

NOVOTURN

Multiturn Sensor

non-contacting

Series RSM2800

analog



Special features

- True Power On System: counts turns even when not powered. Patented non-volatile technology does not require gears or batteries
- non-contacting, magnetic
- long life
- 2 to 16 turn range (720 to 5760°)
- continuous analog output signal across the selected angle range
- resolution 16 bit
- independent linearity up to  $\pm 0.03\%$
- protection class IP54, IP65 or IP67
- 1 or 2 outputs
- available with push-on coupling or marked shaft
- easy mounting
- see separate data sheet for digital interfaces

The RSM 2800 combines multiple-turn angle measurement, compact size, and attractive price.

The patented NOVOTURN technology measures angles across multiple turns, providing high resolution and accuracy. This technology detects the turn count even while not powered. When powered up, the RSM2800 immediately reports the actual angular position, even if the input shaft was rotated while power was off.

The sensor utilizes contactless magnetic technology, providing a very long operational life time. It has excellent capabilities against mechanical shock and vibration.

The customer-selected measurement range is factory-programmed from a range of 2 turns to 16 turns.

The outputs (1 or 2) are linear across the measurement range.

The housing is made of a special high grade temperature resistant plastic material. The sensor is mounted with slots in the housing, which also provides for mechanical adjustment.

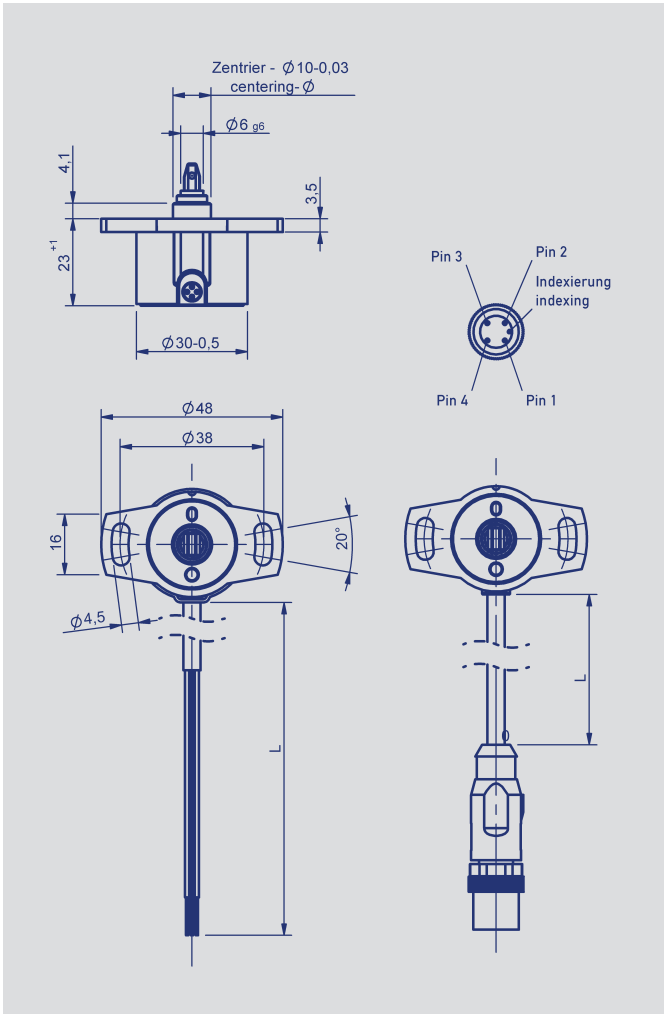
Three shaft types are offered, including D-shaped and Novotechnik's easy-to-mount „push-on“ coupling.

The sensor is insensitive to dirt and moisture (IP-rating dependent). A shielded cable of 0.5 m to 10 meters length is available.

The RSM2800 provides a cost-effective alternative to conventional multi-turn encoders.

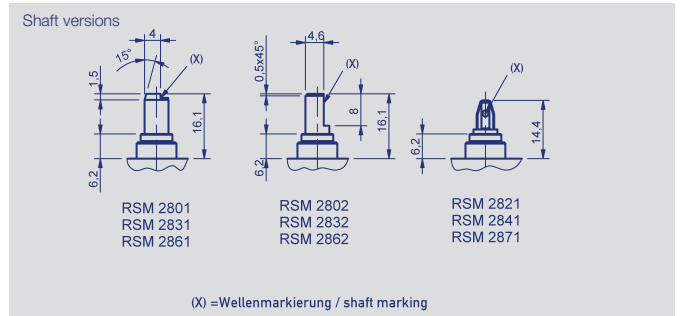
Applications for the RSM2800 exist in printing machines, drive and steering systems, wire length sensors, gate and door drives, fork-lifts, robotics, and many other areas.

