

**NOVOTURN  
Multi-turn Sensor  
Non-contacting**

**RSM-2800**

SPI

**Industrial**



**Special Features**

- Non-contacting, magnetic
- Long life
- Measuring range 5040° or 5760° (14 or 16 turns)
- True-Power-On system: counts turns even when not powered. Patented non-volatile technology does not require gears or batteries
- Available with push-on coupling or marked shaft
- Easy mounting
- Protection class IP54 up to IP67
- Resolution up to 18 bits
- Linearity up to  $\pm 0,03\%$
- Other configurations see separate data sheets

**Applications**

- Mechanical engineering
- Mobile machinery
- Driveline or steering systems
- Wire-actuated encoders
- Gate drives
- Motor sports

Multi-turn sensors that use the GMR technology (giant magneto resistance), provide absolute position values, do not require any reference signals and need no power supply or buffer battery for detecting the revolutions. The fact that rotations are detected even unpowered and the sensor does not lose its position information during a power failure, makes the RSM-2800 with its diameter of only 28 mm an extremely compact real True-Power-On rotary sensor.

The sensor operates magnetically and thus contactless allowing an extremely long life.

The sensor is able to detect angular positions over up to 16 revolutions with a high resolution up to 18 bits.

**Description**

Material	Housing: high grade, temperature resistant plastic PPS-GF40/SF50 Shaft: stainless steel, X8CrNiS18-9 1.4305
Mounting	With 2 screws M4 and washers
Fastening torque of mounting	max. 180 Ncm
Bearing	Sintered bronze bushing
Electrical connection	Cable 5x 0.14 mm <sup>2</sup> (AWG 26), PUR, shielded

**Mechanical Data**

Dimensions	See dimension drawing
Mechanical travel	continuous
Permitted shaft load static or dynamic	20 N (axial / radial)
Torque	0.15 Ncm (IP54), 0.5 Ncm (IP65), 1.0 Ncm (IP67)
Weight	approx. 50 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: 5 VDC**

**Interface parameters**

**81: SPI 16 bits, Binary code, rising output characteristic cw**

82: SPI 16 bits, Binary code, rising output characteristic ccw

**Electrical connection**

**302: Cable, 5-pole, shielded, L = 1 m**

Cable versions and assembled connectors on request

**R S M - 2 8 3 2 - 2 1 4 - 2 8 1 - 3 0 2**

Series

**Mechanical version**

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 configurations on request

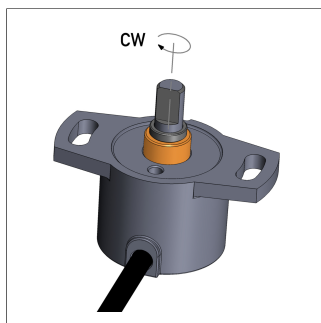
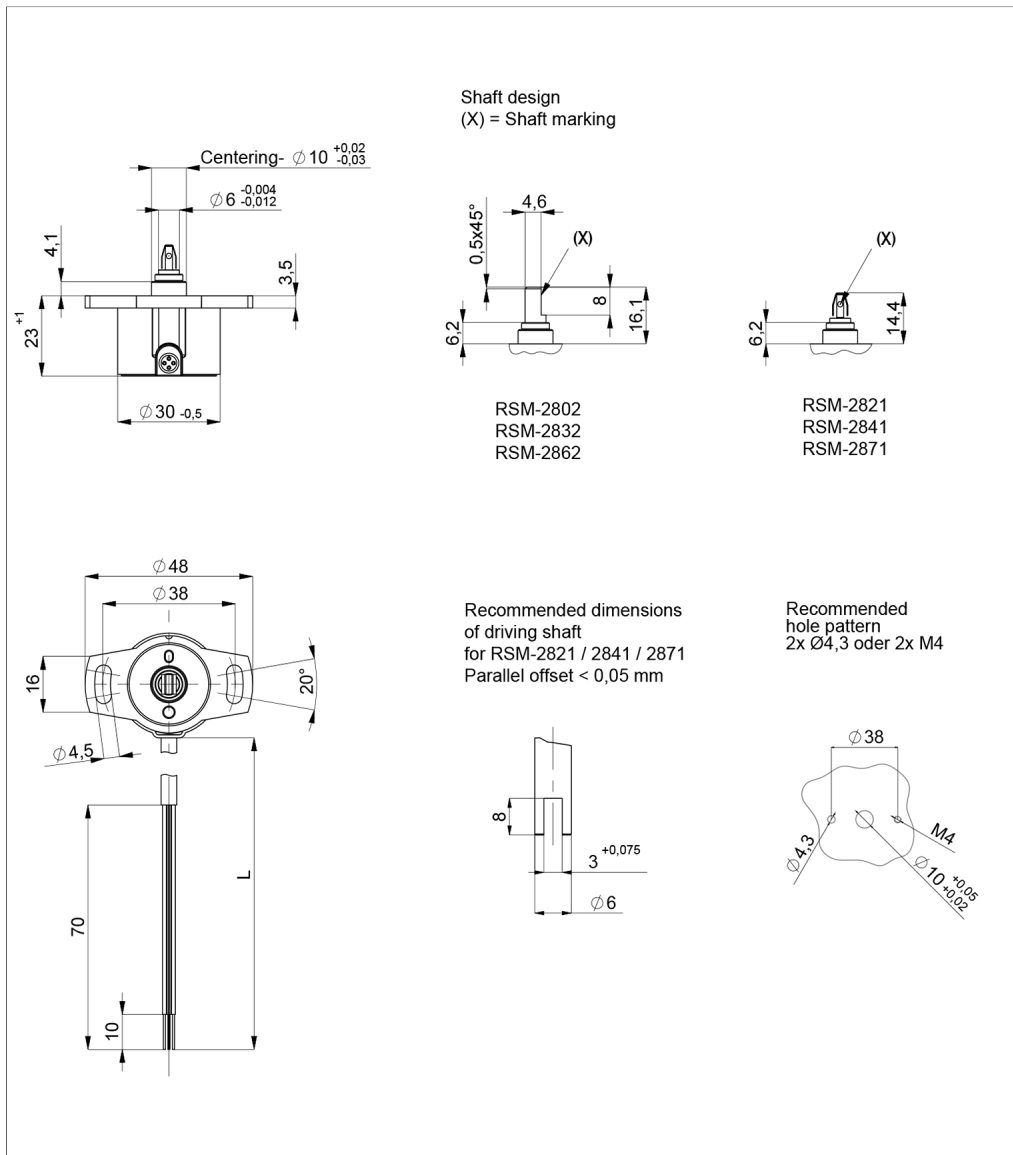
**Number of turns for output characteristic**

