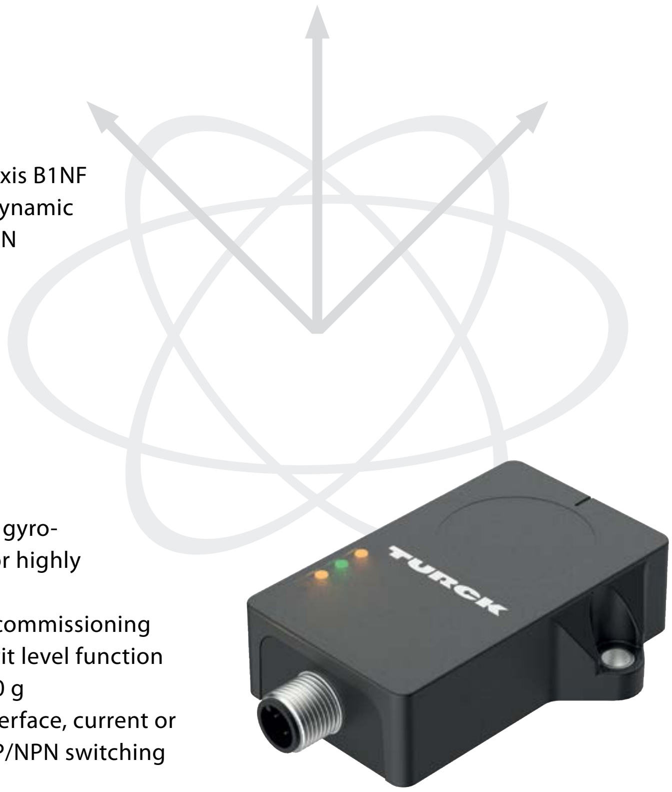
Your Global Automation Partner

B1N(F)-QR20 | B2N(F)-QR20
Dynamic Inclinometers

Products are linked with further information.

Inclinometers — MEMS and Gyroscope Combined



With its new generation of inclinometers, Turck has combined the MEMS acceleration measurement method with gyroscope technology, so that shocks and vibrations can be suppressed much more effectively than with conventional signal filtering. In this way, the B1NF and B2NF single- and two-axis inclinometers achieve state-of-the-art dynamics, allowing them to be used even in very fast control loops on moving or vibrating machines.

The extremely robust IP68/69K sensors output their signals either via analog outputs, two switching outputs or IO-Link COM3, the latest and fastest version of the digital interface. IO-Link also allows convenient adaptation to the required application. Plus, additional information such as the operating hours of the sensor or its ambient temperature can be queried for condition monitoring applications.

The spirit level function facilitates the installation of the devices. For this, an LED uses a flashing frequency to indicate when the sensor is positioned horizontally. The use of translucent plastics for the LED display eliminates LED lenses as a potential weak point in the housing.

Among other things, the devices are suitable for positioning and compensation applications, as well as for dancer queries in the textile, printing or packaging industry.

Turck offers the single-axis B1NF and two-axis B2NF for dynamic applications, and the B1N and B2N for static applications.

Product highlights

- Combined MEMS and gyroscope sensor signal for highly dynamic detection
- Easy installation and commissioning thanks to the LED spirit level function
- Shock-proof up to 200 g
- Fast IO-Link COM3 interface, current or voltage output or PNP/NPN switching output
- Thanks to the use of translucent plastics for the LED display, there is no need for LED lenses that are susceptible to interference
- High temperature range of -40…85 °C
- High protection class IP68/IP69K
- Protection against salt spray and rapid temperature change
- Connector, M12 × 1

Innovative measuring principle
The inclinometers combine acceleration measurement with gyroscope technology. This means that the impact of interfering accelerations can be effectively suppressed, so that the sensor outputs a precise, fast and robust signal even in dynamic applications.

Maintenance-free operation
Robust and sealed housings with protection class IP68/IP69K and a high shock resistance of 200 g as well as a wide temperature range of -40 °C…+85 °C allow maintenance-free operation even in demanding environments.

