



### 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

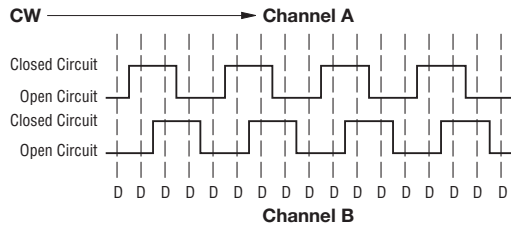
### Mechanical Characteristics

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

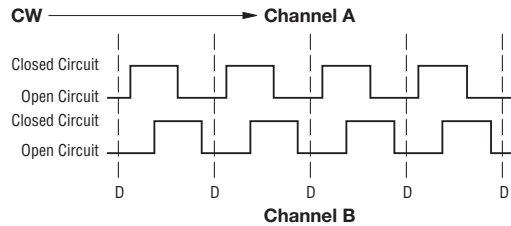
### Quadrature Output Table

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

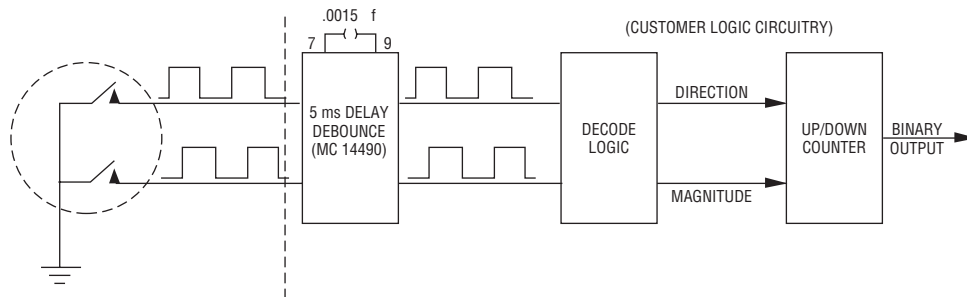
#### 1/4 CYCLE PER DETENT



#### FULL CYCLE PER DETENT (Normally Open in Detent Shown)



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



\*RoHS Directive 2002/95/EC Jan 27, 2003 including Annex.

Specifications are subject to change without notice.

Customers should verify actual device performance in their specific applications

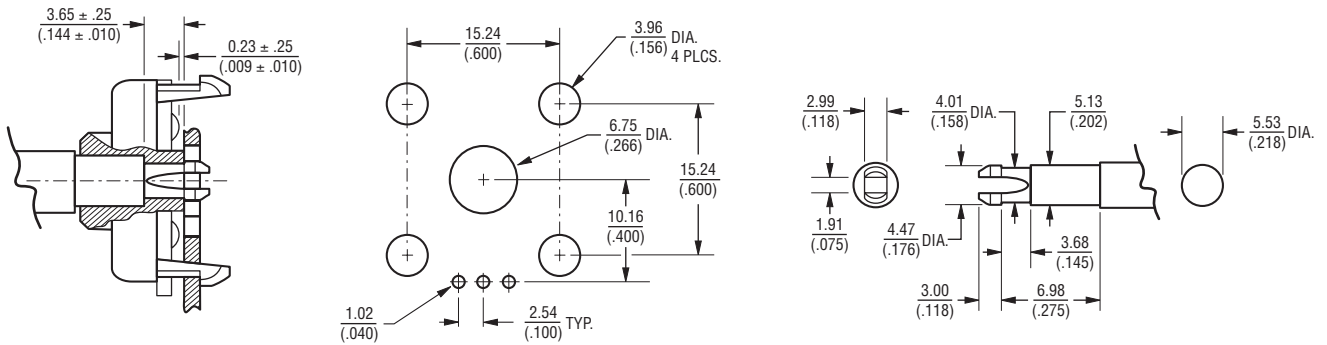
# ES Series - Shaftless Contacting Encoders

**BOURNS®**

## Product Dimensions



## Mounting Dimensions



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

# ES Series - Shaftless Contacting Encoders

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## How To Order

