

## NOVOTURN Multiturn Sensor non-contacting

Series RSM2800  
analog



### Special features

- non-contacting, magnetic
- long life
- electr. angle 720° up to 5760° in 360°-steps available (equates 2 ... 16 turns)
- continuous analog output signal across the selected angle range
- True Power On System: detection also in unpowered state, position value is non-volatile
- available with push-on coupling or marked shaft
- easy mounting
- protection class IP54 up to IP67
- 1 or 2 outputs
- resolution 16 bit
- independent linearity up to  $\pm 0,03$  %
- optional digital interfaces see separate data sheet

This sensor unites the ability to measure angles across multiple turns with the compactness and price attractiveness of multiple turn wirewound potentiometers.

By combining a single turn angle detection and a separate turn detection this sensor is able to measure angles across multiple turns providing high resolution and accuracy. Due to the facts that the sensor can detect turns in unpowered state and that the sensor does store turns non volatile, it is a real true power on angle sensor in a very compact size.

The sensor works internally magnetic and hereby contactless and serves a very long life time. By using contactless technology the sensor has a high resistance against mechanical influences like shock, vibration etc.

The measurement range can be selected between 2 and 16 turns to 5760°. The output signal (1 or 2 channels) has a linear behaviour across the selected measurement range. This is how the output span is taken best use of.

The housing is made of a special high grade temperature resistant plastic material. Fixings are in the form of elongated slots which allow simplicity in mounting together with ease of mechanical adjustment.

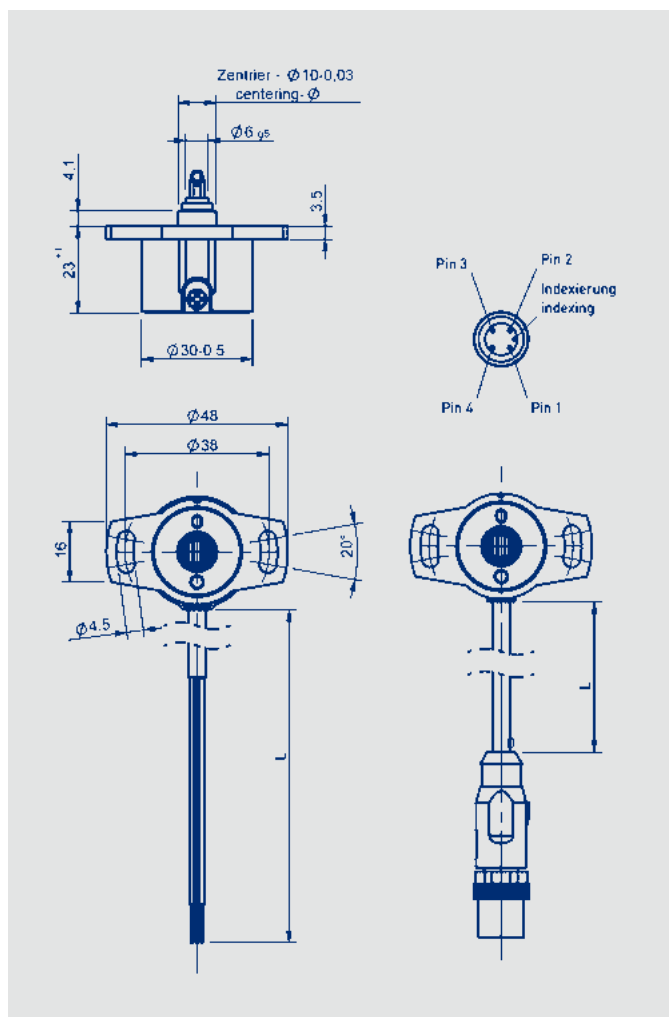
The special backlash-free push-on coupling ensures extremely quick and easy installation. The transducer is not sensitive to either dirt or dampness. Electrical connection is made via a shielded cable which is potted into the housing.

With the RSM2800 for the first time a compact and contactless solution can be provided that makes in many places actual costly solutions like gear drives and so this sensor can help to reduce total cost of systems.

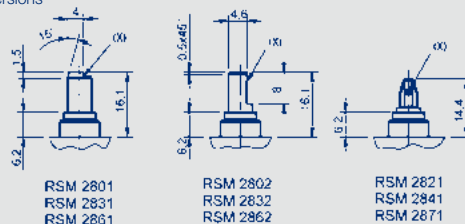
Applications can be found in many areas like printing machines, drive and steering systems, wire length sensors, gate and door drives, in mobile applications such as lifts, in paper industry, in robotics and in common as a replacement for wirewound potentiometers or encoders.

