Single-Turn Continuous Rotation Analog Displacement Sensor

FEATURES

- Conductive plastic potentiometer technology, infinite resolution
- Servo mount anodized light alloy housing
- Precious metal contacts
- Stainless steel shaft and bearings
- Applicable standards: NFC 93255, MIL R 39023

QUICK REFERENCE DATA

<table>
<thead>
<tr>
<th>Sensor type</th>
<th>ROTATIONAL, conductive plastic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output type</td>
<td>Output by turrets</td>
</tr>
<tr>
<td>Market appliance</td>
<td>Industrial, avionics</td>
</tr>
<tr>
<td>Dimensions</td>
<td>1 1/16&quot; (27 mm)</td>
</tr>
</tbody>
</table>

ELECTRICAL SPECIFICATIONS

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>345° ± 3°</th>
</tr>
</thead>
<tbody>
<tr>
<td>Theoretical electrical travel (TET)</td>
<td>30° 60° 90° 100° 120° 140° 170° 180° 210° 308° 308° 348° 333° 20°</td>
</tr>
<tr>
<td>Theoretical electrical travel (TET) - on request</td>
<td>30° 44° 70° 90° 120° 140° 170° 100° 210° 140° 180° 342° 300°</td>
</tr>
<tr>
<td>Useful electrical travel (UET) - on request</td>
<td>± 1 %</td>
</tr>
<tr>
<td>Independent linearity standard</td>
<td>± 0.8 %, ± 0.5 %, ± 0.25 %, ± 0.2 %, ± 0.1 %</td>
</tr>
<tr>
<td>Independent linearity optional</td>
<td>± 0.1 %</td>
</tr>
<tr>
<td>Total resistance (Rn)</td>
<td>4.7 kΩ or 10 kΩ</td>
</tr>
<tr>
<td>Tolerance on Rn</td>
<td>± 20 %</td>
</tr>
<tr>
<td>Output smoothness</td>
<td>≤ 0.1 % (≤ 0.05 % on request)</td>
</tr>
<tr>
<td>Power rating at 70 °C</td>
<td>1.25 W (see &quot;Power Rating Chart&quot;)</td>
</tr>
<tr>
<td>Temperature coefficient</td>
<td>-300 ± 300 ppm/°C</td>
</tr>
<tr>
<td>Wiper current</td>
<td>≤ 1 mA</td>
</tr>
<tr>
<td>Recommended load impedance</td>
<td>≥ 100 Rn for linearity = 1 %</td>
</tr>
<tr>
<td></td>
<td>≥ 1000 Rn for linearity ≤ 0.1 %</td>
</tr>
<tr>
<td>Insulation resistance</td>
<td>≥ 1 GΩ at 500 VDC (≥ 10 GΩ at 500 VDC on request)</td>
</tr>
<tr>
<td>Dielectric strength</td>
<td>750 V RMS, 50 Hz, 1 min</td>
</tr>
</tbody>
</table>

MECHANICAL SPECIFICATIONS

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>360° continuous</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mechanical rotation</td>
<td></td>
</tr>
<tr>
<td>Moment of inertia</td>
<td>≤ 0.4 g cm² (for 1 stage), ≤ 0.2 g cm² (per additional stage)</td>
</tr>
<tr>
<td>Mounting</td>
<td>Standard</td>
</tr>
<tr>
<td>Running and starting torque</td>
<td>≤ 12 cN cm (for 1 stage), ≤ 10 cN cm (per additional stage)</td>
</tr>
<tr>
<td>Protection class</td>
<td>IP 50</td>
</tr>
<tr>
<td>Weight</td>
<td>&lt; 18 g (for 1 stage), &lt; 6 g (per additional stage)</td>
</tr>
</tbody>
</table>

PERFORMANCE

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>-55 °C to +125 °C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating temperature range</td>
<td></td>
</tr>
<tr>
<td>Life</td>
<td>25M cycles</td>
</tr>
<tr>
<td>Rotation speed (max.)</td>
<td>600 rpm</td>
</tr>
</tbody>
</table>

Note

- Nothing stated herein shall be construed as a guarantee of quality or durability.
### SAP PART NUMBERING GUIDELINES

