

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 μ s typical
Phase Angle (Channel A Leads Channel B, Clockwise Rotation)	90 μ s \pm 72 μ s
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.



WARNING
Cancer and Reproductive Harm
www.P65Warnings.ca.gov

*RoHS Directive 2015/863, Mar 31, 2015 and Annex.

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Additional Features

- Cable/connector option
- Optional bracket

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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.

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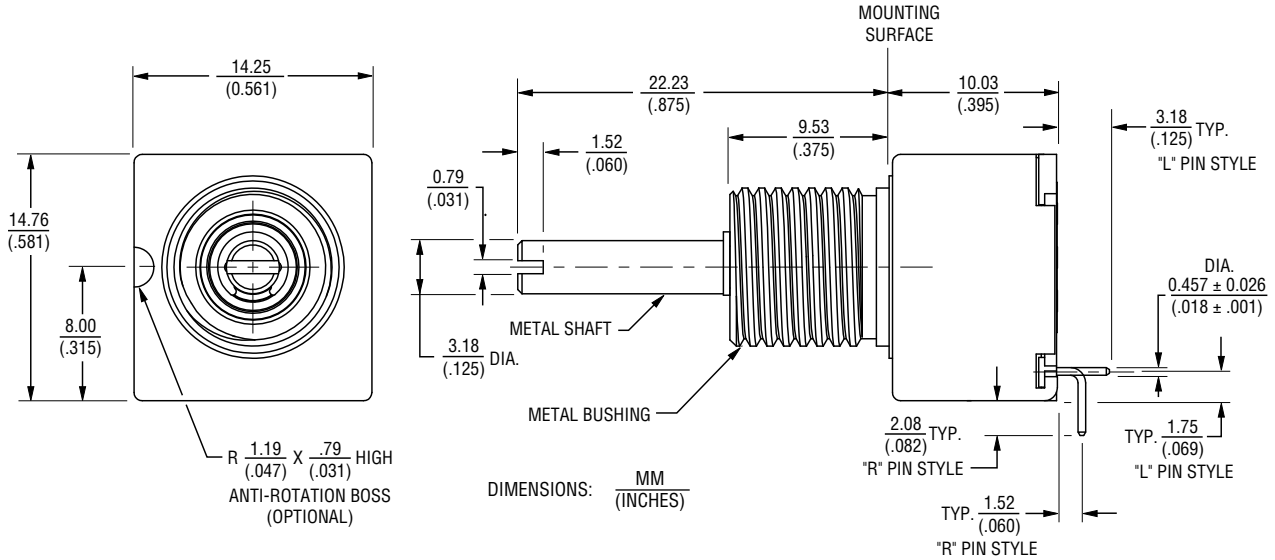
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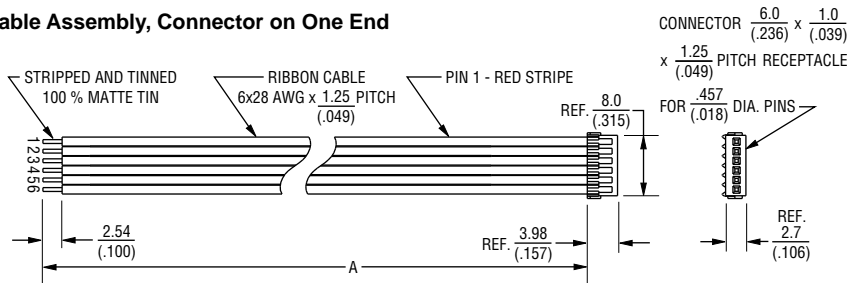
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Product Dimensions

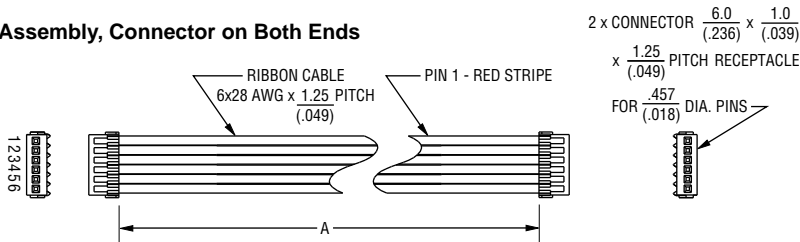


Cable/Connector Options

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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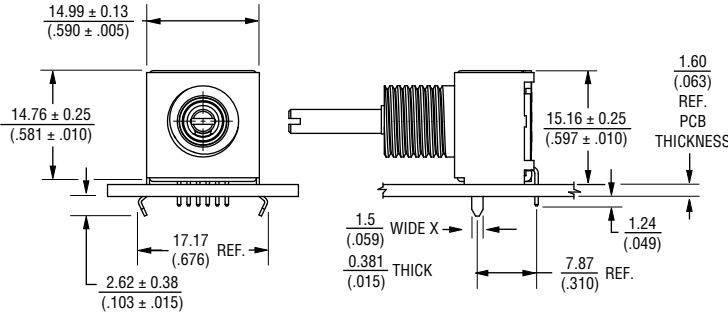
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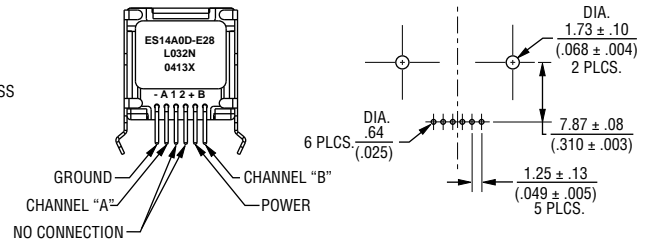
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Terminal Configurations

