The L25 is a lighter duty version of BEI’s H25 optical encoder. Incorporating the same high quality optics and electronics as the H25, the L25 also offers low starting torque. Other features include ABEC 5 bearings, EMI shielding, a 1/4” diameter stainless steel shaft and a drawn aluminum cover. Typical applications include use with light machine tools, test and laboratory instrumentation, the biomedical industry and flow metering.

**Mechanical Specifications**

- **Shaft Diameter:** 1/4” nominal
- **Flat On Shaft:** 0.80 long x 0.03 deep
- **Shaft Loading:** up to 5 lbs. axial and 8 lbs. radial
- **Shaft Runout:** .0005 T.I.R. maximum
- **Starting Torque at 25°C:** 0.07 in-oz typical, 0.12 in-oz maximum without sealed bearings; 0.50 in-oz typical, 1.0 in-oz maximum with sealed bearings
- **Bearings:** Class ABEC 5
- **Shaft material:** 416 stainless steel
- **Bearings Housing:** Die cast aluminum with iridite finish
- **Cover:** Drawn aluminum, 0.060” wall, protective finish standard. Die cast aluminum with protective finish for EM, SM, ECS and SCS terminations
- **Bearing Life:** 1 X 10⁹ revs (6,700 hrs at 2500 RPM)
- **Maximum RPM:** 10,000
- **Moment of Inertia:** 4.1 x 10⁻⁴ oz-in-sec²
- **Weight:** 13 oz. typical

**Electrical Specifications**

- **Code:** Incremental
- **Cycles Per Shaft Turn:** 1 to 28,800
- **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
  - 28V/5V: Line Driver, 5–28 VDC in, Vout = 5 VDC
  - 28V/OC: Open collector, 5–28 VDC in, OCout
- **Current Requirements:**
  - TTL: 175 mA maximum 125 mA typical
- **Output Format:**
  - 2 channels in quadrature = 27º electrical typical. Optional index is typically gated 1/2 cycle wide (see figure 1)
- **Protection Level:** Reverse, overvoltage and output short circuit (4469, 7272 only)
- **Frequency Response:** 100 kHz (see note 7), up to 800 KHz with interpolation option
- **Output Terminations:** (see table 1)

**Environmental Specifications**

- **Enclosure Rating:** NEMA 2 (IP43)
- **Temperature:** Operating, 0º to 70º C; extended temperature testing available (see note 8); storage; -25º to 90º C
- **Shock:** 50 g’s for 11 msec duration
- **Vibration:** 5 to 2000 Hz @ 20 G’s
- **Humidity:** 98% RH without condensation

**NOTES & TABLES:** All notes and tables referred to in the text can be found on the back of this page.

**Model L25 Ordering Options**

Use this diagram, working from left to right to construct your model number (Example: L25G-F3-SB-2000-ABZC-28V/V-SC18).

- **L25**
- **G**
- **Face Mounts** (F1, F2, F3, or F4)
- **Cycles Per Turn**
- **Complements**
- **Output Termination Location**
- **Housing Config.**
- **Shaft Seal Configuration**
- **No. of Channels**
- **Voltage/Output**
- **Special Features**

**FOR ASSISTANCE CALL 800-350-2727**
Table 1—Incremental Output Terminations

The connector style will determine pinouts. For example, an encoder with ABC channels and an M18 connector uses the table to the right.

<table>
<thead>
<tr>
<th>M18 CONNECTOR</th>
<th>PIN</th>
<th>CHANNEL</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td></td>
<td>A</td>
</tr>
<tr>
<td>B</td>
<td></td>
<td>B</td>
</tr>
<tr>
<td>C</td>
<td></td>
<td>C</td>
</tr>
<tr>
<td>D</td>
<td></td>
<td>D</td>
</tr>
<tr>
<td>E</td>
<td></td>
<td>E</td>
</tr>
<tr>
<td>F</td>
<td></td>
<td>F</td>
</tr>
<tr>
<td>G</td>
<td></td>
<td>G</td>
</tr>
</tbody>
</table>

WIRE COLOR (22 AWG) | DA 15P CONNECTOR | CHANNELS DESIGNATED IN MODEL NO. |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>RED</td>
<td>1</td>
<td>0 V (CIRCUIT COMMON)</td>
</tr>
<tr>
<td>WHITE</td>
<td>9</td>
<td>CASE GROUND (Coaxial Connecting Cable)</td>
</tr>
</tbody>
</table>

