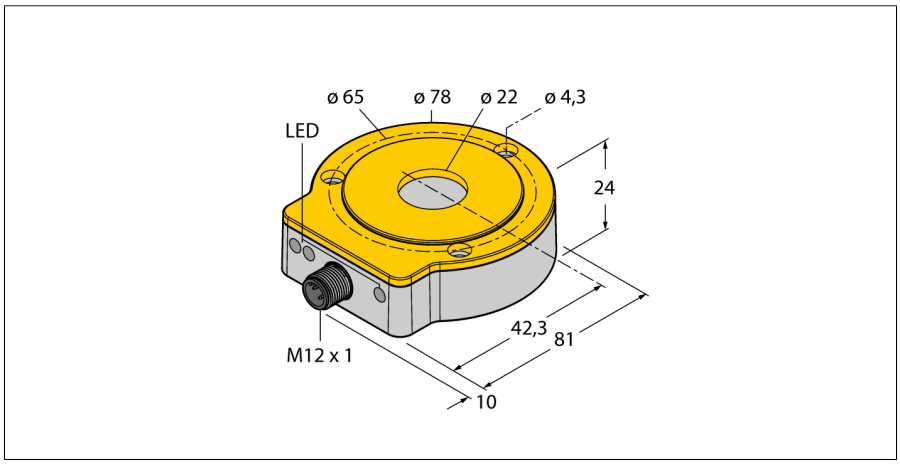
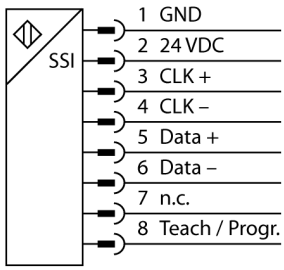
Contactless encoder
Ri360P1-QR24M1-HESG25X3-H1181



Type code	Ri360P1-QR24M1-HESG25X3-H1181
Ident no.	1590940
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
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
Housing material	metal/plastic, ZnAlCu1/PBT-GF30-V0
Connection	male, M12 x 1
Vibration resistance (EN 60068-2-6)	55 Hz
Shock resistance (EN 60068-2-27)	40 g
Continuous shock resistance (EN 60068-2-29)	100 g
Protection class	IP67 / 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, P1-Ri-QR24

- **Compact, rugged housing**
- **Many mounting possibilities**
- **Status displayed via LED**
- **Positioning element for Ø 20 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-0001 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 interferences**
- **15…30 VDC**
- **Male M12 x 1, 8-pin**

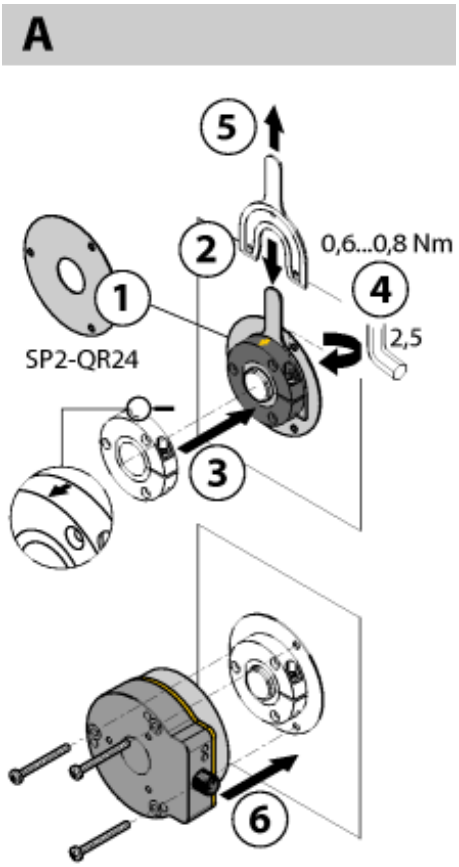
Wiring diagram

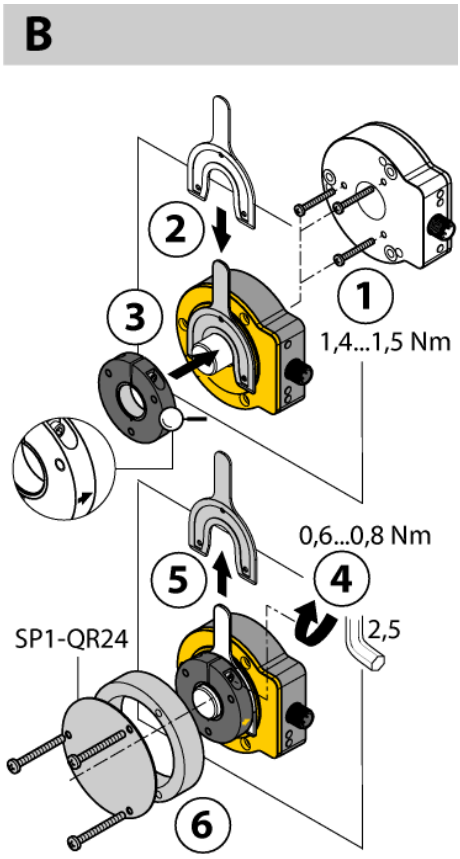


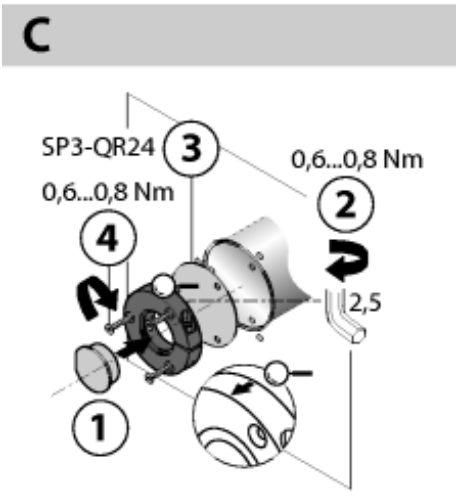
Functional principle

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. Thanks to the innovative technology, electromagnetic AC and DC fields have no effects on the measured signal.

