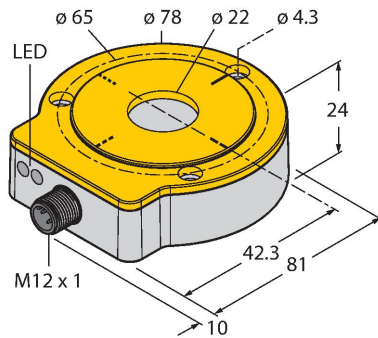


# RI360P0-QR24M0-ELIU5X2LD-H1151/S1321

## Contactless Encoder – Analog

### Premium Line



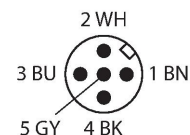
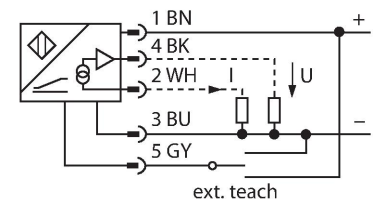
#### Technical data

|                                             |                                                                                                      |
|---------------------------------------------|------------------------------------------------------------------------------------------------------|
| Type                                        | RI360P0-QR24M0-ELIU5X2LD-H1151/S1321                                                                 |
| ID                                          | 100053866                                                                                            |
| Measuring principle                         | Inductive                                                                                            |
| <b>General data</b>                         |                                                                                                      |
| Max. rotational speed                       | 12,000 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                                           |
| Resolution                                  | 16 bit                                                                                               |
| Measuring range                             | 0...360 °                                                                                            |
| Nominal distance                            | 1.5 mm                                                                                               |
| Repeat accuracy                             | ≤ 0.01 % of full scale                                                                               |
| Linearity deviation                         | ≤ 0.05 % f.s.                                                                                        |
| Temperature drift                           | ≤ ± 0.004 %/K                                                                                        |
| Output type                                 | Absolute singleturn                                                                                  |
| Resolution singleturn                       | 16 Bit                                                                                               |
| <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                                                                                                  |

#### Features

- Compact and robust housing
- Status displayed via LED
- Special printing; marking 90°, 180° and 270°
- Measuring range indicated via LED
- Immune to electromagnetic interference
- Protection against conducted interference acc. to ISO 7637-2
- Measuring range programmable via Easy Teach
- Output signal programmable via Easy Teach
- Resolution, 16-bit
- 10...30 VDC
- 0...10 V and 4...20 mA
- Connector M12 × 1, 5-pin

#### Wiring diagram

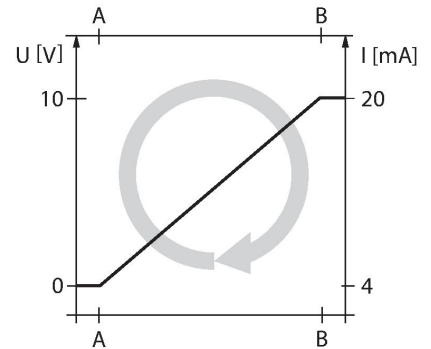


#### Functional principle

## Technical data

|                                             |                                                                             |
|---------------------------------------------|-----------------------------------------------------------------------------|
| Wire break/reverse polarity protection      | yes/yes (voltage supply)                                                    |
| Output function                             | 5-pin, Analog output                                                        |
| Voltage output                              | 0...10 V                                                                    |
| Current output                              | 4...20 mA                                                                   |
| Diagnostic                                  | Positioning element not within detection range: Output signal 24 mA or 11 V |
| Load resistance voltage output              | $\geq 4.7 \text{ k}\Omega$                                                  |
| Load resistance current output              | $\leq 0.4 \text{ k}\Omega$                                                  |
| Sample rate                                 | 5000 Hz                                                                     |
| Load dump protection                        | Impulse 5a: 123 V, Criterion A                                              |
| 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 x 1                                                          |
| <b>Environmental conditions</b>             |                                                                             |
| Ambient temperature                         | -40...+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 x each; 3 axes                                       |
| Continuous shock resistance (EN 60068-2-29) | 40 g; 6 ms ½ sine; 4000 x 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                                                        |

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.



