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Safe encoders: the sensory organs of motion control

Modern-day machinery manufacturers are confronted by a wide range of challenges, reflected in the increasing spread of terms such as "performance level", "diagnostic coverage", and the need to conform to standards such as the EU Machinery Directive. In order to build and sell safe machines, safe system components are key. Safe encoders, serving as the sensory organs of components subject to functional safety demands, are essential links in the safety chain.

Only by reliably recording speed and position data is it possible to safely monitor velocity, standstill or other motion control solutions. While many product standards cite a performance level (PL) defined for rotary or horizontal axes (such as EN12417 machining centres), applications involving inclined or lift axes, and press applications, mostly specify PL e.

This begs the question as to how machinery manufacturers can implement these safe monitoring functions with the specified PL on their machines.

In addition to its functional safety products (ServoOne, SMC), LTi DRIVES supplies motors with safe encoders. The special feature of this is that it encompasses not only the certified encoder, but rather the complete process, from safe mounting through to testing and documentation of the interface. When an encoder of this kind is deployed – even with PL e certification – it must be mounted with 20 times over-dimensioning in order to meet the fail-safety requirements of the safety standard DIN EN 61800-5-2. And other requirements may also need to be met, such as the manufacturer's implementation rules. Such measures make it possible to integrate a comprehensively certified system into the machine.

Things become more difficult when existing machinery concepts are to be retained unmodified.

This is quite justifiable, because in the linear and direct drives segment there are no certified encoder systems based on the current state of development. For such cases, the above components offer the possibility to evaluate a second, redundant encoder so that fault detection by the process can eliminate the need for the aforementioned fail-safety and the specified safety level requirement can be met. In applications to PL d standard, diversity is a commonly used method, and will be presented in similar form in the future second release of DIN EN 61508 (see BGIA Report 02/08, section 6.3).

LTi DRIVES thus enables users to rely virtually blindly on the sensory organs of the motion control system – regardless of whether certified or uncertified, one- or two-channel systems – and so embed machine safety into their processes.



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