

# SERIES ISW38

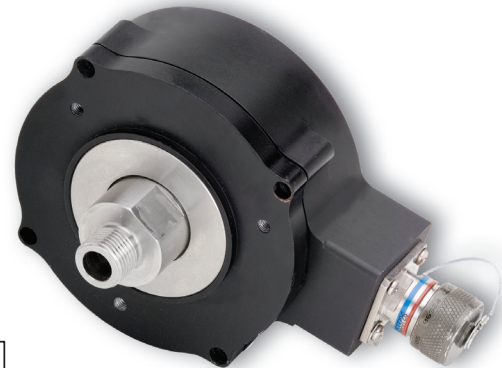
# NorthStar™ brand

## Hazardous Duty Encoder

### Key Features

- Draw Works Threaded Shaft with Field Replaceable Adapters for Reduced Downtime
- ATEX, UL and IECEx Certified for Hazardous Duty Applications
- Dual Isolated Outputs Available for Redundancy
- Anodized Aluminum or Stainless Steel Housing
- NAMUR Sensor Output Available

HAZ  
Hazardous Duty



IIIG  
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 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 200 to 300 PPR and 1200 PPR and above:  $90^\circ \pm 30^\circ$  electrical; all other resolutions:  $90^\circ \pm 15^\circ$

**Symmetry:** For resolutions 200-300PPR and above 1024 PPR:  $180^\circ \pm 25^\circ$  electrical; all other resolutions:  $180^\circ \pm 18^\circ$

**Index:** Gated to B low,  $150^\circ$  to  $330^\circ$

**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:** 125 kHz (data and index)

**Noise Immunity:** Tested to EN61326-1

**Electrical Immunity:** Reverse polarity and short circuit protected

**Termination:** 6, 7, or 10 pin MS Connector; 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)

12 pin CW, M23 Connector (MCN-C1)

Cable with 5 pin M12 Connector (112859-XXXX)

Cable with 8 pin M12 Connector (112860-XXXX)

### MECHANICAL

#### Shaft Sizes:

1"-14 UNS x 5/8" - 18 UNF Threaded Shaft;

1"-14 UNS Threaded Shaft;

