Special Features

- Touchless hall technology
- Electrical range 360°
- High protection class IP67 resp. IP69K (housing side)
- Resolution 14 bits
- Temperature range -40°C to +105°C
- One and dual-channel versions
- Optimized for use in mobile applications with highest EMC requirements such as ISO pulses and high interferences to ISO 11452, exceeds E1 requirements
- Suitable for linkage lever mounting
- Other configurations see separate data sheets

Applications

- Mobile working machines (industrial trucks, construction machinery, agricultural and forestry machinery)
- Marine applications

Mobile working machines or truck conveyors place very high demands on the sensor system due to the external application. The very compact angle sensor RSA-3200 offers reliable function under harsh operating conditions. The sensor is optimized for mobile applications and is certified according to the highest EMC standards such as ISO pulses and interference fields according to ISO 11452. Available are one and dual-channel versions. The stainless steel shaft is designed for assembling of linkage levers.

Description

| Material         | Housing: high grade, temperature resistant plastic PBT-GF with SS inserts  
|                 | Shaft: SS X10CrNiS18-9 1.4305 / AISI 303  
|                 | Sealing: HNBR 70 |
| Mounting        | With 2 screws M4 |
| Fastening torque of mounting | 250 ± 50 Ncm |
| Bearing         | Sintered bronze bushing |
| Sealing         | Double O-ring seal, electronics completely encapsulated |
| Electrical connection | 6-pin M25-connector, code A, tinned contact according to drawing AMP-114-18063-126, Index A1 (Connector: AMP P/N 1-967616-1) |

Mechanical Data

| Dimensions       | See dimension drawing |
| Mechanical travel | continuous |
| Permitted shaft load (static) | 40 N (axial) / 50 N (radial) |
| Torque           | Typ. 1.5 Ncm  
|                 | Depending on the environmental temperature and standstill time, the necessary force for the initial operating of the shaft may increase |
| Weight           | approx. 45 g |
### Ordering Specifications

**Preferred types printed in bold**

- Delivery time up to 25 pcs. within 10 working days EXW
- Best low-volume pricing

<table>
<thead>
<tr>
<th>Series</th>
<th>Mechanical version</th>
</tr>
</thead>
<tbody>
<tr>
<td>RS A</td>
<td>3201: Standard design</td>
</tr>
<tr>
<td></td>
<td>3202: with mounted lever arm Z-RSA-M01</td>
</tr>
</tbody>
</table>

### Interface

6: CANopen

#### Interface parameters

- **Single-channel version**
  - 1: 1x position, 1x speed
  - 5: 1x position, 1x speed with bus termination 120 Ohm

- **Dual-channel version**
  - 2: 2x position, 2x speed
  - 6: 2x position, 2x speed with bus termination 120 Ohm

- **Baud rate**
  - 1: 1000 kBaud
  - 2: 800 kBaud
  - 3: 500 kBaud
  - 4: 250 kBaud
  - 5: 125 kBaud
  - 7: 50 kBaud

- **Electrical connection**
  - 521: Connector AMP MQS 6-pin, male

### Resolution

14: 14 bits

| Interface | Digital Interface |
When the flattening of the shaft points towards the connector, the sensor is near the electrical center position.
### Technical Data

**Type**

RSA-32_-214-6_-521

<table>
<thead>
<tr>
<th>CANopen protocol to CiA DS-301 V4.2.0, Device profile DS-406 V3.3 Encoder Class C2, LSS services to CiA DS-305 V1.1.2</th>
</tr>
</thead>
</table>

**Measured variables**

Position and speed

**Measuring range**

360°

**Number of channels**

1 / 2

**Protocol**

CANopen

**Programmable parameters**

Position, speed, cams, working areas, rotating direction, scale, offset, node ID, baud rate

**Diagnosis**

activated (in case of error, output signal is outside of the plausible signal range)

**Node ID**

1 ... 127 (default 127)

