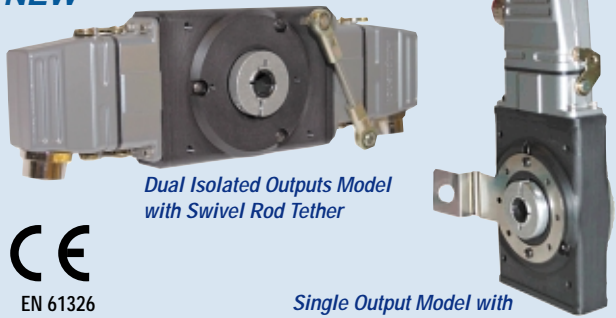


NEW



Dual Isolated Outputs Model with Swivel Rod Tether

Single Output Model with Stamped Metal Tether



EN 61326



Hazardous Location Certification Available
Class I, Division 2, Groups A, B, C & D
Class II Division 2, Groups F & G

Series HSD35

- *Field serviceable connectors require no soldering*
- *Dual output option available for redundancy*
- *Redesigned one-piece hub for less runout and jitter*
- *Can accommodate up to 1-1/4" diameter shaft*
- *New more rigid unbreakable disk in 1024 and 2048 PPR*
- *New improved seals and gasketed cover*
- *Electrically isolated and Thermally insulated*
- *Hazardous Location Certification Available*

Harsh-Duty Optical Encoder

DESCRIPTION

The NorthStar brand Series HSD35 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 which reduces installation depth and also lowers total cost.

It is equipped with an unbreakable disk that resists contamination and meets the demands of the most severe shock and vibration generating processes. Its floating shaft mount and spring tether eliminate bearing loads and flexible shaft couplings to eliminate wear and maintenance.

Series HSD35 has complete electrical protection from overvoltage, reverse voltage, and output short circuits. In addition, the Series HSD35 is not only electrically & thermally isolated, but also environmentally sealed with shaft seals at both ends.

Series HSD35 encoders can be provided with optional hazardous location certification that allows use in environments stated in: Class I, Division 2, Group A: atmospheres such as acetylene; Class I, Division 2, Group B: atmospheres such as hydrogen; Class I, Division 2, Group C: atmospheres such as ethyl ether and ethylene; Class I, Division 2, Group D: atmospheres such as acetone, ammonia, benzene, butane, cyclopropane, ethanol, gasoline, hexane, methanol, methane, natural gas, naphtha, and propane; Class II, Division 2, Groups F & G: atmospheres containing combustible carbonaceous dusts, including carbon black, charcoal, coal, or coke dusts, and combustible dusts including flour, grain and wood.

Classifications of hazardous locations are subject to the approval of the authority having jurisdiction. Refer to Article 500 of the National Electrical Code (NEC) or Section 18 of the Canadian Electrical Code (CEC).

APPLICATIONS:

The HSD35 hollow shaft digital encoder is ideal for motor and machine applications. Flexible mounting and adjustable tether, provide high tolerance to shaft vibration.

A hazardous location certification option can be provided when the environment requires NEC/CEC Class 1 & 2, Division 2 classification.

- Converting Machinery
- Material Handling
- 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
- Operating temperature of -40 to +70C.
Optional 0 to +100C

Electrical

- Short circuit protection and reverse polarity protection

Harsh-Duty Optical Encoder

Series HSD35

Harsh-Duty Optical Encoder... For Hazardous Environment Use

SPECIFICATIONS

STANDARD OPERATING CHARACTERISTICS

Code: Incremental
Resolution: 1 to 2500 PPR (pulses/revolution)
Accuracy: (worst case any edge to any other edge) ± 7.5 arc-min.
Format: Two channel quadrature (AB) with optional Index (Z) and complementary outputs
Phase Sense: A leads B for CW shaft rotation viewing the shaft clamp end of the encoder
Quadrature Phasing: $90^\circ \pm 22.5^\circ$ electrical
Symmetry: $180^\circ \pm 18^\circ$ electrical
Index: $180^\circ \pm 18^\circ$ 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: (each output)
 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
 4469 Differential Line Driver: 100 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:
 10 pin-style HA-10

ELECTRICAL CONNECTIONS

Signal	Connector Pin
Common	1
B	2
A	3
Z *	4
Case (optional)	5
Vcc 5-26 VDC	6
\bar{B}	7
\bar{A}	8
\bar{Z} *	9
No Connection	10

