

**TURCK**

Industrial  
Automation

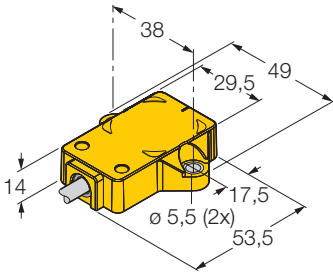
**INDUCTIVE  
ANGLE SENSORS**



***Sense it! Connect it! Bus it! Solve it!***

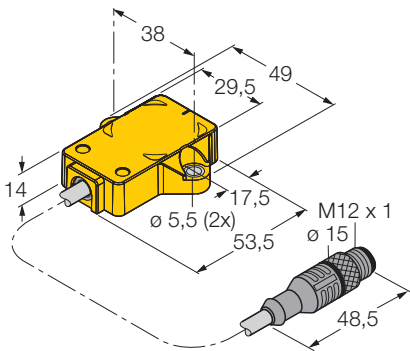
# Inductive angle sensor – Specifications

## Type overview



Ri360P1-QR14-LiU5X2	Ambient temperature	-25...+70 °C
	Operating voltage	15...30 VDC
	Voltage output	0...10 V
	Current output	4...20 mA

Ri360P1-QR14-LU4X2/S97	Ambient temperature	-40...+70 °C
	Operating voltage	8...30 VDC
	Voltage output	0.5...4.5 V



Ri360P1-QR14-LiU5X2-0,3-RS4	Ambient temperature	-25...+70 °C
	Operating voltage	15...30 VDC
	Voltage output	0...10 V
	Current output	4...20 mA

Ri360P1-QR14-LU4X2-0,3-RS4/S97	Ambient temperature	-40...+70 °C
	Operating voltage	8...30 VDC
	Voltage output	0.5...4.5 V

## Technical data

**Scope of delivery** Angle sensor incl. positioning element

<b>Resolution</b>	12 bit
Measuring range	0...360°
Linearity deviation	≤ 0.3 % f. s.
Temperature drift	≤ ± 0.01 %/K
Resolution	≤ 0.09°
Lateral offset	≤ 3 mm

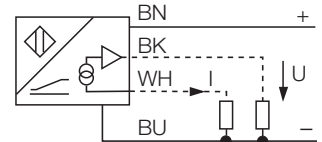
<b>Residual ripple</b>	≤ 10 % U <sub>pp</sub>
Rated insulation voltage	≤ 0.5 kV
Short-circuit protection	yes
Wire-break/Rev. pol. protection	yes/fully
Load resistance voltage	≤ 0.4 kΩ
Load resistance current output	≥ 4.7 kΩ
Sampling rate	700 Hz
Power consumption	< 100 mA

<b>Housing</b>	Cuboid-shaped, QR14
Dimensions	53.5 x 49 x 14 mm
Housing material	Plastic, PBT-GF30-V0
Electrical connection	Cable/Connector
Vibration resistance	55 Hz (1 mm)
Shock resistance	30 g (11 ms)
Degree of protection	IP67

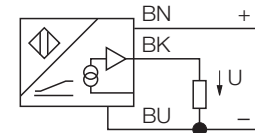
<b>Power-on indication</b>	LED, green
Measuring range indication	Multifunction LED, green

## Pin wiring

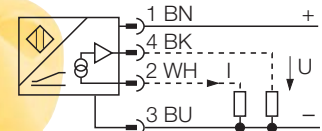
Ri360P1-QR14-LiU5X2



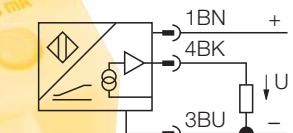
Ri360P1-QR14-LU4X2/S97



Ri360P1-QR14-LiU5X2-0,3-RS4



Ri360P1-QR14-LU4X2-0,3-RS4/S97



# Inductive angle sensor - Contactless detection of angles

The new inductive angle sensor from TURCK operates according to a new, revolutionary measuring principle. The positive features of standard measuring systems have been combined and systematically developed further. Rather than being detected by a magnet, the angular position is determined through inductive RLC coupling. The sensor is thus completely immune to magnetic fields, such as generated by large motors for example.

The Ri angle sensor is suited for many applications, thanks to the excellent interference immunity, the IP67 rated plastic housing and the long service life.

Other typical properties are a measuring range of 360° with a repeatability of 0.09°, as well as standard outputs and an SSI interface.

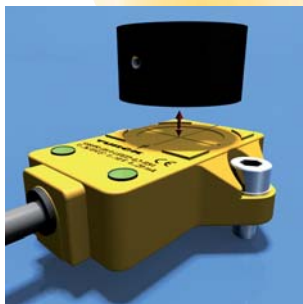
Irregularly rotating shafts cause vibration and offset of the positioning element. The two-part build consisting of sensor and positioning element, compensates lateral offsets of  $\leq 3$  mm. As a result, the sensor works reliably and can be mounted almost anywhere.

