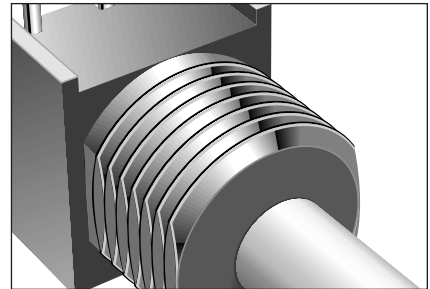
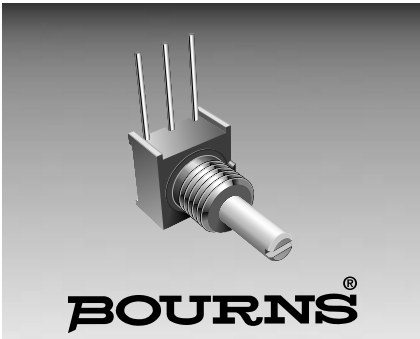


# Encoders



- I. Rotary Encoders
  - 6mm Square .....142
  - 9mm Square .....138
- II. Rotary Optical Encoders
  - 16mm X 21mm.....144
- III. Digital Contacting Encoders
  - 22mm Square .....146
- IV. Absolute "ACE" Encoder
  - 22mm Square .....149





## Features

- Miniature package for design flexibility
- Long operating life
- Conductive plastic element
- Bushing or PC board mount
- Quadrature output

# 3315 - 9mm Square Sealed Incremental Encoder

### Electrical Characteristics

Output.....2-bit gray code,  
 Channel A leads Channel B  
 electrically turning clockwise (CW)  
 Closed Circuit Resistance.....5 ohms  
 maximum  
 Contact Rating.....100 milliamp  
 @ 16 VDC maximum  
 Insulation Resistance (500 VDC)  
 .....1,000 megohms minimum  
 Dielectric Withstanding Voltage  
 Sea Level .....900 VAC minimum  
 Electrical Travel.....Continuous  
 Contact Bounce (15 RPM)  
 .....5 milliseconds maximum  
 RPM (Operating).....120 maximum

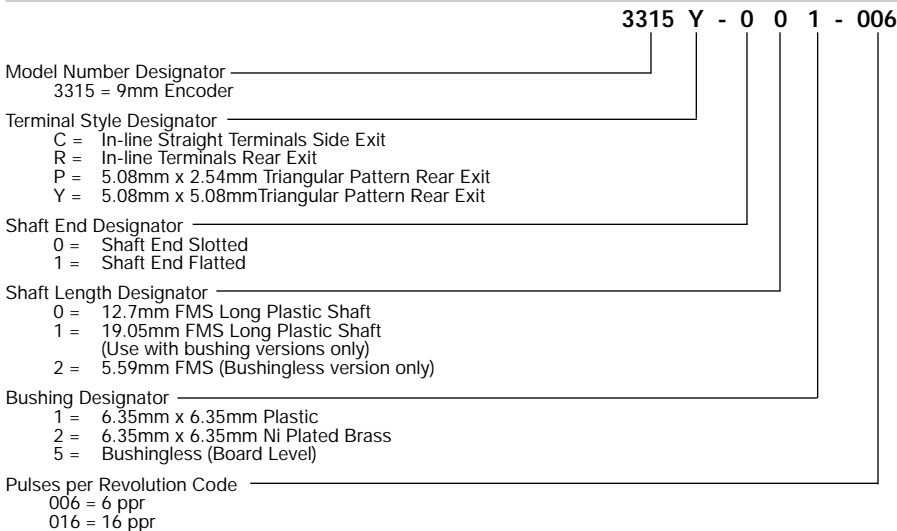
### Environmental Characteristics

Temperature Range .....-55°C to +125°C  
 Vibration .....30G  
 Contact Bounce  
 .....5.0 millisecond maximum  
 Shock .....100G  
 Contact Bounce  
 .....5.0 millisecond maximum  
 Rotational Life ....100,000 cycles @ 6PPR  
 25,000 cycles @ 16ppr

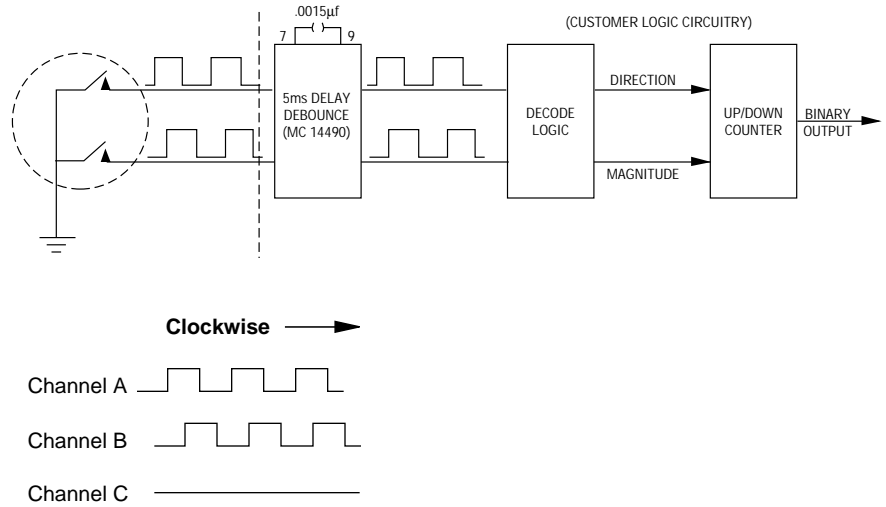
### Mechanical Characteristics

Mechanical Angle .....Continuous  
 Torque .....5 oz-in. maximum  
 Marking .....Manufacturer's symbol and  
 model number, product code,  
 terminal style, date code and  
 resistance code

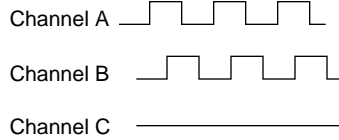
### Part Numbering System



### Recommended Incremental Control Diagram



**Clockwise** →

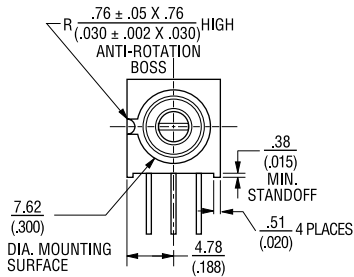
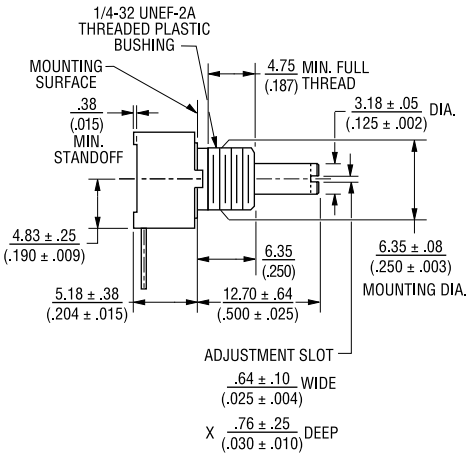
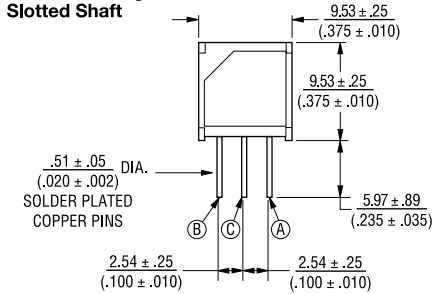