# Technical data

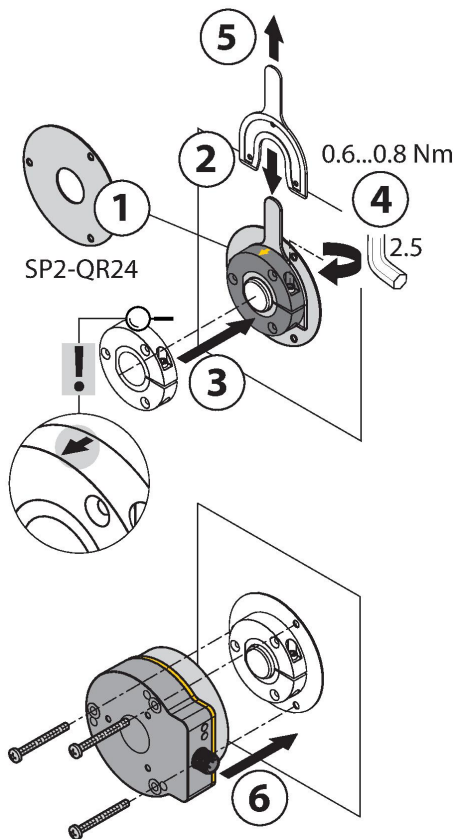
UL certificate

E210608

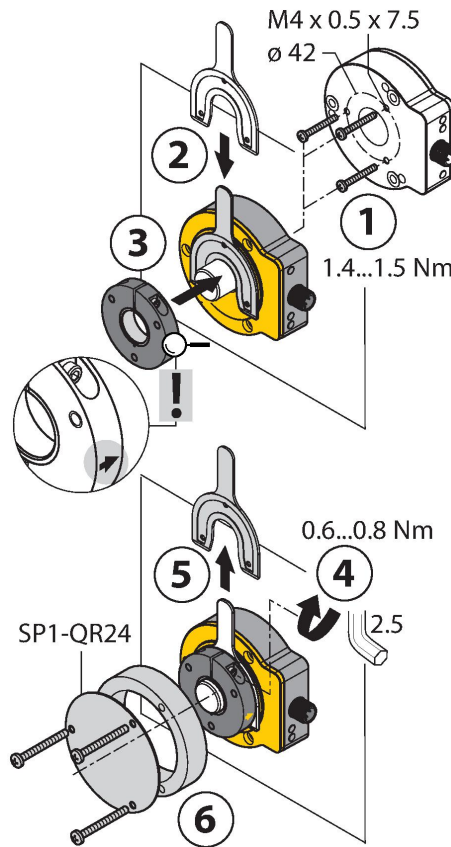
## Mounting instructions

### Mounting instructions/Description

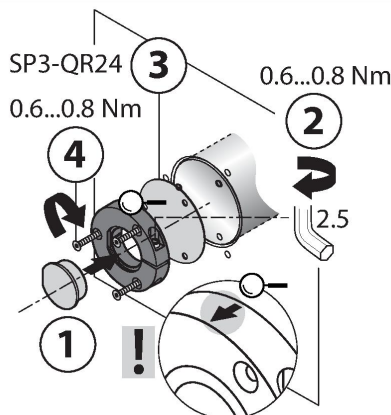
**A**



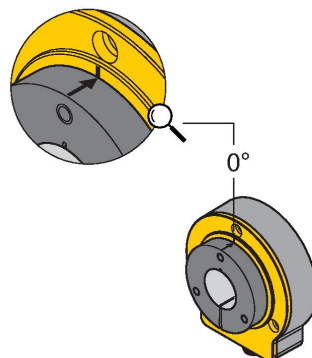
**B**



**C**



**Default: 0°**



The extensive range of mounting accessories enables easy adaptation to many different shaft diameters. Due to the measuring principle, which is based on the functional principle of an RLC coupling, the encoder is immune to magnetized ferrous chips and other interferences. As a result, there are few possible causes of error during mounting. The adjacent figures show the simple installation of the two separate units: the sensor element and the positioning element:

#### Mounting option A:

First, connect the positioning element to the rotatable shaft using the bracket. Then place the encoder with the aluminum ring above the rotating part in such a way that you get a closed and protected unit.

