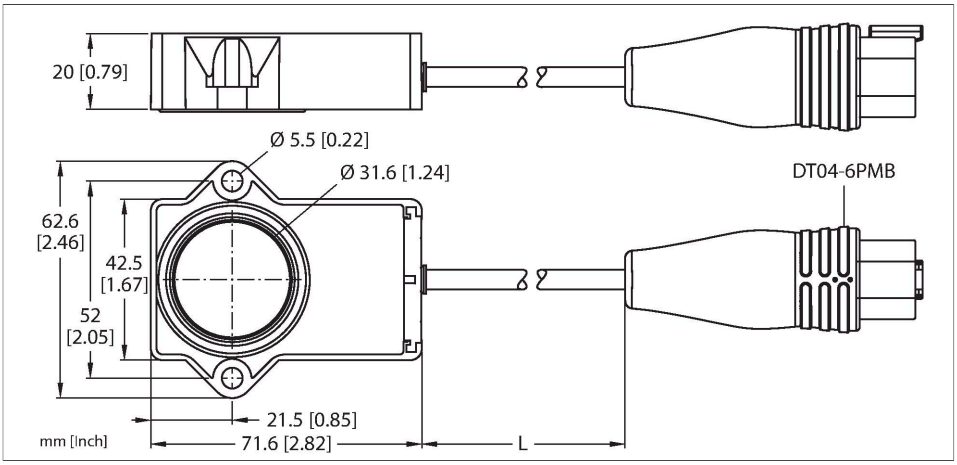
# RI360P2-QR20-9F16B-0.3-DT04-6PMB
# Miniature encoder – With J1939 Output
# Premium Line



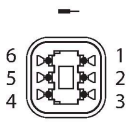

## Technical data

| | |
|---|---|
| Type | RI360P2-QR20-9F16B-0.3-DT04-6PMB |
| ID | 100027544 |
| Measuring principle | Inductive |
| **General data** | |
| Max. rotational speed | 3000 rpm |
| Starting torque shaft load (radial / axial) | Not applicable because of contactless measuring principle |
| Resolution | 0.09° |
| Measuring range | 0…360 ° |
| Nominal distance | 1 mm |
| Repeat accuracy | ≤ 0.025 % of full scale |
| Speed deviation | ± 10 rpm |
| Linearity deviation | ≤ 0.3 % f.s. |
| Output type | Absolute singleturn |
| **Electrical data** | |
| 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 | yes |
| Communication protocol | SAE J1939 |
| Baud rate | 250 kbps |
| Sample rate | 800 Hz |

## Features

- Rectangular, plastic
- Compact and robust housing
- Versatile mounting possibilities
- Positioning element P2-RI-QR20 included in delivery
- For vehicle electrical systems, 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 change
- Measuring range displayed via LED
- Immune to electromagnetic interference
- Resolution: 0.09°
- 8…30 VDC
- J1939
- Male connector, Deutsch DT04-6PMB

## Wiring diagram




Pin 1: CAN_H
Pin 2: CAN_L
Pin 3: V+
Pin 4: V- (GND)
Pin 5: N/C
Pin 6: CAN_Shield

## Functional principle

## Technical data

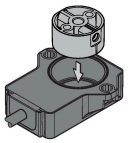
| | |
|---|---|
| Load dump protection | ISO 16750-2: Impuls 5a: 151 V, Impuls 5b: 58 V, Kriterium A |
| Current consumption | < 50 mA |
| **Mechanical data** | |
| Design | Rectangular, QR20 |
| Dimensions | 71.6 x 62.6 x 20 mm |
| Flange type | Flange without mounting element |
| Shaft Type | Blind hole shaft |
| Shaft diameter D (mm) | 6<br>6.35 |
| Housing material | Plastic, Ultem |
| Cable quality | Ø 5.7 mm, 0.4 m |
| Core cross-section | 5 x 0.2 $mm^2$ |
| **Environmental conditions** | |
| 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 P2-RI-QR20; for technical details see data sheet |

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.

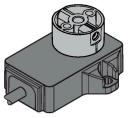
## Mounting instructions

| Mounting instructions/Description |
|---|

1



2



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.

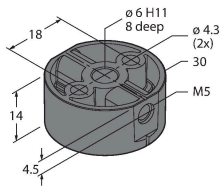
LED function
Operating voltage
Green:Power on
Displayed measuring range
Green:Positioning element is in the detection range
Green flashing:Positioning element is within the measuring range, low signal intensity (e.g. distance too large)
Off:Positioning element is outside the detection range

Inductive measuring principle provides more safety
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.
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.

## Accessories

| P1-RI-QR20 | 1593041 |
|---|---|

Positioning element for encoder RI-QR20, for Ø 6 mm shafts




| P2-RI-QR20 | 1593042 |
|---|---|

Positioning element for encoder RI-QR20, for Ø 6.35 mm shafts