

## Features

- Quadrature output
- Detent option
- Snap-in PC board mount
- Long operating life
- Incremental output
- Up to 24 full quadrature outputs per revolution

## ES Series - Shaftless Contacting Encoders

### Electrical Characteristics

|                                                          |                                                                         |
|----------------------------------------------------------|-------------------------------------------------------------------------|
| Output .....                                             | 2-bit quadrature code, Channel A leads Channel B turning clockwise (CW) |
| Closed Circuit Resistance .....                          | 5 ohms maximum                                                          |
| Open Circuit Resistance .....                            | 100 K ohms minimum                                                      |
| Contact Rating .....                                     | 10 milliamp @ 10 VDC or 0.1 watt maximum                                |
| Insulation Resistance (500 VDC) .....                    | 1,000 megohms minimum                                                   |
| Dielectric Withstanding Voltage (MIL-STD-202 Method 301) |                                                                         |
| Sea Level .....                                          | 1,000 VAC minimum                                                       |
| Electrical Travel .....                                  | Continuous                                                              |
| Contact Bounce (15 RPM) .....                            | 5 milliseconds maximum                                                  |
| RPM (Operating) .....                                    | 120 maximum                                                             |

### Environmental Characteristics

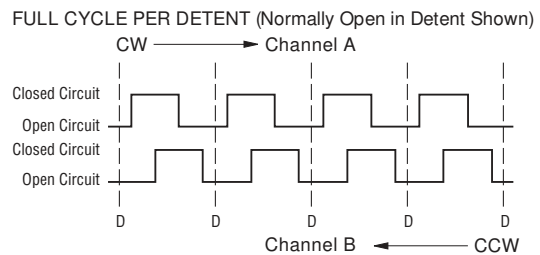
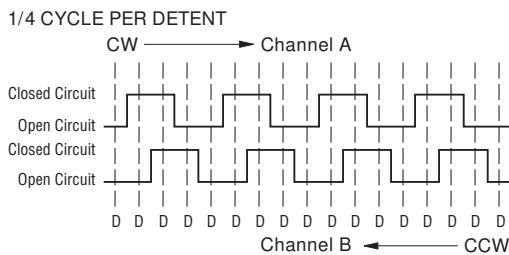
|                                   |                                       |
|-----------------------------------|---------------------------------------|
| Operating Temperature Range ..... | -40 °C to +85 °C (-40 °F to +185 °F)  |
| Storage Temperature Range .....   | -40 °C to +85 °C (-40 °F to +185 °F)  |
| Humidity .....                    | MIL-STD-202, Method 103B, Condition B |
| Vibration .....                   | 15 G                                  |
| Contact Bounce .....              | 0.1 millisecond maximum               |
| Shock .....                       | 50 G                                  |
| Contact Bounce .....              | 0.1 millisecond maximum               |
| Rotational Life .....             | 200,000 shaft revolutions             |
| IP Rating .....                   | IP 40                                 |

### Mechanical Characteristics

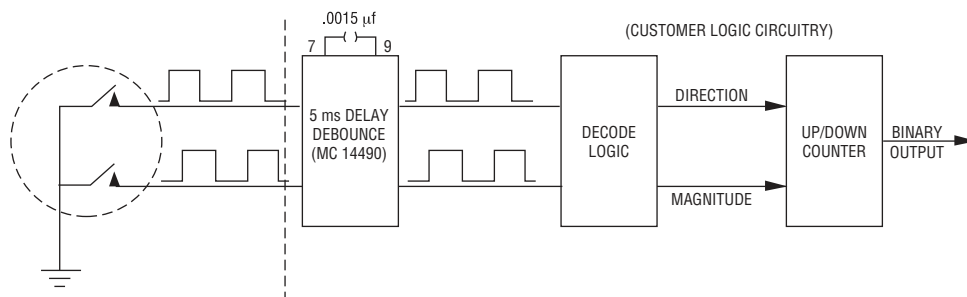
|                                 |                                                                                                |
|---------------------------------|------------------------------------------------------------------------------------------------|
| Mechanical Angle .....          | Continuous                                                                                     |
| Running Torque (Detented) ..... | 0.5 to 1.5 N-cm (0.75 to 2.25 oz-in.)                                                          |
| Undetented Torque .....         | 0.17 to 0.8 N-cm (0.25 to 1.25 oz-in.)                                                         |
| Weight .....                    | Approximately 8 gm (0.28 oz.)                                                                  |
| Terminals .....                 | Printed circuit board terminals                                                                |
| Soldering Condition             |                                                                                                |
| Manual Soldering .....          | 96.5Sn/3.0Ag/0.5Cu solid wire or no-clean rosin cored wire; 370 °C (700 °F) max. for 3 seconds |
| Wave Soldering .....            | 96.5Sn/3.0Ag/0.5Cu solder with no-clean flux; 260 °C (500 °F) max. for 5 seconds               |
| Wash Processes .....            | Not recommended                                                                                |
| Marking .....                   | Manufacturer's name and trademark, part number and date code                                   |
| Hardware .....                  | No hardware supplied                                                                           |

