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# Q20L60/Q42 Inclinometers



## Угол наклона

Надежные инклинометры серий Q20L60 и Q42 фиксируют практически любой наклон, а также могут использоваться в быстро движущихся или подвергающихся ударам системах. Мы предлагаем датчики для угловых диапазонов  $\pm 10^\circ$ ,  $\pm 45^\circ$ ,  $\pm 60^\circ$  и  $\pm 85^\circ$ , а также имеющие свободно настраиваемый диапазон измерений в пределах  $0 \dots 360^\circ$ . Доступны следующие варианты вывода:  $4 \dots 20$  мА,  $0,1 \dots 4,9$  В,  $0 \dots 10$  В, окно PNP/NPN как НЗ или НО контакт, IO-Link, CANopen.

# Inclinometers – Solutions for Many Applications

No matter if applied in harvesters, agricultural and construction machinery, in ships, vehicles and airplanes or in machines, robots and solar plants:

Sensors for measuring and monitoring inclination are universally applicable and help to improve the safety and efficiency of operation processes.

The Turck inclinometer series Q20L60 and Q42 are also suitable for fast production sequences and withstand impacts. The micromechanical pendulum inside, operates on the principle of MEMS technology (Micro Electro Mechanic Systems). Thanks to this technology, the sensors operate with a repeatability of 0.1 % and therefore highly precise and sensitive.



The rectangular biaxial Q20L60 sensors are available as  $\pm 10^\circ$ ,  $\pm 45^\circ$ ,  $\pm 60^\circ$  and  $\pm 85^\circ$  types. The uniaxial Q20L60 versions have a freely adjustable measuring range,  $0^\circ \dots 360^\circ$ . The Q42 are available with CANopen interface (CiA DS-301) or as IO-Link capable biaxial types adjustable within the full range of  $360^\circ$ .



## Highest precision

With a repeatability of 0.1%, the inclinometers are the right solution for high-precision applications, both Q20L60 and Q42 inclinometers feature a resolution of up to  $0.01^\circ$  depending on the measuring range.



## Compact design in IP68/IP69K

The very small 20 mm versions as well as the rectangular Q20L60 and the cubic Q42 are fully encapsulated and thus extremely rugged. High protection rating of IP68/IP69K allows the application in extremely demanding environments.

## Special requirements

Inclinometers make use of the local gravity resp. acceleration of gravity for the measurement of angular tilt and output a corresponding analog signal. This brings along the challenge to suppress disturbing signals that may result from further acceleration or vibration generated in the system. This is usually achieved via the different filter settings, which attenuate shock or output peaks.

Depending on the application, experience shows that specific filter settings need to be applied: Devices with high attenuation show a slower output behaviour, while fast devices usually react quite sensitive to interference.

If special filter settings are required, the devices must be tested under real operating conditions. The only viable way for the user is to parametrize the devices on site. TURCK offers the perfect solution for this task with the IO-Link capable devices: The user can set the needed parameters directly at the sensor, either via IO-Link or teach pin.



### Easy programming

Measuring range, zero point and window function can be adjusted precisely to individual needs, either via IO-Link or teach pin, depending on the type of device.

4...20 mA  
   
 IO-Link  
0...10 V

### Different output types

Different analog and digital output types provide highest flexibility for process integration:  
4...20 mA, 0...10 V, 0,1...4,9 V, PNP/NPN window as NC or NO contact, 2 x 16-bit IO-Link-telegram, CANopen interface.

# Designs and Functions



Biaxial 360° high-end, IO-link capable

- Usable as vibration sensor
- Fulfills e1 specification
- Current 4...20 mA
- Voltage 0...10 V
- Switching output PNP/NPN, NC/NO programmable
- Process value, 2 x 16-bit IO-Link telegram
- Parametrizable via IO-Link
- Filter settings parametrizable
- Teachable Zero point
- Teachable measuring range



Uniaxial 360° with CANopen interface

- Baud rates 10 kbps to 1 Mbps
- High sampling rates and bandwidths
- Parametrizable vibrostability
- Interface acc. to CiA DS-301/ Device profile acc. to CiA DSP-410
- All measured values and parameters adjustable via object directory (OD)
- Can be used as vibration sensor

Biaxial with CANopen interface

- $\pm 10^\circ, \pm 45^\circ, \pm 60^\circ$
- Baud rates 10 kbps to 1 Mbps
- High sampling rates and bandwidths
- Parametrizable vibrostability
- Interface acc. to CiA DS-301/ Device profile acc. to CiA DSP-410
- All measured values and parameters adjustable via object directory (OD)



Uniaxial 360° with analog output

- Current 4...20 mA
- Voltage 0.1...4.9 V
- Adjustable measuring range

Biaxial with analog output

- $\pm 10^\circ, \pm 45^\circ, \pm 60^\circ, \pm 85^\circ$
- Current 4...20 mA
- Voltage 0.1...4.9 V
- Voltage, ratiometric



Uniaxial 360° with two switchpoints

- Two switchpoints, hysteresis and travel path, adjustable
- Switching status displayed via LED

**ZONE 22**

**ZONE 2**



### Individual filter settings

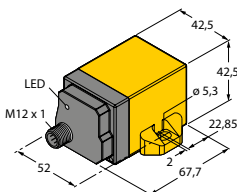
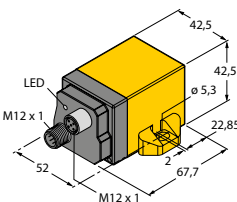
Individual filter settings to blank out possible interferences, allow the sensors to be used in many applications. The filter settings can be adjusted via IO-Link or teach pin.



