

# RI360P0-QR24M0-4096X2-H1181

## Contactless Encoder – Incremental: 4096 ppr Premium Line



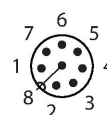
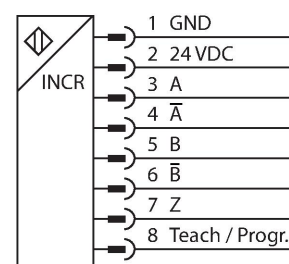
### Technical data

|                                             |                                                                                                       |
|---------------------------------------------|-------------------------------------------------------------------------------------------------------|
| Type                                        | RI360P0-QR24M0-4096X2-H1181                                                                           |
| ID                                          | 1593158                                                                                               |
| Measuring principle                         | Inductive                                                                                             |
| <b>General data</b>                         |                                                                                                       |
| Max. rotational speed                       | 2500 rpm                                                                                              |
|                                             | Determined with standardized construction, with a steel shaft Ø 20 mm, L = 50 mm and reducer Ø 20 mm. |
| Starting torque shaft load (radial / axial) | not applicable, because of contactless measuring principle                                            |
| Nominal distance                            | 1.5 mm                                                                                                |
| Repeat accuracy                             | ≤ 0.01 % of full scale                                                                                |
| Linearity deviation                         | ≤ 0.05 % f.s.                                                                                         |
| Temperature drift                           | ≤ ± 0.003 %/K                                                                                         |
| Output type                                 | Incremental                                                                                           |
| Resolution incremental                      | 4096 ppr                                                                                              |
| <b>Electrical data</b>                      |                                                                                                       |
| Operating voltage $U_B$                     | 10...30 VDC                                                                                           |
| Ripple $U_{ss}$                             | ≤ 10 % $U_{Bmax}$                                                                                     |
| Isolation test voltage                      | 0.5 kV                                                                                                |
| Short-circuit protection                    | yes/Cyclic                                                                                            |
| Wire break/reverse polarity protection      | yes/yes (voltage supply)                                                                              |
| Pulse frequency max.                        | 200 kHz                                                                                               |
| Signal level high                           | min. $U_B - 2 V$                                                                                      |
| Signal level low                            | max. 2.0 V                                                                                            |
| Output function                             | 8-pin, Push-Pull/HTL                                                                                  |
| Sample rate                                 | 1000 Hz                                                                                               |

### Features

- Compact, rugged housing
- Many mounting possibilities
- Status displayed via LED
- Immune to electromagnetic interference
- Position of z-track can be set via Easy-Teach
- Burst function, absolute angular position output incrementally via Easy-Teach pulse
- 10...30 VDC
- Male M12 x 1, 8-pin
- Push-pull A, B, Z, A (inverse), B (inverse)

