Encoders
magnetic Encoder, digital outputs, 3 channels, 1 - 1024 lines per revolution

Series IE3-1024

<table>
<thead>
<tr>
<th>Lines per revolution</th>
<th>N</th>
<th>IE3-32</th>
<th>IE3-64</th>
<th>IE3-128</th>
<th>IE3-256</th>
<th>IE3-512</th>
<th>IE3-1024</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency range, up to</td>
<td>f</td>
<td>15</td>
<td>30</td>
<td>60</td>
<td>120</td>
<td>240</td>
<td>430</td>
</tr>
<tr>
<td>Signal output, square wave</td>
<td>2+1 Index</td>
<td>V</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Supply voltage</td>
<td>Uoo</td>
<td>4,5 ... 5,6</td>
<td>mA</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Current consumption, typical</td>
<td>Ico</td>
<td>typ. 20, max. 30</td>
<td>mA</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Output current, max.</td>
<td>Io</td>
<td>4</td>
<td>mA</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Index Pulse width</td>
<td>t1</td>
<td>90 ± 45</td>
<td>μs</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Phase shift, channel A to B</td>
<td>t2</td>
<td>90 ± 45</td>
<td>μs</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Signal rise/fall time, max. (CLOAD = 50 pF)</td>
<td>tr/td</td>
<td>0,1 / 0,1</td>
<td>ns</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inertia of sensor magnet</td>
<td>J</td>
<td>0,08</td>
<td>g cm²</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operating temperature range</td>
<td>-40 ... +100</td>
<td>°C</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Accuracy, typ.</td>
<td>0,5</td>
<td>m</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Repeatability, typ.</td>
<td>0,1</td>
<td>m</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hysteresis</td>
<td>0,17</td>
<td>m</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Edge spacing, min.</td>
<td>421</td>
<td>ns</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mass, typ.</td>
<td>13,5</td>
<td>g</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1) Velocity (min⁻¹) = f (Hz) x 60/N
2) 3,0 ... 3,6 V optional available on request
3) Uoo = 5 V: with unloaded outputs
4) Uoo = 5 V: low logic level < 0,4 V, high logic level > 4,5 V: CMOS- and TTL compatible
5) At 5 000 min⁻¹

For combination with Motor

Dimensional drawing A <L1 [mm]
2214 ... BXT H | 26,8
3216 ... BXT H | 28,7
4221 ... BXT H | 34,0

Dimensional drawing B <L1 [mm]
2377 ... CRX | 52,5
3264 ... BP4 | 79,1
3274 ... BP4 | 90,8

Dimensional drawing C <L1 [mm]
2342 ... CR | 60,5
2642 ... CRX | 60,5
2642 ... CR | 60,5
2657 ... CRX | 75,5
2657 ... CR | 75,5
2668 ... CR | 86,5
3242 ... CR | 60,5
3257 ... CR | 75,5
3272 ... CR | 90,5

Dimensional drawing D <L1 [mm]
2444 ... B - K1838 | 55,3
3056 ... B - K1838 | 67,3
3264 ... B - K1838 | 75,3
4490 ... B - K1838 | 100,3
4490 ... BS - K1838 | 100,3

Dimensional drawing E <L1 [mm]
2232 ... BX4 | 50,2
2250 ... BX4 | 68,2
2250 ... BX4 S | 68,2

Dimensional drawing F <L1 [mm]
3242 ... BX4 | 60,0
3268 ... BX4 | 86,0

Dimensional drawing G <L1 [mm]
3863 ... CR - 2016 | 82,6
3890 ... CR - 2016 | 108,6

Characteristics
These incremental encoders with 3 output channels, in combination with the FAULHABER Motors, are used for the indication and control of both shaft velocity and direction of rotation as well as for positioning.

A permanent magnet on the shaft creates a moving magnetic field which is captured using an angular sensor and further processed. At the encoder outputs, two 90° phase-shifted square wave signals are available with up to 1024 impulses and an index impulse per motor revolution.

The encoder is available in a variety of different resolutions.
Circuit diagram / Output signals

Output circuit

Output signals
with clockwise rotation as seen from the shaft end

Connector information / Variants

<table>
<thead>
<tr>
<th>No.</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>N.C.</td>
</tr>
<tr>
<td>2</td>
<td>Channel I</td>
</tr>
<tr>
<td>3</td>
<td>GND</td>
</tr>
<tr>
<td>4</td>
<td>UDD</td>
</tr>
<tr>
<td>5</td>
<td>Channel B</td>
</tr>
<tr>
<td>6</td>
<td>Channel A</td>
</tr>
</tbody>
</table>

Connection Encoder

Cable
PVC-ribbon cable 6-AWG 28, 1,27 mm

Caution:
Incorrect lead connection will damage the motor electronics!
In combination with the BX4 brushless DC-servomotors with digital Hall sensors, the sensor supply connections of encoder and motor are connected to each other.

Option

- Connector variants AWG 28 / PVC ribbon cable with connector MOLEX Picoblade 51021-0600, recommended mating connector 53047-0610.
- Option no.: 3592 for combination with Brushless DC-Motors series BX4.
  Note: inclusive motor connector 3830.
- Resolutions from 1 - 1024 lines per revolution are available by request.

Full product description

- Example:
  24445024B-K1838 IE3-1024
  22325024BX4 IE3-256

Dimensional drawing A

Example of combination with 2214...BXTH

IE3-1024
For notes on technical data and lifetime performance refer to “Technical Information”.

Edition 2019 Jun. 14

© DR. FRITZ FAULHABER GMBH & CO. KG
Specifications subject to change without notice.
www.faulhaber.com