

Dynapar brand Encoder Series HS20 Sealed Hollow Shaft



Technical Bulletin

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DESCRIPTION

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.

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.

SPECIFICATIONS

STANDARD OPERATING CHARACTERISTICS

Code: Incremental

Resolution: 1 to 2540 PPR (pulses/revolution)

Accuracy: (worst case any edge to any other edge) ≤ 1024 PPR (metal disk): ± 7.5 arc-min.

> 1024 PPR (glass disk): ± 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 EN61326-1 EMC (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: 5×10^9 revolutions

Slotted tether: 8×10^9 revolutions

Shaft Speed: 6000 RPM max.

Shaft Bore Tolerance: Nominal $+0.0002"/$

$+0.0008"$ ($+0.005/+0.020$ mm)

Mating Shaft Requirements:

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

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

Length: 0.80" (20 mm), minimum

Starting Torque: 3.0 oz-in max.

Moment of Inertia: 5.1×10^{-4} oz-in-sec²

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)

IMPORTANT ENCODER INSTALLATION INFORMATION

Mounting the Encoder: The encoder should be mounted such that its shaft is in close as possible alignment with the axis of the driving machine or motor shaft.

CAUTION: The loads applied to the encoder shaft must be in accordance with the specifications of this device.

Important Wiring Instructions: Use of shielded cable is recommended for all encoder installations. The shield should be connected to signal-ground at the receiving device only.

Grounding: For applications with high ground potential differences, DO NOT ground the encoder through both machine and controls end. Connect the shield at the controls end only. NOTE: If the shield is connected at both ends, grounding problems that degrade system performance can result.

CE Grounding Measures – For best EMC immunity the cable screen must be grounded on both encoder and controls end. For cable lengths longer than 30m or outdoor applications, additional measures must be implemented to comply with CE requirements. Connection of the encoder to DC power supply network is prohibited if CE compliance is required. CE-compliant products are tested to EN61326-1 EMC.

In all cases, system CE compliance is ultimately the responsibility of the manufacturer integrating the encoder.

Connecting the shield at both ends can cause grounding problems that degrade system performance.

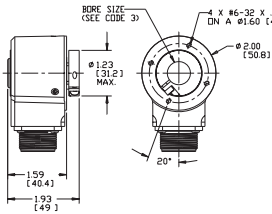
If possible, run the encoder cable through a dedicated conduit (not shared with other wiring). Use of conduit will protect the cable from physical damage and provide a degree of electrical isolation. Do not run the cable in close proximity to other conductors that carry current to heavy loads such as motors, motor starters, contactors, solenoids, etc. This practice can induce electrical transients in the encoder cable, potentially interfering with reliable data transmission.

Refer to Electrical Connections table for wiring information. To avoid possible damage, do not connect or disconnect the encoder connector or wiring while power is applied to the system.

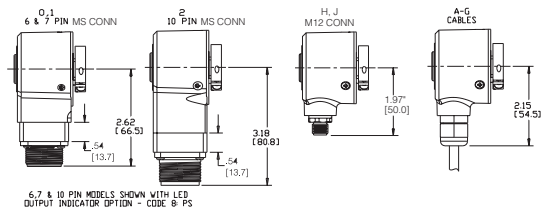
CAUTION: Unused encoder signal wires must be individually insulated and under no circumstances be in contact with ground, voltage sources, or other signal lines.

Dimensions

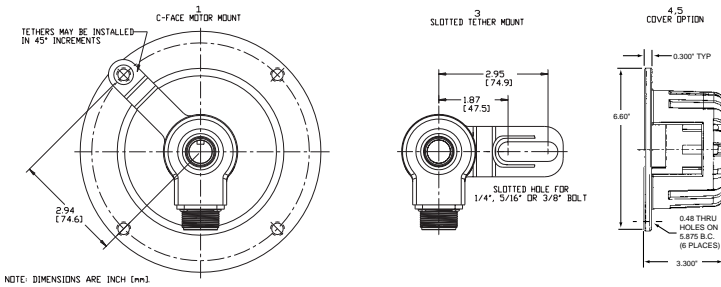
DIMENSIONS



CODE 7: TERMINATION



CODE 4: FIXING



Models Information

Code 1: Model	Code 2: PPR	Code3: Bore Size	Code 4: Fixing	Code 5: Format	Code6: Output	Code 7: Termination	Code 8: Options	
HS20								
Ordering Information								
HS20	Size 20 heavy-duty, sealed hollowshaft encoder	Metal Disk:	0 6 mm	0 None - customer supplied	0 single ended, unidirectional (A)	0 5-26V in, 5-26V open collector out	0 6 pin connector	available when Code 7 is 0 - 7 PS LED Output Indicator
		0001 0300	1 1/4"	1 Clearance hole for 3/8" bolt on 5.88" dia. bolt circle (to fit 4-1/2" NEMA C-face)	1 single ended, bidirectional (AB)	1 5-26V in, 5-26V open collector out w/ 2.2kΩ pullups	1 7 pin connector	
		0005 0360	2 5/16"	2 Slotted hole for bolt on 1.87" to 2.95" radius	2 single ended, bidirectional with index (ABZ)	2 5-26V in, 5-26V push-pull out	2 10 pin connector	
		0010 0400	3 8 mm	3 Same as '1', w/ protective cover kit	3 differential, bidirectional (AA BB)	available when Code 5 is 3 or 4:	3 6 pin connector, plus mating connector	
		0012 0500	4 3/8"	4 Same as '3', w/ Protective cover kit	4 differential, bidirectional with index (AA BB ZZ)	4 5-26V in, 5-26V line driver out	4 7 pin connector, plus mating connector	
		0050 0512	5 10 mm			A same as '3' with extended temp. -40° to 85°C	5 6 pin connector, plus mating connector	
		0060 0600	6 12 mm			B same as '4' with extended temp. -40° to 85°C	6 7 pin connector, plus mating connector	
		0100 0720	7 1/2"				7 10 pin connector, plus mating connector	
		0120 0768	8 5/8"				A 18" cable	
		0180 0800	9 15 mm				B 36" cable	
		0200 0900	A 16 mm				C 72" cable	
		0250 1000	B 14 mm				D 10' cable	
		0256 1024					F 13' cable with 10 pin connector plus mating connector	
		Glass Disk:					G 13' cable	
		1200 1968					J 8 Pin M12 Connector	
		1250 2000					available when Code 5 is 0 thru 2	
		1270 2048					H 5 Pin M12 Connector	
		1500 2400						
		1600 2500						
		1800 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								

Wiring Information

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 configurati

Encoder Function	Cable #108594-* 6 Pin Single Ended		Cable #112123-* 6 Pin Dif Line Drv w/o ldx		Cable #108596-* 7 Pin Dif Line Drv w/o ldx		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. A̅	—	—	C	BRN/WHT	C	BRN/WHT	—	—	H	BRN/WHT
Sig. B̅	—	—	F	ORN/WHT	E	ORN/WHT	—	—	I	ORN/WHT
Sig. Z̅	—	—	—	—	—	—	—	—	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. A̅	—	—	—	—	3	BRN/WHT
Sig. B̅	—	—	—	—	5	ORG/WHT
*Sig. Z̅	—	—	—	—	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



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