NOVOHALL
Rotary Sensor
Non-contacting
RSA-3200
4 ... 20 mA
Mobile Applications

Special Features
- Contactless hall technology
- Electrical range up to 360°
- High protection class IP67 rep. IP69K (housing side)
- Resolution up to 12 bits
- Temperature range -40°C to +105°C
- One and multi-channel versions
- Optimized for use in mobile applications
- For highest EMC requirements such as ISO pulses and interference fields according to ISO 11452 and ECE directive
- Suitable for safety-related applications according to DIN EN ISO 13849
- 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 multi-channel versions which are suitable for use in safety-related applications. The stainless steel shaft is designed for assembling of lever arms.

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 (w/o connection)
approx. 45 g
### Ordering Specifications

**Preferred types printed in bold**
- Delivery time up to 25 pcs. within 10 working days EDW
- Best low-volume pricing

#### Mechanical version

**Output characteristic A (standard)**
- 3201: Standard design
- 3202: with mounted lever arm Z-PSA-N01

**Output characteristic B (180° offset)**
- 3221: Standard design
- 3222: with mounted lever arm Z-PSA-N01

#### Measuring range
- 03: Angle 0° ... 30° min.
- ... 06, 12, 18, 24, 36
- ... 30: Angle 0° ... 360° max.
- Other angles on request

#### Supply voltage $U_b$
- 2: $U_b = 12 V DC$
- 3: $U_b = 24 V DC$

#### Output signal
- 2: 4 ... 20 mA

#### Output characteristic
- 1: Rising characteristic cw
- 2: Rising characteristic ccw
- 3: Crossed outputs, channel 1 rising cw (partly redundant)
- 4: Crossed outputs, channel 1 rising cw (fully redundant)
- Other output characteristics on request

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

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**Ordering Code**

| RS | A | 3 | 2 | 0 | 1 | 6 | 3 | 6 | 3 | 2 | 1 | 5 | 2 | 1 |
|----|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

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**Series**

- For further information, please contact Novotechnik

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**Page 2**
Output characteristic A
(standard)
RSA-3201/3202:
When the flattening of the shaft
or the lever arm points towards
the connector, the sensor is near
the electrical center position.

Output characteristic B
(180° offset)
RSA-3221/3222:
When the flattening of the shaft
or the lever arm is
located opposite to the
connector, the sensor is near
the electrical center position.
### Technical Data

<table>
<thead>
<tr>
<th>Type</th>
<th>RSA-32_ <em>-</em> <em>-32</em>-521</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Output signal</strong></td>
<td>4 ... 20 mA</td>
</tr>
<tr>
<td><strong>Burden</strong></td>
<td>$U_{b} &gt; 13 \text{ V}$, $&lt; 500 \text{ Ohm}$, $U_{b} = 13 \text{ V}$, $&lt; 250 \text{ Ohm}$</td>
</tr>
<tr>
<td><strong>Number of channels</strong></td>
<td>1 / 2</td>
</tr>
<tr>
<td><strong>Diagnosis</strong></td>
<td>activated (in case of error, output signal is outside of the plausible signal range)</td>
</tr>
<tr>
<td><strong>Update rate</strong></td>
<td>typ. 3.4 kHz</td>
</tr>
<tr>
<td><strong>Measuring range</strong></td>
<td>0 ... 30° up to 0 ... 360° in 10°-steps</td>
</tr>
<tr>
<td><strong>Absolute linearity at measuring range</strong></td>
<td>360°: $\pm 0.4 %FS$, 240°: $\pm 0.45 %FS$, 180°: $\pm 0.5 %FS$, 120°: $\pm 0.55 %FS$, 60°: $\pm 0.8 %FS$, 30°: $\pm 1.25 %FS$</td>
</tr>
<tr>
<td><strong>Resolution</strong></td>
<td>12 bits</td>
</tr>
<tr>
<td><strong>Hysteresis</strong></td>
<td>typ. $&lt; 0.1^\circ$ (only measuring range 360°, typ. $&lt; 0.25^\circ$ (lower hysteresis on request)</td>
</tr>
<tr>
<td><strong>Temperature error</strong></td>
<td>Measuring range $&lt; 180^\circ$: typ. $\pm 1.2 %FS$, Measuring range $\geq 180^\circ$: typ. $\pm 0.8 %FS$</td>
</tr>
<tr>
<td><strong>Supply voltage $U_{b}$</strong></td>
<td>12/24 VDC (8 ... 34 VDC)</td>
</tr>
<tr>
<td><strong>Current consumption w/o load</strong></td>
<td>typ. 12 mA per channel</td>
</tr>
<tr>
<td><strong>Overvoltage protection</strong></td>
<td>60 VDC (10 min.)</td>
</tr>
<tr>
<td><strong>Short circuit protection</strong></td>
<td>yes (supply lines and outputs)</td>
</tr>
<tr>
<td><strong>Isolation resistance (500 VDC)</strong></td>
<td>$\geq 10 \text{ M}\Omega$</td>
</tr>
</tbody>
</table>

