

Contactless, Magnetostrictive Position Transducers with a Measuring Path of up to 2,500 mm:

## For Direct Integration in Pneumatic and Hydraulic Cylinders

Rugged, reliable and precise sensors are in demand for mobile applications. Contactless, magnetostrictive position transducers meanwhile play an important role in this field of application, as they guarantee maximum safety and dynamics when transmitting measured values. New designs can even be integrated directly in hydraulic or pneumatic cylinders.

With the absolute-measuring position sensors of the TIM series, Novotechnik has now added magnetostrictive position transducers (see text in box) to its product line which are suitable for inexpensive position determination directly in the pressure area of hydraulic and pneumatic cylinders. The rod-shaped sensors offer a whole range of advantages compared to other measuring principles: Measuring lengths between 50 and 2,500 mm can be realised; stainless steel makes them extremely sturdy and impervious to virtually all media. In addition, the sensors operate extremely precisely and are reliable even under adverse ambient conditions. The linearity values are 0.04 %, and the repetition accuracy is 0.005 % regardless of the measuring length. The contactless, and therefore virtually wear-free sensors are pressure-resistant up to 350 bar (pressure peaks up to 530 bar).

The sensor consists of a pressure-resistant measuring rod which fits into the drilled piston rod. The ring-shaped position transducer is mounted on the piston base. The contactless connection simplifies assembly, as it permits comparatively large tolerances. The electronic signal processing unit is housed in a stainless-steel flange, which is welded to the measuring rod. The sensor therefore forms a compact unit. As the sensors are not only available with the 48 mm push-on flange common in mobile hydraulics but, for example, also with an M18 screw flange and plug connection,

they adapt well to the respective application. They are impact and vibration-resistant, withstand operating temperatures up to 105 °C and naturally meet all common requirements for EMC and vehicle electrical systems of the mobile sector. The measured value is available at the output for direct further processing as a common current or voltage signal.

**Text in box: The magnetostrictive measuring principle**

The measuring process is triggered in magnetostrictive sensors by a short current pulse, which generates a circular magnetic field around the waveguide. The field lines of the position transducer, which marks the measuring position in the waveguide, run vertically to this. An elastic deformation, the magnetostriction, results in the waveguide at the overlapping position of the two magnetic fields. The reversible change in dimension triggers a mechanical pulse, which continues in the waveguide as a torsional wave with a speed of approximately 2,800 m/s. At one end of the waveguide, the torsion wave is converted into an electric signal, and at the other it is attenuated so that no overlapping occurs during subsequent measurements. The running time from the point of origin to the signal converter is directly proportional to the distance between the position transducer and the signal converter.