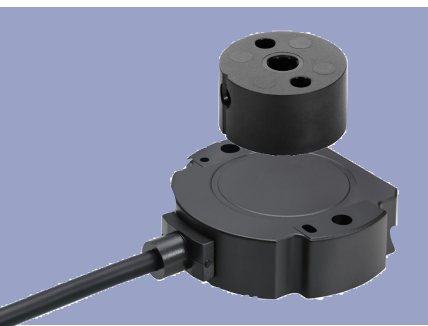
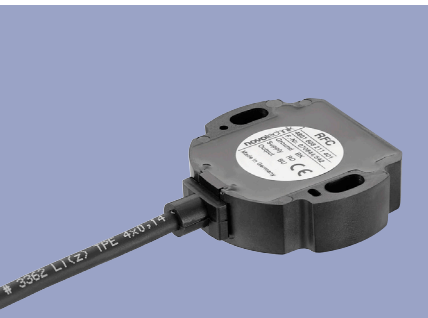


NOVOHALL
Rotary Sensor
touchless technology
transmissive

Series RFC4800
digital
SSI, SPI, Incremental



The RFC 4800 utilizes a separate magnet or magnetic position marker, attached to the rotating shaft to be measured.

The orientation of the magnetic field is measured and the output is one of three types of digital signals.

The two-part design, with the RFC sensor itself, and its magnetic position marker, offers great flexibility when mounting. The absence of shaft and bearing makes the assembly much less sensitive to axial and radial application tolerances. Measurements can be made transmissively through any non-ferromagnetic material.

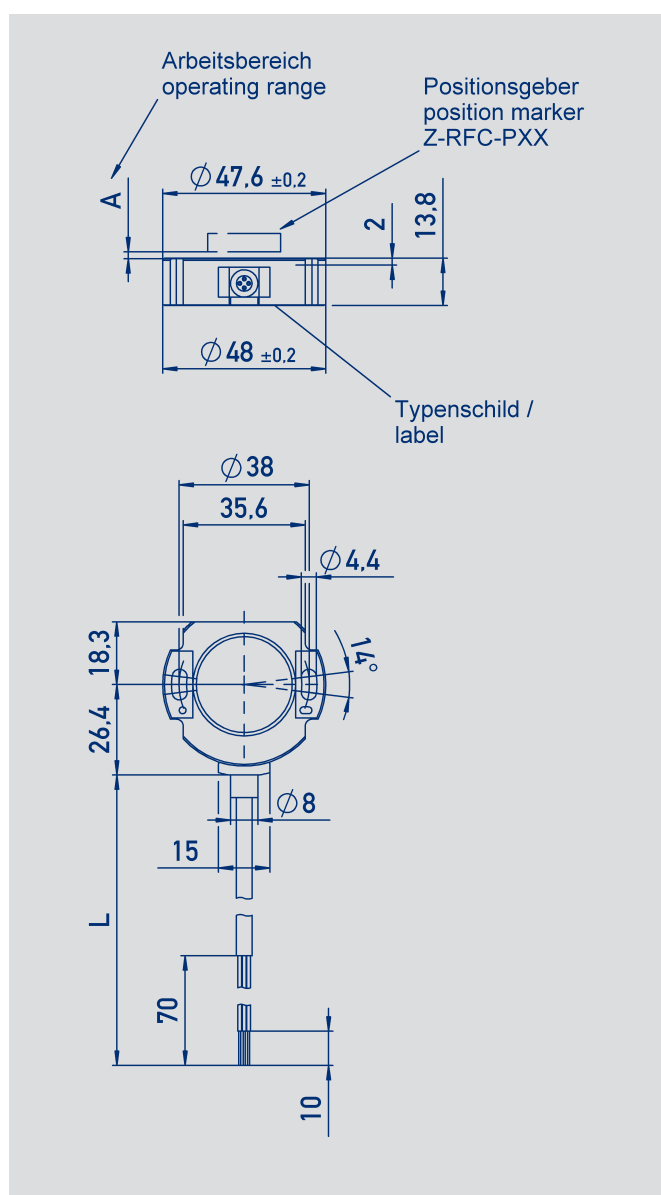
Special features

- fully touchless - no shaft or seals to wear
- measure directly through any non-ferromagnetic material
- unlimited mechanical lifetime
- SSI, SPI or incremental output
- electrical range up to 360°
- linearity $\pm 0.5\%$
- simple mounting
- large allowable radial offset for magnetic pickup
- protection class IP67/IP69k
- resolution 9 - 14 bit
- wide temperature range -40° C up to +85° C
- for analog interface versions - see separate data sheet

