

Sensor  
Potentiometers

Series SP2800



Special features

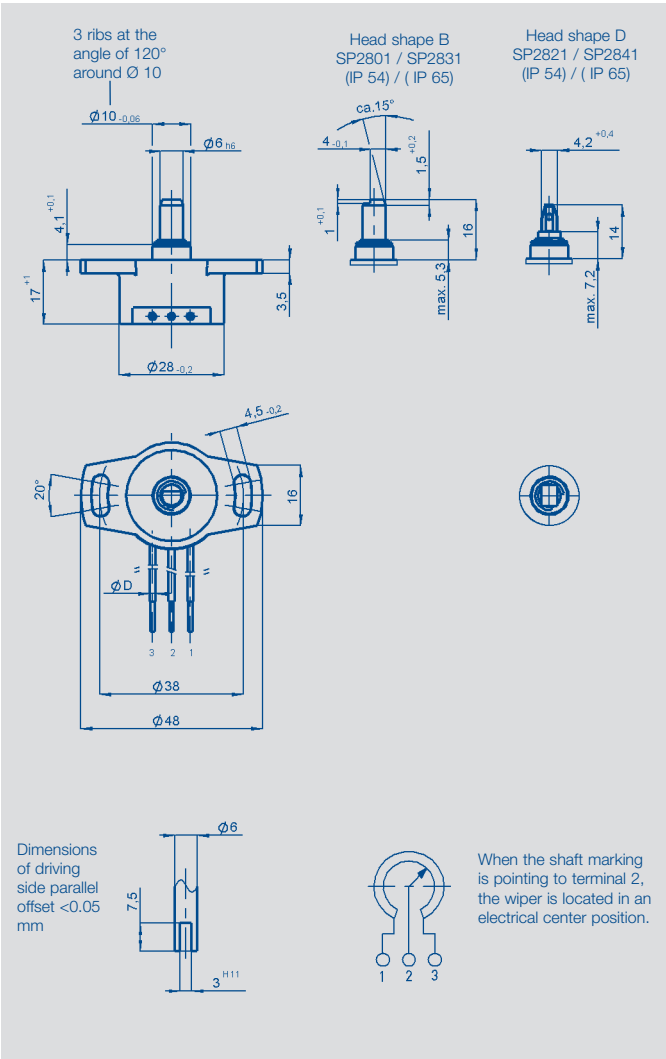
- available with marked shaft (shape B) or with push-on coupling (shape D)
- Easy mounting
- Protection class IP 54 or IP 65
- long life
- 1-channel or 2-channel (electr. full redundant)
- good price/performance ratio

Designed to convert rotary movement into a proportional voltage, these sensors utilize conductive plastic technology on both the resistance and collector tracks.

The housing and bearings are produced in a special high-grade temperature-resistant plastic material. Fixings are in the form of elongated slots which allow simplicity in mounting together with ease of mechanical adjustment.

The special backlash-free push-on coupling ensures extremely quick and easy installation. The sensor is not sensitive to either dirt or dampness. Electrical connections are made via conductors which are sealed into the housing. They are suitable for use with any of the termination methods currently in use. The use of elastomer-damped precious metal multi-finger wiper ensures reliable contact even under the severest of working conditions.

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



| Description                       |                                                                                                                                                                                                                                              |
|-----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Housing and bearing               | high-grade, temperature-resistant plastic                                                                                                                                                                                                    |
| Shaft                             | stainless steel                                                                                                                                                                                                                              |
| Resistance element                | conductive plastic                                                                                                                                                                                                                           |
| Wiper assembly                    | precious metal multi-finger wiper                                                                                                                                                                                                            |
| Mounting position                 | any optional position                                                                                                                                                                                                                        |
| Electrical connections (standard) | conductors, TPE-PEE-insulation, l = 300 mm<br>1-channel: 3 conductors, diameter = 2.1 mm<br>1 = brown, 2 = red, 3 = orange<br>2-channel: 6 conductors, diameter = 1.6 mm<br>1 = brown, 2 = red, 3 = orange<br>4 = brown, 5 = red, 6 = orange |

