



## Features

- Push switch option
- Compact, rugged design
- High reliability
- Metal bushing/shaft



# PEC09 Series - 9 mm Incremental Encoder

## Electrical Characteristics

|                                 |                       |
|---------------------------------|-----------------------|
| Output.....                     | 2-bit quadrature code |
| Closed Circuit Resistance.....  | 3 ohms maximum        |
| Contact Rating.....             | 10 mA @ 5 VDC         |
| Insulation Resistance.....      | 100 megohms @ 250 VDC |
| Dielectric Withstanding Voltage |                       |
| Sea Level.....                  | 300 VAC minimum       |
| Electrical Travel.....          | Continuous            |
| Contact Bounce (15 RPM).....    | 5.0 ms maximum**      |
| RPM (Operating).....            | 60 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)  |
| Humidity.....                    | MIL-STD-202, Method 103B, Condition B |
| Rotational Life.....             | 30,000 cycles minimum                 |
| IP Rating.....                   | IP 40                                 |

## Mechanical Characteristics

|                               |   |
|-------------------------------|---|
| Mechanical Angle.....         | 360 ° continuous  |
| Torque                        |   |
| Running/Detent.....           | 30 to 200 gf.cm (0.42 to 2.7 oz.-in.)                                     |
| Mounting.....                 | 10.0 kgf.cm (8.67 lb.-in.) maximum  |
| Terminal Bend Strength.....   | 300 gf (10.6 ozf)   |
| Shaft Push-Pull Strength..... | 10 kgf (22 lbf)   |
| Weight.....                   | 5 gm (0.17 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 3-5 seconds |
| Hand Soldering.....           | Not recommended   |
| Hardware.....                 | One flat washer and one mounting nut supplied with each encoder           |

## Switch Characteristics

|                                    |                                |
|------------------------------------|--------------------------------|
| Switch Type.....                   | Contact Push ON Momentary SPST |
| Switch Life.....                   | 20,000 cycles minimum          |
| Power Rating (Resistive Load)..... | 10 mA at 5 V DC                |
| Switch Travel.....                 | See How to Order               |
| Switch Actuation Force.....        | 300 ± 200 gf (10.6 ± 7.0 ozf)  |

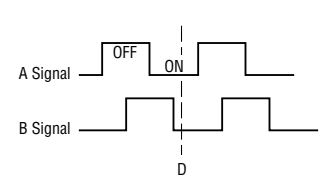
## How To Order

**PEC09 - 2 0 20 F - S 0012**

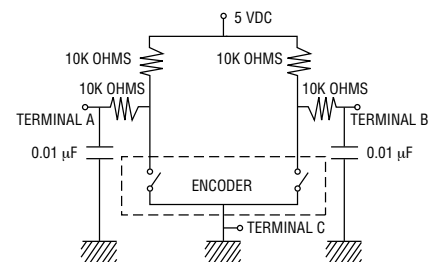
|                             |  |
|-----------------------------|--|
| Model.....                  | PEC09 - 2 0 20 F - S 0012  |
| Terminal Configuration..... | 2 = PC Pin Vertical/Side Exit  |
| Detent Option.....          | 0 = No Detents (12, 15 pulses)<br>1 = 12 Detents (12 pulses)<br>2 = 24 Detents (12 pulses)<br>3 = 30 Detents (15 pulses) |
| Standard Shaft Length.....  | 15 = 15.0 mm<br>20 = 20.0 mm<br>25 = 25.0 mm   |
| Shaft Style.....            | F = Metal Flatted Shaft<br>K = Metal Knurled Shaft   |
| Switch Configuration.....   | N = No Switch<br>S = Push Momentary (0.5 mm stroke)<br>T = Push Momentary (1.5 mm stroke)                                |
| Resolution.....             | 0012 = 12 Pulses per 360 ° Rotation<br>0015 = 15 Pulses per 360 ° Rotation   |

## Quadrature Output Table

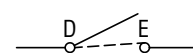
CW →



## Suggested Filter Circuit



## Switch Circuit



CIRCUIT DIAGRAM



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

\*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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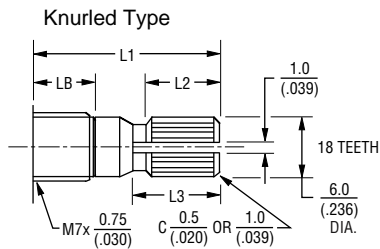