# 3315 - Dimensions and Tolerances

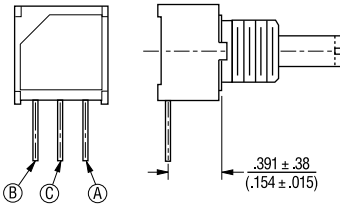


## COMMON DIMENSIONS

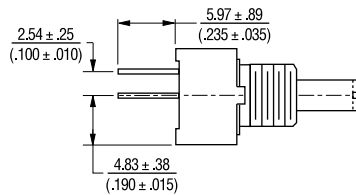
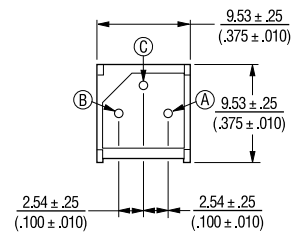
### 3315-001 Plastic Bushing Slotted Shaft



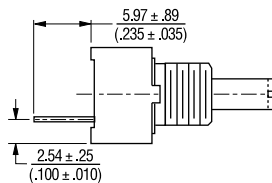
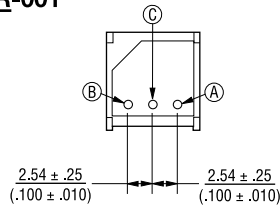
### 3315C-001



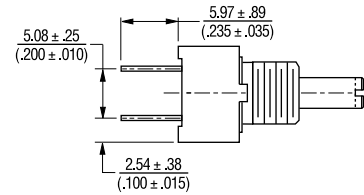
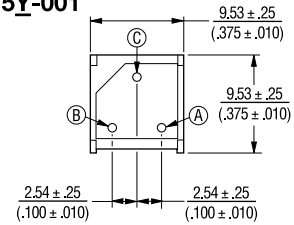
### 3315P-001



### 3315R-001

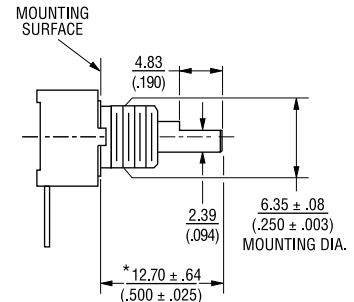


### 3315Y-001



## COMMON DIMENSIONS

### 3315C-101 Plastic Flatted Shaft

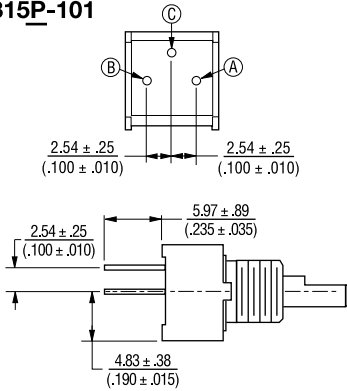


\*FMS = From Mounting Surface

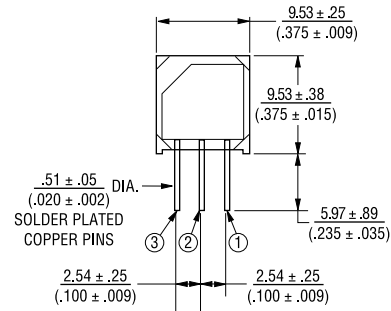
# 3315 - Dimensions and Tolerances



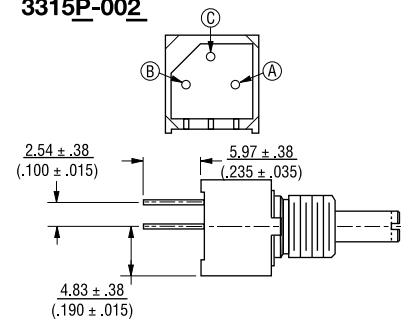
**3315P-101**



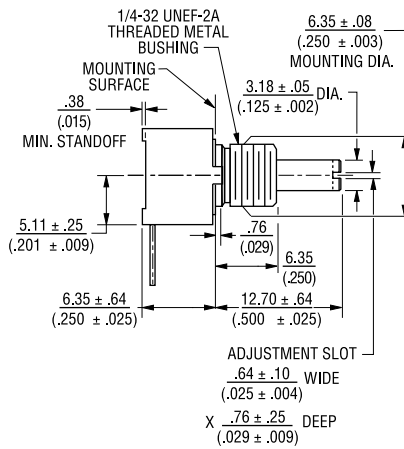
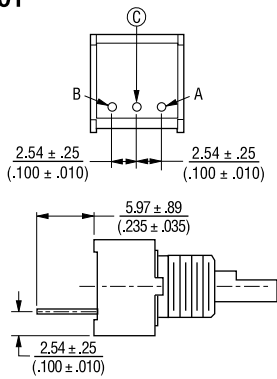
**COMMON DIMENSIONS**  
**3315-002**  
**Metal Bushing**



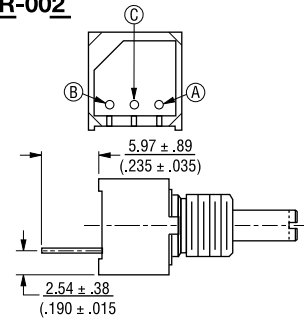
**3315P-002**



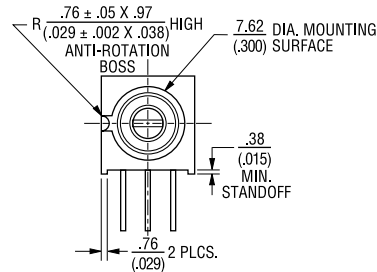
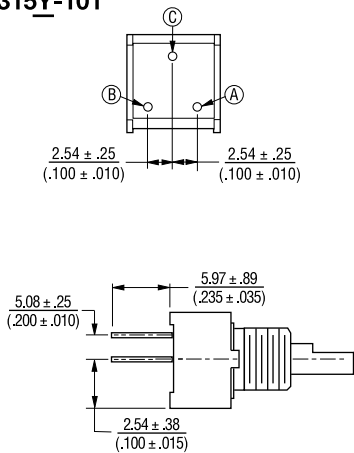
**3315R-101**



