**Series HS35**

- Sealed Hollow Shaft design eliminates mounting bracket, flexible shaft coupling and installation labor
- 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 seals and gasketed cover for IP67 rating
- Electrically isolated and Thermally insulated
- Hazardous Location Certification Available

**APPLICATIONS:**

The Dynapar brand Series HS35 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. A hazardous location certification option can be provided when the environment requires NEC/CEC, Class 1 & 2, Division 2 classification.

- Converting Machinery
- Material Handling
- Packaging Equipment
- Pickling Equipment
- Processing Equipment

**INDUSTRIES**

Chemical, Food & Beverage, Oil & Gas, Paper, Steel and any other where a precise encoder is needed. Optional NEC/CEC, Class 1, Division 2 classification for operation in hazardous environments.

**FEATURES/BENEFITS**

**Mechanical and Environmental**
- Unbreakable code disk
- Flexible mounting
- Eliminated bearing loads
- Insulated from motor housing/shaft temperatures to 125°C
- Heavy duty shaft seals; Sealed connector

**Electrical**
- Overvoltage, reverse voltage, & output short circuit protection
- Noise immunity to EN50082-2

**DESCRIPTION**

The Series HS35 Sealed Hollowshaft is equipped with an unbreakable disk that 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 HS35 has complete electrical protection from over-voltage, reverse voltage, and output short circuits. In addition, the Series HS35 is not only electrically & thermally isolated, but also environmentally sealed with shaft seals at both ends.

The 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, Group F & G. 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).

Note: For CSA Division 2, Group F & G, certification, Dynapar Adapter Kit P/N 114064-0001 must be used.
Harsh-Duty Optical Encoder Meets Stringent Washdown Requirements

### 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 (balanced with B low)

**Waveforms:** Sine wave with rise and fall times less than 1 microsecond into a load capacitance of 1000 pF

#### ELECTRICAL

**Input Power:**

<table>
<thead>
<tr>
<th>Source</th>
<th>Sink or Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>mA</td>
<td>max. including output loads</td>
</tr>
</tbody>
</table>

**Waveforms:**

<table>
<thead>
<tr>
<th>Index</th>
<th>Data B</th>
</tr>
</thead>
<tbody>
<tr>
<td>(90°ELEC)</td>
<td></td>
</tr>
</tbody>
</table>

**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

**DATA AND INDEX**

Not all complements shown.

A shown for reference.

**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" (63 mm) radial typical

Endplay: ±0.050" (1.27 mm) axial typical

Minimum: 1.25 (32 mm) recommended

Maximum: 2.0" (51 mm) to fit inside cover

Solid shaft recommended; keyway allowed; flatted shaft 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-sec²

> 5/8" bore: 25.6 x 10^-4 oz-in-sec²

**Weight:** 16 oz max.

#### ENVIRONMENTAL

**Operating Temperature:**

<table>
<thead>
<tr>
<th>Standard</th>
<th>−40 to +70°C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extended</td>
<td>−40 to +100°C</td>
</tr>
</tbody>
</table>

**Shock:**

50 Gs for 11 milliseconds duration

**Vibration:**

5 to 2000 Hz at 20 Gs

**Humidity:**

5% to 98% without condensation

**Enclosure Rating:**

NEMA4/IP67

**Hazardous Location Certification:**

Available as Optional Feature. Class I, Division 2, Group A, B, C & D. CSA Rle No. LR68404

#### ELECTRICAL CONNECTIONS

6, 7 & 10 Pin MS Connectors and Cables - Code 7= to 6, A to G

Connector & mate/accessory cable assembly pin numbers and wire color information is provided here for reference. HS35 models with direct cable exit carry the same color coding as shown for each output configuration.

**5 & 8 Pin M12 Accessory Cables when Code 7= H or J**

Encoder pin numbers and cable assembly wire color information is provided here for reference.

