

HANNOVER MESSE 2022

CANopen safety encoder with SIL 3

At the fair, TWK shows the recent magnetic TRSN multi-turn and TBSN single-turn encoders supporting CANopen Safety (EN 50325-5). It is prepared to meet the SIL 3 (EN ISO 61508) and ASIL D (ISO 26262) compliance.



The most compact TxSN version has a housing diameter of 42 mm (Source: TWK)

For some applications, the SIL 2 / PL d (safety integrity level / performance level) level is not sufficient. For example, for the automated guided vehicles (AGVs), which move independently and computer-controlled in public areas, the safety requirements are particularly high. High personal injury and property damage can occur if the vehicle functions incorrectly. Thus, the vehicles must be equipped with SIL 3 components, e.g. on the wheels, to detect steering angle and speed. Another application could be remote-controlled vehicles that are moved without a driver present. They are steered remotely from a workstation. From their seat equipped with monitors, pedals, and a steering wheel, the operator can remotely steer a vehicle equipped with cameras and remote technology to the desired destination and back. The data exchange with the vehicle is fulfilled using the 5G cellular technology.

The SIL-3 encoders introduced at the Hannover Messe 2022 can be deployed as control elements of the remote steering station to record important control commands. The first TxSN devices will be delivered at the end of 2022. The redundant design as well as advanced diagnostic and watchdog functions ensure the SIL 3 capability. In addition, extensive test procedures for hardware and firmware during the design phase and later for each device to be delivered in production are intended. Each encoder then outputs the position value, which is recorded twice, checked for plausibility and processed in separate micro-controllers. This is achievable using the CANopen safety solution. The safety check takes place in the safety controller. The latter proves whether both values (normal and bit-inverted) arrive within a specified time window and whether they are identical, considering the inversion. If this is not the case, an alarm is triggered and the vehicle is stopped.

The TxSN encoders provide position resolutions of up to 16 bit, a parameterizable gate time for speed measurement, and speeds up to 10 000 rotations per minute. Available with different flange and shaft forms, the devices feature protection classes up to IP69K. A shaft load capacity up to 250 N axial and radial is possible. The electrical connection is realized via the M12 plug connector or cable. For the launched encoders, as well as for the company's SIL 2 / PL d encoder models, customizable features for further applications are planned. For example, a range of robust enclosures includes seawater-resistant aluminum as standard. Various stainless steels are available e.g. for food-grade applications or for applications with strong magnetic fields. Special enclosures will be offered for versions with explosion protection according to Atex Zone 1 and Atex Zone 21. The most compact version has a housing diameter of 42 mm.

[of](#)