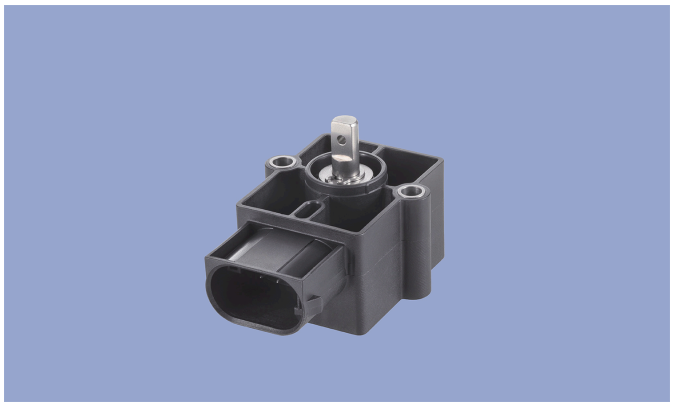
novotechnik
Siedle Group

NOVOHALL
Rotary Sensor
Non-contacting

RSA-3200
Ratiometric
Mobile Applications



Special Features
- Contactless hall technology
- Electrical range up to 360°
- High protection class IP67 rep. IP69K (housing side)
- Resolution up to 12 bit
- Temperature range -40°C to +125°C
- One and multi-channel versions
- Optimized for use in mobile applications
- For highest EMC requirements such as 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 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 stainless steel inserts Shaft: stainless steel, 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 MQS-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 inital operating of the shaft may increase