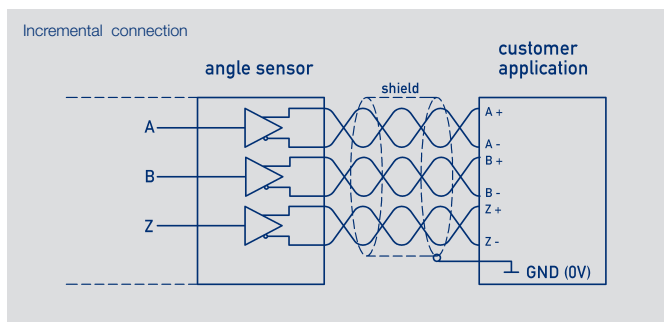
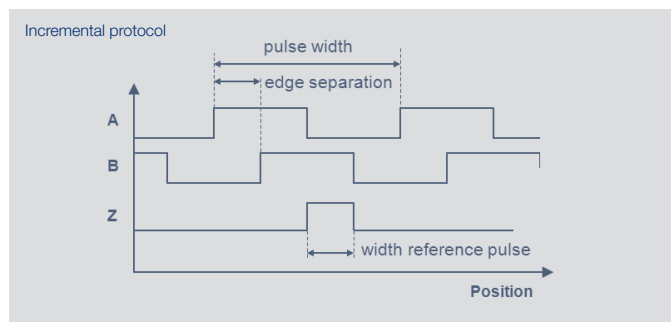
The housing is made of high grade temperature-resistant plastic material. Elongated holes allow for simple mounting and easy mechanical adjustment. The sensor is totally sealed and is not sensitive to dust, dirt or moisture.

Electrical connection is made via an integrated shielded cable.

Description	
Housing	high grade, temperature resistant plastic
Electrical connections	shielded cable AWG 24 (0.25 mm ²) SSI, INC shielded cable AWG 26 (0.14 mm ²) SPI

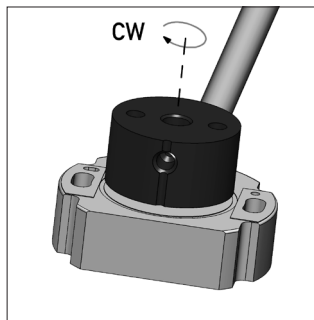


Incremental Interface



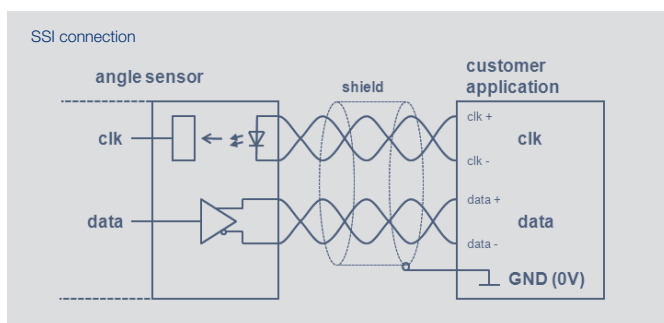
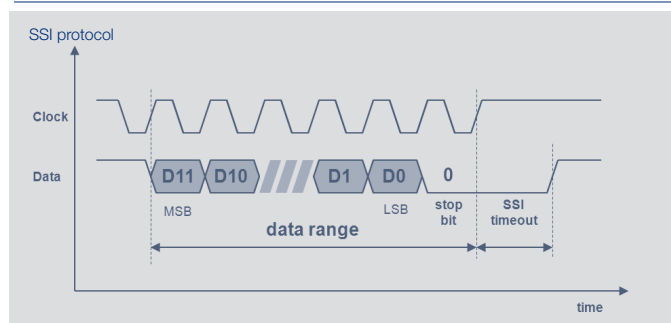
Connections Incremental

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



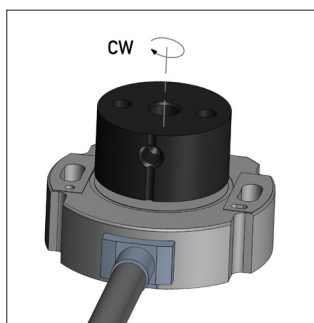
When the indicator of the position marker is pointing away from the cable, the output is in the vicinity of the reference pulse (Z).

