

# HAZARDOUS SERIES HD25 *NorthStar™ brand*

## Hazardous Duty Encoder

### Key Features

- Size 25 Encoder with Single or Dual Isolated Outputs
- ATEX and CSA Certified for Hazardous Duty Applications
- Unbreakable Code Disc up to 5000 PPR
- Special Housing and Seals for IP67 Rating
- Anodized Aluminum, Stainless Steel, or Nickel Plated Housing

HAZ  
Hazardous Duty



## SPECIFICATIONS

### STANDARD OPERATING CHARACTERISTICS

**Code:** Incremental, Optical  
**Resolution:** 1 to 5000 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° ± 15° electrical; For resolutions over 625 PPR: 90° ± 30° electrical  
**Symmetry:**  
 For resolutions to 1024 PPR: 180° ± 18° electrical  
 For resolutions over 1024 PPR: 180° ± 25° electrical  
**Index:** 150° to 330° A Leads B, CCW (From Shaft End)  
**Waveforms:** Squarewave with rise and fall times less than 1 microsecond into a load capacitance of 1000 pf

### ELECTRICAL

**Input Power:** 5VDC, 5-15VDC, 7-26VDC  
**Outputs:**  
 7272 Push-Pull: 40mA, sink or source  
 7272 Differential Line Driver: 40 mA, sink or source  
 7273 Open Collector: 40mA, sink max  
 2N2222 Open Collector: 250mA, sink max  
 4469 Differential Line Driver: 100mA, sink or source  
**Frequency Response:** 125 kHz (data & index)  
**Noise Immunity:** Tested to EN61326-1  
**Electrical Immunity:** Reverse polarity and short circuit protected  
**Termination:** 6, 7, or 10 pin MS 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, NEMA4 style (MCN-N6N4)  
 Cable w/ 5 pin M12 Connector (112859-XXXX)  
 Cable w/ 8 pin M12 Connector (112860-XXXX)

### MECHANICAL

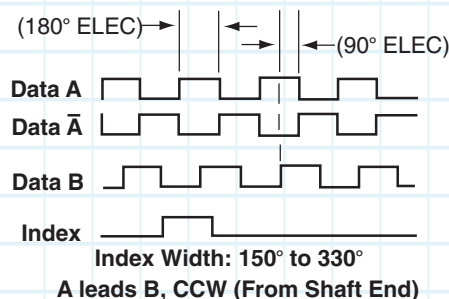
**Shaft Sizes:** 10mm, 12mm, 3/8"  
**Shaft Speed:** 6,000 RPM, maximum  
**Shaft Loading:** Up to 100 lbs axial and radial  
**Starting Torque:** 2.5 in-oz. maximum (at 25°C)  
**Bearings:** 5200 ZZ double row  
**Bearing life:** 5 x 10<sup>8</sup> revs at rated shaft Loading, 5 x 10<sup>11</sup> revs at 10% of rated shaft loading. (manufacturers' specs)  
**Housing and Cover:** Hard Anodized Aluminum. Also available in Electroless Nickel finish and Stainless Steel.  
**Shaft Material:** 303 stainless steel (passivated)  
**Disc Material:** Plastic  
**Weight:** 14 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

### DATA AND INDEX

Not all complements shown  
 A̅ shown for reference



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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: Shaft	Code 4: Electrical	Code 5: Termination	Code 6: Options
<b>HD25</b> □	□□□□	□	□	□	□

