

NEW



Series HSD23

- Single or Dual output
- ATEX Certification available for Intrinsically Safe application
- High Resolution Unbreakable Disk
- Industrial Duty Connector
- NEMA 4X, 6 / IP66, 67 Rated
- Nickel or Stainless Steel Housing available
- Two Year Warranty

Harsh-Duty Optical Hub Shaft Encoder

DESCRIPTION

NorthStar's HSD23 Harsh-Duty Optical Hub Shaft Encoder accepts up to 0.75" diameter shafts and operates reliably from -40 to +100°C. The Hard Anodized finish encoder exceeds IP66/IP67 and NEMA 6 enclosure requirements.

This robust encoder is also available in Stainless Steel to meet NEMA 4x and 6P requirements and its sealed housing allows the Encoder to be operated when regulatory washdown and high pressure steam or caustic chemicals are required. Utilization of an advanced Opto ASIC with innovative packaging techniques enables the encoder to operate in high shock and vibration environments.

The HSD23 is also available in an Intrinsically Safe version certified to ATEX EEx ia IIB T4 when used with the appropriate IS barrier.

APPLICATIONS:

The HSD23 Harsh-Duty Optical Encoder features simple installation on motor or machine hub shafts. It is often mounted on the back of motors where encoder feedback is needed in harsh environment applications. Available housing options make it ideal use in corrosive environments that demand heavy washdown protection. ATEX certification is also available for intrinsically safe applications.

- Converting Machinery
- Material Handling
- Packaging Equipment
- Oil Field Exploration
- Processing Equipment

INDUSTRIES

Chemical, Food & Beverage, Oil & Gas, Paper, Steel and any other where a precise encoder is needed to operate in harsh environments.

FEATURES/BENEFITS

Mechanical and Environmental

- Unbreakable code disk
- Hub Shaft mounting
- Heavy duty shaft seals
- Sealed connector

Electrical

- Cast housing maximizes noise immunity and durability



Harsh-Duty Optical Hub Shaft Encoder

Series HSD23

Harsh-Duty... Meets Stringent Washdown Requirements

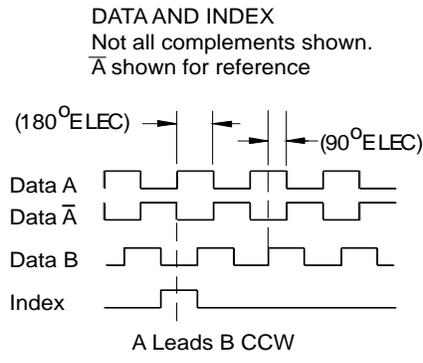
SPECIFICATIONS*

STANDARD OPERATING CHARACTERISTICS

Code: Incremental
Resolution: 1 to 3600 PPR (pulses/revolution)
Format: Two channel quadrature (AB) with optional Index (Z), and complementary outputs
Phase Sense: A leads B for CCW shaft rotation viewing the shaft clamp end of the encoder
Quadrature Phasing: 90° ± 15° electrical
Symmetry: 180° ± 18° electrical
Waveforms: Squarewave with rise and fall times less than 1 microsecond into a load capacitance of 1000 pf

ELECTRICAL

Input Power: 5-26VDC. 50 mA max., not including output loads. ATEX: 5VDC, 7-26VDC
Outputs: 2N2222, ET7272, ET7273
Frequency Response: 125 kHz (data & index)
Termination: 6, 7, or 10 pin MS Connector; 5 or 8 Pin M12 Connector; Cable exit w/seal;
Mating Connector:
 6 pin, style MS3106A-14S-6S (MCN-N4);
 7 pin, style MS3106A-16S-1S (MCN-N5);
 10 pin, style MS3106A-18-1S (MCN-N6)
 5 pin, style M12 Cable with Connector Available
 8 pin, style M12 Cable with Connector Available



MECHANICAL

Shaft Material: 303 stainless steel (passivated)
Bore Diameter: 3/8", 10mm, 1/2", 5/8", 3/4". Insulated inserts provided
Bore runout: 0.0005 TIR at midpoint
Starting torque: 2.5 in-oz. maximum (at 25°C)
Bearings: 61805-2RZ
Bearing life: 5 x 10⁸ revs at rated shaft Loading, 5 x 10¹¹ revs at 10% of rated shaft loading. (manufacturers' specs)
Housing and cover: Hard Anodized Aluminum. Also available in Electroless Nickel finish and Stainless Steel. Tether Available
Disc material: Metal or mylar
Weight: 20 ounces, typical

ENVIRONMENTAL

Operating Temperature: -40 to 100°C
Operating Temperature ATEX: -40 to 80°C
Storage temperature: -40 to 100°C
Shock: 50G's for 11msec duration
Vibration: 5 to 2000Hz @ 20 G's
Humidity: 100%
Enclosure Rating: NEMA 4X, NEMA 6, IP66, IP67 (NEMA 6P upon request)

* Specifications are for base models with standard features only unless otherwise noted. Specifications subject to change without notice in accordance with our DBS policy of continuous improvement. All product and brand names are trademarks of their respective owners. All rights reserved.
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 NorthStar Brand HSD23 Data Sheet (5/06)

ELECTRICAL CONNECTIONS

6, 7 & 10 Pin MS Connectors and Cables

Connector & mate/accessory cable assembly pin numbers and wire color information is provided here for reference. HSD23 models with direct cable exit carry the color coding as shown in the right hand column.

