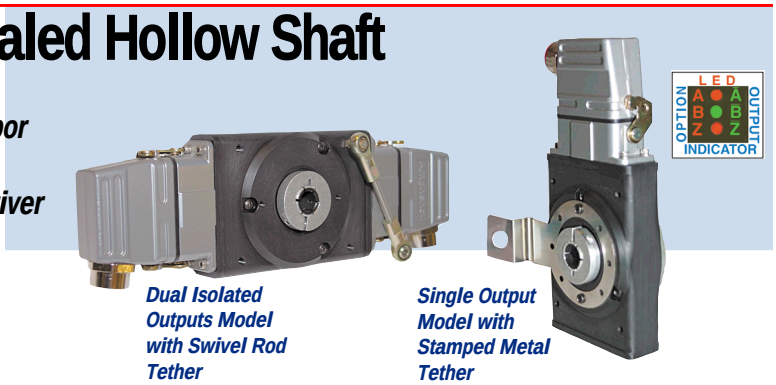
Series HSD35 Heavy Duty Sealed Hollow Shaft

- *Hollow Shaft design eliminates mounting bracket, flexible shaft coupling, and installation labor*
- *Bore is electrically and thermally insulated*
- *Single or Dual output – Optional high current line driver*
- *Choice of Stamped Metal or Swivel Rod Tether*
- *High Resolution Unbreakable Disk*
- *Industrial Duty Latching Connector*
- *NEMA 4 / IP66 Rated*
- *Two Year Warranty*



Dual Isolated Outputs Model with Swivel Rod Tether

Single Output Model with Stamped Metal Tether

APPLICATION/INDUSTRY

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. This not only reduces the installation depth, but also lowers total cost.

DESCRIPTION

The Series HSD35 Sealed Hollowshaft 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.

FEATURES AND BENEFITS

Mechanical and Environmental Features

- Unbreakable code disk
- Flexible mounting
- Minimizes bearing loads
- Heavy duty shaft seals. Optional extra heavy duty rugged shaft seals.
- Sealed connector – No soldering
- Insulated from motor housing/shaft temperatures at or above 125˚C
- Direct shaft size minimizes wobble caused by universal inserts

Electrical Features

- Overvoltage, reverse voltage, & output short circuit protection
- Noise immunity to EN50082-2
- Bore is electrically isolated from shaft currents
- Cast housing maximizes noise immunity and durability

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° ± 22.5° electrical
Symmetry: 180° ± 18° electrical
Index: 180° ± 18° 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
$\overline{B}$	7
$\overline{A}$	8
$\overline{Z}$ *	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: ±0.025" (±063 mm) radial typical
Endplay: ±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:
≤ 5/8" bore: 7.9 x 10^{-4} oz–in–sec^2
> 5/8" bore: 25.6 x 10^{-4} oz–in–sec^2
Weight: 28 oz. max.

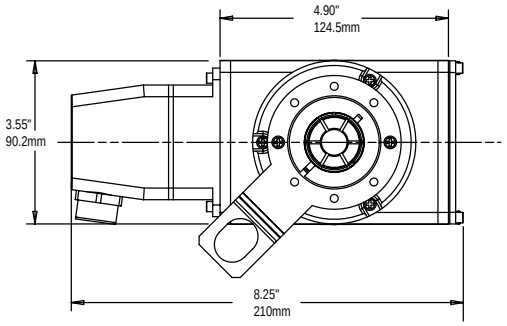
ENVIRONMENTAL

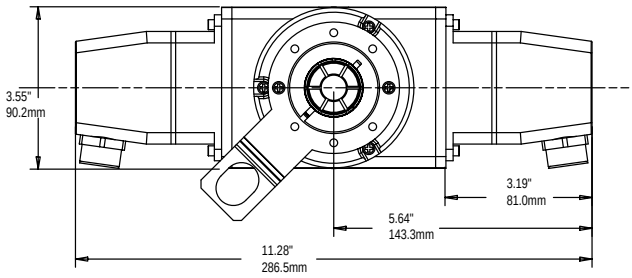
Operating Temperature:
Standard: –40 to +70 °C
Extended: 0 to +100 °C
≤ 5/8" bore: Derate 5 °C per 1000 RPM above 1800 RPM
> 5/8" bore: Derate 10 °C per 1000 RPM above 1800 RPM.
Storage Temperature: –40 to +90 °C
Shock: 50 G's for 11 milliseconds duration
Vibration: 5 to 2000 Hz at 20 G's
Humidity: to 98% without condensation
Enclosure Rating: NEMA4/IP66 (dust proof, washdown)