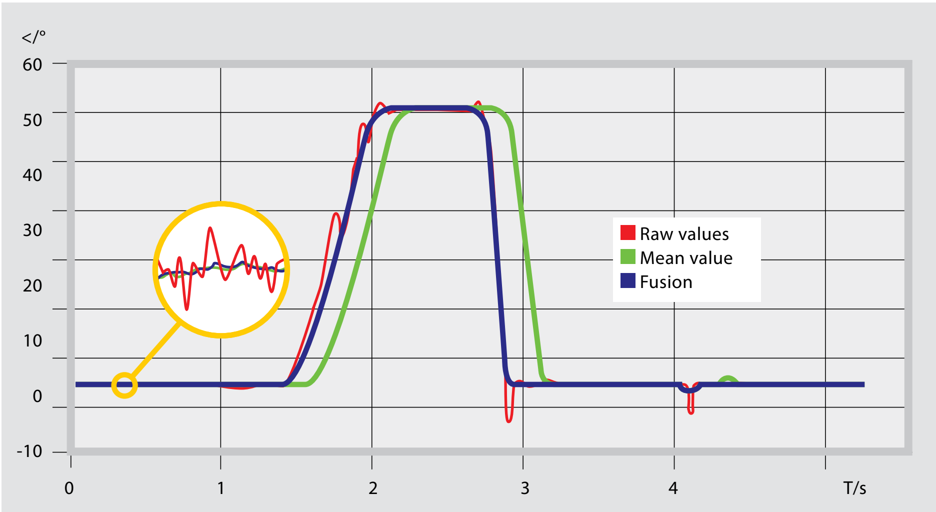
Innovative operating principle

A major advantage of inclinometers is their ease of use and fast commissioning. Using inclinometers gives a large degree of freedom in the design, which makes them extremely attractive. The sensors do not require a separate positioning element, and the mechanical coupling usually required for rotary encoders from the rotating machine part to the encoder shaft is no longer necessary. This minimizes sources of error, which also benefits system availability.

Inclinometers usually use acceleration measuring cells to calculate the inclination angle. Earth's gravity is used as a reference. When the sensor is tilted, it detects a change in acceleration, which is used as a measure for the tilt angle calculation.

In dynamic applications, other influences are often present in addition to acceleration due to vibrations, shocks or starting and braking moments. Average value filters are usually used, which reduce the influence of interfering accelerations. However, these slow down the signal and cannot detect fast movements.

The dynamic inclinometers use both an acceleration measuring cell and a gyroscope sensor to determine angles. Influences caused by vibrations or interfering acceleration are significantly reduced by applying an intelligent fusion algorithm to the acceleration data and the rotation rate values. This allows the sensor to output a precise, fast and robust signal even in moving, dynamic applications.



Simple commissioning using the spirit level function
The spirit level function facilitates the installation of the devices. For this, an LED uses a flashing frequency to indicate when the sensor is positioned horizontally.

Wide range of output variants
In addition to the classic version with analog output, sensors with PNP/NPN switching outputs and with IO-Link interface complete the product portfolio.

Technical Data

Static and dynamic inclinometers with fusion technology

ID	Type designation	Measuring range	Application area
Inclinometers with IO-Link			
100020900	B1NF360 V-QR20-IOLX3-H1141	1-axis, 0 to 360°	Inclinometer with gyroscope function, dynamic application
100020901	B2NF85H-QR20-IOLX3-H1141	2-axis, ±85°	Inclinometer with gyroscope function, dynamic application
100025084	B1N360 V-QR20-IOLX3-H1141	1-axis, 0 to 360°	Inclinometer, static application
100025086	B2N85H-QR20-IOLX3-H1141	2-axis, ±85°	Inclinometer, static application
Inclinometers with 2 × PNP/NPN switching output			
100026931	B1NF360 V-QR20-2UPN6X3-H1141	1-axis, 0 to 360°	Inclinometer with gyroscope function, dynamic application
100026932	B2NF85H-QR20-2UPN6X3-H1141	2-axis, ±85°	Inclinometer with gyroscope function, dynamic application
100026933	B1N360 V-QR20-2UPN6X3-H1141	1-axis, 0 to 360°	Inclinometer, static application
100026934	B2N85H-QR20-2UPN6X3-H1141	2-axis, ±85°	Inclinometer, static application
Inclinometers — analog output 4…20 mA*			
100030753	B1N360 V-QR20-2LI2X3-H1151	1-axis, 0 to 360°	Inclinometer, static application
100030754	B1NF360 V-QR20-2LI2X3-H1151	1-axis, 0 to 360°	Inclinometer with gyroscope function, dynamic application
100031451	B2N10H-QR20-2LI2X3-H1151	2-axis, ±10°	Inclinometer, static application
100031453	B2N45H-QR20-2LI2X3-H1151	2-axis, ±45°	Inclinometer, static application
100031454	B2N60H-QR20-2LI2X3-H1151	2-axis, ±60°	Inclinometer, static application
100031455	B2N85H-QR20-2LI2X3-H1151	2-axis, ±85°	Inclinometer, static application
100031515	B2NF10H-QR20-2LI2X3-H1151	2-axis, ±10°	Inclinometer with gyroscope function, dynamic application
100031517	B2NF45H-QR20-2LI2X3-H1151	2-axis, ±45°	Inclinometer with gyroscope function, dynamic application
100031518	B2NF60H-QR20-2LI2X3-H1151	2-axis, ±60°	Inclinometer with gyroscope function, dynamic application
100031519	B2NF85H-QR20-2LI2X3-H1151	2-axis, ±85°	Inclinometer with gyroscope function, dynamic application

* The measuring range and the output can be changed to 0…10 V, for example, using IODD parameterization. Devices with voltage output are available on request.

Products are linked with further information.

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