HB5M Hollow Bore Optical Encoder

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Description

The HB5M is a hollow bore (hollow shaft / thru-bore) optical encoder with a machined aluminum enclosure and a clear anodized protective finish. The HB5M optical incremental encoder is designed to easily mount to an existing shaft to provide digital feedback information for any motion control application. The HB5M has a compliant mounting method that makes it more tolerant of radial and axial shaft runout than a standard kit encoder.

Typical applications include servo motor feedback, web process control, robotics, flux vector feedback, high power motors, textile machines and elevator controls.

The HB5M bearing style encoder features a hollow bore that accepts shaft diameters of 5mm to 8mm in diameter. The encoder slips over the shaft and is locked into place with two 4-48 set screws. A flexible anti-rotation tether compensates for shaft run out of up to 0.030" axial and 0.010" TIR. The flexible tether provides mounting for two 4-40 machine screws on a 1.812" bolt circle.

The HB5M housing comes standard with a closed cover or an optional hole in the body to allow a shaft to pass completely through the encoder.

The mating connector is polarized and latches into the encoder. Depressing the latch tab allows the connector to be unplugged. Mating connector assemblies are available from US Digital stock. Custom cables are also readily available (see the Cables / Connectors page).

The differential version has an internal differential line driver (26C31) attached to the encoder module that can source and sink 20mA at TTL levels. The cable that connects to this encoder should have 3 twisted pairs for the data channels plus power and ground. Group each pair of differential signals. The recommended receiver is industry standard 26C32.

Features

- Hollow bore (hollow shaft / thru-bore) bearing design
- Rugged anodized aluminum housing
- Heavy duty ball bearings track up to 6,000 RPM
- Positive finger-latching polarized connector
- 2-channel quadrature, TTL squarewave outputs
- 3rd channel index option
- Differential line driver output option
- 32 to 5000 cycles per revolution (CPR)
- 128 to 20000 pulses per revolution (PPR)

Mechanical Drawing

US DIGITAL
1400 NE 136th Avenue
Vancouver, Washington 98684, USA
info@usdigital.com
www.usdigital.com
Local: 360.260.2468
Toll-free: 800.736.0194

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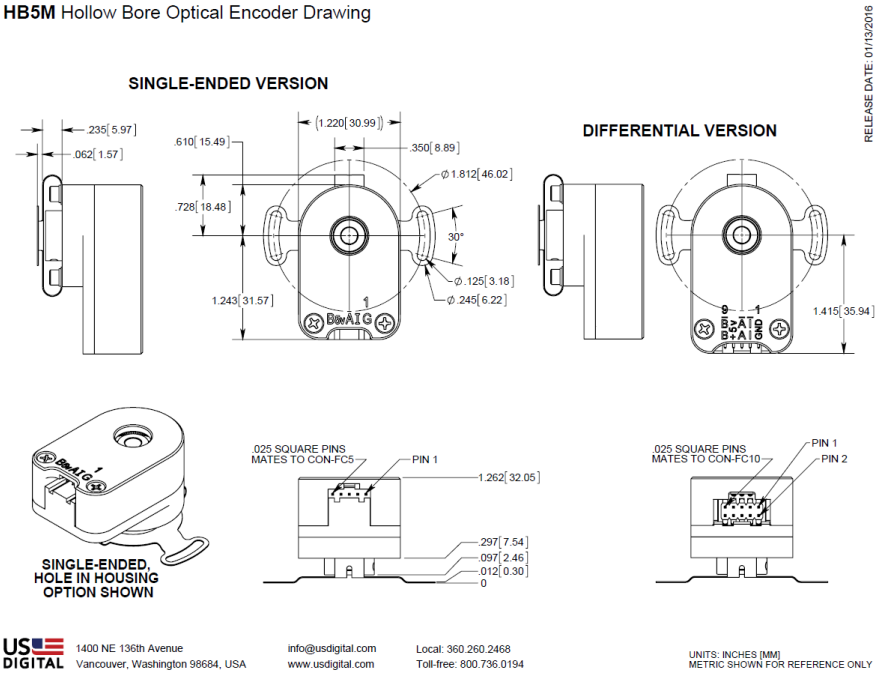
HB5M Hollow Bore Optical Encoder Drawing



Environmental

Parameter	Value	Units
Operating Temperature, CPR < 2000	-40 to 100	C
Operating Temperature, CPR ≥ 2000	-25 to 100	C
Vibration (5Hz to 2kHz)	20	G
Shock, 11 mSec	50	G
Electrostatic Discharge, IEC 61000-4-2	± 4	kV

Mechanical

Parameter	Value
Max. Acceleration	100000 rad/sec^2
Max. Shaft Speed	6000 rpm
Max. Starting Torque	0.20 oz-in
Max. Bore Load	2 lb.
Weight	2.84 oz.
Max. Shaft Total Indicated Runout	0.010 in.
Max. Shaft Axial Play	± 0.030 in.

