

SERIES HSD25

NorthStar™ brand

Harsh Duty Optical Encoder

Key Features

- Compact Hubshaft Design with Field Replaceable Shaft Isolators
- Unbreakable Code Disc up to 3600 PPR
- IP67 Sealing
- Anodized Aluminum, Stainless Steel, or Nickel Plated Housing
- Hub-Shaft Mounting Style



SPECIFICATIONS

STANDARD OPERATING CHARACTERISTICS

Code: Incremental, Optical
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: For resolutions to 625 PPR: $90^\circ \pm 15^\circ$ electrical; For resolutions over 625 PPR: $90^\circ \pm 30^\circ$ electrical
Symmetry:
 For resolutions to 1024 PPR: $180^\circ \pm 18^\circ$ electrical
 For resolutions over 1024 PPR: $180^\circ \pm 25^\circ$ electrical
Index: 150° to 330° , A leads B, CCW (From Clamp End)
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.
Outputs:
 2N2222 Open Collector: 250mA, sink max
 7272 Push-Pull: 40mA, sink or source
 7272 Differential Line Driver: 40 mA, sink or source
 7273 Open Collector: 40mA, sink max
Frequency Response: 125 kHz (data & index)
Noise Immunity: Tested to EN61326-1
Electrical Immunity: Reverse polarity and short circuit protected for 7272 and 7273 line drivers only
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)
 10 Pin, NEMA 4 style (MCN-N6N4)
 12 Pin CW M23 Connector (MCN-C1)

MECHANICAL

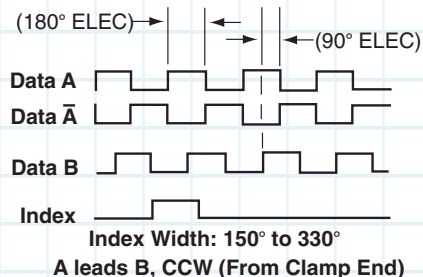
Bore Diameter: $1/4"$ to $3/4"$, 6 mm to 19 mm
Mounting Configuration: Hub Shaft Mounting. Note: tether may be required for proper operation. Options available are a slotted or single point tether.
Mating Shaft Length: $1.0"$ to $1.3"$
Shaft Speed: 6000 RPM max.
Starting Torque: 6.5 in-oz. maximum (at 25°C)
Bearings: 61805-2RZ
Housing and Cover: Hard Anodized Aluminum. Also available in Electroless Nickel Finish and Stainless Steel.
Shaft Material: 303 Stainless Steel (passivated)
Disc Material: Mylar
Weight: 20 ounces, typical

ENVIRONMENTAL

Operating Temperature: -40 to 100°C
Storage temperature: -40 to 100°C
Shock: 50G's for 11msec duration
Vibration: 5 to 2000Hz @ 20 G's
Humidity: Up to 98% (non-condensing)
Enclosure Rating: IP67

DATA AND INDEX

Not all complements shown
 A shown for reference



Ordering Information

To order, complete the model number with code numbers from the table below:

Code 1: Model	Code 2: PPR	Code 3: Bore Size	Code 4: Output Format	Code 5: Termination	Code 6: Options	Code 7: Special Options
HSD 25	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>

Ordering Information						
HSD25 Heavy Duty Hub Shaft Encoder	0001 0500	0 6mm	0 Single Ended ABZ, 5-26VDC push-pull(7272)	0 6 Pin Connector	0 No Options**	Blank None
	0010 0512	1 1/4"	1 Single Ended ABZ, 5-26VDC Open collector (7273)	1 7 Pin Connector	1 Slotted Tether	01 Nickel Plated
	0024 0600	2 5/16"	2 Single Ended ABZ, 5-26VDC Open collector (2222)	2 10 Pin Connector	2 Single Point Tether	02 Stainless Steel
	0025 0625	3 8mm	3 Single Ended ABZ, 5-26VDC Open collector (2222) w/2.2kOhm	3 12 Pin Connector	3 No Tether, Dual Isolated Outputs**	
	0035 0720	4 3/8"	<i>Options 4 & 5 not available when Code 5 is H; and Code 6 is 3, 4, 5</i>		4 10 Pin Bayonet Connector	
	0040 1000	5 10mm	4 Differential AB only, 5-26 in, 5-26 out (7272)	5 6 Pin+Mating Connector	4 Slotted Tether, Dual Isolated Outputs	
	0060 1024	6 12mm	5 Differential AB only, 5-26 in, 5V out (7272)	6 7 Pin+Mating Connector	5 Single Point Tether, Dual Isolated Outputs	
	0100 1200	7 1/2"	<i>Options 6 & 7 not available when Code 5 is 0, 1, 5, 6, H; and Code 6 is 3, 4, 5</i>		7 10 Pin+Mating Connector	
	0120 1250	8 5/8"	6 Differential ABZ, 5-26 in, 5V out (7272)	8 12 Pin+Mating Connector		
	0192 1440	9 15mm	7 Differential ABZ, 5-26 in, 5-26 out (7272)	A .5m (20") cable		
	0200 2000	A 16mm		C 1m (39") cable		
	0240 2048	C 19mm		D 2m (79") cable		
	0250 2500	D 3/4"		E 3m (118") cable		
	0256 2540			L 4m (157") cable		
	0300 2600			H 5 pin M12		
0360 3600			J 8 pin M12			