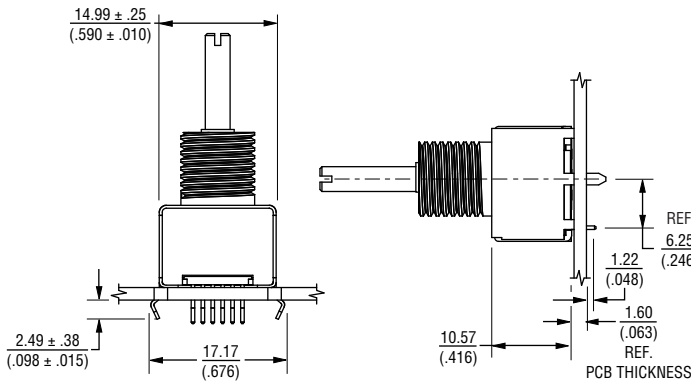
Radial (shown with optional mounting bracket)



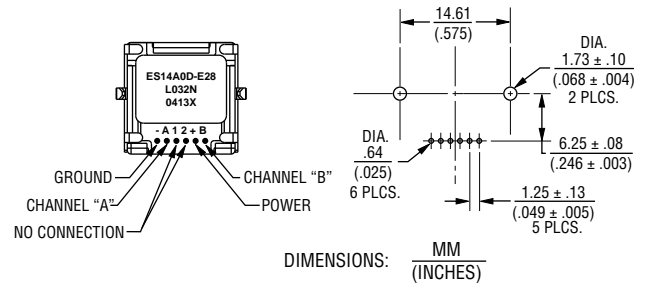
Recommended PCB Layout



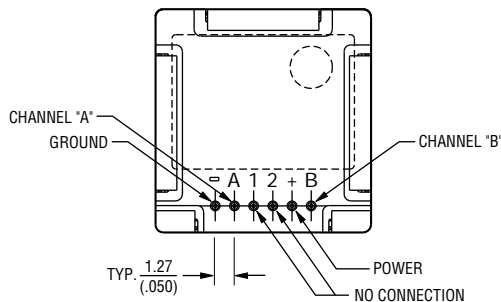
Axial (shown with optional mounting bracket)



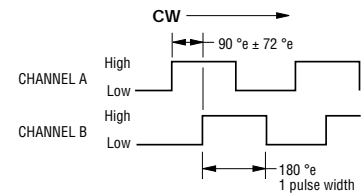
Recommended PCB Layout



Terminal Diagram



Quadrature Output

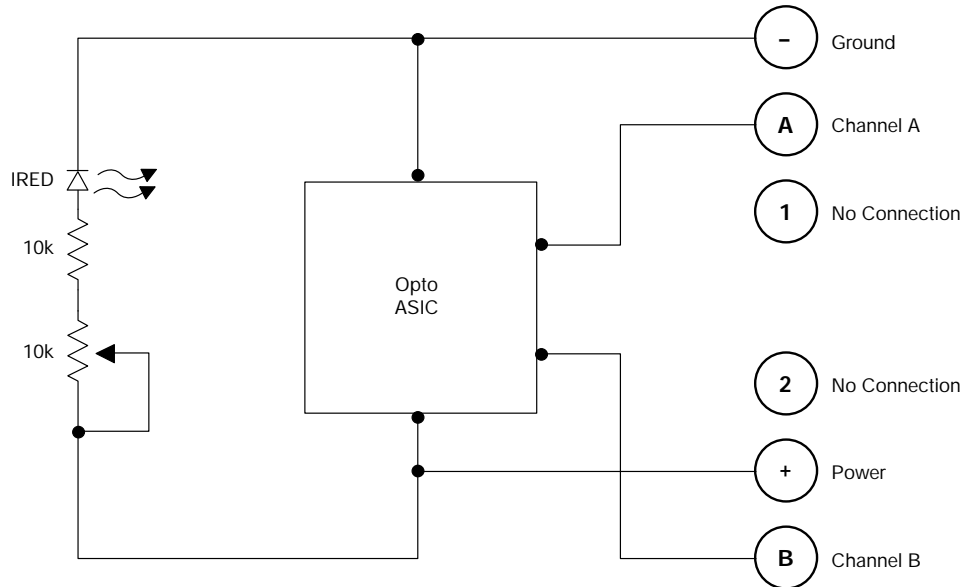


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Electrical Block Diagram



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