

for Miniature DC and Stepper Motors



- Ideal for position and speed sensing in small machines and actuators
- 200 kHz operating frequency
- Resolution to 512 lines/rev

GENERAL INFORMATION

With a total length less than 15mm and a very low mass, the type M9 incremental optical encoder is ideally suited for use on the moving heads of pick-and-place type machines.

The M9 may be used as direct replacements for most Hewlett Packard HEDS-5XXX encoders with no changes to the motor or cable.

The M9 provides high performance feedback for precision motion control in a very small package. Its small envelope makes it ideal for instrument axes for position and speed control in mechanisms too small to accept standard encoders.

Its high performance, advanced features, and competitive pricing make it the encoder of choice for a broad range of applications.

It utilizes an ASIC that integrates all encoder electronics, including the optoelectronics sensors, which enhances reliability and accuracy.

Outputs are single-ended quadrature A and B channels with up to 512 lines per rev plus an index pulse.

TECHNICAL DATA
mechanical

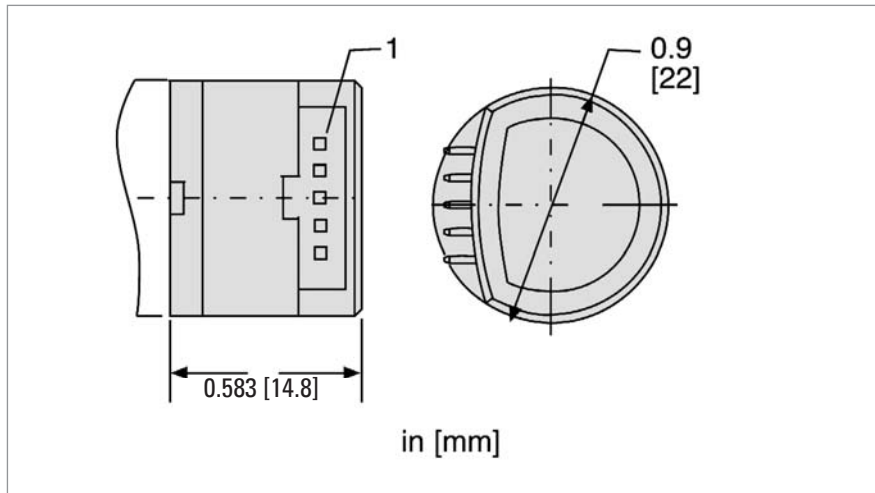
Weight	4.14 g	
Moment of inertia	0.11 gcm ²	
Hollow shaft diameter	1.5 / 2.0 / 2.5 / 3.0 / 4.0 mm 1.125" / 0.156"	
Hollow shaft tolerance	+ 0.010 / - 0.000 mm	
Mating shaft length	max. 11.1 mm min. 9.75 mm	
Mating shaft runout	± 0.0125 mm	
Mating shaft endplay	256 ppr	±0.076 mm;
	250 / 256 ppr	+ 0.127 / - 0.076 mm;
	< 250 ppr	+ 0.178 / - 0.076 mm
Operating temperature	-40 ... + 100 °C	
Storage temperature	-50 ... + 125 °C	
Relative humidity	90 %, non-condensing	

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TECHNICAL DATA
electrical

Code	Incremental, optical
Resolution	100 up to 512 ppr
Phasing	90° ±18° electrical
Symmetry	180 ±18° electrical
Index pulse width	90° ±36° electrical
Supply voltage	DC 5 V ±10 %
Supply current	10 mA, typ.
Output signals	min. 2.5 V high (V _{OH}) max. 0.5 V low (V _{OL})
Output current	6 mA sink/source (25°C), 4 mA (100°C)
Max. output frequency	200 kHz
Connection	5 pole header
Recommended mating connector	AMP; part number 103675-4 (on request)

DIMENSIONAL DRAWINGS



OUTPUT WAVEFORMS
AND CONNECTIONS
(Direction CCW
viewing encoder cover)

PIN	FUNCTION	CABLE WIRE
1	GND	BLACK
2	CH N	BLUE
3	CH A	WHITE
4	+U _B	RED
5	CH B	BROWN

Motor Feedback Systems Type M 9

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ACCESSORIES

	Ordering code
5 pole header, 30 cm ribbon cable with connector	CA 0 050 012

ORDERING INFORMATION

Type	Pulses ppr / poles	Mounting	Hub shaft	Output
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
M9-	0100 / 0 0144 / 0 0200 / 0 0256 / 0 0300 / 0 0360 / 0 0500 / 0 0512 / 0	0 No mounting base A 4 x M1.6 on 18.5mm TK C 2 x #2-56 on 19.05 mm TK D 3 x #0-80 on 20.9 mm TK E 2 x #2-56 on 46.02 mm TK	1.5 1.5 mm 2.0 2.0 mm 2.5 2.5 mm 3.0 3.0 mm 4.0 4.0 mm 125 0.125 inch 156 0.156 inch	1 5 pin header 2 flying leads

Important:

To properly install type M9, a specialized **mounting kit** must be purchased. Only one kit is required to install any number of encoders with the same hub shaft size.

MK

M9

Please designate hub shaft diameter.

Hub shaft

1.5 1.5 mm

2.0 2.0 mm

2.5 2.5 mm

3.0 3.0 mm

125 0.125 inch

156 0.156 inch

Example: Kit for installing encoders with 3.0 mm hub shaft = MK M9 3.0