

# SERIES DWD38

NorthStar™ brand

## Harsh Duty Optical Encoder

### Key Features

- Draw Works Threaded Shaft with Field Replaceable Adapters for Reduced Downtime
- Dual Isolated Outputs Available for Redundancy
- Anodized Aluminum or Stainless Steel Housing
- NAMUR Sensor Output Available
- 400G Shock and 20G Vibration Independently Validated

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 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

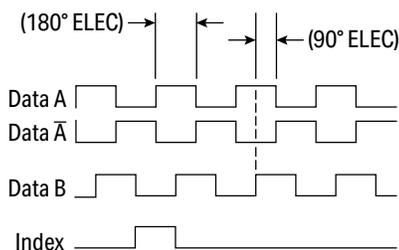
**Input Power:** 5-26VDC; 80 mA max., not including output loads.  
**Outputs:**  
 7272 Push-Pull: 40mA, sink or source  
 7272 Differential Line Driver: 40 mA, sink or source  
 7273 Open Collector: 40mA, sink max  
 2N2222 Open Collector: 250mA, sink max  
**Frequency Response:** 200 kHz (data and 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; 12 pin CW 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)

#### 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 Sizes:** 6,000 RPM max.  
**Starting Torque:** 4.5 in-oz max (at 25°C)  
**Running Torque:** 4.0 in-oz max (at 25°C)  
**Bore Loading:** Up to 20 lbs axial and radial  
**Bore Runout:** 0.0005 TIR at midpoint  
**Starting/Running Torque:** 4.5/4.0 in-oz. maximum (at 25°C)  
**Bearings:** 61806-ZZ  
**Housing and Cover:** Hard Anodized Aluminum. Also available in Electroless Nickel finish and Stainless Steel  
**Disc Material:** Aluminum  
**Shaft Material:** 300 series stainless steel  
**Weight:** 35 ounces, typical

#### STANDARD DATA AND INDEX

Not all complements shown  
 A shown for reference



Index Width:  $180^\circ$  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>DWD38</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"/>
DWD38 Draw Works Encoder	Enter Custom PPR from 1 to 20,000 Examples: <b>0001</b> = 1 PPR <b>0256</b> = 256 PPR <b>1000</b> = 1000 PPR <b>9999</b> = 9999 PPR <b>A000</b> = 10,000 PPR <b>B000</b> = 11,000 PPR <b>C999</b> = 12,999 PPR : : <b>G000</b> = 16,000 PPR <b>G384</b> = 16,384 PPR <b>H000</b> = 17,000 PPR <b>J000</b> = 18,000 PPR <b>K000</b> = 19,000 PPR <b>L000</b> = 20,000 PPR  <b>Note:</b> Letter "I" is skipped and not used	<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>0</b> Single Ended ABZ, 5-26VDC push-pull (7272) <b>1</b> Single Ended ABZ, 5-26VDC open collector (7273) <b>2</b> Single Ended ABZ, 5-26VDC open collector (2222) <b>3</b> Single Ended ABZ, 5-26VDC open collector w/1kOhm (2222)  Options 4 and 5 not available when Code 5 is H <b>4</b> Differential AB only, 5-26VDC in, 5-26V out (7272) <b>5</b> Differential AB only, 5-26VDC in, 5V out (7272)  Options 6 and 7 not available when Code 5 is 0, 1, 5, 6, H <b>6</b> Differential ABZ, 5-26VDC in, 5V out (7272) <b>7</b> Differential ABZ, 5-26VDC in, 5-26V 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 CW 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 w/ in line 10pin 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

## 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

### 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-C1** 12 Pin CW M23 Connector

**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 CONNECTORS AND CABLES WHEN CODE 5 = 0 TO 8, A-D OR K-N

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	Pin	Wire Color	Pin	Wire Color	Pin	Wire Color	Pin	Wire Color	Wire Color
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 <sup>†</sup>	C	YEL	C	YEL	—	—	C	YEL	3	YEL	ORG
Power +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	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 $\bar{Z}$ <sup>†</sup>	—	—	—	—	—	—	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	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