Weight	approx. 45 g

Ordering Specifications

Ordering Specifications

Preferred types printed in bold

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

Supply voltage Ub
2: Ub = 5 VDC

Output signal
1: 5 ... 95% ratiometric to supply voltage Ub (0.25 ... 4.75 VDC)
2: 10 ... 90% ratiometric to supply voltage Ub (0.5 ... 4.5 VDC)

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

R	S	A	-	3	2	0	1	-	6	3	6	-	2	1	1	-	5	2	1

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

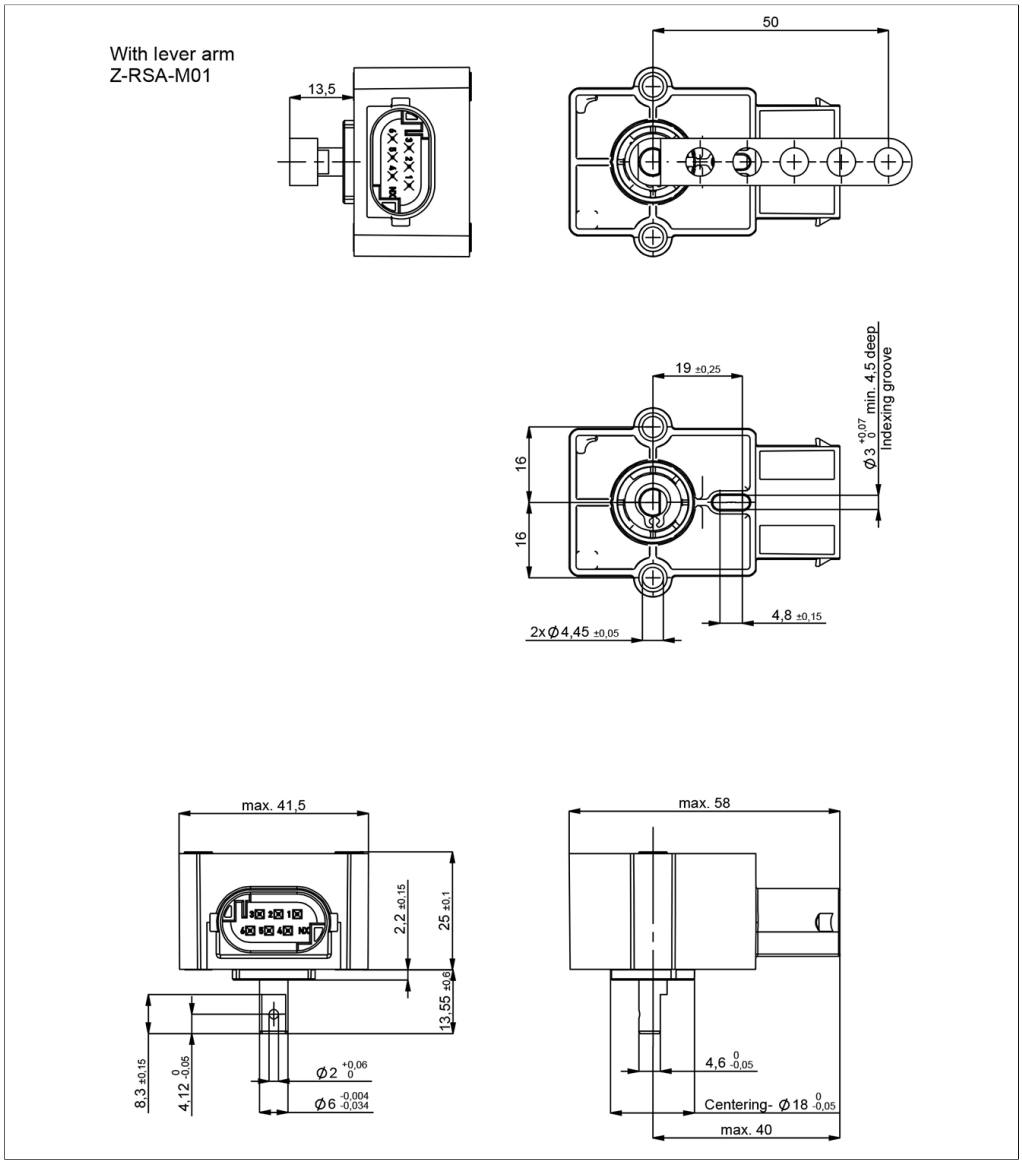
Number of channels
6: One-channel version (1x supply voltage Ub, 1x output)
7: Partly redundant version (1x supply voltage Ub, 2x output)
8: Fully redundant version (2x supply voltage Ub, 2x output)