#### Mounting option B:

Slide the encoder backward onto the shaft and fasten it to the machine. Then fasten the positioning element to the shaft using the bracket.

#### Mounting option C:

If the positioning element is screwed onto a rotating machine part rather than being put on a shaft, you must first insert the dummy plug RA8-QR24. Then tighten the bracket. Next, mount the encoder via the three bores.

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

#### Status display via LED

##### Green:

Sensor is being supplied properly

##### Yellow:

Positioning element is within the measuring range, low signal quality (e.g. distance too great)

##### Yellow flashing:

Positioning element is outside the detection range

##### Off:

Positioning element is within the measuring range

### Individual Parameterization (Teaching with Positioning Element)

|                                       |                                                |                                               |                                                |
|---------------------------------------|------------------------------------------------|-----------------------------------------------|------------------------------------------------|
| Bridge between teach input Pin 5 (GY) | Gnd Pin 3 (BU)                                 | Ub Pin1 (BN)                                  | LED                                            |
| 2 s                                   | Start value                                    | End value                                     | Status LED flashes then turns steady after 2 s |
| 10 s                                  | CCW rotation, then return to last preset value | CW rotation, then return to last preset value | After 10 s status LED flashes fast for 2 s     |
| 15 s                                  | -                                              | Factory setting (360°, CW)                    | after 15 s power and status LED alternate      |

To avoid unintended teaching, keep pin 5 potential-free.

### Preset Parameterization (Teaching without Positioning Element)

|                                           |                                                      |                                 |                                                    |
|-------------------------------------------|------------------------------------------------------|---------------------------------|----------------------------------------------------|
| Bridge pin between teach input Pin 5 (GY) | Gnd Pin 3 (BU)                                       | Ub Pin 1 (BN)                   | LED                                                |
| 2 s                                       | Activate selection mode for output signal (for 10 s) | Activate preset mode (for 10 s) | Status LED steady, flashes 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 (360°, CW)      | After 15 s power and status LED flash equally fast |
| Output configuration                      | Gnd Pin 3 (BU)                                       |                                 | Status LED                                         |
| I out: 4...20 mA                          | Press once                                           |                                 | 1 x flashing                                       |
| I out: 0...20 mA                          | Press twice                                          |                                 | 2 x flashing                                       |
| Uout: 0...10 V                            | Press three times                                    |                                 | 3 x flashing                                       |
| Uout: 0...5 V                             | Press four times                                     |                                 | 4 x flashing                                       |
| Uout: 0.5 V / 4.5 V                       | Press five times                                     |                                 | 5 x flashing                                       |
| Preset mode / Angular range               |                                                      | Ub Pin 1 (BN)                   | Status LED                                         |
| 45°                                       |                                                      | Press once                      | 1 x flashing                                       |
| 60°                                       |                                                      | Press twice                     | 2 x flashing                                       |
| 90°                                       |                                                      | Press three times               | 3 x flashing                                       |
| 180°                                      |                                                      | Press four times                | 4 x flashing                                       |
| 270°                                      |                                                      | Press five times                | 5 x flashing                                       |

To avoid unintended teaching, keep pin 5 potential-free.

## Accessories

### 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

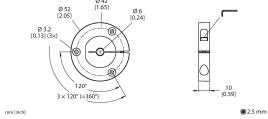


Positioning element, for Ø 10 mm shafts

## P5-RI-QR24

1590925

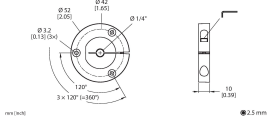
Positioning element, for Ø 6 mm shafts



## P7-RI-QR24

1590927

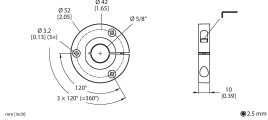
Positioning element, for Ø 1/4" shafts



## P10-RI-QR24

1593013

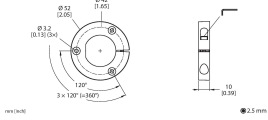
Positioning element for installation on Ø 5/8" shafts



## P8-RI-QR24

1590916

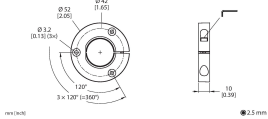
Positioning element with blanking plug for large shafts