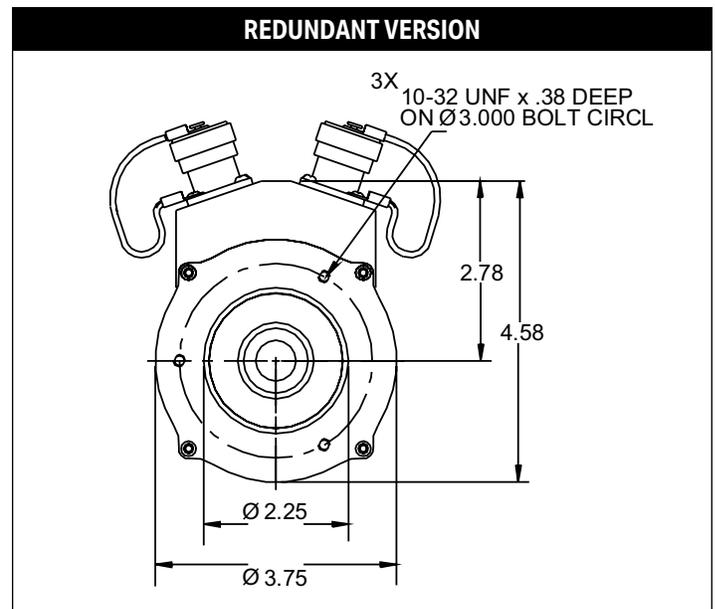
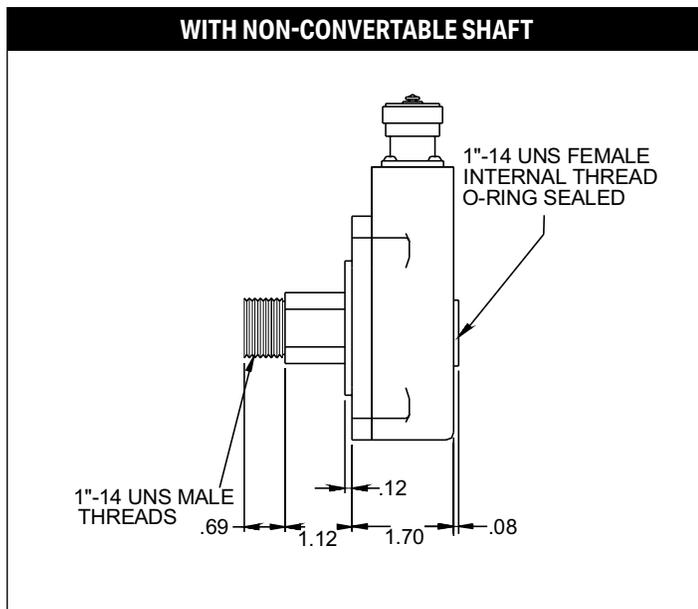
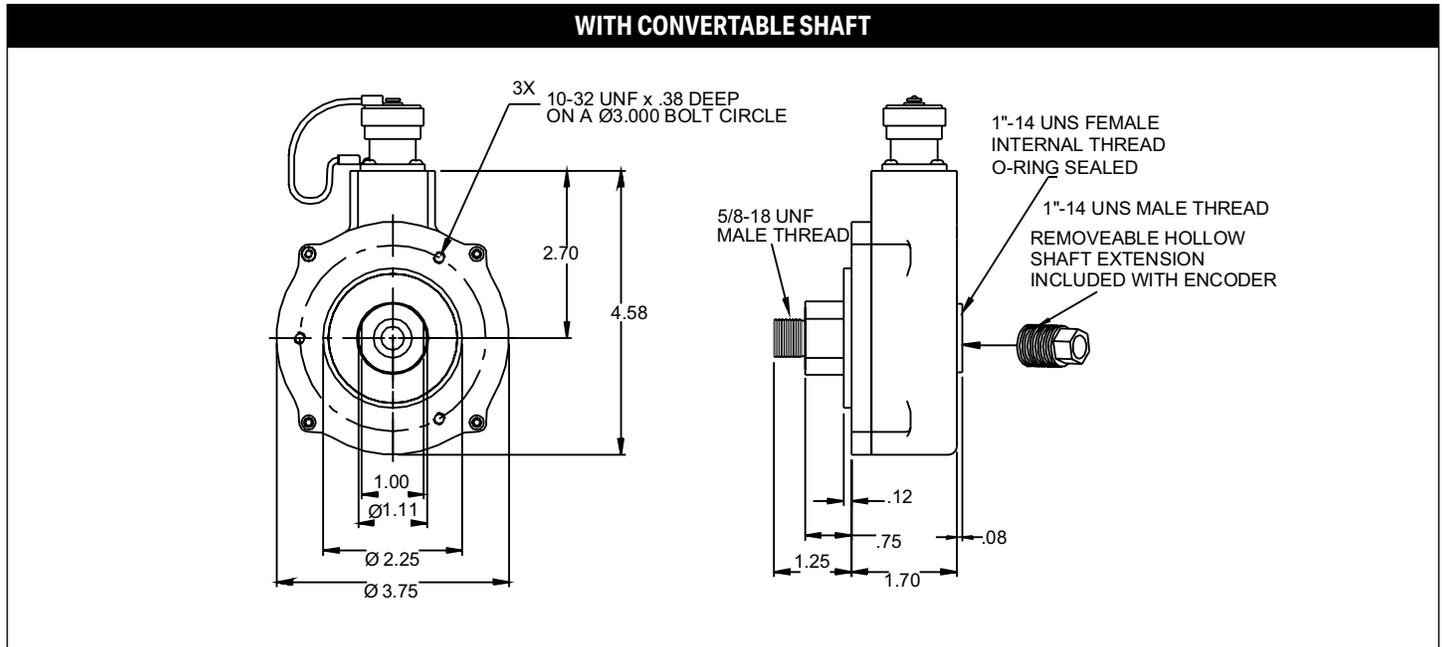
\*For watertight applications, use NEMA4 10 pin cable and connector 109209-XXXX

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

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Dimensions: inch [mm]



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

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