Table 2—Disc Resolutions for Incremental Encoder Model L25

<table>
<thead>
<tr>
<th>L25G - M16 or M18</th>
<th>Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>SIDE CABLE (SC) 15° PULL-UP LEADS (STANDARD 22 AWG)</td>
<td>END CABLE (EC) OPTIONAL</td>
</tr>
<tr>
<td>1.65 (SM18) 0.2495 Ø 0.2497</td>
<td>SM CONNECTOR</td>
</tr>
<tr>
<td>0.250 Min.</td>
<td>Deep</td>
</tr>
<tr>
<td>4 places equally spaced on a Ø 2.00 bolt circle.</td>
<td>SM CONNECTOR</td>
</tr>
<tr>
<td>END CONNECTION</td>
<td>M18 CONNECTOR</td>
</tr>
<tr>
<td>6.2500 2.500 ± 0.03</td>
<td>Ø 1.875 bolt circle.</td>
</tr>
<tr>
<td>0.88 0.125</td>
<td>2.498</td>
</tr>
<tr>
<td>0.22 45°</td>
<td>0.250 Min.</td>
</tr>
<tr>
<td>4 places equally spaced on a Ø 1.272 bolt circle. (900 square, Ref.)</td>
<td>Ø 3.047 0.2495</td>
</tr>
<tr>
<td>Optional Face Mounts</td>
<td>L25G - M16 or M18</td>
</tr>
</tbody>
</table>

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

The shaft seal is recommended in virtually all installations. The most common exceptions are applications requiring 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. Optional ICs: Optional ICs are available as either Line Driver (LD) or NPN Open Collector (OC) types. Open Collectors require pull-up resistors, resulting in higher overall noise immunity. In general, use of a Line Driver style output is recommended. Line Driver sources 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 components, which may damage the driver. 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/5V: Multi-voltage Line Driver (7272); 100 mA source/sink. Input voltage 5 to 28 VDC +5% standard (Note: VDD = VCC). This is TTL compatible when used with 5 V output. 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 typical (load current). This is the recommended replacement for 3040R and 74060R open collector outputs with internal pull-up resistors. It is also a direct replacement for any 4469, 8830, 8830D or 23L831 line driver.

28V/15V: Multi-voltage Line Driver (7272); 100 mA source/sink. Input voltage 5 to 28 VDC +5% standard (Note: VDD = VCC). TTL compatible when used with 5 V output. Supply lines are protected against overvoltage to 60 volts and reverse voltage. Outputs are short circuit protected for one minute. Supply current is 90 mA typical (load current). This is a direct replacement for the 4469 Line Driver. 28V/15V: NPN Open Collector (3904, 7273). Current sink of 80 mA max. Current sourced by external pull-up resistor. Output can be pulled up to voltage other than supply voltage (5 V max). Input voltage 5 to 28 VDC +5% standard. Supply current is 120 mA typical. This replaces prior ICs with designations of 3904, 7404, 3302, 681 and 689. 5V/OCR, 15V/OCR, 24V/OCR: Open Collector (3904R, 7404R, 7273R). Current sink of 15 mA max. Includes internal pull-ups sized at approximately 100 ohms/volt. Max current source is 10 mA. Supply current is 100 mA typical, 120 mA with internal pull-ups. The 5V/OCR, 15V/OCR and 24V/OCR are often replaced by the 28V/5V system in upgraded systems. 3904, 3904R, 4469, 5V/5V, 5V/15V, 5V/OCR, 15V/OCR, 24V/OCR: Intrinsically safe line driver and open collector outputs. These drivers are specifically intrinsically safe encoders, and are installed per the appropriate control drawings listed in Table 2 on this page.

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.

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

Extended temperature ratings are available in the following ranges:

-40 to 70°C for 85°C, –20 to 100°C and –40 to 125°C depending on the particular model. Some models can operate down to -55°C. Extended temperature ranges can affect other performance factors. Consult with factory for more specific information.

Mating straight plug receptacles may be ordered from the factory:

For M12 use MS13116F12-1S, For M14 use MS13106F14S-6S
For M14/19 use MS13116F14-1S, For M16 use MS13106F16S-1S
For M18 use MS13106F18S-1S, For M20 use MS13106F20S-2S