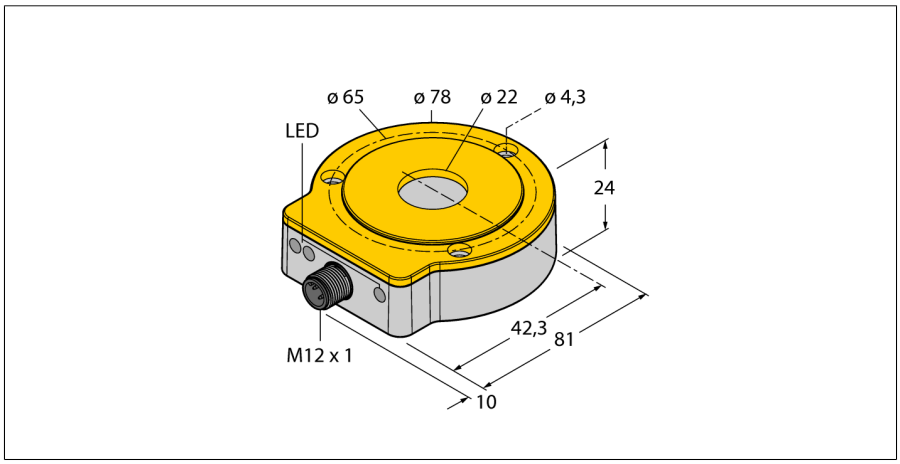
Contactless encoder
Ri360P5-QR24M1-HESG25X3-H1181

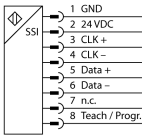
Industrial Automation

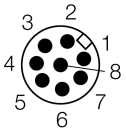


Type code	Ri360P5-QR24M1-HESG25X3-H1181
Ident-No.	1590944
Resolution	16 bit
Measuring range	0…360°
Repeatability	≤ 0.01 % of full scale
Linearity deviation	≤ 0.05 %
Temperature drift	≤ ± 0.003 % / K
Ambient temperature	-25…+85 °C
Operating voltage	15…30VDC
Residual ripple	≤ 10 % U_{ss}
Rated insulation voltage	≤ 0.5 kV
Output function	8-wire, SSi, 25 Bit, Gray coded
Output Type	absolute multiturn
Resolution single-turn	16 Bit
Resolution multiturn	6 Bit
Process data area	configurable
Diagnostic bits	Bit 22: Position was changed during power drop Bit 23: Positioning element has reached the end of the measuring range. This is indicated by a lower signal quality. Bit 24: Positioning element is outside the measuring range. Data messages parametrizable as multiturn and singleturn process data or error bits
Sample rate	5000 Hz The sensor's sampling rate depends on the master's SSI cycle time. Sampling rate 1…5 KHz in synchronized operating mode (signal propagation delay 200 µs)
Current consumption	< 100 mA
Dimensions	81 x 78 x 24 mm
Shaft Type	Hollow shaft
Housing material	metal/plastic, ZnAlCu1/PBT-GF30-V0
Connection	male, M12 x 1
Vibration resistance	55 Hz (1 mm)
Vibration resistance (EN 60068-2-6)	20 g; 10…3000 Hz; 50 cycles; 3 axes
Shock resistance (EN 60068-2-27)	100 g; 11 ms ½ sinus; each 3x; 3 axes
Continuous shock resistance (EN 60068-2-29)	40 g; 6 ms ½ sinus; each 4000 x; 3 axes
Protection class	IP68 / IP69K
MTTF	138 years acc. to SN 29500 (Ed.99) 40 °C
Power-on indication	LED green
Measuring range display	LED, yellow, yellow flashing
Error indication	LED red
Included in scope of supply	mounting aid MT-QR24, aluminium ring M1-QR24, P5-Ri-QR24

- **Compact, rugged housing**
- **Many mounting possibilities**
- **Status displayed via LED**
- **Positioning element for 6 mm shaft incl.**
- **Protecting ring, aluminium, incl.**
- **SSI output**
- **25 bit, Gray-coded**
- **SSI clock rate: 62.5 KHz … 1 MHz**
- **Single or multiturn, length of data frame and bit coding parametrizable via PACT*ware* with programming box USB-2-IOL-0002 and adapter cable RKC8.302T-1,5-RSC4T/TX320**
- **Default settings: Singleturn Bit 0 … Bit 15, Multiturn Bit 16 … Bit 21, Status Bit 22 … Bit 24**
- **Zero point, sync./async. operating mode adjustable via Easy Teach**
- **Compatible with all standard SSI masters**
- **In sync. mode, jitter < 5 µs required on the master side**
- **Immune to electromagnetic interference**
- **15…30 VDC**
- **Male M12 x 1, 8-pin**

Wiring diagram





Functional principle

The measuring principle of inductive angle sensors is based on oscillation circuit coupling between the positioning element and the sensor, whereby an output signal is provided proportional to the angle of the positioning element. The rugged sensors are wear and maintenance-free, thanks to the contactless operating principle. They convince through their excellent repeatability, resolution and linearity within a broad temperature range. The innovative technology ensures a high immunity to electromagnetic DC and AC fields.

