

Description

The HB6M is a high resolution hollow bore (hollow shaft / thru-bore) optical encoder with a machined aluminum enclosure and a clear anodized protective finish. The HB6M optical incremental encoder is designed to easily mount to an existing shaft to provide digital feedback information for any motion control application.

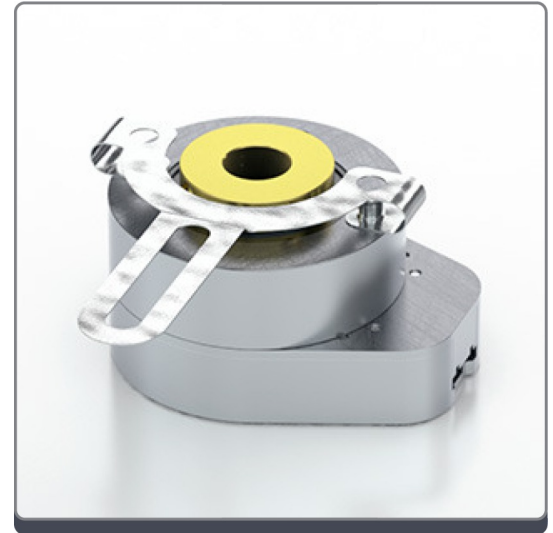
Typical applications include servo motor feedback, web process control, robotics, flux vector feedback, high power motors, textile machines and elevator controls.

The HB6M bearing style encoder features a hollow bore that accepts shaft diameters of 0.250" to 0.750" in diameter. The encoder slips over the shaft and is locked into place with two 6-32 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 single point mounting for bolt circles from 2.50" up to 5.00".

The HB6M 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 page).

The differential version has an internal differential line driver (26C31) 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.

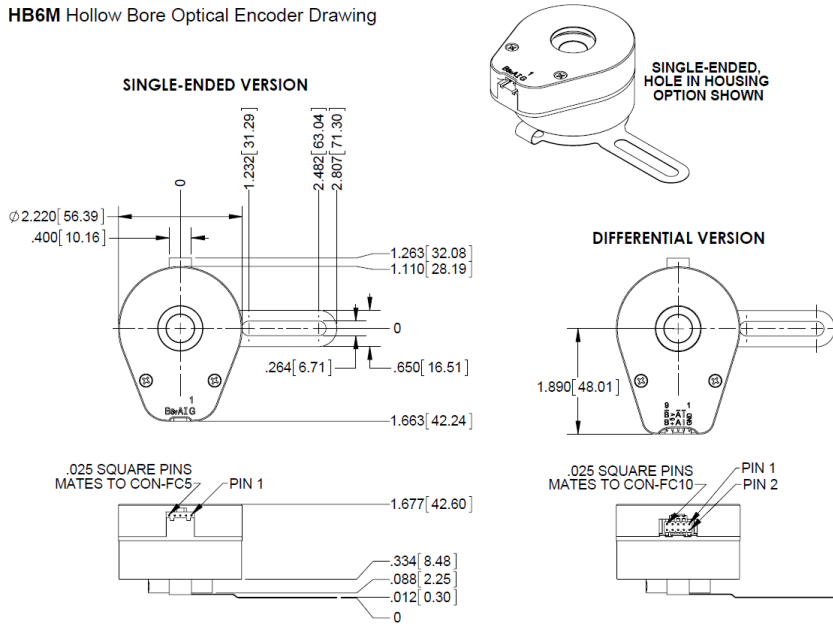


Features

- ▶ Hollow bore (hollow shaft / thru-bore) bearing design
- ▶ Rugged anodized aluminum housing
- ▶ Industrial duty 6805 series bearings
- ▶ Heavy duty ball bearings track up to 6,000 RPM
- ▶ Positive latching polarized connector
- ▶ 2-channel quadrature, TTL squarewave outputs
- ▶ 3rd channel index option
- ▶ Differential line driver output option
- ▶ 64 to 10000 cycles per revolution (CPR); 256 to 40000 pulses per revolution (PPR)

Mechanical Drawing

HB6M Hollow Bore Optical Encoder Drawing



RELEASE DATE: 01/13/2016

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UNITS: INCHES (MM)
METRIC SHOWN FOR REFERENCE ONLY

Environmental

Parameter	Value	Units
Operating Temperature (CPR < 3600)	-40 to 100	C
Operating Temperature (CPR ≥ 3600)	-25 to 100	C
Vibration (5Hz to 2kHz)	20	G
Shock, 11 mSec	50	G
Electrostatic Discharge, IEC 61000-4-2	± 4	kV