Mechanical version
Output characteristic A (standard)
3201: Standard design
3202: with mounted lever arm Z-RSA-M01

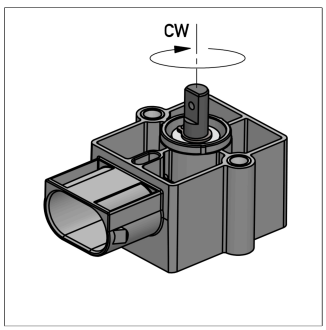
Output characteristic B (180° offset)
3221: Standard design
3222: with mounted lever arm Z-RSA-M01

Series

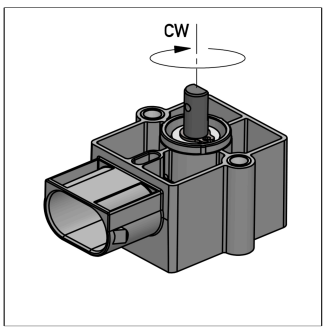
Drawing



CAD data see
www.novotechnik.de/en/download/cad-data/



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.

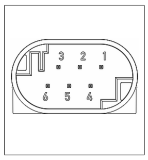
Technical Data

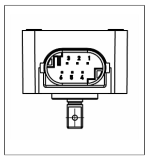
Type	**RSA-32_ _-_ _ _-2_ _-521**
Output signal	ratiometric to supply voltage Ub 5 ... 95% (0.25 ... 4.75 V) 10 ... 90% (0.5 ... 4.5 V)
Load	≥ 5 kΩ
Number of channels	1 / 2
Diagnosis	activated (in case of error, output signal is outside of the plausible signal range)
Update rate	typ. 3.4 kHz
Measuring range	0 ... 30° up to 0 ... 360° in 10°-steps
Absolute linearity at measuring range	360°: ≤ ±0.4 %FS, 240°: ≤ ±0.45 %FS, 180°: ≤ ±0.5 %FS, 120°: ≤ ±0.55 %FS, 60°: ≤ ±0.8 %FS, 30°: ≤ ±1.25 %FS
Resolution	12 bits
Repeatability	typ. ≤ ±0.1°
Hysteresis	typ. < ±0.1° Only measuring range 360°: typ. < 0.25° (lower hysteresis on request)
Temperature error	Measuring range < 180°: typ. ±0.7 %FS, Measuring range ≥ 180°: typ. ±0.35 %FS
Supply voltage Ub	5 VDC (4.5 ... 5.5 VDC)
Current consumption w/o load	typ. 12 mA per channel
Overvoltage protection	24 VDC (60 min.)
Polarity protection	yes (supply lines and outputs)
Short circuit protection	yes (vs. GND and supply voltage Ub)
Insulation resistance (500 VDC)	≥ 10 MΩ
Environmental Data	
Max. operational speed	120 rpm (temporary 800 rpm)
Vibration IEC 60068-2-6	20 g, 5 ... 2000 Hz, Amax = 0.75 mm
Shock IEC 60068-2-27	50 g, 6 ms
Protection class ISO 20653	IP67 (shaft side), IP69K (housing incl. electronics)
Operating temperature	-40 ... +125°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 (DCavg...) and support for functional safety are available on request.
MTTF (IEC 60050)	1652 years (one-channel), 824 years (partly redundant, per channel) or 826 years (fully redundant, per channel)
MTTFd (EN ISO 13849-1 parts count method, w/o load)	3304 years (one-channel), 1648 years (partly redundant, per channel) or 1653 years (fully redundant, per channel)
MTTFd Declaration of Conformity	https://www.novotechnik.de/en/downloads/certificates/mttfd-certificate
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
EN 13309 Construction machinery	
Emission/Immunity E1	acc. to ECE-R10
ISO 13766-1/-2 Construction machinery	On request

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

Connection Assignment

	One-channel	Partly redundant	Fully redundant
Supply voltage Ub 1	Pin 1	Pin 1 / Pin 6	Pin 1
GND 1	Pin 2	Pin 2 / Pin 5	Pin 2
Signal output 1	Pin 4	Pin 4	Pin 4
Signal output 2	-	Pin 3	Pin 3
Supply voltage Ub 2	-	-	Pin 6
GND 2	-	-	Pin 5
Not assigned	Pin 3, Pin 5, Pin 6	-	-

