

## 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 °e typical
Phase Angle (Channel A Leads Channel B, Clockwise Rotation) .....	90 °e $\pm$ 72 °e
Insulation Resistance @ 500 VDC .....	1,000 megohms minimum
Operating RPM .....	1000 maximum

### Environmental Characteristics

Operating Temperature Range @ 5.0 VDC .....	-40 °C to +70 °C (-40 °F to +158 °F)
Storage Temperature Range .....	-55 °C to +125 °C (-67 °F to +257 °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 ° 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 °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
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.



**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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## Additional Features

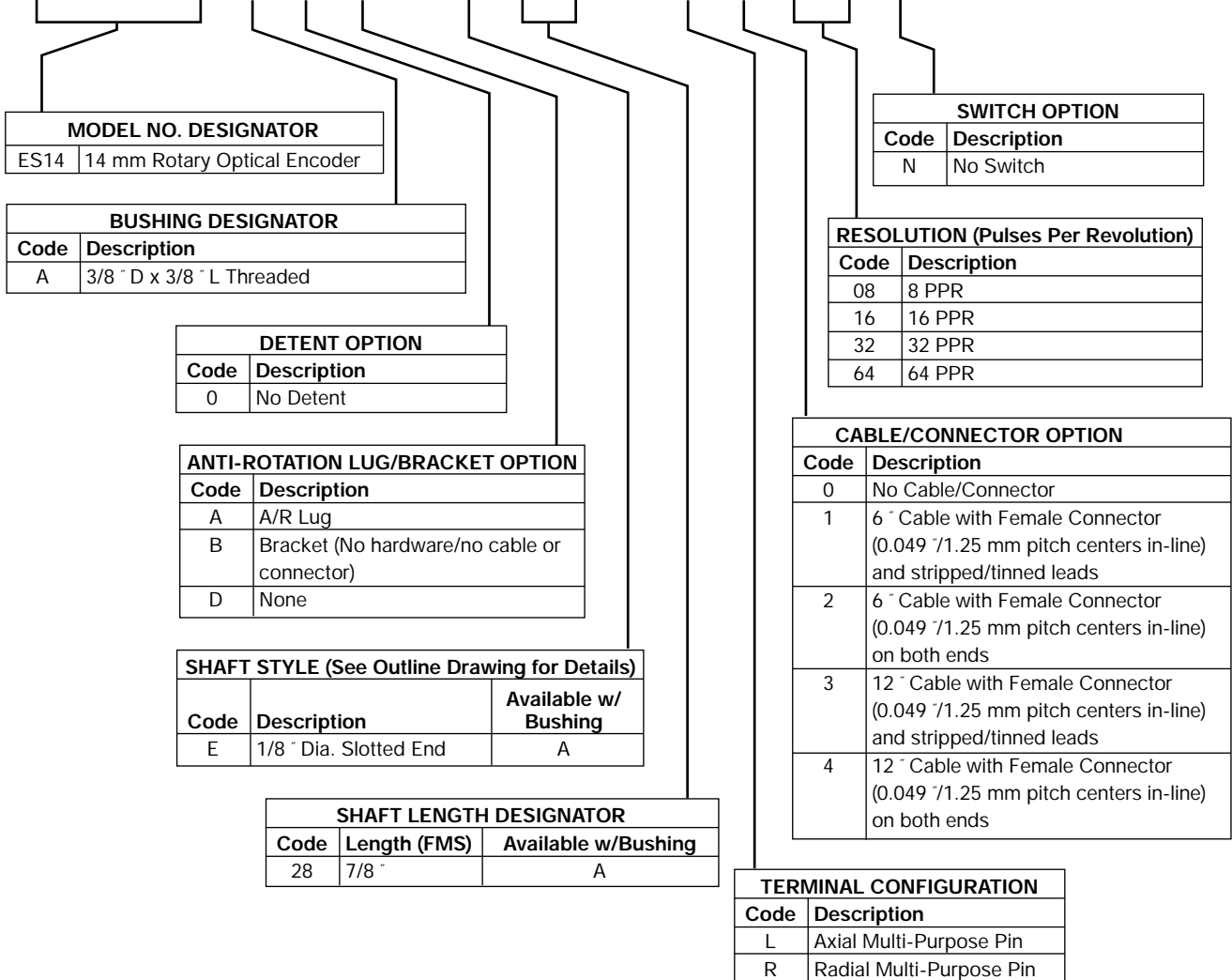
- Cable/connector option
- Optional bracket

