Shafted Encoder

Key Features

- Optional Extended Temperature Range of −40° to +85°C
- High 5000 PPR Resolution Available
- Industry Standard Size 25 (2.5”)

SPECIFICATIONS

STANDARD OPERATING CHARACTERISTICS

Code: Incremental, Optical

Resolution: 3000 to 5000 PPR (pulses/revolution)

Accuracy: (Worst case any edge to any other edge) ±10.8°/PPR

Format: Two channel quadrature (AB) with optional Index (Z) and complementary outputs

Phase Sense: A leads B for CW or CCW shaft rotation as viewed from the shaft end of the encoder; see Ordering Information

Quadrature Phasing: 90° ± 25° electrical

Symmetry: 180° ± 25° electrical

Index: 90° ± 25° 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 80 mA max., not including output loads

Outputs:

- 7272 Push-Pull: 40mA, sink or source
- 7272 Differential Line Driver: 40 mA, sink or source
- 7273 Open Collector: 40mA, sink max

Frequency Response: 250 kHz

Noise Immunity: Tested to EN61326-1

Electrical Immunity: Reverse polarity and short circuit protected

Termination: MS Connector, M12 Connector, Cable Exit

Mating Connector:
- 7 pin, style MS3106A-16S-1S (MCN-N5)
- 10 pin, style MS3106A-18-1S (MCN-N6)
- 10 pin, NEMA4 style (MCN-N6N4)
- Cable w/ 5 pin M12 Connector (112859-XXXX)
- Cable w/ 8 pin M12 Connector (112860-XXXX)

MECHANICAL

Shaft Sizes: 1/4” or 3/8”

Shaft Loading: 40 lbs. radial, 30 lbs. axial

Shaft Speed: 10,000 RPM max. (See Frequency Response)

Starting Torque: (max at 25 °C)

HC525: 1.0 oz-in;

HC625: 2.5 oz.-in

Moment of Inertia: 2.83 x 10^-4 oz-in–sec^2

Housing and Cover: Aluminum

Shaft Material: Stainless Steel

Disc Material: Glass

Weight: 1.5 lbs

ENVIRONMENTAL

Operating Temperature:

- Standard: 0 to +70 °C;
- Extended: −40 to +85 °C

Storage Temperature: −40 to +90 °C

Shock: 50 G’s for 11 milliseconds duration

Vibration: 5 to 2000 Hz at 20 G’s

Humidity: Up to 98% (non-condensing)

Enclosure Rating:

HC525: NEMA12/IP54 (dirt tight, splashproof);

HC625: NEMA4/IP66 (dust proof, washdown)
### Ordering Information

To order, complete the model number with code numbers from the table below:

<table>
<thead>
<tr>
<th></th>
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<tbody>
<tr>
<td>HC 25</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3000</td>
<td>3.000</td>
<td>1</td>
<td>7 Pin Connector or Cable</td>
<td>0</td>
<td>5-26V in; 5-26V</td>
<td>Blank and Code 6 is PS Available when Code 4 is 0 or 1: Output Indicator</td>
<td></td>
</tr>
<tr>
<td>HC 25</td>
<td>3600</td>
<td>3.600</td>
<td>2</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>4096</td>
<td>4.096</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>5000</td>
<td>5.000</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

#### Code 1
- HC525: Size 25 Enclosed, Shielded Bearings
- HC625: Size 25 Enclosed, with Shaft Seal

#### Code 2: PPR
- 5000, 3600, 3000

#### Code 3: Mechanical
- 1: Flange Mount, 3/8" Shaft
- 2: Flange Mount, 1/4" Shaft
- 3: 2.50" Servo Mount/4 Hole, 2.00" BC Face Mount, 3/8" Shaft
- 4: 2.50" Servo Mount/3 Hole, 2.00" BC Face Mount, 3/8" Shaft
- 5: 2.50" Servo Mount/3 Hole, 2.00" BC Face Mount, 1/4" Shaft
- 6: 2.50" Servo Mount/3 Hole, 1.88" BC Face Mount, 3/8" Shaft
- 7: 2.50" Servo Mount/3 Hole, 1.88" BC Face Mount, 1/4" Shaft
- 8: 2.62" Servo Mount/3 Hole, 1.88" BC Face Mount, 3/8" Shaft
- 9: 2.62" Servo Mount/3 Hole, 1.88" BC Face Mount, 1/4" Shaft