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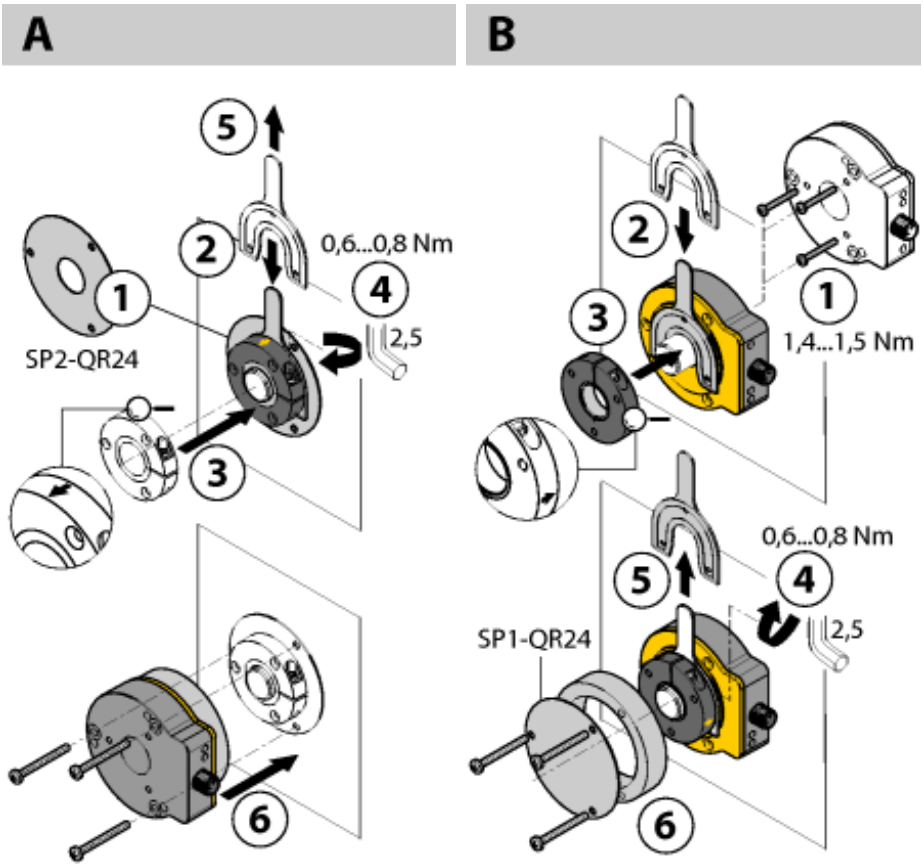

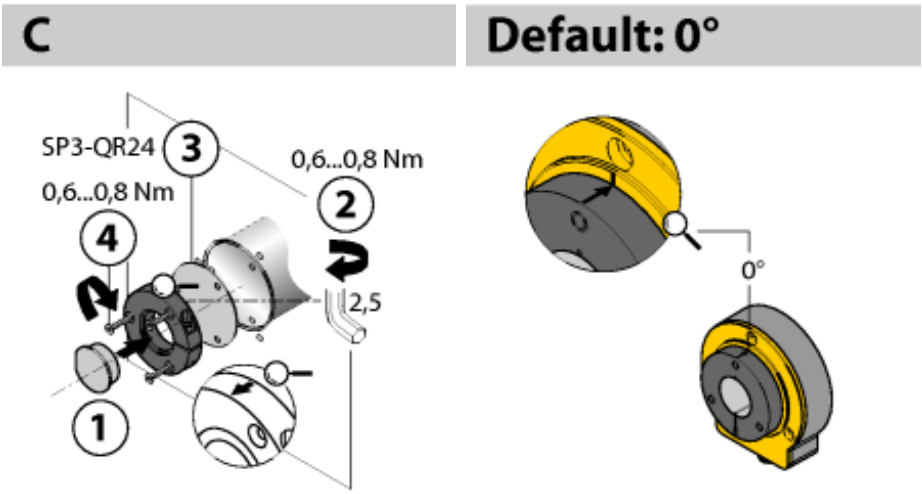

Extensive range of mounting accessories for easy adaptation to many different shaft diameters. Based on the functional principle of RLC coupling, the encoder is immune to magnetized metal splinters and other interferences.
The adjacent figure shows the two separate units, sensor and positioning element.