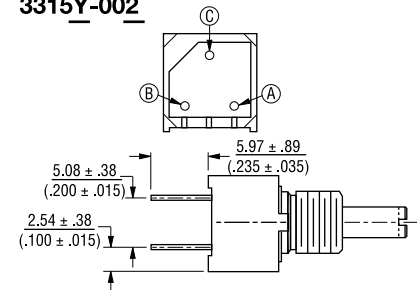
**3315R-002**



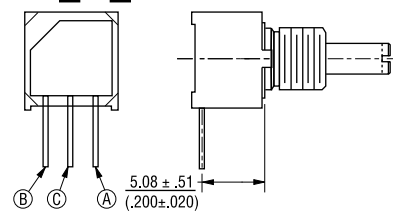
**3315Y-101**



**3315Y-002**



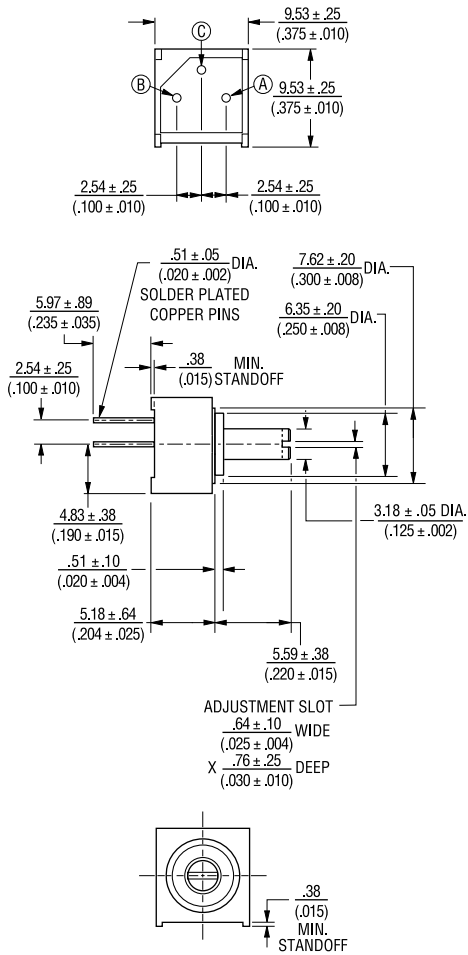
**3315C-002**



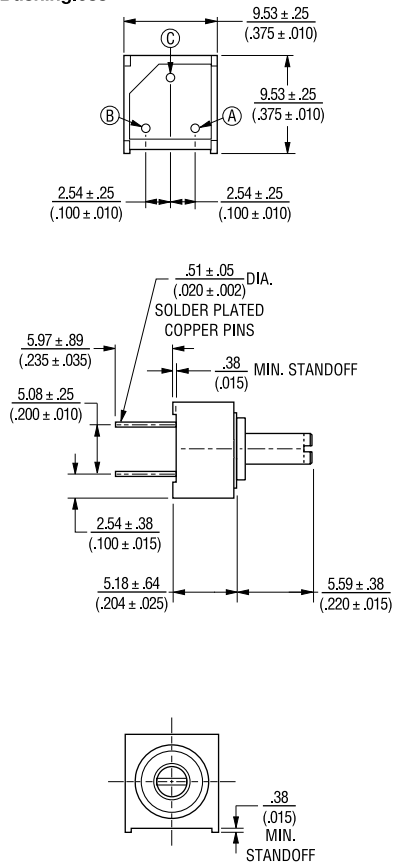
# 3315 - Dimensions and Tolerances

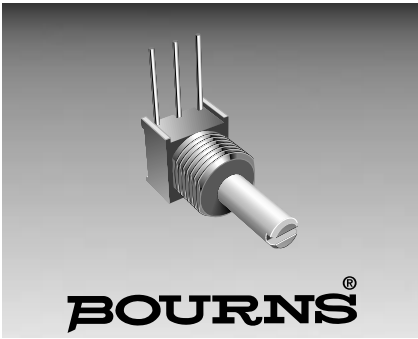


**3315P-005**  
Bushingless



**3315Y-005**  
Bushingless





## Features

- Miniature package for design flexibility
- Long operating life
- High operating temperature capabilities
- Conductive plastic element
- Bushing or PC board mount
- Quadrature output

# 3375 - 6mm Square Encoder

### Electrical Characteristics

Output .....2-bit gray code,  
 Channel A leads Channel B  
 by electrically turning clockwise (CW)  
 Closed Circuit Resistance  
 .....5 ohms maximum  
 Contact Rating  
 .....100 milliamp @ 16 VDC maximum  
 Insulation Resistance (500 VDC)  
 .....1,000 megohms minimum  
 Dielectric Withstanding Voltage  
 Sea Level .....900 VAC minimum  
 Electrical Travel .....Continuous  
 Contact Bounce (15 RPM)  
 .....5 milliseconds maximum  
 RPM (Operating) .....120 maximum

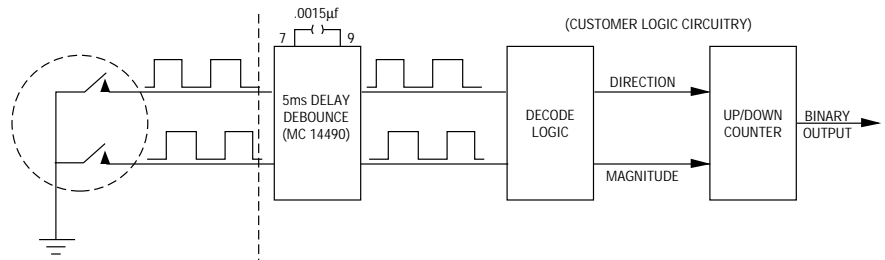
### Environmental Characteristics

Temperature Range .....-55°C to +125°C  
 Vibration .....30G  
 Contact Bounce .....5 millisecond  
 maximum  
 Shock .....100G  
 Contact Bounce .....5 millisecond  
 maximum  
 Rotational Life .....100,000 cycles

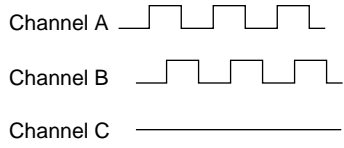
### Mechanical Characteristics

Mechanical Angle .....Continuous  
 Torque .....5 oz-in. maximum  
 Marking .....Manufacturer's symbol and  
 model number, product code,  
 terminal style, date code