#### Code 4: Output
- 0: Single Ended, no Index, Format A, Table 2
- 1: Single Ended, with Index, Format A, Table 2
- 2: Differential, no Index, Format C, Table 3
- 3: Single Ended, with Index, Format C, Table 2
- 4: Single Ended, no Index, Format D, Table 2
- 5: 5-26V in; 5-26V Open Collector with 2.9k Pull-up out
- 6: 5-26V in; 5-26V Open Collector out
- 7: 5-26V in; 5V Totem Pole out
- 8: 5-26V in; 5V Line Driver out
- 9: 5-26V in; 5-26V Line Driver out

#### Code 5: Electrical
- A: Same as "B" with extend. temp range
- B: Same as "A" with extend. temp range
- C: Same as "E" with extend. temp range
- D: Same as "F" with extend. temp range
- E: Same as "G" with extend. temp range

#### Code 6: Termination
- 0: End Mount Connector
- 1: Side Mount Connector

#### Code 7: Options
- Blank: None

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**Cable Assemblies with MS Connector**

- **HCN-5**: 7 pin, style MS3106A-165-1S
- **HCN-6**: 10 pin, style MS3106A-18-1S
- **HCN-6N4**: 10 pin, NEM4 style

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**Cable Assemblies with M12 Connector**

- 1400431XXXX: 7 Pin MS, Cable Assy. For Use with Single Ended w/Index Outputs
- 108596-XXXX: 7 Pin MS, Cable Assy. For Use with Differential Line Driver w/o Index Outputs
- 1400635XXXX: 10 Pin MS, Cable Assy. For Use with Differential Line Driver with Index Outputs
- 109209-XXXX: NEM4 10 pin MS, Cable Assy. For Use with Differential Line Driver with Index Outputs

**Cable Assemblies with M12 Connector**

- 112659-XXXX: 5 Pin M12, Cable Assy. For Use with Single Ended Outputs
- 112660-XXXX: 8 Pin M12, Cable Assy. For Use with Single Ended Outputs
- 112660-XXXX: 8 Pin M12, Cable Assy. For Use with Differential Line Driver Outputs

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**Note:** Standard cable length is 10 feet but may be ordered in any length in 5 foot increments. For example, for a 20 foot cable, replace XXXX with -0020.
**SERIES HC25**

**ELECTRICAL CONNECTIONS**

Prewired Cable or Accessory Cables with 7 or 10 Pin MS Connector - when Code 4 = 0 to 6, or A, B, C, D or G

Note: Wire color codes are referenced here for models that are specified with pre-wired cable. Connector/cables are described in the Encoder Accessories section of this catalog and color-coding information is provided here for reference.

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

<table>
<thead>
<tr>
<th>Table 1 – Differential</th>
<th>Table 2 – Single Ended</th>
<th>Table 3 – Differential</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Encoder Function</strong></td>
<td><strong>Cable # 109209-XXXX</strong> or <strong>1400635XXXX</strong> 10 Pin Dif Line Driver w/ Index</td>
<td><strong>Cable # 140043/1XXXX</strong> 7 Pin Single Ended w/ Index Outputs</td>
</tr>
<tr>
<td><strong>Pin</strong></td>
<td><strong>Wire Color Code</strong></td>
<td><strong>Cable Accessory Color Code</strong></td>
</tr>
<tr>
<td>Signal A</td>
<td>A</td>
<td>BRN</td>
</tr>
<tr>
<td>Signal B</td>
<td>B</td>
<td>ORN</td>
</tr>
<tr>
<td>Signal Z*</td>
<td>C</td>
<td>YEL</td>
</tr>
<tr>
<td>Power Source</td>
<td>D</td>
<td>RED</td>
</tr>
<tr>
<td>N/C</td>
<td>E</td>
<td>—</td>
</tr>
<tr>
<td>Common</td>
<td>F</td>
<td>BLK</td>
</tr>
<tr>
<td>Case</td>
<td>G</td>
<td>GRN</td>
</tr>
<tr>
<td>Signal A</td>
<td>H</td>
<td>BRN/WHT</td>
</tr>
<tr>
<td>Signal B</td>
<td>I</td>
<td>ORN/WHT</td>
</tr>
</tbody>
</table>