Encoder Function	Cable # 108594-6 Pin Single Ended		Cable # 108595-7 Pin Single Ended		Cable # 108596-7 Pin Dif Line Drv w/o Idx		Cable # 1400635-10 Pin Dif Line Drv w/ Idx		Cable # 108615-12 Pin CCW		Cable Exit with Seal Wire Color
	Pin	Wire Color	Pin	Wire Color	Pin	Wire Color	Pin	Wire Color	Pin	Wire Color	
Sig. A	E	BRN	A	BRN	A	BRN	A	BRN	5	BRN	GREEN
Sig. B	D	ORG	B	ORG	B	ORG	B	ORG	8	ORN	BLUE
Sig. Z	C	YEL	C	YEL	—	—	C	YEL	3	YEL	ORANGE
Power +V	B	RED	D	RED	D	RED	D	RED	12	RED	RED
Com	A	BLK	F	BLK	F	BLK	F	BLK	10	BLK	BLACK
Case	—	—	G	GRN	G	GRN	G	GRN	9	—	WHITE
N/C	F	—	E	—	—	—	E	—	7	—	—
Sig \bar{A}	—	—	—	—	C	BRN/WHT	H	BRN/WHT	6	BRN/WHT	VIOLET
Sig \bar{B}	—	—	—	—	E	ORG/WHT	I	ORG/WHT	1	ORN/WHT	BROWN
Sig \bar{Z}	—	—	—	—	—	—	J	YEL/WHT	4	YEL/WHT	YELLOW
0 Volt Sense	—	—	—	—	—	—	—	—	2	GRN	—
5 Volt Sense	—	—	—	—	—	—	—	—	11	BLK/WHT	—

5 & 8 Pin M12 Accessory Cables when Code 6= H or J

Connector pin numbers and cable assembly wire color information is provided here for reference.

Encoder Function	Cable # 112859-5 Pin Single Ended		Cable # 112860-8 Pin Single Ended		Cable # 112860-8 Pin Differential	
	Pin	Wire Color	Pin	Wire Color	Pin	Wire Color
Sig. A	4	BLK	1	BRN	1	BRN
Sig. B	2	WHT	4	ORG	4	ORG
*Sig. Z	5	GRY	6	YEL	6	YEL
Power +V	1	BRN	2	RED	2	RED
Com	3	BLU	7	BLK	7	BLK
Sig. \bar{A}	-	-	-	-	3	BRN/WHT
Sig. \bar{B}	-	-	-	-	5	ORG/WHT
*Sig. \bar{Z}	-	-	-	-	8	YEL/WHT

* Index not provided on all models. See ordering information
Cable Configuration: PVC jacket, 105 °C rated, overall foil shield; 24 AWG conductors, minimum

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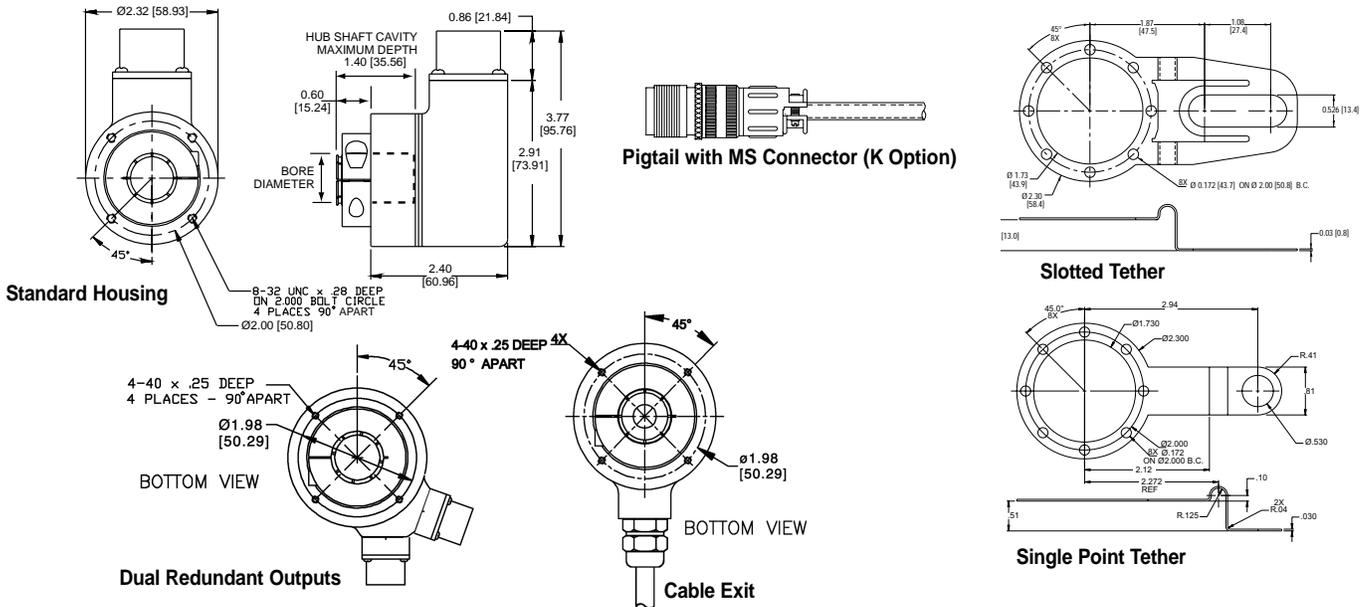
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Harsh-Duty Optical Hub Shaft Encoder