### Environmental Data

| **Max. operational speed** | 120 rpm (temporary 800 rpm) |
| **Vibration IEC 60666-2-6** | 20 g, 5 ... 2000 Hz, $Am_{\text{ax}} = 0.75 \text{ mm}$ |
| **Shock IEC 60068-2-27** | 50 g, 6 ms |
| **Protection class ISO 20653** | IP67 (shaft side), IP69K (housing incl. electronics) |
| **Operating temperature** | $-40 \ldots +105^\circ\text{C}$* |
| **Operating humidity** | 0 ... 98 % R.H. (no condensation) |
| **Life** | typ. 30 Mio. movements (when operated without lever) |
| **Functional safety** | Suitable for safety-related applications according to ISO 13849 after customer validation. Further safety data (DOCavg...) and support for functional safety are available on request. |
| **MTTF (IEC 60665)** | 725 years (one-channel), 448 years (partly redundant, per channel) or 364 years (fully redundant, per channel) |
| **MTTFd (EN ISO 13849-1 parts count method, w/o load)** | 1453 years (one-channel), 890 years (partly redundant, per channel) or 727 years (fully redundant, 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 / 15 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 5 |
| **ISO 7637-2 Transient emissions** | Level 3 |
| **ISO 7637-2 Pulses on supply lines** | Level 4 |
| **ISO 13766-1/-2 Construction machinery** | acc. to ECE-R10 |

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

<table>
<thead>
<tr>
<th></th>
<th>Single-channel</th>
<th>Partly redundant</th>
<th>Fully redundant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply voltage Ub 1</td>
<td>Pin 1</td>
<td>Pin 1</td>
<td>Pin 1</td>
</tr>
<tr>
<td>8N 1</td>
<td>Pin 2</td>
<td>Pin 2</td>
<td>Pin 2</td>
</tr>
<tr>
<td>Signal output 1</td>
<td>Pin 4</td>
<td>Pin 4</td>
<td>Pin 4</td>
</tr>
<tr>
<td>Signal output 2</td>
<td>-</td>
<td>Pin 3</td>
<td>Pin 3</td>
</tr>
<tr>
<td>Supply voltage Ub 2</td>
<td>-</td>
<td>-</td>
<td>Pin 6</td>
</tr>
<tr>
<td>8N 2</td>
<td>-</td>
<td>-</td>
<td>Pin 6</td>
</tr>
<tr>
<td>Not assigned</td>
<td>Pin 3, Pin 5, Pin 6</td>
<td>Pin 5, Pin 6</td>
<td>-</td>
</tr>
</tbody>
</table>

![Connection Diagram](image)
Temperature Diagram

Output characteristics:

- One-channel, rising cw
- Crossed output characteristics, ch. 1 rising cw
- On request: output characteristics with offset
- On request: trapezoid output characteristic

On request: signal 2 = 0.5 x signal 1
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
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

P/N | Type      |
--- |----------|
400005666 | EEM-33-34 |

EEM-33-24
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

P/N | Type      | Length |
--- |----------|--------|
300109629 | 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.