### 360° full angular range

With the biaxial inclinometers from Turck the user can exploit the full angular range of 360° degrees for measurement.

# Q42 Series – Types and Features

Dimension drawing	Type code	Measuring range	Resolution	Output	Temperature range
	B2N360-Q42-E2LiUPN8X2-H1181				-25...+75 °C
	B2N360-Q42-E2LiUPN8X2-H1181/S97	360 °	≤ 0.01°	biaxial, 4...20 mA, 0...10 V, PNP/NPN; NO/NC, 2 x 16 bit IO-Link telegram, parametrizable via teach-pin or IO-Link	-40...+85 °C
	B2N10H-Q42-CN2-2H1150	±10°	≤ 0.05°	Biaxial, CANopen	-30...+70 °C
	B2N45H-Q42-CN2-2H1150	±45°			
	B2N60H-Q42-CN2-2H1150	±60°	≤ 0.1°		
	B1N360V-Q42-CN2-2H1150	360°	≤ 0.01°	Uniaxial, CANopen	



## Freely parameterizable 3D inclinometer

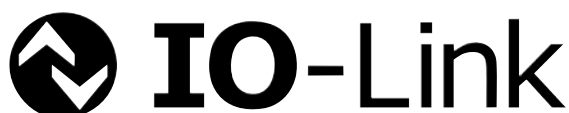
The B2N360-Q42-E inclinometer from Turck is unique on the market, freely parameterizable via IO-Link and precisely adaptable to individual demands. Depending on the local conditions and requirements, the user can individually adjust the filter settings, the measuring range, the PNP/NPN window and adjust the analog output to current or voltage values for the respective angular range.

The sensor can be used as inclinometer or as vibration sensor, delivering output values according to the power of vibration. The angular value is not only provided as analog output but can also be transmitted via 2 x 16-bit IO-Link telegram.

Two types of inclinometers are available: An industrial type for -25...+75 °C and an e1 classified type for use in utility vehicles and construction machines. The e1 version withstands extreme temperatures in a range between -40...+85 °C and is powered with the board net typical operating voltage of 7...30 V. Both types are IP68/IP69K rated.

## Features

- Maximum range 360°, biaxial
- IO-Link capable
- Current/voltage output, adjustable
- 2 x 16-bit IO-Link telegram
- Individual filter settings for vibration/shock suppression
- Window function/switchpoints PNP/NPN
- Easy teaching via pin
- Can be used as inclinometer or as vibration sensor
- Protection IP68/IP69K



# Q20L60 Series – Types and Features

Dimension drawing	Type code	Measuring range	Resolution	Temperature range
	<b>uniaxial, current output 4...20 mA</b>			
	B1N360V-Q20L60-2LI2-H1151	360 °	≤ 0,14 °	-30...+70 °C
	B1N360V-Q20L60-2LI2-H1151/3GD*			
	<b>uniaxial, voltage output 0,1...4,9 V</b>			
	B1N360V-Q20L60-2LU3-H1151	360 °	≤ 0,14 °	-30...+70 °C
	B1N360V-Q20L60-2LU3-H1151/3GD*			
<b>uniaxial, 2 switching output, programmable</b>				
B1N360V-Q20L60-2UP6X3-H1151	360 °	≤ 0,14 °	-30...+70 °C	
B1N360V-Q20L60-2UP6X3-H1151/3GD*				
	<b>biaxial, current output 4...20 mA</b>			
	B2N10H-Q20L60-2LI2-H1151	±10 °	≤ 0,04 °	-30...+70 °C
	B2N45H-Q20L60-2LI2-H1151	±45°	≤ 0,1°	-40...+70 °C
	B2N45H-Q20L60-2LI2-H1151/S97			
	B2N45H-Q20L60-2LI2-H1151/3GD*	±60 °	≤ 0,14 °	-30...+70 °C
	B2N60H-Q20L60-2LI2-H1151			
	B2N60H-Q20L60-2LI2-H1151/S97			
	B2N85H-Q20L60-2LI2-H1151	±85 °		-30...+70 °C
	<b>biaxial, voltage output 0,1...4,9 V</b>			
	B2N10H-Q20L60-2LU3-H1151	±10 °	≤ 0,04 °	-30...+70 °C
	B2N45H-Q20L60-2LU3-H1151	±45°	≤ 0,1°	-40...+70 °C
	B2N45H-Q20L60-2LU3-H1151/S97			
	B2N45H-Q20L60-2LU3-H1151/3GD*	±60 °	≤ 0,14 °	-30...+70 °C
	B2N60H-Q20L60-2LU3-H1151			
	B2N60H-Q20L60-2LU3-H1151/S97			
B2N85H-Q20L60-2LU3-H1151	±85 °	≤ 0,14 °	-30...+70 °C	

\* Certified acc. to ATEX zones 2 (gases) and 22 (dusts).

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