Standard Potentiometers
Series P6500

Special features
• very long life - 100 x 10^6 movements
• very good linearity - standard ± 0.05 %,
• very high resolution - better than 0.007°
• high admissible operating speed 10 000 min⁻¹
• unrestricted continuous rotation

Precision potentiometer for measuring, control and instrumentation applications.

The distinguishing features of the P 6500 include an all metal case, ball-bearings, a conductive resistance element and elastomer-damped wipers.

As a high-precision angular displacement transducer this potentiometer meets all kinds of analog applications.

Together with an A/D converter it serves as a low-cost digital-absolute-encoder for precision setting or pick-up and thus opens a multitude of digital applications.

Special versions with different electrical travels and shaft dimensions are available.

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### Description

<table>
<thead>
<tr>
<th>Description</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size</td>
<td>servo size 20</td>
</tr>
<tr>
<td>Case</td>
<td>two-part; flange anodized aluminium; cover high-grade, temperature-resistant plastic</td>
</tr>
<tr>
<td>Shaft</td>
<td>stainless steel</td>
</tr>
<tr>
<td>Bearings</td>
<td>stainless steel ball bearings</td>
</tr>
<tr>
<td>Resistance element</td>
<td>conductive plastic</td>
</tr>
<tr>
<td>Wiper assembly</td>
<td>precious metal multi-finger wiper</td>
</tr>
<tr>
<td>Electrical connections</td>
<td>gold-plated brass terminals</td>
</tr>
</tbody>
</table>
### Mechanical Data

- **Dimensions**: see drawing
- **Mounting**: with 3 clamps Z1-31
- **Mechanical travel**: 360°, continuous
- **Permitted shaft loading (axial and radial)**: static or dynamic force 45 N
- **Maximum operational speed**: 10,000 min⁻¹
- **Weight**: 80 g

### Electrical Data

- **Actual electrical travel**: 355 ±2°
- **Available resistance values**: 1; 2; 5 kΩ
- **Resistance tolerance**: ±20%
- **Repeatability**: 0.002 (±0.007°)
- **Effective temperature coefficient of the output-to-applied voltage ratio**: typical 5 ppm/K
- **Independent linearity**: ±0.05%
- **Max. permissible applied voltage**: 42 V
- **Recommended operating wiper current**: ≤ 1 µA
- **Max. wiper current in case of malfunction**: 10 mA
- **Insulation resistance (500 VDC)**: ≥ 10 MΩ
- **Dielectric strength (500 VAC, 50 Hz)**: ≤ 100 µA

### Environmental Data

- **Temperature range**: -40...+100 °C
- **Vibration**: 5...2000 Hz
  - $A_{max} = 0.75$ mm
  - $A_{max} = 20$ mm
- **Shock**: 50 g
  - 11 ms
- **Life**: >100 x 10⁶ rev.
- **Protection class**: IP 40 (DIN 400 50 / IEC 529)

### Order designations

<table>
<thead>
<tr>
<th>Type</th>
<th>Art.no.</th>
<th>R in kΩ</th>
</tr>
</thead>
<tbody>
<tr>
<td>P6501 A102</td>
<td>008201</td>
<td>1</td>
</tr>
<tr>
<td>P6501 A202</td>
<td>008202</td>
<td>2</td>
</tr>
<tr>
<td>P6501 A502</td>
<td>008203</td>
<td>5</td>
</tr>
</tbody>
</table>

### Additional models available

<table>
<thead>
<tr>
<th>Type</th>
<th>Art.no.</th>
<th>R in kΩ</th>
</tr>
</thead>
<tbody>
<tr>
<td>P6501 S0049</td>
<td>008224</td>
<td>≤ 60° ± 2°, indep. Lin. ± 0.2%, R= 14Ω ±20%</td>
</tr>
<tr>
<td>P6501 G252</td>
<td>008221</td>
<td>≤ 90° ± 2°, indep. Lin. ± 0.3%, R= 2,54Ω ±20%</td>
</tr>
<tr>
<td>P6501 R252</td>
<td>008225</td>
<td>≤ 180° ± 2°, indep. Lin. ± 0.15%, R= 2,54Ω ±20%</td>
</tr>
</tbody>
</table>

**Important**

All the values given in this data sheet for linearity, lifetime and temperature coefficient in the voltage dividing mode are quoted for the device operating with the wiper voltage driving operational amplifier working as a voltage follower, where virtually no load is applied to the wiper ($I_w ≤ 1µA$).