SSI Interface



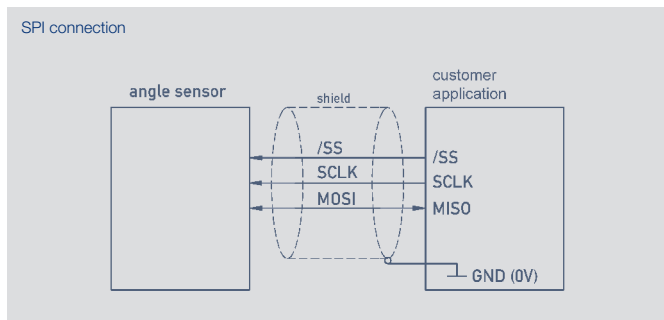
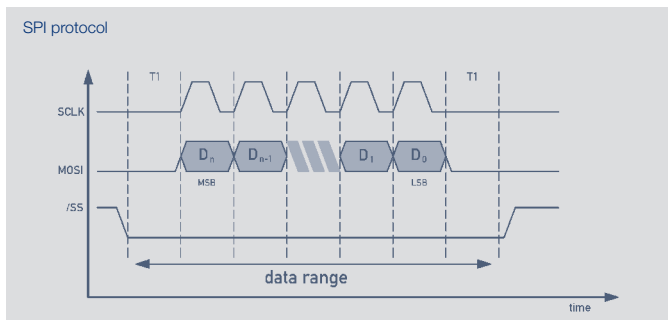
Connections SSI

Signal	Wire colour
Supply voltage Ub	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



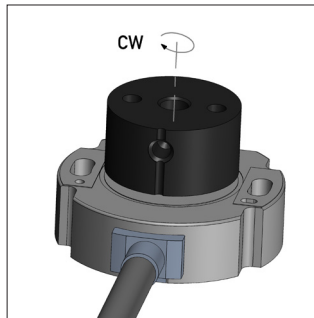
When the indicator of the position marker is pointing towards the cable, the sensor output is near the electrical center position.

SPI Interface



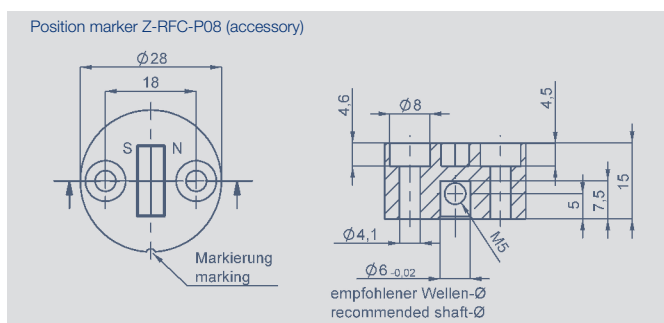
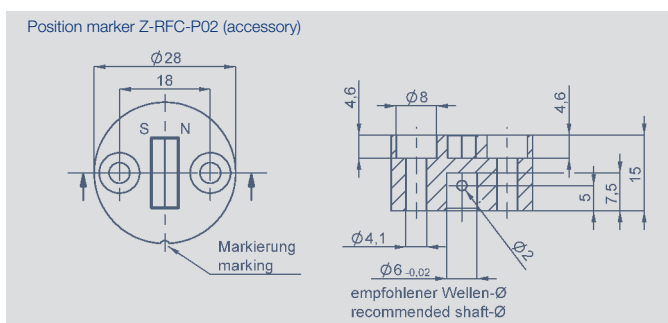
Connections SPI

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



When the indicator of the position marker is pointing towards the cable, the sensor output is near the electrical center position.

Position marker (examples)



Operating range position marker SSI / INC

Z-RFC-P02 / ...P04 / ...P08 / ...P23	0 ... 1.4 mm
--------------------------------------	--------------

Operating range position marker SPI

Z-RFC-P02 / ...P04 / ...P08 / ...P23	0 ... 4 mm
--------------------------------------	------------

For position marker options and data, see separate data sheet „Positionmarker_rotary“
Novotechnik-approved magnets are used to achieve specified performance.

