QG series

Engineering draft specification, for internal use only. Subject to change without notice

QG65D-KIXv-360-CAN-C(F)M-UL

Dynamic Inclination sensor

1 axis vertical mounting

Programmable device
Interface: CANopen

Parameters programmable
by CANopen object dictionary

Measuring range
360°

	General specifications v20181109
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
Ingress Protection (IEC 60529)	IP67
Relative humidity	0 - 100%
Weight	approx. 110 gram
Supply voltage	10 - 30 V dc
Polarity protection	Yes
Current consumption	≤ 75 mA
Operating temperature	-40 .. +85 °C
Storage temperature	-40 .. +85 °C
Measuring range	360°
Centering function	Yes (CANout 0 = 0°), range: 360°
Frequency response (-3dB)	0 - 10 Hz
Typ. Accuracy @20°C (2σ)	overall 0,1° typ. (static), 0,5° typ. (dynamic), repeatability 0,1°
Offset error	< ± 0,05° typ. after centering
Non linearity	< ± 0,1° typ. (static), ± 0,5° typ (dynamic)
Sensitivity error	not applicable. Max angle rate < 125°/s
Resolution	0,01°
Temperature coefficient	t.b.d.
Max mechanical shock	1000g
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, CiA301 V4.2.0 & EN 50325-4 + Device Profile CiA410 DSP 2.0.0 for inclinometers
Baud rate	250 kbit/s (default, range 10/20/50/100/125/250/500/800/1000 kbit/s)
Node Id	01h (range: 01h - 7Fh)
TPDO	TPDO2: 281h (for Node ID=01h), TPDO1: 181h (for Node ID=01h)
Event time	TPDO1: 5 - 500 ms (default: 100 ms)
Sync mode	On/off (default: off)
Heartbeat	On/off (default: on, 2s)
Programming options	Baudrate, Node Id, Event time, Sync mode, Heartbeat, Output format
Output format	Integer: 0 to 35999 (PDO1:byte2,1)
Gyro compensation settings	Off/light/medium/strong (default: medium)
Filtering	Input filter enabled, output filter disabled
Modes of operation	Event mode, Sync-mode
Boot time	< 1 s
Programming options	by CANopen object dictionary (CAN parameters, filtering, gyro)

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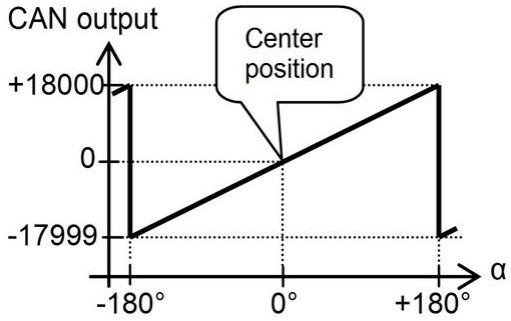
CANoutput = 100*α

Centering can be done to eliminate mechanical offsets. (can be done by CAN object 300Fh)
The current sensor position will be stored as the new Center position in the internal Eeprom.

Transfer characteristic

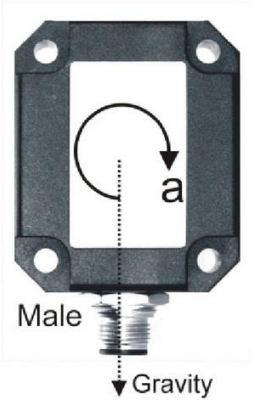


Rotation in vertical plane.

Lateral tilt sensitivity error:
< ± 0,03°/° lateral tilt (typ.)
Max. lateral tilt: 45°

Drawn in the default 0° position.

Measurement orientation



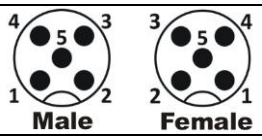
Connection

Connectivity (length ±10%)

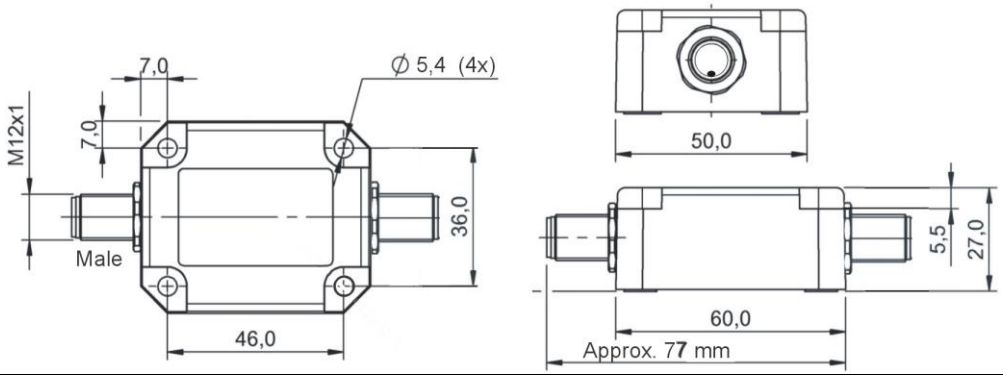
Male only or Male & Female (internal T-junction) M12 connector (5 pins, A-coding)
(CiA303 V1.8.0) (Brass Nickel coated, contacts copper alloy)
No bus termination inside. A CANbus always has to be terminated properly. For bus termination order seperate M12 termination resistor (optional: T-connector)

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)



UL, CAN-manual, EDS-file, Ordering codes

QG series sensors are intended to measure inclination/acceleration/tilt. Flawless function (acc. spec.) is ensured only when used within specifications. This device is not a safety component acc. to EU Machine Directive (ISO13849). For full redundancy two devices can be used. Modifications or non-approved use will result in loss of warranty and void any claims against the manufacturer.

UL File number: E312057. UL & c-UL listed product (UL508 standards UL60947-5-2 & CSA-C22,2 No.14)
Product Identity / Category Code Number (CCN): Industrial Control Equipment / NRKH & NRKH7
Enclosure / Temperature rating: Enclosure type 1 / Temperature -40° . .+85 °C
Electrical rating: Intended to be used with a Class 2 power source in accordance with UL1310
Electrical ratings: max. input Voltage 30V dc, max. current 500mA
Accessory Cable Assembly: Any UL-listed (CYJV/7) mating connector with mechanical locking, wire thickness of at least 30 AWG (0,05 mm²), recommenced ≤23 AWG (≥0,25 mm²)

As this device is accelerometer-based the sensor is inherent sensitive for accelerations/vibrations.
The majority of these dynamic effects will be eliminated by the on-board gyro.
The on-board gyro and Kalmann filtering is special designed to prevent the inclinometer to become significant inaccurate in dynamic situations.The sensor has three pre-programmed Kalmann algorithms that can be selected via the CANbus (gyro compensation settings off/light/medium/strong)
Application specific testing must be carried out to check which compensation algorith fits the application best, and whether this sensor will fulfil customers requirements.

A CAN-manual will be available at product launch
EDS-file (CiA306 V1.3.0) will be available at product launch

Ordering codes:
M12 Male: QG65D-KIXv-360-CAN-CM-UL
M12 Male & Female: QG65D-KIXv-360-CAN-CFM-UL