Series HSD23

Harsh-Duty... Meets Stringent Washdown Requirements

DIMENSIONS inches [mm]



ORDERING INFORMATION

Code 1: Model	Code 2: PPR	Code 3: Bore Size	Code 4: Format	Code 5: Output	Code 6: Termination	Code 7: Safety	Code 8: Housing/Tether
HSD23	<input type="checkbox"/>						

Ordering Information							
HSD23 Size 23	0001 0500	4 3/8"	0 single ended, unidirectional (A)	0 5-26V in, 5-26V Open Collector out (7273)	0 6 pin connector	0 No ATEX	0 Cast Alum Housing; slotted tether
Harsh-Duty, Optical Hub Shaft Encoder	0024 0512	5 10 mm	1 single ended, bidirectional (AB)	2 5-26V in, 5-26V Push-Pull out	1 7 pin connector	1 ATEX Type 1* Option	1 Nickel Housing; slotted tether
	0035 0600	7 1/2"	2 single ended, bidirectional with index (ABZ)	F 5-26V in, 5-26V Open Collector out (2222)	2 10 pin connector	available when: Code 5 is 0, 2, 3, F or G	2 Stainless Housing; slotted tether
	0040 0625	8 5/8"	3 differential, bidirectional (AA BB)	G 5-26V in, 5-26V Open Collector out with 2.2 k Ω Pullups (2222)	3 12 pin connector	2 ATEX Type 2* Option	3 Redundant Outputs (Dual Connector Housing); slotted tether
	0050 0720	C 3/4"	available when Code 5 is 3 or 4 and Code 8 is 0 to 2, or 6 to 8:	available when: Code 4 is 3, 4 or 5	5 6 pin connector, plus mating connector	3 ATEX Type 3* Option	4 Nickel Housing; Redundant Outputs; slotted tether
	0060 1000		4 differential, bidirectional with index (AA BB ZZ)	3 5-26V in, 5-26V Differential Line Driver out (7272)	6 7 pin connector, plus mating connector		5 Stainless Housing, Redundant Outputs; slotted-tether
	0100 1024		5 Dual isolated differential, bi-directional w/index (AABBZZ)	4 5-26V in, 5V Differential Line Driver out (7272)	7 10 pin connector, plus mating connector		C Cast Alum Housing; single-point tether
	0120 1200				8 12 pin connector, plus mating connector		D Nickel Housing; single-point tether
	0192 1250				A 18" (.5m) cable		E Stainless Housing; single-point tether
	0200 1440				B 36" (1m) cable		F Redundant Outputs (Dual Connector Housing); single-point tether
	0240 2000				C 72" (2m) cable		G Nickel Housing; Redundant Outputs; single-point tether
	0250 2048				D 10' (3m) cable		H Stainless Housing, Redundant Outputs; single-point tether
	0256 2500				G 13" (.3m) cable		6 Same as "0" but no tether**
	0300 2540				J 8 Pin M12 Connector		7 Same as "1" but no tether**
	0360 3000				K 18" (.5m) cable with 10 pin in-line connector		8 Same as "2" but no tether**
	3600				available when Code 5 is 0, 2 or F		9 Same as "3" but no tether**
					H 5 Pin M12 Connector		A Same as "4" but no tether**
							B Same as "5" but no tether**

**Note: Tether may be required for proper encoder operation and may be supplied by the customer or ordered as the following accessories:

- 113317-0001 Single Point Tether Kit
- 113318-0001 Slotted Tether Kit

*Note: Available ATEX Certified Options
ATEX Type 1: ATEX Certified; 5V in, 5V out only
ATEX Type 2: ATEX Certified; 7-26V in, 7-26V out
ATEX Type 3: ATEX Certified; 7-26V in, 5V out
 NOTE: When selecting ATEX models, ATEX voltages replace those shown in Code 5.

Worldwide Brands:

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Eagle Signal™

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NorthStar™

Veeder-Root™



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More Reliable. Our experience with more than 25,000 customers has taught us to design controllers that are reliable and durable, with quality standards that meet six sigma requirements.

For additional information or a full-line catalog, contact DICG Customer Service or visit our web site.

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