**214: 14 turns = 5040°, measuring range controlled**

216: 16 turns = 5760°, measuring range not controlled

**Drawing**

CAD data see  
[www.novotechnik.de/en/download/cad-data/](http://www.novotechnik.de/en/download/cad-data/)



When the marking of the shaft is pointing towards the electrical outlet, the sensor output is located on an integer turn position.

## Technical Data

Type	RSM-28 _-2_ -28 _- _-
Protocol	SPI
Coding	Binary
Level	TTL level (see manual Multiturn SPI Detail)
Update rate (internal)	1 kHz
Resolution	16 bits over the entire measuring range
Measuring range	14 turns = 5040°, measuring range controlled 16 turns = 5760°, measuring range not controlled
Absolute linearity	14 turns: $\leq \pm 0,036$ %FS 16 turns: $\leq \pm 0,031$ %FS
Repeatability	$\leq \pm 0,5^\circ$
Hysteresis	$\leq \pm 1^\circ$
Temperature error	$\pm 0,1$ %FS
Supply voltage $U_b$	5 VDC (4.5 ... 5.5 VDC)
Current consumption w/o load	typ. 25 mA
Polarity protection	yes (supply lines and outputs)
Short circuit protection	yes (vs. GND and supply voltage $U_b$ )
Max. clock rate	100 kHz
Insulation resistance (500 VDC)	$\geq 10$ M $\Omega$
<b>Environmental Data</b>	
Max. operational speed	800 rpm
Vibration IEC 60068-2-6	20 g, 5 ... 2000 Hz, $A_{max} = 0.75$ mm
Shock IEC 60068-2-27	50 g, 6 ms
Protection class DIN EN 60529	IP54 / IP65 / IP67
Operating temperature	-40 ... +85°C
Insensitivity to magnetic DC fields	< 15 mT
Life	> 50 Mio. movements (mechanically)
MTTF (IEC 60050)	193 years
<b>EMC Compatibility</b>	
EN 61000-4-2 ESD (contact/air discharge)	4 kV, 8 kV
EN 61000-4-3 Electromagnetic fields (RFI)	10 V/m
EN 61000-4-4 Fast transients (burst)	1 kV
EN 61000-4-6 Cond. disturbances (HF fields)	10 V eff.
EN 61000-4-8 Magnetic fields	30 A/m
EN 55016-2-3 Radiated disturbances	Industrial and residential area

