

# SERIES ISD25

NorthStar™ brand

## Hazardous Duty Encoder

### Key Features

- Class I, Division 1 and Zone 0 Certified
- ATEX, UL and IECEx Certified for Hazardous Duty Applications
- Unbreakable Code Disc up to 9,000 PPR
- IP67 Sealing
- Anodized Aluminum, Stainless Steel, or Nickel Plated Housing

HAZ  
Hazardous Duty



II1G  
Ex ia op is IIB T4 Ga

E116133  
Class 1, Div 1 Group C&D

### SPECIFICATIONS

#### STANDARD OPERATING CHARACTERISTICS

**Code:** Incremental, Optical

**Resolution:** 1 to 9,000 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:**  $180^\circ$  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:** 5VDC, 7-26VDC

#### 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; M23 Connector; Cable exit with seal

#### Mating Connector:

6 Pin MS, Style MS3106A-14S-6S (MCN-N4)

7 Pin MS, Style MS3106A-16S-1S (MCN-N5)

10 Pin MS, Style MS3106A-18-1S (MCN-N6)

10 Pin Bayonet, Style MS3116-F12-10S (MCN-B1)

10 Pin, NEMA4 Style (MCN-N6N4)

12 Pin CW M23 Connector (MCN-C1)

Cable with 5 pin M12 Connector (112859-XXXX)

Cable with 8 pin M12 Connector (112860-XXXX)

#### MECHANICAL

**Bore Diameter:** 3/8", 10mm, 1/2", 5/8", 3/4". Insulated inserts provided

**Mounting Configuration:** Hubshaft, direct mount over shaft with multiple tether options available

**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. Tether Available

**Shaft Material:** 303 stainless steel (passivated)

**Disc Material:** Aluminum

**Weight:** 20 ounces, typical

#### ENVIRONMENTAL

**Operating Temperature:** -40 to 80°C

**Storage temperature:** -40 to 100°C

**Shock:** 50G's for 11msec duration

**Vibration:** 5 to 2000Hz @ 20 G's

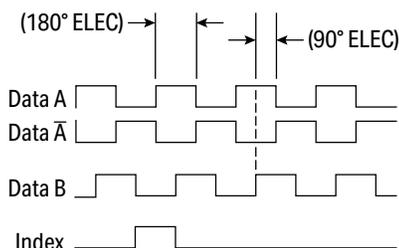
**Humidity:** Up to 98% (non-condensing)

**Enclosure Rating:** IP67

#### STANDARD DATA AND INDEX

Not all complements shown

$\bar{A}$  shown for reference



Index Width:  $180^\circ$  Default

A leads B, CCW (from clamp end)