1"-14 UNS x 5/8" - 18 UNF Field Replaceable Threaded Shaft

**Shaft Speed:** 6000 RPM max

**Bore Loading:** Up to 20 lbs axial and radial

**Bore Runout:** 0.0005 TIR at midpoint

**Starting Torque:** 4.5 in-oz. max (at 25°C)

**Running Torque:** 4.0 in-oz. max (at 25°C)

**Bearings:** 61806-ZZ

**Housing and Cover:** Hard Anodized Aluminum. Also available in Electroless Nickel finish and Stainless Steel

**Shaft Material:** 300 series stainless steel

**Disc Material:** Aluminum

**Weight:** 35 ounces, typical

### ENVIRONMENTAL

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

**Storage temperature:** -40 to 100°C

**Shock:** 400g for 6msec duration

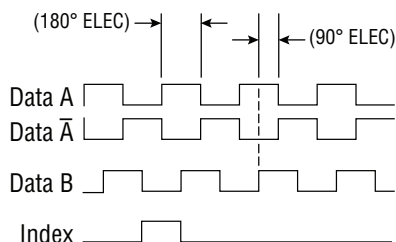
**Vibration:** 5 to 3000Hz @ 20g

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

**Enclosure Rating:** IP67

### DATA AND INDEX

Not all complements shown  
A shown for reference



Index Width:  $150^\circ$  to  $330^\circ$  Default  
A leads B, CCW (from shaft 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: Shaft	Code 4: Output Format	Code 5: Termination	Code 6: Options
<b>ISW38</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"/>
ISW38 Hazardous Duty Encoder	0015 0600 0032 1000 0050 1024 0060 1200 0100 2000 0200 2048 0240 4000 0250 4096 0500 5000 0512	<b>0</b> 1"-14 UNS x 5/8" - 18 UNF Threaded Shaft <b>1</b> 1"-14 UNS Threaded Shaft <b>2</b> 1"-14 UNS x 5/8" - 18 UNF Field Replaceable Threaded Shaft	<b>A</b> Single Ended ABZ, 7-26V in, 7-26V out push-pull (7272) <b>C</b> Single Ended ABZ, 5V in, 5V out push-pull (7272) <b>D</b> Single Ended ABZ, 7-26V in, 5V out push-pull (7272) <b>E</b> Single Ended ABZ, 7-26V in, 7-26V out Open Collector (7273) <b>F</b> Single Ended ABZ, 7-26V in, 7-26V out Open Collector (2222) <b>G</b> Single Ended ABZ, 7-26V in, 7-26V out Open Collector with 1kOhm (2222)  Options H, J and K not available when Code 5 is H <b>H</b> Differential AB only, 5V in, 5V out (7272) <b>J</b> Differential AB only, 7-26 in, 7-26 out (7272) <b>K</b> Differential AB only, 7-26 in, 5V out (7272)  Options L, M, P not available when Code 5 is 0, 1, 5, 6, H <b>L</b> Differential ABZ, 5V in, 5V out (7272) <b>M</b> Differential ABZ, 7-26 in, 7-26 out (7272) <b>P</b> Differential ABZ, 7-26 in, 5V out (7272)  Option N available only when Code 2 is 0015 and Code 6 is 0, 1, or 2 <b>N</b> Namur output*, 15mA max  *Hazardous certification for Namur output covered under separate certificate.	<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>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>A</b> .5m (18") cable <b>C</b> 1m (36") cable <b>D</b> 2m (72") cable <b>H</b> 5 pin M12 connector <b>J</b> 8 pin M12 connector <b>K</b> 1.5 ft (18") cable with inline 10 pin connector <b>M</b> 5 ft (60") cable <b>N</b> 10 ft (120") cable	<b>0</b> Aluminum Housing <b>1</b> Nickel Finish Housing <b>2</b> Stainless Steel Housing <b>3</b> Dual Isolated Outputs, Aluminum Housing† <b>4</b> Dual Isolated Outputs, Nickel Housing† <b>5</b> Dual Isolated Outputs, Stainless Steel Housing†  † Simultaneous use of redundant outputs may void ATEX certification. Consult factory for details.

## 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
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-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

\*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 # 115901-XXXX 12 Pin (CW)		Cable Exit with Seal
	Pin	Wire Color Code	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	5	BRN	GRN
Signal B	D	ORG	B	ORG	B	ORG	B	ORG	8	ORG	BLU
Signal Z*	C	YEL	C	YEL	—	—	C	YEL	3	YEL	ORG
Powern +V	B	RED	D	RED	D	RED	D	RED	12	RED	RED
Common	A	BLK	F	BLK	F	BLK	F	BLK	10	BLK	BLK
Case	—	—	G	GRN	G	GRN	G	GRN	9	—	WHT
N/C-SLD	F	—	E	—	—	—	E	—	7	—	—
Signal $\bar{A}$	—	—	—	—	C	BRN/WHT	H	BRN/WHT	6	BRN/WHT	VIO
Signal $\bar{B}$	—	—	—	—	E	ORG/WHT	I	ORG/WHT	1	ORG/WHT	BRN
Signal $\bar{Z}^*$	—	—	—	—	—	—	J	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 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
Powern +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

\*Index not provided on all models. See ordering information.