### Recommended Incremental Control Diagram

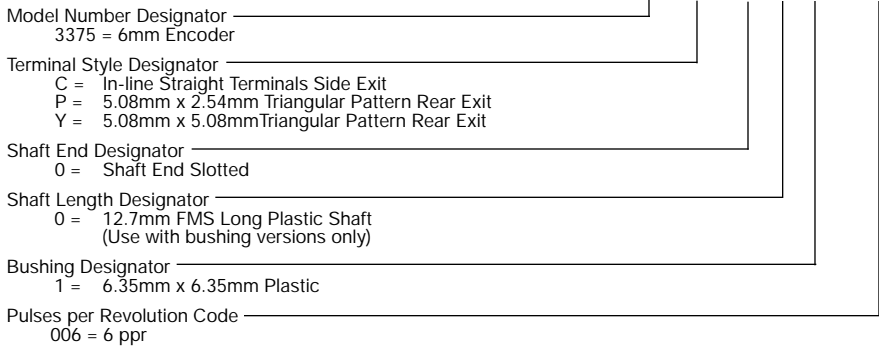


**Clockwise** →



### Part Numbering System

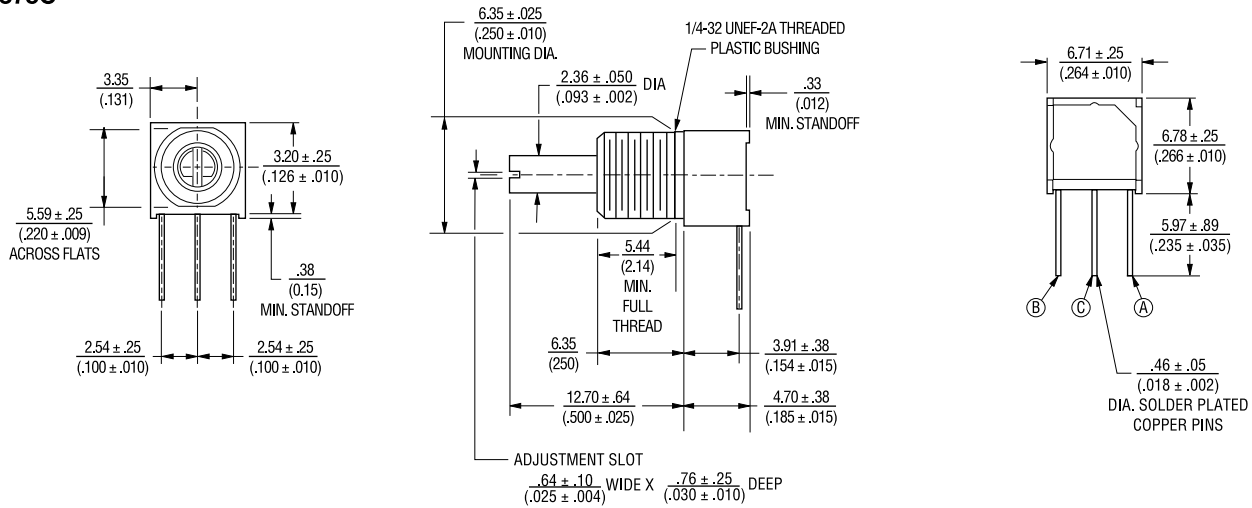
3375 Y - 0 0 1 - 006



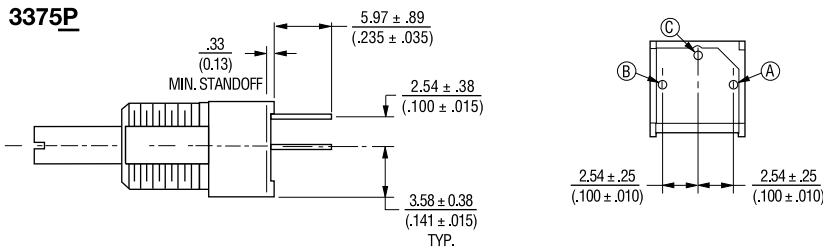
# 3375 - 6mm Square Encoder



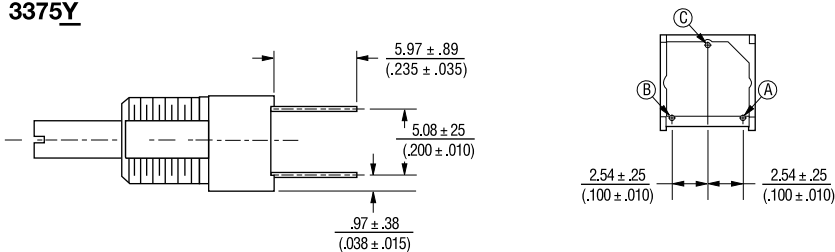
## COMMON DIMENSIONS 3375C

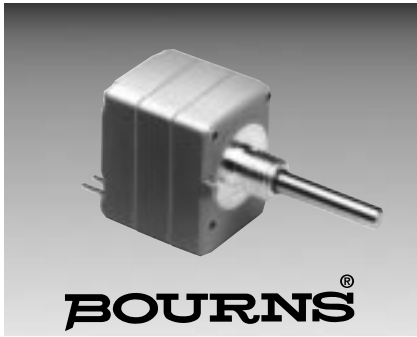


## 3375P



## 3375Y





## Features

- Two channel quadrature output
- Bushing or servo mount
- Square wave signal
- Index channel available
- Small size
- Resolution to 256PPR
- CMOS and TTL compatible
- Long life
- High operating speed

**BOURNS®**

## EN - Rotary Optical Encoder

### Electrical Characteristics

Output .....	2-bit gray code, Channel A leads Channel B by 90° (electrical) with clockwise rotation
Supply Voltage .....	5.0 VDC ±0.25 VDC*
Supply Current .....	26 mA maximum
Output Voltage	
Low Output .....	0.8V maximum
High Output .....	4V minimum
Output Current	
Low Output .....	25mA minimum
Insulation Resistance (500 VDC) .....	1,000 megohms
Rise/Fall Time .....	200ns (typical)
Shaft RPM (Ball Bearing) .....	3,000 rpm maximum
Power Consumption .....	136 mW maximum
Pulse Width (Electrical Degrees, Each Channel) .....	180° ±45° TYP.
Pulse Width (Index Channel) .....	360° ±90°
Phase (Electrical Degrees, Channel A to Channel B) .....	90° ±45° TYP.
Index Channel Centered on 1-1 State Combination of A and B Channels .....	0° ±45°

\*Consult factory for other voltages up to 15 VDC.

### Environmental Characteristics

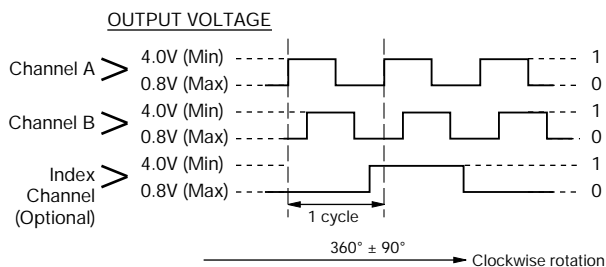
Operating Temperature Range (Standard) .....	-40°C to +85°C
Vibration .....	5G
Shock .....	50G
Humidity .....	MIL-STD-202, Method 103B, Condition B

### Mechanical Characteristics

Torque (Starting and Running)	
A & C Bushings (Spring Loaded for Optimum Feel) .....	1.5 oz-in. maximum
W, S & T Bushings (Ball Bearing Shaft Support) .....	0.1 oz-in. maximum
Mechanical Rotation .....	Continuous
Shaft End Play .....	0.012" T.I.R. maximum
Shaft Radial Play .....	0.005" T.I.R. maximum
Rotational Life	
A & C Bushings (300 rpm maximum)** .....	10,000,000 revolutions
W, S & T Bushings (3,000 rpm maximum)** .....	200,000,000 revolutions
Weight .....	0.4 oz.

\*\*For resolutions ≤ 128 quadrature cycles per shaft revolution.

### OUTPUT TABLE



### STANDARD RESOLUTIONS AVAILABLE

(Full quadrature output cycles per shaft revolution)	
25*	125
50*	128
64	200
100	256

For Non-Standard Resolutions—  
Consult Factory

\* Channel B leads Channel A



## ROTARY OPTICAL

The Bourns® EN model is a self-contained rotary optical encoder. It produces a 2-bit quadrature signal which is suitable for digital systems where both magnitude and direction of adjustment must be provided. The EN encoder is ideal for use as a digital panel control or as a position sensing device in applications where long life, reliability, high resolution and precise linearity are critical.

The EN series encoder converts rotary input into electrical signals which can be used by microprocessors without A/D conversion.

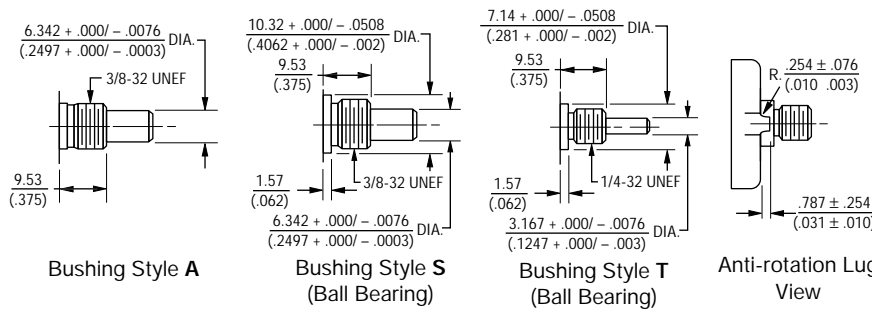
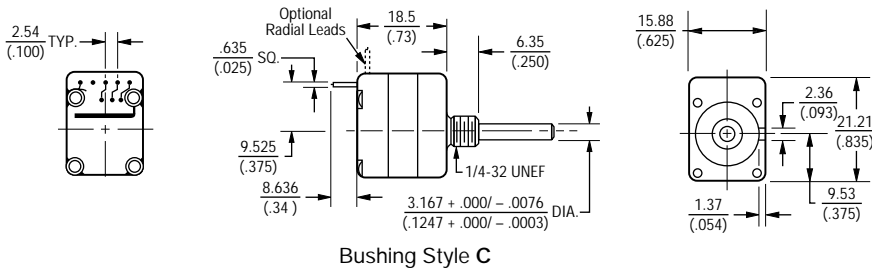
Bourns encoder output signals are square wave digital pulses which do not require debounce circuitry. Both features make it possible to significantly reduce the memory overhead, wiring and wiring interconnects required by other types of control devices.

