



## Features

- Incremental encoder / quadrature output
- Exceptionally long operating life
- Sturdy construction
- Bushing mount
- Available with PC board mounting bracket (optional)
- RoHS compliant\*

## ECW - Digital Contacting Encoder

### Electrical Characteristics

|  |  |
|--|--|
| Output.....  | 2-bit quadrature code, Channel A leads Channel B by 90 ° electrically 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  |
| Phase Tolerance (CH A to CH B).....                      | 90 ° ± 72 °  |

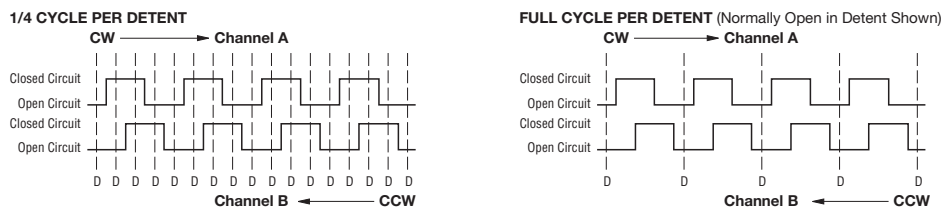
### Environmental Characteristics

|                                  |                                       |
|----------------------------------|---------------------------------------|
| 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                                 |

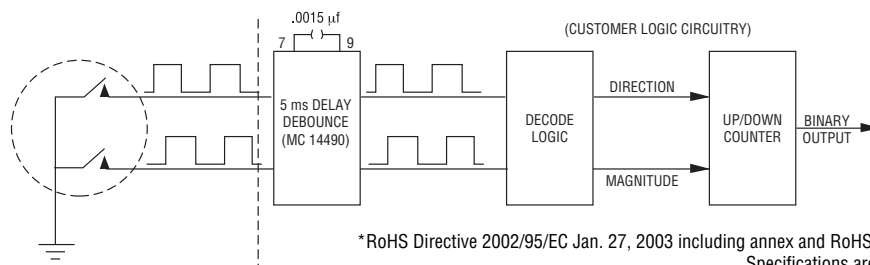
### Mechanical Characteristics

|                                     |   |
|-------------------------------------|---|
| 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 1.0 N-cm (0.25 to 1.50 oz-in.)  |
| Mounting Torque.....                | 79 N-cm (7 lb.-in.) maximum   |
| Shaft Side Load (Static).....       | 4.5 kg (10 lbs.) minimum  |
| Weight.....                         | Approximately 21 gms. (0.75 oz.)  |
| Terminals..... PC pin or solder lug |   |
| Soldering Condition                 |   |
| Manual Soldering.....               | 96.5Sn/3.0Ag/0.5Cu solid wire or no-clean rosin cored wire<br>370 °C (700 °F) max. for 3 seconds          |
| Wave Soldering.....                 | 96.5Sn/3.0Ag/0.5Cu solder with no-clean flux<br>260 °C (500 °F) max. for 5 seconds                        |
| Wash processes.....                 | Not recommended   |
| Marking.....                        | Manufacturer's name and trademark, part number, and date code.  |
| Hardware.....                       | One lockwasher and one mounting nut are shipped with each encoder, except where noted in the part number. |

### Quadrature Output Table – This table is intended to show available outputs as currently defined.



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



\*RoHS Directive 2002/95/EC Jan. 27, 2003 including annex and RoHS Recast 2011/65/EU June 8, 2011.

Specifications are subject to change without notice.

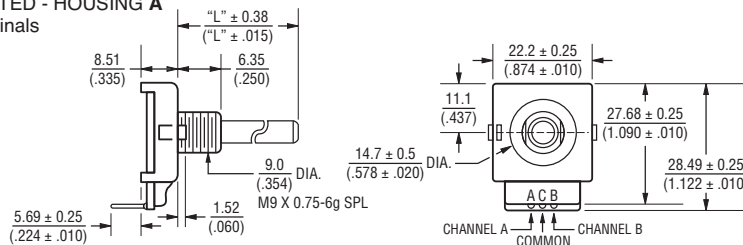
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# BOURNS®

## Dimensional Drawings

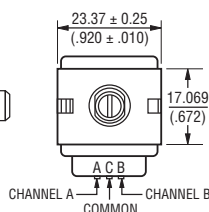
### BUSHING MOUNTED - HOUSING A Rear-Facing Terminals



