



## Features

- Compact design, long life and high reliability
- Vertical and horizontal mount versions
- Momentary switch
- Dual LED design
- Flatted and knurled shaft styles
- Bushing and bushingless options



## PEL12D - 12 mm Encoder with Switch and 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
Switch Life .....	20,000 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

### Switch Characteristics

Switch Type .....	Contact Push ON Momentary SPST
Power Rating (Resistive Load) .....	10 mA at 5 V DC
Contact Resistance .....	100 milliohms
Switch Travel .....	0.5 +0.0/-0.3 mm
Switch Actuation Force .....	450 ± 200 gf (15.9 ± 7.0 oz.)

### How To Order

**PEL12D - 4 0 21 F - S 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: _____
16 = 16.0 mm	26 = 26.0 mm
18 = 18.5 mm	31 = 31.0 mm
21 = 21.0 mm	25 = 25.0 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 _____	
S = Push Momentary Switch	
LED Color _____	
Dual: _____	
1 = Blue/Orange	
2 = Green/Red	
3 = Blue/Green	
Resolution _____	
024 = 24 Pulses per 360 ° Rotation	

\*\*\* Available in 18.5, 21 and 26 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

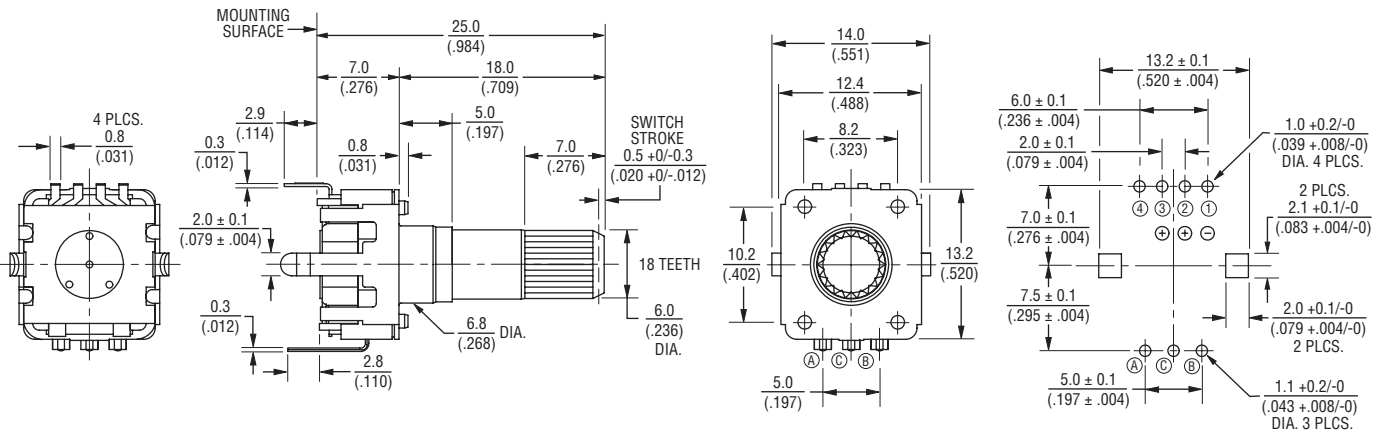
Level control, tuning and timer settings in:

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

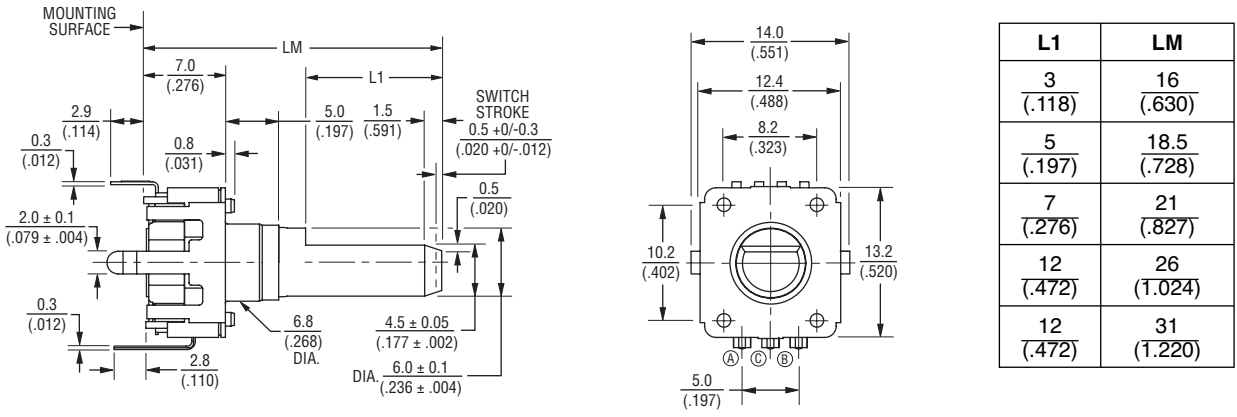
## PEL12D - 12 mm Encoder with Switch and Illuminated Shaft BOURNS®