### Important:

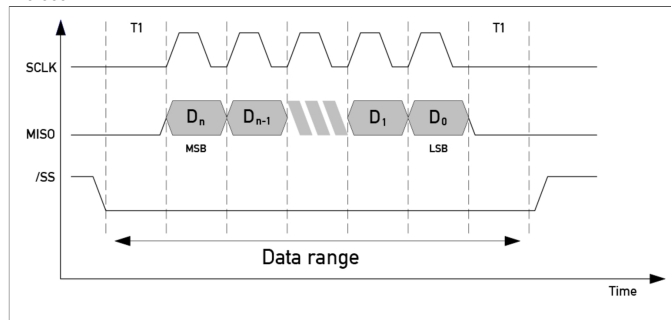
While operation, care should be taken not to rotate the sensor shaft below 0° or above 5760°. Refer to users manual.  
FS = Full scale: Signal span according to electrical measuring range

### Connection Assignment

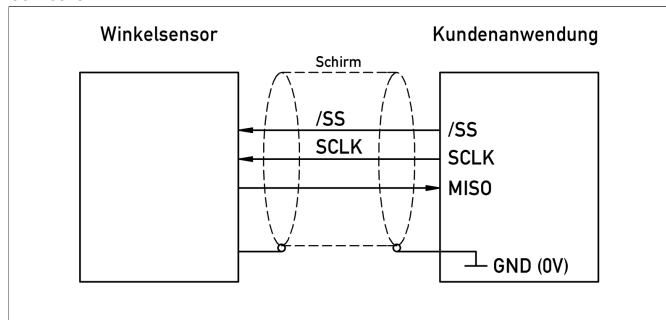
Signal	Cable code 3_ _
Supply voltage $U_b$	GN
GND	BN
MISO	YE
SCLK	GY
/SS (slave select)	WH
	Connect cable shielding to GND

**Technical Data**  
**Output**  
**Characteristics**

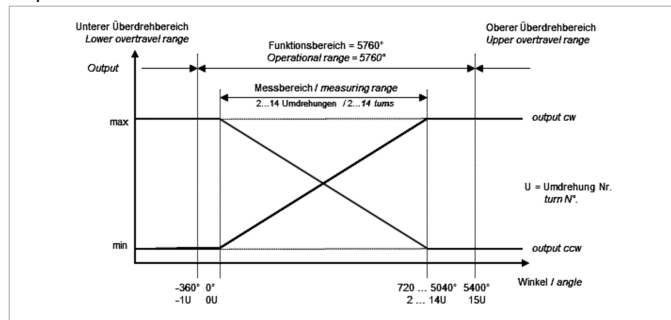
Protocol



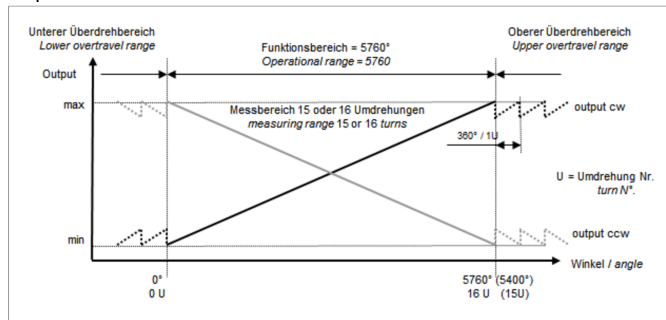
Connection



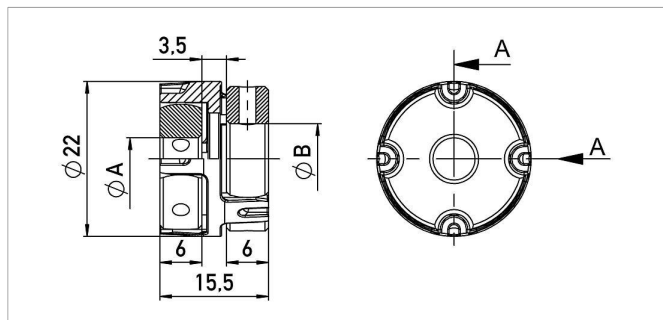
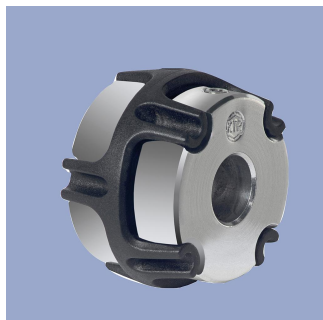
Output characteristic



Output characteristic



## Sensor Mounting



### Z-106-G\_

Backlash-free, double cardanic shaft coupling for  $\varnothing 6$  mm to  $\varnothing 6$  mm,  $\varnothing 6.35$  mm or  $\varnothing 10$  mm, mounting via 2 threaded pins with internal hexagon