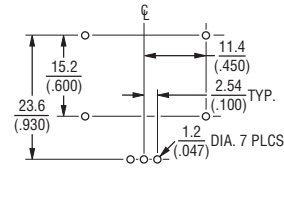
### PANEL HOLE DIMENSIONS Bushing Mounted



### PCB BRACKET MOUNTED - HOUSING B Dimensions not given are the same as Bushing Mounted.

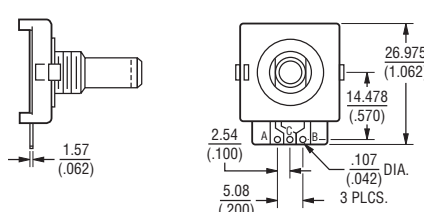


### PCB MOUNTING DIMENSIONS (Housing Styles B and E)

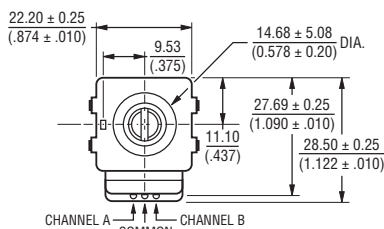
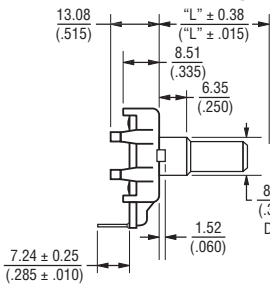


### SOLDER HOLES - HOUSING C

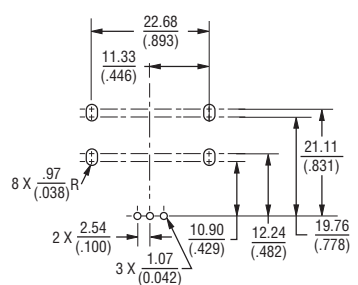
Dimensions not given are the same as Bushing Mounted.



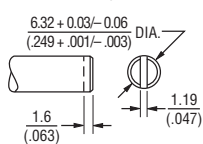
### SNAP-IN MOUNT - Housing G



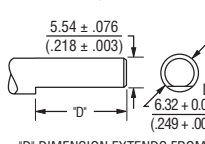
### PCB MOUNTING DIMENSIONS



### Shaft Style B

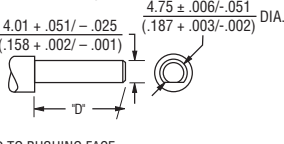


### Shaft Style C

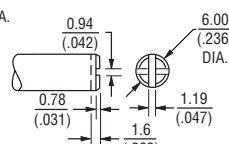


"D" DIMENSION EXTENDS FROM SHAFT END TO BUSHING FACE  
 "D" = (SHAFT LENGTH, FMS) - (BUSHING LENGTH)

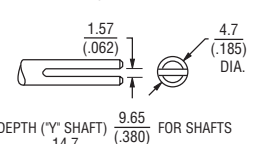
### Shaft Style J



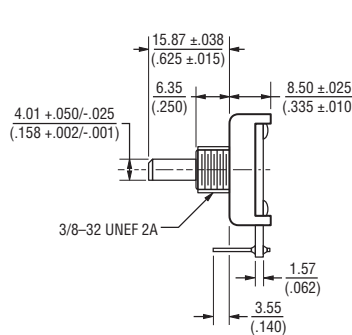
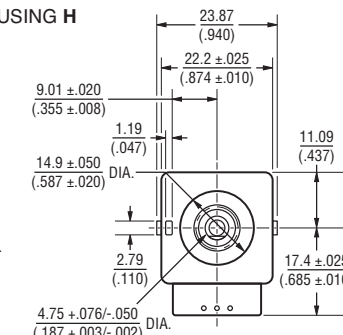
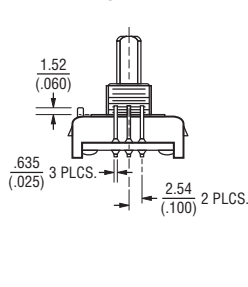
### Shaft Style R