### 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

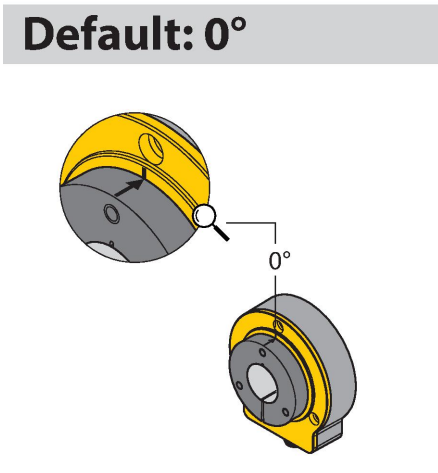
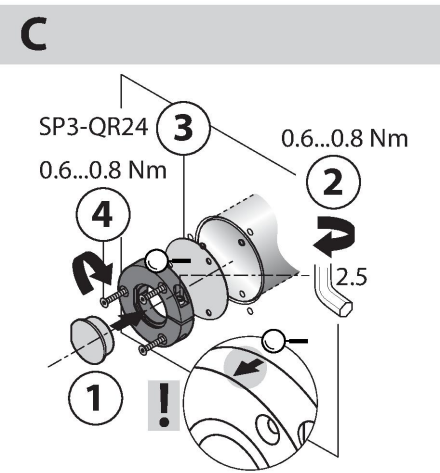
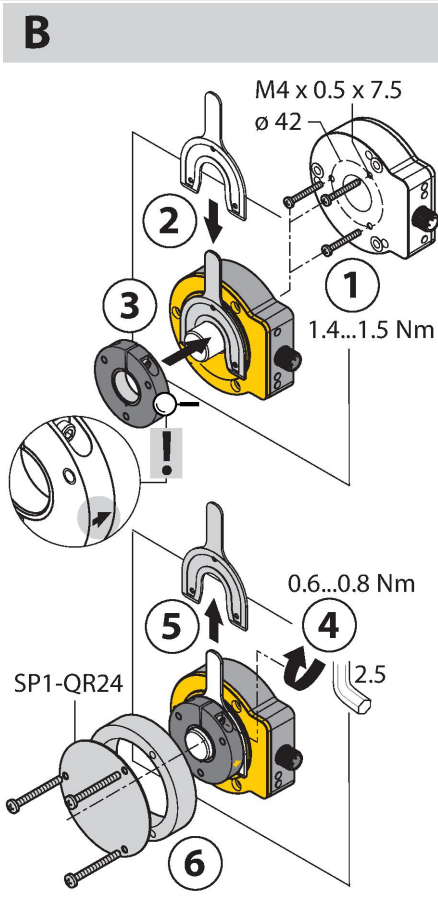
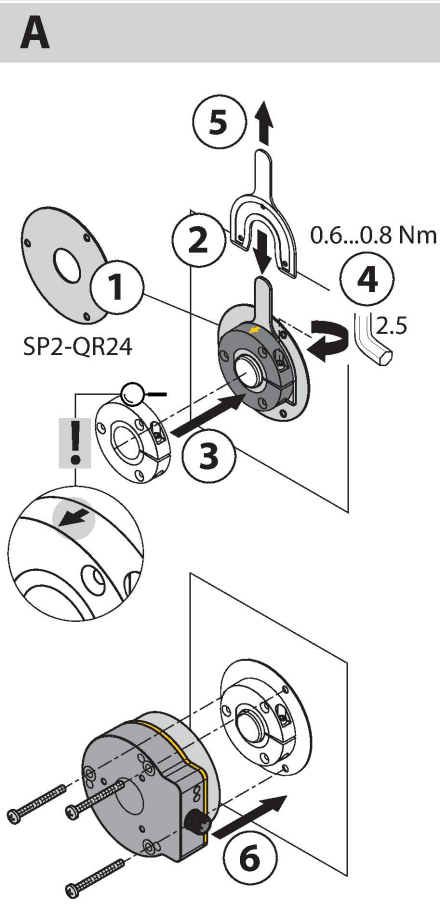
## Technical data

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.

|                                             |                                                                       |
|---------------------------------------------|-----------------------------------------------------------------------|
| Current consumption                         | < 100 mA                                                              |
| <b>Mechanical data</b>                      |                                                                       |
| Design                                      | QR24                                                                  |
| Dimensions                                  | 81 x 78 x 24 mm                                                       |
| Flange type                                 | Flange without mounting element                                       |
| Shaft Type                                  | Hollow shaft                                                          |
| Shaft diameter D (mm)                       | 6<br>6.35<br>9.525<br>10<br>12<br>12.7<br>14<br>15.875<br>19.05<br>20 |
| Housing material                            | Metal/plastic, ZnAlCu1/PBT-GF30-V0                                    |
| Electrical connection                       | Connector, M12 × 1                                                    |
| <b>Environmental conditions</b>             |                                                                       |
| Ambient temperature                         | -25...+85 °C                                                          |
|                                             | Acc. to UL approval to +70 °C                                         |
| 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 sine; 3 × each; 3 axes                                 |
| Continuous shock resistance (EN 60068-2-29) | 40 g; 6 ms ½ sine; 4000 × each; 3 axes                                |
| Protection class                            | IP68<br>IP69K                                                         |
| MTTF                                        | 138 years acc. to SN 29500 (Ed. 99) 40 °C                             |
| Power-on indication                         | LED, Green                                                            |
| Measuring range display                     | LED, yellow, yellow flashing                                          |
| Included in delivery                        | MT-QR24 mounting aid                                                  |
| UL certificate                              | E210608                                                               |

