ENCODER DATA SHEET
INC35 & BIC35 INCREMENTAL ENCODERS

FEATURES
- Optical incremental encoder with long life LED light source
- INC35 is intended for rotation in one direction.
- BIC35 is intended for bidirectional rotation.
- Standard models with or without an index pulse
- BIC35 models output square waves in quadrature, or optionally pulse trains
- Several choices of output line drivers are optional.
- Standard units operate from +5 VDC. Other supply voltage ranges are optional.
- Internal count multiplication and direction sensing logic.
- Shaft seal, alternate output connector, low torque bearings are optional.
- Extended temperature range optional.

APPLICATIONS
- Radar Antennas
- Calibration, Test, and Other Ground Support Equipment
- Automatic Weight Logging
- Liquid Level Measurements

USE THIS BLOCK DIAGRAM TO ORDER

CODE FORMAT:
INC – UNIDIRECTIONAL INCREMENTAL
BIC – BIDIRECTIONAL INCREMENTAL

CONFIGURATION:
1A – STANDARD
2A – STANDARD W/ZERO INDEX
OTHER DESIGNATIONS ARE ASSIGNED BY FACTORY

OUTPUT SIGNAL TIMING DIAGRAM
ONE CYCLE
90 +/- 45 DEG

TABLE 1
<table>
<thead>
<tr>
<th>CYCLES PER 360°</th>
<th>DESIGNATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1024</td>
<td>10</td>
</tr>
<tr>
<td>1800</td>
<td>182</td>
</tr>
<tr>
<td>2048</td>
<td>11</td>
</tr>
<tr>
<td>3600</td>
<td>362</td>
</tr>
<tr>
<td>4096</td>
<td>12</td>
</tr>
<tr>
<td>5000</td>
<td>502</td>
</tr>
</tbody>
</table>

Approved for general release.

BEI Precision
1100 Murphy Drive  ■  Maumelle, AR 72113 USA  ■  Tel: 501-851-4000  ■  Fax: 501-851-5476

10/2010
MM-184B
### MECHANICAL CHARACTERISTICS

- **Dimensions** per Figure 1
- **Weight** 48.0 oz maximum
- **Starting Torque** 0.5 oz-in maximum @ 25°C
- **Moment of Inertia** 0.6 oz-in² maximum
- **Slewing Speed** (See note 1) 3000 RPM maximum
- **Operating Speed (See Note 1)**
  - Models without Zero index: \[ \frac{50KHz}{cycles / 360°} \times 60 \]
  - Models with Zero index: \[ \frac{15KHz}{cycles / 360°} \times 60 \]
- **Shaft rotation** Continuous & Reversible
- **Mechanical Life** \(10^6\) Revolutions min
- **Shaft loading** 5.0 lbs max

### ELECTRICAL CHARACTERISTICS

- **Code Format** Optional – Unidirectional or Bidirectional with or without Zero Index
- **Input Power** 5.0 VDC ±5% @ 225 mA
- **Output Circuitry** DTL-TTL compatible. Fan out: 10 unit loads (UL) (1 UL = 1 DTL gate)
- **Output Logic Levels**
  - Logic ‘1’ +Vcc with 1K ±10% ohm source impedance.
  - Logic ‘0’ 0.0 to 0.5 VDC max with 12 mA sink current max
- **Illumination Source** Solid State (GaAs)
- **Type** 100,000 Hrs min
- **Useful Life**
- **Temperature**
  - Operating 0°C to 71°C
  - Storage -40°C to 85°C
- **Vibration** 5 to 500 Hz @ 20 g’s
- **Shock** 30 g’s for 11 ms duration

### ENVIRONMENTAL

- **Temperature**
  - Operating 0°C to 71°C
  - Storage -40°C to 85°C
- **Vibration** 5 to 500 Hz @ 20 g’s
- **Shock** 30 g’s for 11 ms duration

### NOTES:

1. Slewing Speed is the maximum mechanical speed to which the coder may be subjected without permanent degradation of performance. Operating Speed is the maximum mechanical speed at which the encoder may be read while maintaining full accuracy. In cases where Operating Speed calculates too higher value than Slewing Speed, the latter is the limiting factor. Higher operating Speeds up to 150 kHz are permissible, particularly with one channel models where quadrature alignment is not a applicable, and with two channel models where a broader quadrature quadrature alignment tolerance is permitted. quadrature tolerance specified (±45 Elect Deg) is Worst Case and considers maximum operating speed, input voltage tolerance and full temperature range.

2. Other input voltages (up to 15 volts) can be facilitated; Logical ‘1’ level will be equal to VCC with a 1K ±10% ohm source impedance. Additionally, higher sink currents (up to 45 mA) can be facilitated; Logical ‘0’ level will be 1 volt typical and 1.75 volt maximum when sinking 45 mA. Specify input voltage (Vcc) and tolerance, and sink current requirement on purchase order (if other than standard).

3. Special configurations, such as the following, are available on special order:
   - Low Torque Bearings
   - Line Driver Output Circuitry
   - Internal Count Multiplication and Direction Sensing Logic
   - Other Resolutions
   - Shaft Seals
   - Extended Operating Temperature Range

---

*Specifications Subject to Change Without Notice*