<table>
<thead>
<tr>
<th>Encoder Configuration</th>
<th>Cable Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 &amp; 8 Pin M12 Accessory Cables when Code 7= H or J</td>
<td></td>
</tr>
</tbody>
</table>

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

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**Customer Service +1 800.873.8731 • Technical Support +1 800.234.8731**

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Factory Automation Worldwide Brands: Dynapar™ • Harowe™ • Hengstler™ • NorthStar™
## Harsh-Duty Optical Encoder

### Series HS35

**Harsh-Duty Optical Encoder... Meets Stringent Washdown Requirements**

**DIMENSIONS** Inches [mm]

<table>
<thead>
<tr>
<th>Code</th>
<th>Dimensions</th>
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</thead>
<tbody>
<tr>
<td>1, 2</td>
<td>C-face Motor Mount</td>
</tr>
<tr>
<td>3</td>
<td>Fan Cover Motor Mount</td>
</tr>
<tr>
<td>4, 5, 6, 7</td>
<td>Cover Option</td>
</tr>
<tr>
<td>0, 1</td>
<td>6 &amp; 7 Pin MS</td>
</tr>
<tr>
<td>2</td>
<td>10 Pin MS</td>
</tr>
<tr>
<td>3</td>
<td>12 Pin MS</td>
</tr>
<tr>
<td>H, J</td>
<td>5 &amp; 8 Pin M12</td>
</tr>
<tr>
<td>A-G</td>
<td>Cables</td>
</tr>
</tbody>
</table>

**Code 4: Fixing**

- Tethers may be installed in 45° increments.
- Tether mounting holes: 2 x #6-32 x .25" dp. on Ø2.437" B.C. both sides.

**Code 7: Termination**

- 6 & 7 Pin and 10 Pin shown with LED Output Indicator Option - Code 8: PS

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.

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HS35 Data Sheet (9/08)
ORDERING INFORMATION

<table>
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<tr>
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<tbody>
<tr>
<td>HS35</td>
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</tbody>
</table>

Ordering Information

HS35 Size 35 heavy-duty, sealed hollowshaft encoder

0001 0500 0 6 mm
0003 0512 1 1/4"
0010 0600 2 5/16"
0012 0900 3 8 mm
0050 1000 4 3/8"
0060 1024 5 10 mm
0064 1200 6 12 mm
0100 1270 7 1 1/2"
0120 1500 8 5/8"
0240 1800 9 15 mm
0250 2000 A 16 mm
0300 2048 B 19 mm
0360 2400 C 3/4"
0360 2400 D 20 mm
0400 2500 E 7/8"
0400 2500 F 24 mm
0400 2500 G 1"
0400 2500 H 1 1/8"
0400 2500 P 1 1/4"

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 D-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

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 (ABB)
4 differential, bidirectional with index (ABAABZ)

Available when Code 5 is 3, 4 or 5:
3 5-26V in, 5-26V open collector out
4 5-26V in, 5-26V open collector out w/ 2.2kΩ pullups
5 2-6V in, 2-6V push-pull out

Available when Code 5 is 3, 4 or 5:
3 5-26V in, 5-26V 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)

Available when Code 6 is 3, 4, 5, 6, A or B, and Code 7 is 2, 3, or 7 thru G, J:
4 differential, bidirectional with index (ABAABZ)

Available when Code 6 is 3, 4 or 5:
3 same as '4' with extended temp. to 100˚C
4 same as '4' with extended temp. to 100˚C

0 6 pin connector
1 7 pin connector
2 10 pin connector
3 12 pin connector
4 6 pin connector, plus mating connector
5 7 pin connector, plus mating connector
6 10 pin connector, plus mating connector
7 12 pin connector, plus mating connector
8 12 pin connector, plus mating connector

0 18" (5m) cable
1 36" (1m) cable
2 72" (2m) cable
3 10" (3m) cable
4 13" (3m) cable
5 with 10 pin connector plus mating connector
6 13" (.3) cable
7 8 PIN M12 Connector

Available when Code 5 is 0 thru 2
H 5 Pin M12 Connector

D2 Hazardous Location Certified
D3 Same as D2 including adapter for CSA Div. 2, Group F & G Certification (see specifications)

Note: Requires use of Mating Cable Assembly 114074-XXXX available when Code 7 is 2

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