Max. Shaft Insertion Depth	1.0 in. with default cover. No limit with H-option cover.
Moment of Inertia	1.29 x 10^-4 oz-in-sec^2
Technical Bulletin TB1001 - Shaft and Bore Tolerances	Download

Phase Relationship

A leads B in a clockwise shaft rotation, and B leads A in counterclockwise shaft rotation viewed from the rear side (opposite flexible mount) of the encoder.

Single-ended Electrical

- Specifications apply over entire operating temperature range.
- Typical values are specified at Vcc = 5.0Vdc and 25 ° C.
- For complete details, see the EM1 or EM2 product pages.

Parameter	Min.	Typ.	Max.	Units	Conditions
Supply Voltage	4.5	5.0	5.5	V	
Supply Current		27	33	mA	CPR < 500, no load
		54	62	mA	CPR ≥ 500 and <2000, no load
		72	85	mA	CPR ≥ 2000, no load
Low-level Output			0.5	V	I_{OL} = 8mA max., CPR < 2000
			0.5	V	I_{OL} = 5mA max., CPR ≥ 2000
		0.25		V	no load, CPR ≥ 2000
High-level Output	2.0			V	I_{OH} = -8mA max. and CPR < 2000
	2.0			V	I_{OH} = -5mA max. and CPR ≥ 2000
		4.8		V	no load and CPR < 2000
		3.5		V	no load and CPR ≥ 2000
Output Current Per Channel	-8		8	mA	CPR < 2000
	-5		5	mA	CPR ≥ 2000
Output Rise Time		110		nS	CPR < 2000
		50		nS	CPR ≥ 2000, ± 5mA load
Output Fall Time		100		nS	CPR < 2000
		50		nS	CPR ≥ 2000, ± 5mA load

Differential Electrical

- Specifications apply over entire operating temperature range.

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- Typical values are specified at Vcc = 5.0Vdc and 25 ° C.
- For complete details, see the EM1 product page.

Parameter	Min.	Typ.	Max.	Units	Conditions
Supply Voltage	4.5	5.0	5.5	V	
Supply Current		29	36	mA	CPR < 500, no load
		56	65	mA	CPR ≥ 500 and < 2000, no load
		74	88	mA	CPR ≥ 2000, no load
Low-level Output		0.2	0.4	V	I_{OL} = 20mA max.
High-level Output	2.4	3.4		V	I_{OH} = -20mA max.
Differential Output Rise/Fall Time			15	nS	

Pin-outs

5-pin Single-ended:

Pin	Description
1	Ground
2	Index
3	A channel
4	+5VDC power
5	B channel

10-pin Differential

Pin	Description
1	Ground
2	Ground
3	Index-
4	Index+
5	A- channel
6	A+ channel
7	+5VDC power
8	+5VDC power
9	B- channel
10	B+ channel

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Ordering Information

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CPR	Bore	Index	Output	Housing
32 =	197 =*5mm*	NE =*No Index*	S =*Single-ended*	D =*Default*
50 =	236 =*6mm*	IE =*Index*	D =*Differential*	H =*Hole in Housing*
96 =	250 =*1/4"*			
100 =	313 =*5/16"*			
192 =	315 =*8mm*			
200 =				
250 =				
256 =				
360 =				
400 =				
500 =				
512 =				
540 =				
720 =				
900 =				
1000 =				
1024 =				
1250 =				
2000 =				
2048 =				
2500 =				
4000 =				
4096 =				
5000 =				

Notes

- Cables and connectors are not included and must be ordered separately.
- For ordering information please see the Compatible Cables / Connectors section above.
- US Digital warrants its products against defects in materials and workmanship for two years. See complete warranty for details.

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Base Pricing

Quantity	Price
1	$164.00
10	$147.00

For volume discounts, please contact us at sales@usdigital.com or 800.736.0194.

- Add 15% per unit for **CPR** of , , , , or
- Add 8% per unit for **Output** of Differential
- Add 6% per unit for **Index** of IE or **CPR** greater than or equal to 1000.

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