

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 5000 PPR
- Special Housing and Seals for IP67 Rating
- Anodized Aluminum, Stainless Steel, or Nickel Plated Housing

HD
Heavy Duty



CE
EN 61326-1



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: 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: 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, 5, 8 pin M12 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)

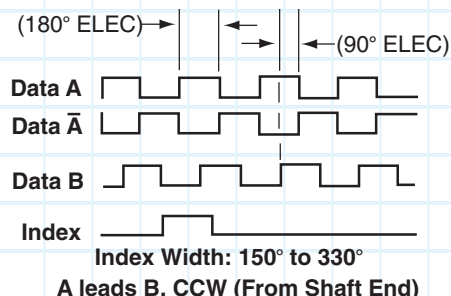
MECHANICAL

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 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: Plastic
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

DATA AND INDEX Not all complements shown A shown for reference



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 □	□□□□	□	□	□	□
Ordering Information					
Size 25 Heavy Duty Encoder	0001 0625 0024 0720 0025 0900 0035 1000 0040 1024 0050 1200 0060 1250 0100 1440 0120 1524 0192 1600 0200 1800 0240 2000 0250 2048 0256 2500 0300 2540 0360 2600 0500 3600 0512 4096 0600 5000	0 3/8" Dia. Shaft with flat 4 10mm Dia. Shaft, with flat 6 12mm Dia. Shaft 7 3/8" Dia. Shaft w/ Flat, 4 Hole 2.00" BC	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 k Ω 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 Dif- ferential Line Driver out (7272) 4 5-26V in, 5V Dif- ferential Line Driver out (7272) 6 5-15V in, 5-15V Dif- ferential 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	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.

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 w/o 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.

SERIES HD25



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 Cable # 1400635XXXX 10 Pin Dif Line Driver with 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

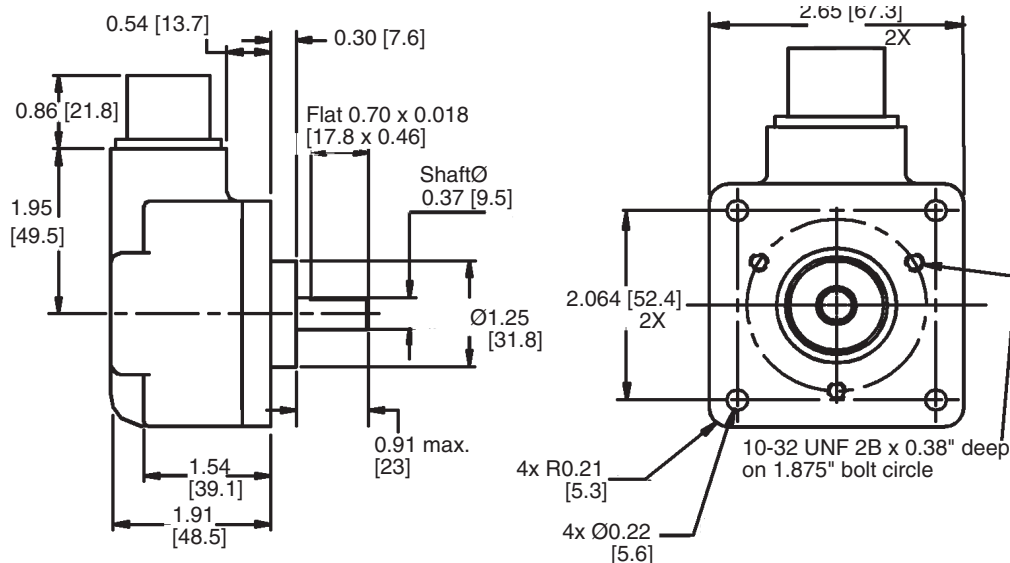
Connector pin numbers and cable assembly wire color information is provided here for reference.

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

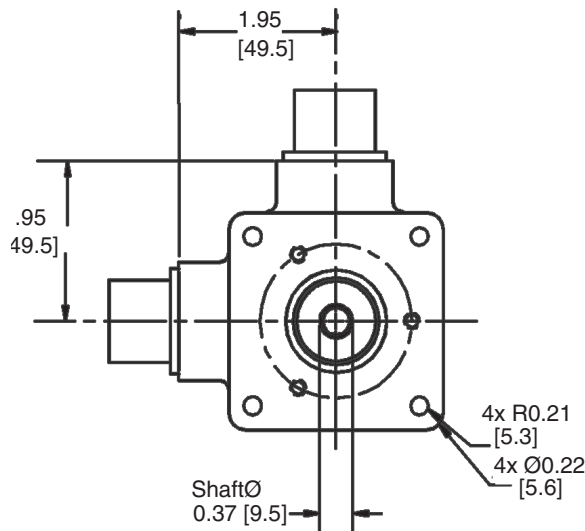
NOTES:

- 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

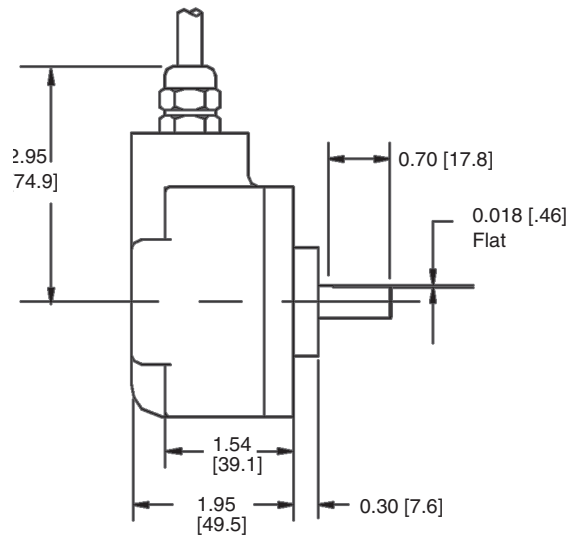
DIMENSIONS inches [mm]



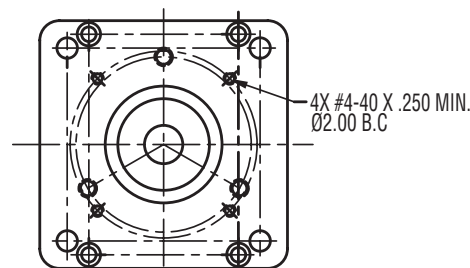
Standard Housing



Dual Redundant Outputs



Cable Exit



With 4 Hole 2.00" BC