

# SERIES HS20

**Dynapar™ brand**

## Sealed Hollowshaft Encoder

### Key Features

- Hollowshaft Design Eliminates Brackets and Couplings
- Electrically Isolated Shaft Design
- Compact Size for Tight Mounting Constraints



## SPECIFICATIONS

### STANDARD OPERATING CHARACTERISTICS

**Code:** Incremental

**Resolution:** 1 to 2540 PPR (pulses/revolution)

**Accuracy:** (worst case any edge to any other edge)  $\leq 1024$  PPR (metal disk):  $\pm 7.5$  arc-min.  
 $> 1024$  PPR (glass disk):  $\pm 2.5$  arc-min.

**Format:** Two channel quadrature (AB) with optional Index (Z) and complementary outputs

**Phase Sense:** A leads B for CCW shaft rotation viewing the hub clamp end of the encoder

**Quadrature Phasing:**  $90^\circ \pm 22.5^\circ$  electrical

**Symmetry:**  $180^\circ \pm 18^\circ$  electrical

**Index:**  $180^\circ +18^\circ/-135^\circ$  electrical (gated with B low)

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

### ELECTRICAL

#### Input Power:

4.5 min. to 26 VDC max. at 100 mA max., not including output loads

#### Outputs:

7273 Open Collector: 30 VDC max., 40 mA sink max.

7272 Push-Pull and Differential Line Driver: 40 mA sink or source

**Frequency Response:** 100 kHz min.

**Electrical Protection:** Overvoltage, reverse voltage and output short circuit protected

**Noise Immunity:** Tested to EN61326 (Industrial) for Electro Static Discharge, Radio Frequency Interference, Electrical Fast Transients, Conducted and Magnetic Interference

#### 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);

5 pin, style M12: Cable with connector available

8 pin, style M12: Cable with connector available

### MECHANICAL

**Bearing Life:** (at maximum tether loading)

Standard tether:  $5 \times 10^9$  revolutions

Slotted tether:  $8 \times 10^9$  revolutions

**Shaft Speed:** 6000 RPM max.

**Shaft Bore Tolerance:** Nominal  $+0.0002$ "/  
 $+0.0008$ " ( $+0.005/+0.020$  mm)

#### Mating Shaft Requirements:

Runout:  $\pm 0.005$ " ( $\pm 0.13$ mm) radial, max.

Endplay:  $\pm 0.050$ " ( $\pm 1.27$  mm) axial, max.

Length: 0.80" (20 mm), minimum

**Starting Torque:** 3.0 oz-in max.

**Moment of Inertia:**  $5.1 \times 10^{-4}$  oz-in-sec<sup>2</sup>

**Weight:** 10 oz. max.

### ENVIRONMENTAL

Operating Temperature:

Standard: 0 to  $+70^\circ$  C

Extended:  $-40$  to  $+85^\circ$  C

**Storage Temperature:**  $-40$  to  $+85^\circ$  C

**Shock:** 50 G's for 11 milliseconds duration

**Vibration:** 5 to 2000 Hz at 2.5 G's

**Humidity:** to 98% without condensation

**Enclosure Rating:** NEMA4/IP65 (dust proof, washdown)

**Ordering Information**

To order, complete the model number with code numbers from the table below:

Code 1: Model	Code 2: PPR	Code 3: Bore Size	Code 4: Fixing	Code 5: Format	Code 6: Output	Code 7: Termination	Code 8: Options
<b>HS20</b>	□□□□	□	□	□	□	□	□□