Material Aluminium, PEEK

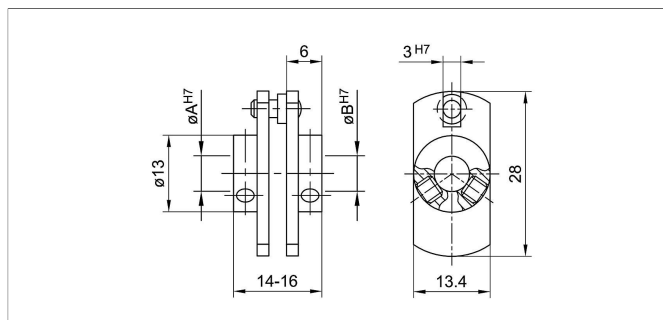
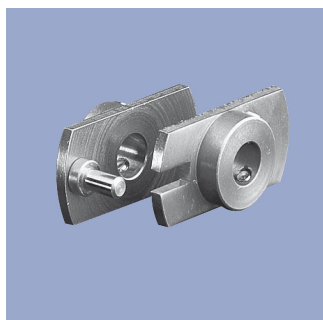
Operating temp.  $-40 \dots +160^\circ\text{C}$

Transferable  $\leq 1$  Nm

torque

Displacement rad.  $\leq 0.1$  mm, angl.  $\leq 0.45^\circ$

P/N	Type	$\varnothing A / \varnothing B$ [mm]
400103910	Z-106-G-6	6 / 6
400103912	Z-106-G-6,35	6 / 6.35
400103913	Z-106-G-10	6 / 10



### Z-104-G-6

Fork coupling with low backlash for  $\varnothing 6$  mm.

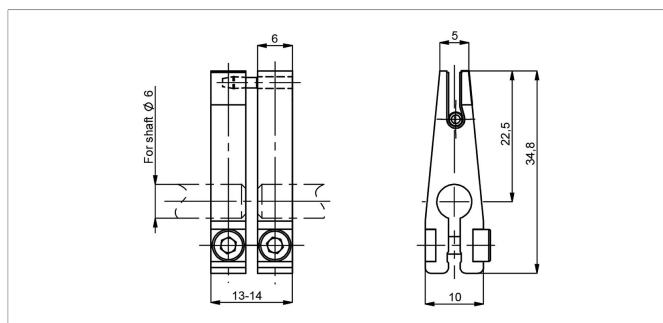
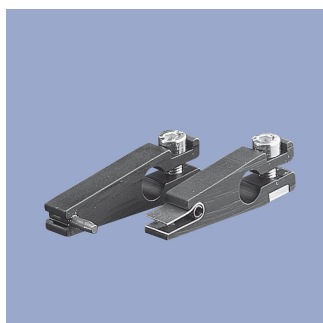
Mounting with 2 cylinder head screws M3 with internal hexagon.

Angle screwdriver DIN 911 AF 1.5 included in delivery.

Material Stainless Steel, driving pin polished

Displacement  $\leq 1$  mm

P/N	Type	$\varnothing A / \varnothing B$ [mm]
400005690	Z-104-G-6	6 / 6



### Z-105-G-6

Backlash-free fork coupling for  $\varnothing 6$  mm. Mounting with 1 cylinder head screw M3 with internal hexagon.

Angle screwdriver DIN 911 AF 2.5 included in delivery.

Material Aluminium, anodized (black)  
Driving pin and spring hardened

Transferable  $\leq 5$  Ncm

torque

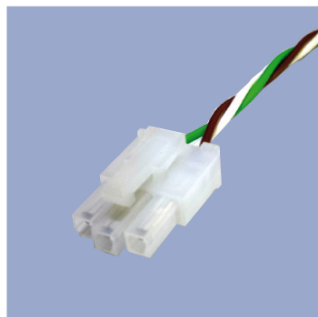
Displacement  $\leq 1$  mm

P/N	Type
400005691	Z-105-G-6

## Connecting Options on request



- M12 connector**
- Customized lengths
  - 3-, 4-, 6- and 8-pole versions
  - Protection class IP68
  - Ordering codes of standard versions see ordering specifications



- Molex Mini Fit jr.**
- Customized length and lead wires
  - 3-, 4- and 6-pole versions
  - On request



- Tyco AMP Super Seal**
- Pin- and bushing housing
  - Customized lengths
  - 3-, 4- and 6-pole versions
  - Protection class IP67
  - On request



- Molex Mini Fit jr.**
- Customized length and lead wires
  - 3-, 4- and 6-pole versions
  - On request



- Deutsch DTM 04**
- Pin- and bushing housing
  - Customized lengths
  - 3-, 4- and 6-pole versions
  - Protection class IP67
  - On request



- ITT Cannon Sure Seal connector**
- Customized lengths
  - 3-, 4- and 6-pole versions
  - Protection class IP67
  - On request

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