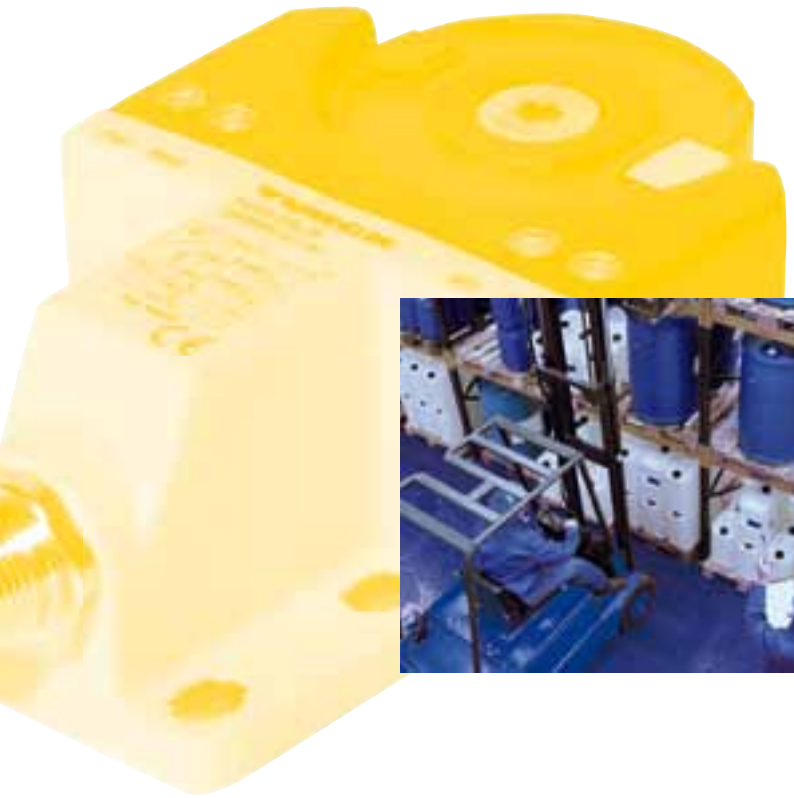
TURCK

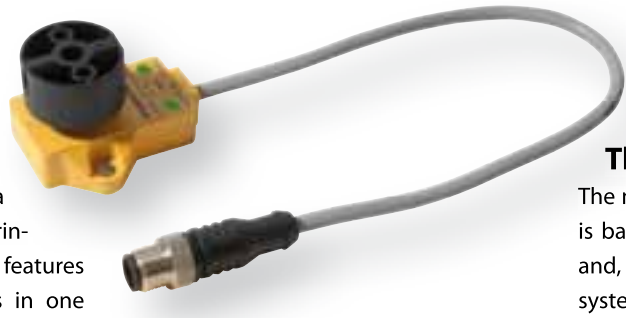
Industrial
Automation

INDUCTIVE ANGLE SENSORS



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

Inductive angle sensors – contactless angle measurement



The inductive angle sensor from TURCK operates on the basis of a new, revolutionary measuring principle. It combines the positive features of standard measuring systems in one device and has been systematically developed further. The angular position is not detected via a positioning magnet but via RLC coupling. This makes the sensor completely immune to magnetic fields generated by large motors for example.

Being extremely immune to electromagnetic interference and enclosed in a rugged IP67 rated plastic housing of unlimited durability, these Ri-angle sensors are suitable for many applications.

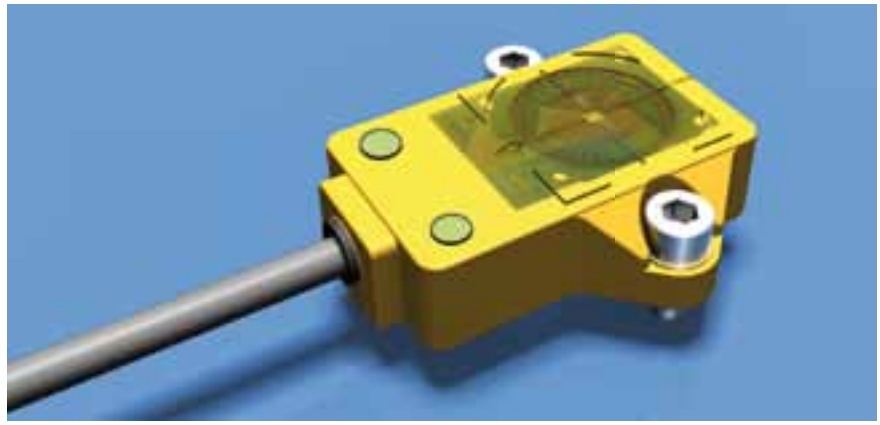
The measuring range is 360° and the repeatability is 0.09° On the output side, standard analog outputs are available, as well as switching outputs or SSI interfaces.