Ordering Information							
<b>HS20</b> Size 20 heavy-duty, sealed hollowshaft encoder	Metal Disk:	<b>0</b> 6 mm <b>1</b> 1/4" <b>2</b> 5/16" <b>3</b> 8 mm <b>4</b> 3/8" <b>5</b> 10 mm <b>6</b> 12 mm <b>7</b> 1/2" <b>8</b> 5/8" <b>9</b> 15 mm <b>A</b> 16 mm	<b>0</b> None - customer supplied <b>1</b> Clearance hole for 3/8" bolt on 5.88" dia. bolt circle (to fit 4-1/2" NEMA C-face) <b>3</b> Slotted hole for bolt on 1.87" to 2.95" radius <b>4</b> Same as '1', w/ protective cover kit <b>5</b> Same as '3', w/ Protective cover kit	<b>0</b> single ended, unidirectional (A) <b>1</b> single ended, bidirectional (AB) <b>2</b> single ended, bidirectional with index (ABZ) available when Code 6 is 3, 4, A or B: <b>3</b> differential, bidirectional (AĀ BB̄) available when Code 6 is 3, 4, A or B and code 7 is 2, or 7 thru G: <b>4</b> differential, bidirectional with index (AĀ BB̄ ZZ̄)	<b>0</b> 5-26V in, 5-26V open collector out <b>1</b> 5-26V in, 5-26V open collector out w/ 2.2kΩ pullups <b>2</b> 5-26V in, 5-26V push-pull out available when Code 5 is 3 or 4: <b>3</b> 5-26V in, 5V line driver out <b>4</b> 5-26V in, 5-26V line driver out <b>A</b> same as '3' with extended temp. -40° to 85°C <b>B</b> same as '4' with extended temp. -40° to 85°C	<b>0</b> 6 pin connector <b>1</b> 7 pin connector <b>2</b> 10 pin connector <b>5</b> 6 pin connector, plus mating connector <b>6</b> 7 pin connector, plus mating connector <b>7</b> 10 pin connector, plus mating connector <b>A</b> 18" (.5m) cable <b>B</b> 36" (1m) cable <b>C</b> 72" (2m) cable <b>D</b> 10' (3m) cable <b>F</b> 13" (.3m) cable with 10 pin connector plus mating connector <b>G</b> 13" (.3m) cable <b>J</b> 8 Pin M12 Connector available when Code 5 is 0 thru 2 <b>H</b> 5 Pin M12 Connector	available when Code 7 is 0 or 5 and Code 5 is 0-2, or Code 7 is 1, 2, 6, 7: <b>PS</b> LED Output Indicator
	Glass Disk:	<b>1200</b> 1968 <b>1250</b> 2000 <b>1270</b> 2048 <b>1500</b> 2400 <b>1600</b> 2500 <b>1800</b> 2540					

- 112096-0001 Tether Kit (clearance hole for 3/8" bolt on 5.88" diameter bolt-circle)
- 112096-0002 Tether Kit (slotted hole for bolt on 1.87" to 2.75" radius)
- 112105-0001 Protective Cover Accessory

**10 foot Cable Assemblies with MS Connector**

- 108594-0010** 6 Pin MS, Cable Assy. For Use with Single Ended Outputs
- 108595-0010** 7 Pin MS, Cable Assy. For Use with Single Ended Outputs
- 108596-0010** 7 Pin MS, Cable Assy. For Use with Differential Line Driver w/o Index Outputs
- 1400635-0010** 10 Pin MS, Cable Assy. For Use with Differential Line Driver with Index Outputs

**15 foot Cable Assemblies with M12 Connector**

- 112859-0015** 5 Pin M12, Cable Assy. For Use with Single Ended Outputs
- 112860-0015** 8 Pin M12, Cable Assy. For Use with Single Ended Outputs
- 112860-0015** 8 Pin M12, Cable Assy. For Use with Differential Line Driver Outputs

**Mating Connectors (no cable)**

- 6 pin, style MS3106A-14S-6S (MCN-N4)
- 7 pin, style MS3106A-16S-1S (MCN-N5)
- 10 pin, style MS3106A-18-1S (MCN-N6)

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## ELECTRICAL CONNECTIONS

### 6, 7 & 10 Pin MS Connectors and Cables - Code 7= 0 to 7, A to G

Connector & mate/accessory cable assembly pin numbers and wire color information is provided here for reference. HS20 models with direct cable exit carry the same color coding as shown for each output configuration.

Encoder Function	Cable #108594-* 6 Pin Single Ended		Cable #112123-* 6 Pin Dif Line Drv w/o Idx		Cable #108596-* 7 Pin Dif Line Drv w/o Idx		Cable #108595-* 7 Pin (If Used)		Cable #1400635-* 10 Pin (If Used)	
	Pin	Wire Color	Pin	Wire Color	Pin	Wire Color	Pin	Wire Color	Pin	Wire Color
Sig. A	E	BRN	E	BRN	A	BRN	A	BRN	A	BRN
Sig. B	D	ORN	D	ORN	B	ORN	B	ORN	B	ORN
Sig. Z	C	YEL	—	—	—	—	C	YEL	C	YEL
Power +V	B	RED	B	RED	D	RED	D	RED	D	RED
N/C	F	—	—	—	—	—	E	—	E	—
Com	A	BLK	A	BLK	F	BLK	F	BLK	F	BLK
Case	—	—	—	—	G	GRN	G	GRN	G	GRN
Sig. $\bar{A}$	—	—	C	BRN/WHT	C	BRN/WHT	—	—	H	BRN/WHT
Sig. $\bar{B}$	—	—	F	ORN/WHT	E	ORN/WHT	—	—	I	ORN/WHT
Sig. $\bar{Z}$	—	—	—	—	—	—	—	—	J	YEL/WHT