Mounting instructions

Mounting instructions/Description



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.

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 steady:

Positioning element has reached the end of the measuring range. This is indicated by a lower signal quality.

yellow flashing:

Positioning element is outside the measuring range.

off:

Positioning element is in the measuring range.

Individual Parameterization (Teaching with Positioning Element)

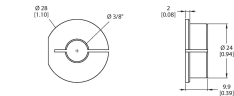
| Jumper between teach input Pin 8 | Gnd Pin 1                   | Ub Pin 2                              | LED                                            |
|----------------------------------|-----------------------------|---------------------------------------|------------------------------------------------|
| 2 s                              | Z-track zero point teaching | One-time triggering of burst function | Status LED flashes then turns steady after 2 s |
| 10 s                             | CCW rotation direction      | CW rotation direction                 | After 10 s status LED flashes fast for 2 s     |
| 15 s                             | -                           | Factory setting (z-track, CW)         | After 15 s power and status LED alternate      |

To avoid unintended teaching, keep pin 8 potential-free.

## Accessories

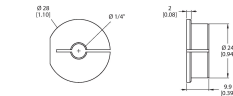
|                        |                                                                                   |
|------------------------|-----------------------------------------------------------------------------------|
| <b>P1-RI-QR24</b><br>  | <b>1590921</b><br><b>Positioning element, for Ø 20 mm shafts</b>                  |
| <b>P2-RI-QR24</b><br>  | <b>1590922</b><br><b>Positioning element, for Ø 14 mm shafts</b>                  |
| <b>P3-RI-QR24</b><br>  | <b>1590923</b><br><b>Positioning element, for Ø 12 mm shafts</b>                  |
| <b>P4-RI-QR24</b><br>  | <b>1590924</b><br><b>Positioning element, for Ø 10 mm shafts</b>                  |
| <b>P5-RI-QR24</b><br>  | <b>1590925</b><br><b>Positioning element, for Ø 6 mm shafts</b>                   |
| <b>P6-RI-QR24</b><br>  | <b>1590926</b><br><b>Positioning element, for Ø 3/8\" shafts</b>                  |
| <b>P7-RI-QR24</b><br>  | <b>1590927</b><br><b>Positioning element, for Ø 1/4\" shafts</b>                  |
| <b>P9-RI-QR24</b><br>  | <b>1593012</b><br><b>Positioning element for installation on Ø 1/2\" shafts</b>   |
| <b>P10-RI-QR24</b><br> | <b>1593013</b><br><b>Positioning element for installation on Ø 5/8\" shafts</b>   |
| <b>P11-RI-QR24</b><br> | <b>1593014</b><br><b>Positioning element for installation on Ø 3/4\" shafts</b>   |
| <b>P8-RI-QR24</b><br>  | <b>1590916</b><br><b>Positioning element with blanking plug for large shafts</b>  |
| <b>PE1-QR24</b><br>    | <b>1590937</b><br><b>Positioning element without adapter sleeve</b>               |
| <b>RA2-QR24</b><br>    | <b>1590929</b><br><b>Adapter sleeve, for Ø 14 mm shafts</b>                       |
| <b>RA3-QR24</b><br>    | <b>1590930</b><br><b>Adapter sleeve, for Ø 12 mm shafts</b>                       |
| <b>RA4-QR24</b><br>    | <b>1590931</b><br><b>Adapter sleeve, for Ø 10 mm shafts</b>                       |
| <b>RA5-QR24</b><br>    | <b>1590932</b><br><b>Adapter sleeve, for Ø 6 mm shafts</b>                        |
| <b>M1-QR24</b><br>     | <b>1590920</b><br><b>Aluminum protecting ring, for inductive encoders RI-QR24</b> |
| <b>RA1-QR24</b><br>    | <b>1590928</b><br><b>Adapter sleeve, for Ø 20 mm shafts</b>                       |

