QG series

SIL2 / PLd Certified sensor

QG65N-KDXYh-090-CANS-C(F)M-2d

Safety inclination sensor

2 axis horizontal mounting

Programmable device
Interface: CANopen Safety

SIL CL 2 (acc. to IEC 62061)
PLd (acc. to EN ISO 13849)

Measuring range
± 90°

	General specifications 12084/12081, v20180117
Housing	Reinforced plastic injection molded (Faradex DS, black, EMI shielded by stainless steel fiber in PC)
Dimensions (indicative)	60x50x27 mm
Mounting	4x M5x25 mm zinc plated pozidrive screws included (optional: 2x Ø4mm positioning pins)
Ingress Protection (IEC 60529)	IP67
Relative humidity	0 - 100%
Weight	approx. 110 gram
Supply voltage	8 - 60 V dc SELV
Polarity protection	Yes
Current consumption	⩽ 75 mA
Operating temperature	-40 .. +85 °C
Storage temperature	-40 .. +85 °C
Measuring range	± 90°
Centering function	Yes (CANout 0 = 0°), range: ±5°
Frequency response (-3dB)	0 - 20 Hz
Accuracy (typ. and/or 2σ)	overall 0,1° typ.
Offset error	< ± 0,05° typ. after centering
Non linearity	< ± 0,1° typ. (< ± 0,15° max.)
Sensitivity error	not applicable
Resolution	0,01°
Temperature coefficient	± 0,01°/K typ.
Max mechanical shock	10.000 g
CAN interface (hardware)	According to ISO 11898-1 & ISO 11898-2 (also known as CAN 2.0 A/B)
CANopen application layer and communication profile	CANopen Safety protocol: EN 50325-5, CANopen protocol: EN 50325-4 (CiA 301 v4.0 & and 4.2.0) CANopen device profile for inclinometers: CiA 410 version 2.0.0
Baud rate Node Id TPDO1 event time Sync mode (TPDO's), Heartbeat Output format SRDO1 COB-ID1 SRDO1 COB-ID2 Safeguard cycle time (SCT) Safety related validation time (SRVT) Filtering Reaction on error	125 kbit/s (default, range 10/20/50/100/125/250/500/800/1000 kbit/s) 01h (default, range: 01h - 3Fh) (01h - 7Fh with adapted COB-ID's) 50 ms (default, range 10-500 ms) off (default, range on/off) Integer: -9000 to +9000 (SRDO:X=byte 2,1; Y=byte 4,3) (byte 5,6,7,8: integer 0) FFh + 2x node ID (for Node ID=01h: SRDO1 COB-ID1=101h) 100h + 2x node ID (for Node ID=01h: SRDO1 COB-ID2=102h) 80ms in CAN object dictionary, worst case 100ms 20ms Output filter disabled Emergency message 080h+Node-ID followed by NMT stop state (no CAN communication)
Boot time	< 1 s
Programming options	by CANopen object dictionary (CAN parameters, filtering)

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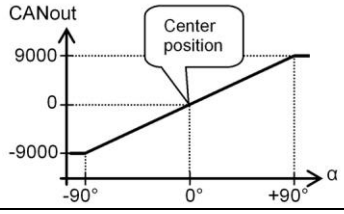
CANoutput = 100*α

Clipping outside measuring range

Transfer characteristic

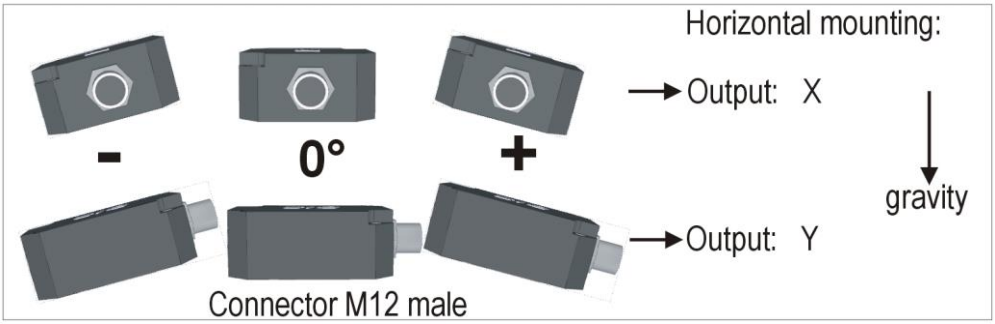


Default 0°: horizontal (label upwards), no acceleration applied. To eliminate mounting offsets the sensor can be centered within ±5° tilt (by the CAN object dictionary)

Cross tilt sensitivity error:
< (0,12 * cross tilt angle)² % typ.