The absence of shaft and bearing (contactless principle) enables easy adaption to bearing tolerances on the customer side.

## Features:

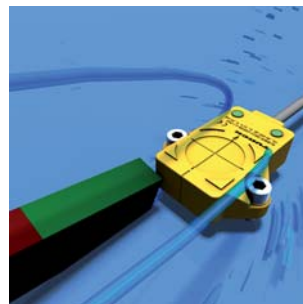
- Contactless, wear-free operation
- Easy mounting and fitting
- Measuring range up to 360°
- High interference immunity
- Rotary code switch, 24<sup>4</sup> coding
- Highly reliable measuring principle and safe operation
- High linearity
- High flexibility
- Rugged plastic housing
- Hardly affected by lateral offset and vibration

## Long service life

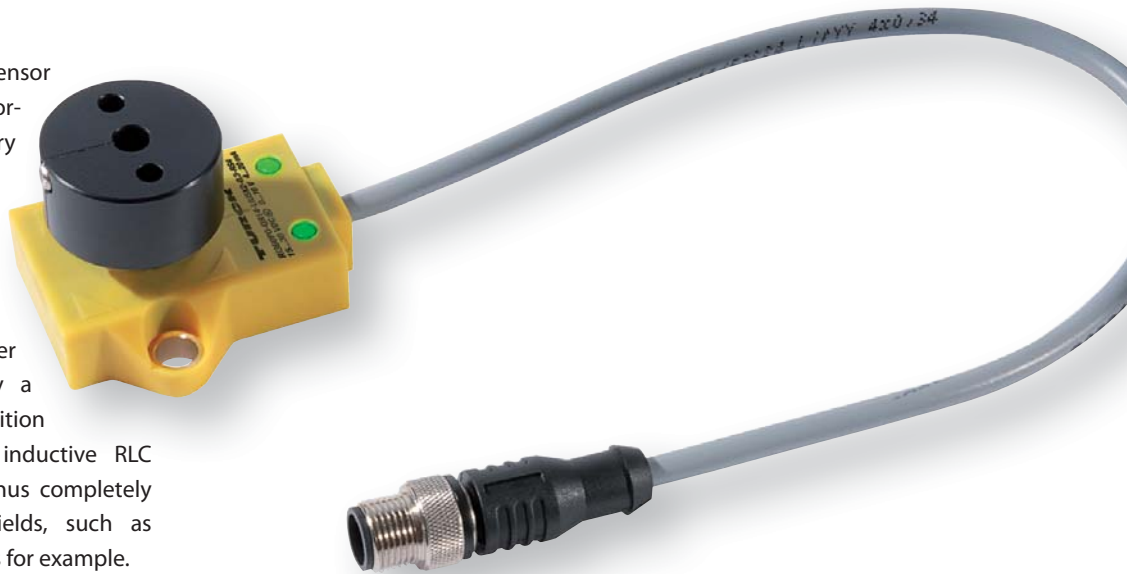


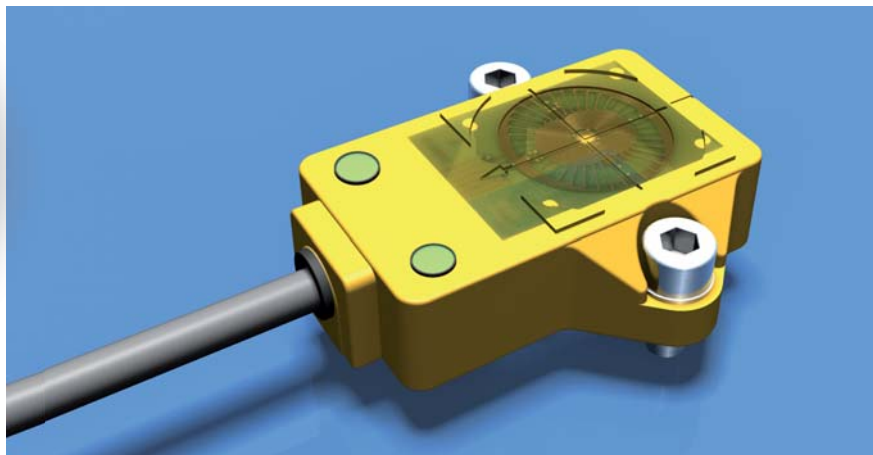
The new measuring system works contactless and wear-free. Important features such as accuracy, linearity and tightness are conserved for life and guarantee faultless operation of the sensor at all times.

## Highly interference immune



Frequency converters, large motors, ferritic metals or permanent magnets are no problem at all. The new angle sensor operating on the basis of resonance oscillation, is insensitive to interference caused by magnetic fields and features excellent EMC properties. The distance between sensor and positioning element as well as roughness in the guidance have no influence on the output signal.