#### NOTES:

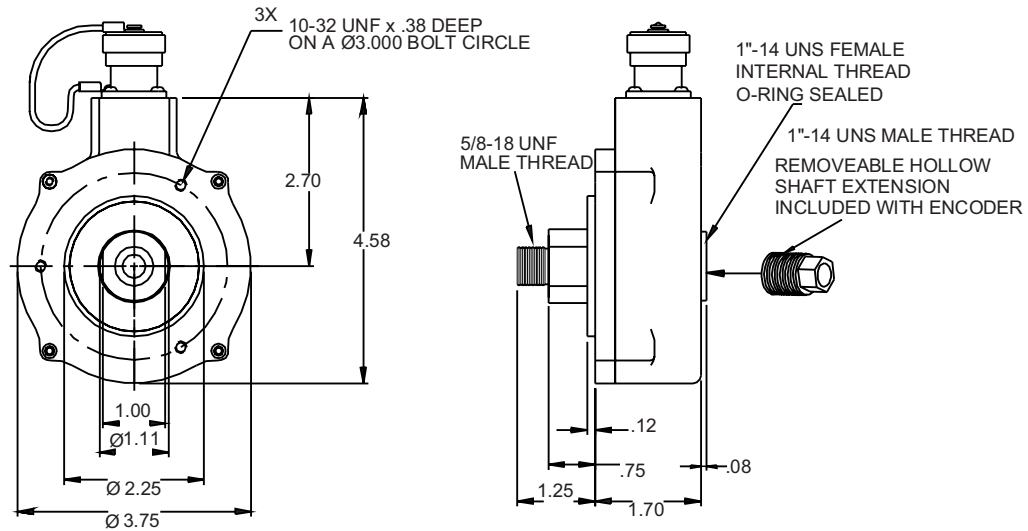
- Cable Configuration (Table 1): PVC jacket, 105°C rated, overall foil shield; 3 twisted pairs 24 AWG (output signals), plus 2 twisted pairs 22 AWG (input power)
- Cable Configuration (Table 2): PVC jacket, 105°C rated, overall foil shield; 24 AWG conductors, minimum
- Standard cable length is 10 feet 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 NEMA4 10 pin cable and connector 109209-XXXX

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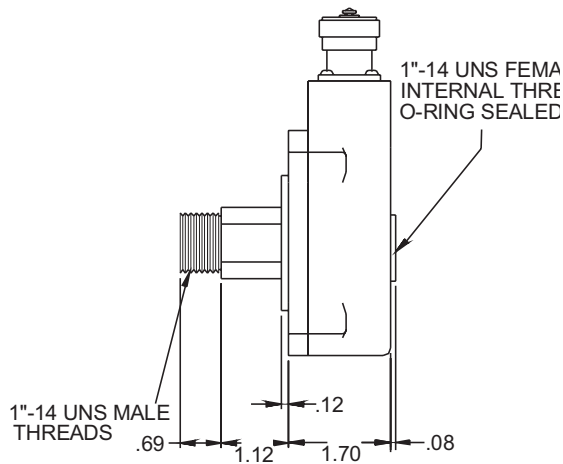
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Dimensions: inch [mm]

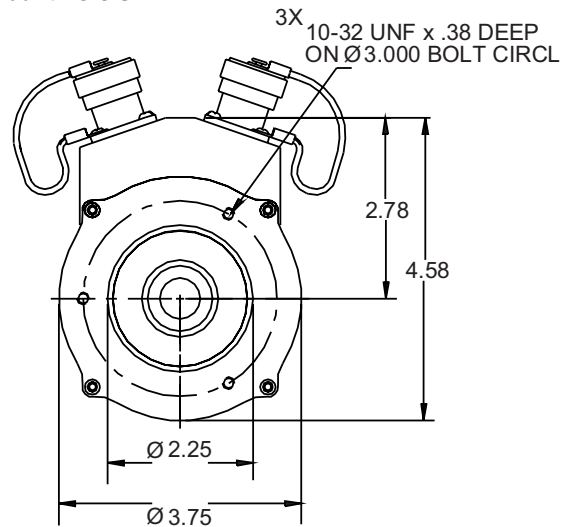
### With Convertable Shaft



### With Non-Convertible Shaft



### Redundant Version



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

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