

QG series

SIL2 / PLd Certified sensor

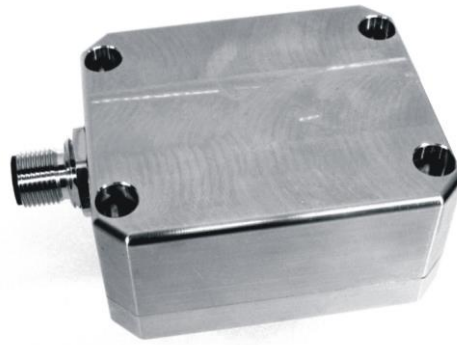
QG76N-SDXYh-090-CANS-C(F)M-2d

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
 $\pm 90^\circ$



CANopen
safety easy to use



General specifications v20190501

Housing	Stainless steel (AISI 316)
Dimensions (indicative)	70x60x33 mm
Mounting	Included: 4x M4x30 mm stainless steel (A4) Hexagon socket head screws
Ingress Protection (IEC 60529)	IP67 (IP68 with optional cable gland)
Relative humidity	0 - 100%
Weight	approx. 700 gram
Supply voltage	8 - 60 V dc SELV
Polarity protection	Yes
Current consumption	≤ 25 mA
Operating temperature	-40 .. +85 °C
Storage temperature	-40 .. +85 °C
Measuring range	$\pm 90^\circ$
Centering function	Yes (CANout 0 = 0°), range: $\pm 5^\circ$
Frequency response (-3dB)	0 - 20 Hz
Typ. Accuracy @20°C (2 σ)	overall 0,15° typ.
Offset error	$< \pm 0,05^\circ$ typ. ($< \pm 0,1^\circ$ max.) after centering
Non linearity	$< \pm 0,1^\circ$ typ. ($< \pm 0,2^\circ$ max.)
Sensitivity error	not applicable
Resolution	0.05°
Temperature coefficient	$\pm 0,01^\circ/\text{K}$ 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 & 4.2.0) CANopen device profile for inclinometers: CiA 410 version 2.0.0
Baud rate	125 kbit/s (default, range 10/20/50/100/125/250/500/800/1000 kbit/s)
Node Id	01h (default, range: 01h - 3Fh) (01h - 7Fh with adapted COB-ID's)
TPDO1 event time	50 ms (default, range 10-500 ms)
Sync mode (TPDO's), Heartbeat	off (default, range on/off)
Output format	Integer: -9000 to +9000 (SRDO:X=byte 2,1; Y=byte 4,3)
SRDO1 COB-ID1	FFh + 2x node ID (for Node ID=01h: SRDO1 COB-ID1=101h)
SRDO1 COB-ID2	100h + 2x node ID (for Node ID=01h: SRDO1 COB-ID2=102h)
Safeguard cycle time (SCT)	80ms in CAN object dictionary, worst case 100ms
Safety related validation time (SRVT)	20ms
Filtering	Output filter disabled
Reaction on error	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 = $100 \cdot \alpha$

Clipping outside measuring range

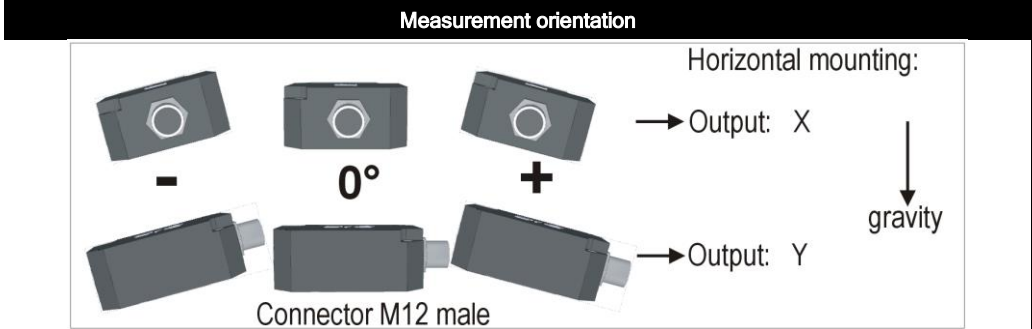
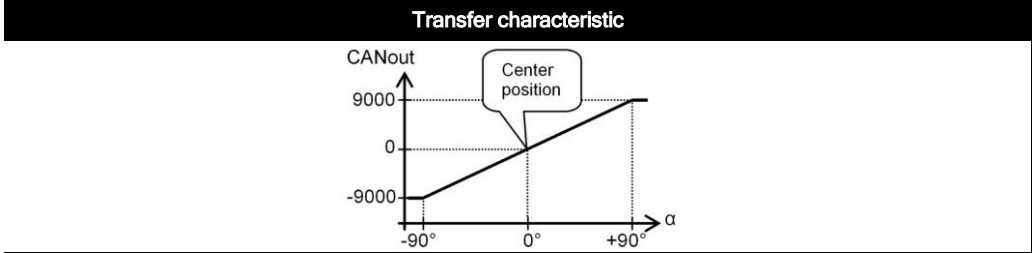
Default 0°: horizontal (label upwards), no acceleration applied.
To eliminate mounting offsets the sensor can be centered within $\pm 5^\circ$ tilt (by the CAN object dictionary)

Cross tilt sensitivity error:
 $< (0,12 \cdot \text{cross tilt angle})^2$ % typ.

→ one axis $< 10^\circ$ tilt for max. accuracy
→ only one axis may exceed 45° tilt

Connection

Wire / pin coding

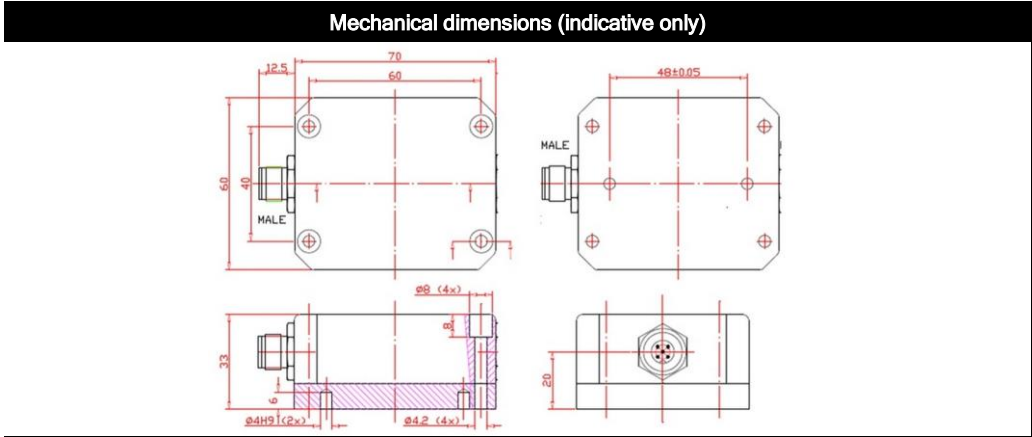


Connectivity (length $\pm 10\%$)

Male only or Male & Female (internal T-junction) M12 connector (5 pins, A-coding) (CiA303 V1.8.0) (stainless steel 1.4404 (316L), contacts copper alloy)

No bus termination inside. A CANbus always has to be terminated properly. For bus termination order separate M12 termination resistor (optional: T-connector)

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



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: QG76N-SDXYh-090-CANS-CM-2d
M12 Male & Female: QG76N-SDXYh-090-CANS-CFM-2d