### Product Dimensions

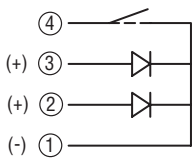
**PEL12D-4xxxS-Sxxxx (Horizontal Mount w/Dual LED & Switch, Knurled Shaft)**



**PEL12D-4xxxF-Sxxxx (Horizontal Mount w/Dual LED & Switch, Flatted Shaft)**



### Dual LED Circuit



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

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

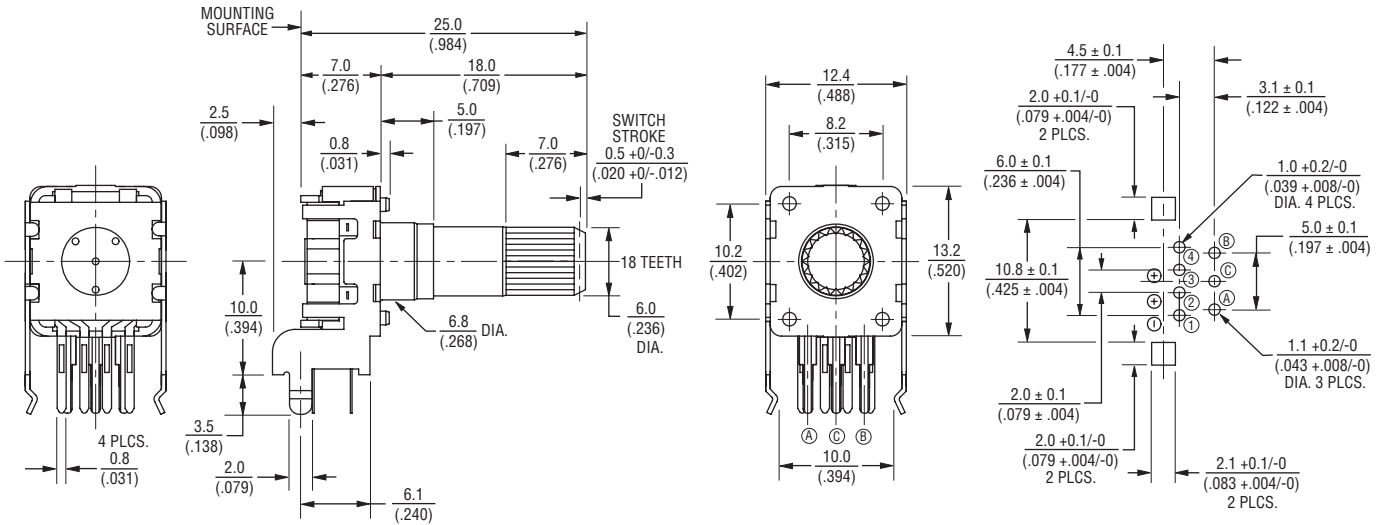
Specifications are subject to change without notice. Customers should verify actual device performance in their specific applications.