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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 sensor operates absolutely wear-free and is immune to magnetized metal splinters and other interference fields. Wrong installation is hardly possible.
The adjacent figure shows the two separate units, sensor and positioning element.

Mounting option A:
First, interconnect positioning element and rotatable shaft. 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 to be screwed on a rotating machine part, use the RA0-QR24 plug which is included in the delivery. 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. The direction of fitting is specified by an arrow on the edge of the positioning element. (Arrowhead in direction sensor)

The separately arranged sensor and positioning element inhibit that compensating currents or damaging mechanical loads are transmitted via the shaft to the sensor. In addition, the encoder remains tight and highly protected during its entire lifespan.
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.

Status display via LED
green steady:
Optimal sensor supply
yellow:
Positioning element has reached the end of the measuring range. This is indicated by a lower signal quality, see status bit 23.
yellow flashing:
Positioning element is outside the measuring range, 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

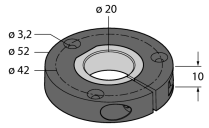
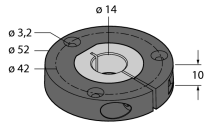
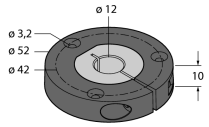
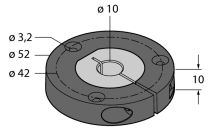
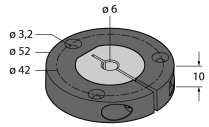
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Parametrization

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 sec. 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)

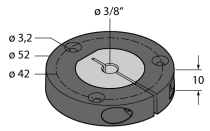
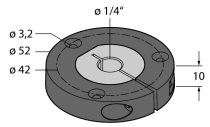
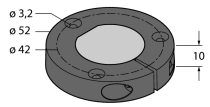
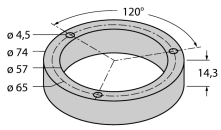
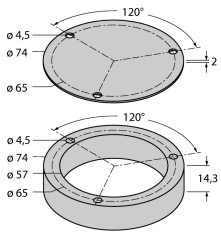
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Accessories

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	

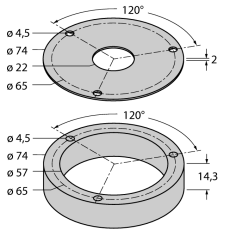
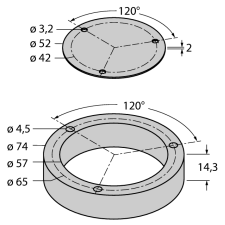
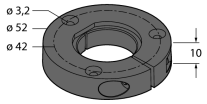
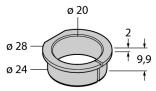
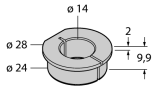
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Accessories

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	
P8-Ri-QR24	1590916	Positioning element, for Ø 12 mm shafts	
M1-QR24	1590920	Aluminium protecting ring, for inductive encoders Ri-QR24	
M2-QR24	1590917	Aluminium protecting ring and shield for inductive encoders Ri-QR24	

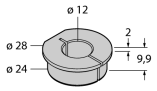
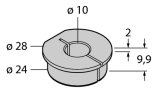
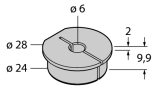
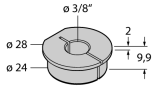
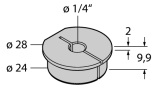
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Accessories

Type code	Ident no.	Description	Dimension drawing
M3-QR24	1590918	Aluminium protecting ring and shield for inductive encoders Ri-QR24	
M4-QR24	1590919	Aluminium protecting ring and shield 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	

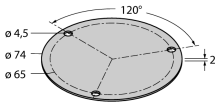
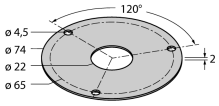
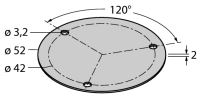
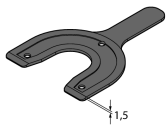
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Accessories

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	

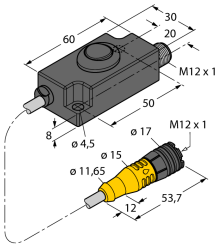
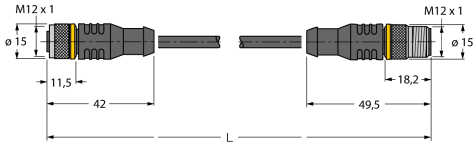
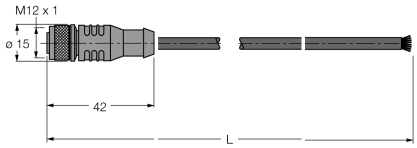
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Accessories

Type code	Ident no.	Description	Dimension drawing
RA8-QR24	1590959	Plug for positioning element (alternative to adapter sleeve)	
SP1-QR24	1590938	Shield Ø 74 mm, aluminium	
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	

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Accessories

Type code	Ident no.	Description	Dimension drawing
TX2-Q20L60	6967117	Easy Teach adapter for simple programming of inductive encoders with SSI interface	
RKC8.302T-1,5-RSC4T/ TX320	6625003	Adapter cable for connection of SSI 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	
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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