### Description

Housing	high grade, temperature resistant plastic
Shaft	stainless steel
Bearings	bronze sleeve bearing
Electrical connections	shielded cable, 4 x AWG26
	M12 connector with short cable

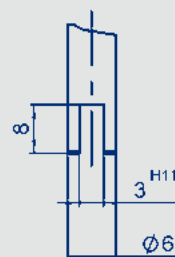


#### Shaft versions

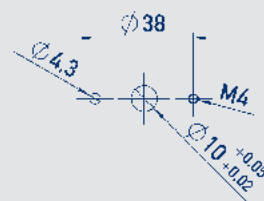


(X) - Wellenmarkierung / shaft marking

Recommended dimensions of driving shaft  
for RSM2821 and RSM2841.  
Parallel offset < 0.05 mm.



Recommended hole pattern  
2 x Ø 4,3 oder 2 x M4



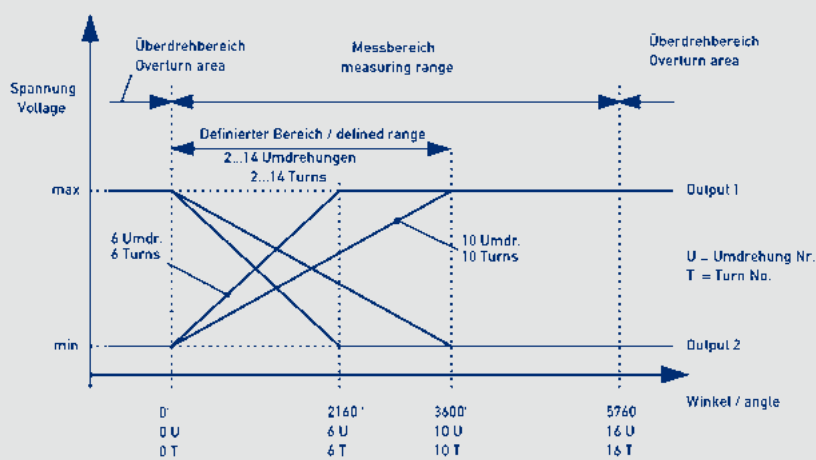
#### Connection assignment

Signal	M12 connector	Cable
Ground	3	brown
Supply voltage	1	green
Signal output 1	2	white
Signal output 2 / not assigned	4	yellow

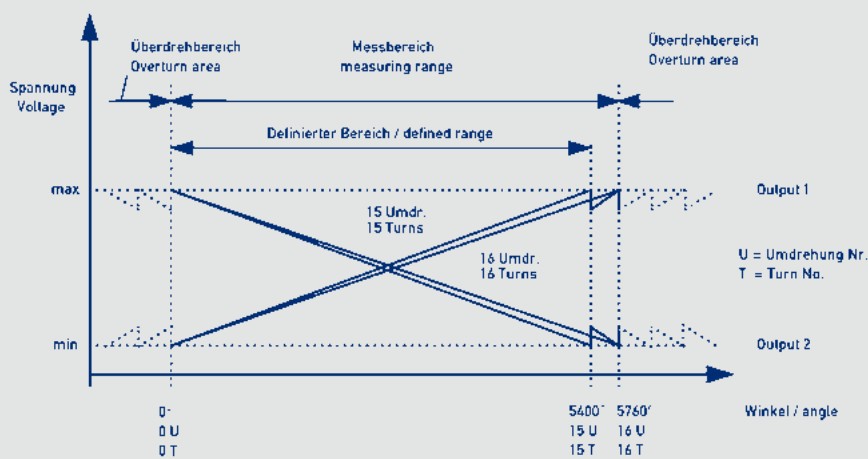
Cable shielding connect to ground.

When the shaft marking  
points to the cable outlet, the  
sensor is in a full turn position.