<table>
<thead>
<tr>
<th>MODEL</th>
<th>SIZE (mm)</th>
<th>GANG</th>
<th>VALUE</th>
<th>LINEARITY</th>
<th>ANGLE</th>
<th>PACKAGING</th>
</tr>
</thead>
<tbody>
<tr>
<td>POPR</td>
<td>27</td>
<td>1</td>
<td>472 = 4K7</td>
<td>A = 1 %</td>
<td>345</td>
<td>B = box</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2</td>
<td>103 = 10K</td>
<td>B = 0.5 %</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>3</td>
<td></td>
<td>C = 0.25 %</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>4</td>
<td></td>
<td>D = 0.1 %</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### DIMENSIONS in millimeters

**Number of cups**

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>L</td>
<td>16</td>
<td>21.5</td>
<td>27</td>
<td>32.5</td>
<td>38</td>
</tr>
</tbody>
</table>

**DESIGNS ON REQUEST**

**OPTION 1**

[Diagram of SAP PART NUMBERING GUIDELINES and DIMENSIONS]
DIMENSIONS in millimeters

OPTION 2

- Ø 27.0 ± 0.2
- Ø 25.4 ± 0.2
- 1 ± 0.1
- 9 ± 0.5
- 16.5 max.
- Depth 1.143 ± 0.1
- 0.762 ± 0.1

OPTION 3

- Ø 27.05 ± 0.2
- Ø 25.4 ± 0.2
- Ø 3.175 ± 0.013
- 1 ± 0.1
- 10.5 ± 0.5
- 16.5 max.
### OPTION 4: 4 CUPS WITH INTERMEDIATE HOUSING

- **External involute spline data per ANSI B92.1A**
  - Fillet root side fit table 38
  - Number of teeth: 8 (-1)
  - Spline pitch: 48/96
  - Pressure angle: 30°
  - Base diameter: 3.6661852
  - Pitch diameter (A): 4.23333
  - Major diameter: 4.7244 / 4.7752
  - Form diameter: 3.81
  - Minor diameter: 2.921 min.
  - Circular tooth thickness
    - Maximum effective: 0.8910
    - Minimum actual: 0.8525
    - Maximum actual: 0.8694
  - Minimum measurements over pins: 5.79374 / 5.8166
  - Pin diameter: 1.016 (ref.)
  - Fillet radius minimum: 0.1778

### OPTION 5: SPECIFIC FLANGE AND SHAFT (EXAMPLE OF CUSTOMIZATION, OTHER VARIANTS ALSO FEASIBLE)

- **External involute spline data per ANSI B92.1A**
  - Fillet root side fit table 38
  - Number of teeth: 8 (-1)
  - Spline pitch: 48/96
  - Pressure angle: 30°
  - Base diameter: 3.6661852
  - Pitch diameter (A): 4.23333
  - Major diameter: 4.7244 / 4.7752
  - Form diameter: 3.81
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For technical questions, contact: mcbprecisionpot@vishay.com

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DIMENSIONS in millimeters

OPTION 6: DOUBLE FUNCTIONS (POTENTIOMETER FUNCTION AND SWITCH) WITH RETURN SPRING

- Wires AWG26 (length 250 mm)

Schematic Diagram

Green Red Red / Black
Black Yellow Blue

Electrical Function

U (Volt)
+5 V
-5 V

-6°30' +6°30' -60° +60°

Angle (°)

ELECTRICAL DIAGRAM

POWER RATING CHART

Clockwise direction viewed from control shaft side
OPTIONS (on request)

- Other ohmic value: 1.5 kΩ; 2 kΩ; 5 kΩ; 50 kΩ
- Other tolerances on $R_n$: ± 10 %
- Other lineairties: ± 0.065 %
- Other theoretical electrical travel
- Connectors (center tap)
- Through shaft
- Insulating resistance: ≥ 10 GΩ at 500 VDC
- Shaft: without flat surface (without D shape), other specific design feasible (e.g. lamella design)
- Total length (old model with one gang): 14 mm in place of 16 mm

- Type of wiper: 5 strands or 2 or 3 lamellas
- Protection class: IP 65 (front flange)
- Electrical reference: 0.5 U ± 0.1 % U
- Electrical phasing between cups: ± 0.1 % or 0.03 % at U/2
- Mechanical reference: U/2 printing flange / shaft at ± 10° (by printing or machined hole on the flange)
- Intensity accidental = 5 mA
- Function: sine and / or cosine with accuracy ± 1 %
- Flange: with ears in place of synchro mechanical fixation
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