The two-part build consisting of sensor and positioning element, compensates lateral offsets of up to 3 mm. As a result, the sensor works reliably and can be mounted almost anywhere. The resonator can be mounted on solid as well as on hollow shafts. The contactless measuring principle reliably compensates bearing tolerances as well as vibration caused by irregularly rotating shafts.

The measuring principle

The measuring principle of angle sensors is based on the innovative RLC coupling and, compared to conventional magnetic systems, offer considerable advantages.
The sensor housing contains an extremely precise manufactured system of printed emitter and receiver coils. Exited by a high-frequency electromagnetic AC field, the emitter coil and the positioning element, also called resonator, coalesce in RLC coupling. As a result, the resonator is inductively coupled to the receiver coils.

The receiver coils are arranged in a circle such as to induce different voltages depending on the resonator's angle of rotation. These voltages are used as a measure for evaluation of the sensor signal to be provided.

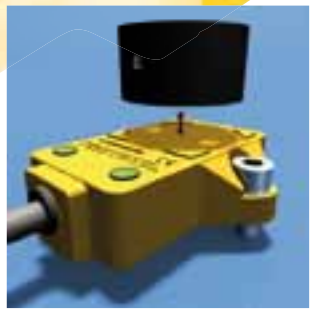


- Operates contactless, and wear-free
- Easily mounted and aligned
- Measuring range 360°
- Highly interference immune
- Measures highly precise and functions highly reliable
- Behaves highly linear
- Rugged, high-quality plastic housing
- Hardly affected by lateral offset and vibration
- Adjustable angular range
- High protection rating IP67
- Diagnostics via LEDs

General features

Contactless and wear-free detection

The new measuring principle operates entirely 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.

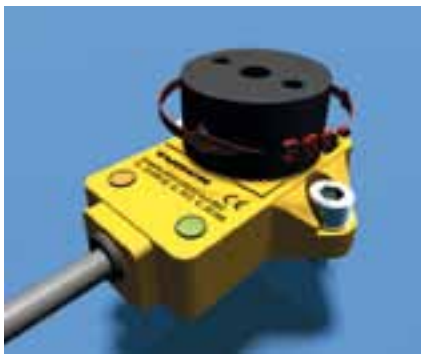


Approvals (only DSU35)

For wiring into the Ex zones 1 and 21, we offer loop-powered intrinsically safe devices with a 4…20 mA output.
Estimated to be available Q2/2013

Positioning element for Ri-QR14 – flexibly mounted

The positioning elements can be mounted in many different ways ,thanks to their favourable design: They can be mounted on solid shafts, screwed on via counterbores and even fit on hollow shafts using special adapter pins.

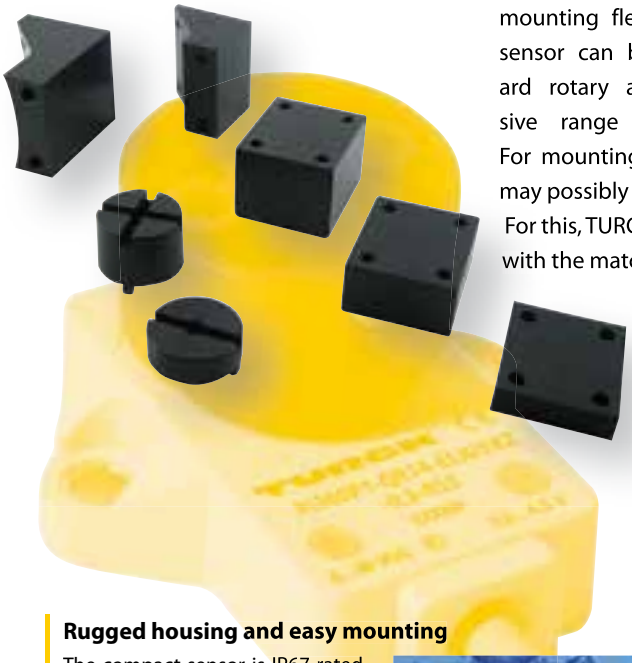


Broad range of accessories for the DSU35

A comprehensive range of accessories for perfect mounting and installation additionally enhances the functionality and reduces the time for installation.