# PEC09 Series - 9 mm Incremental Encoder

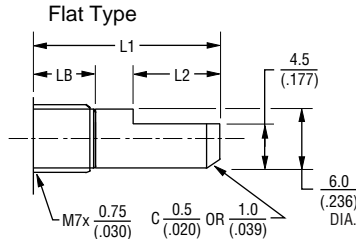
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## Shaft Options

### PEC09-2xxxx-Nxxxx

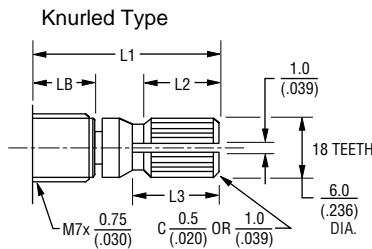


| L1           | LB             | L2             | L3             |
|--------------|----------------|----------------|----------------|
| 15<br>(.591) | 5.0<br>(.197)  | 6.0<br>(.236)  | 7.0<br>(.276)  |
| 20<br>(.787) | 7.0<br>(.276)  | 10.0<br>(.394) | 11.0<br>(.433) |
| 25<br>(.984) | 10.0<br>(.394) | 10.0<br>(.394) | 11.0<br>(.433) |

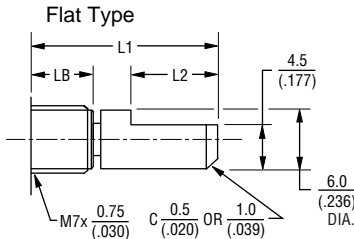


| L1           | LB             | L2             |
|--------------|----------------|----------------|
| 15<br>(.591) | 5.0<br>(.197)  | 7.0<br>(.276)  |
| 20<br>(.787) | 7.0<br>(.276)  | 12.0<br>(.472) |
| 25<br>(.984) | 10.0<br>(.394) | 12.0<br>(.472) |

### PEC09-2xxxx-Sxxxx (0.5 mm Switch Stroke)

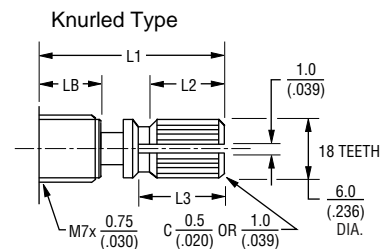


| L1           | LB             | L2            | L3             |
|--------------|----------------|---------------|----------------|
| 15<br>(.591) | 5.0<br>(.197)  | 6.0<br>(.236) | 7.0<br>(.276)  |
| 20<br>(.787) | 7.0<br>(.276)  | 9.0<br>(.354) | 10.0<br>(.394) |
| 25<br>(.984) | 10.0<br>(.394) | 9.0<br>(.354) | 10.0<br>(.394) |

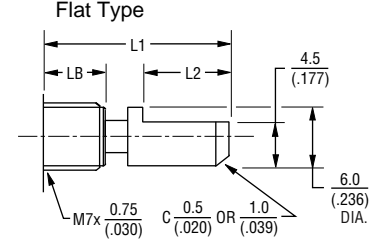


| L1           | LB             | L2             |
|--------------|----------------|----------------|
| 15<br>(.591) | 5.0<br>(.197)  | 7.0<br>(.276)  |
| 20<br>(.787) | 7.0<br>(.276)  | 10.0<br>(.394) |
| 25<br>(.984) | 10.0<br>(.394) | 10.0<br>(.394) |

### PEC09-2xxxx-Txxxx (1.5 mm Switch Stroke)



| L1           | LB             | L2            | L3            |
|--------------|----------------|---------------|---------------|
| 15<br>(.591) | 5.0<br>(.197)  | 5.0<br>(.197) | 6.0<br>(.236) |
| 20<br>(.787) | 7.0<br>(.276)  | 8.0<br>(.315) | 9.0<br>(.354) |
| 25<br>(.984) | 10.0<br>(.394) | 8.0<br>(.315) | 9.0<br>(.354) |



| L1           | LB             | L2             |
|--------------|----------------|----------------|
| 15<br>(.591) | 5.0<br>(.197)  | 7.0<br>(.276)  |
| 20<br>(.787) | 7.0<br>(.276)  | 10.0<br>(.394) |
| 25<br>(.984) | 10.0<br>(.394) | 10.0<br>(.394) |

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

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Specifications are subject to change without notice.

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