# ES14 - 14 mm Rotary Optical Encoder

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### Part Numbering System

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



#### 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.

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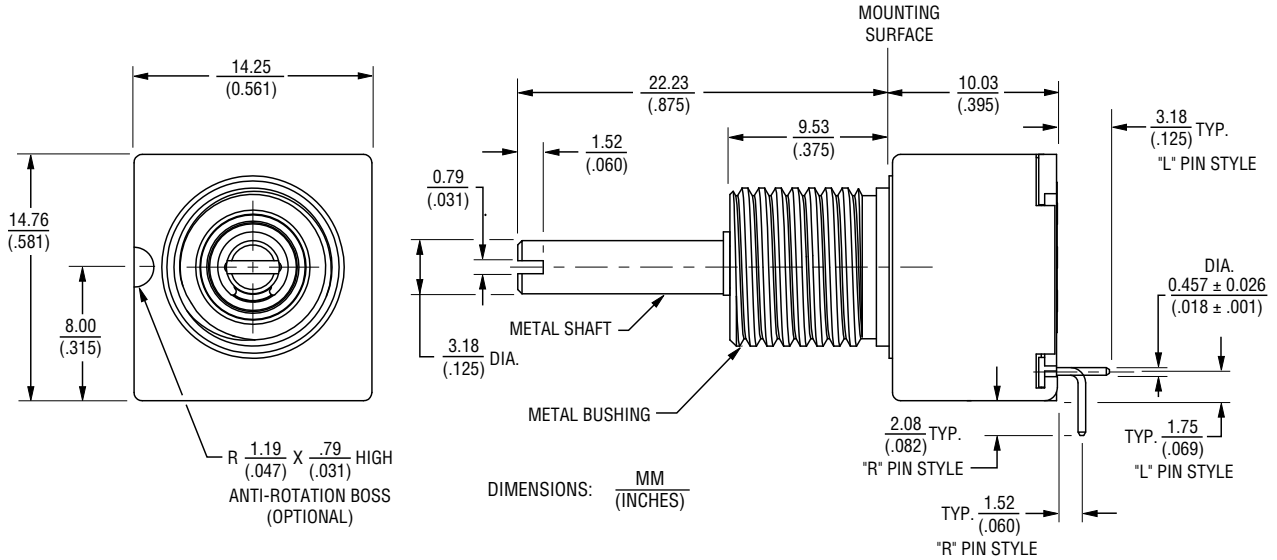
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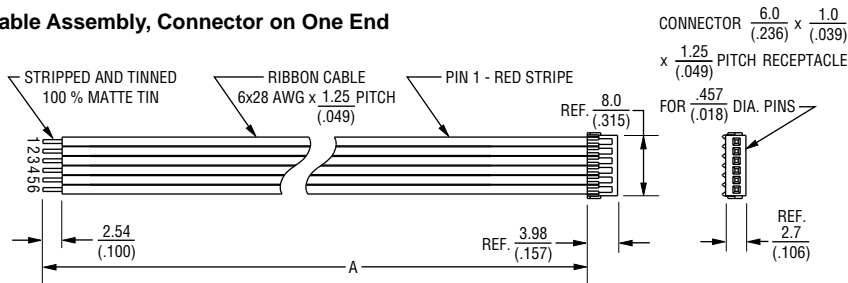
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## Product Dimensions

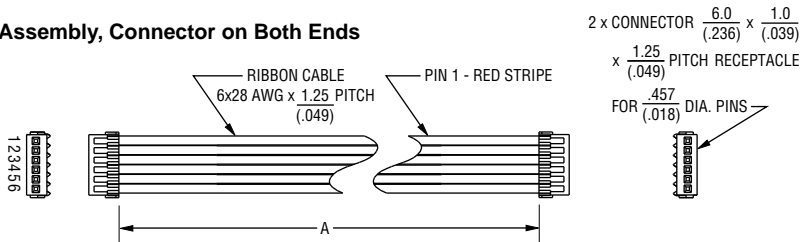


## Cable/Connector Options

### 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)

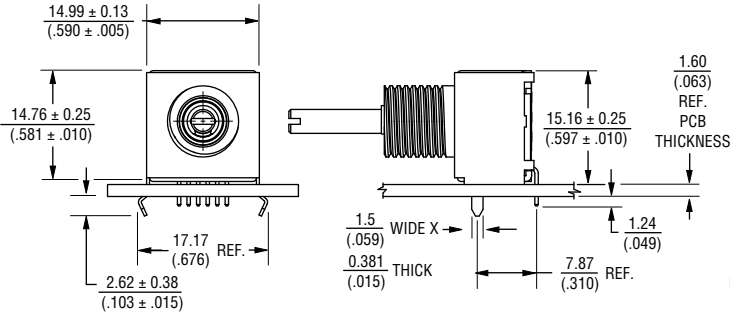
DIMENSIONS: MM (INCHES)