* Index (Z) optional. See Ordering Information

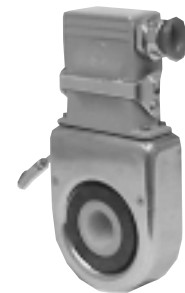
MECHANICAL

Bearing Life: 80,000 hours at 3600 RPM; 128,000 hours at 1800 RPM
Shaft Loading: 40 lbs. radial, 30 lbs. axial
Shaft Speed: 3600 RPM max. (*Important: see Operating Temperature derating for >1800 RPM*)
Shaft Bore Tolerance: Nominal $+0.0003"/+0.0005"$ ($+0.008/+0.013$ mm)
Mating Shaft Requirements:
 Runout: $\pm 0.025"$ (± 0.63 mm) radial typical
 Endplay: $\pm 0.050"$ (± 1.27 mm) axial typical
 Minimum Length: 1.25" (32 mm) recommended
 Maximum Length: 2.0" (51 mm) to fit inside cover
 Solid shaft recommended; keyway allowed; flatted shaft should not be used
Starting Torque: 5.0 oz-in max.
Running Torque: 4.5 oz.-in max.
Moment of Inertia:
 $\leq 5/8"$ bore: 7.9×10^{-4} oz-in-sec²
 $> 5/8"$ bore: 25.6×10^{-4} oz-in-sec²
Weight: 28 oz. max. Environmental

ENVIRONMENTAL

Operating Temperature:
 Standard: -40 to $+70^\circ\text{C}$
 Extended: 0 to $+100^\circ\text{C}$
 $\leq 5/8"$ bore: Derate 5°C per 1000 RPM above 1800 RPM
 $> 5/8"$ bore: Derate 10°C per 1000 RPM above 1800 RPM.
Storage Temperature: -40 to $+90^\circ\text{C}$
Shock: 50 G's for 11 milliseconds duration
Vibration: 5 to 2000 Hz at 20 G's
Humidity: to 98% without condensation
Enclosure Rating: NEMA4/IP67
Connector Rating: NEMA4/IP65
Hazardous Location Certification:
 Available as *Optional Feature*. Class I, Division 2, Group A, B, C & D; Class II, Division 2, Groups F & G. CSA File No. LR86404

Replaces the Magcoder HS35M (shown below)



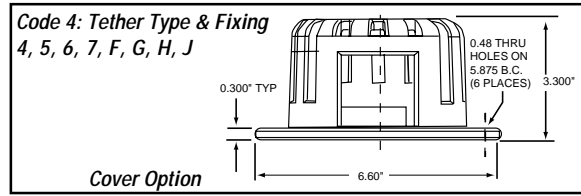
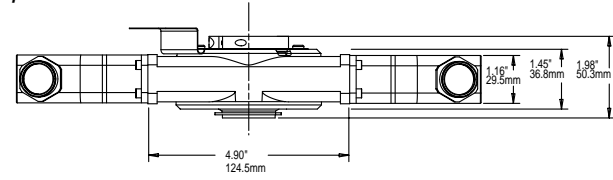
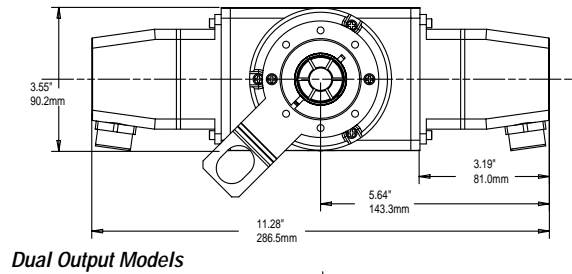
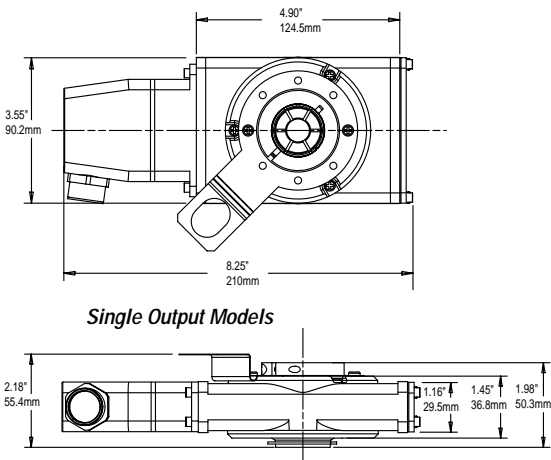
Contact Customer Service for appropriate replacement model. +1.800.873.8731

