



Features

- RoHS compliant*
- HCMOS, CMOS and TTL compatible
- Compact package size
- High rotational cycle life
- Ball bearing shaft support
- Recommended for machine/machine interface applications (MMI)



ES14 - 14 mm Rotary Optical Encoder

Electrical Characteristics

Electrical Output	2-bit quadrature code
Resolution	8 to 64 pulses per revolution (PPR)
Supply Voltage (VCC)	5.0 VDC $\pm$ 0.25 VDC
Supply Current (ICC)	26 mA maximum
Output Voltage	
Low (VCE(sat)), per Channel	800 mV maximum at I(SINK) = 25 mA
High (VO(HI)), per Channel	4.0 VDC minimum @ VCC = 4.75 VDC
Output Current I(SINK), per Channel	25 mA minimum
Rise/Fall Time	200 ns typical
Power Dissipation	167 mW maximum
Pulse Width (per Channel)	180 $^{\circ}$ e typical
Phase Angle (Channel A Leads Channel B, Clockwise Rotation)	90 $^{\circ}$ e $\pm$ 72 $^{\circ}$ e
Insulation Resistance @ 500 VDC	1,000 megohms minimum
Operating RPM	1000 maximum

Environmental Characteristics

Operating Temperature Range @ 5.0 VDC	-40 $^{\circ}$ C to +70 $^{\circ}$ C (-40 $^{\circ}$ F to +158 $^{\circ}$ F)
Storage Temperature Range	-55 $^{\circ}$ C to +125 $^{\circ}$ C (-67 $^{\circ}$ F to +257 $^{\circ}$ F)
Vibration	15 G
Shock	50 G
Humidity	MIL-STD-202, Method 103, Condition B
Flammability	Conforms to UL 94HB
IP Rating	IP 54**

Mechanical Characteristics

Mechanical Angle	360 $^{\circ}$ Continuous
Torque	
Starting/Running	1.05 N-mm (0.15 oz.-in.) maximum
Rotational Life	50,000,000 cycles (100,000,000 revolutions)
Shaft Radial Play	0.003 in. maximum
Shaft Axial Structural Strength	35 lbs. minimum
Mounting Torque	2.0 N-m (18 lb.-in.) maximum

Materials and Finishes

Terminals	Sn plated PC pins
Soldering Condition	
Manual Soldering	96.5Sn/3.0Ag/0.5Cu solid wire or no-clean rosin cored wire 370 $^{\circ}$ C (700 $^{\circ}$ F) max. for 3 seconds
Wave Soldering	96.5Sn/3.0Ag/0.5Cu solder with no-clean flux 260 $^{\circ}$ C (500 $^{\circ}$ F) max. for 5 seconds
Wash processes	Not recommended
Mounting Hardware	
Nut	Brass, hex (metric)/Nickel-plated brass, hex (SAE)
Lockwasher	Nickel-plated spring steel, internal tooth
Marking	Manufacturer's symbol, model number, product code, terminal style and date code
Standard Packaging	Anti-static plastic tube (25 pcs./tube)

**When device is mounted by normal mounting means.

*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.

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

Users should verify actual device performance in their specific applications.

Additional Features

- Cable/connector option
- Optional bracket

ES14 - 14 mm Rotary Optical Encoder

BOURNS®

Part Numbering System

E	S	1	4	A	0	D	-	E	2	8	-	L	0	3	2	N
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

MODEL NO. DESIGNATOR	
ES14	14 mm Rotary Optical Encoder

BUSHING DESIGNATOR	
Code	Description
A	3/8 " D x 3/8 " L Threaded

DETENT OPTION	
Code	Description
0	No Detent

ANTI-ROTATION LUG/BACKET OPTION	
Code	Description
A	A/R Lug
B	Bracket (No hardware/no cable or connector)
D	None

SHAFT STYLE (See Outline Drawing for Details)		
Code	Description	Available w/ Bushing
E	1/8 " Dia. Slotted End	A

SHAFT LENGTH DESIGNATOR		
Code	Length (FMS)	Available w/Bushing
28	7/8 "	A

SWITCH OPTION	
Code	Description
N	No Switch

RESOLUTION (Pulses Per Revolution)	
Code	Description
08	8 PPR
16	16 PPR
32	32 PPR
64	64 PPR