## PE1-QR24

1590937

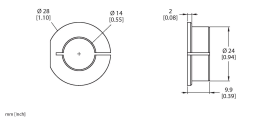
Positioning element without adapter sleeve



## RA2-QR24

1590929

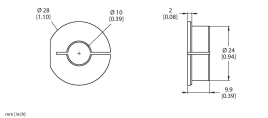
Adapter sleeve, for Ø 14 mm shafts



## RA4-QR24

1590931

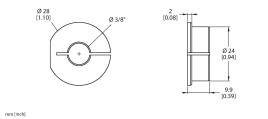
Adapter sleeve, for Ø 10 mm shafts



## RA6-QR24

1590933

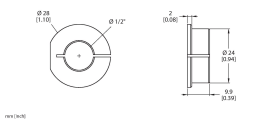
Adapter sleeve, for Ø 3/8" shafts



## RA9-QR24

1590960

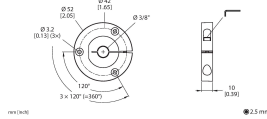
Adapter sleeve, for Ø 1/2" shafts



## P6-RI-QR24

1590926

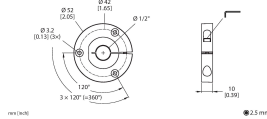
Positioning element, for Ø 3/8" shafts



## P9-RI-QR24

1593012

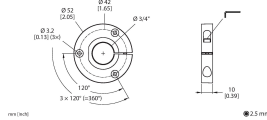
Positioning element for installation on Ø 1/2" shafts



## P11-RI-QR24

1593014

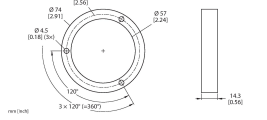
Positioning element for installation on Ø 3/4" shafts



## M1-QR24

1590920

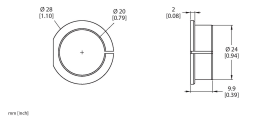
Aluminum protecting ring, for inductive encoders RI-QR24



## RA1-QR24

1590928

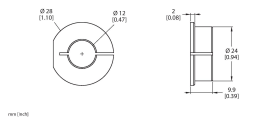
Adapter sleeve, for Ø 20 mm shafts



## RA3-QR24

1590930

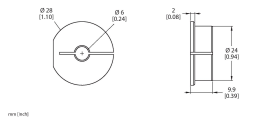
Adapter sleeve, for Ø 12 mm shafts



## RA5-QR24

1590932

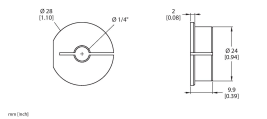
Adapter sleeve, for Ø 6 mm shafts



## RA7-QR24

1590934

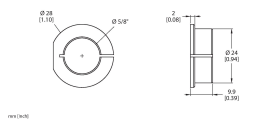
Adapter sleeve, for Ø 1/4" shafts



## RA10-QR24

1590961

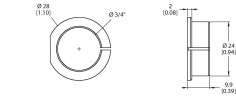
Adapter sleeve, for Ø 5/8" shafts



## RA11-QR24

1590962

Adapter sleeve, for Ø 3/4" shafts

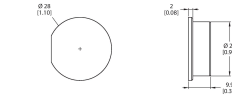


1991/24/02

## RA8-QR24

1590959

Plug for mounting option C

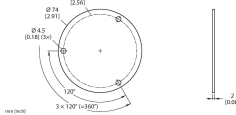


1991/24/02

## SP1-QR24

1590938

Shield plate Ø 74 mm, aluminium

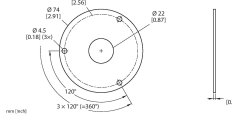


1991/24/02

## SP2-QR24

1590939

Shield plate Ø 74 mm, aluminium, with borehole for shaft feedthrough

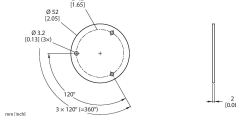


1991/24/02

## SP3-QR24

1590958

Shield plate Ø 52 mm, aluminium

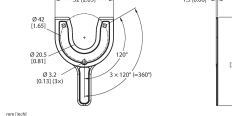


1991/24/02

## MT-QR24

1590935

Mounting aid for optimal alignment of positioning element



1991/24/02