

**NOVOHALL  
Rotary Sensor  
non-contacting**

Series RSC2800  
analog



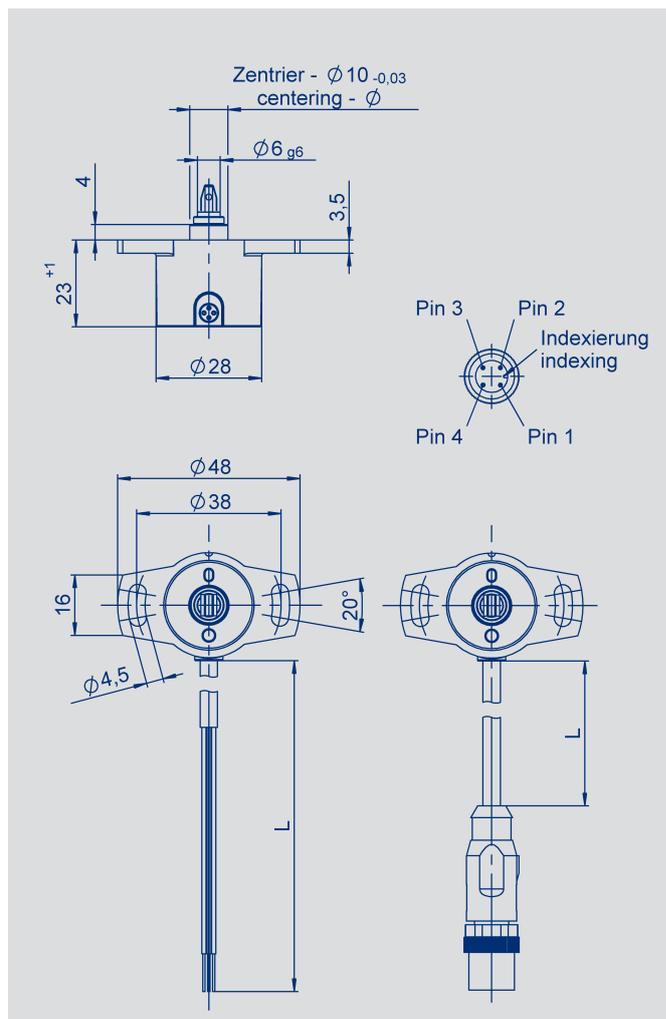
**Special features**

- non-contacting, magnetic technology
- measuring range up to 360°
- available with push-on coupling or marked shaft
- simple mounting
- protection class IP54, IP65, IP67
- long life
- very small hysteresis
- internal resolution 12 bit
- independent linearity  $\pm 0.5\%$
- single output and redundant versions
- digital interface versions - see separate data sheet
- european E1 approved

The RSC 2800 sensor utilizes a contactless magnetic measurement technology to determine the measured angle. Unlike conventional Hall sensors, the orientation of the magnetic field is measured. The output is available as either analog voltage or current.

The housing is made of a special high grade temperature-resistant plastic material. Elongated slots allow simplicity in mounting together with ease of mechanical adjustment.

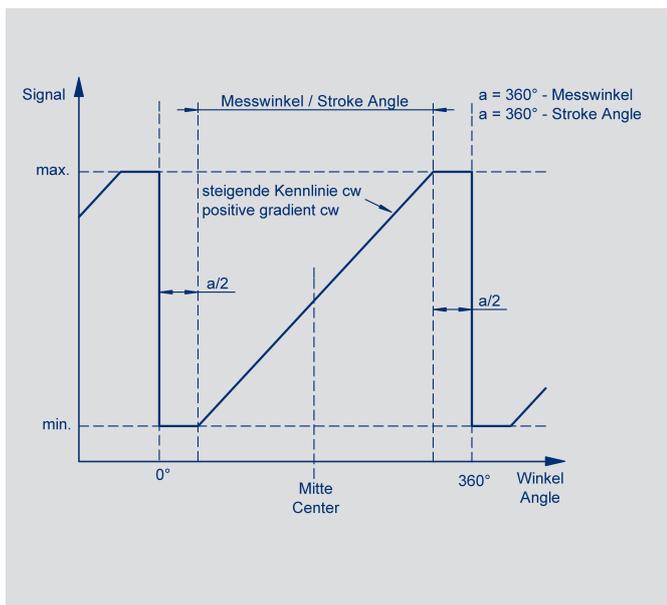
Three shaft options are available, including a push-on coupling option that ensures fast and simple installation. The transducer is not sensitive to either dirt or humidity.



