



As Diverse as the Applications:

Position Sensing for the Future of Automation

Non-contacting position sensing has become an established technology for industrial automation and mobile applications. According to a German saying, progress does not halt, and this holds true also for linear position sensors and rotary sensors, which are often based on magnetics. Robustness, speed, accuracy, and - in particular in regards to Industry 4.0 - communications capabilities are important key words in this context. At the same time, the selection of suitable measuring concepts and the corresponding sensors is always governed by the requirements of the measuring task at hand. That is to say: different applications require different sensors.

This year's SPS/IPC/Drives in Nuremberg, Germany, will once again be a good opportunity to learn about the state of technology, the latest trends, and the different non-contacting operating principles of linear and rotary position sensors. The theme at the booth of sensor specialist Novotechnik, for instance, appears to be diversity; the company's portfolio ranges from highly-dynamic linear position sensors to Single- and Multiturn rotary sensors, which are also suitable for mobile applications. The subject of Industry 4.0 is a central issue, here as well: Many of the products now feature IO-Link communications capabilities. This allows the automation cluster to fully utilize their intelligent features.

Highly Dynamic Inductive Linear Position Sensor

The inductive linear position sensor TF1, available in standard lengths of 100mm to 1000mm is virtually predestined for quick positioning tasks. The measuring system's update rate is up to 10kHz, resulting in a time delay of

0.2ms between actual position and corresponding measurement value. Improved control dynamics eliminate overshooting even with rapidly changing movements. At the same time, the sensor offers resolutions of up to 1 micrometers. Some examples of typical applications are: linear drives, injection molding and die casting equipment, presses and punches for sheet metal processing, packaging or wood processing equipment, and position sensing in rapid motion units of production lines.

And the Novopad technology is non-susceptible to the magnetic fields generated by large motors, hydraulic valves, or magnetically actuated clamping mechanisms, for instance. This holds true because the position sensing is achieved through the application of inductive rather than magnetic principles. Another advantage for the field of metal processing is the fact that metal shavings will not accumulate at the non-magnetic sensor. Position markers are available in guided designs for coupling to driving rods, and in non-guided designs for mechanical decoupling. Owing to the robust sensor design – with the material measure embodied in a circuit board – even strong vibrations will not interfere with the measuring results. What's more, the sensor covers a wide temperature range of -40 to +85° C. The measurement signal is provided as an analog current/voltage signal, or in digital form via SSI. Additionally, IO-Link or CANopen standard communication interfaces are available; an Ethernet interface will be forthcoming.

IO-Link: An Interface for the Future

In order to facilitate the easy and cost-effective interlinking of sensors and control units in the framework of Industry 4.0, the standardized communications protocol IO-Link has been defined. This offers several practical advantages: The point-to-point connection offers field bus functionality at attractive prices, and enables uninterrupted control unit communications down to the sensor level. In particular the wiring – in comparison with Industrial Ethernet – is decidedly more simple and thus more cost-effective, since unshielded 3-wire leads as well as the M12 connector system are supported.

On activation, the user can easily modify parameters, such as zero or the direction of rotation, in order to reduce diversity of variants. In addition to purely positional data, additional data, such as status or diagnostics messages can be exchanged. Control circuit errors are quickly identified, thanks to the central

storage of setup parameters. Sensor replacements can be accomplished in little time. Thus, IO-Link ultimately facilitates cost reductions for automation technology as well as engineering. By now, many sensors are offering these advantages to the user. This year, at Nuremberg, Novotechnik will present a whole “bag full” of linear position sensors and rotary sensors that are available with IO-Link:

This includes linear sensors, such as the highly-dynamic inductive linear position sensor mentioned above, as well as rotary sensors, such as the robust Single- and Multiturn transducers of the RSC-2800 and RSB-/RMB-3600 series. The magnetic sensors of the RSC-2800 series have proven themselves in many industrial and mobile applications, by now. They are compact, easy to install, and capture the rotation angle over the entire 360 degrees, at a resolution of up to 14 bits. The Single- and Multiturn sensors of the RSB-/RMB-3600 series are robust single- oder multi-channel designs with full metal casings measuring only 36.5mm in diameter and featuring durable ball bearings. Other examples of sensors featuring IO-Link are the absolute, magnetostrictive linear position sensor TH1 (rod-style transducer) suitable for direct integration in cylinders as well as the also magnetostrictive linear position sensor TP1 (profile-design transducer).

Robust Rotary Sensors for Mobile Machinery

Mobile machinery for construction, agriculture, and forestry, as well as pallet trucks are placing high demands on sensors, due to their outdoor use. However, in addition to reliable functionality under rough operating conditions, further characteristics are usually required, e.g. small footprint where installation space is tight, and redundancy for applications where safety is of concern; and last but not least, the cost factor frequently plays a significant role. The magnetic rotary sensors of the RSA-3200 and RFE-3200 series have been developed specifically with these requirements in mind. They are available in a shaft design (RSA) as well as in a non-contacting design with separate position marker (RFE). Both designs have been optimized for the requirements of mobile applications and tested to the most stringent of EMC standards, such as ISO-pulses and high disturbances according to ISO 11452. The positional values are provided as analog current or voltage values; a CANopen interface is also available. In addition, single- oder multi-channel designs are available. The latter are suitable for appli-

cations where safety is a concern, as in PLd / Cat. 3 according to DIN EN ISO 13849).

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