

SERIES HSD25

NorthStar™ brand

Harsh Duty Optical Encoder

Key Features

- Compact Design with Field Replaceable Shaft Isolators
- Expanded Resolution up to 20,000 PPR
- Premium IP67 Sealing
- Anodized Aluminum, Stainless Steel, or Nickel Plated Housing
- Hub-Shaft Mounting Style

HD
Heavy Duty



SPECIFICATIONS

STANDARD OPERATING CHARACTERISTICS

Code: Incremental, Optical

Resolution: 1 to 20,000 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: $90^\circ \pm 30^\circ$ electrical

Symmetry: $180^\circ \pm 25^\circ$ electrical

Index: 180° default gated to B low

Waveforms: Squarewave with rise and fall times less than 1 microsecond into a load capacitance of 1000 pF

ELECTRICAL

Input Power: 5-26VDC. 80 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: 200 kHz (data and index)

Noise Immunity: Tested to EN61326-1

Electrical Immunity: Reverse polarity (All models); Short circuit protection (7272 and 7273 line drivers only)

Termination: 6, 7, or 10 pin MS Connector; 5 or 8 Pin M12 Connector; 12 Pin M23 Connector; Cable exit with 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, NEMA4 style (MCN-N6N4)

10 pin, Bayonet, style MS3116-F12-10S (MCN-B1)

12 Pin CW M23 Connector (MCN-C1)

MECHANICAL

Bore Diameter: 1/4" to 3/4", 6 mm to 16 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: Aluminum

Weight: 20 ounces, typical

ENVIRONMENTAL

Operating Temperature: -40 to 100°C

Storage temperature: -40 to 100°C

Shock: 50G's for 11ms duration

Vibration: 5 to 2000Hz @ 20 G's

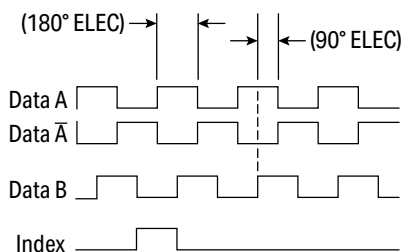
Humidity: Up to 98% (non-condensing)

Enclosure Rating: IP67

STANDARD DATA AND INDEX

Not all complements shown

\bar{A} shown for reference



Index Width: 180° Default

A leads B, CCW (from clamp end)

SERIES HSD25

NorthStar™ brand

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
HSD25	<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"/>
HSD25 Heavy Duty Hub Shaft Encoder	Enter Custom PPR from 1 to 20,000 Examples: 0001 = 1 PPR 0256 = 256 PPR 1000 = 1000 PPR 9999 = 9999 PPR A000 = 10,000 PPR B000 = 11,000 PPR C999 = 12,999 PPR : : G000 = 16,000 PPR G384 = 16,384 PPR H000 = 17,000 PPR J000 = 18,000 PPR K000 = 19,000 PPR L000 = 20,000 PPR Note: Letter "I" is skipped and not use	0 6mm 1 1/4" 2 5/16" 3 8mm 4 3/8" 5 10mm 6 12mm 7 1/2" 8 5/8" 9 15mm A 16mm D 3/4" M 14mm	0 Single Ended ABZ, 5-26VDC push-pull (7272) 1 Single Ended ABZ, 5-26VDC Open collector (7273) Options 2 and 3 not available when Code 6 is 3, 4, 5 2 Single Ended ABZ, 5-26VDC Open collector (2222) 3 Single Ended ABZ, 5-26VDC Open collector (2222) w/2.2kOhm Options 4 and 5 not available when Code 5 is H 4 Differential AB only, 5-26VDC in, 5-26V out (7272) 5 Differential AB only, 5-26VDC in, 5V out (7272) Options 6 and 7 not available when Code 5 is 0, 1, 5, 6, H 6 Differential ABZ, 5-26VDC in, 5V out (7272) 7 Differential ABZ, 5-26VDC in, 5-26V out (7272)	0 6 Pin Connector 1 7 Pin Connector 2 10 Pin Connector 3 12 Pin Connector 4 10 Pin Bayonet Connector 5 6 Pin+Mating Connector 6 7 Pin+Mating Connector 7 10 Pin+Mating Connector 8 12 Pin+Mating Connector 9 10 Pin Bayonet Mating Connector A .5m (20") cable C 1m (39") cable D 2m (79") cable E 3m (118") cable L 4m (157") cable H 5 pin M12 J 8 pin M12 K 1.5 ft (18") cable w/ in line 10 Pin Connector M 5 ft (60") cable N 10 ft (120") cable P 1.5 ft (18") Cable with 10-pin Bulkhead Connector	0 No Options* 1 Slotted Tether 2 Single Point Tether 3 No Tether*, Dual Isolated Outputs† 4 Slotted Tether, Dual Isolated Outputs† 5 Single Point Tether, Dual Isolated Outputs† * Tether may be required for proper encoder operation and may be supplied by the customer or ordered below † Simultaneous use of redundant outputs may void ATEX certification. Consult factory for details.	Blank None 01 Nickel Plated 02 Stainless Steel