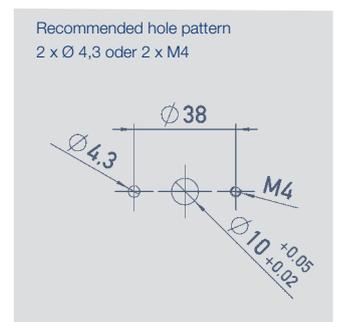
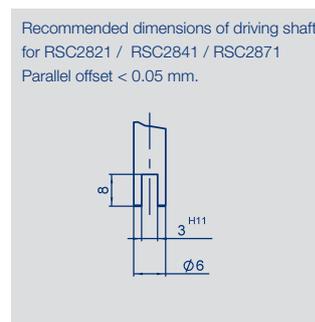
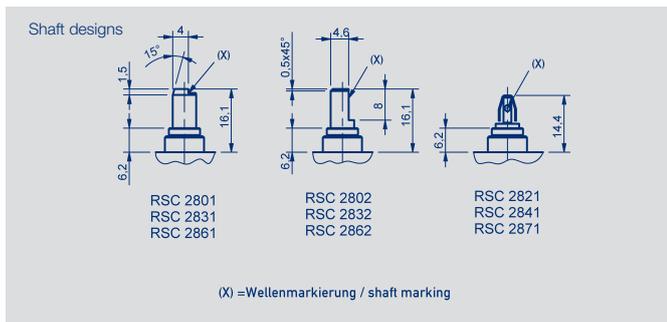
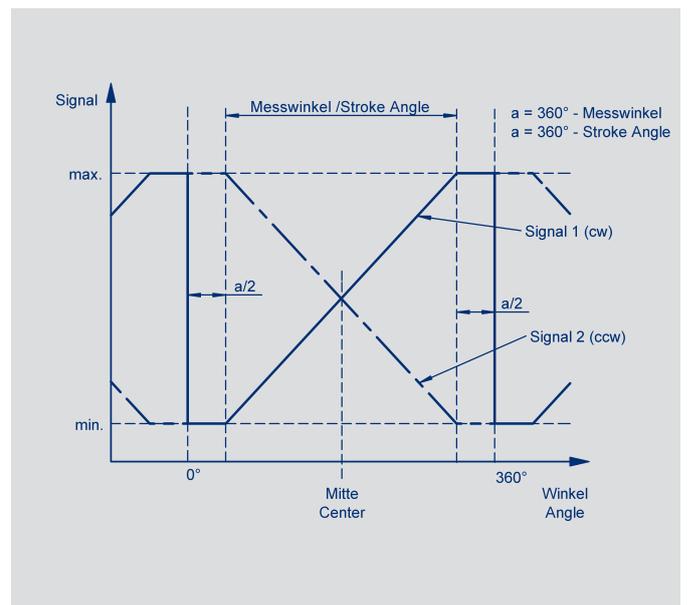
Description	
Housing	High grade, temperature resistant plastic
Shaft	Stainless steel
Bearings	Bronze sleeve bearing
Electrical connections	Cable AWG 26 (0.14 mm <sup>2</sup> ) Cable AWG 20 (0.5 mm <sup>2</sup> ) Connector M12

## Output Characteristics and Pin Assignment

### Output characteristic one-channel versions

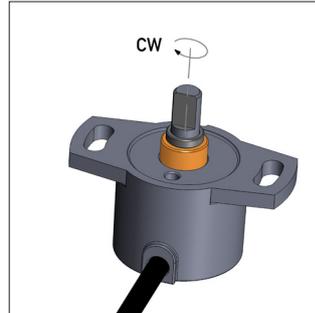


### Output characteristics multi-channel versions



Connection assignment	M12 connector	Cable
GND	pin 3	brown
Supply voltage Ub	pin 1	green
Output 1	pin 2	white
Not assigned / output 2	pin 4	yellow

Cable shielding connect to GND.



