The H25 is the flagship of the BEI Sensors product line. It was designed from the ground up for the industrial marketplace. The H25 offers features such as EMI shielding, 40 lb. ABEC 7 bearings, matched thermal coefficients on critical components, and custom high-efficiency optics. The encoder meets NEMA 4 and 13 requirements when ordered with the shaft seal. Typical applications include machine control, process control, the wood processing industry, oil well logging, industrial weighing, agricultural machinery, textile equipment, web process control, robotics, and food processing.

Special Models of the H25 Incremental Encoder are available with one or more of the following certifications. Consult factory for details.

- EN 61000-6-4 and EN 61000-6-2
- UL 12.000SX
- UL 13.0071X
- Class I, Group A,B,C & D; Class II Group E,F & G
- Class I, Zone 0, Group IIC

Mechanical Specifications

- Shaft Diameter: 3/8" (1/2" as special feature)
- Flat On Shaft: 3/8" Shaft: 0.80 long X 0.033" deep; 1/2" Shaft: 0.80 long X 0.04" deep (1/2" shaft w/fat must be ordered as special feature)
- Shaft Loading: 3/8" shaft: Up to 40 pounds axial and 35 pounds radial; 1/2" shaft: Up to 90 pounds axial and 80 pounds radial
- Shaft Runout: 0.0005 T.I.R. at midpoint regardless of shaft diameter
- Starting Torque at 25°C: Without shaft seal 1.0 in-oz (max); With shaft seal 2.5 in-oz (max); 1/2" shaft with shaft seal: 3.5 in-oz (max)
- Bearings: Class ABEC 7 standard, ABEC 5 for 1/2" shaft
- Shaft Material: 416 stainless steel
- Bearing Housing: Die cast aluminum with protective finish; stainless steel (special feature)
- Cover: Die cast aluminum; stainless steel (special feature)
- Bearing Life: 2 X 10^8 revs (1300 hrs at 2500 RPM)
- Moment of Inertia: 4.1 X 10^-4 oz-in-sec^2; 5.2 X 10^-4 oz-in-sec^2 with 1/2" shaft
- Weight: 13 oz typical, 14.5 oz typical with 1/2" shaft

Electrical Specifications

- Code: Incremental
- Output Format: 2 channels in quadrature, 1/2 cycle index gated with negative & channel
- Cycles Per Shaft Turn: 1 to 72,000 (see table 2) For resolutions above 6,000 see BEI for interpolation options
- Supply Voltage: 5 to 28 VDC available
- Current Requirements: 100 mA typical + output load, 250 mA (max)
- Voltage/Output: (see note 5)
  - 15V/V: Line Driver, 5–15 VDC in, Vout = Vin
  - 28V/V: Line Driver, 5–28 VDC in, Vout = Vin
- Shaft Loading: 3/8" shaft: Up to 40 pounds axial and 35 pounds radial; 1/2" shaft: Up to 90 pounds axial and 80 pounds radial
- Shaft Runout: 0.0005 T.I.R. at midpoint regardless of shaft diameter
- Starting Torque at 25°C: Without shaft seal 1.0 in-oz (max); With shaft seal 2.5 in-oz (max); 1/2" shaft with shaft seal: 3.5 in-oz (max)
- Bearings: Class ABEC 7 standard, ABEC 5 for 1/2" shaft
- Shaft Material: 416 stainless steel
- Bearing Housing: Die cast aluminum with protective finish; stainless steel (special feature)
- Cover: Die cast aluminum; stainless steel (special feature)
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- Moment of Inertia: 4.1 X 10^-4 oz-in-sec^2; 5.2 X 10^-4 oz-in-sec^2 with 1/2" shaft
- Weight: 13 oz typical, 14.5 oz typical with 1/2" shaft

H25 Incremental Ordering Options

Use this diagram, working from left to right to construct your model number (example: H25D-SS-2000-ABZC-28V/V-SM18).

All notes and tables referred to can be found on pages the back of this page.
Tables

Table 1: Incremental Output Terminations

The connector style will determine pinouts. For example, an encoder with ABC channels and an M16 connector uses the table to the right.

<table>
<thead>
<tr>
<th>M14 CONNECTOR</th>
<th>M16 CONNECTOR</th>
<th>CHANNELS DESIGNATED IN MODEL NO.</th>
<th>PIN</th>
<th>CHANNEL</th>
</tr>
</thead>
<tbody>
<tr>
<td>E</td>
<td>A</td>
<td>A</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>C</td>
<td>D</td>
<td>+V</td>
<td>X</td>
<td>Z</td>
</tr>
<tr>
<td>B</td>
<td>F</td>
<td>+V (Supply Voltage)</td>
<td>Y</td>
<td>G</td>
</tr>
<tr>
<td>A</td>
<td>G</td>
<td>0V (Circuit Common)</td>
<td>H</td>
<td>Z</td>
</tr>
</tbody>
</table>

Table 2: Disc Resolutions for Incremental Encoder Models H25, H38, H40, L25, E25

Resolutions highlighted with are available as standard Model 25 EXPRESS ENCODERS® that ship in one to three days.


