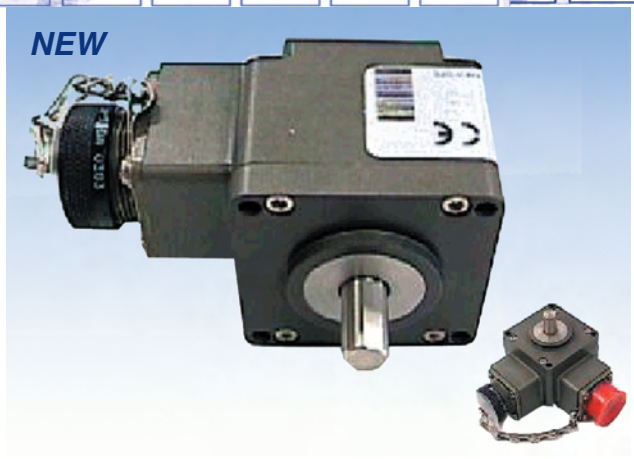


Series HD20

- *Single or Dual output*
- *ATEX Certfication available for Intrinsically Safe application*
- *High Resolution Unbreakable Disk*
- *Industrial Duty Connector*
- *NEMA 4X / IP67 Rated*
- *Nickel or Stainless Steel Housing available*
- *Two Year Warranty*

Harsh-Duty Optical Encoder

DESCRIPTION

The HD20 Harsh-Duty Optical Encoder is a compact heavy-duty encoder designed to exceed IP66/IP67 and NEMA 6 enclosure requirements. It is also available in stainless steel that exceeds NEMA 4X and NEMA 6P requirements and is ideal for stringent wash down environments, including those where high pressure steam or caustic chemicals are needed to meet regulatory requirements.

The HD20 features 100 lb Axial and Radial Bearings, –40° to +100°C temperature range and unique labyrinth double-sealed housing, and optional dual "redundant" outputs and is covered by a two-year warranty (one year for bearings). NorthStar's traditional quality, reliability and value are built-in to every HD20 encoder.

Also available in this series, is an Intrinsically Safe version certified to ATEX EEx ia IIB T4 when used with the appropriate IS Barrier. Accessory barriers can be supplied with the encoder.

APPLICATIONS:

The HD20 Harsh-Duty Optical Encoder is ideal for machine applications with corrosive environments that demand heavy washdown protection. This compact, special-duty encoder is designed to excede IP66/IP67 and NEMA 6 enclosure requirements with a PPR range through 3600. ATEX certification is also available for intrinsically safe applications.

- Converting Machinery
- Material Handling
- Packaging Equipment
- Pickling Equipment
- Processing Equipment

INDUSTRIES

Chemical, Food & Beverage, Oil & Gas, Paper, Steel and any other where a precise encoder is needed to operate in harsh environments.

FEATURES/BENEFITS

Mechanical and Environmental

- Unbreakable code disk
- Flexible mounting
- Heavy duty shaft seals
- Sealed connector

Electrical

- Cast housing maximizes noise immunity and durability

Harsh-Duty Optical Encoder

Series HD20

Harsh-Duty Optical Encoder… Meets Stringent Washdown Requirements

SPECIFICATIONS*

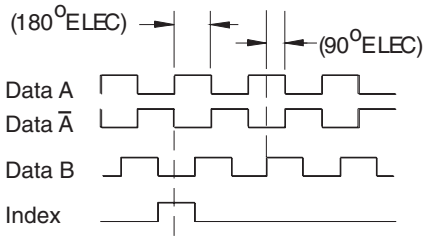
STANDARD OPERATING CHARACTERISTICS

Code: Incremental
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 625PPR: 90° ± 15° electrical; For resolutions over 625 PPR: 90° ± 30° electrical of 1000 pf
Symmetry:
For resolutions to 1024PPR: 180° ±18° electrical
For resolutions over 1024PPR: 180° ±25° electrical
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, 7-26VDC
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)

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



A Leads B CCW

MECHANICAL

Shaft Material: 303 stainless steel (passivated)
Shaft speed: 6000 RPM, maximum
Shaft loading: Up to 100 lbs axial and radial
Shaft runout: 0.0005 TIR at midpoint
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.
Disc material: Metal or mylar
Weight: 14 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: Enclosure Rating: NEMA 4X, NEMA 6, IP66, IP67 (NEMA 6P upon request)

Note: "MS" type mating connectors and prebuilt cables are rated NEMA 12. "M12" Cable assemblies are rated IP67

* Specifications are for base models with standard features only unless otherwise noted. Specifications subject to change without notice in accordance with our DBS policy of continuous improvement. All product and brand names are trademarks of their respective owners. All rights reserved.