**Cable Configuration:** PVC jacket, 105 °C rated, overall foil shield; 3 twisted pairs 26 AWG (output signals), plus 2 twisted pairs 24 AWG (input power)

### 5 & 8 Pin M12 Accessory Cables when Code 7= H or J

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

Encoder Function	Cable # 112859-* 5 Pin Single Ended		Cable # 112860-* 8 Pin Single Ended		Cable # 112860-* 8 Pin Differential	
	Pin	Wire Color	Pin	Wire Color	Pin	Wire Color
Sig. A	4	BLK	1	BRN	1	BRN
Sig. B	2	WHT	4	ORG	4	ORG
†Sig. Z	5	GRY	6	YEL	6	YEL
Power +V	1	BRN	2	RED	2	RED
Com	3	BLU	7	BLK	7	BLK
Sig. $\bar{A}$	—	—	—	—	3	BRN/WHT
Sig. $\bar{B}$	—	—	—	—	5	ORG/WHT
†Sig. $\bar{Z}$	—	—	—	—	8	YEL/WHT

**Cable Configuration:** PVC jacket, 105 °C rated, overall foil shield; 24 AWG conductors, minimum

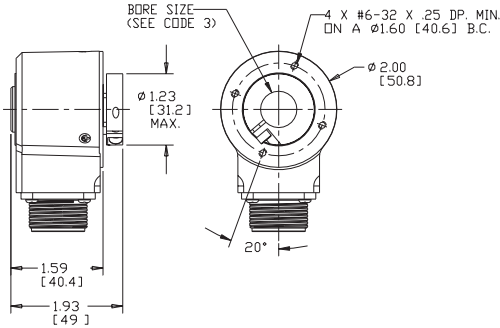
\*Note: Standard cable length is 10 feet but may be ordered in any length in 5 foot increment. For example, -0020 is a 20 foot cable.

†Note: Index not provided on all models. See ordering information

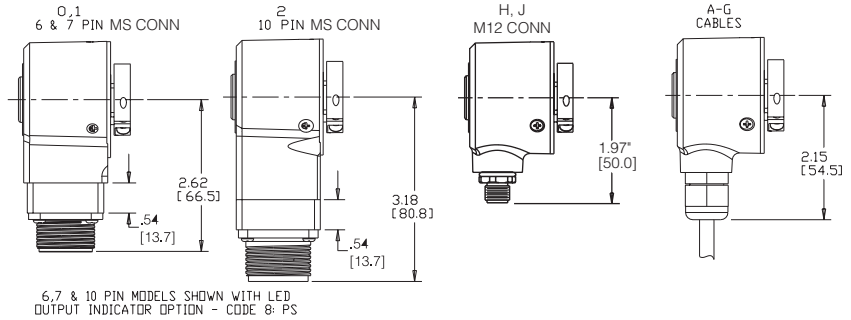
See "Accessories" Section for Connectors and Cable Assemblies Ordering Information

**DIMENSIONS**

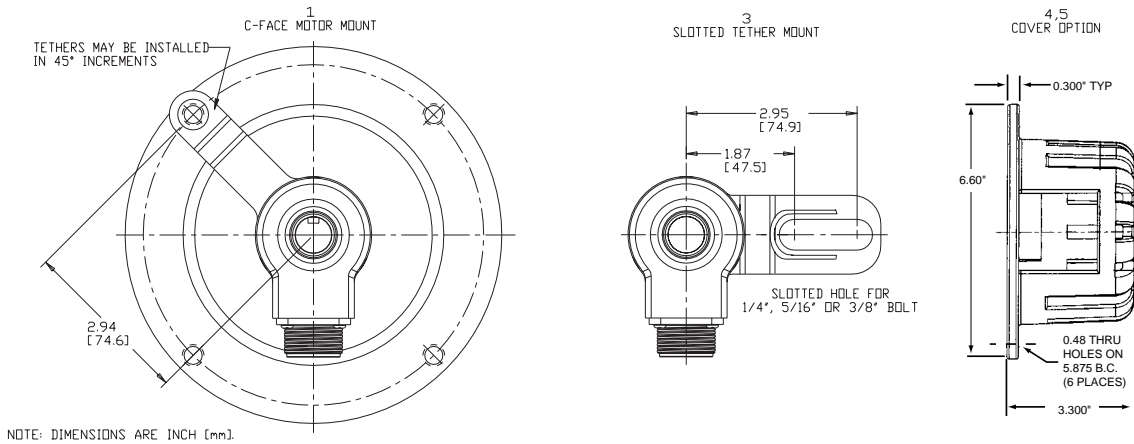
DIMENSIONS



CODE 7: TERMINATION



CODE 4: FIXING



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