Cable Assemblies with MS Connector*

- 108594-XXXX** 6 Pin MS, Cable Assy. For Use with Single Ended Outputs
- 108595-XXXX** 7 Pin MS, Cable Assy. For Use with Single Ended Outputs
- 108596-XXXX** 7 Pin MS, Cable Assy. For Use with Differential Line Driver w/o Index Outputs
- 1400635XXXX** 10 Pin MS, Cable Assy. For Use with Differential Line Driver with Index Outputs
- 109209-XXXX** NEMA4 10 pin MS, Cable Assy. For use with Differential Line Driver with Index Outputs

Cable Assemblies with M23 Connector*

- 115901-XXXX** 12 pin M23, Cable Assy. For Use with Differential Line Driver with Index Outputs, CW

Cable Assemblies with M12 Connector*

- 112859-XXXX** 5 Pin M12, Cable Assy. For Use with Single Ended Outputs
- 112860-XXXX** 8 Pin M12, Cable Assy. For Use with Single Ended Outputs
- 112860-XXXX** 8 Pin M12, Cable Assy. For Use with Differential Line Driver Outputs

*Note: Standard cable length is 10 feet but may be ordered in any length in 5 foot increments. For example, for a 20 foot cable, replace XXXX with -0020.

Mating Connectors (no cable)

- 6 pin, style MS3106A-14S-6S (MCN-N4)
- 7 pin, style MS3106A-16S-1S (MCN-N5)
- 10 pin, style MS3106A-18-1S (MCN-N6)
- 10 pin, NEMA 4 style (MCN-N6N4)
- 12 Pin CW M23 Connector (MCN-C1)

Tether Kits**

- 113764-0001 Single Point Tether Kit
- 113766-0001 Slotted Tether Kit

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

SERIES HSD25



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. Models with direct cable exit carry the color coding as shown in the right hand column.

Encoder Function	Cable # 108594-XXXX 6 Pin Single Ended		Cable # 108595-XXXX 7 Pin Single Ended		Cable # 108596-XXXX 7 Pin Dif Line Driver With Out Index		**Cable # 1400635XXXX **Cable # 109209-XXXX 10 Pin Dif Line Driver with Index		Cable # 114448-XXXX 10 Pin Bayonet		Cable # 115901-XXXX 12 Pin (CW)		Cable Exit with Seal
	Pin	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	A	BRN	5	BRN	GRN
Sig. B	D	ORG	B	ORG	B	ORG	B	ORG	B	ORG	8	ORN	BLU
Sig. Z*	C	YEL	C	YEL	—	—	C	YEL	C	YEL	3	YEL	ORG
Power +V	B	RED	D	RED	D	RED	D	RED	D	RED	12	RED	RED
Com	A	BLK	F	BLK	F	BLK	F	BLK	F	BLK	10	BLK	BLK
Case	—	—	G	GRN	G	GRN	G	GRN	G	GRN	9	—	WHT
N/C-SLD	F	—	E	—	—	—	E	—	E	—	7	—	—
Sig. \bar{A}	—	—	—	—	C	BRN/WHT	H	BRN/WHT	H	BRN/WHT	6	BRN/WHT	VIO
Sig. \bar{B}	—	—	—	—	E	ORG/WHT	I	ORG/WHT	I	ORG/WHT	1	ORN/WHT	BRN
Sig. \bar{Z}^*	—	—	—	—	—	—	J	YEL/WHT	J	YEL/WHT	4	YEL/WHT	YEL

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

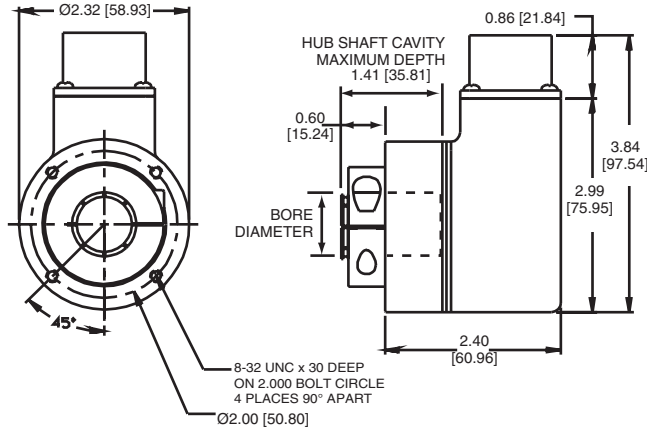
Connector pin numbers and cable assembly wire color information is provided here for reference.

