



MPE-3A Series

Magnetic Rotary Encoders

FEATURES

- ❑ "System on a Chip" sensor technology
- ❑ Quadrature Outputs
- ❑ Index Output (once per revolution)
- ❑ 0.35 degree resolution 1/1024 per revolution
- ❑ High shock & vibration resistance
- ❑ 10,000 RPM Capability
- ❑ -40° C to +90° C operation
- ❑ 5V nominal supply voltage
- ❑ Environmentally protected to IP-67
- ❑ Anodized aluminum housing for corrosion resistance
- ❑ Small size
- ❑ Zero-Halogen continuous flex cable
- ❑ Slew rate limited outputs for low EMI radiation



MAGNETIC, NON-CONTACT ROTARY ENCODER for position feedback in a wide range of industrial applications.

Eclipse Scientific Products is pleased to offer MPE-3A, a versatile rotary encoder that senses position by measuring the orientation of the North-South poles of a specially magnetized magnet.

In a typical application, a suitable magnet is mounted on a shaft, wheel, or other mechanical component that rotates, and MPE-3A's integrated sensor produces the incremental A & B quadrature output signals of common industrial encoders.

MPE-3A has no moving parts to wear out, and its robust design offers very high resistance to shock and vibration. MPE-3A operates over a -40 to + 90 C temperature range and features a durable polyurethane CSA/UL approved continuous flex cable.

Eclipse Scientific will quote customer-specific connectors and others options upon request.

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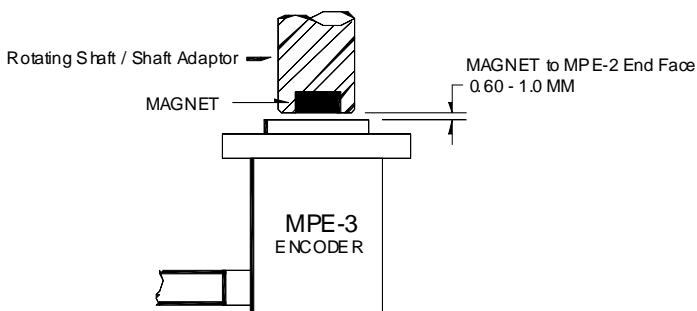
Magnet Alignment

The MPE-3A sensor element is positioned directly at the center of the encoder's end face, and the rotating magnet should be positioned as close as possible to that centerline, and normal to the mounting flange for proper operation. MPE-3A is designed to locate into a 14 mm hole.

Sensing Distance

The optimum distance between a rotating magnet and the MPE-3A end face is 0.6 mm to 1.0 mm as shown in figure 1. Increasing the distance between magnet and sensor will cause the encoder outputs to jitter, however the encoder does not lose counts until the magnetic field drops below its sensitivity. It may be possible to increase the sensing distance and minimize output jitter using more powerful magnets if greater sensing distance is required.

Figure 1



Digital Outputs

MPE-3A generates quadrature (A/B) digital outputs. The outputs can be used to drive a variety of industry standard Encoder Interface cards and Motion Controllers.

Single Ended Outputs

MPE-3A outputs swing 0 - 4.50 volts unterminated or lightly loaded, and can be used to drive motion controllers and CMOS/TTL logic in a single ended fashion with respect to the Supply V- (Signal Ground). MPE-3A outputs have a 750 ns. rise time (for low EMI), which may be too slow for direct interface to TTL & CMOS digital logic. Eclipse recommends a high gain receiver suitable for slow rise time encoder signals.

Accuracy

The MPE-3A incorporates an advanced magnetic sensor containing Analog & Digital signal processing to measure magnetic field strength and orientation in order to determine angular position. This process takes place at approximately 100 us. intervals (a 10 KHz rate). Because of this processing burden, MPE-3A quadrature outputs can lag behind actual position by up to 1.0 degrees at high speeds, which is much higher than typical optical encoders. However, in many applications, the distance traveled per motor revolution is small because a gear reduction is typically employed, and the resulting positional error in motion due to the encoder lag may not be a significant factor. MPE-3A does not lose counts, the quadrature outputs simply lag behind actual position at high speed. As the rotational speed decreases, the error decreases to within +/- .35 degrees. The worst case output lag at high speed is < 1.0 degree.

IMPORTANT NOTE

MPE-3A auto-calibrates upon power up, so it is important that a magnet be in place when power is applied.