Technical Data - SSI Interface

RFC-48__-2__-4__-__-__		
Supply voltage 5 VDC		
Mechanical Data		
Dimensions	see dimension drawing	
Mounting	with 2 screws M4 (enclosed in delivery), max.torque 250 Ncm	
Mechanical travel	360 continuous	°
Maximum operational speed	30000, higher speed on request	RPM
Weight	approx. 50	g
Electrical Data		
Supply voltage U_b	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 U_b)	
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 (t_m)	16	μs
Resolution across 360°	12	Bit
Repeatability	0.1	°
Hysteresis	standard 0.7	
Independent linearity	typ. 0.5	\pm % FS
Temperature error	± 0.375	% FS
Insulation resistance (500 VDC)	≥ 10	M Ω
Cross-section cable	AWG 24, 0.25	
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	100 (6 ms)	g
Life	mechanically unlimited	
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 40050 / IEC 529)	IP67 / IP6k9k	
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 10V/m eff. EN 55011/EN 55022/a1 Radiated disturbances class B	

Technical Data - Incremental Interface

RFC-48__-2__-5__-__-__	
Supply voltage 5 VDC	
Mechanical Data	
Dimensions	see dimension drawing
Mounting	with 2 screws M4 (enclosed in delivery), max. torque 250 Ncm
Mechanical travel	360 continuous °
Maximum operational speed	30000, higher speed on request 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
Update rate (internal)	2000 kHz
Resolution across 360°	12 (11 / 10 / 9) Bit
Repeatability	0.1 °
Hysteresis	standard 0.7 °
Independent linearität	typ. 0.5 \pm % FS
Temperature error	± 0.375 % FS
Insulation resistance (500 VDC)	≥ 10 M Ω
Cross-section cable	AWG 24, 0,25 mm ²
Environmental Data	
Temperature range	-40...+85 °C
Vibration IEC 60068-2-6	5...2000 Hz Amax = 0.75 mm amax = 20 g
Shock IEC 60068-2-27	100 (6 ms) g
Life	mechanically unlimited
MTTF (DIN EN IO 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 40050 / IEC 529)	IP67 / IP6k9k
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 10V/m eff. EN 55011/EN 55022/A1 Radiated disturbances class B

Technical Data - SPI Interface

RFC-48__-2__-8__-__-__		
Supply voltage 5 VDC		
Mechanical Data		
Dimensions	see dimension drawing	
Mounting	with 2 screws M4 (enclosed in delivery), max. torque 2 Ncm	
Mechanical travel	360 continuous	°
Weight	approx. 50	g
Electrical Data		
Supply voltage U_b	5 (4.5 ... 5.5)	VDC
Current consumption (w/o load)	typ. 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 across 360°	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	Hz
	Amax = 0.75	mm
	amax = 20	g
Shock IEC 60068-2-27	100 (6 ms)	g
Life	mechanically unlimited	
MTTF (DIN EN ISO 13849-1 parts count method, w/o load)	272	years
Functional safety	If you need assistance in using our products in safety-related systems, please contact us.	
Protection class (DIN 40050 / IEC 529)	IP67 / IP6k9k	
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 10V/m eff. EN 61000-4-8 Power frequency magnetic fields 3A/m EN 55011/EN 55022/A1 Radiated disturbances class B	

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- reduced delivery time for up to 25 pcs
- 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), output RS422 comp., Gray code, rising cw**
- 12: 5 V (4.5 ... 5.5 V), output RS422 komp., Gray code, rising ccw**

Interface parameter for Incremental Interface (5 _ _)

- 10: 5 V (4.5 ... 5.5 V), output RS422 comp., rising cw**
On request: High Side and Low Side outputs
UWV 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 ... 5.5 V), Binary code, rising cw**

Electrical connection

- 302: round cable 5-pol. 1 m (0,14mm²; shielded) SPI**
- 432: round cable 8-pol. 1 m (0,25 mm², shielded), SSI, Inc.**
Cable versions and assembled connectors on request.

R F C - 4 8 0 1 - 2 1 2 - 4 1 1 - 4 3 2

Series

Mechanical version

- 4801: elongated hole for fixation and easy adjustment**
- 4802: round hole mounting on request

Resolution (SSI Interface)

- 12: 12 bit - 4096 increments**
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)
- 9: 128 ppr - 512 increments resolution (at 4-fold interpolation)
- Other resolutions on request.

Resolution (SPI Interface)

- 14: SPI 14 bit**

Model

- 2: Digital Interface**

Necessary accessories

Position marker Z-RFC-P02,
P/N 005661.

(Information on further position markers, working distances and lateral magnet offset see separate data sheet Positionmarker_Rotary)