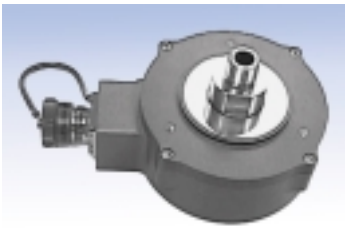
NorthStar brand Encoder
Series DWD38 Harsh-Duty Optical Encoder - DrawWorks



CE

Technical Bulletin

Bulletin Number: 702650-0001
Revision Level: None
Date: January 20, 2006

DANAHER INDUSTRIAL CONTROLS
1675 Delany Road
Gurnee, IL 60031-1282
Phone: 847.662.2666
Fax: 847.662.6633
Application Assistance 1.800.234.8731

DESCRIPTION

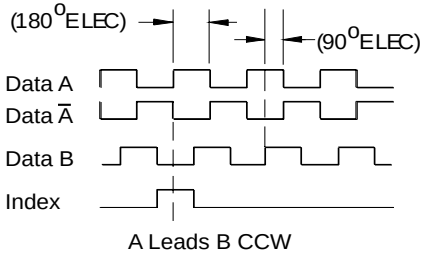
The DWD38 operates reliably from –40 to +100°C. Its Hard Anodized finish exceeds IP66/IP67 and NEMA 6 enclosure requirements.

It is a preferred choice as a DrawWorks encoder by the Oil Field industry and is also ideal for use in high shock and vibration applications such as Food Processing, Material Handling and Packaging Equipment.

The DWD38 is also available in Stainless Steel to meet NEMA 4x and 6P requirements. A labyrinth double-sealed housing allows operation in washdown with high pressure steam, or caustic chemical environments.

It is also available in an Intrinsically Safe version, certified to ATEX EEx ia IIB T4, when used with the appropriate IS Barrier.

DATA AND INDEX
Not all complements shown.
$\overline{A}$ shown for reference



A Leads B CCW

STANDARD OPERATING CHARACTERISTICS

Code: Incremental
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: 90° ± 15° electrical
Symmetry: 50% ± 5%
Waveforms: Squarewave with rise and fall times less than 1 microsecond into a load capacitance of 1000 pf

ELECTRICAL

Input Power: 5-26VDC; 50 mA max., not including output loads. ATEX: 5VDC, 5-26VDC
Outputs: 2N2222, ET7272, ET7273
Frequency Response: 125 kHz (data & index)
Termination: 6, 7, or 10 pin MS Connector; 18" 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)

MECHANICAL

Shaft Material: 300 series stainless steel
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
Bearing life: 5 x 10^8 revs at rated shaft Loading, 5 x 10^{11} revs at 10% of rated shaft loading.(manufacturers' specs)
Housing and cover: Hard Anodized Aluminum. Also available in Electroless Nickel finish and Stainless Steel.
Disc material: Metal or mylar
Weight: 35 ounces, typical

ENVIRONMENTAL

Operating Temperature: -40 to 100°C
Operating Temperature ATEX: -40 to 80°C
Storage temperature: -40 to 100°C
Shock: 50G's for 11msec duration
Vibration: 5 to 2000Hz @ 20 G's
Humidity: 100%
Enclosure Rating: NEMA 4X, NEMA 6, IP66, IP67. NEMA 6P upon request

IMPORTANT ENCODER INSTALLATION INFORMATION

Mounting the Encoder: The encoder should be mounted such that its shaft is in close as possible alignment with the axis of the driving machine or motor shaft.

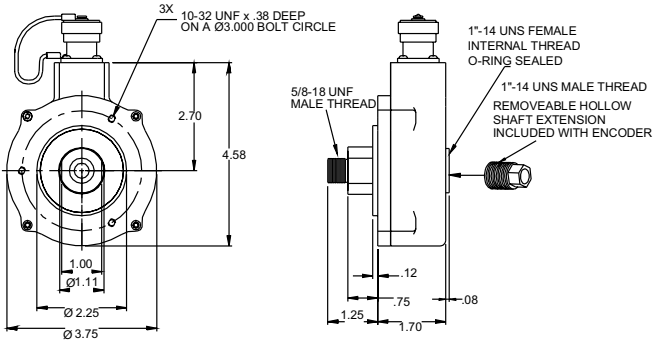
> ***CAUTION: The loads applied to the encoder shaft must be in accordance with the specificatios of this device.***

Important Wiring Instructions: Use of shielded cable is recommended for all encoder installations. The shield should be connected to signal-ground at the receiving device only. ***Connecting the shield at both ends can cause grounding problems that degrade system performance.***
If possible, run the encoder cable through a dedicated conduit (not shared with other wiring). Use of conduit will protect the cable from physical damage and provide a degree of electrical isolation. Do not run the cable in close proximity to other conductors that carry current to heavy loads such as motors, motor starters, contactors, solenoids, etc. This practice can induce electrical transients in the encoder cable, potentially interfering with reliable data transmission.