EN optical encoders offer a useful rotational life of from 10 million to 200 million shaft revolutions, making them ideal for extended service applications. The Bourns encoder is also compact and well suited for situations where the available space is limited.

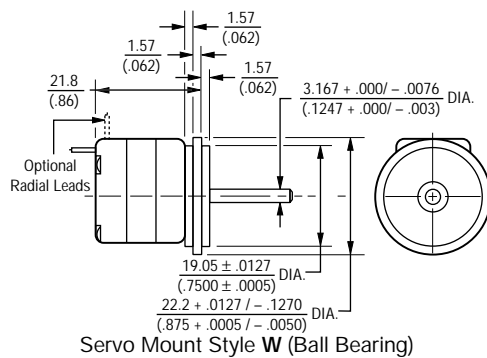
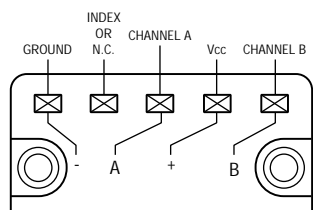
# EN - Rotary Optical Encoder



## Dimensional Drawings



## TERMINATION DIAGRAM



## How To Order

BOURNS EN SERIES OPTICAL ENCODER

E N C 1 J D 2 8 L 0 0 1 2 8

ANTI-ROTATION LUG POSITION		SHAFT LENGTH*	
Code	Description	Code	Description
D	None	16	1/2" Long
J	9:00 Position	20	5/8" Long
P	Rear Mounting Bracket	28	7/8" Long

SWITCHING CONFIGURATION		TERMINAL*** CONFIGURATION	
Code	Description	Code	Description
1	Channel A Leads Channel B By 90 (Clockwise Rotation)**	L	Axial, Multi-Purpose Pin
2	Code 1 Switching With Index Channel	R	Radial, Multi-Purpose Pin
		M	Rear Ribbon Cable with Connector
		N	Side Ribbon Cable with Connector
		W	Rear Ribbon Cable - No Connector
		Y	Side Ribbon Cable - No Connector

RESOLUTION	
Code	Cycles Per Revolution
00025	25
00050	50
00064	64
00100	100
00125	125
00128	128
00200	200
00256	256

SHAFT STYLE		
Code	Description	Use With Bushings (Code)
B	1/4" Dia., Plain End	A, S
D	1/8" Dia., Plain End	C, T, W
C	1/4" Dia., Single Flatted	A, S

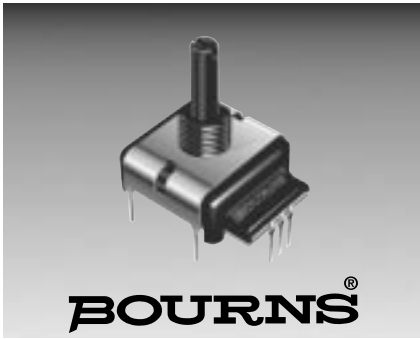
  

BUSHING CONFIGURATION	
Code	Description
A	3/8"D X 3/8"L Threaded
C	1/4"D X 1/4"L Threaded
S	3/8"D X 3/8"L Threaded (Ball Bearing)
T	1/4"D X 3/8"L Threaded (Ball Bearing)
W	Servo Mount 7/8"D (Ball Bearing)

Consult factory for options not shown, including:

- Wire lead or cable options
- Connectors
- Non-standard resolutions
- Special shaft/bushing sizes and features
- Special performance characteristics
- PCB mounting bracket

\* Shaft length measured from mounting surface.  
 \*\* 25 and 50ppr is reversed (Channel B leads Channel A)  
 \*\*\* Standard ribbon cable is 10" long  
 Consult factory for other lengths.



### Features

- Incremental encoder / quadrature output
- Exceptionally long operating life
- High operating temperature capabilities - up to 125°C
- Sturdy construction
- Bushing mount

■ Available with PC board mounting bracket (optional)

**BOURNS®**

## ECW - Digital Contacting Encoder

### Electrical Characteristics

Output .....	2-bit gray code, Channel A leads Channel B by 90° electrically turning clockwise (CW)
Closed Circuit Resistance .....	5 ohms maximum
Open Circuit Resistance .....	100K 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

Storage Temperature Range .....	-40°C to +140°C
Operating Temperature Range .....	+1°C to +125°C
Humidity .....	MIL-STD-202, Method 103B, Condition B
Vibration .....	15G
Contact Bounce .....	0.1 millisecond maximum
Shock .....	50G
Contact Bounce .....	0.1 millisecond maximum
Rotational Life .....	200,000 shaft revolutions*

### Mechanical Characteristics

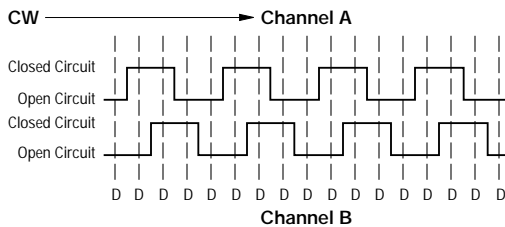
Mechanical Angle .....	Continuous
Weight .....	Approximately 0.75 oz.
Torque (Detented) .....	0.75 to 2.25 oz-in.
Mounting Torque .....	7 in-lbs. maximum
Shaft Side Load (Static) .....	10 lbs. minimum

\*Applies to EC Option.

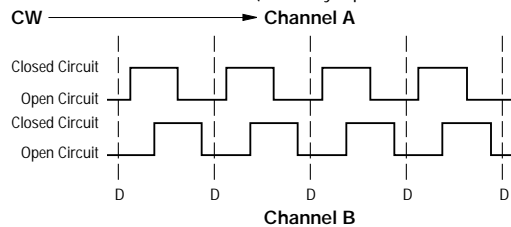
### QUADRATURE OUTPUT TABLE

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

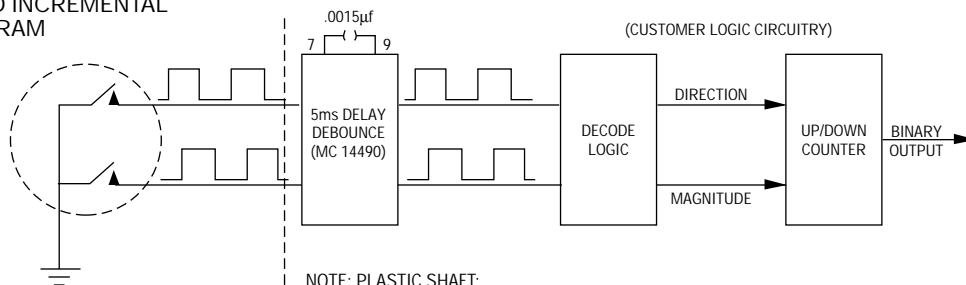
#### 1/4 CYCLE PER DETENT



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



### RECOMMENDED INCREMENTAL CONTROL DIAGRAM



NOTE: PLASTIC SHAFT:  
 0.093 ± 0.002 DIA.  
 WITH A 0.025 ± 0.004 WIDE  
 X 0.030 ± 0.010 DEEP ADJUSTMENT SLOT

**DIGITAL CONTACTING**

The Digital Contacting Encoder is commonly referred to by such names as Digital Panel Control, Bit Switch, Gray Switch and Digital Switch. All such names are synonymous with a device whose output is a digital gray code signal, rather than a conventional potentiometric voltage ratio output.