→ one axis <10° tilt for max. accuracy
→ only one axis may exceed 45° tilt

Measurement orientation



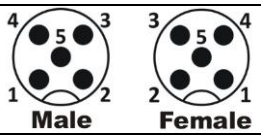
Connection

Connectivity (length ±10%)

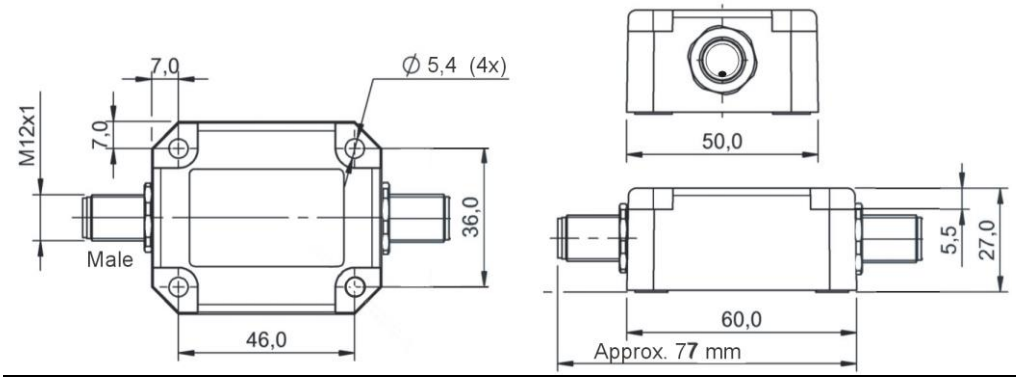
Male only or Male & Female (internal T-junction) M12 connector (5 pins, A-coding)
(CiA303 V1.8.0) (Brass Nickel coated, contacts copper alloy)
No bus termination inside. A CANbus always has to be terminated properly. For bus termination order seperate M12 termination resistor (optional: T-connector)

Wire / pin coding

Pin 1:	Shield
Pin 2:	Vcc
Pin 3:	Gnd & CAN_GND
Pin 4:	CAN_H
Pin 5:	CAN_L



Mechanical dimensions (indicative only)



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CAN-manual, EDS-file, Safety information, Ordering codes

A CANopen-safety manual, EDS-files (CiA306 V1.3.0) and a Declaration of Conformity are available on www.dis-sensors.com/downloads

Safety information:
- this datasheet + relevant manual must be read and understood before using this safety device
- certified level: SIL CL 2 (acc. to IEC 62061), PLd (acc. to EN ISO 13849)
- EC type examination by DEKRA EXAM GmbH Reg. no.: ZP/C015/16
- hardware architecture: HFT=0 (according IEC 62061, CAT.2 (according to EN ISO 13849)
- Standard (-40°C to +45°C): MTTFd: 447 year, DC: 93%, CCF: 70 pt, SFF: 98%, PFHd: 14E-09
- High Temp. (up to +85 °C): MTTFd: 73 year, DC: 93%, CCF: 70 pt, SFF: 98%, PFHd: 91E-09
- only a SELV power supply should be used
- Redundancy Compare Time (error if this time is expired): customer adjustable (default 2000ms)
- Redundancy Compare Angle (error if angle-difference > this value): customer adjustable (default 3°)
- Redundancy error: Redundancy Compare Angle & Redundancy Compare Time exceeded
- Error: any detected error or a redundancy error
- Safety Related Fault Respons Time (SRFRT): 100ms + Redundancy Compare Time (default 2000ms)

As this device is accelerometer-based the sensor is inherent sensitive for accelerations/vibrations. Application specific testing must be carried out to check whether this sensor will fulfil your requirements.
Ordering codes:
M12 Male: QG65N-KDXYh-090-CANS-CM-2d, 12084
M12 Male & Female: QG65N-KDXYh-090-CANS-CFM-2d, 12081