PLd-compliant inclinometer

The Swiss company Baumer has introduced the GIM600R functional-safe tilt sensor featuring CANopen or J1939 connectivity. It has been developed for rough conditions in mobile machines and off-highway vehicles.

(Source: Baumer)

Inclinometers are sensors for measuring angles of slope (or tilt), elevation, or depression of an object with respect to gravity. The launched GIM600R sensor complies with the ISO 13849-1:2023 safety standard, ensuring robustness and measurement accuracy. It is intended for applications in aerial work platforms, loader cranes, and telehandlers. The temperature-stable precision of the product simplifies machine design and allows for increased working range. The PLd-compliant (performance level d) sensor also enables reliable measurements for static stability control in construction vehicles.

The sensor improves the machine uptime providing a high environmental resistance. For the proof of resistance, the product went through numerous, demanding endurance tests. It meets the ingress protection requirements up to IP69K rating and is corrosion-resistant up to CX level. It is further immune to shocks, vibrations, dust, dirt, and salt spray.

The CANopen respectively the J1939 interface enables an easy integration into the control system. The supplier provides a system configuration suite to parameterize the sensor as known for other sensors, featuring an intuitive dashboard. OEMs (original equipment manufacturers), who have previously relied on GIM140R or GIM500R inclination sensors can simply replace them with the GIM600R.

The GIM600R sensor comes in different versions:

- 1-dimensional inclination sensor to be installed vertically;
- 2-dimensional inclination sensor to be installed vertically;
- 2-dimensional inclination sensor to be installed horizontally.

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Brief news: Sensors

- ***Cable extension transducer:*** TSM (Top Sensors Manufacture) located in Italy offers draw-wire encoders measuring lengths of up to 5 m (CET5) and up to 12,5 m (CET12). The products comply with CANopen and feature CANopen Safety (EN 50325-5) connectivity.
- ***Draw-wire sensor:*** Gefran situated in Italy offers the GSH-A sensor device measuring lengths of up to 12,5 m. The sensor embedding an inclinometer provides a CANopen interface. The housing is IP67-rated.
- ***Encoder:*** The EN580C sensor by Baumer (Switzerland) comes with a CANopen Interface. The rotary absolute encoder with housing diameter of 58 mm features a 21-bit single-turn resolution and a 16-bit resolution in multi-turn mode.
- ***Cable extension transducer:*** The WST61 CANopen sensor by ASM (Germany) has a measurement range of up to 20 m. It integrates an inclination sensor for ±180° angles. The device is available in a redundant version to be used as functional-safe sensor. Other variants support shorter length measurements (6 m respectively 3 m).
- ***Inclinometer:*** STW (Sensor-Technik Wiedemann) (Germany) has developed the SMX.igs-a family of sensors. The redundant inclinometers can transmit the measured values via CANopen Safety (EN 50325-5), CANopen, or J1939. A version with only the CAN hardware is available, too.
- ***Safety encoder:*** ifm (Germany) offers the 58-mm sensor device, coming with CANopen Safety and CANopen CC (classic) ports. They comply with PLd (performance level d) and SIL 2 (safety integrity level 2). The certified absolute encoders are available with a 10-mm solid shaft or a 12-mm hollow shaft.

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These two-channel inclinometers provide two CANopen or J1939 interfaces available on two M12 connectors. The CANopen versions feature two node-IDs. They comply with the CiA 301 (version 4.2.0) CANopen base specification, CiA 305 (version 3.0.0) for layer setting services, and CiA 410 (version 2.0.0) CANopen profile for inclinometers, but not with EN 50325-5 (CANopen Safety). The redundant inclination measurements need to be cross-checked in the functional-safe host controller. Optionally, the 3-axis acceleration parameters are mappable into PDO (process data object) messages. Another option is an integrated termination resistor. The J1939 version maps the inclination values into two parameter groups with the number 65363, containing additionally the module-ID, the error-ID, and an 8-bit device temperature value. CAN in Automation (CiA) has also released a CiA 410 compatible profile specification for J1939 (CiA 410-J, version 1.1.0), which is not supported by the GIM600R sensor. *hz*