Description	
Housing	high grade, temperature resistant plastic
Shaft	stainless steel
Bearings	bronze sleeve bearing
Electrical connections	shielded cable, 4 x AWG 26
	M12 connector with short cable

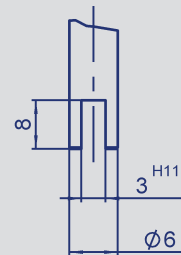


Connection assignment		
Signal	M12 connector	Cable
Ground	3	brown
Supply voltage	1	green
Signal output 1	2	white
Signal output 2 / not assigned	4	yellow

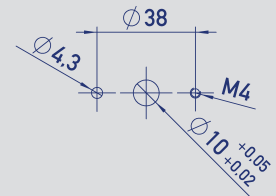
Cable shielding connect to ground.



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

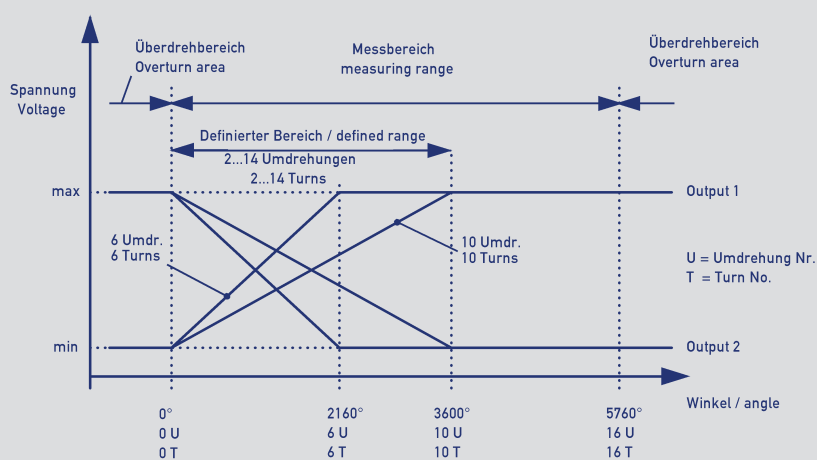


Recommended hole pattern  
2 x Ø 4,3 oder 2 x M4

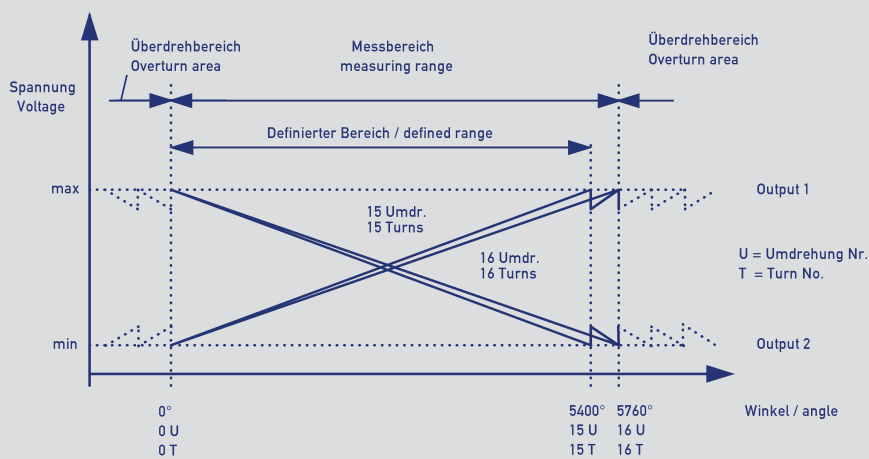


When the shaft marking points toward the cable outlet, the sensor is in a full turn position.

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															RPM
Weight	~ 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															MΩms
Wire diameter	~ 0.14 mm² (AWG 26)															mm²
Environmental Data																
Temperature range	-40...+85															°C
Insensibility against magnetic DC fields	< 15															mT
Vibration (IEC 68000-2-6)	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 produkcts in safety-related systems, please contact us															
Protection class (to 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:
- reduced delivery time for up to 25 pieces
  - best low-volume pricing

Supply Voltage Ub  
1: Ub = 24 V (18.0 ... 30 V)  
2: Ub = 5 V (4.5 ... 5.5 V)

Output signal Ub = 24 V (1 \_ \_)  
1: 0 ... 10 V  
2: 4...20 mA

Output signal Ub = 5 V (2 \_ \_)  
1: 0.25 ... 4.75 V ratiometric to Ub  
2: 0.5 ... 4.5 V ratiometric to Ub

Output configuration  
1: rising curve CW  
2: rising curve CCW  
3: 2 crossed outputs, Ch1 rising CW, Ch2 rising CCW  
(only Ub = 5 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, in increments of 1 turn  
**003, 006, 010, 016**  
other angles on request

X turns correspond to an electrical angle of X • 360°  
\* not recommended for new designs

Recommended accessories  
MAP 300/400/4000 process-control indicators with display.