SERIES HD20

NorthStar™ brand

Harsh Duty Optical Encoder

HD Heavy Duty

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**

CE EN 61326-1

RoHS

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° ± 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

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 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.
Shaft Material: 303 stainless steel (passivated)
Disc Material: Plastic
Weight: 14 ounces, typical

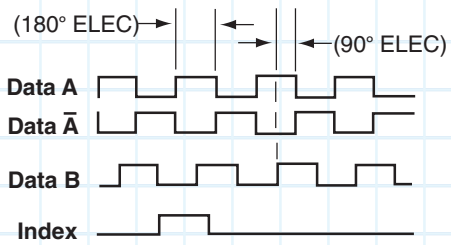
ENVIRONMENTAL

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
$\bar{A}$ shown for reference



Index Width: 150° to 330°
A leads B, CCW (From Shaft End)

NorthStar™ brand SERIES HD20

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

***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.

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

SERIES HD20

by DYNAPAR™

ELECTRICAL CONNECTIONS

6, 7 & 10 Pin MS Connectors and Cables

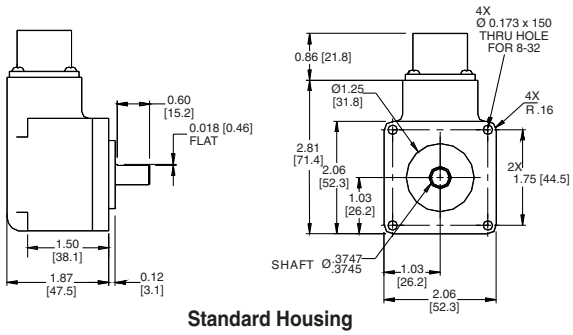
Connector & mate/accessory cable assembly pin numbers and wire color information is provided here for reference.
Models with direct cable exit carry the color coding as shown in the right hand column.

Table 1

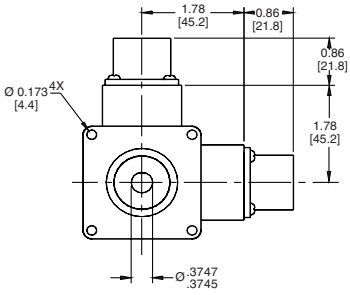
Encoder Function	Cable # 108594-XXXX 6 Pin Single Ended		Cable # 108595-XXXX 7 Pin Single Ended		Cable # 108596-XXXX 7 Pin Dif Line Driver without Index		** Cable # 109209-XXXX or Cable # 1400635XXXX 10 Pin Dif Line Driver with Index		Cable Exit with Seal
	Pin	Wire Color Code	Pin	Wire Color Code	Pin	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

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

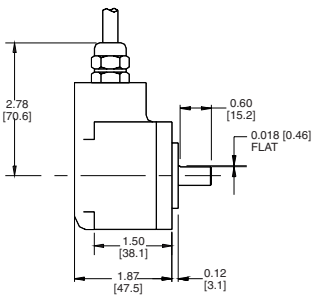
DIMENSIONS



Standard Housing



Dual Redundant Outputs



Cable Exit

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

DYNAPAR™
INNOVATION - CUSTOMIZATION - DELIVERY

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 Representitive
Hengstler GmbH
Uhlandstrasse 49, 78554 Aldingen
Germany
www.hengstler.com

NorthStar™ brand is a trademark of DYNAPAR. All rights reserved.
Specifications subject to change without notice.
Document No. 702745-0001 Rev. L ©2017 DYNAPAR