The advantage of the Digital Contacting Encoder is that it permits the direct entry of digitized analog data into a digital circuit without A/D

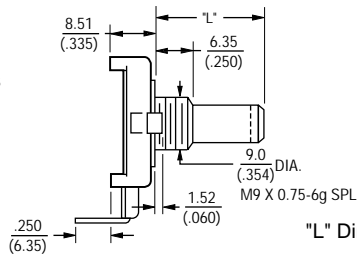
conversion. The two (2) channel gray coded signal of this incremental encoder allows the user's decoder circuit to sense analog direction of rotation, as well as up-down counter capabilities . . . all without the time and cost required for A/D conversion. This approach can reduce memory overhead, wiring and wiring interconnects, and can provide greater MPU program speed.

**ECW - Digital Contacting Encoder** **BOURNS®**

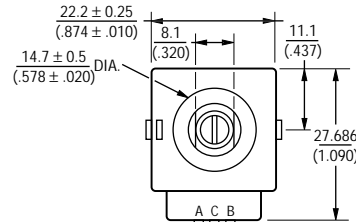
FOR ORDERING INFORMATION, SEE FOLLOWING PAGE.

**BUSHING MOUNTED - HOUSING A**  
W style bushing shown.

Shaft lengths "L" for B, C, R and Y styles  
24 = .750" (19mm)  
36 = 1.125" (28.5mm)

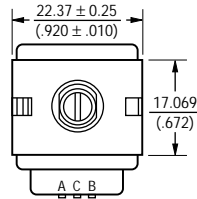
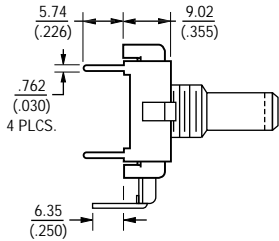


"L" Dim. = 1.125 or .750



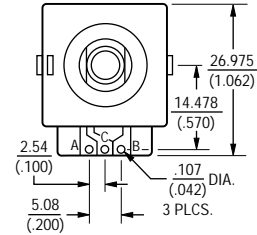
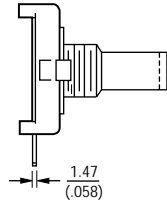
**PCB BRACKET MOUNTED - HOUSING B**

Dimensions not given are the same as Bushing Mounted.

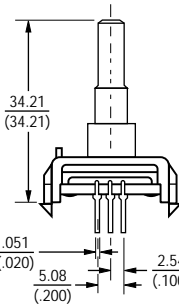
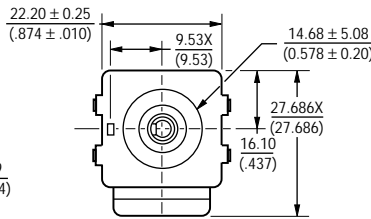
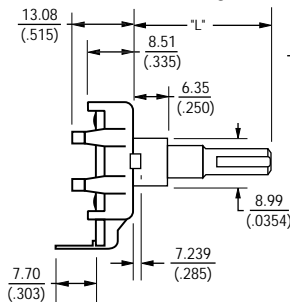


**SOLDER HOLES - HOUSING C**

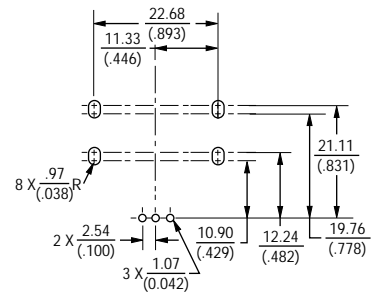
Dimensions not given are the same as Bushing Mounted.



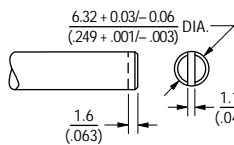
**SNAP-IN MOUNT - Housing G**



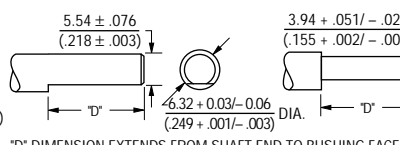
**PCB MOUNTING DIMENSIONS**



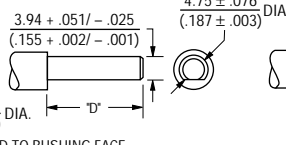
**Shaft Style B**



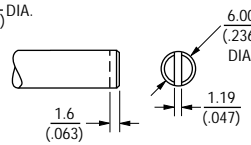
**Shaft Style C**



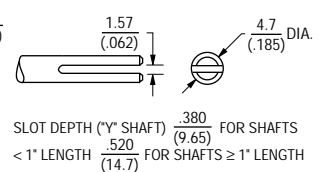
**Shaft Style J**



**Shaft Style R**



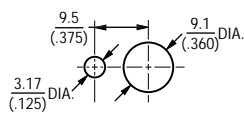
**Shaft Style Y**



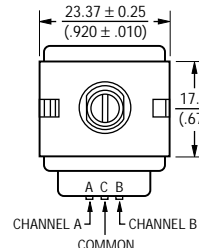
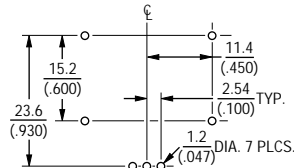
"D" DIMENSION EXTENDS FROM SHAFT END TO BUSHING FACE  
"D" = (SHAFT LENGTH, FMS) - (BUSHING LENGTH)

FOR TOLERANCES NOT SHOWN  
.XX = ± .010  
.XXX = ± .005  
SHAFT DIMENSIONS ± 1/32"

**PANEL HOLE DIMENSIONS**  
Bushing Mounted



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



# ECW - Digital Contacting Encoder - How To Order



## PART NUMBERING SYSTEM

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

Code	Rotational Life
C	200,000 Revolutions
L	100,000 Revolutions

BUSHING CONFIGURATION	
Code	Description
W	9mm x 1/4" Length. Threaded M9x0.75
L	9mm x 3/8" Length. Threaded M9x0.75 (Use B shaft only.)
T	9mm 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
2	Normally Closed

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 Inserted Slot (6mm Dia.)
Y	Split Shaft Version (.185" Dia.)
J	Flatted Shaft (3/16" Dia.)

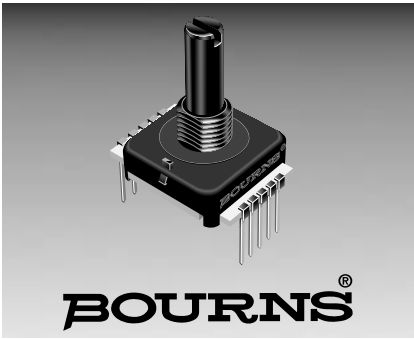
PERFORMANCE CODE		
Code	Detents	Cycles/Rev.
E0006		6
E0009		9
E0012	0	12
E0024		24
B0012	12	12
C0006		6
C0024	24	24
D0009	36	9

HOUSING TERMINAL CONFIGURATION (X indicates "Equipped With")							
Code							
Features	A	B	C	D	E	F	G*
Terminal Cover	X	X			X		X
Terminals	X	X			X		X
Solder Holes			X	X		X	
PCB Bracket		X		X	X	X	
Hardware Included	X		X		X	X	
Snap-In Mount							X

\*Bushing code T only.

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

The sample part number demonstrates the identification code for Bourns contacting encoders. The part number shown is a commonly used model, typically available from stock.