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## 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
<b>ISD25</b>	<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"/>
ISD25 Hazardous Duty Encoder	Enter Custom PPR from 0001 to 9000 Examples: <b>0001</b> = 1 PPR <b>0256</b> = 256 PPR <b>1024</b> = 1024 PPR <b>8192</b> = 8192 PPR <b>9000</b> = 9000 PPR	<b>0</b> 6mm <b>1</b> 1/4" <b>2</b> 5/16" <b>3</b> 8mm <b>4</b> 3/8" <b>5</b> 10mm <b>6</b> 12mm <b>7</b> 1/2" <b>8</b> 5/8" <b>9</b> 15mm <b>A</b> 16mm <b>C</b> 19mm <b>D</b> 3/4"	<b>A</b> Single Ended ABZ, 7-26VDC in, 7-26V out push-pull (7272) <b>C</b> Single Ended ABZ, 5VDC in, 5V out push-pull (7272) <b>D</b> Single Ended ABZ, 7-26VDC in, 7-26V out Open Collector (7273)  Options E and F not available when code 6 is 3, 4, 5 <b>E</b> Single Ended ABZ, 7-26VDC in, 7-26V out Open Collector (2222) <b>F</b> Single Ended ABZ, 7-26VDC in, 7-26V out Open Collector with 2.2kOhm pullup (2222)  Options G, H and J not available when Code 5 is 0, 5, H <b>G</b> Differential AB only, 5VDC in, 5V out (7272) <b>H</b> Differential AB only, 7-26VDC in, 7-26V out (7272) <b>J</b> Differential AB only, 7-26VDC in, 5V out (7272)  Options K, L and M not available when Code 5 is 0, 1, 5, 6, H <b>K</b> Differential ABZ, 5VDC in, 5V out (7272) <b>L</b> Differential ABZ, 7-26VDC in, 7-26V out (7272) <b>M</b> Differential ABZ, 7-26VDC in, 5V out (7272)	<b>0</b> 6 pin connector <b>1</b> 7 pin connector <b>2</b> 10 pin connector <b>3</b> 12 pin connector <b>4</b> 10 pin bayonet connector <b>5</b> 6 pin+mating connector <b>6</b> 7 pin+mating connector <b>7</b> 10 pin+mating connector <b>8</b> 12 pin+mating connector <b>9</b> 10 pin Bayonet mating connector <b>A</b> .5m (20") cable <b>C</b> 1m (39") cable <b>D</b> 2m (79") cable <b>E</b> 3m (118") cable <b>L</b> 4m (157") cable <b>H</b> 5 pin M12 <b>J</b> 8 pin M12 <b>K</b> 1.5 ft (18") cable with inline 10pin connector <b>M</b> 5 ft (60") cable <b>N</b> 10 ft (120") cable <b>P</b> 1.5 ft (18") Cable with 10-pin Bulkhead Connector	<b>0</b> No Options* <b>1</b> Slotted Tether <b>2</b> Single Point Tether <b>3</b> No Tether*, Dual Isolated Outputs† <b>4</b> Slotted Tether, Dual Isolated Outputs† <b>5</b> Single Point Tether, Dual Isolated Outputs†  *Tether may be required for proper encoder operation and may be supplied by the customer or ordered from below. †Simultaneous use of redundant outputs will void ATEX certification and is not allowed. Consult factory for details.	<b>Blank</b> None <b>01</b> Nickel Plated <b>02</b> Stainless Steel

## ACCESSORIES

Cable Assemblies with MS Connector			
SKU	Pins		Use with...
108594-XXXX	6 Pin MS	Connector, Cable Assembly	single ended outputs
108595-XXXX	7 Pin MS		single ended outputs
108596-XXXX	7 Pin MS		differential line driver without index outputs
114448-XXXX	10 Pin Bayonet		differential line driver with index outputs
1400635XXXX	10 Pin MS		differential line driver with index outputs
109209-XXXX	NEMA4 10 pin MS		differential line driver with index outputs

Mating Connectors (no cable)		
SKU	Pins	Style
MCN-N4	6 pin	MS3106A-14S-6S
MCN-N5	7 pin	MS3106A-16S-1S
MCN-N6	10 pin	MS3106A-18-1S
MCN-N6N4	10 pin	NEMA4
MCN-B1	10 Pin Bayonet	MS3116-F12-10S
MCN-C1	12 Pin	CW M23 Connector

Cable Assemblies with M23 Connector			
SKU	Pins		Use with...
115901-XXXX	12 pin M23, CW	Connector, Cable Assembly	differential line driver with index outputs

Cable Assemblies with M12 Connector			
SKU	Pins		Use with...
112859-XXXX	5 Pin M12	Connector, Cable Assembly	single ended outputs
112860-XXXX	8 Pin M12		single ended outputs
112860-XXXX	8 Pin M12		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.

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### 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 <sup>†</sup>	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. $\bar{Z}$ <sup>†</sup>	—	—	—	—	—	—	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 <sup>†</sup>	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 $\bar{Z}$ <sup>†</sup>	—	—	—	—	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

