Dynapar brand Encoder
Series HS20 Sealed Hollow Shaft

CE

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DYNAPAR™

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Technical Bulletin

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° ± 22.5° electrical
Symmetry: 180° ±18° electrical
Index: 180° +18°/-135° 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: $5x10^9$ revolutions
Slotted tether: $8x10^9$ revolutions
Shaft Speed: 6000 RPM max.
Shaft Bore Tolerance: Nominal +0.0002"/ +0.0008" (+0.005/+0.020 mm)
Mating Shaft Requirements:
Runout: ±0.005" (±0.13mm) radial, max.
Endplay: ±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–sec^2
Weight: 10 oz. max.

ENVIRONMENTAL

Operating Temperature:
Standard: 0 to +70° C
Extended: –40 to +85° C
Storage Temperature: –40 to +85° 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 specificatios 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.

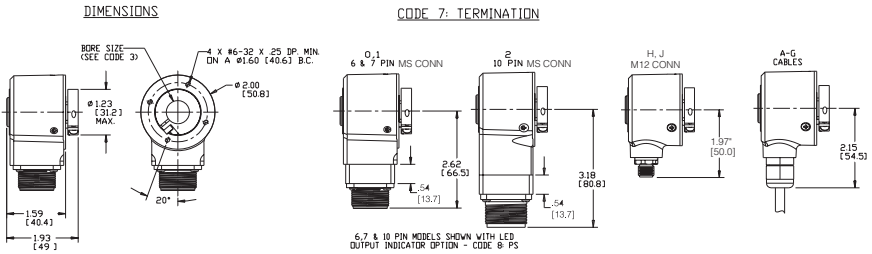
Connecting the shield at both ends can cause grounding problems that degrade system performance.

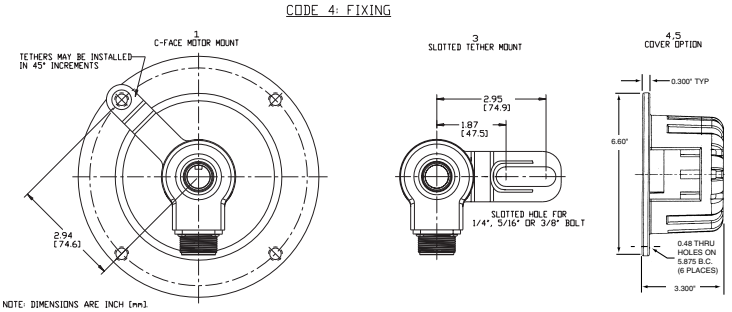
If possible, run the encoder cable through a dedicated conduit (not shared with other wiring). Use of conduit will protect the cable from physical damage and provide a degree of electrical isolation. Do not run the cable in close proximity to other conductors that carry current to heavy loads such as 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





Models 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
HS20 □□□□		□	□	□	□	□	□□
Ordering Information							
HS20 Size 20 heavy-duty, sealed hollowshaft encoder	Metal Disk: **0001 0300** **0005 0360** **0010 0400** **0012 0500** **0050 0512** **0060 0600** **0100 0720** **0120 0768** **0180 0800** **0200 0900** **0240 1000** **0250 1024** **0256** Glass Disk: **1200 1968** **1250 2000** **1270 2048** **1500 2400** **1600 2500** **1800 2540**	**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, undirectional (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 ($\overline{A}$ $\overline{B}$) available when Code 6 is 3, 4, A or B and code 7 is 2, or 7 thru G: **4** differential, bidirectional with index ($\overline{A}$ $\overline{B}$ $\overline{Z}$)	**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 **PS** LED Output Indicator

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 configuratic

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. $\overline{A}$	—	—	C	BRN/WHT	C	BRN/WHT	—	—	H	BRN/WHT
Sig. $\overline{B}$	—	—	F	ORN/WHT	E	ORN/WHT	—	—	I	ORN/WHT
Sig. $\overline{Z}$	—	—	—	—	—	—	—	—	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. $\overline{A}$	–	–	–	–	3	BRN/WHT
Sig. $\overline{B}$	–	–	–	–	5	ORG/WHT
***Sig. $\overline{Z}$**	–	–	–	–	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

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