COMPATIBLE ACCESSORIES

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 without 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
- 114448-XXXX 10 Bayonet, 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

MATING CONNECTORS (NO CABLE)

- MCN-N4 6 pin, style MS3106A-14S-6S
- MCN-N5 7 pin, style MS3106A-16S-1S
- MCN-N6 10 pin, style MS3106A-18-1S
- MCN-N6N4 10 pin, NEMA4 style
- MCN-B1 10 pin, Bayonet, style MS3116-F12-10S
- MCN-C1 12 Pin CW M23 Connector

TETHER KITS

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

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.

SERIES HSD25

NorthStar™ brand

ELECTRICAL CONNECTIONS

6, 7 AND 10 PIN MS AND M23 CONNECTORS AND CABLES

Connector and 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

Table 1

Encoder Function	Cable # 108594-XXXX 6 Pin Single Ended		Cable # 108595-XXXX 7 Pin Single Ended		Cable # 108596-XXXX 7 Pin Diff Line Driver without Index		Cable # 109209-XXXX* or 1400635XXXX 10 Pin Diff 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	Wire Color
Signal A	E	BRN	A	BRN	A	BRN	A	BRN	A	BRN	5	BRN	GRN
Signal B	D	ORG	B	ORG	B	ORG	B	ORG	B	ORG	8	ORG	BLU
Signal 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
Common	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	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	J	ORG/WHT	1	ORG/WHT	BRN
Sig. \bar{Z} †	—	—	—	—	—	—	J	YEL/WHT	K	YEL/WHT	4	YEL/WHT	YEL

5 AND 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.

Table 2

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
Signal A	4	BLK	1	BRN	1	BRN
Signal B	2	WHT	4	ORG	4	ORG
Signal Z†	5	GRY	6	YEL	6	YEL
Power +V	1	BRN	2	RED	2	RED
Common	3	BLU	7	BLK	7	BLK
Signal \bar{A}	—	—	—	—	3	BRN/WHT
Signal \bar{B}	—	—	—	—	5	ORG/WHT
Signal \bar{Z} †	—	—	—	—	8	YEL/WHT

Notes:

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)

Cable Configuration (Table 2): PVC jacket, 105°C rated, overall foil shield; 24 AWG conductors, minimum

