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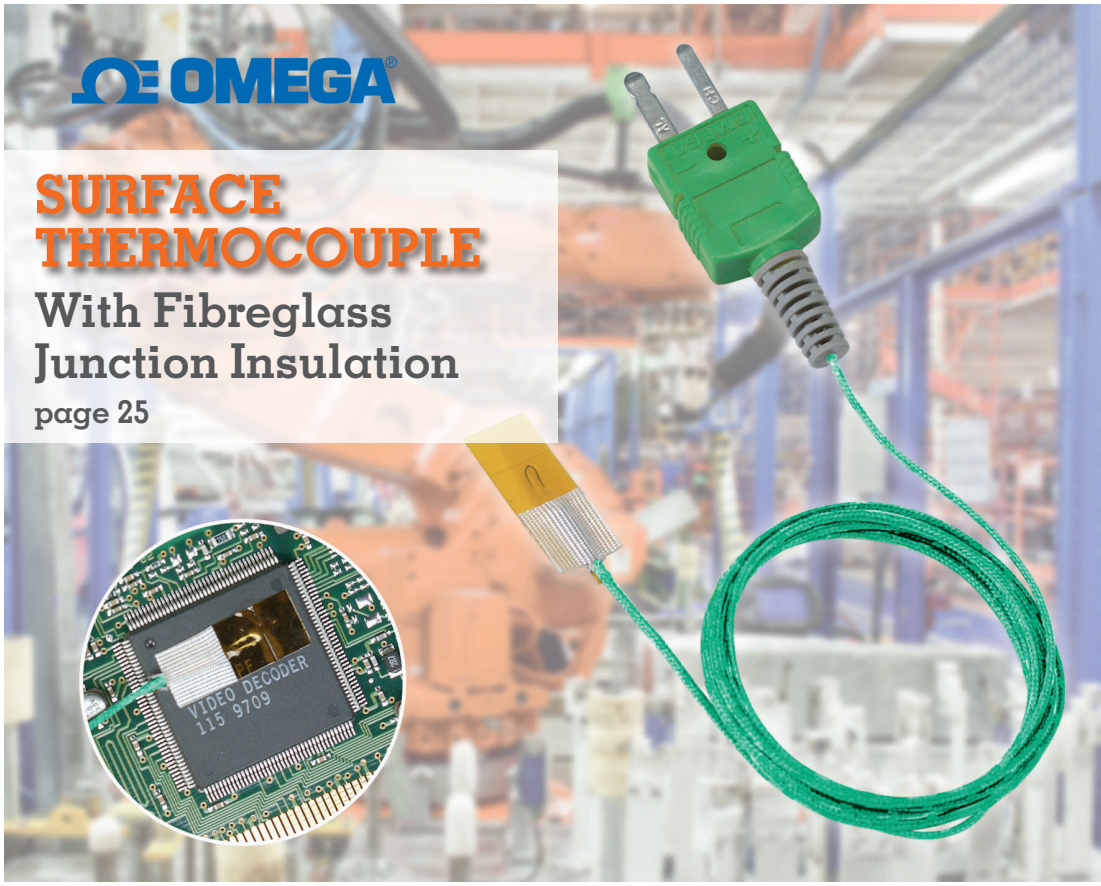

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Technical Article

Open Linear Encoder System To Increase Safety

The magnetic sensor SIKO MagLine Encoder MSA111C comes with certified safety functions being now available in a SIL-2 version

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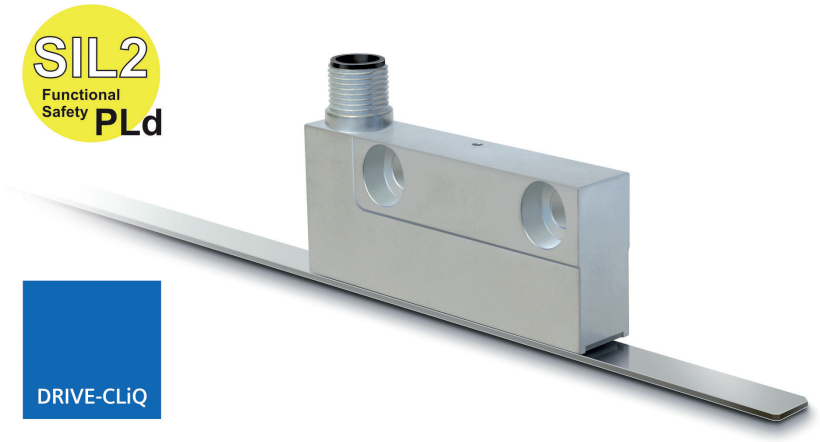
The terms 'functional safety' and 'Industry 4.0' are on everyone's lips. In the coming decades the industry will have to manage new tasks, which means that digitalisation in production is developing at a great pace. The aim is to create machines that can independently control and monitor short-term (production) changes, without posing a risk of danger or death.

In this digital world, machine safety in accordance with Machine Directive 2006/42/EC is of great importance. The safety concept is evaluated using system and subsystem failure probabilities. Subsystems and products that have already been qualified and certified are a big advantage when creating a complete system.

This exact requirement is now met by the absolute measuring SIKO MagLine Encoder MSA111C with DRIVECLiQ[1]interface and SIL2. The sensor has been tested and certified as SIL 2 compliant according to EN 61508, performance level 'd', category 3 (according to EN ISO 13849) by TÜV Rheinland. This means that the SIKO Encoder can be used in machine manufacturing safety applications without additional outlay. Whereas up to now two separate sensors had to be used to obtain position values that are independent of each other, the functional safety requirements can now be achieved with the MSA111C-DQ SIL 2 magnetic linear sensor. The DRIVE-CLiQ interface itself has the advantage of being easily connected (Plug-and-Play) to existing Siemens SINUMERIK and SINAMICS controllers. It is equipped with an electronic rating plate. This contains component-specific data, which enable error-free drive system configuration during start-up. This leads to a significant reduction of effort required during project planning.



Cost-optimisation, automatic start-up and a high degree of error monitoring

The safety requirements for SIL2 call for a special measurement channel. This is taken care of by the new sensor. It passes independent position values on to the DRIVE-CLiQ interface. The controller is informed of possible data transmission errors by error bits (DRIVE-CLiQ). This guarantees that the safety-oriented controller is informed of the actual position values at all times. Possible errors (i.e. measuring distance to the gauge exceeded, non-plausible values) are recognised immediately, so that the controller can bring the machines into a safe state. Emergency mode operation is guaranteed at all times. The safe position, in other words the maximum possible change in position before an error message is generated, is max. 6mm with the MSA111C. Sources of danger are minimised or at least significantly reduced. This satisfies current as well as future stringent requirements for personal and environmental safety in modern production. Mean values for service life (MTTFd) and probability of failure (PFH) are accurately specified. This makes the system ideally suited to be used in safety-critical complete systems with SIL2 and Performance Level d.

The compact linear sensor also excels when it comes to the features of accuracy and operating speed: The system accuracy is +/- 10 µm, while the reproducibility accuracy is even as good as +/- 2 µm. The maximum resolution is 1 µm (absolute). It has an operating speed of up to 5m/s. The linear sensor MSA111C-DQ is based on the proven magnetic measuring principle, has non-contact operation, and like all MagLine sensors distinguishes itself by being unaffected to a large degree by dirt (dust, oils, greases, shavings) and vibration. The SIKO linear sensor also has the clear benefits of withstanding condensation (100% moisture) and high UV-resistance.

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[1] *DRIVE-CLiQ is a registered trademark of SIEMENS AG*