

SERIES HD20

NorthStar™ brand

Harsh Duty Optical Encoder

Key Features

- Size 20 Heavy-Duty Encoder with Single or Dual Isolated Outputs
- Unbreakable Code Disc up to 3600 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 3600 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: $90^\circ \pm 15^\circ$ electrical; For resolutions over 625 PPR: $90^\circ \pm 30^\circ$ electrical
Symmetry:
 For resolutions to 1024 PPR: $180^\circ \pm 18^\circ$ electrical
 For resolutions over 1024 PPR: $180^\circ \pm 25^\circ$ 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

MECHANICAL

Shaft Size: 10mm, 3/8"
Shaft Speed: 6000 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: 5×10^8 revs at rated shaft Loading, 5×10^{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.
Shaft Material: 303 stainless steel (passivated)
Disc Material: Plastic
Weight: 14 ounces, typical

ENVIRONMENTAL

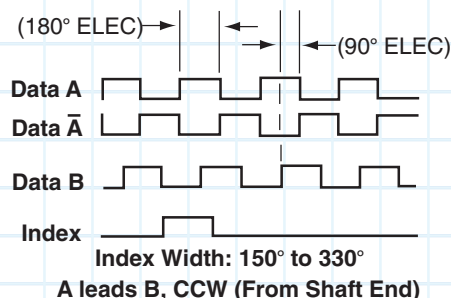
Operating Temperature: -40 to 100°C
Storage Temperature: -40 to 100°C
Shock: 50G's for 11msec duration
Vibration: 5 to 2000Hz @ 20 G's
Humidity: Up to 98% (non-condensing)
Enclosure Rating: IP67

ELECTRICAL

Input Power: 5-26VDC; 80 mA max., not including output loads.
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 & index)
Noise Immunity: Tested to EN61326-1
Electrical Immunity: Reverse polarity and short circuit protected
Termination: 6, 7, or 10 pin MS 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)

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
HD20 □	□□□□	□	□	□	□

Ordering Information						
Size 20 Heavy Duty Encoder	0001 0500 0010 0512 0024 0600 0025 0625	0 3/8" Dia. Shaft with flat	0 5-26V in, 5-26V Open Collector out (7273)	1 6 Pin Connector	0 No Options	
1 Unidirectional	0035 0720	4 10mm Dia. Shaft, no flat	2 5-26V in, 5-26V Push-Pull out (7272)	3 7 Pin Connector	1 Nickel Finish Housing	
2 Bidirectional	0040 1000			5 10 Pin Connector	2 Stainless Steel Housing	
3 Bidirectional with Index	0060 1024 0100 1200 0120 1250 0192 1440 0200 2000 0240 2048 0250 2500 0256 2540 0300 2600 0360 3600		F 5-26V in, 5-26V Open Collector out (2222)	D 18" Sealed Cable	Available when: Code 4 is 0, 2	
			G 5-26V in, 5-26V Open Collector out with 2.2 kΩ Pullups (2222)	E 3' Sealed Cable	3 Redundant Outputs (Dual Connector Housing).	
			Available when: Code 1 is 1,2 and Code 5 is 3 through H, or Code 1 is 3 and Code 5 is 5 through H:	F 6' Sealed Cable	4 Nickel Finish Housing with Redundant Outputs.	
			3 5-26V in, 5-26V Differential Line Driver out (7272)	G 10' Sealed Cable	5 Stainless Steel Housing with Redun- dant Outputs.	
			4 5-26V in, 5V Differential Line Driver out (7272)	H 15' Sealed Cable		

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
- 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

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

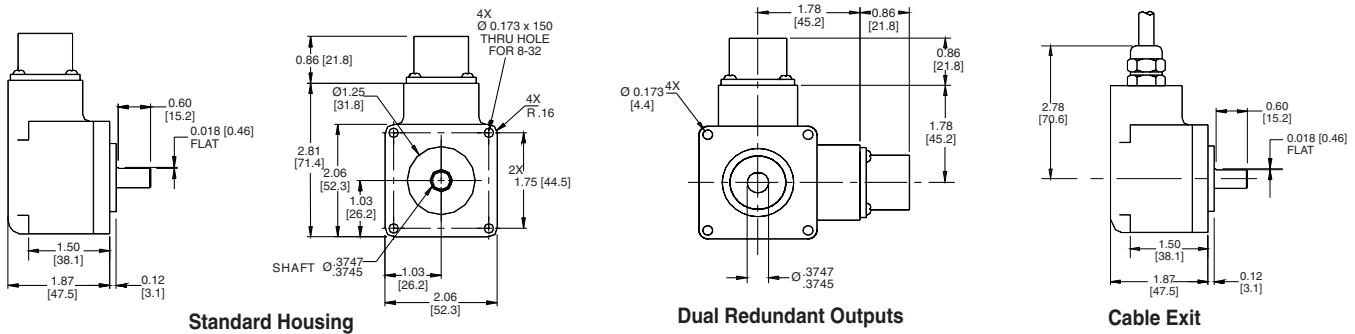
6, 7 & 10 Pin MS Connectors and Cables

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	Table 1								
	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

- 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) 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
- 3) *Index not provided on all models. See ordering information.
- 4) **For watertight applications, use NEMA4 10 pin cable & connector 109209-XXXX
- 5) "MS" Type mating connectors and pre-build cables are rated NEMA 12

DIMENSIONS



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WWW.DYNAPAR.COM

Headquarters: 1675 Delany Road • Gurnee, IL 60031-1282 • USA

Customer Service:
Tel.: +1.800.873.8731
Fax: +1.847.662.4150
custserv@dynapar.com

Technical Support
Tel.: +1.800.234.8731
Fax: +1.847.662.4150
northstar.techsupport@dynapar.com

European Sales Representative
Hengstler GmbH
Uhlandstrasse 49, 78554 Aldingen
Germany
www.hengstler.com