| 5 & 8 Pin M12 Accessory Cables - when Code 4 = H to Z | |

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

<table>
<thead>
<tr>
<th>Table 4</th>
<th>Table 5</th>
<th>Table 6</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Encoder Function</strong></td>
<td><strong>Cable # 112859-XXXX</strong> 5 Pin Single Ended</td>
<td><strong>Cable # 112860-XXXX</strong> 8 Pin Single Ended</td>
</tr>
<tr>
<td><strong>Pin</strong></td>
<td><strong>Wire Color Code</strong></td>
<td><strong>Pin</strong></td>
</tr>
<tr>
<td>Signal A</td>
<td>4</td>
<td>BLK</td>
</tr>
<tr>
<td>Signal B</td>
<td>2</td>
<td>WHT</td>
</tr>
<tr>
<td>Signal Z*</td>
<td>5</td>
<td>GRY</td>
</tr>
<tr>
<td>Power +V</td>
<td>1</td>
<td>BRN BLU</td>
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<tr>
<td>Com</td>
<td>3</td>
<td>—</td>
</tr>
<tr>
<td>Signal A</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Signal B</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Signal Z*</td>
<td>—</td>
<td>—</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Table 5</th>
<th>Table 6</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Encoder Function</strong></td>
<td><strong>Cable # 108596-XXXX</strong> 7 Pin Dif Line Driver w/o Index</td>
</tr>
<tr>
<td><strong>Pin</strong></td>
<td><strong>Wire Color Code</strong></td>
</tr>
<tr>
<td>Signal A</td>
<td>A</td>
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<tr>
<td>Signal B</td>
<td>B</td>
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<tr>
<td>Signal Z*</td>
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<td>Power Source</td>
<td>D</td>
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<td>Common</td>
<td>E</td>
</tr>
<tr>
<td>Case</td>
<td>F</td>
</tr>
<tr>
<td>Signal A</td>
<td>G</td>
</tr>
</tbody>
</table>

**NOTES:**

1) Cable Configuration (Tables 1 and 3): PVC jacket, 105 °C rated, overall foil shield; 3 twisted pairs 26 AWG (output signals), plus 2 twisted pairs 24 AWG (input power)
2) Cable Configuration (Table 2): PVC jacket, 105 °C rated, overall foil shield; 3 twisted pairs 26 AWG (output signals), plus 2 twisted pairs 24 AWG (input power)
3) Cable Configuration (Tables 4, 5 and 6): PVC jacket, 105 °C rated, overall foil shield; 24 AWG conductors, minimum
4) Standard cable length is 10 feet but may be ordered in any length in 5 foot increments. For example, for a 20 foot cable, replace -XXXX with -0020
5) * Index not provided on all models. See ordering information.
6) **For watertight applications, use NEMA4 10 pin cable & connector 109209-XXXX
7) “MS” Type mating connectors and pre-build cables are rated NEMA 12
8) “M12” Cable assemblies are rated IP67
DIMENSIONS

Code 3: Mechanical

0.2: Flange
1.3: 2.5° Servo
4.5: 2.5° Servo
6.7: 2.5° Servo
8.9: 2.62° Servo

Code 4: Output

0 - 3: Format A
4.5: Format B
6 - D: Format C
G: Format D

Code 6: Termination

0: End MS Connector
1: Side MS Connector
0: End M12 Connector
1: Side M12 Connector

Note: Flat provided on 3/8" shaft

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