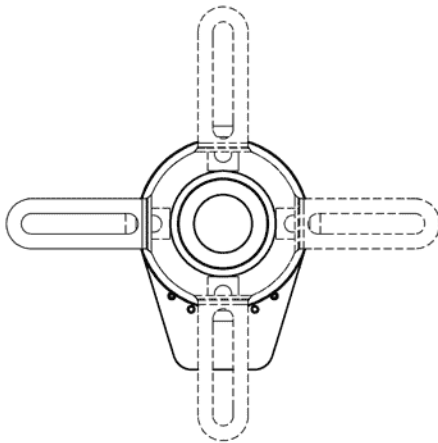
Mechanical

Parameter	Dimension
Max. Acceleration	100000 rad/sec ²
Max. Shaft Speed	6000 rpm
Max. Starting Torque	0.70 oz-in
Max. Bore Loading	5 lb.
Weight	11.5 oz.
Max. Shaft Total Indicated Runout	0.010 in.
Max. Shaft Axial Play	± 0.030 in.

Parameter	Dimension
Max. Shaft Insertion Depth	1.4 in. with default cover. No limit with H-option cover.
Moment of Inertia	3.7x10 ⁻³ oz-in-sec ²
Technical Bulletin TB1001 - Shaft and Bore Tolerances	Download

Tether Mounting

The tether is shipped detached and may be mounted in the four different methods as shown below.



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 and EM2 product pages.

Parameter	Min.	Typ.	Max.	Units	Conditions
Supply Voltage	4.5	5.0	5.5	V	
Supply Current		27	33	mA	CPR < 1000, no load
		54	62	mA	CPR ≥ 1000 and < 3600, no load
		72	85	mA	CPR ≥ 3600, no load
Low-level Output			0.5	V	IOL = 8mA max., CPR < 3600

Parameter	Min.	Typ.	Max.	Units	Conditions
		0.5	mA		IOL = 5mA max., CPR ≥ 3600
	0.05		mA		no load, CPR < 3600
	0.25		mA		no load, CPR ≥ 3600
High-level Output	2.0		V		IOH = -8mA max., CPR < 3600
	2.0		V		IOH = -5mA max., CPR ≥ 3600
	4.8		V		no load, CPR < 3600
	3.5		V		no load, CPR ≥ 3600
Output Current Per Channel	-8		8	mA	CPR < 3600
	-5		5	mA	CPR ≥ 3600
Output Rise Time		110		nS	CPR < 3600
		50		nS	CPR ≥ 3600
Output Fall Time		35		nS	CPR < 3600
		50		nS	CPR ≥ 3600

Differential 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 and EM2 product pages.

Parameter	Min.	Typ.	Max.	Units	Conditions
Supply Voltage	4.5	5.0	5.5	V	
Supply Current		29	36	mA	CPR < 1000, no load
		56	65	mA	CPR ≥ 1000 and < 3600, no load
		74	88	mA	CPR ≥ 3600, no load
Low-level Output		0.2	0.4	V	IOL = 20mA max.
High-level Output	2.4	3.4		V	IOH = -20mA max.
Differential Output Rise/Fall Time			15	nS	

Pin-outs

5-pin Single-ended

Pin	Description
1	Ground
2	Index

Pin	Description
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

Ordering Information

HB6M - - - - -

CPR	Bore	Index	Output	Housing
64 =	236 =6mm	NE =No Index	S =Single-ended	D =Default
100 =	250 =1/4"	IE =Index	D =Differential	H =Hole in Housing
200 =	312 =5/16"			
400 =	315 =8mm			
500 =	375 =3/8"			
512 =	394 =10mm			
1000 =	472 =12mm			
1024 =	500 =1/2"			
1800 =	551 =14mm			
2000 =	625 =5/8"			
2048 =	750 =3/4"			
2500 =				
3600				
4000				
4096				
5000				
7200				
8000				
8192				
10000				

Notes

- Cables and connectors are not included and must be ordered separately.
- US Digital warrants its products against defects in materials and workmanship for two years. See complete warranty for details.