When the shaft marking points toward the cable outlet, the sensor is located in the electrical center position.

## Technical Data for Industrial Applications

<b>Technical Data - Versions for Industrial Applications</b>				
Design optimized for use in machine and plant applications. High reliability. Simple interface to PLC. Many options.				
Type designations	RSC - 28 _ _ _ _ - 2 _ _ _ _ ratiometric	RSC - 28 _ _ _ _ - 1 1 _ _ _ _ analog voltage	RSC - 28 _ _ _ _ - 1 2 _ _ _ _ analog current	
<b>Mechanical Data</b>				
Dimensions	see dimension drawing			
Mounting	2 screws M4 and washer			
Starting torque of mounting screws with washer at housing flange	180			Ncm
Mechanical travel	360 continuous			°
Permitted shaft loading (axial and radial) static or dynamic force	20			N
Torque	1.0 (IP67); 0.5 (IP65); 0.15 (IP54)			Ncm
Maximum operational speed	800			min <sup>-1</sup>
Weight	~ 50			g
<b>Electrical Data</b>				
Supply voltage U <sub>b</sub>	5 (4.5 ... 5.5)	24 (18 ... 30)	24 (18 ... 30)	VDC
Current consumption (w/o load)	typical 15 (typ. 8 on request) per channel			mA
Reverse voltage	yes, supply lines			
Short circuit protection	yes (vs. GND and supply)			
Measuring range	0 to 30° up to 0 to 360, in 10° steps			°
Number of channels	1 or 2	1	1	
Update rate	typ. 5			kHz
Resolution	12			bit
Repeatability	0.1			°
Hysteresis	< 0.1			°
Independent linearity	≤ 0.5			± % FS
Output signal	ratiometric to supply voltage 0.25...4.75 VDC 0.5...4.5 VDC (load >1 kΩ)	0.1...10 VDC (load >10 kΩ)	4...20 mA (load < 500 Ω)	
Temperature error at measuring range 30 up to 170°	0.625	0.94	0.94	± % FS
Temperature error at measuring range 180 up to 360°	0.31	0.5	0.5	± % FS
Insulation resistance (500 VDC)	≥ 10			MΩ
Cross-section cable	AWG 26, 0.14 (AWG 20, 0.5)*			mm <sup>2</sup>
<b>Environmental Data</b>				
Temperature range	-40...+85 (-25...+85 with M12 connector)			°C
Vibration (IEC 60068-2-6)	5...2000 Hz A <sub>max</sub> = 0.75 mm a <sub>max</sub> = 20 g			
Shock (IEC 60068-2-27)	50 (6 ms)			g
Life	> 50x10 <sup>6</sup>			movements
MTTF (DIN EN ISO 13849-1 parts count method, w/o load)	356 (single) 210 (per channel) partly redundant 388 (per channel) fully redundant	107	105	years years years
Functional Safety	If you need assistance in using our products in safety-related systems, please contact us			
Protection class (DIN EN 60529)	IP54 / IP65 / IP67			
EMC compatibility	EN 61000-4-2 electrostatic discharges (ESD) 4 kV, 8 kV EN 61000-4-3 electromagnetic fields 10 V/m EN 61000-4-4 electrical fast transients (burst) 1 kV EN 61000-4-6 conducted disturbances, induced by RF fields 10 V eff. EN 61000-4-8 power frequency magnetic fields 3 A/m EN 55011/EN 55022/A1 radiated disturbances class B			

\*) The cross-sections of the lead wires will be increased to 0.5 mm<sup>2</sup>.  
The changeover is carried out depending on model type and starts from Q1-2016.  
For questions, please call your local distributor or our hotline on +49 711 4489 250.