Output signals measurement range 2...14 turns



Output signals measurement range 15 ... 16 turns



Technical Data	RSM - 28 _ _ _ - _ _ _ - 2 _ _ - _ _ _ ratiometric				RSM - 28 _ _ _ - _ _ _ - 11 _ - _ _ _ Analog voltage				RSM - 28 _ _ _ - _ _ _ - 12 _ - _ _ _ Analog current							
Mechanical Data																
Dimensions	see dimension drawing															
Mounting	2 fillister head screws M4 and washer															
Starting torque of mounting screws with washer at housing flange	180															Ncm
Mechanical travel	360 continuous															°
Permitted shaft load (axial and radial) static or dynamic force	20															N
Torque	0.15 (IP54), 0.5 (IP65), 1.0 (IP67)															Ncm
Permitted operational speed	800															min-1
Weight	ca. 50															g
Electrical Data																
Supply voltage Ub	5 ±0,5				24 ±6				24 ±6				VDC			
Number of channels	1 / 2				1 / 2				1							
Output signal	ratiometric load ≥ 10 kΩ				0,1...10 V load ≥ 10 kΩ				4...20 mA, load ≤ 500 Ω							
Load supply current	30 typical															mA
Reverse voltage	yes															
Short circuit protection	yes (signal to Ub and ground)															
Measuring range	0 ... 720°, 0...5760 (360° steps)															°
Resolution	16															bit
Repeatability	±0.1															%
Hysteresis	< 0.1															%
Independent linearity	0.25...0.031 (s. table below)															%
Start-up time	typ. 10															ms
Response time	max. 2															ms
Temperature error of output signal	±0,15				±0,31				±0,625				% FS			
Insulation resistance (500 VDC)	≥ 10															M½
Wire diameter	ca. 0.14 mm2 (AWG 26)															mm2
Environmental Data																
Temperature range	-40...+85															°C
Insensibility against magnetic DC fields	< 15															mT
Vibration (IEC 680002-6)	5...2000 Hz Amax = 0.75 mm amax = 20 g															
Shock (IEC 68000-2-27)	50 (6 ms)															g
Life	> 50 x 106 (mechanical)															movements
MTTF (DIN EN 13849-1 parts count method, w/o load)	175 single				184 single				186				years			
	175 (per output, with 2 outputs)				184 (per output, with 2 outputs)								years			
Functional Safety	When using our produkts in safety-related systems, please contact us															
Protection class (nach DIN EN 60529)	IP54 / IP65 / IP67															
EMC compatibility	EN 61000-4-2 electrostatic discharges (ESD) 4kV, 8kV EN 61000-4-3 electromagnetic fields 10V/m EN 61000-4-4 electrical fast transient / burst 1kV EN 61000-4-6 conducted disturbances, induced by RF fields 10V/m eff. EN 61000-4-8 power frequency magnetic fields 3A/m EN 55011/EN 55022/A1 radiated disturbances class B															
Linearities																
Measuring range	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	turns
Linearity typ.	0,250	0,167	0,125	0,100	0,083	0,071	0,063	0,056	0,050	0,045	0,042	0,039	0,036	0,033	0,031	%
Linearity max.	0,350	0,267	0,225	0,200	0,183	0,171	0,163	0,156	0,150	0,145	0,142	0,138	0,136	0,133	0,131	%



## Ordering specifications

### Preferred types printed in bold:

- delivery time up to 25 pcs. within 10 working days
- no low volume surcharge

### Supply Voltage $U_b$

- 1:  $U_b = 24\text{ V}$  (18.0 ... 30 V)  
2:  $U_b = 5\text{ V}$  (4.5 ... 5.5 V)

### Output signal $U_b = 24\text{ V}$ (1 \_ \_)

- 1: 0 ... 10 V  
2: 4...20 mA

### Output signal $U_b = 5\text{ V}$ (2 \_ \_)

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

### Output configuration

- 1: rising curve CW  
2: rising curve CCW  
3: 2 crossed outputs, Ch1 rising CW, Ch2 rising CCW  
(only  $U_b = 5\text{ V}$  (2 \_ \_ ) and output 0...10 V (11\_ )  
other characteristics on request

### Electrical connection

- 201: Round cable 4-pol., shielded, L = 0.5 m  
202: Round cable 4-pol., shielded, L = 1 m  
206: Round cable 4-pol., shielded, L = 3 m  
210: Round cable 4-pol., shielded, L = 5 m  
220: Round cable 4-pol., shielded, L = 10 m  
501: M12 x 1 connector shielded, straight; L = 150 mm  
other cable lengths and assembled connectors on request

R S M - 2 8 3 2 - 0 1 0 - 1 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 versions on request

### Number of turns output characteristics

- from 002 = 2 turns to 016 = 16 turns, increment 1 turn  
**003, 006, 010, 016**  
other angles on request

X turns correspond to an electrical angle of  $X \cdot 360^\circ$

\* not recommended for new designs

## Recommended accessories

Process-controlled indicators  
MAP300/400/4000 with  
display.