CABLE/CONNECTOR OPTION	
Code	Description
0	No Cable/Connector
1	6 " Cable with Female Connector (0.049 "/1.25 mm pitch centers in-line) and stripped/tinned leads
2	6 " Cable with Female Connector (0.049 "/1.25 mm pitch centers in-line) on both ends
3	12 " Cable with Female Connector (0.049 "/1.25 mm pitch centers in-line) and stripped/tinned leads
4	12 " Cable with Female Connector (0.049 "/1.25 mm pitch centers in-line) on both ends

TERMINAL CONFIGURATION	
Code	Description
L	Axial Multi-Purpose Pin
R	Radial Multi-Purpose Pin

Cable and Connector Options:

H-290-4 = 6 " Cable with Female Connector (0.049 "/1.25 mm pitch centers in-line) and stripped/tinned leads
H-290-1 = 6 " Cable with Female Connector (0.049 "/1.25 mm pitch centers in-line) on both ends
H-290-2 = 12 " Cable with Female Connector (0.049 "/1.25 mm pitch centers in-line) and stripped/tinned leads
H-290-3 = 12 " Cable with Female Connector (0.049 "/1.25 mm pitch centers in-line) on both ends

For other cable and connector options, please contact the factory.

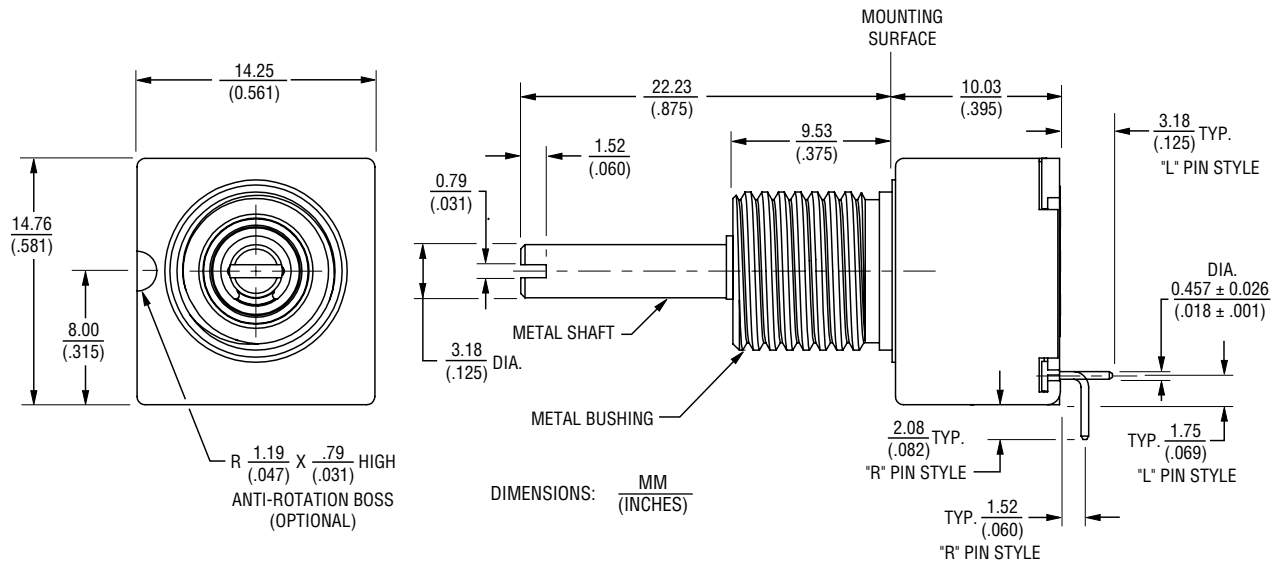
Specifications are subject to change without notice.

