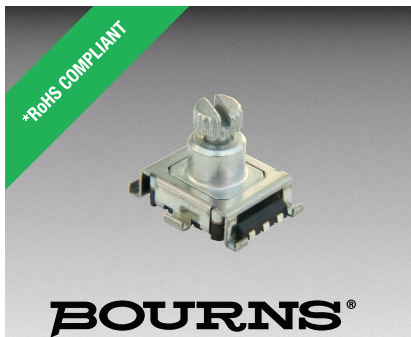




Features

- Push switch option standard
- Compact, rugged design
- High reliability
- Metal bushing/shaft
- Surface mount version

Applications

Level control, tuning and timer settings in:

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

PEC11S Series - 12 mm SMD 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).....	2.0 ms maximum
RPM (Operating)	60 maximum

Environmental Characteristics

Operating Temperature Range	-40 °C to +70 °C (-40 °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	15,000 cycles minimum
Switch Life	20,000 cycles minimum
IP Rating	IP 40
Moisture Sensitivity Level	1
ESD Classification (HBM).....	N/A

Mechanical Characteristics

Mechanical Angle	360 ° continuous
Detent Torque	100 ±70 gf.cm (1.36 ±0.1 oz.-in.)
Shaft Push-Pull Strength	10 kg max.
Weight	5 gm (0.17 oz.) maximum
Terminals	Printed circuit board surface mount terminals
Soldering Condition	
Reflow Soldering	Sn95.5/Ag2.8/Cu0.7 solder with no-clean flux (see Solder Profiles for recommended time and temperature)
Hand Soldering	Not recommended
Hardware	No hardware supplied with this encoder

Switch Characteristics

Switch Type	Contact Push ON Momentary SPST
Power Rating (Resistive Load).....	10 mA at 5 V DC
Switch Travel	
S (Standard)	0.5 ± 0.3 mm
H (High)	1.5 ± 0.5 mm
Switch Actuation Force	See How to Order
Contact Resistance	100 mΩ max.

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WARNING Cancer and Reproductive Harm - www.P65Warnings.ca.gov

*RoHS Directive 2015/863, Mar 31, 2015 and Annex.

Specifications are subject to change without notice.

Users should verify actual device performance in their specific applications.

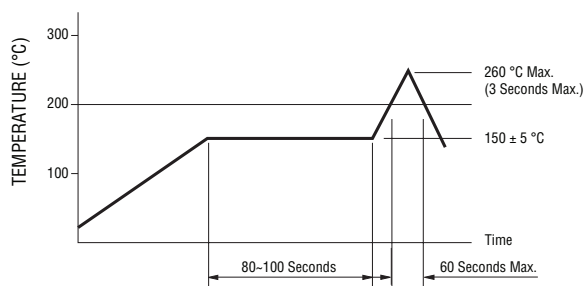
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The device characteristics and parameters in this data sheet can and do vary in different applications and actual device performance may vary over time.

PEC11S Series - 12 mm SMD Incremental Encoder

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Solder Profile



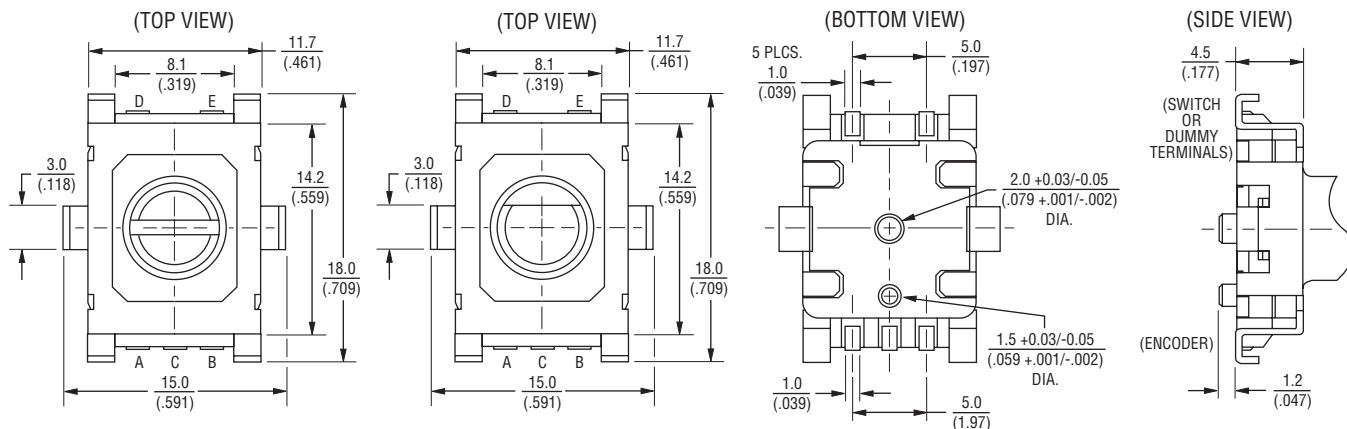
Notes:

1. No clean solder paste is recommended.
2. Aqueous wash is not recommended.
3. Use of water soluble soldering flux shall be avoided due to possible corrosion.
4. Multiple passes through the soldering process is not recommended.