## Ordering Specifications for Industrial Applications

### Ordering specifications

**Preferred types printed in bold:**

- reduced delivery time for up to 25 pieces
- best low-volume pricing

**Supply Ub**

- 1: 24 V (18 ... 30 V)  
2: 5 V (4.5 ... 5.5 V)

**Output signal - Ub = 24 V**

- 1: 0.1 ... 10 V  
2: 4 ... 20 mA

**Output signal - Ub = 5 V**

- 1: 0.25 ... 4.75 V ratiometric to Ub  
2: 0.5 ... 4.5 V ratiometric to Ub

**Output characteristics**

- 1: rising CW  
2: rising CCW  
3: **crossed output channel 1 rising / channel 2 falling CW (only at Ub = 5 V)**  
Other characteristics on request

**Electrical connection**

- 201: round cable 4-pol., 0.5 m shielded  
202: **round cable 4-pol., 1 m shielded**  
206: **round cable 4-pol., 3 m shielded**  
210: round cable 4-pol., 5 m shielded  
220: round cable 4-conductor, 10 m shielded  
501: **connector M12 with round cable, L = 0.15 m, shielded**  
Cable versions and assembled connectors on request

**R S C - 2 8 3 2 - 6 3 6 - 2 1 1 - 2 0 2**

Series

**Mechanical version**

- 2801: 6 mm shaft with marking, IP54  
2831: 6 mm, shaft with marking, IP65  
2861: 6 mm shaft with marking, IP67  
2802: 6 mm shaft with flattening, IP54  
**2832: 6 mm shaft with flattening, IP65**  
2862: 6 mm shaft with flattening, IP67  
2821: push-on coupling, IP54  
**2841: push-on coupling, IP65**  
2871: push-on coupling, IP67  
Other shaft designs on request

**Measuring range**

- Example: 03 = 30° (min.)  
Example: 36 = 360° (max.)  
... **06, 12, 18, 24, 36**  
Other angles on request

**Numbers of channels**

- 6: single output 1 x Ub / 1 x output  
7: **partly redundant 1 x Ub / 2 x output (only at Ub = 5 V)**

### Recommended accessories

MAP process control indicators with display.

## Technical Data for Mobile Applications

### Technical Data - Versions for Mobile Applications

These versions are optimized for the high requirements in mobile applications.

Tested to the highest requirements as ISO-pulse and high interferences to ECE-R10 (E1)

<b>Type designations</b>	<b>RSC - 28 _ _ - _ _ - 2 _ _ - _ _ _</b> <b>ratiometric</b>	
<b>Mechanical Data</b>		
Dimensions	see dimension drawing	
Mounting	2 screws M4 and washer	
Starting torque of mounting screws with washer at housing flange	180	Ncm
Mechanical travel	360 continuous	°
Permitted shaft loading (axial and radial) static or dynamic force	20	N
Torque	1.0 (IP67); 0.5 (IP65); 0.15 (IP54)	Ncm
Maximum operational speed	800	min <sup>-1</sup>
Weight	~ 50	g
<b>Electrical Data</b>		
Supply voltage $U_b$	5 (4.5 ... 5.5)	VDC
Current consumption (w/o load)	typical 15 (typ. 8 on request) per channel	mA
Reverse voltage	yes, supply lines	
Short circuit protection	yes (vs. GND and supply)	
Measuring range	0 to 30° up to 0 to 360, in 10° steps	°
Number of channels	1	
Update rate	typ. 5	kHz
Resolution	12	bit
Repeatability	0.1	°
Hysteresis	< 0.1	°
Independent linearity	≤ 0.5	± % FS
Output signal	ratiometric to $U_b$ 0.25...4.75 VDC 0.5...4.5 VDC (load > 1 kΩ)	
Temperature error at measuring range 30 up to 170°	0.625	± % FS
Temperature error at measuring range 180 up to 360°	0.31	± % FS
Insulation resistance (500 VDC)	≥ 10	MΩ
Cross-section cable	AWG 20, 0.5	mm <sup>2</sup>
<b>Environmental Data</b>		
Temperature range	-40...+85	°C
Vibration (IEC 60068-2-6)	5...2000 A <sub>max</sub> = 0.75 a <sub>max</sub> = 20	Hz mm g
Shock (IEC 60068-2-27)	50 (6 ms)	g
Life	> 50x10 <sup>6</sup>	movements
MTTF (DIN EN ISO 13849-1 parts count method, w/o load)	356	years
Functional Safety	If you need assistance in using our products in safety-related systems, please contact us	
Protection class (DIN EN 60529)	IP54 / IP65 / IP67	
EMC compatibility	Interference emission and immunity to ECE-R10 (E1) (ISO 11452-2, ISO 11452-5, CISPR 25, ISO 7637-2)	

