

NOVOHALL
Rotary Sensor
non-contacting

Series RSC2800
digital
SSI, SPI, Incremental



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.

Special features

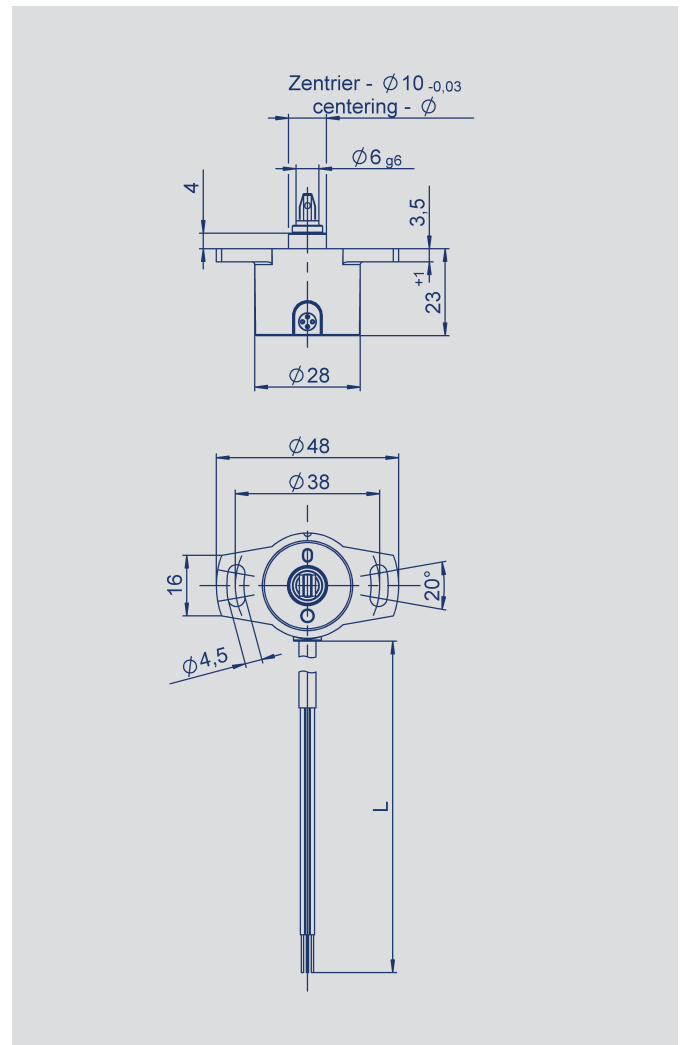
- Non-contacting, magnetic
- Measuring range 360°
- SSI, SPI and Incremental output
- Available with push-on coupling or marked shaft
- Simple mounting
- Protection class IP54, IP65, IP67
- Long life
- Very small hysteresis
- Resolution 9 - 14 bit
- Linearity $\leq \pm 0.5\%$
- Analog interface versions - see separate data sheet

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.

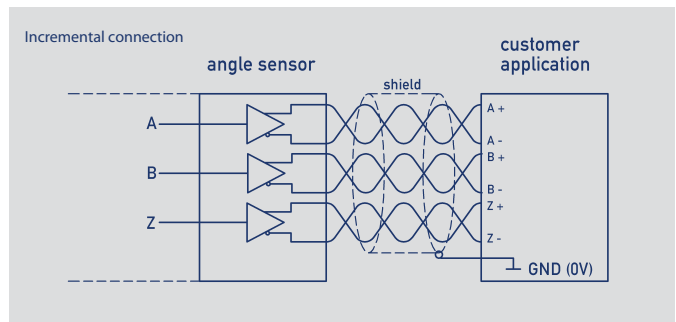
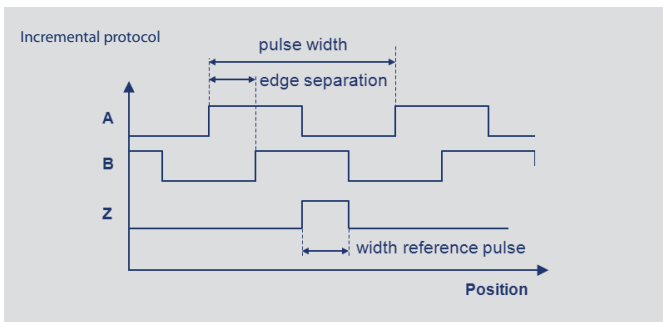
Three shaft options are available, including a push-on coupling option that ensures fast and simple installation. The transducer is not sensitive to either dirt or humidity.

Electrical connection is made via a shielded cable which is sealed into the housing. An M12 connector is available as an option.