Ordering Information						
Size 25 Hazardous Duty Encoder	<b>0001</b> <b>0024</b> <b>0025</b> <b>0035</b> <b>0040</b> <b>0050</b> <b>0060</b> <b>0100</b> <b>0120</b> <b>0192</b> <b>0200</b> <b>0240</b> <b>0250</b> <b>0256</b> <b>0300</b> <b>0360</b> <b>0500</b> <b>0512</b> <b>0600</b>	<b>0625</b> <b>0720</b> <b>0900</b> <b>1000</b> <b>1024</b> <b>1200</b> <b>1250</b> <b>1440</b> <b>1524</b> <b>1600</b> <b>1800</b> <b>2000</b> <b>2048</b> <b>2500</b> <b>2540</b> <b>2600</b> <b>3600</b> <b>4096</b> <b>5000</b>	<b>0</b> 3/8" Dia. Shaft with flat <b>4</b> 10mm Dia. Shaft, with flat <b>6</b> 12mm Dia. Shaft <b>7</b> 3/8" Dia Shaft w/ Flat, 4 Hole 2.00" BC	<b>0</b> Open Collector out (7273) <b>2</b> Push-Pull out (7272) <b>F</b> Open Collector out (2222) <b>G</b> Open Collector out with 2.2 kΩ Pullups (2222)  Available when: Code1 is 1, 2 and Code 5 is 3,5 or A through P, or Code 1 is 3 and code 5 is 5 or A through P: <b>3</b> Differential Line Driver Out (7272) <b>6</b> Differential Line Driver Out (4469)  *Note: Available ATEX Certi- fied Options <b>ATEX Type 1:</b> ATEX Certified; 5V in, 5V out only <b>ATEX Type 2:</b> ATEX Certified; 7-26V in, 7-26V out <b>ATEX Type 3:</b> ATEX Certified; 7-26V in, 5V out <b>ATEX Type 4:</b> ATEX Certified; 5-15V in, 5-15V out	<b>1</b> 6 Pin Connector <b>3</b> 7 Pin Connector <b>5</b> 10 Pin Connector <b>9</b> 5 Pin M12 Connector <b>A</b> 8 Pin M12 Connector <b>D</b> 18" Sealed Cable <b>E</b> 3' Sealed Cable <b>F</b> 6' Sealed Cable <b>G</b> 10' Sealed Cable <b>H</b> 15' Sealed Cable <b>P</b> 5m Sealed Cable	<b>A</b> No Options w/ ATEX Type 1 <b>B</b> Nickel Finish Housing w/ ATEX Type 1 <b>C</b> Stainless Steel Housing w/ ATEX Type 1 <b>G</b> Same as "A" w/ ATEX Type 2 <b>H</b> Same as "B" w/ ATEX Type 2 <b>I</b> Same as "C" w/ ATEX Type 2  Available when Code 4 is 0, 2 <b>D</b> Redundant Outputs (Dual Connector Housing) w/ ATEX Type 1. <i>See †NOTE</i> <b>E</b> Nickel Finish Housing, Redundant Outputs w/ ATEX Type 1. <i>See †NOTE</i> <b>F</b> Stainless Steel Housing, Redundant Outputs w/ ATEX Type 1. <i>See †NOTE</i> <b>J</b> Same as "D" w/ ATEX Type 2. <i>See †NOTE</i> <b>K</b> Same as "E" w/ ATEX Type 2. <i>See †NOTE</i> <b>L</b> Same as "F" w/ ATEX Type 2. <i>See †NOTE</i> <b>M</b> Same as "A" w/ ATEX Type 3 <b>N</b> Same as "B" w/ ATEX Type 3 <b>O</b> Same as "C" w/ ATEX Type 3 <b>P</b> Same as "D" w/ ATEX Type 3. <i>See †NOTE</i> <b>Q</b> Same as "E" w/ ATEX Type 3. <i>See †NOTE</i> <b>R</b> Same as "F" w/ ATEX Type 3. <i>See †NOTE</i>  Available when Code 4 is 6: <b>S</b> Same as "A", w/ATEX Type 4 <b>T</b> Same as "B", w/ATEX Type 4 <b>U</b> Same as "C", w/ATEX Type 4  † NOTE: Simultaneous use of redundant outputs may void ATEX certification. Consult factory for details.

### Cable Assemblies with MS Connector

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

### Cable Assemblies with M12 Connector

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

### Mating Connectors (no cable)

<b>MCN-N4</b>	6 pin, style MS3106A-14S-6S
<b>MCN-N5</b>	7 pin, style MS3106A-16S-1S
<b>MCN-N6</b>	10 pin, style MS3106A-18-1S
<b>MCN-N6N4</b>	10 pin, NEMA4 style

\*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 & 10 Pin MS Connectors and Cables - When Code 5 = 1, 3, 5, or D-P

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.

Table 1									
Encoder Function	Cable # 108594-XXXX 6 Pin Single Ended		Cable # 108595-XXXX 7 Pin Single Ended		Cable # 108596-XXXX 7 Pin Dif Line Driver without Index		**Cable # 109209-XXXX or 1400635XXXX 10 Pin Dif Line Driver w/ Index		Cable Exit with Seal
	Pin	Wire Color Code	Pin	Wire Color Code	Pin	Wire Color Code	Pin	Wire Color Code	Wire Color Code
Signal A	E	BRN	A	BRN	A	BRN	A	BRN	GRN
Signal B	D	ORN	B	ORG	B	ORG	B	ORG	BLU
Signal Z*	C	YEL	C	YEL	—	—	C	YEL	ORG
Power +V	B	RED	D	RED	D	RED	D	RED	RED
Com	A	BLK	F	BLK	F	BLK	F	BLK	BLK
Case	—	—	G	GRN	G	GRN	G	GRN	WHT
N/C	F	—	E	—	—	—	E	—	—
Signal $\bar{A}$	—	—	—	—	C	BRN/WHT	H	BRN/WHT	VIO
Signal $\bar{B}$	—	—	—	—	E	ORG/WHT	I	ORG/WHT	BRN
Signal $\bar{Z}$ *	—	—	—	—	—	—	J	YEL/WHT	YEL