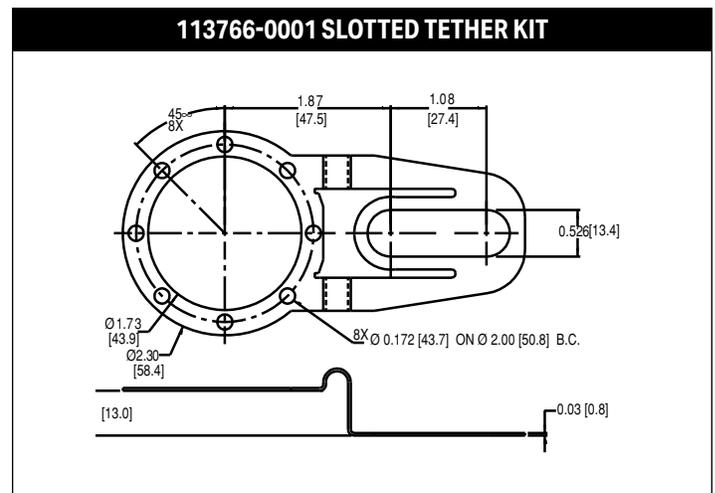
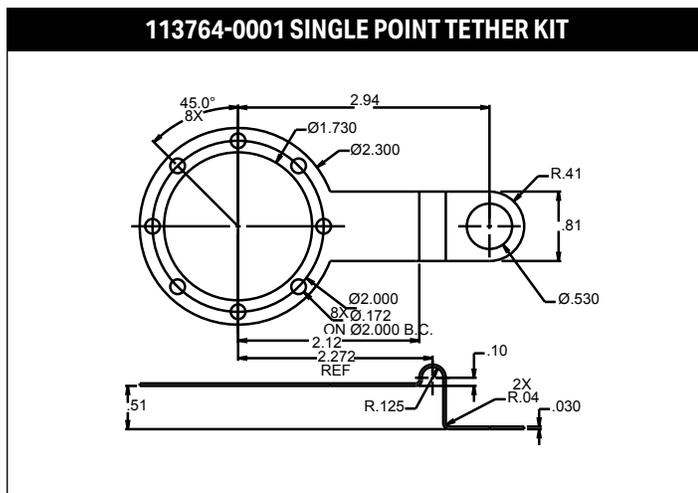
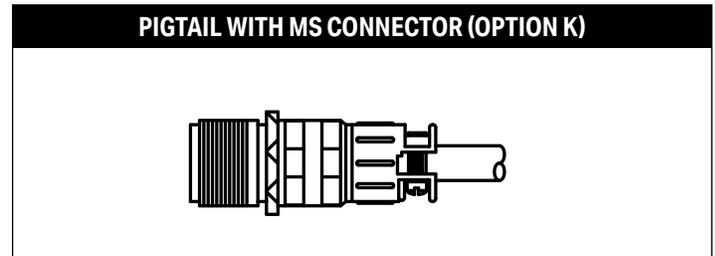
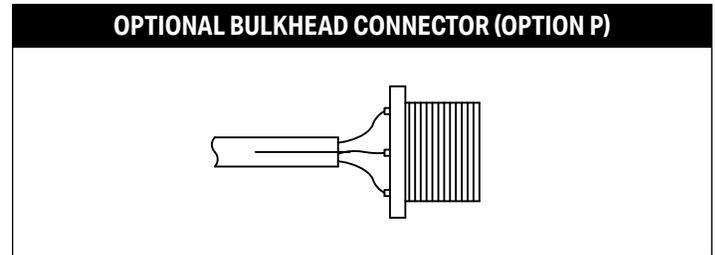
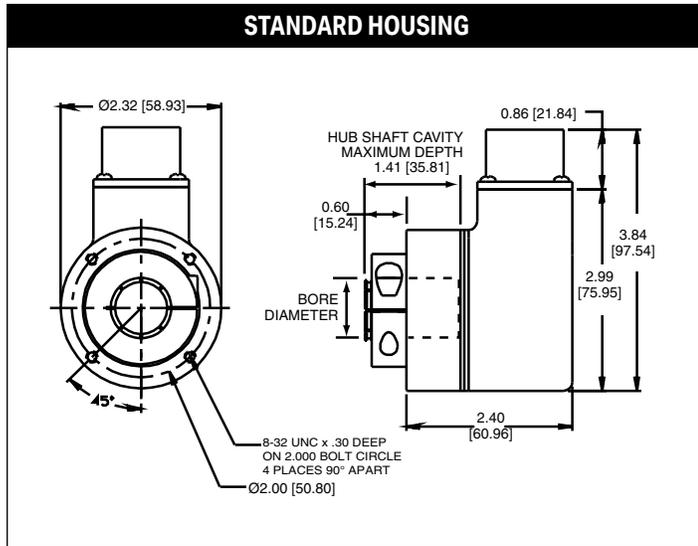
\*For watertight applications, use NEMA 4 10 pin cable and connector 109209-XXXX

<sup>†</sup> Index not provided on all models. See ordering information

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Dimensions: inch [mm]



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

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