Ri-DSU35 for mounting on rotary actuators

The Ri-DSU35 angle sensors and the well-established Ni4-DSU35 dual sensors are identical in construction. The user also profits from the enormous mounting flexibility of the device. The sensor can be mounted on all standard rotary actuators with the extensive range of available accessories. For mounting on very large drives, you may possibly need additional accessories. For this, TURCK offers stable spacer plates with the matching accessories. No matter how large the drive, always the same sensor-actuator combination is used. This is a further plus. You find a list of all standard drives on www.turck.com



Rugged housing and easy mounting

The compact sensor is IP67 rated and resistant to many chemicals and oils. Made of high-quality plastic, the housing is very rugged. The two-part build consisting of sensor and positioning element compensates lateral offsets of and guarantees easy fitting and operation.

High linearity and vibration resistance

The new angle sensors provide highly precise measuring signals within 360° and a repeatability of 0.09°. The contactless measuring principle reliably compensates bearing tolerances as well as vibration caused by irregularly rotating shafts. This guarantees a high degree of linearity.

Many different application possibilities

Teachable rotary sensors

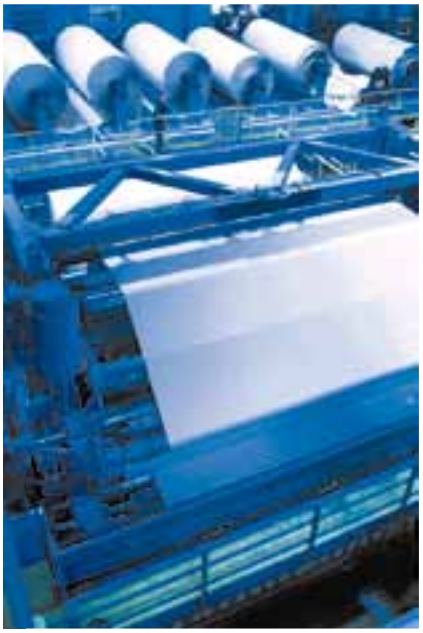
The user can now adjust the measuring range of the Ri sensors directly at the device according to individual needs. What's more, presets can be retrieved and limit values are freely adjustable. The following presets are available (the zero point always remains unchanged): 30°, 45°, 60°, 90°, 180°, 270°. The direction of rotation is also freely selectable. The output characteristic may rise with CW as well as with CCW rotation.

Position detection on rotary actuators

Dual sensors can only capture two positions, the new Ri-DSU35 sensors instead are not only able to monitor three-way flaps, they also detect the valve position during cleaning cycles. This is only possible thanks to their 360° detection ability. The new sensors also contribute to a better system availability because they detect the wear of seals. Wear results from many switching cycles causing the ON/OFF positions to exceed the originally adjusted angular range.

Ri sensors now also comply with the e1 specification

With a resistance of 100 V/m to radiated electromagnetic interference, the Ri360…LU4…/S97 series not only meets but even exceeds the requirements of the e1 type approval and is thus optimally suited for the mobile equipment sector.



Dancer roller monitoring

The angle sensors of the RI series operate contactless and wear-free. They can be installed in printing machines where they continuously query the actual position of the dancer rolls which ensure constant web tension. The paper is thus securely controlled during the printing process, machine down-times are avoided and a good printing quality is guaranteed. The RI sensors are also optimally suited for measuring the height of paper stacks.

The contactless operating RI angle sensors reduce down-times and ensure high machine availability.

Adaptable to any application

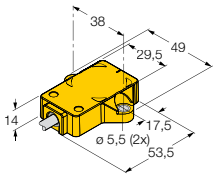
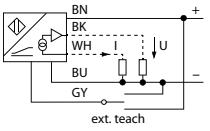
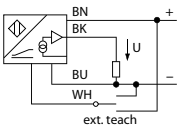
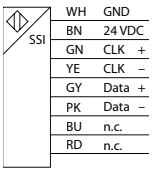
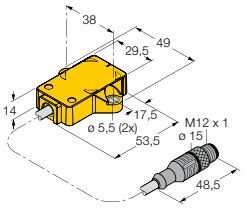
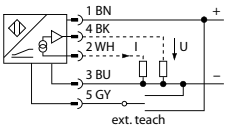
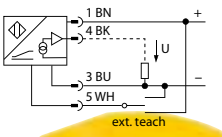
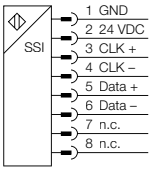
The DSU35 and QR14 types provide many freedom in terms of connectibility. While the DSU35 has the positioning element mounted in front, the QR14 features the active face on top.

