Rotational Absolute Magnetic Encoder Displacement Sensor

**FEATURES**
- Hall effect principle
- OTP (one time programmable) or flash technology
- Lightning protection
- Plug and play
- Good magnetic immunity
- Ball bearings
- Stainless steel shaft
- Housing protected

**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>Cable</td>
</tr>
<tr>
<td>Market appliance</td>
<td>Industrial, railway, military airplane actuator</td>
</tr>
<tr>
<td>Dimensions</td>
<td>7/8” (22 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>± 10 V</td>
</tr>
<tr>
<td>Current supply</td>
<td>5 mA max.</td>
</tr>
<tr>
<td>Current supply maximum at startup time</td>
<td>15 mA during 50 ms (typical)</td>
</tr>
<tr>
<td>Connection</td>
<td>Shielded cable</td>
</tr>
<tr>
<td>Useful electrical angle</td>
<td>80°</td>
</tr>
<tr>
<td>Absolute accuracy at 18 °C to 25 °C</td>
<td>Refer to curves in charts “Channel 1” and “Channel 2”</td>
</tr>
<tr>
<td>Absolute accuracy at -40 °C to +110 °C</td>
<td>Refer to curves in charts “Channel 1” and “Channel 2”</td>
</tr>
<tr>
<td>Residual ripple</td>
<td>≤ 30 mV</td>
</tr>
<tr>
<td>Residual ripple frequency</td>
<td>75 kHz ± 30 kHz</td>
</tr>
<tr>
<td>Response time</td>
<td>1 ms max. (for an angle of 20° in 6 ms ± 2 ms)</td>
</tr>
<tr>
<td>Electrical phasing</td>
<td>0.5 U ± 0.1 % U</td>
</tr>
<tr>
<td>Nominal power at 70 °C</td>
<td>≤ 0.2 W</td>
</tr>
<tr>
<td>Lightning</td>
<td>DO160d level 4</td>
</tr>
<tr>
<td>Coupling (for design 2 functions)</td>
<td>≤ 14 mV</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>Hysteresis</td>
<td>≤ 14 mV</td>
</tr>
<tr>
<td>Running torque</td>
<td>&lt; 0.2 N.m</td>
</tr>
<tr>
<td>Weight</td>
<td>36 g ± 4 g (for 1 function); 51 g ± 5.1 g (for 2 functions)</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>E = encoder with housing</td>
<td>022</td>
<td>M</td>
<td>1 = 1 function 2 = 2 functions</td>
<td>UU</td>
<td>UU</td>
<td>B = analog CCW</td>
<td>B = box</td>
</tr>
</tbody>
</table>

**PERFORMANCE**

**PARAMETER**

- Operating temperature range: -40 °C to +125 °C
- Protection class: IP50
- Life: 50M cycles
- Vibration: 1.5 mm pic from 10 Hz to 60 Hz, 20 g from 60 Hz to 2000 Hz (free shaft) on 3 major axis
- Shock: 50 g, 1 ms, 1/2 sinus on the 3 axis

**CHANNEL 1**

![Graph showing Absolute Error (V) vs Angle (°) for Channel 1](image)

- Blue line: At room temperature
- Red line: Over the temperature range

**CHANNEL 2**

![Graph showing Absolute Error (V) vs Angle (°) for Channel 2](image)

- Blue line: At room temperature
- Red line: Over the temperature range
VARIANT 1: SINGLE FUNCTION

**DIMENSIONS** in millimeters

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ø 22</td>
<td></td>
</tr>
<tr>
<td>Ø 19.05h6 (+0.013)</td>
<td></td>
</tr>
<tr>
<td>Ø 6.5 max.</td>
<td></td>
</tr>
<tr>
<td>Ø 3.175 -0.013</td>
<td></td>
</tr>
<tr>
<td>Ø 19.25 max.</td>
<td></td>
</tr>
<tr>
<td>9 ± 0.5</td>
<td></td>
</tr>
<tr>
<td>1.6 ± 0.1</td>
<td></td>
</tr>
<tr>
<td>Ø 19.25 max.</td>
<td></td>
</tr>
<tr>
<td>Ø 22.1 max.</td>
<td></td>
</tr>
<tr>
<td>1 ± 0.4</td>
<td></td>
</tr>
<tr>
<td>0.8 ± 0.2</td>
<td></td>
</tr>
<tr>
<td>0.6 max.</td>
<td></td>
</tr>
<tr>
<td>1.6 ± 0.1</td>
<td></td>
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</tr>
</tbody>
</table>

**Note**

(1) When the shaft chamfer is aligned with the red point, the position is approximately at electrical zero.

**RESPONSE TIME**

![Response Time Graph]

**ELECTRICAL DIAGRAM (1)**

- **Green** (-10 V)
- **Yellow** (+10 V)
- **Brown** (output)

**Note**

(1) Shaft side view, decreasing function when rotation is clockwise (CW).
**VARIANT 2: REDUNDANT FUNCTIONS**

**DIMENSIONS in millimeters**

**RESPONSE TIME**

![Response Time Graph](image)

**ELECTRICAL DIAGRAM (1)**

**OPTIONS (on request)**

- Other accuracy
- Other resolution
- Other mechanical dimensions and mechanical interfaces
- Other electrical interface (for example: SSI, ...)
- Possibility of function redundant

**Note**

(1) Shaft side view, decreasing function when rotation is clockwise (CW)

- When the shaft chamfer is aligned with the red point, the position is approximately at electrical zero

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**For technical questions, contact:** mcbprecisionpot@vishay.com

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