Harsh-Duty Optical Encoder

Series HSD35

Harsh-Duty Optical Encoder... For Hazardous Environment Use

DIMENSIONS inches [mm]



ORDERING INFORMATION

Code 1: Model	Code 2: PPR	Code 3: Bore	Code 4: Tether Type & Fixing	Code 5: Format	Code 6: Output	Code 7: Options
HSD35	□□□□	□	□	□	□	□□

Ordering Information								
HSD35 Size 35 heavy-duty, sealed hollowshaft encoder with industrial latching connector (1/2" NPT)	0001	0300	0 6 mm	Stamped Metal 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) 2 Clearance hole for 1/2" bolt on 7.25" dia. bolt circle (to fit 8-1/2" NEMA C-face) 3 Slotted hole for bolt on 2.5" to 4.0" radius (to fit standard AC motor fan cover slots) 4 Same as '1', w/ cover kit 5 Same as '3', w/ cover kit 6 Same as '1' w/ dual cover kit 7 Same as '3' w/ dual cover kit	Swivel Rod A Standard Tether B 56C Tether C 180C Tether D 56C Tether with protective guard E 180C Tether with protective guard Available when Code 5 is 0-4: F Same as 'A', w/ cover kit G Same as 'B', w/ cover kit Available when Code 5 is 5: H Same as 'A' w/ dual cover kit J Same as 'B' w/ dual 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, 5, 6, A or B: 3 differential, bidirectional (AA BB) available when Code 6 is 3, 4, 5, 6, A or B: 4 differential, bidirectional with index (AA BB ZZ) available when Code 6 is 3, 4, 5, 6, A or B: 5 Dual isolated differential, bidirectional w/index (AABBZZ)	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, 4 or 5: 3 5-26V in, 5V line driver out (7272) 4 5-26V in, 5-26V line driver out (7272) 5 5-26V in, 5V Differential Line Driver out (4469) 6 5-15V in, 5-15V Differential Line Driver out (4469) A same as '3' with extended temp. to 100°C B same as '4' with extended temp. to 100°C	D2 Hazardous Location Certified (see specifications) Leave Blank No Option
	0002	0360	1 1/4"					
	0003	0400	2 5/16"					
	0005	0500	3 8 mm					
	0006	0512	4 3/8"					
	0007	0600	5 10 mm					
	0010	0720	6 12 mm					
	0012	0800	7 1/2"					
	0025	0900	8 5/8"					
	0050	1000	9 15 mm					
0060	1024	A 16 mm						
0064	1200	B 19 mm						
0100	1270	C 3/4"						
0120	1500	D 20 mm						
0128	1800	E 7/8"						
0180	2000	F 24 mm						
0200	2048	G 1"						
0240	2400	H 1-1/8"						
0250	2500	J 14 mm						
		K 18 mm						
		M 25 mm						
		N 28 mm						
		P 1-1/4"						

109473-0001	Stamped Tether kit (clearance hole for 3/8" bolt on 5.88" dia. bolt circle)	110533-0001	Cover Kit, 56C face
109473-0002	Stamped Tether kit (clearance hole for 1/2" bolt on 7.25" dia. bolt circle)	110533-0002	Cover Kit, fan cover
109473-0003	Stamped Tether kit (slotted hole for bolt on 2.5" to 4.0" radius)	110533-0003	Dual Cover Kit, 56C face
112121-0001	Spare Hub Clamp (Bore size Code 3: 0 - 9)	110533-0004	Dual Cover Kit, fan cover
112121-0002	Spare Hub Clamp (Bore size Code 3: A - H)	106-764	Spare Mating Connector
756-042-01	Rod tether kit, standard		
756-043-01	Rod tether kit, 56C		
756-044-01	Rod tether kit, 180C		

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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 Dynapar Customer Service or visit our web site.

* 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.

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NorthStar brand HSD35 Data Sheet (2/08)

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



Factory Automation Worldwide Brands: Dynapar™ • Harowe™ • Hengstler™ • NorthStar™

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