Rotary Sensor
Potentiometric
P-2500

Special Features
• Unmatched combination of size, performance and price
• Long life - 100 Mio. movements
• Excellent linearity ±0.2%
• High admissible operating speed - 10 000 rpm
• Unrestricted continuous rotation

Applications
• Measuring/control technology
• Valves/throttle control
• Manufacturing Engineering (woodwork machines, riveting machines, packaging machines, welding machines)
• Assembly/test devices
• Medical appliances
• Building automation

Precision potentiometer for measuring, control and instrumentation applications.
The distinguishing features of the P-2500 include an all metal case, ball-bearings, a conductive resistance element and elastomer-damped wipers.
Because of its reliability, long life, good linearity, high resolution, high operational speed and corrosion resistance, this component opens applications hitherto closed to conventional potentiometers.
Special versions with different electrical travels and shaft dimensions are available.

Description

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Servo size</td>
<td>11</td>
</tr>
</tbody>
</table>
| Material         | Flange: aluminium, anodized  
                  | Cover: high grade, temperature resistant plastic  
                  | Shaft: SS                     |
| Mounting         | With 3 mounting clamps 21-11 (included in delivery) |
| Fastening torque of mounting | max. 120 Ncm |
| Bearing          | Stainless steel ball bearings  |
| Resistance element | Conductive plastic |
| Wiper            | Precious metal multi-finger wiper |
| Electrical connection | Gold-plated brass terminals |

Mechanical Data

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensions</td>
<td>See dimension drawing</td>
</tr>
<tr>
<td>Mechanical travel</td>
<td>360° continuous</td>
</tr>
<tr>
<td>Permitted shaft load</td>
<td>15 N (axial / radial)</td>
</tr>
<tr>
<td>Torque</td>
<td>≤ 0.07 Ncm</td>
</tr>
<tr>
<td>Weight</td>
<td>approx. 20 g</td>
</tr>
<tr>
<td>P/N</td>
<td>Type</td>
</tr>
<tr>
<td>---------</td>
<td>---------------</td>
</tr>
<tr>
<td>4000003201</td>
<td>P-2501-A102</td>
</tr>
<tr>
<td>4000003202</td>
<td>P-2501-A202</td>
</tr>
<tr>
<td>4000003203</td>
<td>P-2501-A502</td>
</tr>
</tbody>
</table>
Schematic (seen on shaft)
### Technical Data

<table>
<thead>
<tr>
<th>Type</th>
<th>P-2501-A102</th>
<th>P-2501-A202</th>
<th>P-2501-A502</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measuring range</td>
<td>345° ±2°</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Defined elect. measuring range</td>
<td>339°</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Output signal</td>
<td>Voltage divider</td>
<td>2 kΩ</td>
<td>5 kΩ</td>
</tr>
<tr>
<td>Resistance value</td>
<td>1 kΩ</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resistance tolerance</td>
<td>± 10 %</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Independent linearity</td>
<td>≤ ±0.2 %FS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Repeatability</td>
<td>≤ ±0.003 % (0.01)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Recommended operating wiper current</td>
<td>≤ 1 μA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max. wiper current in case of malfunction</td>
<td>10 mA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max. permissible supply voltage Uth</td>
<td>48 VDC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Effective temp. coefficient of the output-to-applied voltage ratio</td>
<td>typ. 5 ppm/K</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Insulation resistance (500 VDC)</td>
<td>≥ 10 MΩ</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Environmental Data

- **Max. operational speed**: 10,000 rpm
- **Vibration IEC 60068-2-6**: 20 g, 5...2000 Hz, Amax = 0.75 mm
- **Shock IEC 60068-2-27**: 50 g, 11 ms
- **Protection class DIN EN 60529**: IP40
- **Operating temperature**: -40...+100°C
- **Life**: typ. > 100 Mio. movements

**Important:**

All values specified in this data sheet for linearity, lifetime and temperature coefficient are only valid for a sensor used as a voltage divider with virtually no load applied to the wiper (Ie ≤ 1 µA).
Sensor Mounting

Z-103-G03
Fork coupling with low backlash for Ø3 mm. Mounting with 1 cylinder head screw M2 with internal hexagon. Angle screwdriver DIN 911 AF 1.5 included in delivery.

Material: SS
Displacement: ≤ 1 mm

P/N: 400005687
Type: Z-103-G03
Signal Processing

MUP-080
Cost-efficient signal conditioner with fixed output range, voltage or current output. Not adjustable. Detailed data see separate data sheet.

<table>
<thead>
<tr>
<th>P/N</th>
<th>Type</th>
<th>Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>400054220</td>
<td>MUP-080-111</td>
<td>0 ... 10 V</td>
</tr>
<tr>
<td>400054221</td>
<td>MUP-080-113</td>
<td>4 ... 20 mA</td>
</tr>
</tbody>
</table>

MUP-110
Signal conditioner in compact size with voltage or current output, adjustable zero and span. Detailed data see separate data sheet.

<table>
<thead>
<tr>
<th>P/N</th>
<th>Type</th>
<th>Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>400054010</td>
<td>MUP-110-0</td>
<td>0 ... 20 mA</td>
</tr>
<tr>
<td>400054011</td>
<td>MUP-110-1</td>
<td>0 ... 10 V</td>
</tr>
<tr>
<td>400054014</td>
<td>MUP-110-4</td>
<td>4 ... 20 mA</td>
</tr>
</tbody>
</table>

MUP-160
Signal conditioner in compact size with voltage or current output, adjustable zero and span. With galvanic isolation. Detailed data see separate data sheet.

<table>
<thead>
<tr>
<th>P/N</th>
<th>Type</th>
<th>Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>400054060</td>
<td>MUP-160-0</td>
<td>0 ... 20 mA</td>
</tr>
<tr>
<td>400054061</td>
<td>MUP-160-1</td>
<td>0 ... 10 V</td>
</tr>
<tr>
<td>400054064</td>
<td>MUP-160-4</td>
<td>4 ... 20 mA</td>
</tr>
</tbody>
</table>

MUP-400
Signal conditioner with simple teach-in function to adapt start and end point. Switchable current or voltage output. Available with or without galvanic isolation. Detailed data see separate data sheet.

<table>
<thead>
<tr>
<th>P/N</th>
<th>Type</th>
<th>Isolation</th>
</tr>
</thead>
<tbody>
<tr>
<td>400054201</td>
<td>MUP-400-01</td>
<td>w/o</td>
</tr>
<tr>
<td>400054202</td>
<td>MUP-400-11</td>
<td>with</td>
</tr>
</tbody>
</table>
MAP-4000
Multifunctional measuring device with digital display for direct connection of potentiometric and normalized signals.
• Supply voltage 10...30 VDC, 80...250 VDC or AC
• High accuracy up to 0.1%
• Adjustable supply voltage for sensors 5...24 V
• Temperature coefficient 100 ppm/K
• Optional RS 232, RS 485, analog output, limited switch
• Complete data see separate data sheet
The specifications contained in our datasheets are intended solely for informational purposes. The documented specification values are based on ideal operational and environmental conditions and can vary significantly depending on the actual customer application. Using our products at or close to one or more of the specified performance ranges can lead to limitations regarding other performance parameters. It is therefore necessary that the end user verifies relevant performance parameters in the intended application. We reserve the right to change product specifications without notice.