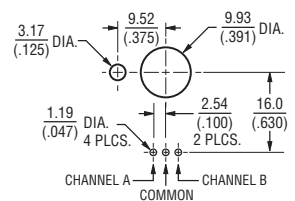
### Shaft Style Y



### BUSHING MOUNTED - HOUSING H Front-Facing Terminals



FOR TOLERANCES NOT SHOWN  
 .XX ± .25 .XXX ± .13  
 (.010) (.005)  
 SHAFT DIMENSIONS ± 1/32"  
 DIMENSIONS: MM (IN)



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## How to Order

### PART NUMBERING SYSTEM

**E C W 1 J - B 2 4 - B C 0 0 2 4 L**

| Code | Rotational Life     |
|------|---------------------|
| C    | 200,000 Revolutions |

| BUSHING CONFIGURATION |  |
|-----------------------|--|
| Code                  | Description  |
| W                     | 9 mm x 1/4 " Length. Threaded M9x0.75                        |
| L                     | 9 mm x 3/8 " Length. Threaded M9x0.75<br>(Use B shaft only.) |
| T                     | 9 mm x 1/4 ". No Thread.                                     |

| SWITCHING CONFIGURATION (In Detent Position)   |                |
|--|----------------|
| Applies to performance codes B0012 and C0024 only, use code "0" for all other performance codes. |                |
| Code   | Description    |
| 0  | Not Applicable |
| 1  | Normally Open  |

| ANTI-ROTATION LUG POSITION |               |
|----------------------------|---------------|
| Code                       | Description   |
| J                          | 9:00 Position |
| D                          | None          |

| SHAFT STYLE (See Outline Drawing for Details) |                                       |
|---|---------------------------------------|
| Code  | Description                           |
| B   | Plain with Inserted Slot (1/4 " Dia.) |
| C   | Single Flatted (1/4 " Dia.)           |
| R   | Plain with Cross Slot (6 mm Dia.)     |
| Y   | Split Shaft Version (.185 " Dia.)     |
| J   | Flatted Shaft (3/16 " Dia.)           |

| RoHS IDENTIFIER |             |
|-----------------|-------------|
| Code            | Description |
| L               | Compliant   |

| PERFORMANCE CODE |         |             |
|------------------|---------|-------------|
| Code             | Detents | Cycles/Rev. |
| E0006            | 0       | 6           |
| E0009            | 0       | 9           |
| E0012            | 0       | 12          |
| E0024            | 0       | 24          |
| E0036            | 0       | 36          |
| B0012            | 12      | 12          |
| C0006            | 24      | 6           |
| <b>C0024</b>     |         | <b>24</b>   |
| D0009            | 36      | 9           |

| HOUSING TERMINAL CONFIGURATION<br>(X indicates "Equipped With") |   |   |   |   |   |   |    |   |   |   |
|---|---|---|---|---|---|---|----|---|---|---|
| Code  |   |   |   |   |   |   |    |   |   |   |
| Features  | A | B | C | D | E | F | G* | H | K |   |
| Terminal Cover  | X | X |   |   | X |   | X  |   |   |   |
| Rear-Facing Terminals   | X | X |   |   | X |   | X  |   |   |   |
| Solder Holes  |   |   | X | X |   | X |    |   |   |   |
| PCB Bracket   |   | X |   | X | X | X |    |   |   |   |
| Hardware Included   | X |   | X |   | X | X |    | X |   |   |
| Snap-In Mount   |   |   |   |   |   |   |    | X |   |   |
| Forward-Facing Terminals  |   |   |   |   |   |   |    |   | X | X |

\*Bushing code T only.

| SHAFT LENGTH (FMS) |                             |                        |
|--------------------|-----------------------------|------------------------|
| Code               | Description                 | Available Shaft Styles |
| 16                 | 1/2 " Length                | B                      |
| 20                 | 5/8 " (15.9 mm) Length      | J                      |
| <b>24</b>          | <b>3/4 " (19 mm) Length</b> | <b>B, C, J, Y</b>      |
| 28                 | 7/8 " (22.2 mm) Length      | B, C, J, Y             |
| 32                 | 1 " (25.4 mm) Length        | B, C, J, Y             |
| 36                 | 1-1/8 " (28.6 mm) Length    | B, C, J, Y             |
| Metric             |                             |                        |
| 19                 | 19 mm Length                | R                      |
| 22                 | 22 mm Length                | R                      |
| 24                 | 24 mm Length                | R                      |

The sample part number demonstrates the identification code for Bourns contacting encoders.

Boldface features are Bourns standard options. All others are available with higher minimum order quantities.

REV. 02/13

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