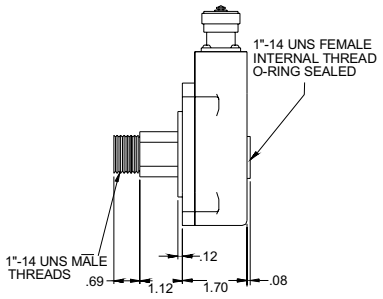
Refer to Electrical Connections table for wiring information. To avoid possible damage, do not connect or disconnect the encoder connector or wiring while power is applied to the system.

> ***CAUTION: Unused encoder signal wires must be individually insulated and under no circumstances be in contact with ground, voltage sources, or other signal lines.***

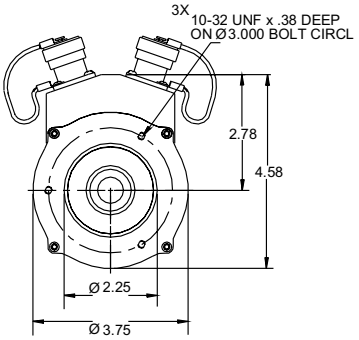
Dimensions
inches [mm]



With Convertable Shaft



With Non-Convertable Shaft



Redundant Version

Models Information

Code 1: Model	Code 2: PPR	Code 3: Shaft	Code4:Electrical	Code 5: Termination	Code 6: Options
DWD38 □	□□□□	□	□	□	□
Ordering Information					
Size 38 Harsh-Duty Optical Encoder - DrawWorks **1** Unidirectional **2** Bidirectional **3** Bidirectional with Index	**0015** **0032** **0100** **0200** **0240** **0250** **0500** **0512** **0600** **1000** **1024** **1200** **2000** **2048** **4000** **5000**	**0** 1"-14 UNS x 5/8" - 18 UNF Threaded Shaft **1** 1"-14 UNS Threaded Shaft	**0** 5-26V in, 5-26V Open Collector out (7273) **2** 5-26V in, 5-26V Push-Pull out **F** 5-26V in, 5-26V Open Collector out (2222) **G** 5-26V in, 5-26V Open Collector out with 2.2 kΩ Pullups (2222) **N** NAMUR 15 mA Maximum	**1** 6 Pin Connector **3** 7 Pin Connector **5** 10 Pin Connector **D** 18" Sealed Cable	**0** No Options **1** Nickel Finish Housing **2** Stainless Steel Housing **3** Redundant Outputs (Dual Connector Housing) **4** Nickel Finish Housing with Redundant Outputs **5** Stainless Steel Housing with Redundant Outputs
With ATEX Type 1* Option **4** Unidirectional **5** Bidirectional **6** Bidirectional with Index					
available when: Code 4 is 0 - 3, F or G **With ATEX Type 2* Option** **7** Unidirectional **8** Bidirectional **9** Bidirectional with Index			available when: Code 1 is 1,2,4,5,7,8,A or B and Code 5 is 3 through D, or Code 1 is 3,6,9 or C and Code 5 is 5 or D: **3** 5-26V in, 5-26V Differential Line Driver out (7272) **4** 5-26V in, 5V Differential Line Driver out (7272)		
available when: Code 4 is 4 **With ATEX Type 3* Option** **A** Unidirectional **B** Bidirectional **C** Bidirectional with Index					

*Note: Available ATEX Certified Options

ATEX Type 1: ATEX Certified; 5V in, 5V out only

ATEX Type 2: ATEX Certified; 5-26V in, 5-26V out

ATEX Type 3: ATEX Certified; 5-26V in, 5V out

Wiring Information

6, 7 & 10 Pin MS Connectors and Cables

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.

Encoder Function	Cable # 108594- 6 Pin Single Ended		Cable # 108595- 7 Pin Single Ended		Cable # 108596- 7 Pin Dif Line Drv w/o Idx		Cable # 1400635- 10 Pin Dif Line Drv w/ Idx		Cable Exit with Seal
	Pin	Wire Color	Pin	Wire Color	Pin	Wire Color	Pin	Wire Color	Wire Color
Sig. A	E	BRN	A	BRN	A	BRN	A	BRN	GREEN
Sig. B	D	ORG	B	ORG	B	ORG	B	ORG	BLUE
Sig. Z	C	YEL	C	YEL	—	—	C	YEL	ORANGE
Power +V	B	RED	D	RED	D	RED	D	RED	RED
Com	A	BLK	F	BLK	F	BLK	F	BLK	BLACK
Case	—	—	G	GRN	G	GRN	G	GRN	WHITE
N/C	F	—	E	—	—	—	E	—	—
Sig$\overline{A}$	—	—	—	—	C	BRN/WHT	H	BRN/WHT	VIOLET
Sig$\overline{B}$	—	—	—	—	E	ORG/WHT	I	ORG/WHT	BROWN
Sig$\overline{Z}$	—	—	—	—	—	—	J	YEL/WHT	YELLOW

DANAHER INDUSTRIAL CONTROLS

1675 Delany Road
Gurnee, IL 60031-1282
Phone: 847.662.2666
Fax: 847.662.6633
Application Assistance 1.800.234.8731