Rotational Absolute Magnetic Kit Encoder Version 90 mm Displacement Sensor

FEATURES
- Hall effect principle
- Especially dedicated to hard conditions (vibrations, shocks, CEM, ...)
- Not sensitive to external magnetic fields and temperature
- Not sensitive to moisture and pollution
- Plug and play
- Small error due to misalignment
- Very high precision (VHP)
- Protected design, patent EP 2711663
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

QUICK REFERENCE DATA

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensor type</td>
<td>ROTATIONAL, magnetic technology</td>
</tr>
<tr>
<td>Output type</td>
<td>Wires or cables</td>
</tr>
<tr>
<td>Market appliance</td>
<td>Industrial</td>
</tr>
<tr>
<td>Dimensions</td>
<td>Diameter 90 mm</td>
</tr>
</tbody>
</table>

ELECTRICAL SPECIFICATIONS

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage supply</td>
<td>5 V ± 0.25 V</td>
</tr>
<tr>
<td>Current supply</td>
<td>≤ 200 mA max. at 5 V</td>
</tr>
<tr>
<td>Output</td>
<td>SSI</td>
</tr>
<tr>
<td>Connection</td>
<td>Ultra-flex AWG32 wires (shielded cable and connector on request)</td>
</tr>
<tr>
<td>Useful electrical angle</td>
<td>360° (single turn)</td>
</tr>
<tr>
<td>Absolute accuracy at -40 °C to +85 °C Standard:</td>
<td>± 0.0055° = 16 bits</td>
</tr>
<tr>
<td>Resolution</td>
<td>19 bits (524 288 points) (20 bits on request)</td>
</tr>
<tr>
<td>Startup time</td>
<td>≤ 20 ms</td>
</tr>
<tr>
<td>Refresh time</td>
<td>≤ 100 μs</td>
</tr>
<tr>
<td>Latency time</td>
<td>≤ 200 μs</td>
</tr>
<tr>
<td>Sampling rate</td>
<td>10 kHz ± 5 %</td>
</tr>
</tbody>
</table>

MECHANICAL SPECIFICATIONS

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mechanical angle</td>
<td>360°</td>
</tr>
<tr>
<td>Maximum speed rotation</td>
<td>8 rpm (up to 150 rpm with decreasing of accuracy, see “Maximum Speed vs. Accuracy” chart)</td>
</tr>
<tr>
<td>Weight</td>
<td>185 g ± 20 %</td>
</tr>
</tbody>
</table>

SAP PART NUMBERING GUIDELINES

<table>
<thead>
<tr>
<th>Type</th>
<th>Model</th>
<th>Design</th>
<th>Size (mm)</th>
<th>Type</th>
<th>Function</th>
<th>Accuracy (Bits)</th>
<th>Resolution (Bits)</th>
<th>Output</th>
<th>Packaging</th>
</tr>
</thead>
<tbody>
<tr>
<td>R = rotational</td>
<td>AM</td>
<td>K = kit</td>
<td>090</td>
<td>M = hard conditions</td>
<td>1</td>
<td>16</td>
<td>19</td>
<td>J = SSI CCW</td>
<td>B = box</td>
</tr>
</tbody>
</table>

Note
(1) With design 4 ears
**PERFORMANCE**

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating temperature range</td>
<td>-40 °C to +85 °C</td>
</tr>
<tr>
<td>Storage temperature range</td>
<td>-55 °C to +105 °C</td>
</tr>
<tr>
<td>Vibration</td>
<td>0.05 g²/Hz, 20 Hz to 2000 Hz for 1 h along the three major axis</td>
</tr>
<tr>
<td>Shock</td>
<td>180 g, 14 ms, 1/2 sine</td>
</tr>
<tr>
<td>EMC</td>
<td>MIL-STD-461F - CS114: conducted susceptibility, bulk cable injection, 10 kHz to 200 MHz table VI army ground level common mode injection and differential mode on positive - RS101: magnetic susceptibility, magnetic field, fig. RS101-2 from 30 Hz to 100 kHz - RS103: radiated susceptibility, electric field, 2 MHz to 18 GHz (level: 50 V/m) - RE102: radiated emissions, electric field, fig. RE102-4 - navy mobile and army - 10 kHz to 18 GHz</td>
</tr>
<tr>
<td>Magnetic protection</td>
<td>No influence up to 0.5 mT</td>
</tr>
</tbody>
</table>

**MAXIMUM SPEED VS. ACCURACY CHART**

![Graph showing Maximum Speed vs. Accuracy](chart.png)

**DIMENSIONS in millimeters**

![Dimensions Diagram](dimensions.png)
**ELECTRICAL INTERFACE DESCRIPTION - SSI INTERFACE**

### 6 WIRES CONNECTIONS

<table>
<thead>
<tr>
<th>NAME</th>
<th>WIRE COLOR</th>
</tr>
</thead>
<tbody>
<tr>
<td>GND</td>
<td>Black</td>
</tr>
<tr>
<td>+5 V</td>
<td>Red</td>
</tr>
<tr>
<td>CLK+</td>
<td>White</td>
</tr>
<tr>
<td>CLK-</td>
<td>Clear</td>
</tr>
<tr>
<td>DATA+</td>
<td>Green</td>
</tr>
<tr>
<td>DATA-</td>
<td>Yellow</td>
</tr>
</tbody>
</table>

### SSI PARAMETERS

- **Output code**: Binary
- **Data differential interface**: RS422 according to EIA-RS422
- **CLK differential interface**: RS422 according to EIA-RS422
- **Minimum clock frequency**: 300 kHz
- **Maximum clock frequency**: 4 MHz
- **Data bit (n)**: 21 bits

**Timing Diagram**

![Timing Diagram](image)

Timing:
- \( T_{\text{sampling}} \geq 20.5 \times T_{\text{clock}} \)
- \( T_{p} = 12 \mu s \)
- \( T_{\text{clock}} = \frac{1}{F_{\text{clock}}} \)
- \( T_{\text{clock}} \leq 200 \text{ ns} \)
- \( T_{p} = 500 \text{ ns} \)
- \( T_{\text{clock}} = \frac{1}{F_{\text{clock}}} \)
- \( T_{p} = 12 \mu s \)
OPTIONS

- Other design on request (mechanical interfaces, electrical interfaces, ...)

DIMENSIONS in millimeters

DESIGN ON REQUEST

- Rotor
- Stator

(Ø 94.6)

4 x Ø 2.8

(Ø 45)

4 x Ø 2.8

33.5° ± 5°

C-C

4 x (Ø 101)

4 x Ø 2.8

3 ± 0.05

2.5 ± 0.05

2.7 ± 0.2

3.5 ± 0.2

0.3 ± 0.05

0.9 ± 0.1

0.9 ± 0.1

3.5 ± 0.2

4 x (Ø 101)

4 x (Ø 101)

3 ± 0.05

2.5 ± 0.05

2.7 ± 0.2

3.5 ± 0.2

0.3 ± 0.05

0.9 ± 0.1

0.9 ± 0.1

3.5 ± 0.2

Heat shrinkable sleeve

Wee length: 300 ± 20

A A

C

B

C

A A

C

B

C

A A

C

B

C

A A

C

B
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