RoHS COMPLIANT

Description

The H5 series ball bearing optical shaft encoder has a molded polycarbonate housing and utilizes either a 5-pin or 10-pin latching connector. This non-contacting rotary to digital converter is designed to provide digital feedback information.

The H5 is fully assembled with a brass shaft, two 1/4" ID by 1/2" OD heavy duty ball bearings and a mounting plate. The mounting plate comes with 2 mounting holes for screws #4 or smaller.

A secure connection to the H5 series encoder is made through a 5-pin (single-ended versions) or 10-pin (differential versions) latching connector (sold separately). The mating connectors are available from US Digital with several cable options and lengths.

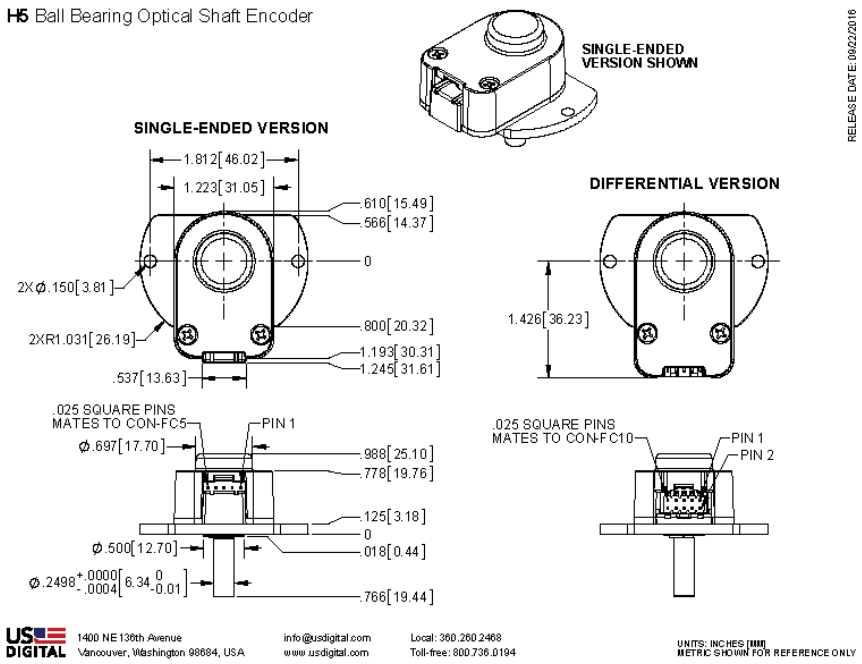
For differential versions, the internal differential line driver (26C31) can source and sink 20mA at TTL levels. The recommended receiver is the industry standard 26C32. Maximum noise immunity is achieved when the differential receiver is terminated with a 150 Ω resistor in series with a .0047 µF capacitor placed across each differential pair. The capacitor simply conserves power; otherwise power consumption would increase by approximately 20mA per pair, or 60mA for 3 pairs.

Features

- Ball bearing option tracks to 10,000 RPM
- 2-channel quadrature, TTL squarewave outputs
- 3rd channel index option available on some resolutions
- 32 to 5000 cycles per revolution (CPR)
- 128 to 20000 pulses per revolution (PPR)
- Wide operating temperature
- Single +5VDC supply

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



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
Electrostatic Discharge Single-ended (-S version), IEC 61000-4-2 Differential (-D version), Human Body Model	 ± 4 ± 2	 kV

Mechanical

Parameter	Value
Max. Acceleration	100000 rad/sec²
Max. Shaft Speed (mechanical)	10000 rpm (1)
Max. Shaft Torque	0.05 in-oz
Max. Shaft Loading	2 lbs.
Bearing Life	life in millions of revs. = (90/P)³ where P = radial load in pounds.

Parameter	Value
Weight	
Single-ended	1.79 oz.
Differential	1.89 oz.
Max. Shaft Total Indicated Runout (TIR)	0.006 in.
Moment of Inertia	0.001 oz-in-s²
Technical Bulletin TB1001 - Shaft and Bore Tolerances	Download

(1) The maximum speed due to electrical considerations is dependent on the CPR. See theEM1 andEM2 product pages.

Phase Relationship

B leads A for clockwise shaft rotation, and A leads B for counterclockwise rotation when viewed from the shaft side 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

Parameter	Min.	Typ.	Max.	Units	Conditions
	50		nS	CPR ≥ 2000, ± 5mA load	

Differential Electrical

- Specifications apply over entire operating temperature range.
- Typical values are specified at Vcc = 5.0Vdc and 25 ° C.
- For complete details, see theEM1 andEM2 product pages.

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-out

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

Ordering Information

H5 - [ ] - [ ] - [ ]

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CPR	Index	Output
32 =	NE =*No Index*	S =*Single-ended*
50 =	IE =*Index*	D =*Differential*
96 =		
100 =		
192 =		
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.
- US Digital® warrants its products against d efects in materials and workmanship for two years. See complete warranty for details.

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