

SERIES HD25

NorthStar™ brand

Harsh Duty Optical Encoder

Key Features

- Size 25 Heavy-Duty Encoder with Single or Dual Isolated Outputs
- Unbreakable Code Disc up to 20,000 PPR
- Special Housing and Seals for IP67 Rating
- Anodized Aluminum, Stainless Steel, or Nickel Plated Housing

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° ± 30° electrical
Symmetry: 180° ± 25° electrical
Index: 180° 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, 5-15VDC dependant on output type. 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
 4469 Differential Line Driver: 100mA, sink or source
Frequency Response: 200 kHz (data and index)
Noise Immunity: Tested to EN61326-1
Electrical Immunity: Reverse polarity for all models and short circuit protected for 7272 and 7273 only
Termination: 6, 7, or 10 pin MS Connector, 5, 8 pin M12 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)
 Cable with 5 pin M12 Connector (112859-XXXX)
 Cable with 8 pin M12 Connector (112860-XXXX)

MECHANICAL

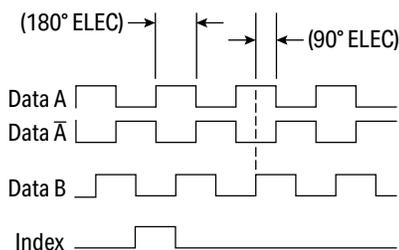
Shaft Sizes: 10mm, 12mm, 3/8"
Shaft Speed: 6,000 RPM, maximum
Shaft Loading: Up to 100 lbs axial and radial
Starting Torque: 2.5 in-oz. maximum (at 25°C)
Bearings: 5200 ZZ double row
Bearing life: 5 x 10⁸ revs at rated shaft Loading, 5 x 10¹¹ revs at 10% of rated shaft loading. (manufacturers' specs)
Housing and Cover: Hard Anodized Aluminum. Also available in Electroless Nickel finish and Stainless Steel.
Shaft Material: 303 stainless steel (passivated)
Disc Material: Aluminum
Weight: 14 ounces, typical

ENVIRONMENTAL

Operating Temperature: -40 to 100°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
 A̅ shown for reference



Index Width: 180° 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: Electrical	Code 5: Termination	Code 6: Options
HD25		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
HD25 Heavy Duty Encoder 1 Unidirectional (A Channel) 2 Bidirectional (A & B Channels) 3 Bidirectional with Index (A, B, Z Channels) Note: See code 4 column for addition of differential complementary channels	Enter Custom PPR from 1 to 20,000 Examples: 0001 = 1 PPR 0256 = 256 PPR 1000 = 1000 PPR 9999 = 9999 PPR A000 = 10,000 PPR B000 = 11,000 PPR C999 = 12,999 PPR : : G000 = 16,000 PPR G384 = 16,384 PPR H000 = 17,000 PPR J000 = 18,000 PPR K000 = 19,000 PPR L000 = 20,000 PPR Note: Letter "I" is skipped and not used	0 3/8" Dia. Shaft with flat 4 10mm Dia. Shaft, with flat 6 12mm Dia. Shaft 7 3/8" Dia Shaft with Flat, 4 Hole 2.00" BC	Available for all code options 0 5-26V in, 5-26V Open Collector out (7273) 2 5-26V in, 5-26V Push-Pull out (7272) 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) 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: 3 5-26V in, 5-26V Differential Line Driver out (7272) 4 5-26V in, 5V Differential Line Driver out (7272) 6 5-15V in, 5-15V Differential Line Driver out (4469)	1 6 Pin Connector 3 7 Pin Connector 5 10 Pin Connector 9 5 Pin M12 Connector A 8 Pin M12 Connector D 18" Sealed Cable E 3' Sealed Cable F 6' Sealed Cable G 10' Sealed Cable H 15' Sealed Cable P 5m Sealed Cable	Available for all code options 0 Standard Housing 1 Nickel Finish Housing 2 Stainless Steel Housing Available when: Code 4 is 0, 2, 3, 4 3 Redundant Outputs (Dual Connector Housing) 4 Nickel Finish Housing with Redundant Outputs 5 Stainless Steel Housing with Redundant Outputs Note: Simultaneous use of the dual outputs is not recommended.

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
1400635XXX	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 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

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 = 1, 3, 5, OR D-P

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 Exit with Seal
	Pin	Wire Color	Pin	Wire Color	Pin	Wire Color	Pin	Wire Color	Wire Color
Signal A	E	BRN	A	BRN	A	BRN	A	BRN	GRN
Signal B	D	ORG	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
Common	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 AND 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	Pin	Wire Color	Pin	Wire Color
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
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