Replaces the Magcoder HS35M (shown below)

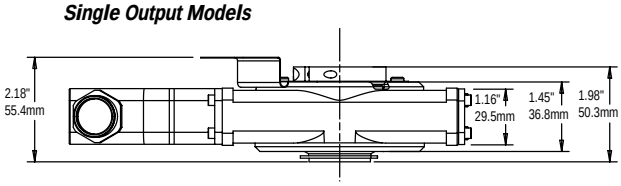
Contact Customer Service for appropriate replacement model. **+1.800.873.8731**

DIMENSIONS

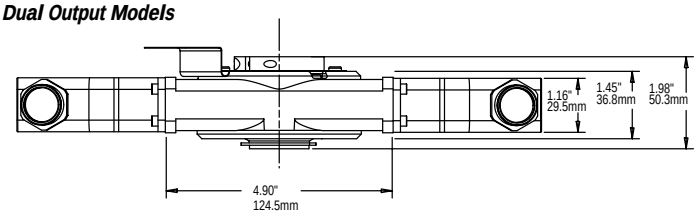




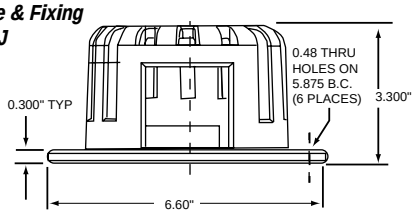
Single Output Models



Dual Output Models



Code 4: Tether Type & Fixing
4, 5, 6, 7, F, G, H, J



Cover Option

ORDERING INFORMATION

Code 1: Model	Code 2: PPR	Code 3: Bore	Code 4: Tether Type & Fixing	Code 5: Format	Code 6: Output	Code 7: Seal	Code 8: Options
HSD35 □□□□		□	□	□	□	□	□

Ordering Information

HSD35 Size 35 heavy-duty, sealed hollowshaft encoder with industrial latching connector (1/2" NPT)

0001	**0300**
0002	**0360**
0003	**0400**
0005	**0500**
0006	**0512**
0007	**0600**
0010	**0720**
0012	**0800**
0025	**0900**
0050	**1000**
0060	**1024**
0064	**1200**
0100	**1270**
0120	**1500**
0128	**1800**
0180	**2000**
0200	**2048**
0240	**2400**
0250	**2500**

Code 3: Bore

- **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
- **B** 19 mm
- **C** 3/4"
- **D** 20 mm
- **E** 7/8"
- **F** 24 mm
- **G** 1"
- **H** 1-1/8"
- **J** 14 mm
- **K** 18 mm
- **M** 25 mm
- **N** 28 mm
- **P** 1-1/4"

Code 4: Tether Type & Fixing

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)

Available when Code 5 is 0-4:

- **4** Same as **'1'**, w/ cover kit
- **5** Same as **'3'**, w/ cover kit

Available when Code 5 is 5

- **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

Code 5: Format

- **0** single ended, undirectional (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 ($A\bar{A}$ $B\bar{B}$)

available when Code 6 is 3, 4, 5, 6, A or B:

- **4** differential, bidirectional with index ($A\bar{A}$ $B\bar{B}$ $Z\bar{Z}$)

available when Code 6 is 3, 4, 5, 6, A or B:

- **5** Dual isolated differential, bi-directional w/index ($A\bar{A}B\bar{B}Z\bar{Z}$)

Code 6: Output

- **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, 5 V Differential Line Driver out (4469)
- **6** 5-15V in, 5-15 V Differential Line Driver out (4469)
- **A** same as **'3'** with high temp. to 100˚C
- **B** same as **'4'** with high temp. to 100˚C

Code 7: Seal

- **0** Standard Shaft Seals
- **1** Rugged Shaft Seals

Code 8: Options

- **Blank** None
- **D** LED Output Indicator

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

110533-0001	Cover Kit, 56C face
110533-0002	Cover Kit, fan cover
110533-0003	Dual Cover Kit, 56C face
110533-0004	Dual Cover Kit, fan cover
106-764	Spare Mating Connector