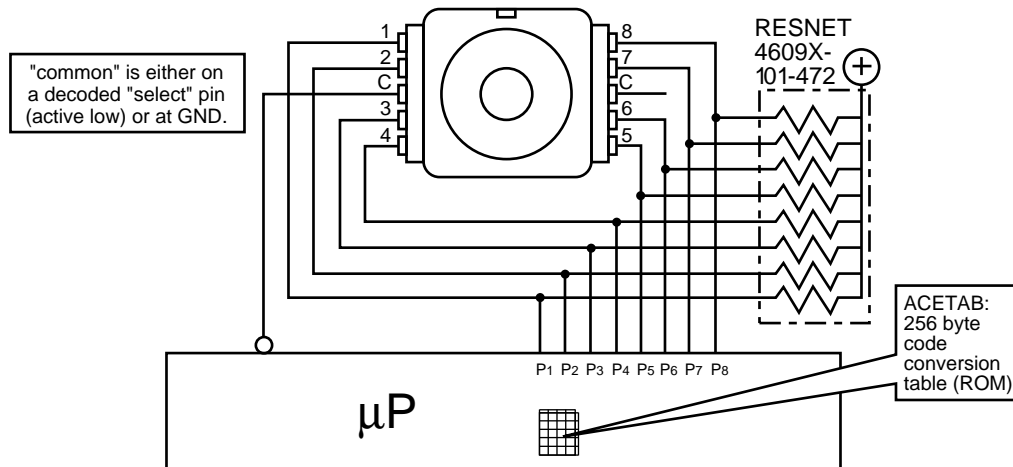


## Features

- Absolute encoder / gray code output
- Digital output
- High operating temperature capabilities - up to 125°C
- Sturdy construction
- Bushing mount
- Available with PC board mounting bracket (optional)

## EAW - Absolute Contacting Encoder (ACE™)

### Recommended Control Diagram for ACE-128



### Electrical Characteristics

Output .....	8-bit gray code with 128 absolute states
Closed Circuit Resistance .....	5 ohms maximum
Open Circuit Resistance .....	100K 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 (60 RPM) .....	2.7 milliseconds maximum
RPM (Operating) .....	120 maximum

### Environmental Characteristics

Storage Temperature Range .....	-40°C to +140°C
Operating Temperature Range .....	-40°C to +125°C
Humidity .....	MIL-STD-202, Method 103B, Condition B
Vibration .....	15G
Contact Bounce .....	0.1 millisecond maximum
Shock .....	50G
Contact Bounce .....	0.1 millisecond maximum
Rotational Life .....	50,000 shaft revolutions minimum*

### Mechanical Characteristics

Mechanical Angle .....	Continuous*
Weight .....	Approximately 0.50 oz.
Torque .....	0.75 to 2.50 oz-in.
Mounting Torque .....	7 in-lbs. maximum
Shaft Side Load (Static) .....	10 lbs. minimum

\* Consult Factory

Until now, the choice of an absolute encoder meant an expensive, and larger-sized product. Through the use of combinatorial mathematics, the gray-code pattern of the Bourns Absolute Contacting Encoder ACE™ is placed on a single track for a very economical, energy-efficient and compact product. Bourns' ACE™ provides an absolute digital output that will also retain its last position in the event of a power failure.

An intelligent alternative to incremental encoders and potentiometers, the Bourns ACE™ is ideally suited for many industrial, automotive, medical and consumer product applications.

## EAW - Absolute Contacting Encoder (ACE™)

**BOURNS®**

### Pin Output Code For ACE-128

Bit/Pin correlation: b7 b6 b5 b4 b3 b2 b1 b0 = p8 p7 p6 p5 p4 p3 p2 p1

A binary "1" denotes an "open" switch and a binary "0" denotes a "closed" switch.

Positions 0-127 are seen by a clockwise rotation of the shaft.

Position	p8	p7	p6	p5	p4	p3	p2	p1	Decimal Output
0	0	1	1	1	1	1	1	1	127
1	0	0	1	1	1	1	1	1	63
2	0	0	1	1	1	1	1	0	62
3	0	0	1	1	1	0	1	0	58
4	0	0	1	1	1	0	0	0	56
5	1	0	1	1	1	0	0	0	184
6	1	0	0	1	1	0	0	0	152
7	0	0	0	1	1	0	0	0	24
8	0	0	0	0	1	0	0	0	8
9	0	1	0	0	1	0	0	0	72
10	0	1	0	0	1	0	0	1	73
11	0	1	0	0	1	1	0	1	77
12	0	1	0	0	1	1	1	1	79
13	0	0	0	0	1	1	1	1	15
14	0	0	1	0	1	1	1	1	47
15	1	0	1	0	1	1	1	1	175
16	1	0	1	1	1	1	1	1	191
17	1	0	0	1	1	1	1	1	159
18	0	0	0	1	1	1	1	1	31
19	0	0	0	1	1	1	0	1	29
20	0	0	0	1	1	1	0	0	28
21	0	1	0	1	1	1	0	0	92
22	0	1	0	0	1	1	0	0	76
23	0	0	0	0	1	1	0	0	12
24	0	0	0	0	0	1	0	0	4
25	0	0	1	0	0	1	0	0	36
26	1	0	1	0	0	1	0	0	164
27	1	0	1	0	0	1	1	0	166
28	1	0	1	0	0	1	1	1	167
29	1	0	0	0	0	1	1	1	135
30	1	0	0	1	0	1	1	1	151
31	1	1	0	1	0	1	1	1	215
32	1	1	0	1	1	1	1	1	223
33	1	1	0	0	1	1	1	1	207
34	1	0	0	0	1	1	1	1	143
35	1	0	0	0	1	1	1	0	142
36	0	0	0	0	1	1	1	0	14
37	0	0	1	0	1	1	1	0	46
38	0	0	1	0	0	1	1	0	38
39	0	0	0	0	0	1	1	0	6
40	0	0	0	0	0	0	1	0	2
41	0	0	0	1	0	0	1	0	18
42	0	1	0	1	0	0	1	0	82
43	0	1	0	1	0	0	1	1	83
44	1	1	0	1	0	0	1	1	211
45	1	1	0	0	0	0	1	1	195
46	1	1	0	0	1	0	1	1	203
47	1	1	1	0	1	0	1	1	235
48	1	1	1	0	1	1	1	1	239
49	1	1	1	0	0	1	1	1	231
50	1	1	0	0	0	1	1	1	199
51	0	1	0	0	0	1	1	1	71
52	0	0	0	0	0	1	1	1	7
53	0	0	0	1	0	1	1	1	23
54	0	0	0	1	0	0	1	1	19
55	0	0	0	0	0	0	1	1	3
56	0	0	0	0	0	0	0	1	1
57	0	0	0	0	1	0	0	1	9
58	0	0	1	0	1	0	0	1	41
59	1	0	1	0	1	0	0	1	169
60	1	1	1	0	1	0	0	1	233
61	1	1	1	0	0	0	0	1	225
62	1	1	1	0	0	1	0	1	229
63	1	1	1	1	0	1	0	1	245

