LP series Incremental Encoder

- Low profile package saves space
- Excellent resistance to shock and vibration
- 30mm standard through shaft, PEEK reduction hub available
- High protection level of IP66
- High performance in temperatures from -40°C to +100°C
- Ruggedized HTL 11-30V push-pull
- Wiring fault tolerant output and overvoltage protection up to 60Vdc
- Long cables drive capability
- Resolutions from 1 to 10000 PPR
- Terminal box connection (also available with M12 or cable output)
- Also designed for use in hazardous areas (contact factory)

Certifications:
The LP Incremental Encoder is available with the following certifications

- 2004/108/CE
- UL listed
- CE

Output Waveform:
Waveform AA/ BB/ 00/ Channel B before A Clockwise

Index calibration gated A & B (code 9)

Index calibration gated B (code V/US)

Mechanical Characteristics:

<table>
<thead>
<tr>
<th>Material</th>
<th>Cover : anodised aluminum</th>
<th>Vibrations (EN60068-2-6)</th>
<th>≤ 200m.s⁻² (55 ... 2000 Hz)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Body : anodised aluminum</td>
<td>Shaft inertia</td>
<td>&lt; 84000 g.mm²</td>
</tr>
<tr>
<td></td>
<td>Shaft : AISI 303 stainless steel</td>
<td>Static/Dynamic torque</td>
<td>30 / 300 mN.m</td>
</tr>
<tr>
<td>Ball bearings</td>
<td>6807 - Sealed</td>
<td>Continuous max. speed*</td>
<td>6000 min⁻¹</td>
</tr>
<tr>
<td></td>
<td>Maximum loads</td>
<td>Theoretical mechanical lifetime L1h**</td>
<td>&gt; 18.10⁹ turns / 100000 hours</td>
</tr>
<tr>
<td></td>
<td>Axial: 40 N</td>
<td>Encoder weight (approx.)</td>
<td>790g</td>
</tr>
<tr>
<td></td>
<td>Radial: 80 N</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Shocks (EN60068-2-27) ≤ 3000m.s⁻² (during 5 ms)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Available mechanics – shaft options:

- HHUB: Through Hollow Shaft
- HHKB: Blind Hollow Shaft
- HHAB: Shaft with Integrated coupling
- HHMB: Solid Shaft

* please reference the user manual heat derating curves
** continuous max. speed – ½ max. load – ISO 281, L10
**Incremental Encoder**

**Terminal box connection**

**LP series**

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**Dimensions**

**HHUB** – Through hollow shaft – with terminal box

**Note:**

CHc: Hexagonal Socket head cap screws

HC: Hexagonal socket set screws

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**HHKB** – Blind hollow shaft – with terminal box

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Changes possible without further notice – Version 01/07
**Dimensions**

**HHAB** – Shaft with integrated coupling – with terminal box

**Dimensions**

**HHMB** – Solid shaft – with terminal box
## Electrical Characteristics:

<table>
<thead>
<tr>
<th>Version</th>
<th>Output signals</th>
<th>Resolution</th>
<th>Operating Voltage Vcl</th>
<th>Supply current (no loads)</th>
<th>Current per channel pair</th>
<th>Output Levels (ls=20mA)</th>
<th>Frequency capability</th>
<th>Short circuits proof</th>
<th>Reverse polarity tolerant &amp; Overvoltage protection</th>
<th>Wiring fault tolerant &amp; Overvoltage protection</th>
<th>Temperature range</th>
</tr>
</thead>
<tbody>
<tr>
<td>5GE</td>
<td>HTL</td>
<td>1 to 10000</td>
<td>11.30V 250mA</td>
<td>100mA</td>
<td>75mA</td>
<td>Low max: 1.5V High min: Vcl – 3.5V</td>
<td>Up to 300kHz</td>
<td>Yes</td>
<td>No</td>
<td>Yes Up to 60Vdc</td>
<td>-40°C +85°C</td>
</tr>
<tr>
<td>PG5</td>
<td>TTL RS422</td>
<td>5-30V 250mA</td>
<td>5V+/−5% 250mA</td>
<td>75mA</td>
<td>40mA</td>
<td>Low max: 0.5V High min: Vcl – 2.5V</td>
<td>Up to 1MHz</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>-40°C +100°C</td>
</tr>
<tr>
<td>2G2</td>
<td>TTL RS422</td>
<td>4.75-30V 250mA</td>
<td>75mA</td>
<td>40mA</td>
<td>Low max: 4V High min: Vcl</td>
<td>Up to 1MHz</td>
<td>Yes (except to Vcl)</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>-40°C +100°C</td>
</tr>
<tr>
<td>RG2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>No</td>
<td>No</td>
<td></td>
</tr>
</tbody>
</table>

Notes:
- UL listed: -20°C +80°C. Device must be supplied by a Class 2, LPS or SELV limited energy source.

## Connection:

<table>
<thead>
<tr>
<th>Terminal box connection</th>
</tr>
</thead>
<tbody>
<tr>
<td>GX</td>
</tr>
<tr>
<td>-</td>
</tr>
<tr>
<td>1</td>
</tr>
</tbody>
</table>

## Available resolutions:

Standard: 32 64 100 128 250 256 360 512 600 720 1000 1024 1200 1250 1500 2000 2048 2500 3600 4960 5000 7200 8192 10000

For non-standard and resolutions above 10000 PPR, please contact factory.

## LP Incremental Ordering Options

Use this diagram, working from left to right to construct your model number [Example: HHAB_E6//PG5V/US/01024//GXRX//U6****]

### TYPE:
- HHUB = hollow shaft
- HHKB = blind shaft
- HHAB = hollow shaft with integrated coupling
- HHMB = solid shaft

### SHAFT BORE:
- E5 = 5/8" (except HHAB with integrated coupling)
- E6 = 3/4"
- E8 = 1"
- 30 = 30mm
- 14 = 14mm
- 20 = 20mm
- 12 = 12mm

### VOLTAGE/OUTPUT:
- 2G2 = 5V voltage and RS422 output
- 5GE = 11-30V voltage and push-pull output
- PG5 = 5-30V voltage and push-pull output
- RG2 = 4.75-30V voltage and RS422 output

### CHANNELS:
- 9 = A/ B/ Z before A **
- V/US = A/ B/ Z before A
- Z gated A&B
- ** = No anti-rotation

### CYCLES/TURN:
- U3 = With insulated sleeve
- U5 = Blind sleeve
- U6 = Through sleeve

### OUTPUT TERMINATION:
- GXR = Terminal box

### HUB:
- HHAB = Anti-rotation for HHAB and HHKB

### ANTI-ROTATION:
- ** = No anti-rotation

Stainless steel option available

Anti-rotation accessory: M9230-04/xxx Ball end tether arm (xxx = length in cm) to be ordered separately.