GENERAL SPECIFICATIONS

Parameter	Conditions/Comments	Min	Typ	Max.	Units
Resolution	A & B Outputs		2x256		PPR
Effective resolution	4X Quadrature mode		1024		Count/Rev
Max. RPM	Recommended Magnetic Source		10,000		RPM
Accuracy			+/- 0.35		Degree
Magnet sensing distance	Recommended Magnetic Source		1.0		mm
Operating Voltage		4.5	5.0	5.5	Volts
Operating Current			20	25	ma

DIGITAL OUTPUTS

Parameter	Conditions/Comments	Min	Typ	Max.	Units
Output Voltage					
LOW State		0		0.4	Volts
HIGH State		4.5			Volts

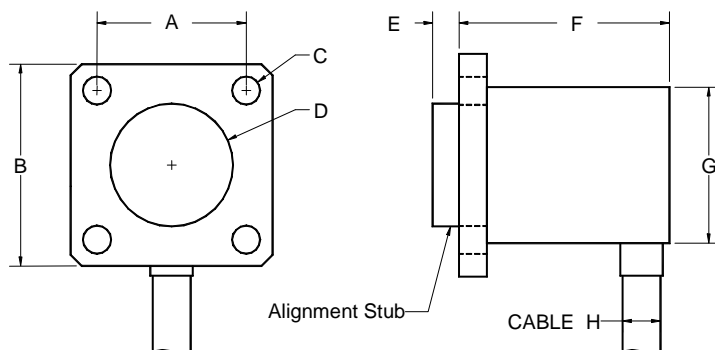
ENVIRONMENTAL

Parameter	Conditions/Comments/SPEC	Min	Typ	Max.	Units
Operating Temp Range		-40		+90	° C
Storage Temp Range			TBD		
Protection Class	IP-67 minimum				
Specified Depth	TBD		TBD		
Specified Time Duration	TBD		TBD		

MPE-3A DIMENSIONS

Note: MPE-3A is designed to locate in a 14.00 mm hole (D), and be fastened with M3 or #4 threaded screws.

DIM (Nominal)	INCHES	MM	TOL
A	0.700	17.80	+/- .2 MM
B (Square)	0.90	23.0	+/- .2 MM
C x 4	0.126	3.20	+/- .2 MM
D	0.543	13.82	+/- .2 MM
E	0.118	3.0	+/- .2 MM
F	0.906	24.0	+/- .2 MM
G	0.70	17.8	+/- .2 MM
H	0.16	4.0	



STANDARD WIRING CONNECTIONS

Table 6 refers to the Yellow Polyurethane cable

MPE-3A can be ordered with different types of adaptor cables to suit requirements, see ordering information

Table 6

Colour	Signal	Description
Red	VCC	5.0 VDC (V+ Supply)
Black	GND	GND (0V) Isolated from housing
White	A	A (Quadrature Output)
Green	B	B (Quadrature Output)

Note: Shield is connected to MPE-3A housing, and isolated from power and signal conductors.

ORDERING INFORMATION



MPE-3A Encoder

Encoders

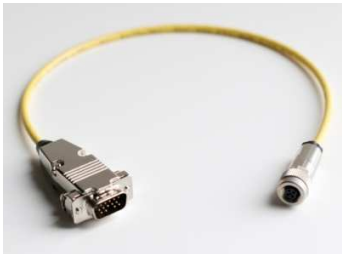
Part Number: **MPE-3A**

Includes: An integrated 2.5 m Polyurethane continuous flex cable with Binder 712 Series connector

(1) 0.4 m (ADC) Adaptor Cable with the option of available instrument connector types:

- Olympus – OmniScan
- Sonatest – VEO
- AGR – TD Handy Scan

(Note: Also available with bare lead wires)



Olympus – OmniScan Connector
0.4m (15") length shown



Sonatest – VEO Connector
5m (16ft) length shown



AGR – TD Handy Scan Connector
0.4m (15") length shown

Instrument Adaptor Cables

Part Number: **ADC-MPE-3A_**

Includes: (1) Polyurethane continuous flex, CSA/UL, -50 to + 90C temp range, FT-1, Zero Halogen, RoHS compliant, available in 3 standard lengths:

- 0.4 m (15 in)
- 5 m (16 ft)
- 15 m (50 ft)

-with the option of 3 standard available instrument connector types:

- Olympus – OmniScan
- Sonatest – VEO
- AGR – TD Handy Scan

(Note: Also available with bare lead wires)



Dipole Magnet

Dipole Magnets for MPE-3A Encoder

Part Number: **P_HMAG10001**

Includes: (1) Specialized magnet ideal for use with MPE-3A series magnetic encoder:

- nickel plated for high corrosion resistance
- size, dia. 6 mm x 2.5 mm, tolerance +/-0.1 mm

Please Note:

The purpose of this manual is to provide information for product mechanical aspects, parts assembly and adjustments only. It is not intended as a guide for NDT procedures, techniques, data collection or data interpretation.

It is the responsibility of the end user to use this product in a safe manner and in accordance with any local or regional safety legislation.

The information provided by Eclipse Scientific is believed to be accurate however Eclipse Scientific accepts no responsibility for the use of this product, nor any patent infringement or other rights of third parties. Eclipse Scientific reserves the right to change specifications without notice. Please contact Eclipse Scientific for the most current product information.