$	$\frac{30}{(1.181)}$

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

### Single LED Circuit



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

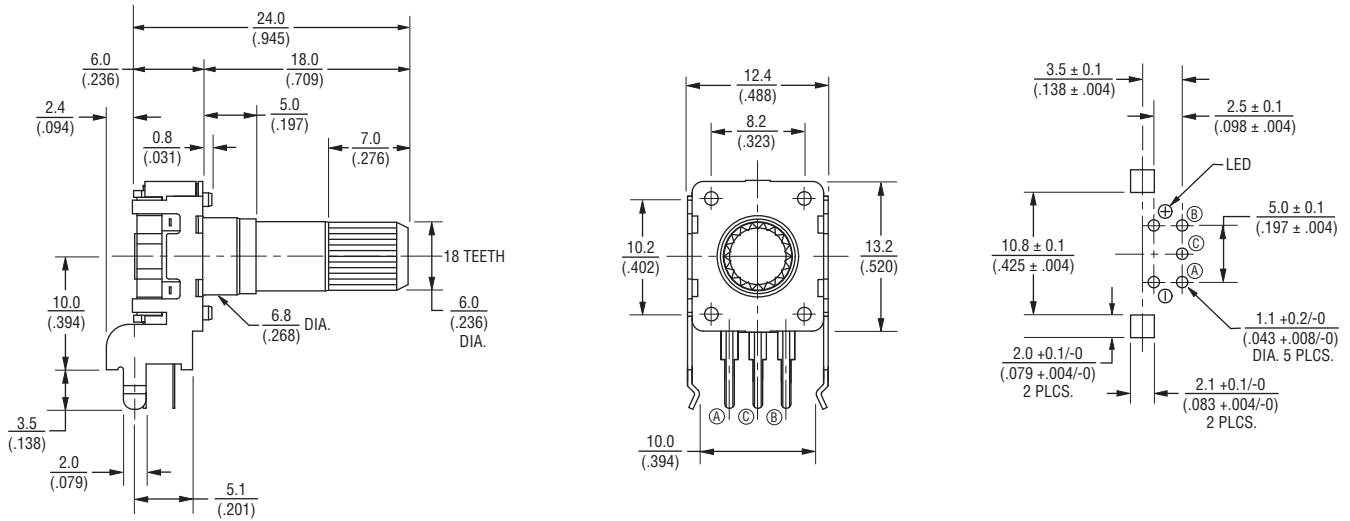
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# PEL12S - 12 mm Encoder with Illuminated Shaft

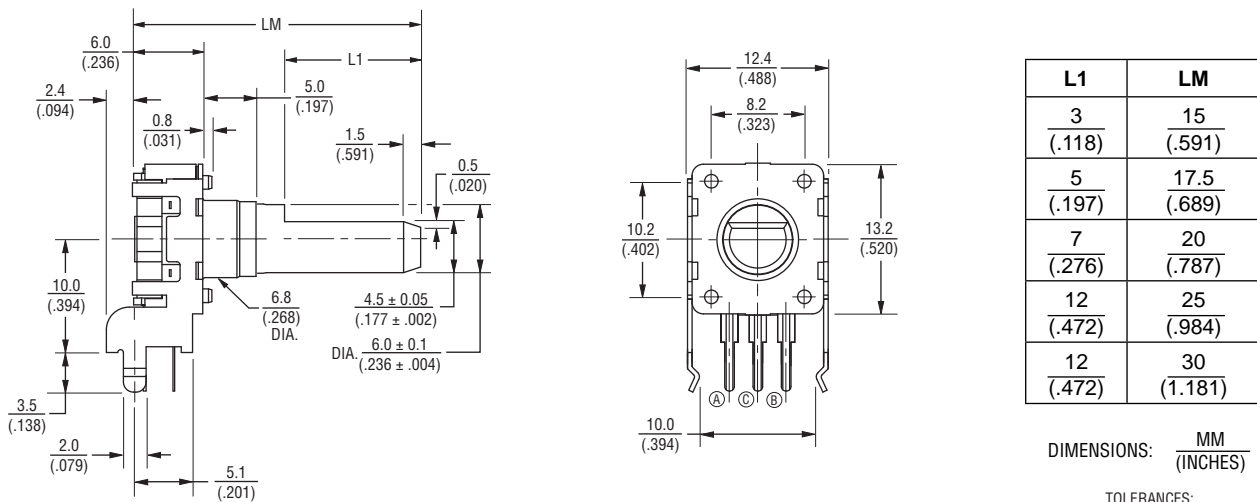
**BOURNS®**

## 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)



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

TOLERANCES:  
 UNDER 10.0 =  $\pm 0.3$  10.0 - 100 =  $\pm 0.5$   
 (.394) =  $(\pm 0.012)$  (.394 - 3.937) =  $(\pm 0.020)$

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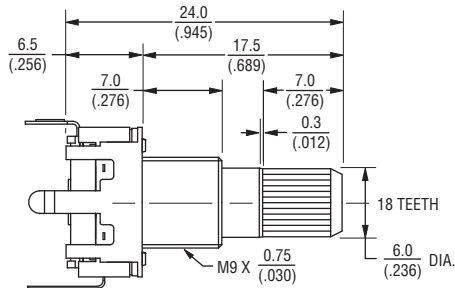
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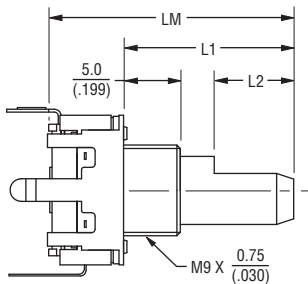
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## Product Dimensions

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)

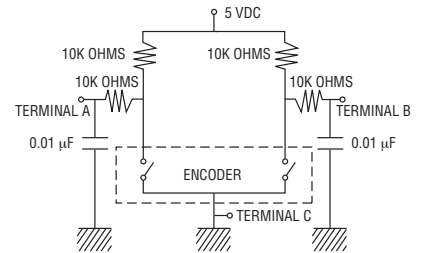


L2	L1	LM
5 (.197)	11 (.433)	17.5 (.689)
7 (.276)	13.5 (.532)	20 (.787)
12 (.472)	18.5 (.728)	25 (.984)

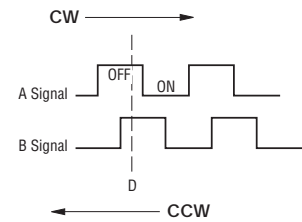
DIMENSIONS:  $\frac{\text{MM}}{\text{(INCHES)}}$

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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