Processing Method: Reflow soldering with infrared heat or forced air convection (only once).

Product Dimensions

Common Dimensions

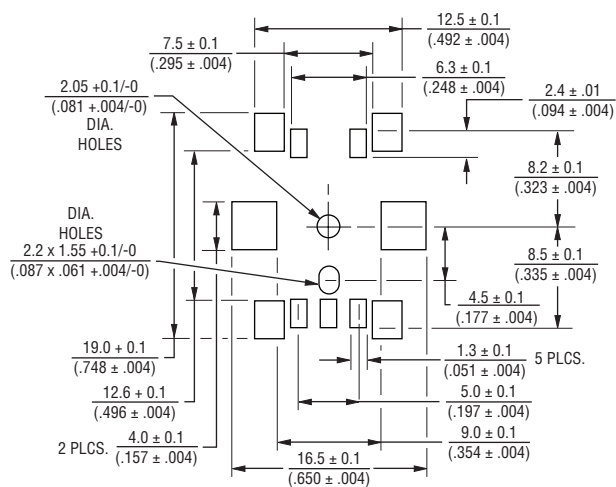


TOLERANCES (UNLESS OTHERWISE NOTED): ≤ 10 $\leq (.394) = \pm 0.3 \pm (.012)$

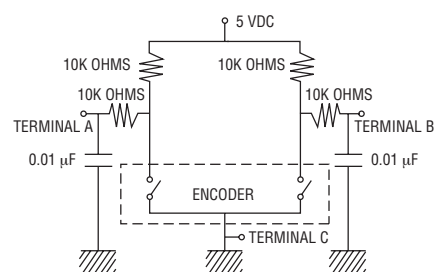
> 10 $> (.394) = \pm 0.5 \pm (.020)$

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

Recommended PCB Layout



Suggested Filter Circuit



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PEC11S without Switch

L1	LB	L2	L3
15	5	7	8
(.591)	(.197)	(.279)	(.315)
20	7	10	11
(.787)	(.276)	(.394)	(.433)

L1	LB	L2
$\frac{9.5}{(.374)}$	$\frac{5}{(.197)}$	$\frac{4.5}{(.177)}$

[illegible]

L1	LB	L2
15 (.591)	5 (.197)	7 (.276)
20 (.787)	7 (.276)	12 (.472)

Technical drawing of a 1/2-18 UNF-2A x 3.00 inch hex bolt with a hex nut. The bolt has a head diameter of 7.0 (276) and a head length of 0.5 (0.020). The hex nut has an outer diameter of 6.0 (236) and a height of 1.0 (0.039). The bolt has 18 teeth. The drawing shows the bolt and nut assembly with dimensions L1, L2, L3, LB, and C.

L1	LB	L2	L3
<u>15</u>	<u>5</u>	<u>7</u>	<u>7.5</u>
(.591)	(.197)	(.276)	(.295)
<u>20</u>	<u>7</u>	<u>9</u>	<u>10</u>
(.787)	(.276)	(.354)	(.394)

Technical drawing of a gear with 18 teeth. The drawing shows the gear profile with dimensions in inches and millimeters. The dimensions are:

- Overall width: 1.6 (0.063)
- Inner diameter: 7.0 (0.276)
- Outer diameter: 6.0 (0.238)
- Pitch diameter: 1.0 (0.039)
- Root diameter: 0.5 (0.020)
- Teeth count: 18 TEETH
- Labels: L1, LB, L2, C

L1	LB	L2
9.5 (.374)	5 (.197)	2.7 (.106)
13.5 (.531)	5 (.197)	6.7 (.264)

Technical drawing of a shaft with the following dimensions and tolerances:

- Overall length: L_1
- Distance from left end to start of step: LB
- Distance from start of step to right end: L_2
- Left end diameter: 7.0 DIA. $(.276)$
- Right end diameter: 6.0 DIA. $(.236)$
- Step height: 4.5 $(.177)$
- Surface finish symbol: C $\frac{0.5}{(.020)}$ OR C $\frac{1.0}{(.039)}$