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

ES14 - 14 mm Rotary Optical Encoder

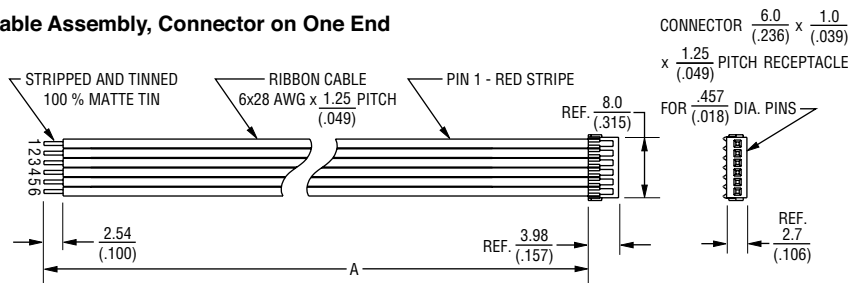
BOURNS®

Product Dimensions

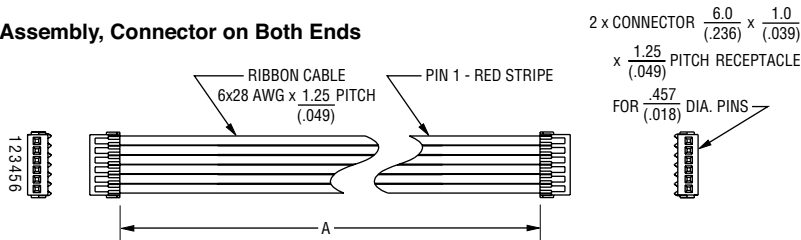


Cable/Connector Options

Cable Assembly, Connector on One End



Cable Assembly, Connector on Both Ends



HARDWARE NUMBER	DESCRIPTION	"A" DIM.
H-290-4	CABLE ASSEMBLY, CONNECTOR ON ONE END	152.4 ± 5.0 (6.0 ± .197)
H-290-2	CABLE ASSEMBLY, CONNECTOR ON ONE END	304.8 ± 5.0 (12.0 ± .197)
H-290-1	CABLE ASSEMBLY, CONNECTOR ON BOTH ENDS	152.4 ± 5.0 (6.0 ± .197)
H-290-3	CABLE ASSEMBLY, CONNECTOR ON BOTH ENDS	304.8 ± 5.0 (12.0 ± .197)

DIMENSIONS: MM (INCHES)

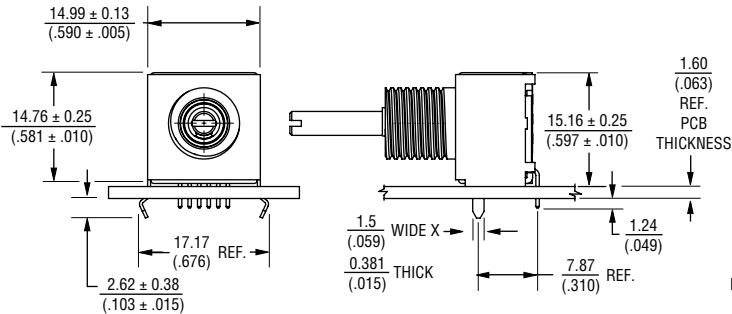
Specifications are subject to change without notice.
The device characteristics and parameters in this data sheet can and do vary in different applications and actual device performance may vary over time.
Users should verify actual device performance in their specific applications.

ES14 - 14 mm Rotary Optical Encoder

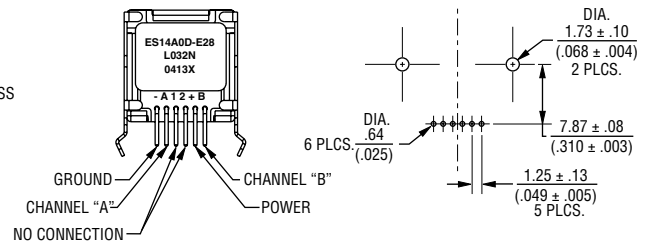
BOURNS®

Terminal Configurations

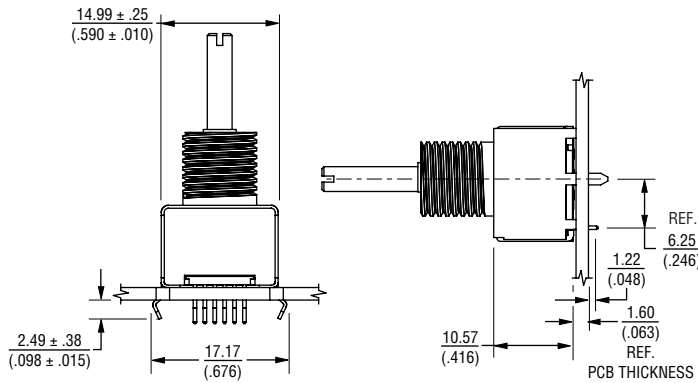
Radial (shown with optional mounting bracket)



