

QG series

QG40N-series SIL CL 1 / PLc

QG40N-KIXv-170-ASP-CM-UL-1c

**Tilt switch for
SIL CL 1 (acc. to IEC 62061)
PLc (acc. to EN ISO 13849)
applications**

1 axis vertical mounting

Programmable device
Output: PNP

Switch points programmable
between $\pm 1^\circ$ and $\pm 170^\circ$

Measuring range
Factory defaults:
 $\pm 90^\circ$ & $\pm 170^\circ$



General specifications 12525, v20190221

Plastic injection molded housing (Arnite T06 202 PBT black)

40x40x25 mm

Included: 2x M3x25 mm zinc plated steel pozidrive pan head screws, self-tapping (PZ DIN 7500C)

IP67, IP69K

0 - 100%

approx. 45 gram

10- 30V dc

Yes

≤ 20 mA

$-40 \dots +60$ °C

$-40 \dots +85$ °C

Factory defaults:
 $\pm 90^\circ$ & $\pm 170^\circ$

Yes (0°), range: 360°

0-0,5 Hz

$\pm 0,5^\circ$

0° (after zeroing)

not applicable

not applicable

$0,1^\circ$

$\pm 0,02^\circ/\text{K}$ typ.

10.000 g

dual PNP

200 mA cont., protected against back EMF

Yes

< 1 s (Non-conducting during the boot process)

by optional QG40N-configurator (switch points, delay times, filtering)

Housing

Dimensions (indicative)

Mounting

Ingress Protection (IEC 60529)

Relative humidity

Weight

Supply voltage

Polarity protection

Current consumption

Operating temperature

Storage temperature

Measuring range

Centering function

Frequency response (-3dB)

Typ. Accuracy @20°C (2σ)

Offset error

Non linearity

Sensitivity error

Resolution

Temperature coefficient

Max mechanical shock

Output

Output load

Short circuit protection

Boot time

Programming options

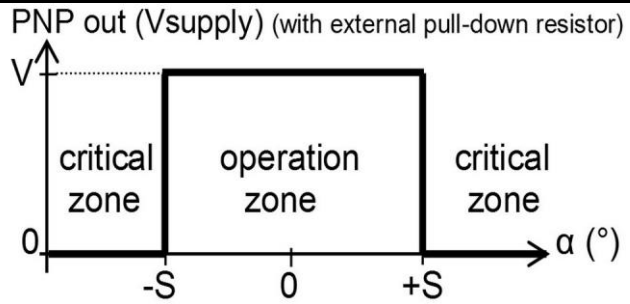
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2 independent PNP outputs:
 - Programmable switchpoints $\pm S$ (optional QG40N Configurator)
 - Operation zone: conducting
 - Critical zone: non-conducting
 - Unpowered sensor: non-conducting
 - Diagnostic error: non-conducting

Factory defaults:
 - Switchpoint $\pm S$ output 1: $\pm 90^\circ$
 - Switchpoint $\pm S$ output 2: $\pm 170^\circ$
 - Hysteresis: $0,5^\circ$
 - operation \blacktriangleright critical delay : 0,5 s
 - critical \blacktriangleright operation delay : 1 s

Transfer characteristic



The default 0° position is when the sensor is mounted vertically (M12 downwards) and no acceleration is applied.

Zeroing: eliminate mech. offsets
 Connect zeroing input to ground ($>0,5\text{sec}$) within 1 min. after power up. Normally the zeroing input should be left unconnected.

Zeroing is possible at any position in vertical plane.

Measurement orientation



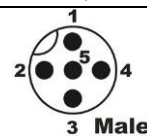
Connection

Wire / pin coding

Connectivity (length $\pm 10\%$)

M12 5p male connector (Glass fibre reinforced grade, contacts CuZn pre-nickel galvan. Au)

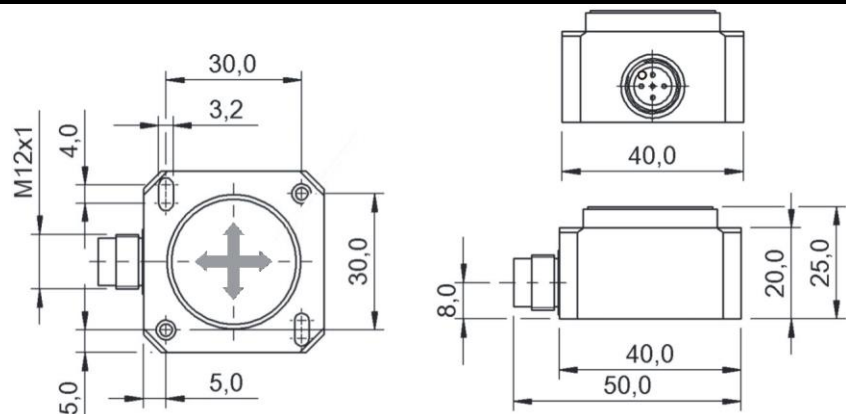
Pin 1: + Supply Voltage
 Pin 2: output 2
 Pin 3: Gnd
 Pin 4: output 1
 Pin 5: zeroing



If connected with M12 F (accessory sold by DIS):

Brown: + Supply Voltage
 White: output 2
 Blue: Gnd
 Black: output 1
 Green/yellow: zeroing

Mechanical dimensions (indicative only)



Safety Information, Intended use, UL, Remarks

QG series sensors are intended to measure inclination, acceleration or tilt angle after installing in machines, equipment and systems. Flawless function in accordance with the specifications is ensured only when the device is used within its specifications.

Modifications or non-approved use are not permitted and will result in loss of warranty and void any claims against the manufacturer.

Safety information:

- Read this datasheet carefully before using this device in a safety application
 - Safety level: SIL CL 1 (acc. to IEC 62061) , PLc (acc. to EN ISO 13849)
 - Judgement if this device can be used as safety device in customers application is the solely responsibility of the customer involved. Calculations can be based on these figures:
 - Hardware architecture: HFT=0 (according IEC 62061), CAT.2 (according to EN ISO 13849)
 - MTTFd: 415 years, DC: >60% ("low"), CCF: 65pt, SFF: >60%, PFHD:1,5E-07
 - Error: any diagnostic error will force both sensor outputs to "non-conducting" (low)
 - MCU Unknown interrupt
 - MCU RAM error
 - MCU FLASH error
 - MCU EEPROM error
 - MCU Watch Dog error
 - Sensor Self-test error
 - Sensor Interrupt error
 - Sensor Data format sensor error
 - Measurement error (fault in sensor element)
 - output error (output is not equal to processor output)
 - voltage error
 - If both outputs are non-conducting (low) the controller of the application involved should consider the sensor as defective and take appropriate action to prevent hazardous situations.
 - If the device does not meet the safety requirements for an application it can be used redundant.
 - Safety Related Fault Respons Time (SRFRT): <300ms
 - Proof test interval (mission time): 20 years
 - A safety/operation manual, declaration of conformity and 3D-stepfile are available on request.
- UL certificate: 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), recommended ≤23 AWG (≥0,25 mm²)

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.