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

*MS" Type mating connectors and pre-build cables are rated NEMA 12

"M12" Cable assemblies are rated IP67

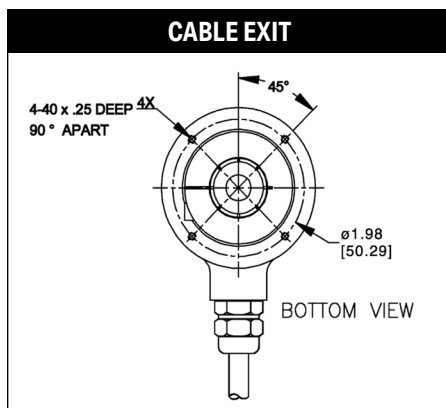
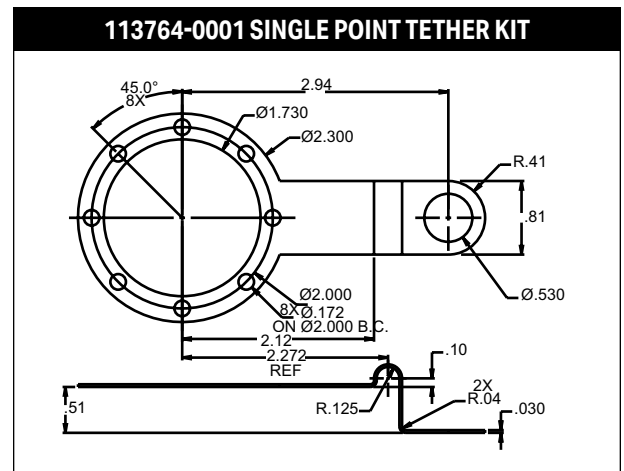
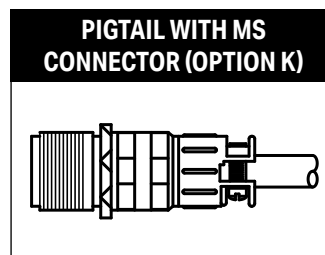
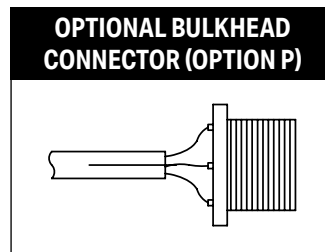
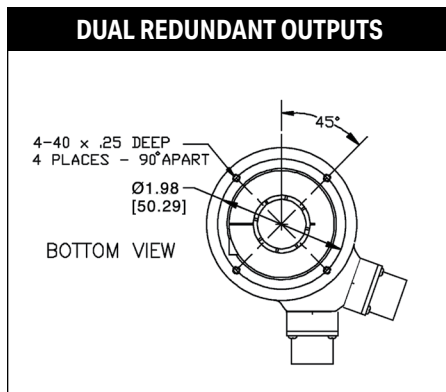
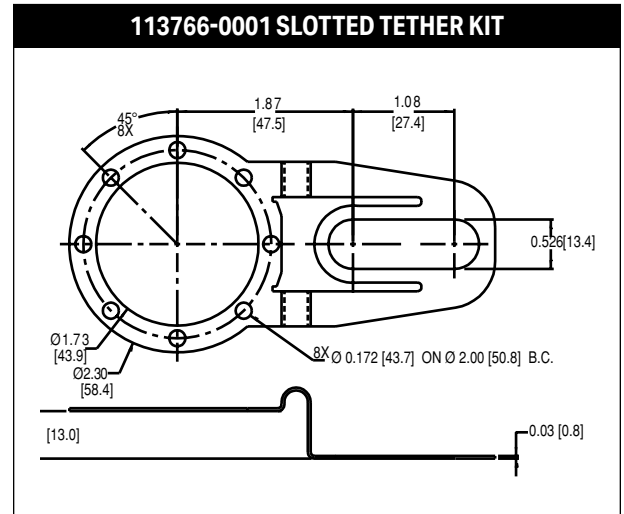
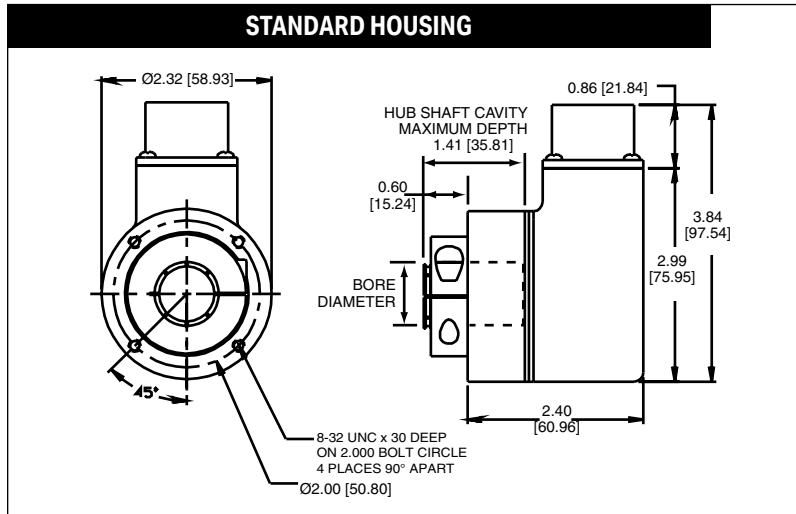
*For watertight applications, use NEMA 4 10 pin cable and connector 118022-XXXX

† Index not provided on all models. See ordering information

SERIES HSD25

NorthStar™ brand

Dimensions: inch [mm]



Worldwide Brands: NorthStar™ • Dynapar™ • Hengstler™ • Harowe™

WWW.DYNAPAR.COM



Headquarters
2100 West Broad St.
Elizabethtown, NC 28337
USA

Customer Service:
Tel: +1.800.234.8731
custserv@dynapar.com

Technical Support
Tel.: +1.800.234.8731
support@dynapar.com

European Sales Representative
Hengstler GmbH
Uhlandstrasse 49, 78554 Aldingen
Germany
www.hengstler.com