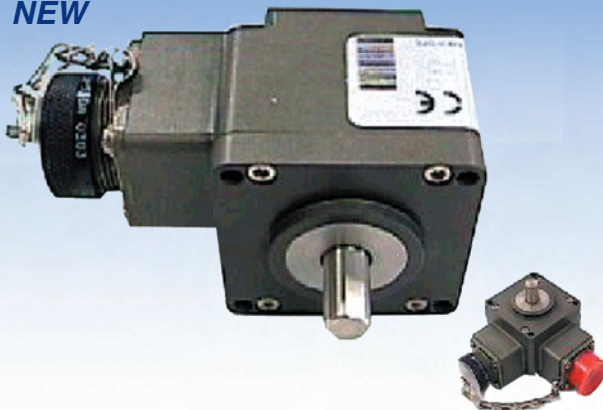


**NEW**



## Series HD20

- *Single or Dual output*
- *ATEX Certification 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 exceed 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:  $90^\circ \pm 15^\circ$  electrical; For resolutions over 625 PPR:  $90^\circ \pm 30^\circ$  electrical of 1000 pf

**Symmetry:**

For resolutions to 1024PPR:  $180^\circ \pm 18^\circ$  electrical

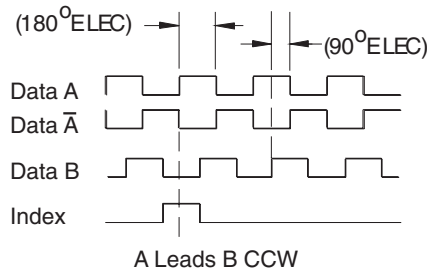
For resolutions over 1024PPR:  $180^\circ \pm 25^\circ$  electrical

**Waveforms:** Squarewave with rise and fall times less than 1 microsecond into a load capacitance of 1000 pf

#### DATA AND INDEX

Not all complements shown.

$\bar{A}$  shown for reference



#### 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

#### 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)

#### 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:**  $5 \times 10^8$  revs at rated shaft loading,  $5 \times 10^{11}$  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

\* 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.

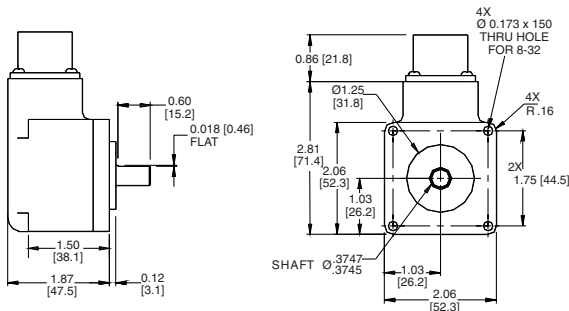
Encoder Function	Cable # 108594-6 Pin Single Ended		Cable # 108595-7 Pin Single Ended		Cable # 108596-7 Pin Dif Line Drv w/o Idx		Cable # 1400635-10 Pin Dif Line Drv w/ Idx		Cable Exit with Seal
	Pin	Wire Color	Pin	Wire Color	Pin	Wire Color	Pin	Wire Color	Wire Color
<b>Sig. A</b>	E	BRN	A	BRN	A	BRN	A	BRN	GREEN
<b>Sig. B</b>	D	ORG	B	ORG	B	ORG	B	ORG	BLUE
<b>Sig. Z</b>	C	YEL	C	YEL	—	—	C	YEL	ORANGE
<b>Power +V</b>	B	RED	D	RED	D	RED	D	RED	RED
<b>Com</b>	A	BLK	F	BLK	F	BLK	F	BLK	BLACK
<b>Case</b>	—	—	G	GRN	G	GRN	G	GRN	WHITE
<b>N/C</b>	F	—	E	—	—	—	E	—	—
<b>Sig<math>\bar{A}</math></b>	—	—	—	—	C	BRN/WHT	H	BRN/WHT	VIOLET
<b>Sig<math>\bar{B}</math></b>	—	—	—	—	E	ORG/WHT	I	ORG/WHT	BROWN
<b>Sig<math>\bar{Z}</math></b>	—	—	—	—	—	—	J	YEL/WHT	YELLOW

Note: "MS" type mating connectors and prebuilt cables are rated NEMA 12.

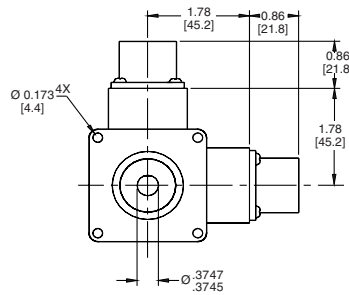
"M12" Cable assemblies are rated IP67

**Harsh-Duty Optical Encoder... Meets Stringent Washdown Requirements**

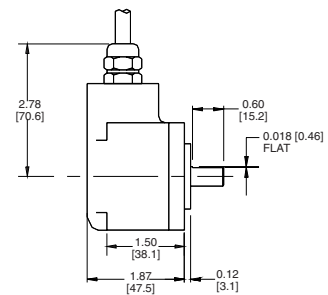
**DIMENSIONS** inches [mm]



**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
<b>HD20</b> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Ordering Information					
Size 20 Extreme 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  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 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.

\*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.*

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**More Reliable.** Our experience with more than 25,000 customers has taught us to design controllers that are reliable and durable, with quality standards that meet six sigma requirements.

For additional information or a full-line catalog, contact DICG Customer Service or visit our web site.

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**Satellite Locations:**

North America: North Carolina, South Carolina, Connecticut, Massachusetts, New York, Canada, British Virgin Islands • Europe: United Kingdom, Italy, France, Germany, Spain, Slovakia • Latin America: Brazil • Asia: China, Japan, Korea, Singapore



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