

Capacitive motor feedback systems: the “absolute” alternative to resolvers

Waldkirch, Innovation No 18 2009– Extreme ruggedness coupled with multiturn capability, an electronic type label and a HIPERFACE® interface characterise the new SEK/SEL motor feedback systems. With their many times greater precision, these absolute measurement systems are the perfect alternative to the resolver solutions still found in the basis segment of industrial applications involving the detection of position and speed of rotation.

Capacitive motor feedback systems are available in four different versions: as the single-turn SEK37 and SEK52 or multiturn SEL37 and SEL52. The multiturn property of the SEL versions is achieved via a mechanical drive as well as magnets and Hall sensors. A decisive advantage over resolvers is that the SEK/SEL units require no external evaluation because the electronics are all located on an ASIC integrated in the devices.

Capacitive functional principle offers many advantages

At the heart of the SEK/SEL series is the bearing-free capacitive sensor element – which also meets the prerequisite of being an economically attractive alternative solution for the resolver segment. The transmitter circuit board has a coarsely resolving disk track with three pulses per rotation and a finely resolving track with 16 pulses per rota

tion. The receiver circuit board opposite has two conducting tracks with which the coarse or fine pulses are detected. The pulses are generated or modulated by a star-shaped rotor whose rotation changes the dielectric between the transmitter and receiver circuit boards. Whereby comprehensive, i.e. holistic, scanning takes place so that neither radial nor axial nor tilting tolerances during the rotation of the rotor can lead to impairment of the measurement accuracy. The capacitive method of function is, however, not only very precise, but also extremely robust because it requires no ball bearings. These motor feedback systems also offer a level of temperature resistance that has hitherto largely been restricted to resolvers.

SEK/SEL: more than a gap-filler between resolvers and motor feedback

Regarding ruggedness and precision, the SEK/SEL devices offer the application-related performance features that are required in the lower segment of the industrial detection of position and speed of rotation, in particular. In automation terms, however, they offer users new possibilities, particularly those for whom aspects like the multiturn feature or machine integration via the proven HIPERFACE® interface standards are important. The SEK/SEL motor feedback systems are thus of simultaneous interest to two worlds of automation: the former world of the resolver, in which users require greater performance from the position-finder, and the “classic” motor feedback world, which can now exploit efficient temperature- and vibration-resistant devices without having to give up proven automation structures, such as those offered by SKS/SKM 36 or SRS/SRM 50 high-end motor feedback systems.

Wide range of use

Servo-motors, handling drives, feed axles and standard robot applications on the one hand, and robust applications such as on textile machines or in mining on the other hand – both are areas of use for the new capacitive motor feedback systems. Given the design of the mechanical connection technology, it can be seen that the SEK/SEL series is intended to attract users away from both the resolver segment and the segment of incremental encoders. Thus both the SEK37 and SEL37 are designed for slipping over the conical shafts that are the norm for the SKS36 and SKM36 ultra-compact motor feedback systems, for example. In addition to the shoulder clamp familiar from resolvers, the SEK52 and SEL52 also offer device versions for hollow and conical shafts. Thus these new device families are mechanically compatible with existing families such as SK- and SR-devices and therefore offer customers another real advantage – a considerable reduction in the variety of motors or motor shafts to be stocked.



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