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 ±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: SS X9CrNiS18-9 1.4305 / AISI 303
Mounting
With 2 screws M4 and washers
Fastening torque of mounting
max. 190 Ncm
Bearing
Sintered bronze bushing
Electrical connection
Cable 5x 0.14 mm² (AWG 26), PUR, shielded

Mechanical Data
Dimensions
See dimension drawing
Mechanical travel
Continuous
Permitted shaft load
20 N (axial / radial)
Torque
0.15 Nm (IP54), 0.5 Nm (IP65), 1.0 Nm (IP67)
Weight
approx. 50 g
Ordering Specifications

Preferred types printed in bold
- Delivery time up to 25 pcs. within 10 working days EXW
- Best low-volume pricing

Supply voltage $U_b$
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

<table>
<thead>
<tr>
<th>R</th>
<th>S</th>
<th>M</th>
<th>2</th>
<th>8</th>
<th>3</th>
<th>2</th>
<th>2</th>
<th>1</th>
<th>4</th>
<th>2</th>
<th>8</th>
<th>1</th>
<th>3</th>
<th>0</th>
<th>2</th>
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</thead>
</table>

Number of turns for output characteristic
214: 14 turns = 5040$, measuring range controlled
216: 16 turns = 5760$, measuring range not controlled

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
When the marking of the shaft is pointing towards the electrical outlet, the sensor output is located on an integer turn position.
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: ≤ ±0.036 %FS
| 16 turns: ≤ ±0.031 %FS
Repeatability | ≤ ±0.5°
Hysteresis | ≤ ±1°
Temperature error | ≤ ±0.1 %FS
Supply voltage Ub | 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)
Max. clock rate | 100 kHz
Insulation resistance (500 VDC) | ≥ 10 MΩ

Environmental Data
Max. operational speed | 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 DIN EN 60529 | IP54 / IP65 / IP67
Operating temperature | -40 ... +85°C
Absolute insensitivity to magnetic DC fields | ≤ 15 mT
Life | > 50 Mio. movements (mechanically)
MTTF (IEC 60050) | 193 years

EMC Compatibility
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 Conducted disturbances (RF 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 install guide. FS = Full scale: Signal span according to electrical measuring range.

Connection Assignment

<table>
<thead>
<tr>
<th>Signal</th>
<th>Cable code 3_ _</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply voltage Ub</td>
<td>GN</td>
</tr>
<tr>
<td>SDO</td>
<td>EN</td>
</tr>
<tr>
<td>MISO</td>
<td>YE</td>
</tr>
<tr>
<td>SCLK</td>
<td>GY</td>
</tr>
<tr>
<td>SS (slave select)</td>
<td>WH</td>
</tr>
</tbody>
</table>
Connect cable shielding to GND
Z-106-G-
Backlash-free, double cardanic shaft coupling for Ø6 mm to Ø6 mm, Ø6.35 mm or Ø10 mm, mounting via 2 threaded pins with internal hexagon.

- Material: Aluminium, PEEK
- Operating temp.: -40 ... +160°C
- Transferable torque: ≤ 1 Nm
- Displacement: rad. ≤ 0.1 mm, angl. ≤ 0.45°

<table>
<thead>
<tr>
<th>P/N</th>
<th>Type</th>
<th>ØA / ØB [mm]</th>
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</thead>
<tbody>
<tr>
<td>400103910</td>
<td>Z-106-G-6</td>
<td>6 / 6</td>
</tr>
<tr>
<td>400103912</td>
<td>Z-106-G-6,35</td>
<td>6 / 6,35</td>
</tr>
<tr>
<td>400103913</td>
<td>Z-106-G-10</td>
<td>6 / 10</td>
</tr>
</tbody>
</table>

Z-104-G-6
Fork coupling with low backlash for Ø6 mm. Mounting with 2 cylinder head screws M3 with internal hexagon.

- Material: SS, ground driving pin
- Displacement: ≤ 1 mm

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<tr>
<td>400005690</td>
<td>Z-104-G-6</td>
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</table>

Z-105-G-6
Backlash-free fork coupling for Ø6 mm. Mounting with 1 cylinder head screw M3 with internal hexagon.

- Material: Aluminium, anodized (black), driving pin and spring hardened
- Transferable torque: ≤ 5 Ncm
- Displacement: ≤ 1 mm

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Connecting Options on request

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

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

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

- MoLEX Mini Fit jr.
  - Customized length and lead wires
  - 3-, 4- and 6-pole versions
  - On request
The specifications contained in our datasheets are intended solely for informational purposes. The documented specification values are based on ideal operational and environmental conditions and can vary significantly depending on the actual customer application. Using our products at or close to one or more of the specified performance ranges can lead to limitations regarding other performance parameters. It is therefore necessary that the end user verifies relevant performance parameters in the intended application. We reserve the right to change product specifications without notice.