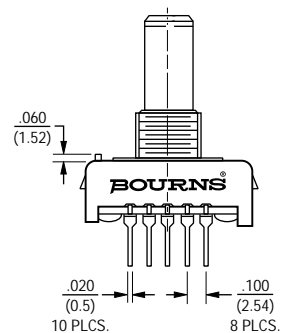
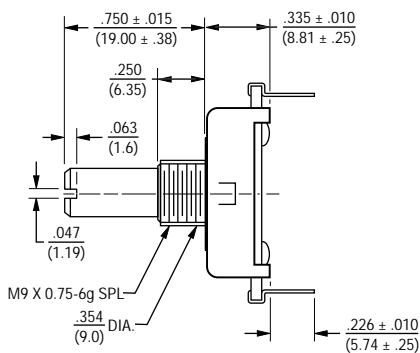
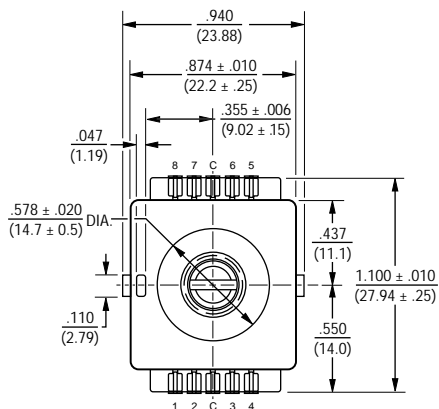
Position	p8	p7	p6	p5	p4	p3	p2	p1	Decimal Output
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65	1	1	1	1	0	0	1	1	243
66	1	1	1	0	0	0	1	1	227
67	1	0	1	0	0	0	1	1	163
68	1	0	0	0	0	0	1	1	131
69	1	0	0	0	1	0	1	1	139
70	1	0	0	0	1	0	0	1	137
71	1	0	0	0	0	0	0	1	129
72	1	0	0	0	0	0	0	0	128
73	1	0	0	0	0	1	0	0	132
74	1	0	0	1	0	1	0	0	148
75	1	1	0	1	0	1	0	0	212
76	1	1	1	1	0	1	0	0	244
77	1	1	1	1	0	0	0	0	240
78	1	1	1	1	0	0	1	0	242
79	1	1	1	1	1	0	1	0	250
80	1	1	1	1	1	0	1	1	251
81	1	1	1	1	1	0	0	1	249
82	1	1	1	1	0	0	0	1	241
83	1	1	0	1	0	0	0	1	209
84	1	1	0	0	0	0	0	1	193
85	1	1	0	0	0	1	0	1	197
86	1	1	0	0	0	1	0	0	196
87	1	1	0	0	0	0	0	0	192
88	0	1	0	0	0	0	0	0	64
89	0	1	0	0	0	0	1	0	66
90	0	1	0	0	1	0	1	0	74
91	0	1	1	0	1	0	1	0	106
92	0	1	1	1	1	0	1	0	122
93	0	1	1	1	1	0	0	0	120
94	0	1	1	1	1	0	0	1	121
95	0	1	1	1	1	1	0	1	125
96	1	1	1	1	1	1	0	1	253
97	1	1	1	1	1	1	0	0	252
98	1	1	1	1	1	0	0	0	248
99	1	1	1	0	1	0	0	0	232
100	1	1	1	0	0	0	0	0	224
101	1	1	1	0	0	0	1	0	226
102	0	1	1	0	0	0	1	0	98
103	0	1	1	0	0	0	0	0	96
104	0	0	1	0	0	0	0	0	32
105	0	0	1	0	0	0	0	1	33
106	0	0	1	0	0	1	0	1	37
107	0	0	1	1	0	1	0	1	53
108	0	0	1	1	1	1	0	1	61
109	0	0	1	1	1	1	0	0	60
110	1	0	1	1	1	1	0	0	188
111	1	0	1	1	1	1	1	0	190
112	1	1	1	1	1	1	1	0	254
113	0	1	1	1	1	1	1	0	126
114	0	1	1	1	1	1	0	0	124
115	0	1	1	1	0	1	0	0	116
116	0	1	1	1	0	0	0	0	112
117	0	1	1	1	0	0	0	1	113
118	0	0	1	1	0	0	0	1	49
119	0	0	1	1	0	0	0	0	48
120	0	0	0	1	0	0	0	0	16
121	1	0	0	1	0	0	0	0	144
122	1	0	0	1	0	0	1	0	146
123	1	0	0	1	1	0	1	0	154
124	1	0	0	1	1	1	1	0	158
125	0	0	0	1	1	1	1	0	30
126	0	1	0	1	1	1	1	0	94
127	0	1	0	1	1	1	1	1	95

# EAW - Absolute Contacting Encoder (ACE™)

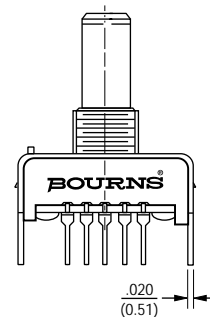
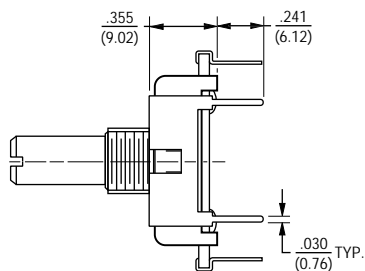
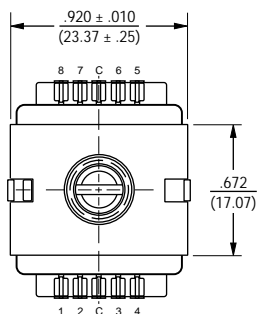


## Dimensional Drawings

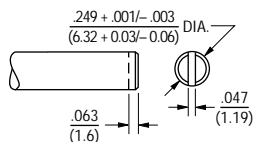
Dimensional Drawings - For ACE - 128  
Bushing mounted: Housing A



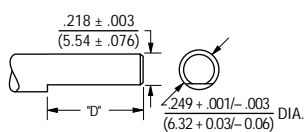
## PCB Bracket Mounted: Housing B



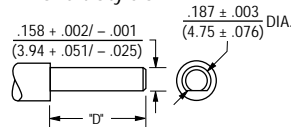
## Shaft Style B



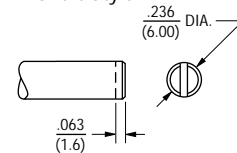
## Shaft Style C



## Shaft Style J

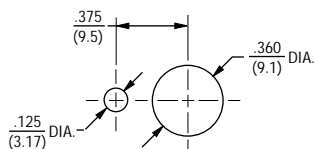


## Shaft Style R

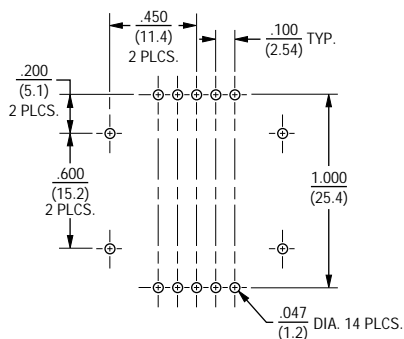


\*D\* DIMENSION EXTENDS FROM SHAFT END TO BUSHING FACE  
\*D\* = (SHAFT LENGTH, FMS) - (BUSHING LENGTH)

## PANEL HOLE DIMENSIONS



## PCB BOARD HOLE PATTERN W/PCB BRACKET



# EAW - ACE™ Encoder - How To Order



## PART NUMBERING SYSTEM

**E A W 0 J - B 2 4 - A E 0 1 2 8**

Code	Rotational Life
A	50,000 Revolutions

BUSHING CONFIGURATION	
Code	Description
W	9mm x 1/4" Length. Threaded M9x0.75
L	9mm x 3/8" Length. Threaded M9x0.75 (Use B shaft only.)

DETENT CONFIGURATION	
Applies to performance codes E0016, E0030 and E0036 only.	
Code	Description
0	Non-Detented
1	Detented

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 Inserted Slot (6mm Dia.)

PERFORMANCE CODE		
Code	Detents	States/Rev.
E0030*	30	30
E0036*	36	36
E0128	0	128

HOUSING TERMINAL CONFIGURATION (X indicates "Equipped With")			
Features	Code		
	A	B	C
Terminals	X	X	X
PCB Bracket		X	X
Hardware Included	X		X

\*Bushing code T only.

SHAFT LENGTH (FMS)		
Code	Description	Available Shaft Styles
24	3/4" (19mm) Length	B, C, J
Metric		
19	19mm Length	R

The sample part number demonstrates the identification code for Bourns contacting encoders. The part number shown is a commonly used model, typically available from stock.

\*Consult factory concerning special inquiries.