### The measuring principle

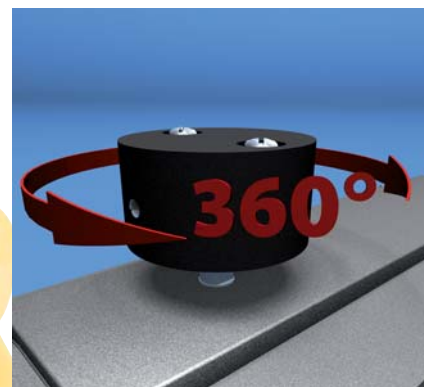
Inductive RLC coupling provides considerable advantages compared to magnetic measuring systems.

The printed coils are very precisely manufactured and work as a system of emitter and receiver coils. The emitter coil is excited by a high frequency AC field, inducing inductive RLC coupling between emitter coil and positioning element (resonator). As a result, the resonator and receiver coils are also inductively coupled.

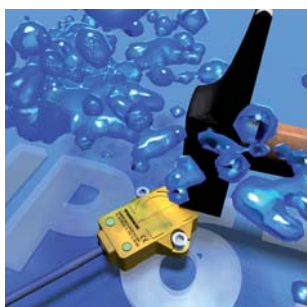
The receiver coils are arranged in a circle. Depending on the resonator's rotation angle, different voltages are induced in the coils, serving as a measure for the sensor signal.

### Positioning element – flexible mounting

Thanks to the smart design, the positioning element can be mounted in many ways. With blind holes they can be screwed on solid shafts and with special pin adapters they can even be mounted on hollow shafts.



### Rugged housing and easy mounting



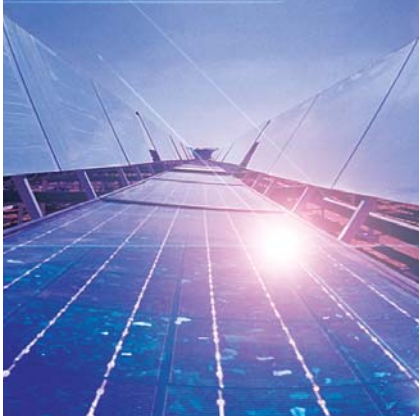
Made of high-quality plastic and IP67 rated, the housing provides high mechanical stability, protecting the sensor optimally against most chemicals and oils. The two-part build consisting of sensor and positioning element compensates lateral offsets of  $\leq 3$  mm and guarantees easy fitting and operation.

### High linearity and vibration resistance



The new angle sensors provide highly precise measuring signals within  $360^\circ$  and a repeatability of  $0.09^\circ$ . Bearing tolerances are easily compensated through the contactless principle, as well as vibration caused by irregularly rotating shafts. This guarantees high linearity

# Many application possibilities



## Solar tracking

The panels on solar trackers or similar systems are adjusted according to the sun's position. The movement takes place uniaxially in a horizontal plane. The angular measurement required to avoid mutual shadowing of the panels, is achieved with Ri angle sensors.



## Wind turbines – blade pitch

Wind turbines with pitch control enable direct intervention on turbines. A change of pitch allows the power consumption and the drive torque to be adjusted according to the current situation. The Ri angle sensor measures the pitch and feeds the blade control continuously with precise data. Light vibrations and electromagnetic fields are easily compensated and damaging is reliably avoided.

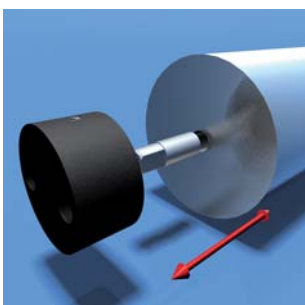


## Entrance systems – swivel mechanism

Entrance systems of department stores not only welcome customers, they also register customer frequencies and offer theft protection. Thanks to features such as high accuracy, linearity and resolution,

contactless angle sensors of the Ri series are easily fitted in the swivel mechanism, as there is no shaft to be centered. Thus, new systems can be extended and existing systems modernized with little effort.

## Hollow/solid shaft adaptable



Thanks to the innovative accessories, you can mount the sensor on standard hollow as well as on solid shafts. Adapters are available in sizes of 6 and 8 mm and provide undreamed-of flexibility.

## Flexible process connection



You can choose between different analog outputs, 0...10 V, 4...20 mA and 0.5...4.5 V and an SSI interface. Standard M12 x 1 plug or cable connection are provided, making the use of special connectors redundant.

Dimension drawing	Type code	Description
Function accessories		
	TB4	Analog test box for sensors with analog or switching output, incl. batteries
Adapter		
	HSA-M6-QR14	Hollow/solid shaft adapter Ø 6 mm
	HSA-M8-QR14	Hollow/solid shaft adapter Ø 8 mm
Positioning element		
	P1-Ri-QR14	Positioning element, operating at a distance of 0...6 mm to the sensor surface
Spacer sleeve		
	DS-Ri-QR14	Spacer sleeve for overhead mounting

[www.turck.com](http://www.turck.com)

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