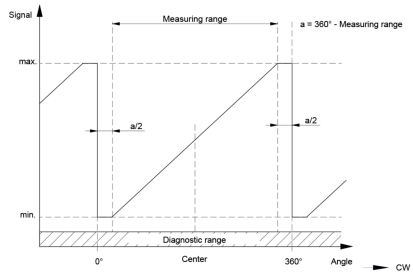




Technical Data
Output Characteristics

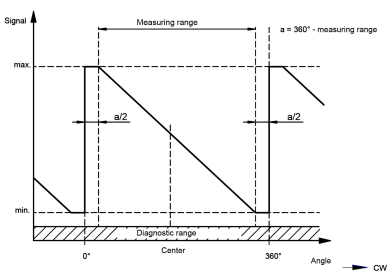
Output characteristic

One-channel, rising cw



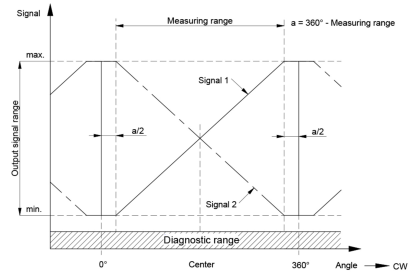
Output characteristic

One-channel rising ccw



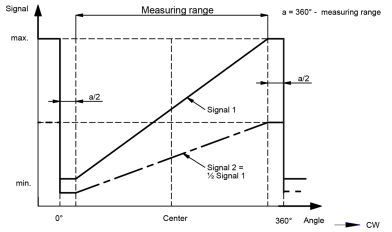
Output characteristic

Crossed output characteristics, ch. 1 rising cw



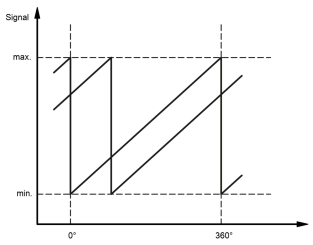
Output characteristic

On request: signal 2 = 0.5 x signal 1



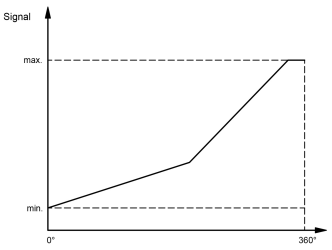
Output characteristic

On request: output characteristics with offset



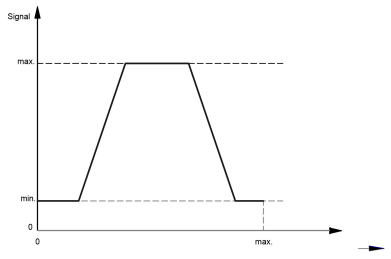
Output characteristic

On request: different gradients



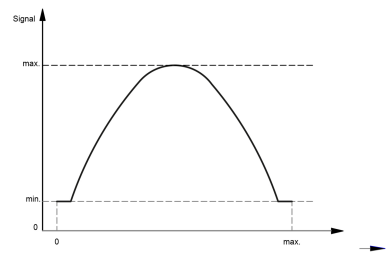
Output characteristic

On request: trapezoid output characteristic

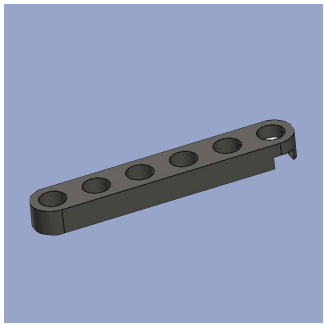


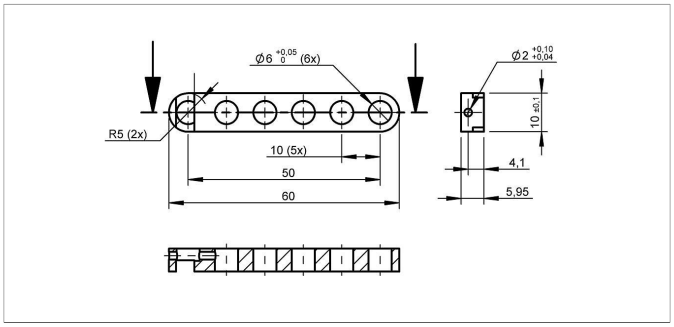
Output characteristic

On request: parabolic output characteristic



Sensor Mounting



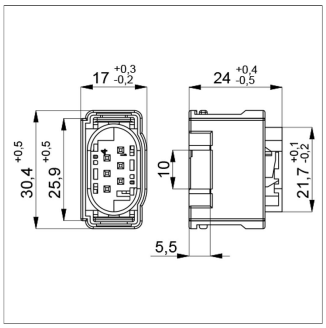


Z-RSA-M01
Lever arm 50 mm for mounting at shaft with locking pin (included in delivery).
Further levers (geometry, materials...) on request.

Material	Aluminium, anodized

P/N	Type
400105062	Z-RSA-M01

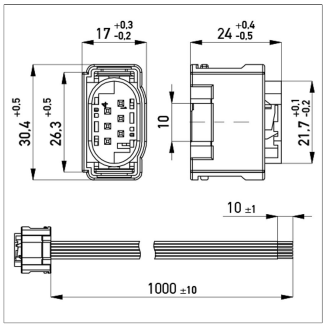
Connector System MQS

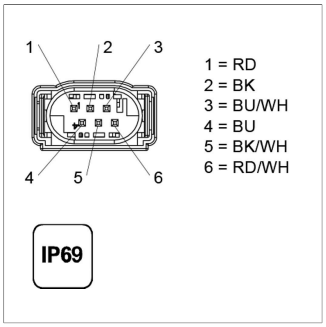


EEM-33-34
Connector kit MQS including
• 1 plug socket (female), PBT GF15, AMP P/N 1-967616-1
• 6 tinned contacts for cable cross-section area 0.25 ... 0.35 mm² (AWG 22), AMP-P/N 963727-1 or 5-962885-1
• 6 single conductor sealings AMP P/N 967067-2

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
400108029	EEM-33-24	1 m

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