Mounting option A:
First, interconnect positioning element and rotatable shaft with the bracket. Then place the encoder above the rotating part in such a way that you get a tight and protected unit.

Mounting option B:
Push the encoder on the back site of the shaft and fasten it to the machine. Then clamp the positioning element to the shaft with the bracket.

Mounting option C:
If the positioning element is screwed on a rotating machine part and not to a shaft, you must first put on the dummy plug RA8-QR24. Then tie up the bracket. Screw on the encoder via the three bores.

When mounting, ensure that the positioning element is correctly aligned towards the sensor's active face. For correct fitting see arrow on the edge of the positioning element. (Arrow must point in direction of sensor)

Due to the separate installation of positioning element and sensor no electrical currents or harmful mechanical forces are transmitted via the shaft to the sensor. The encoder also offers a high degree of protection for life and stays permanently sealed.
The accessories enclosed in the delivery help to mount encoder and positioning element at an optimal distance from each other. LEDs indicate the switching status. Optionally, you can use the shield plates which are included in the accessories to increase the allowed distance between positioning element and sensor.

Status display via LED
green
Sensor is supplied correctly, asynchronous mode
green flashing
Sensor is supplied properly, synchronous mode
green fast flashing:
Sensor is supplied properly but is not receiving CLK pulses from the SSI master
yellow
Positioning element is in the measuring range, signal low (e.g. distance too large), see status bit 23
yellow flashing
Positioning element is outside the coverage, see status bit 24
off
Positioning element is in the measuring range

Multiturn error
red:
Position was changed during power drop, see status bit 22

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parametrization

Parameters	Easy-Teach input	LED	Description
zero point	bridge Pin 1 (GND) and Pin 8 for 2 s	Status LED flashes, after 2 s steady	encoder position set to zero
switching between sync/async mode	bridge Pin 2 (U_B) and Pin 8 for 2 s	Status LED flashes, after 2 s steady power LED steady green: async mode, power LED flashes green: sync mode	async mode is set per default; encoder switches between async/sync mode by means of a teach pulse
direction mode	bridge Pin 2 (U_B) and Pin 8 for 10 s	after 10 s status LED flashes for 2 s	the encoder rotates in CW direction (default)
	bridge Pin 1 (GND) and Pin 8 for 10 s	after 10 s status LED flashes for 2 s	the encoder rotates in CCW direction
multiturn error- flag	bridge Pin 1 (GND) and Pin 8 for 15 s	after 15 s power and status LED alterante	multiturn error- flag is deleted
Easy-Teach reset	bridge Pin 2 (U_B) and Pin 8 for 15 s	after 15 s power and status LED alternate	the following parameters are reset to factory settings: direction mode (CW), zero point, multiturn error (delete), multiturn counter (zero)

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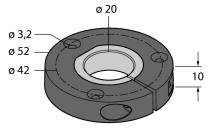
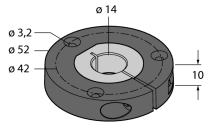
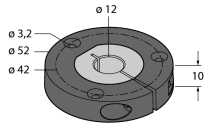
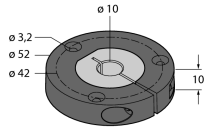
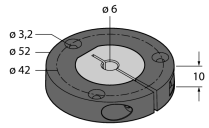
Accessories

Type code	Ident-No.	Description	Dimension drawing
P1-Ri-QR24	1590921	Positioning element, for Ø 20 mm shafts	
P2-Ri-QR24	1590922	Positioning element, for Ø 14 mm shafts	
P3-Ri-QR24	1590923	Positioning element, for Ø 12 mm shafts	
P4-Ri-QR24	1590924	Positioning element, for Ø 10 mm shafts	
P5-Ri-QR24	1590925	Positioning element, for Ø 6 mm shafts	

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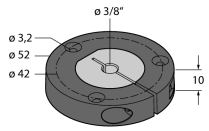
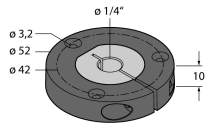
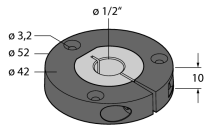
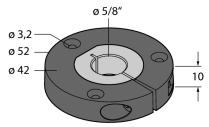
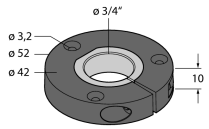
Accessories

Type code	Ident-No.	Description	Dimension drawing
P6-Ri-QR24	1590926	Positioning element, for Ø 3/8“ shafts	
P7-Ri-QR24	1590927	Positioning element, for Ø 1/4“ shafts	
P9-Ri-QR24	1593012	Positioning element for installation on Ø 1/2“ shafts	
P10-Ri-QR24	1593013	Positioning element for installation on Ø 5/8“ shafts	
P11-Ri-QR24	1593014	Positioning element for installation on Ø 3/4“ shafts	