## Ordering Specifications for Mobile Applications

### Ordering specifications

**Preferred types printed in bold:**

- reduced delivery time for up to 25 pieces
- best low-volume pricing

**Supply Ub**

2: Ub = 5 V (4.5 ... 5.5 V)

**Output signal**

1: 0.25 ... 4.75 V ratiometric to Ub (5...95 %)

2: 0.5 ... 4.5 V ratiometric to Ub (10...90 %)

**Output characteristics**

1: rising CW

2: rising CCW

Other characteristics on request

**Electrical connection**

252: round cable 4-pol., 1 m unshielded

256: round cable 4-pol., 3 m unshielded

Cable versions and assembled connectors on request

**R S C - 2 8 3 2 - 6 3 6 - 2 1 1 - 2 5 2**

Series

**Mechanical version**

2801: 6 mm shaft with marking, IP54

2831: 6 mm,shaft with marking, IP65

2861: 6 mm shaft with marking, IP67

2802: 6 mm shaft with flattening, IP54

**2832: 6 mm shaft with flattening, IP65**

2862: 6 mm shaft with flattening, IP67

2821: push-on coupling, IP54

**2841: push-on coupling, IP65**

2871: push-on coupling, IP67

Other shaft designs on request

**Measuring range**

Example: 03 = 30° (min.,)

Example: 36 = 360° (max.)

... **06, 12, 18, 24, 36**

Other angles on request

**Numbers of channels**

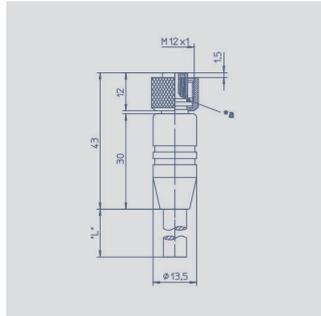
**6: single output 1 x Ub / 1 x output**

**Accessories**  
Connector-System M12

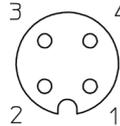
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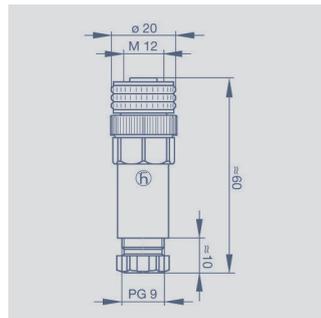


Pin assignment  
1 = brown  
2 = white  
3 = blue  
4 = black

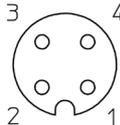


**M12x1 Mating female connector, 4-pin, straight, A-coded, with molded cable, shielded, IP67, open ended**

Connector housing	Plastic PA	
Cable sheath	PUR; Ø = max. 6 mm, -25 °C...+80 °C (moved) -50 °C...+80 °C (fixed)	
Wires	PP, 0.34 mm <sup>2</sup>	
<b>Length</b>	<b>Type</b>	<b>P/N</b>
2 m	EEM 33-32	005600
5 m	EEM 33-62	005609
10 m	EEM 33-97	005650



Pin assignment



**M12x1 Mating female connector, 4-pin, straight, A-coded, with coupling nut, screw termination, IP67, not shielded**

Connector housing	Plastic PBT	
Connector housing	-25 °C...+90 °C	
For wire gauge	6...8 mm, max. 0.75 mm <sup>2</sup>	
Type	EEM 33-88, P/N 005633	