

Rugged, Reliable and, if necessary, also Redundant

## Precision Rotary Transducers for the Heavy-Duty Segment

Automation technology is also used in harsh environmental conditions. Typical examples can be found in driven machines in road construction and in agriculture and forestry, on moving platforms, in container terminals and in harbour cranes. The sensors used here must meet special requirements. Sufficient accuracy alone is not enough. A high level of reliability must be ensured even with heavy vibrations, moisture and extreme temperature fluctuations. And the understandable desire for “affordable” technology also plays a role here. Conductive plastic potentiometers available today in surprisingly rugged designs are therefore usually unbeatable in applications of this kind.

With the conductive plastic potentiometers of the IPX 7900 series, Novotechnik has expanded its product line with rugged rotary transducers specially developed for use under extreme environmental conditions, e.g. for mobile applications. A typical application is, for example, actual value detection on the steered axle of electro-hydraulic steering systems. The heavy-duty potentiometers are available for detection ranges of 120°, 200° and 350° and offer unrestricted continuous rotation. All variants have either a single-channel or a two-channel, redundant design with two separate connections. As a result, the requirements as per SIL 3 are met in accordance with IEC 61508 (see text in box).

The angle sensors also meet the requirements of the protection type IP67 (plug variant M12) or IP69k (PG screwed cable gland with cable connection). They are impervious to dust, dirt or moisture. As potentiometers operate according to the voltage divider principle, temperature fluctuations also have no effect on the measuring accuracy. Even with heavy vibra-

tions, the expected service life of the rotary sensors is over 100 million movements. A rugged all-metal housing and a positive-locking cover protect the conductive plastic resistance tip and the extremely durable multi-finger wiper. The solid yet compact design with dimensions of 79 x 35 mm<sup>2</sup> enables direct attachment to the axle without additional protective measures. The sturdy, one-piece shaft with dual ball-bearing mounting with a large bearing spacing and a 13 mm diameter enables direct steering via a strong lever or driver.

### **Text for a box: Redundant rotary transducer with SIL 3 approval**

In accordance with IEC 61511 and IEC 61508, machines and risk-reducing measures are divided into four safety levels each: From SIL 1 for a low risk to SIL 4 for an extremely high risk. The abbreviation SIL stands for Safety Integrity Level; the SIL value describes the specified safety function if a fault occurs. The following applies here: The greater the risk, the more reliable the execution of the risk reduction measures and the components used must be. Of course, this also applies to conductive plastic potentiometers frequently used for actual value detection directly on the steered axles of mobile driven machines, e.g. harbour cranes, stone crushers, aircraft de-icing machines, vehicles for transporting heavy loads, etc. The two-channel, fully redundant model of the heavy-duty rotary sensor IPX 7900 meets the requirements according to SIL 3 with two separate connections.