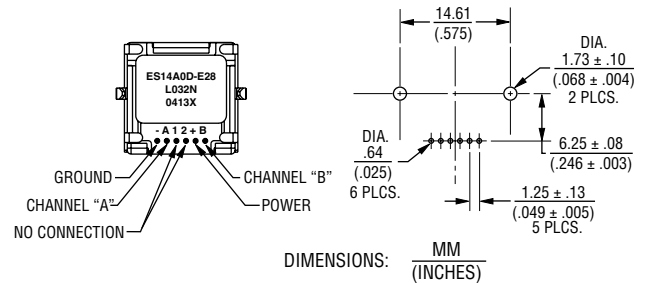
Recommended PCB Layout



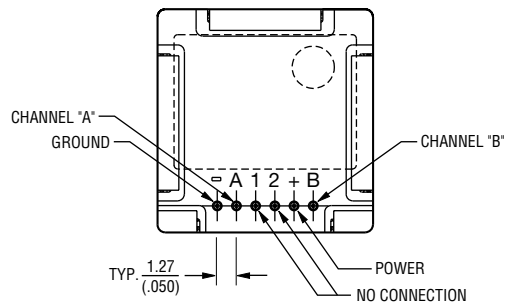
Axial (shown with optional mounting bracket)



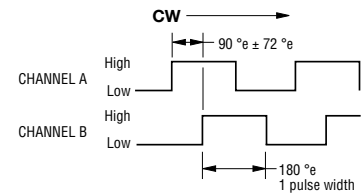
Recommended PCB Layout



Terminal Diagram



Quadrature Output

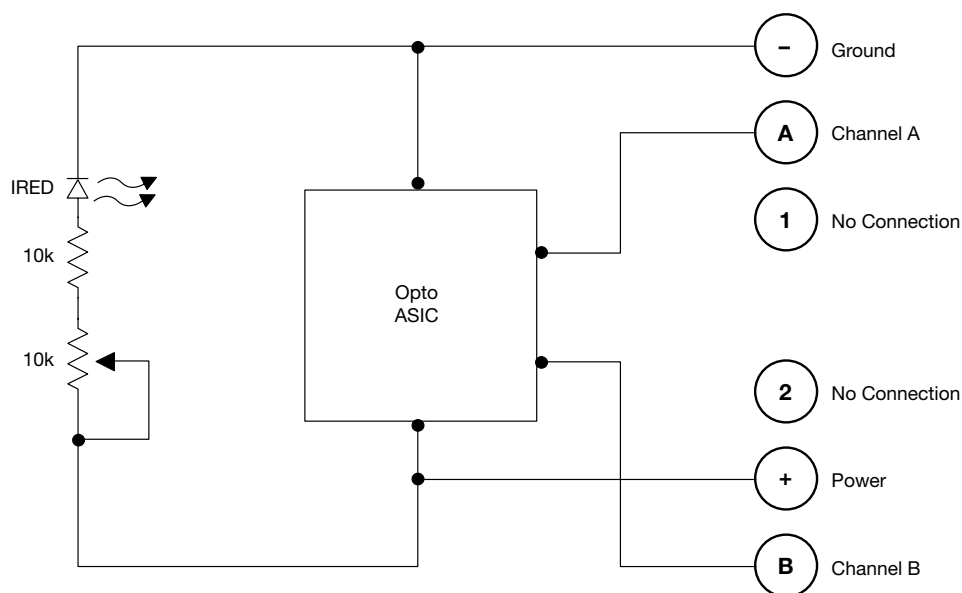


Specifications are subject to change without notice.
The device characteristics and parameters in this data sheet can and do vary in different applications and actual device performance may vary over time.
Users should verify actual device performance in their specific applications.

ES14 - 14 mm Rotary Optical Encoder

BOURNS®

Electrical Block Diagram



BOURNS®

Asia-Pacific: Tel: +886-2 2562-4117 • Fax: +886-2 2562-4116

EMEA: Tel: +36 88 520 390 • Fax: +36 88 520 211

The Americas: Tel: +1-951 781-5500 • Fax: +1-951 781-5700

www.bourns.com