RA6-QR24 1590933 Adapter sleeve, for Ø 3/8" shafts



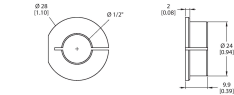
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RA7-QR24 1590934 Adapter sleeve, for Ø 1/4" shafts



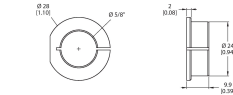
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RA9-QR24 1590960 Adapter sleeve, for Ø 1/2" shafts



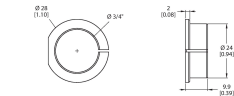
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RA10-QR24 1590961 Adapter sleeve, for Ø 5/8" shafts



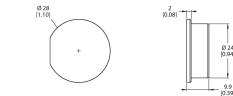
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RA11-QR24 1590962 Adapter sleeve, for Ø 3/4" shafts



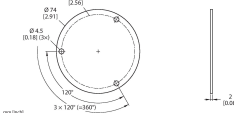
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RA8-QR24 1590959 Plug for mounting option C



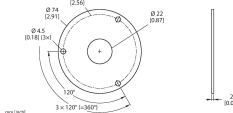
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SP1-QR24 1590938 Shield plate Ø 74 mm, aluminium



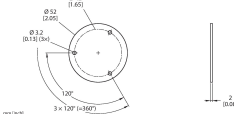
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SP2-QR24 1590939 Shield plate Ø 74 mm, aluminium, with borehole for shaft feedthrough



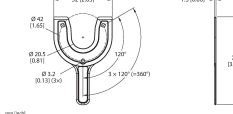
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SP3-QR24 1590958 Shield plate Ø 52 mm, aluminium



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MT-QR24 1590935 Mounting aid for optimal alignment of positioning element

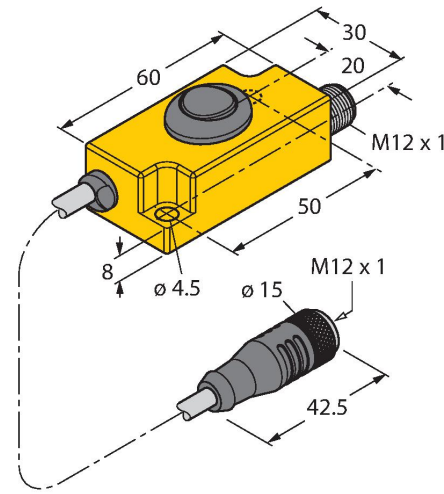


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Accessories

| Dimension drawing | Type           | ID      |                                                                                                                                                                                                                                            |
|-------------------|----------------|---------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                   | RKC8T-2/TXL    | 6625142 | Connection cable, M12 female connector, straight, 8-pin, cable length: 2 m, jacket material: PUR, black; cULus approval                                                                                                                    |
|                   | E-RKC 8T-264-2 | U-04781 | 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 <a href="http://www.turck.com">www.turck.com</a> |

Accessories

| Dimension drawing                                                                 | Type       | ID      |                                                                                                     |
|-----------------------------------------------------------------------------------|------------|---------|-----------------------------------------------------------------------------------------------------|
|  | TX2-Q20L60 | 6967117 | Teach adapter for inductive encoders with 8-pin male M12 x 1, for simple programming via Easy Teach |