Description	
Housing	high grade, temperature resistant plastic
Shaft	stainless steel
Bearings	bronze sleeve bearing
Electrical connections	shielded cable, AWG 24 (0.25 mm ²) SSI, INC shielded cable, AWG 26 (0.14 mm ²) SPI

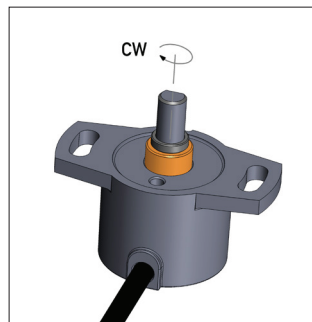


Incremental Interface



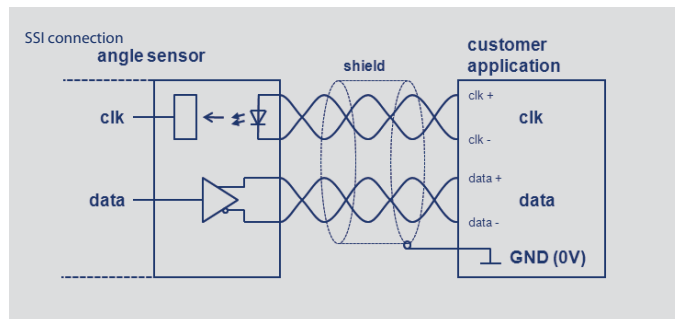
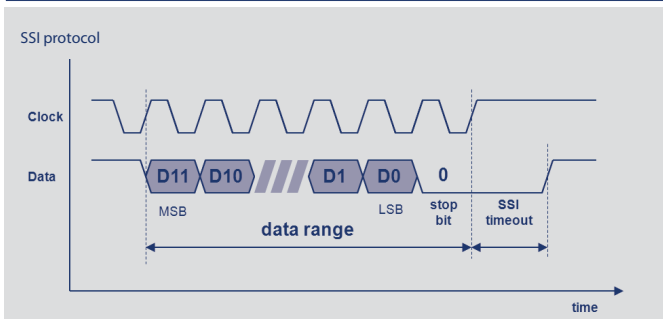
Connections Incremental

Signal	Wire colour
Supply voltage U_b	White
GND	Brown
A+	Yellow
A-	Green
B+	Pink
B-	Grey
Z+	Blue
Z-	Red



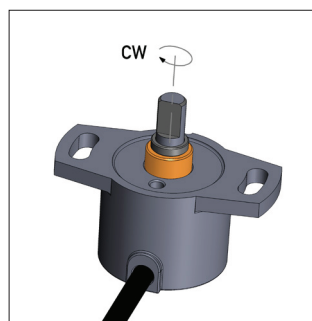
When the shaft marking is pointing away from the cable outlet, the sensor is located at the reference pulse (Z).

SSI Interface



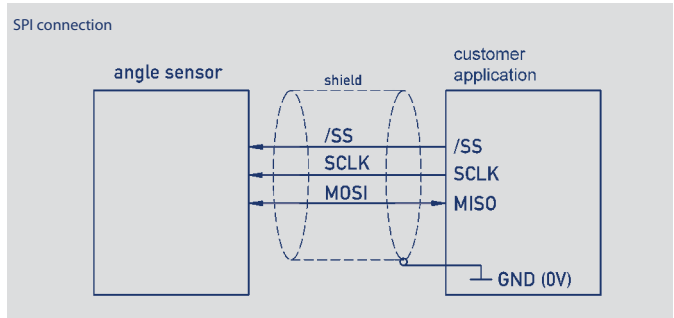
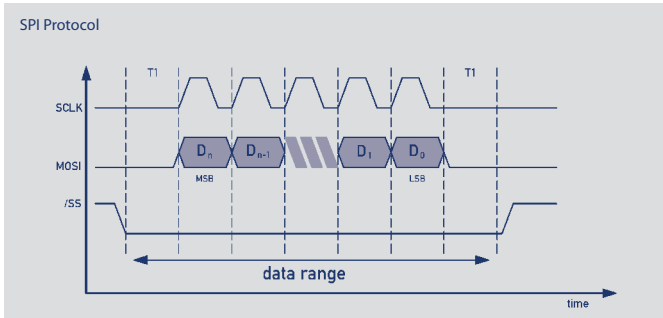
Connections SSI

Signal	Wire colour
Supply voltage U_b	White
GND	Brown
Signal output SSI Data+	Pink
Signal output SSI Data-	Grey
Clock input SSI Clk+	Yellow
Clock input SSI Clk-	Green
Not assigned	Blue
Not assigned	Red



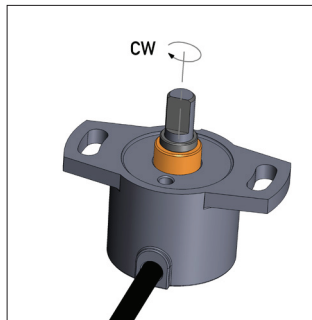
When the shaft marking points towards the cable outlet, the sensor is located in the electrical center position.