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. HD20 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

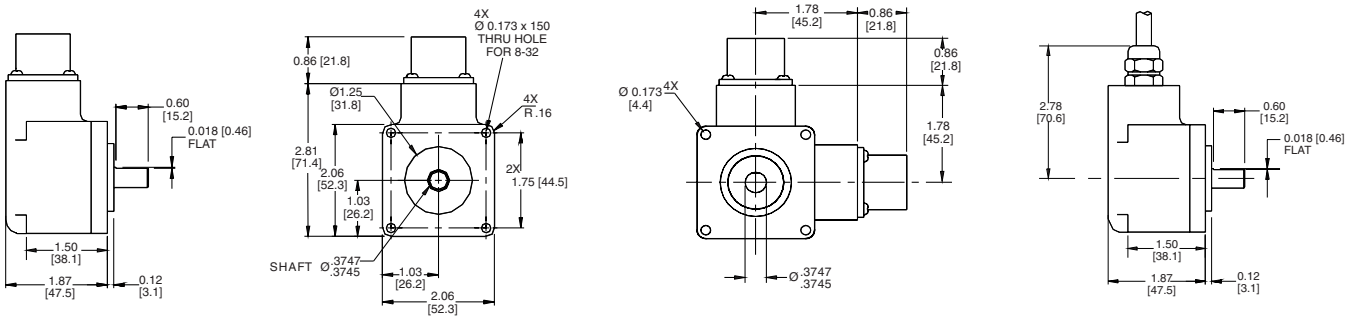
Note: "MS" type mating connectors and prebuilt cables are rated NEMA 12.
"M12" Cable assemblies are rated IP67

Harsh-Duty Optical Encoder

Series HD20

Harsh-Duty Optical Encoder… Meets Stringent Washdown Requirements

DIMENSIONS inches [mm]



Standard Housing | **Dual Redundant Outputs** | **Cable Exit**

ORDERING INFORMATION

Code 1: Model	Code 2: PPR	Code 3: Shaft	Code 4: Electrical	Code 5: Termination	Code 6: Options
HD20□	**□□□□**	**□**	**□**	**□**	**□**

Ordering Information

Code 1: Model

Size 20 Extreme Heavy Duty Encoder

1 Unidirectional
2 Bidirectional
3 Bidirectional with Index

Code 2: PPR

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**

Code 3: Shaft

0 3/8" Dia. Shaft with flat
4 10mm Dia. Shaft, no flat

Code 4: Electrical

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)

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)

Code 5: Termination

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

*Note: Available ATEX Certified Options

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

ATEX Type 2: ATEX Certified; 7-26V in, 7-26V out

ATEX Type 3: ATEX Certified; 7-26V in, 5V out

NOTE:ATEX voltages replace those shown in Code 4.

Code 6: Options

0 No Options
1 Nickel Finish Housing
2 Stainless Steel Housing
A Same as "0" w/ ATEX Type 1
B Same as "1" w/ ATEX Type 1
C Same as "2" w/ ATEX Type 1

Available when Code 4 is 0, 2, 3, F or G

G Same as "0" w/ ATEX Type 2
H Same as "1" w/ ATEX Type 2
I Same as "2" w/ ATEX Type 2

Available when Code 4 is 4

M Same as "0" w/ ATEX Type 3
N Same as "1" w/ ATEX Type 3
O Same as "2" w/ ATEX Type 3

Available when Code 4 is 0, 2, F or G

3 Redundant Outputs (Dual Connector Housing). See † NOTE
4 Nickel Finish Housing with Redundant Outputs. See † NOTE
5 Stainless Steel Housing with Redundant Outputs. See † NOTE
D Same as "3" " w/ ATEX Type 1. *See †NOTE*
E Same as "4" w/ ATEX Type 1. *See †NOTE*
F Same as "5" w/ ATEX Type 1. *See †NOTE*
J Same as "3" w/ ATEX Type 2. *See †NOTE*
K Same as "4" w/ ATEX Type 2. *See †NOTE*
L Same as "5" w/ ATEX Type 2. *See †NOTE*
P Same as "3" w/ ATEX Type 3. *See †NOTE*
Q Same as "4" w/ ATEX Type 3. *See †NOTE*
R Same as "5" w/ ATEX Type 3. *See †NOTE*

† NOTE: Simultaneous use of redundant outputs may void ATEX certification. Consult factory for details.