*All or ABC output only. NOTE: Resolutions up to 72,000 are available.

These commodities, technology or software exported from the United States must be in accordance with the Bureau of Industry and Security, Export Administration regulations. Divergence contrary to U.S. Law is prohibited.

Figure 1

Output Waveform

Notes

1. Mounting is usually done either using the D-style square flange mount, E- or G-style servo mount, or one of the standard face mounts, F1 for example. Consult factory for additional face mount options.

2. The shaft seal is recommended in virtually all installations. The most common exceptions are applications requiring a very low starting torque or those requiring operation at both high temperature and high speed.

3. Non-standard index widths and multiple indices are available by special order. Consult factory.

4. Complementary outputs are recommended for use with line driver type (source/sink) outputs. When used with differential receivers, this combination provides a high degree of noise immunity.

5. Output IC’s: Output IC’s are available as either Line Driver (LD) or NPN Open Collector (OC) types. Open Collectors require pull-up resistors, resulting in higher output source impedance (sink impedance is similar to that of line-drivers). In general, use of a Line Driver style output is recommended. Line Drivers source or sink current and their lower impedance mean better noise immunity and faster switching times. Warning: Do not connect any line driver outputs directly to circuit common, which may damage the driver.

6. Unused outputs should be isolated and left floating. Our applications specialists would be pleased to discuss your system requirements and the compatibility of your receiving electronics with Line Driver type outputs.

28V/V: Multi-voltage Line Driver (7222): 100 mA TSSOP/L (5V/OC type), 100 mA TSSOP/L (5V/OCR type). This is the revised replacement for 3801R and 7401R open collector outputs with internal pull-up resistors. It is also a direct replacement for any 4469, 4863C, 6830 or 26LS31 line driver.

28V/5: Multi-voltage Line Driver (7227): 100 mA TSSOP/L (5V/OC type), 100 mA TSSOP/L (5V/OCR type), internal 5V (3V TTL compatible) logic out. Supply lines are protected against overvoltage to 60 volts and reverse voltage. Outputs are short circuit protected for one minute. Supply current is 120 mA typ (plus load current). This is the recommended replacement for 3804R and 7404R open collector outputs with internal pull-up resistors. It is also a direct replacement for any 4469, 4863C, 6830 or 26LS31 line driver.

38V/V: Multi-voltage Line Driver (4469): 100 mA TSSOP/L (5V/OC type), 100 mA TSSOP/L (5V/OCR type), internal 5V (3V TTL compatible) logic out. Supply lines are protected against overvoltage to 60 volts and reverse voltage. Outputs are short circuit protected for one minute. Supply current is 120 mA typ (plus load current). This is the direct replacement for the 4469 Line Driver.

28V/OC: NPN Open Collector (3804, 7404): Current sink of 80 mA max. Current sourced by external pull-up resistor. Output can be pulled up to voltage other than supply voltage (30V max), Input voltage 5 to 28 VDC +/- 5% standard. Supply current is 120 mA typ, This replaces prior IC’s with designations of 3004, 7404, 3302, 681 and 6899.

5V/OCR, 15V/OCR, 24V/OCR: (Open Collector) (3904*, 4723*, 7273*): Current sink of 70 mA max. Includes internal pull-up sized at approximately 100 ohms/ volt. 5V, 5V/OC, 5V/OCR and 9V/OC can be intrinsically safe line driver and open collector outputs available on certain model variations. They are intrinsically safe only when installed per the contrabooking noted on the certification label affixed to the encoder body.

3004, 3904R, 4469, 5V/OC, 15V/OCR, 24V/OCR: Intrinsically safe line driver and open collector outputs. These drivers are specific to intrinsically safe encoders, and are installed per the appropriate control drawings listed in Table 2.1 on page 48.

6. Special –S at the end of the model number is used to define a variety of non-standard features such as special shaft lengths, voltage options, or special testing. Please consult the factory to discuss your special requirements.

7. Higher frequency response may be available. Please consult with the factory.

8. Mating straight plug receptacles may be ordered from the factory: For M12 use MS3116F12-19S, For M14 use MS3106F19S-6S, For M14/19 use MS3116L19S-14S, For M16 use MS3106F18S-1S, For M16 use MS3106F18S-1S. * Products manufactured prior to April 2007 used the line driver IC number instead of voltage output in model number.