Flexible process connection

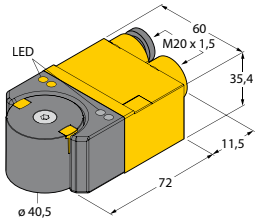
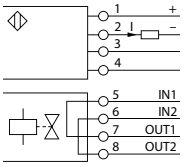
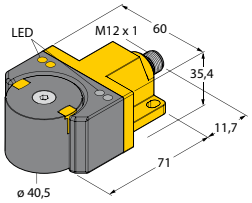
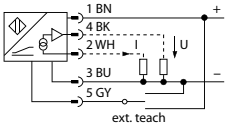
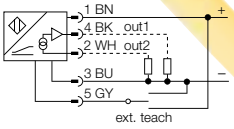
Different types of outputs are also available: You can choose between 0…10 V, 4…20 mA and 0.5…4.5 V and an SSI interface. Standard M12 x 1 plug or cable connection are provided, making the use of special connectors redundant.

Technical features

QR14

Dimension drawing	Wiring diagram		
			
	Ri360P1-QR14-ELiU5X2	**Ri360P1-QR14-ELU4X2/S97**	**Ri360P1-QR14-ESG25X2**
			
	Ri360P1-QR14-ELiU5X2-0,3-RS5	**Ri360P1-QR14-ELU4X2-0,3-RS4/S97**	**Ri360P1-QR14-ESG25X2-0,3-RS8**

DSU35

Dimension drawing	Wiring diagram	
		
	Ri360P1-DSU35TC-Li-Exi	
		
	Ri360P1-DSU35-ELiU5X2-H1151	**Ri360P1-DSU35-2UP6X4-H1151**

Type code	Measuring range	Ambient temperature	Operating voltage	Output	Resolution
Ri360P1-QR14-ELiU5X2		-25…+70 °C	15…30 VDC	0…10 V/4…20 mA	12 bit
Ri360P1-QR14-ELU4X2/S97		-40…+70 °C	8…30 VDC	0.5…4.5 V	12 bit
Ri360P1-QR14-ESG25X2		-25…+70 °C	15…30 VDC	SSI, 25 bit Gray coded	16 bit
Ri360P1-QR14-ELiU5X2-0,3-RS5		-25…+70 °C	15…30 VDC	0…10 V/4…20 mA	12 bit
Ri360P1-QR14-ELU4X2-0,3-RS4/S97	0…360 °	-40…+70 °C	8…30 VDC	0.5…4.5 V	12 bit
Ri360P1-QR14-ESG25X2-0,3-RS8		-25…+70 °C	15…30 VDC	SSI, 25 bit Gray coded	16 bit
Ri360P1-DSU35-TC-Li-Exi*		-20…+75 °C	14…30 VDC	4…20 mA, loop powered	12 bit
Ri360P1-DSU35-ELiU5X2-H1151		-20…+75 °C	15…30 VDC	0…10 V/4…20 mA	12 bit
Ri360P1-DSU35-2UP6X4-H1151		-20…+75 °C	10…30 VDC	PNP, normally open/closed	12 bit

*Estimated to be available Q2/2013

Accessories

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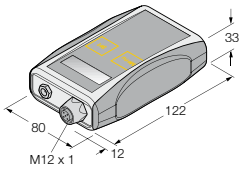
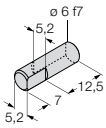
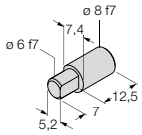
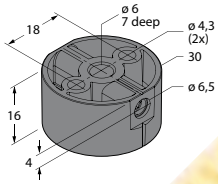
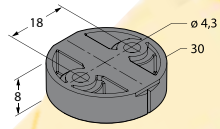
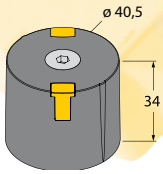
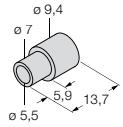
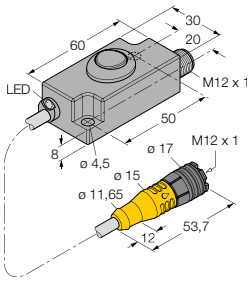
Industrial Automation

Dimension drawing	Type code/Description
Function accessories	
	**TB4** Analog test box for sensors with analog or switching output, incl. batteries
Adapter	
	**HSA-M6-QR14** Adapter pin for mounting on hollow and solid shafts, for P1-Ri-QR14, Ø solid shaft: 6 mm
	**HSA-M8-QR14** Adapter pin for mounting on hollow and solid shafts, for P1-Ri-QR14, Ø solid shaft: 8 mm
Positioning element	
	**P1-Ri-QR14** Positioning element for Ri-QR14, distance to the sensor surface 0…6 mm, included in delivery
	**P3-Ri-QR14** Flat positioning element (optional) for Ri-QR14
	**P1-Ri-DSU35** Positioning element for Ri-DSU35 for frontal detection of angles (For more DSU35 accessories please visit www.turck.com)
Sleeves	
	**DS-Ri-QR14** Spacer sleeves for mounting the Ri-QR14 overhead
Teach adapter	
	**TX1-Q20L60** Teach adapter for easy programming of measuring range (optional)

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