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Compact and inexpensive: potentiometric angle sensors

Automotive technology for industrial use

For efficiency reasons, today cars of the lower price category and two or three-wheeled vehicles are also increasingly equipped with electronically controlled systems. These are dependent on exact information on the current vehicle condition, e.g. angle data. The position sensors required for this purpose must meet the most demanding requirements for precision and reliability under the extreme environmental conditions in the car. The usual large quantities for the mass market of automotive technology simultaneously provide for low prices. And now this can also be beneficial in industrial applications.

With the SP16, SP32, SP40 and SP50 potentiometric sensors, Novotechnik has now added a whole family of angle sensors to its product range that are both rugged and inexpensive while being suitable for measuring range from 0 to 120 degrees (Figure 1). They operate with a linearity of +/-2 %, a repetitive accuracy of one degree and at ambient temperatures between -30 and +120 °C or -40 and +125 °C. They were originally developed for automotive applications near the engine, e.g. for detecting the throttle valve position (Figure 2). However, their resistance to external influences such as vibration, temperature fluctuations, dirt and moisture also make them interesting for industrial applications, e.g. for use on mobile driven machines, rail vehicles for conveyor technology and wherever simple, reliable sensors for valve control and angle measurement are required. At the same time, the angle sensors require extremely little energy and are non-critical with regard to EMC compatibility and magnetic fields.

Installation is simple thanks to rugged fastening bushings or lugs on the sturdy plastic housings. The numeric codes of the model designation stand for the spacing of the screw-on lugs, i.e. 32, 40 or 50 mm. For the SP16, the 16 mm indicate the distance from the housing centre to the centre of the oval oblong-hole mounting tab. There are various shaft geometries for mounting the sensor shafts on the application side. With correct installation, the requirements of the IP67 protection type are met. The life expectancy of the sensors is typically specified with four million movements.

Text for a technology box: Potentiometer on a conductive plastic basis

The heart of a potentiometric sensor is a layer/wiper system, which consists of a screen-printed resistor and a moving wiper. Independently spring-mounted, multi-finger stainless-steel wipers provide for reliable contact even under the harshest operating conditions. A major advantage of this system lies in its simple design without complicated electronics, which makes the sensor system extremely inexpensive. The resolution is only limited by the downstream electronics; 16 bits can be achieved.

Figure 1: Compact, inexpensive, rugged potentiometric shaft sensors

Figure 2: The angle sensors were originally developed for automotive applications near the engine, e.g. for detecting the throttle valve position. However, their resistance to external influences also makes them interesting for industrial applications

Photos: Novotechnik

About Novotechnik

For over 60 years Novotechnik, with headquarters in Ostfildern in the Swabian region of Germany, has been a pioneer in the further development of measuring technology. Meanwhile over 200 employees work on top achievements in Germany alone. The results are high-performance position and angle sensors without which production, control and measuring technology or cars are simply no longer imaginable. The broad product range consists of position and angle sensors with different operating principles, special solutions for the automotive sector and measuring transducers and measuring devices. This covers virtually every imaginable task and solutions are custom-tailored for special application needs.

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