# PEL12D - 12 mm Encoder with Switch and Illuminated Shaft

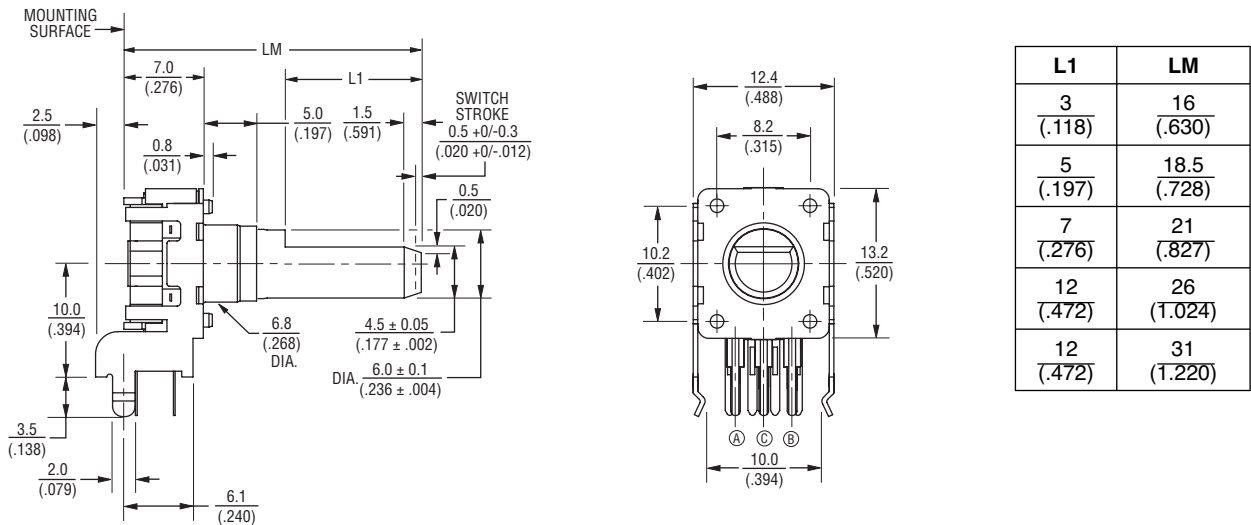


## Product Dimensions

### PEL12D-2xxxS-Sxxxx (Vertical Mount w/Dual LED & Switch, Knurled Shaft)



### PEL12D-2xxxF-Sxxxx (Vertical Mount w/Dual LED & Switch, Flatted Shaft)



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

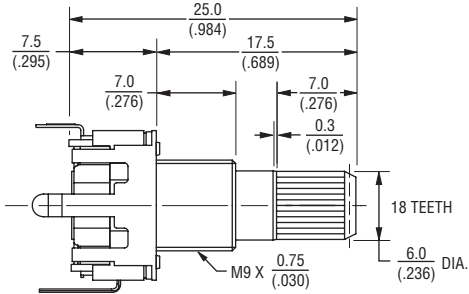
TOLERANCES:  
 UNDER  $\frac{10.0}{(.394)} = \frac{\pm 0.3}{(\pm 0.012)}$   $\frac{10.0 \sim 100}{(.394 \sim 3.937)} = \frac{\pm 0.5}{(\pm 0.020)}$

# PEL12D - 12 mm Encoder with Switch and Illuminated Shaft

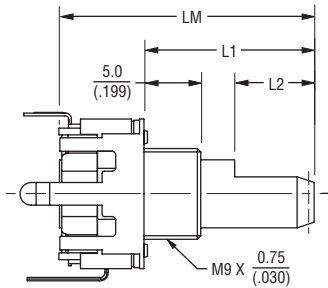


## Product Dimensions

PEL12D-4xxxT-Sxxxx (Horizontal Mount w/Dual LED & Switch, Knurled Shaft w/Bushing)



PEL12D-4xxxG-Sxxxx (Horizontal Mount w/Dual LED & Switch, Flatted Shaft w/Bushing)

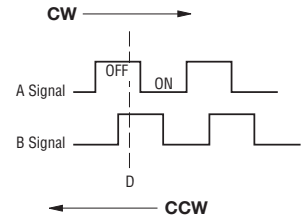


L2	L1	LM
5 (.197)	11 (.433)	18.5 (.728)
7 (.276)	13.5 (.532)	21 (.827)
12 (.472)	18.5 (.728)	26 (1.024)

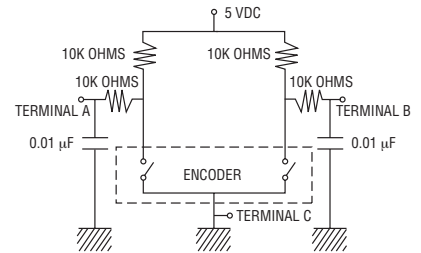
DIMENSIONS:  $\frac{\text{MM}}{\text{(INCHES)}}$

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

## Quadrature Output Table



## Suggested Filter Circuit



## LED Terminal Decoder

Code	Color	Terminals
1	Blue / Orange	① ② / ① ③
2	Green / Red	① ② / ① ③
3	Blue / Green	① ② / ① ③

## LED Characteristics (Dual)

LED Color		Power Dissipation (mW)	DC Forward Current (mA)	Forward Voltage (V)	
				Typ.	Max.
Blue/ Orange	Blue	105	30	3.3	4.0
	Orange	75	30	2.1	2.5
Green/ Red	Green	120	30	3.2	4.0
	Red	75	30	1.95	2.5
Blue/ Green	Blue	120	30	3.3	4.0
	Green	120	30	3.2	4.0
Red/ Green	Red	75	30	1.95	2.5
	Green	120	30	3.2	4.0

### Notes:

Reverse Current: 10  $\mu$ A  
 Reverse Voltage: 5 VDC  
 Test Condition (IF): 20 mA



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