Encoders
optical Encoder, digital outputs,
1000 lines per revolution, 3 channels, Line Driver

For combination with
Brushless DC-Motors

**Series 40B**

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lines per revolution</td>
<td>N 1000</td>
</tr>
<tr>
<td>Frequency range</td>
<td>up to 200 kHz</td>
</tr>
<tr>
<td>Signal output, square wave</td>
<td>2 + 1 index and complementary signals</td>
</tr>
<tr>
<td>Supply voltage</td>
<td>U_{oo} 4.5 ... 5.5 V DC</td>
</tr>
<tr>
<td>Current consumption, max.</td>
<td>I_{oo} 100 mA</td>
</tr>
<tr>
<td>Pulse width</td>
<td>P 180 ± 18 °</td>
</tr>
<tr>
<td>Index pulse width</td>
<td>P_{ref} 180 ± 36 °</td>
</tr>
<tr>
<td>Phase “A” to “B”</td>
<td>δ 90 ± 18 °</td>
</tr>
<tr>
<td>Signal rise/fall time, typical</td>
<td>tr/\text{tf} 0.25 / 0.25 μs</td>
</tr>
<tr>
<td>Inertia of code disc</td>
<td>J 4.7 gcm²</td>
</tr>
<tr>
<td>Operating temperature range</td>
<td>–40 ... +120 °C</td>
</tr>
<tr>
<td>EMC radiated emission</td>
<td>EN 50081-2</td>
</tr>
<tr>
<td>Protection classification</td>
<td>IP54</td>
</tr>
</tbody>
</table>

1) speed (rpm) = f (Hz) \times 60/N
2) U_{oo} = 5 V: with unloaded outputs

**For combination with motor**

<table>
<thead>
<tr>
<th>Dimensional drawing</th>
<th>&lt;L1 [mm]</th>
</tr>
</thead>
<tbody>
<tr>
<td>4490...B - K1300</td>
<td>120.8</td>
</tr>
<tr>
<td>4490...BS - K1300</td>
<td>120.8</td>
</tr>
</tbody>
</table>

**Features**

- Designed for industrial environments, this high-performance incremental shaft encoder in combination with the Brushless DC-Servomotors is for the indication and control of both shaft velocity and direction of rotation as well as for positioning.
- A LED source and lens system transmits collimated light through a low inertia disc to give two channels with 90° phase shift.
- The index pulse is synchronized with the channel B. Each encoder channel provides complementary output signals.
- The single 5 volt supply and the digital output signals are interfaced with a shielded cable.
- The line driver offers enhanced performance when the encoder is used in noisy environment, or when it is required to operate over long cables.
- Details for the Brushless DC-Servomotors and suitable reduction gearheads are on separate catalogue pages.

**Circuit diagram / Output signals**

**Output circuit**

![Circuit diagram]

**Output signals**

With clockwise rotation as seen from the shaft end

- **Amplitude**:
  - Ch. A / B / I
  - U_{oo}
  - GND
  - Ch. A / B / T

- **Rotation**:
  - P
  - P_{ref}
  - I
  - A
  - B

Recommendation: Please use a latch to capture the outputs.
Connector information / Variants

Motor logic
5 conductors, AWG 26

Encoder signals
8 conductors, AWG 28

Motor power
3 conductors, AWG 16

Example of combination with 4490...B

Cable
Shielded cables, PVC insulation, black
Length 300 mm ± 15mm

Full product description
Example: 4490H024B-K1300 40B

Dimensions drawing A

Example of combination with 4490...B

For notes on technical data and lifetime performance refer to "Technical Information".
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