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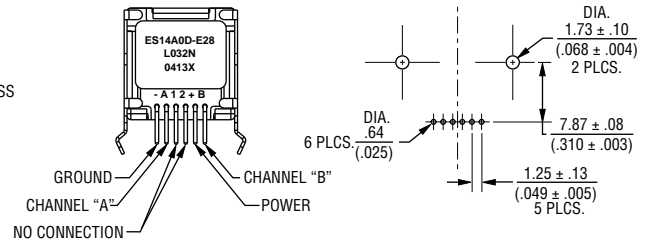
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## Terminal Configurations

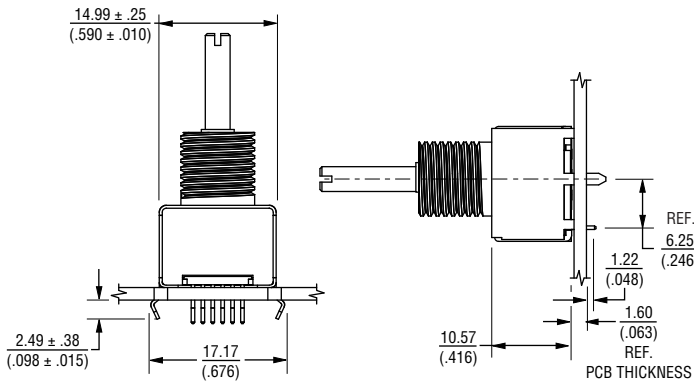
### Radial (shown with optional mounting bracket)



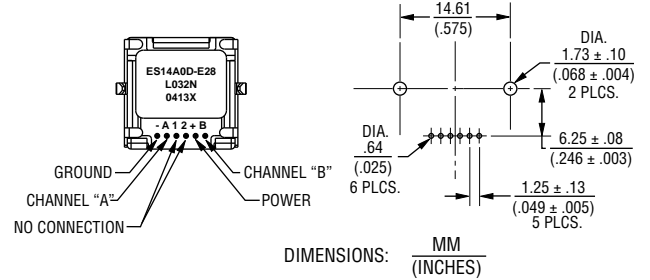
### Recommended PCB Layout



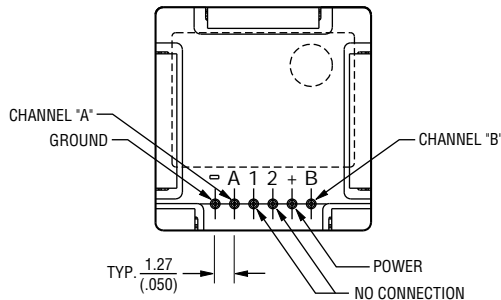
### Axial (shown with optional mounting bracket)



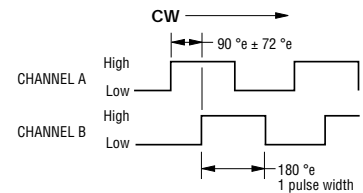
### Recommended PCB Layout



## Terminal Diagram



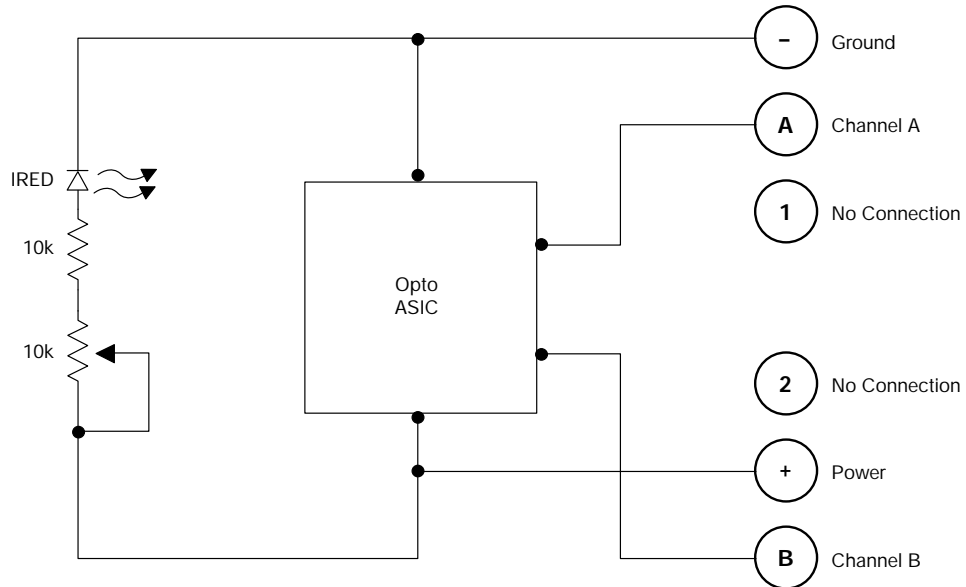
## Quadrature Output



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## Electrical Block Diagram



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