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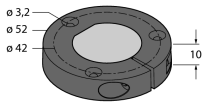
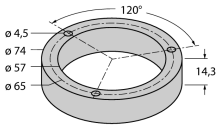
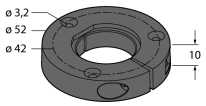
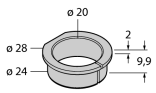
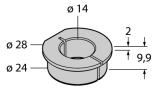
Accessories

Type code	Ident-No.	Description	Dimension drawing
P8-Ri-QR24	1590916	Positioning element with blanking plug for large shafts	
M1-QR24	1590920	Aluminium protecting ring, for inductive encoders Ri-QR24	
PE1-QR24	1590937	Positioning element without adapter sleeve	
RA1-QR24	1590928	Adapter sleeve, for Ø 20 mm shafts	
RA2-QR24	1590929	Adapter sleeve, for Ø 14 mm shafts	

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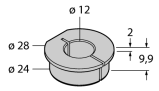
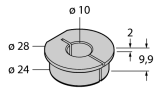
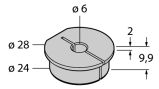
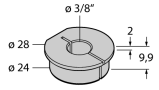
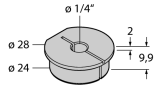
Accessories

Type code	Ident-No.	Description	Dimension drawing
RA3-QR24	1590930	Adapter sleeve, for Ø 12 mm shafts	
RA4-QR24	1590931	Adapter sleeve, for Ø 10 mm shafts	
RA5-QR24	1590932	Adapter sleeve, for Ø 6 mm shafts	
RA6-QR24	1590933	Adapter sleeve, for Ø 3/8“ shafts	
RA7-QR24	1590934	Adapter sleeve, for Ø 1/4“ shafts	

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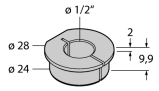
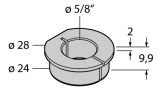
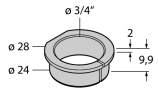
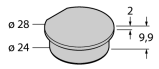
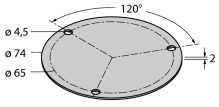
Accessories

Type code	Ident-No.	Description	Dimension drawing
RA9-QR24	1590960	Adapter sleeve, for Ø 3/8“ shafts	
RA10-QR24	1590961	Adapter sleeve, for Ø 3/8“ shafts	
RA11-QR24	1590962	Adapter sleeve, for Ø 3/8“ shafts	
RA8-QR24	1590959	Plug for positioning element (alternative to adapter sleeve)	
SP1-QR24	1590938	Shield Ø 74 mm, aluminium	

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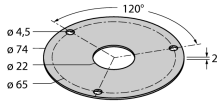
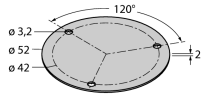
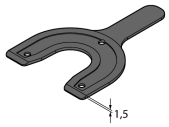
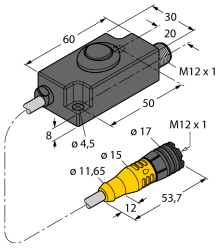
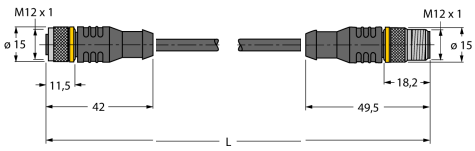
Accessories

Type code	Ident-No.	Description	Dimension drawing
SP2-QR24	1590939	Shield Ø 74 mm, aluminiuim, with borehole for shaft feedthrough	
SP3-QR24	1590958	Shield Ø 52 mm, aluminium	
MT-QR24	1590935	Mounting aid for optimal alignment of positioning element	
TX2-Q20L60	6967117	Teach adapter for inductive encoders with 8-pin male M12 x 1, for simple programming via Easy Teach	
RKC8.302T-1,5-RSC4T/ TX320	6625003	Adapter cable to connect sensor to USB-2-IOL-0002 parametrizing unit; female M12, straight, 8-pin on male M12, straigth, 3-pin; cable length: 1.5 m; sheath material: PUR, sheath color: black, cULus approved; RoHS conform; protection class IP67	

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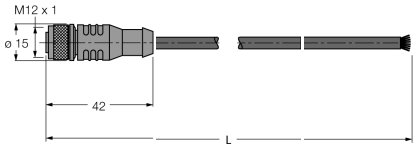
Accessories

Type code	Ident-No.	Description	Dimension drawing
E-RKC8T-264-2	6611746	Connection cable, female M12, straight, 8-pin (twisted pairs),shielded, cable length: 2 m, sheath material: PVC, black; cULus approval; other cable lengths and qualities available, see www.turck.com	

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