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© 10/2008  
Art.-Nr.: 062 719  
Subject to changes  
Printed in Germany

| Mechanical Data                                                             |                                                              |                                                                                                                                             |     |                   |
|-----------------------------------------------------------------------------|--------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|-----|-------------------|
| Dimensions                                                                  | see drawing                                                  |                                                                                                                                             |     |                   |
| Mounting                                                                    | with 2 M4 fillister-head screws + washer                     |                                                                                                                                             |     |                   |
| Mechanical angles                                                           | 360, continuous                                              |                                                                                                                                             |     | °                 |
| Permitted shaft loading<br>(axial and radial)<br>static or dynamic force    | 20                                                           |                                                                                                                                             |     | N                 |
| Torque                                                                      | 0.2 (IP54), 0.5 (IP65)                                       |                                                                                                                                             |     | Ncm               |
| Maximum operational speed                                                   | 120                                                          |                                                                                                                                             |     | min <sup>-1</sup> |
| Weight                                                                      | 30                                                           |                                                                                                                                             |     | g                 |
| Electrical Data                                                             |                                                              |                                                                                                                                             |     |                   |
| Actual electrical angle                                                     | 100                                                          | 308                                                                                                                                         | 345 | ° ± 2°            |
| Nominal resistance                                                          | 3                                                            | 5                                                                                                                                           | 5   | kΩ                |
| Resistance tolerance                                                        | ±20                                                          |                                                                                                                                             |     | %                 |
| Repeatability<br>(dependent from mounting tolerances)                       | with shaft shape B ≤ 0.03<br>with shaft shape D ≤ 0.06       |                                                                                                                                             |     | °<br>°            |
| Effective temperature coefficient of<br>the output-to-applied voltage ratio | typical 5                                                    |                                                                                                                                             |     | ppm/K             |
| Independent linearity                                                       | 1.0                                                          | 0.3                                                                                                                                         | 0.3 | ±%                |
| Max. permissible applied voltage                                            | 42                                                           |                                                                                                                                             |     | V                 |
| Recommended operating wiper current                                         | ≤ 1                                                          |                                                                                                                                             |     | μA                |
| Max. wiper current in case of malfunction                                   | 10                                                           |                                                                                                                                             |     | mA                |
| Insulation resistance<br>(500 VDC, 1 bar, 2 s)                              | ≥ 10                                                         |                                                                                                                                             |     | MΩ                |
| Dielectric strength<br>(50 Hz, 2 s, 1 bar, 500 VAC)                         | ≤ 100                                                        |                                                                                                                                             |     | μA                |
| Conductor length, bared, tinned                                             | approx. 300                                                  |                                                                                                                                             |     | mm                |
| Conductor diameter                                                          | approx. 1                                                    |                                                                                                                                             |     | mm <sup>2</sup>   |
|                                                                             |                                                              |                                                                                                                                             |     |                   |
| Environmental Data                                                          |                                                              |                                                                                                                                             |     |                   |
| Temperature range                                                           | -40 ... +120 (temporary 150°C, max. 1 h)                     |                                                                                                                                             |     | °C                |
| Vibration                                                                   | 5...2000<br>A <sub>max</sub> = 0.75<br>a <sub>max</sub> = 20 |                                                                                                                                             |     | Hz<br>mm<br>g     |
| Life                                                                        | 50 x 10 <sup>6</sup>                                         |                                                                                                                                             |     | movements         |
| Protection class                                                            | IP 54 or IP 65 (DIN 400 50 / IEC 529)                        |                                                                                                                                             |     |                   |
|                                                                             |                                                              |                                                                                                                                             |     |                   |
| Order designations                                                          |                                                              |                                                                                                                                             |     |                   |
| Type                                                                        | Art.no.                                                      |                                                                                                                                             |     |                   |
| SP2801 308 000 001                                                          | 019520                                                       | ↗ 308°, 6 mm shaft, IP 54                                                                                                                   |     |                   |
| SP2821 308 000 001                                                          | 019540                                                       | ↗ 308°, push-on coupling, IP 54                                                                                                             |     |                   |
| SP2831 308 000 001                                                          | 019521                                                       | ↗ 308°, 6 mm shaft, IP 65                                                                                                                   |     |                   |
| SP2841 308 000 001                                                          | 019541                                                       | ↗ 308°, push-on coupling, IP 65                                                                                                             |     |                   |
| SP2801 100 002 001                                                          | 019522                                                       | ↗ 100°, 6 mm shaft, IP 54,                                                                                                                  |     |                   |
| SP2831 100 002 001                                                          | 019527                                                       | ↗ 100°, 6 mm shaft, IP 65,                                                                                                                  |     |                   |
| SP2841 100 002 001                                                          | 019542                                                       | ↗ 100°, push-on coupling, IP 65                                                                                                             |     |                   |
| SP2841 345 065 001                                                          | 019564                                                       | ↗ 345°, push-on coupling, IP 65                                                                                                             |     |                   |
| SP2841 100 067 006                                                          | 019565                                                       | redundant (without diagramm - drawing on request);<br>push-on coupling, IP65<br>per track: ↗100° ±2°, 3 kΩ ±20 %, indepen. linearity ±1.0 % |     |                   |

## 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 on operational amplifier working as a voltage follower, where virtually no load is applied to the wiper ( $I_e \leq 1 \mu A$ ).

## Recommended accessories

Processor controlled indicators MAP... with display,  
Signal conditioner MUP.../  
MUK ... for standardized output signals