Encoder Function	Cable # 112859-XXXX 5 Pin Single Ended		Cable # 112860-XXXX 8 Pin Single Ended		Cable # 112860-XXXX 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

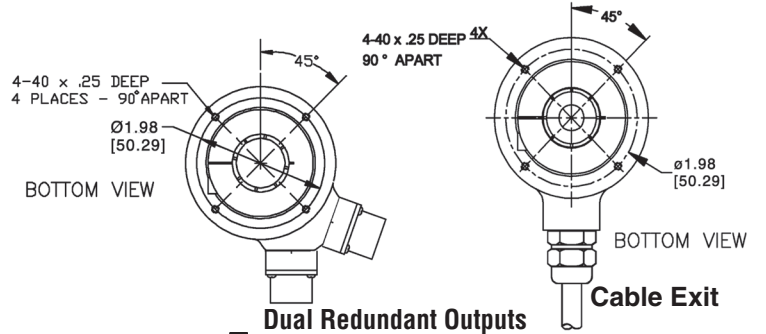
NOTES:

- 1) Cable Configuration (**Table 1**): PVC jacket, 105 °C rated, overall foil shield; 3 twisted pairs 24 AWG (output signals), plus 2 twisted pairs 22 AWG (input power)
- 2) Cable Configuration (**Table 2**): PVC jacket, 105°C rated, overall foil shield; 24 AWG conductors, minimum
- 3) Standard cable length is 10 feet but may be ordered in any length in 5 foot increments. For example, for a 20 foot cable, replace -XXXX with -0020
- 4) *Index not provided on all models. See ordering information.
- 5) **For watertight applications, use NEMA4 10 pin cable & connector 1400635XXXX or 109209-XXXX.
- 6) "MS" Type mating connectors and pre-build cables are rated NEMA 12
- 7) "M12" Cable assemblies are rated IP67

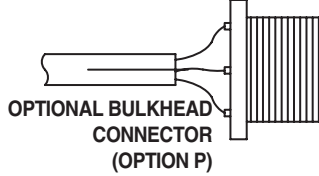
DIMENSIONS inches [mm]



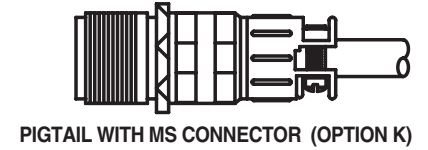
Standard Housing



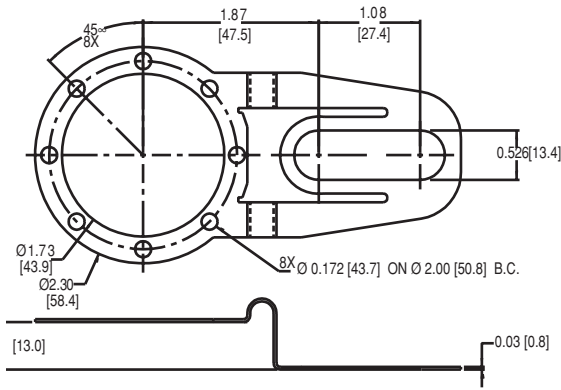
Dual Redundant Outputs



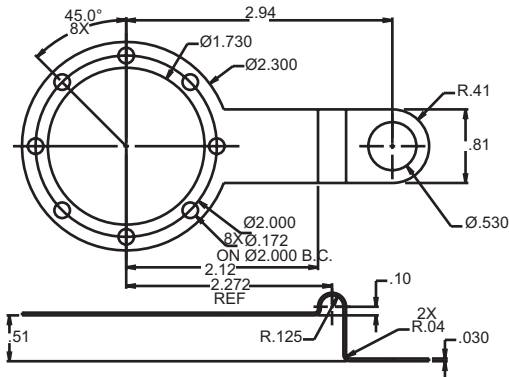
OPTIONAL BULKHEAD CONNECTOR (OPTION P)



PIGTAIL WITH MS CONNECTOR (OPTION K)



Slotted Tether



Single Point Tether



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