L1	LB	L2
<u>9.5</u> (.374)	<u>5</u> (.197)	<u>3</u> (.118)
<u>15</u> (.591)	<u>5</u> (.197)	<u>7</u> (.276)
<u>20</u> (.787)	<u>7</u> (.276)	<u>10</u> (.394)

Technical drawing of a 18 TEETH coupling pin. The drawing shows a side view of the pin with various dimensions and labels. The dimensions are: L1 (total length), LB (length of the first section), L2 (length of the second section), L3 (length of the third section), 6.0 DIA (diameter of the second section), 7.0 DIA (diameter of the first section), 1.0 (width of the second section), 0.5 (width of the third section), and 1.0 OR C (width of the third section). The label "18 TEETH" is placed above the second section. The label "DIA." is placed to the left of the first section. The label "OR C" is placed below the third section.

L1	LB	L2	L3
15 (.591)	5 (.197)	6 (.236)	6.5 (.256)
20 (.787)	7 (.276)	8 (.315)	9 (.354)

Technical drawing of a 18-teeth gear. Dimensions are given in inches (in) and millimeters (mm) in parentheses. The drawing shows a side view of the gear with the following specifications:

- Overall length: L_1 (in)
- Length of the gear body: L_2 (in)
- Length of the mounting flange: L_B (in)
- Outer diameter: 6.0 (236) DIA.
- Inner diameter: 7.0 (276) DIA.
- Number of teeth: 18 TEETH
- Teeth thickness: 1.0 (39)
- Teeth width: 1.6 (63)
- Teeth height: 0.5 (20)
- Teeth profile: C

L1	LB	L2
9.5 (.374)	5 (.197)	2.9 (.114)
13.5 (.531)	5 (.197)	6.9 (.272)

Technical drawing of a shaft-hub assembly. The drawing shows a shaft with a diameter of 7.0 (276) DIA. and a hub with a diameter of 6.0 (236) DIA. The shaft has a length of L1 and a shoulder of length LB. The hub has a length of L2. The fit is specified as 6.0 (236) DIA. with a tolerance of 4.5 (.177). The shaft has a tolerance of 7.0 (276) DIA. with a tolerance of 0.5 (.020) OR C 1.0 (.039).

L1	LB	L2
15 (.591)	5 (.197)	7 (.276)
20 (.787)	7 (.276)	10 (.394)
25 (.985)	7 (.275)	12 (.473)

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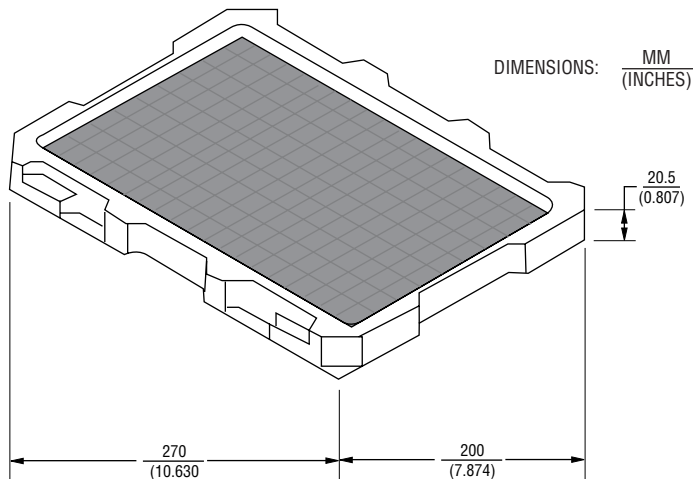
How To Order

PEC11S - 9 2 20 F - S 0015

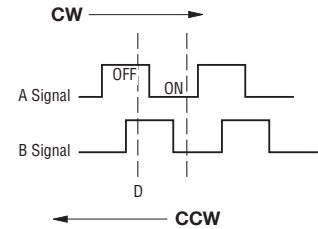
Model _____
 Terminal Configuration _____
 9 = Surface Mount Gull-wing Style
 Detent Option _____
 2 = 30 Detents
 Shaft Length (See Product Dimensions - Shaft Styles for Availability) _____
 9 = 9.5 mm
 13 = 13.5 mm
 15 = 15.0 mm
 20 = 20.0 mm
 25 = 25.0 mm (Flat Shaft and H-Switch Configuration Only)
 Shaft Style _____
 F = Flatted, Metal
 K = Knurled, Metal
 Switch Configuration (SPST) _____
 S = 350 ± 100 gf
 H = 400 ± 200 gf
 N = No Switch
 Resolution _____
 0015 = 15 Pulses per 360 ° Rotation

Packaging

Tray 60 pcs. per tray
 Outer Box 10 trays; 1200 pcs. per box



Quadrature Output Table



Switch Circuit



NOTE: D and E are dummy terminals on non-switch version.

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