**Baud rate**

50 ... 1000 kbaud

**Update rate (output)**

1 kHz

**Resolution**

14 bits

**Resolution speed**

360°/2^14 = 0.022°/ms

**Absolute linearity**

1 Channel: ±0.5 % FS, 2 Channels: ±0.85 % FS

**Repeatability**

± 0.1°

**Hysteresis**

± 0.1°

**Temperature error**

±0.2 % FS

**Supply voltage Ub**

12/24 VDC (8 ... 34 VDC)

**Current consumption at Power-on**

± 50 mA

**Power drain w/o load**

< 0.4 W

**Overvoltage protection**

45 VDC (permanent)

**Polarity protection**

yes (supply lines)

**Short circuit protection**

yes (output vs. GND and supply voltage up to 40 VDC)

**Insulation resistance (500 VDC)**

≥ 10 MΩ

**Bus termination internal**

120 Ω (optionally)

**Environmental Data**

**Max. operational speed**

120 rpm (temporary 800 rpm)

**Vibration IEC 60068-2-6**

20 g, 5 ... 2000 Hz, Am = 0.75 mm

**Shock IEC 60068-2-27**

50 g, 6 ms

**Protection class DIN EN 60529**

IP67 (shaft side), IP69K (housing incl. electronics)

**Operating temperature**

-40 ... +105°C

**Operating humidity**

0 ... 98 % R.H. (no condensation)

**Life**

typ. 30 Mio. movements (when operated without lever)

**MTTF (IEC 60065)**

843 years (one-channel) or 819 years (two-channel, per channel)

**Traceability**

Serial number on type labeling, production batch of the sensor assembly and relevant sensor components

**EMC Compatibility**

ISO 10605 ESD (Handling/Component) 8 kV

ISO 11452-2 Radiated HF-fields 100 V/m

ISO 11452-5 Radiated HF-Fields, stripline 200 V/m

CISPR 25 Radiated emission Level 3

ISO 7637-3 Transient Emissions Level 4

ISO 7637-2 Pulses on supply lines Level 4

ISO 7637-2 Pulses on output lines Level 4

**Emission/Immunity**

Starting profile Level 4 @ 12 V / Level 3 @ 24 V

Exceeds E1 requirements

**FS** = Full scale: Signal span according to electrical measuring range

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Page 4
## Connection Assignment

<table>
<thead>
<tr>
<th>Signal</th>
<th>Connector Code</th>
<th>Pin(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply Voltage Ub</td>
<td>code 5, _</td>
<td>Pin 1</td>
</tr>
<tr>
<td>GND</td>
<td></td>
<td>Pin 2</td>
</tr>
<tr>
<td>CAN_H</td>
<td></td>
<td>Pin 3, pin 6</td>
</tr>
<tr>
<td>CAN_L</td>
<td></td>
<td>Pin 4, pin 5</td>
</tr>
</tbody>
</table>
Sensor Mounting

Z-RSA-M01
Lever arm 50 mm for mounting at shaft with locking pin (included in delivery).
Further levers (geometry, materials...) on request.
Material Aluminium, anodized
P/N 400105062 Z-RSA-M01

[Diagram of sensor mounting interface]
Connector kit MQS System including
• 1 plug socket (female), PBT GF15, AMP P/N 1-967616-1
• 6 tinned contacts for cable cross-section area 0.25 ... 0.35 mm² (AWG 22), AMP-P/N 963727-1 or 5-962885-1
• 6 single conductor sealings AMP P/N 967067-2
Operating temp. -40 ... +120°C

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Connector MQS AMP P/N 1-967616-1, 6-pin, PBT GF15, with lead wires 0.5 mm², PVC, 1 m, open ended
Operating temp. -40 ... +120°C
Lead wires PVC, 6x0.5 mm²

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P/N  Type  Length
40005666  EEM-33-34
400106029  EEM-33-24  1 m
The specifications contained in our datasheets are intended solely for informational purposes. The documented specification values are based on ideal operational and environmental conditions and can vary significantly depending on the actual customer application. Using our products at or close to one or more of the specified performance ranges can lead to limitations regarding other performance parameters. It is therefore necessary that the end user verifies relevant performance parameters in the intended application. We reserve the right to change product specifications without notice.