

# Series HS20 Sealed Hollow Shaft

- Hollowshaft design eliminates mounting bracket, flexible shaft coupling, and installation labor
- Direct shaft mount eliminates shaft alignment procedures
- Flexible tether minimizes bearing load
- Robust metal hubshaft
- Electrically isolated



MOTOR MOUNT

## APPLICATION/INDUSTRY

The Dynapar brand Series HS20 Sealed Hollowshaft encoder is designed for easy installation on motor or machine shafts. Its hollowshaft design eliminates the need for a flexible shaft coupling, mounting bracket, flower pot, or flange adapter. This not only reduces the installation depth, but also lowers total cost.

## DESCRIPTION

The Series HS20 Sealed Hollowshaft's floating shaft mount and spring tether minimize bearing loads and eliminate flexible shaft couplings to reduce wear and maintenance.

Series HS20 has complete electrical protection from overvoltage, reverse voltage, and output short circuits. In addition, the Series HS20 is electrically isolated, and environmentally sealed with shaft seals at both ends.

## FEATURES AND BENEFITS

Mechanical and Environmental Features

- Flexible mounting
- Minimal bearing loads
- Shaft seals at both ends of hollowshaft
- Sealed connector or cable exit

Electrical Features

- Overvoltage, reverse voltage, & output short circuit protection
- Noise immunity to EN50082-2
- Electrically isolated

## 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 EN50082-2 (Heavy 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)

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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

\* Index not provided on all models. See ordering information

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

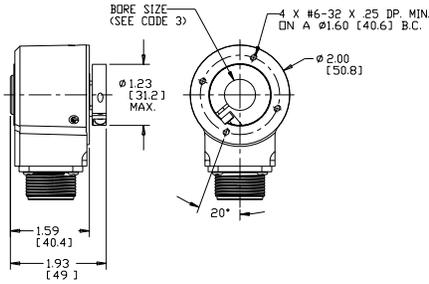
See "Accessories" Section for Connectors and Cable Assemblies Ordering Information

# Series HS20 Sealed Hollow Shaft

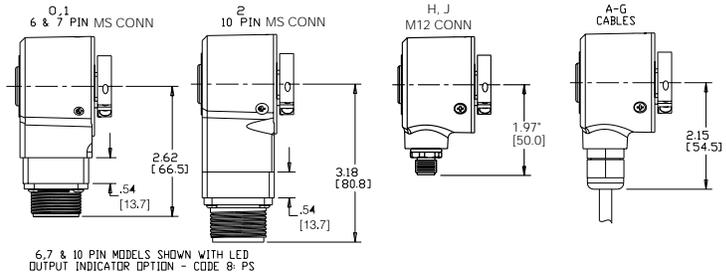
## DIMENSIONS

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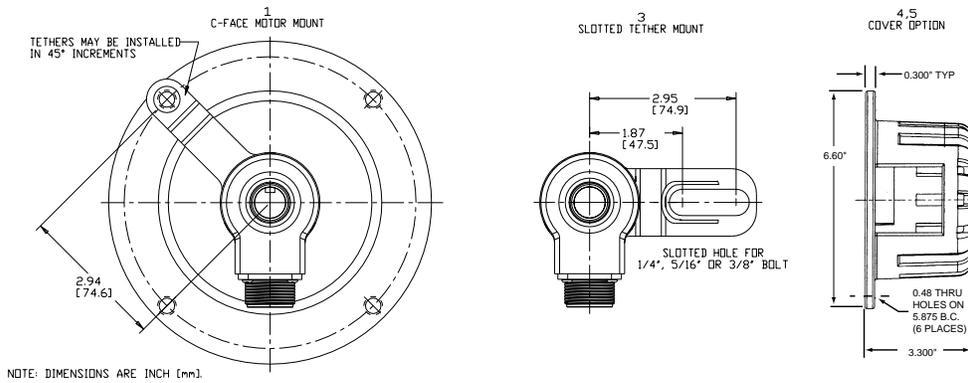
DIMENSIONS



CODE 7: TERMINATION



CODE 4: FIXING



# Series HS20 Sealed Hollow Shaft

## ORDERING INFORMATION

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

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