### Quadrature Output Table

This table is intended to show available outputs as currently defined.



### RECOMMENDED INCREMENTAL CONTROL DIAGRAM FOR USE WITH A DEBOUNCE CIRCUIT



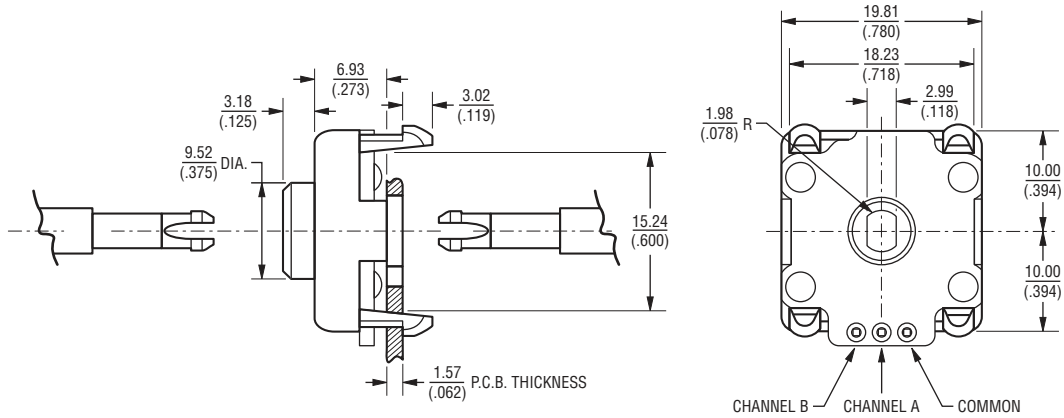
**WARNING Cancer and Reproductive Harm**  
[www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov)

\*RoHS Directive 2015/863, Mar 31, 2015 and Annex.  
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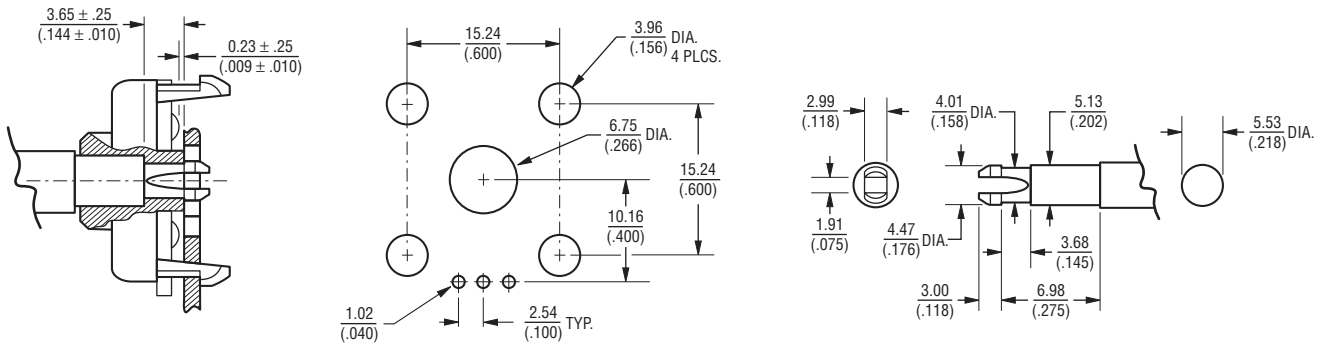
# ES Series - Shaftless Contacting Encoders