### 5 & 8 Pin M12 Accessory Cables when - When Code 5 = 9 or A

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

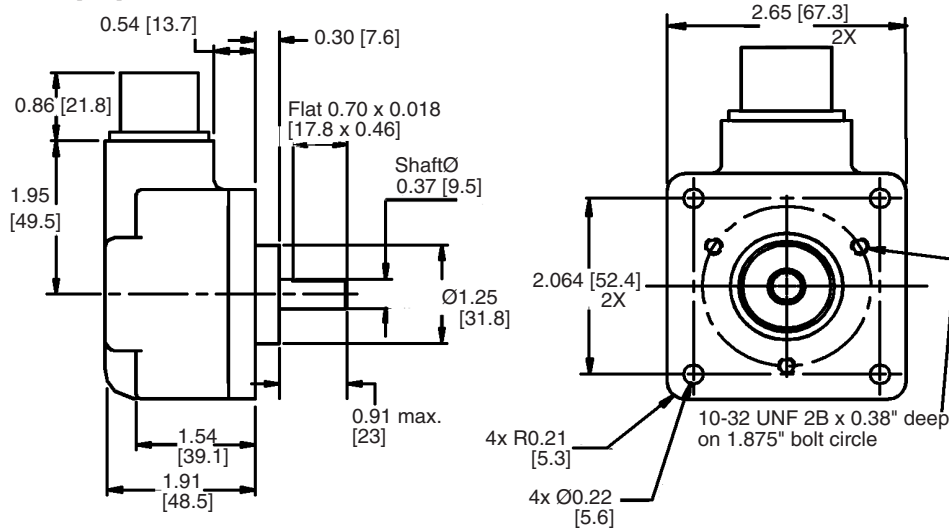
Table 2						
Encoder Function	Cable # 112859-XXXX 5 Pin Single Ended		Cable # 112860-XXXX 8 Pin Single Ended		Cable # 112860-XXXX 8 Pin Differential	
	Pin	Wire Color Code	Pin	Wire Color Code	Pin	Wire Color Code
Signal A	4	BLK	1	BRN	1	BRN
Signal B	2	WHT	4	ORG	4	ORG
Signal Z*	5	GRY	6	YEL	6	YEL
Power +V	1	BRN	2	RED	2	RED
Com	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:

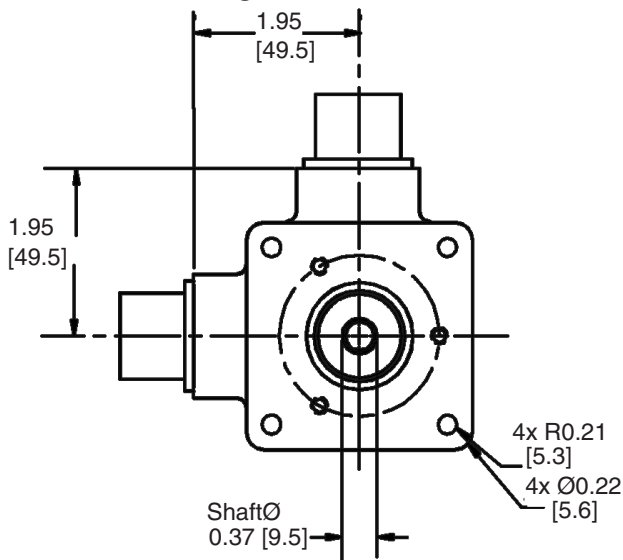
- 1) Cable Configuration (**Table 1**): PVC jacket, 105 °C rated, overall foil shield; 3 twisted pairs 26 AWG (output signals), plus 2 twisted pairs 24 AWG (input power)
- 2) Cable Configuration (**Table 2**): PVC jacket, 105 °C rated, overall foil shield; 24 AWG conductors, minimum
- 3) Standard cable 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 109209-XXXX.
- 6) "MS" Type mating connectors and pre-build cables are rated NEMA 12
- 7) "M12" Cable assemblies are rated IP67

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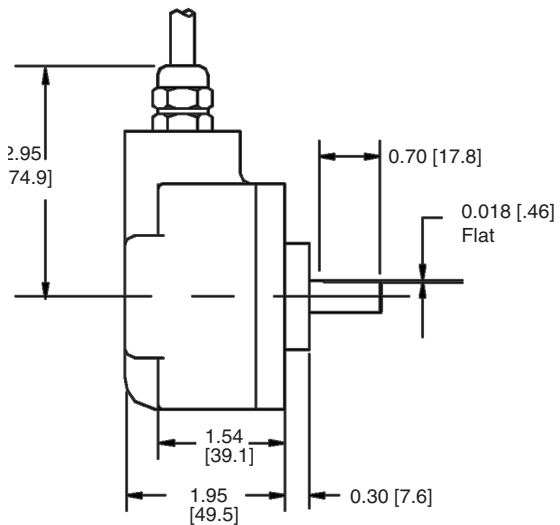
**DIMENSIONS** inches [mm]



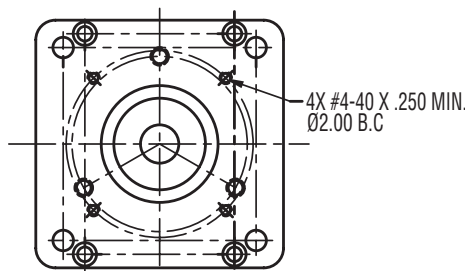
**Standard Housing**



**Dual Redundant Outputs**



**Cable Exit**



**With 4 Hole 2.00" BC**



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