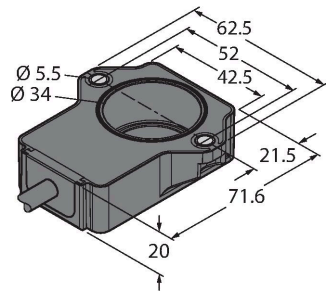


# RI120P1-QR20-LU4X2

## Miniature Encoder – With Analog Output

### Premium Line



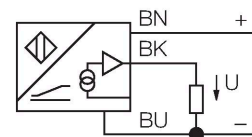
#### Technical data

|   |   |
|---|---|
| Type  | RI120P1-QR20-LU4X2  |
| ID  | 100000192   |
| Measuring principle                         | Inductive   |
| <b>General data</b>                         |   |
| Starting torque shaft load (radial / axial) | Not applicable because of contactless measuring principle |
| Resolution                                  | 0.09°/12 bit  |
| Measuring range                             | -60...60 °  |
| Nominal distance                            | 1 mm  |
| Repeat accuracy                             | ≤ 0.075 % of full scale                                   |
| Linearity deviation                         | ≤ 1.25 % f.s.   |
| Temperature drift                           | ≤ ± 0.01 %/K  |
| Output type                                 | Absolute singleturn                                       |
| <b>Electrical data</b>                      |   |
| Operating voltage $U_B$                     | 8...30 VDC  |
| Ripple $U_{ss}$                             | ≤ 10 % $U_{Bmax}$   |
| Isolation test voltage                      | 0.5 kV  |
| Short-circuit protection                    | yes   |
| Wire break/reverse polarity protection      | no/yes (voltage supply)                                   |
| Output function                             | 3-wire, Analog output                                     |
| Voltage output                              | 0.5...4.5 V   |
| Diagnostic                                  | Positioning element not detected: Output signal 5 V       |

#### Features

- Rectangular, plastic
- Compact and robust housing
- Versatile mounting possibilities
- Positioning element P1-RI-QR20 included in delivery
- For vehicle board nets, 12 V and 24 V
- Increased interference immunity 100 V/m following the e1 type approval
- Protection against conducted interference acc. to DIN ISO 7637-2 (SAE J 113-11)
- Extended temperature range
- High protection class IP68/IP69K
- Protection against salt spray and rapid temperature changes
- Measuring range displayed via LED
- Immune to electromagnetic interference
- Resolution: 0.09°
- 3-wire, 8...30 VDC
- Analog output 0.5...4.5 V
- Output 5 V (typ.) where there is no RLC coupling

#### Wiring diagram

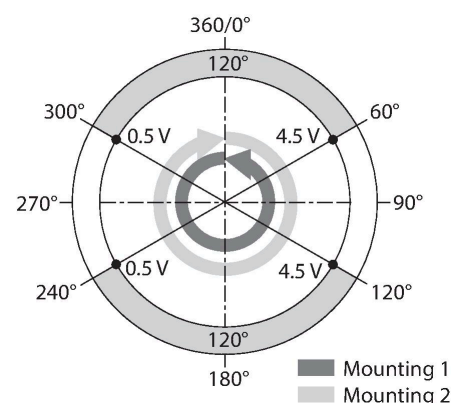


#### Functional principle

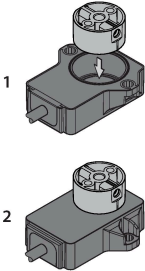
## Technical data

|   |  |
|---|--|
| Load resistance voltage output              | ≥ 4.7 kΩ   |
| Sample rate                                 | 800 Hz   |
| Load-dump protection (DIN ISO 7637-2)       | Severity degree IV/Level 4   |
| Current consumption                         | < 100 mA   |
| <b>Mechanical data</b>                      |  |
| Design                                      | Rectangular, QR20  |
| Dimensions                                  | 71.6 x 62.6 x 20 mm  |
| Flange type                                 | Flange without mounting element                                      |
| Shaft Type                                  | Blind hole shaft   |
| Shaft diameter D (mm)                       | 6<br>6.35  |
| Housing material                            | Plastic, Ultem   |
| Electrical connection                       | Cable  |
| Cable quality                               | Ø 5.2 mm, Lif32Y32Y, TPE, 2 m  |
| Core cross-section                          | 3 x 0.5 mm <sup>2</sup>  |
| <b>Environmental conditions</b>             |  |
| Ambient temperature                         | -40...+85 °C   |
| Storage temperature                         | -40...+125 °C  |
| Temperature changes (EN60068-2-14)          | -40... +85 °C; 20 cycles   |
| 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                               |
| Salt spray test (EN 60068-2-52)             | Severity degree 5 (4 test cycles)                                    |
| Protection class                            | IP68<br>IP69K  |
| MTTF  | 423 years acc. to SN 29500 (Ed. 99) 40 °C                            |
| Power-on indication                         | LED, Green   |
| Measuring range display                     | multifunction LED, green<br>green flashing                           |
| Included in delivery                        | Positioning element P1-RI-QR20; for technical details see data sheet |

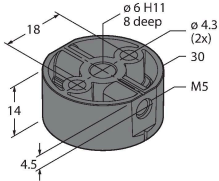
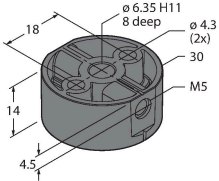
These sensors are extremely reliable even under the most extreme environmental conditions. Their extremely robust design meets the requirements for the IP68 and IP69K protection ratings. Thanks to their excellent resistance to constant shocks and thermal shock resistance, they are the ideal choice for mobile applications, such as road construction vehicles and agricultural machinery.



Mounting instructions

| Mounting instructions/Description   |   |
|---|---|
|  | <p>There are two different mounting options. One option is to position the positioning element above the sensor housing. However, it can also be mounted so that the sensor housing completely encloses the positioning element.</p> <p>LED function<br/>Operating voltage<br/>Green:Power on<br/>Displayed measuring range<br/>Green:Positioning element is in the detection range<br/>Green flashing:Positioning element is within the measuring range, low signal intensity (e.g. distance too large)<br/>Off:Positioning element is outside the detection range</p> <p>Inductive measuring principle provides more safety<br/>Due to the measuring principle, which is based on the functional principle of an RLC coupling, the sensor operates absolutely wear-free and is immune to magnetized ironware and other interferences. The amplitude of the signal can be changed by metal parts, which in turn affects the accuracy.<br/>Owing to the differential analysis, the output signal remains almost unchanged, even if the position of the positioning element deviates from the ideal axis of rotation. The distance between the sensor and the positioning element can be up to 5 mm, whereby the nominal distance is 1 mm.</p> |

Accessories

|   |         |  |         |
|---|---------|--|---------|
| P1-RI-QR20  | 1593041 | P2-RI-QR20   | 1593042 |
| Positioning element for encoder RI-QR20, for Ø 6 mm shafts                          |         | Positioning element for encoder RI-QR20, for Ø 6.35 mm shafts                        |         |
|  |         |  |         |

RI120P1-QR20-LU4X2| 02/21/2025 15-00 | technical changes reserved