**BOURNS®**

## Product Dimensions



## Mounting Dimensions



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

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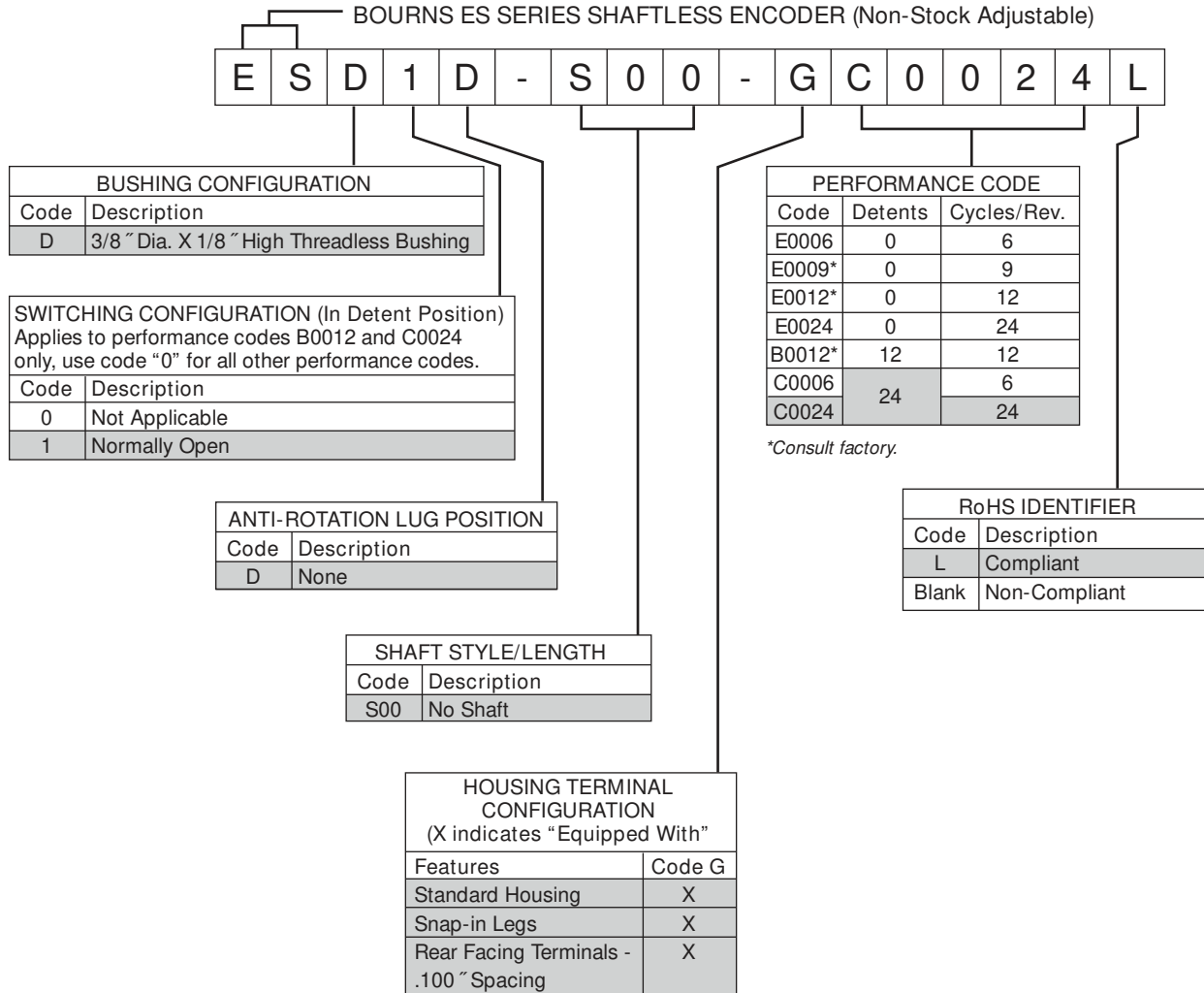
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# ES Series - Shaftless Contacting Encoders

**BOURNS®**

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