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

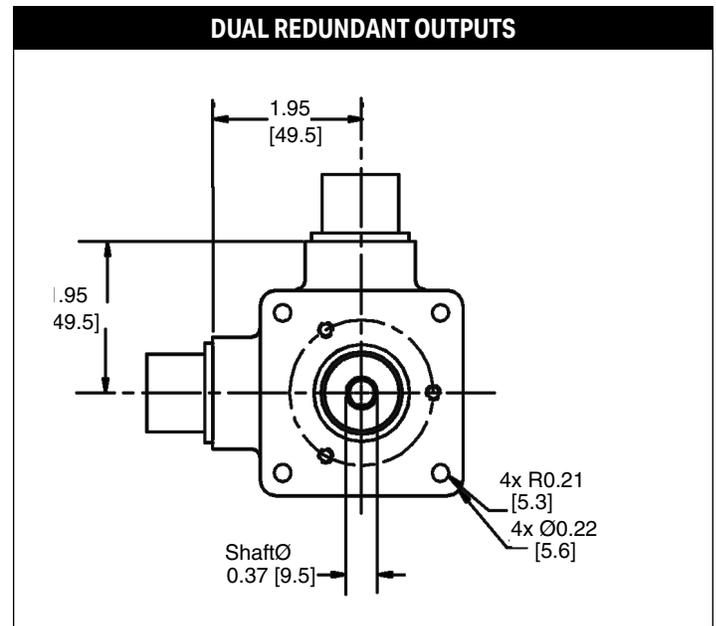
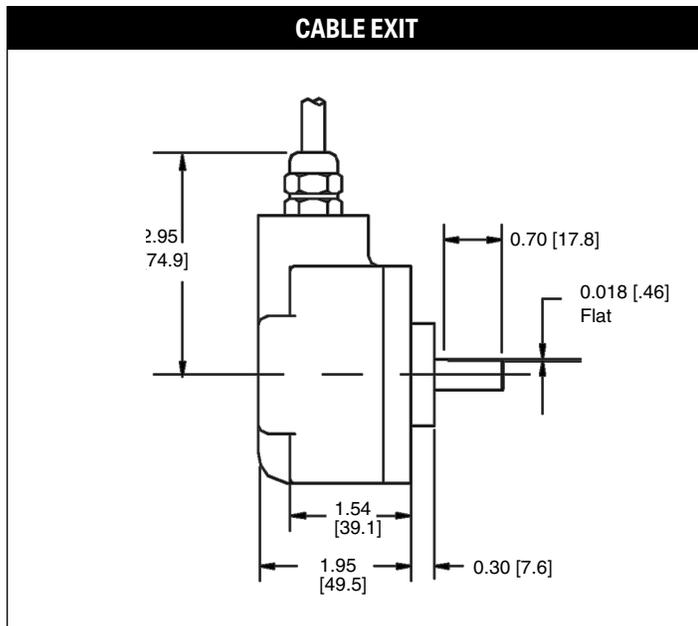
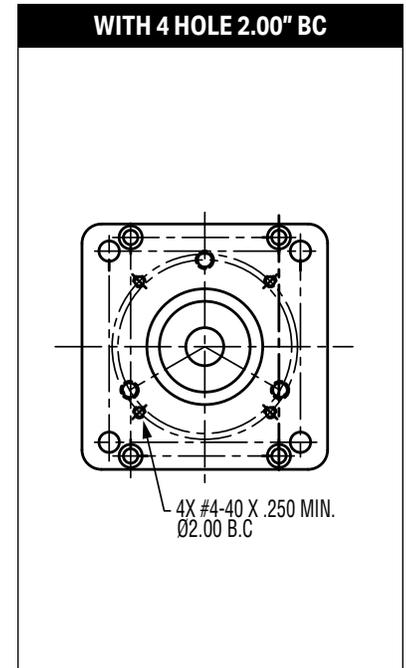
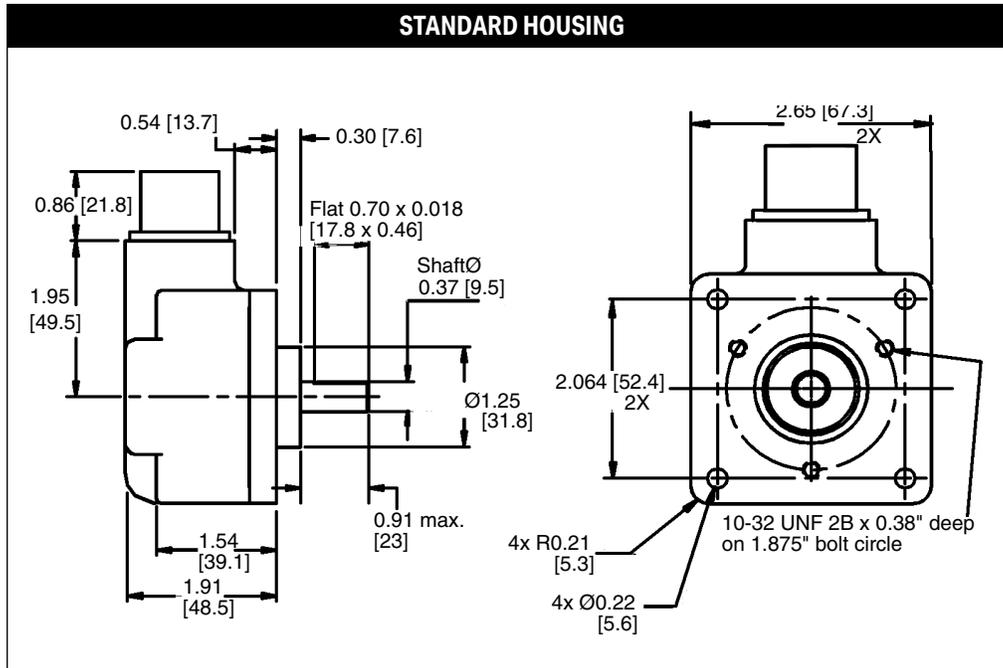
*For watertight applications, use NEMA4 10 pin cable and connector 109209-XXXX

[†] Index not provided on all models. See ordering information

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Dimensions: inch [mm]



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