SPI Interface



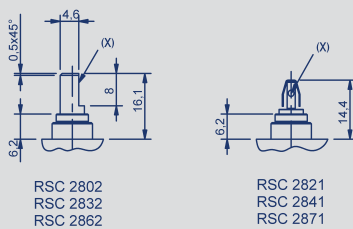
Connections SPI

Signal	Wire colour
Supply voltage U_b	Green
GND	Brown
MOSI / MISO	Yellow
SCLK	Grey
/SS (slave select)	White



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

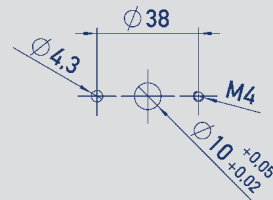
Shaft designs



(X) = Wellenmarkierung / shaft marking

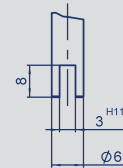
Recommended hole pattern

2 x $\varnothing 4.3$ or 2 x M4



Recommended dimensions of driving shaft

for RSC2821 / RSC2841 / RSC2871
Parallel offset < 0.05 mm



Technical Data - SSI Interface

Type	RSC - 28 _ _ - 2 _ _ - 4 _ _ - _ _ _ _ Supply voltage 5 VDC	
Mechanical Data		
Dimensions	see dimension drawing	
Mounting	with 2 screws M4 and washer	
Starting torque of mounting screws 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	RPM
Weight	~ 50	g
Electrical Data		
Supply voltage Ub	5 (4.5 ... 5.5)	VDC
Current consumption (w/o load)	typ. 27	mA
Reverse voltage	yes, supply lines	
Short circuit protection	yes (vs. GND and supply)	
Measuring range	360	°
Max. Clock rate	1	MHz
Inputs	RS422 compatible, CLK lines electrically isolated via optocouplers	
Protocol	SSI 13 bit (12 bit data + 1 stop bit)	
Ohmic load at outputs	≥ 120	Ω
Encoding	Gray code	
Update rate (internal)	2000	kHz
Monoflop time (tm)	16	μs
Resolution across 360°	12	bit
Repeatability	0.1	°
Hysteresis	Standard 0.7	°
Independent linearity	typ. 0.5	± % FS
Temperature error	±0.375	% FS
Insulation resistance (500 VDC)	≥ 10	MΩ
Cross-section cable	AWG 24, 0.25	mm ²
Environmental Data		
Temperature range	-40...+85	°C
Vibration IEC 60068-2-6	5...2000 Amax = 0.75 amax = 20	Hz mm g
Shock IEC 60068-2-27	50 (6 ms)	g
Life	> 50x10 ⁶	movements
MTTF (DIN EN ISO 13849-1 parts count method, w/o load)	148	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) 4kV, 8kV EN 61000-4-3 electromagnetic fields 10V/m EN 61000-4-4 electrical fast transients (Burst) 1kV EN 61000-4-6 conducted disturbances, induced by RF fields 10 V/m eff. EN 55011/EN 55022/a1 Radiated disturbances class B	

Technical Data - Incremental Interface

Type	RSC - 28 ___ - 2 ___ - 5 ___ - ___ Supply voltage 5 VDC	
Mechanical Data		
Dimensions		
Mounting	with 2 screws M4 and washer	
Starting torque of mounting screws at housing flange	180	Ncm
Mechanical travel	360 continuous	°
Permitted shaft loading (axial and radial) static or dynamic force	20 see dimension drawing	N
Torque	1.0 (IP67); 0.5 (IP65); 0.15 (IP54)	Ncm
Maximum operational speed	800	RPM
Weight	approx 50	g
Electrical Data		
Supply voltage U_b	5 (4.5 ... 5.5)	VDC
Current consumption (w/o load)	typ. 20	mA
Reverse voltage	yes, supply lines and outputs	
Short circuit protection	yes (vs. GND and U_b)	
Measuring range	360	°
Outputs	A+ / A- B+ / B- Z+ / Z-	
Level	RS-422, TTL compatible	
Length Z-pulse	= distance between 2 edges A / B	
Ohmic load at outputs	≥ 120 per channel A / B / Z	Ω
Resolution across 360° (with 4 times interpolation)	12 (11 / 10 / 9)	bit
Repeatability	0.1	°
Hysteresis	Standard 0.7	°
Independent linearity	typ. 0.5	± % FS
Temperature error	±0.375	% FS
Insulation resistance (500 VDC)	≥ 10	MΩ
Cross-section cable	AWG 24, 0.25	mm ²
Environmental Data		
Temperature range	-40...+85	°C
Vibration IEC 60068-2-6	5...2000 Amax = 0.75 amax = 20	Hz mm g
Shock IEC 60068-2-27	50 (6 ms)	g
Life	> 50x10 ⁶	movements
MTTF (DIN EN ISO 13849-1 parts count method, w/o load)	246	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) 4kV, 8kV EN 61000-4-3 electromagnetic fields 10V/m EN 61000-4-4 electrical fast transients (Burst) 1kV EN 61000-4-6 conducted disturbances, induced by RF fields 10 V/m eff. EN 61000-4-8 Power frequency magnetic fields 3A/m EN 55011/EN 55022/a1 Radiated disturbances class B	

Technical Data - SPI Interface

Type	RSC - 28 ___ - 214 - 8 ___ - ___ Supply voltage 5 VDC	
Mechanical Data		
Dimensions	see dimension drawing	
Mounting	with 2 screws M4 and washer	
Starting torque of mounting screws 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	RPM
Weight	approx. 50	g
Electrical Data		
Supply voltage U_b	5 (4.5 ... 5.5)	VDC
Current consumption (w/o load)	typical 15	mA
Reverse voltage	yes, supply lines	
Short circuit protection	yes (vs. GND and U_b)	
Measuring range	360	°
Max. Clock rate	400	kHz
Level SCLK,MOSI,SS	TTL level (see application note SPI protocol)	
Protocol	SPI	
Update rate (internal)	5	kHz
Resolution	14	bit
Repeatability	0.1	°
Hysteresis	< 0.1	°
Independent linearity	≤ 0.5	± % FS
Temperature error	±0.625	% FS
Insulation resistance (500 VDC)	≥ 10	MΩ
Cross-section cable	AWG 26, 0.14	mm ²
Environmental Data		
Temperature range	-40...+85	°C
Vibration IEC 60068-2-6	5...2000 Amax = 0.75 amax = 20	Hz mm g
Shock IEC 60068-2-27	50 (6 ms)	g
Life	> 50x10 ⁶	movements
MTTF (DIN EN ISO 13849-1 parts count method, w/o load)	316	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) 4kV, 8kV EN 61000-4-3 electromagnetic fields: 10V/m EN 61000-4-4 electrical fast transients (Burst) 1kV EN 61000-4-6 conducted disturbances, induced by RF fields 10 V/m eff. EN 61000-4-8 Power frequency magnetic fields 3A/m EN 55011/EN 55022/a1 Radiated disturbances class B	

Ordering specifications

Preferred types printed in bold:

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

Interface

- 4: Synchronous-Serial Interface (SSI)
- 5: Incremental Interface A / B / Z
- 8: SPI Interface

Interface parameter for SSI Interface (4 _ _)

- 11: 5 V (4.5 ... 5.5 V) supply, output RS422 comp., Gray code, rising cw
- 12: 5 V (4.5 ... 5.5 V) supply, output RS422 comp., Gray code, rising ccw

Interface parameter for Incremental Interface (5 _ _)

- 15: 5 V (4.5 ... 5.5 V) supply, output RS422 comp., rising cw
- On request: high side and low side outputs
- UVW signals instead of ABZ signals for motor commutation
- Absolute position at Power On (Power on burst)

Interface parameter for SPI Interface (8 _ _)

- 31: 5 V (4.5 V ... 5.5 V) supply, Binary code, rising cw

Electrical connection

- 302: Round cable 5-pol. 1 m (0.14mm ²; shielded) SPI
- 432: Round cable 8-pol. 1 m (0.25 mm ²; shielded) SSI INC
- Cable versions and assembled connectors on request.

R S C - **2 8 3 2** - **2 1 2** - **4 1 1** - **4 3 2**

Series

Resolution (SSI interface)

- 12: 12 bit - 4096 steps
- other resolutions on request

Resolution (Incremental interface)

- 12: 1024 ppr - 4096 increments resolution (at 4-fold interpolation)
- 11: 512 ppr - 2048 increments resolution (at 4-fold interpolation)
- 10: 256 ppr - 1024 increments resolution (at 4-fold interpolation)
- 09: 128 ppr - 512 increments resolution (at 4-fold interpolation)
- other resolutions on request

Resolution (SPI interface)

- 14: SPI 14 bit

Model

- 2: digital interface

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