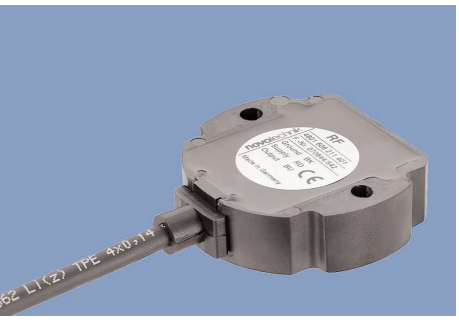
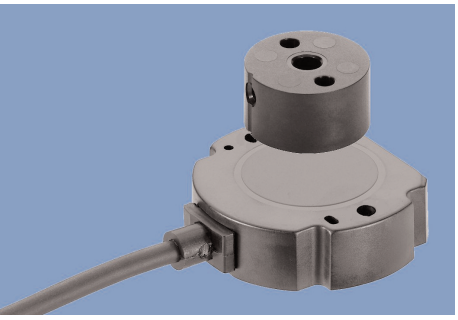
novotechnik
Siedle Gruppe

NOVOHALL Angle Sensor touchless transmissiv

Series RFC4800 SSI, incremental





Special features
- touchless, magnetic
- enables for transmissive measurement
- SSI and incremental output
- extremely fast measurement
- electrical range up to 360°
- simple mounting
- lateral magnet offset up to ±1 mm
- protection class IP67 / IP69K
- unlimited mechanical lifetime
- resolution 12 bit
- linearity <±0.5%

Versions with analogue interface see separate data sheet

The sensor utilizes the orientation of a magnetic field for the determination of the actual position. Therefore, a magnet is attached to the rotating shaft. The magnetic field orientation is captured with an integrated circuit.

The digital output represents the calculated position. The generation of the position data works almost in real time.

The housing is made of high grade temperature-resistant plastic material. The fixings allow for simple mounting. The sensor is fully sealed and therefore is not sensitive to dust, dirt or moisture.

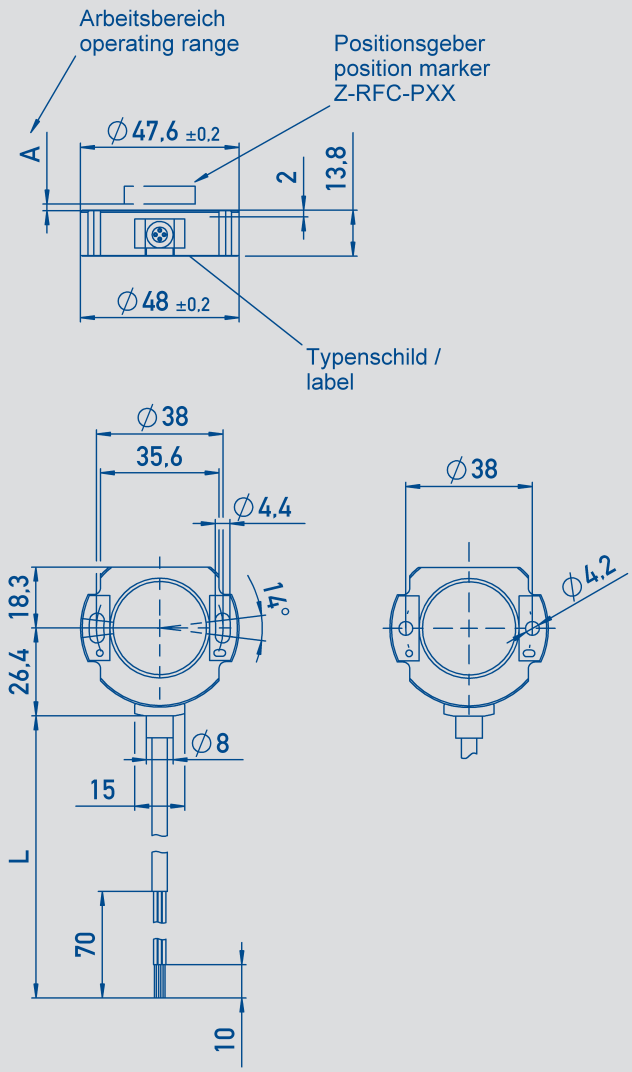
The two-part design of the sensor Series RFC and its position marker offers the user maximal variability when mounting the sensor. The absence of shaft and bearing makes the assembly insensitive against application tolerances and disburdens from using coupling devices.

Measurements can be made also transmissively through various (non-magnetic) materials such as plastic or aluminium.

Electrical connection is made via a cable being moulded in the sensor.

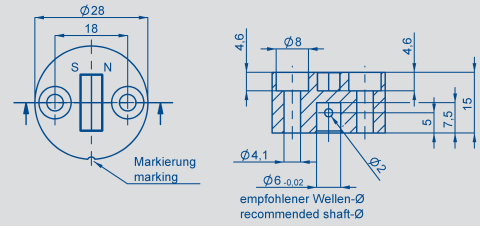
Description	
Housing	high grade, temperature resistant plastic
Electrical connections	shielded cable AWG 24 (0,22 mm^2)

CW: View on active side of sensor

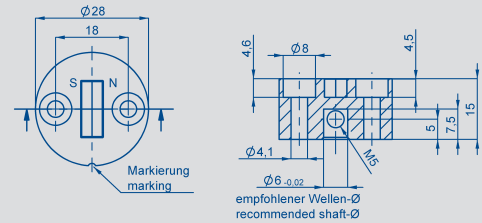


If the marking of the position marker shows to the cable outlet, the sensor is in zero position.

Position marker Z-RFC-P02 (accessory)



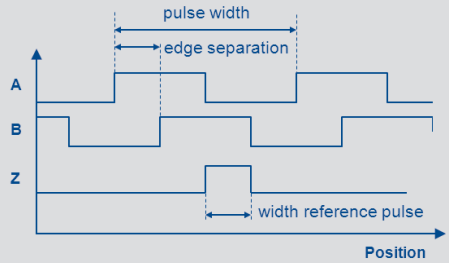
Position marker Z-RFC-P08 (accessory)



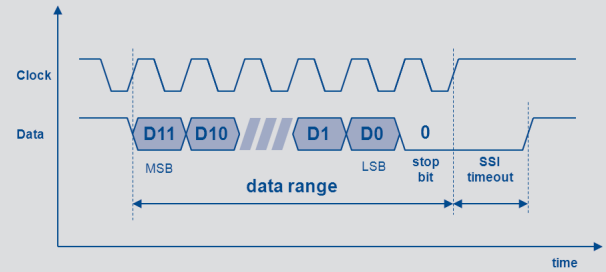
Further postion markers please refer to separate data sheet.

Operating range poition markers	
Z-RFC-P02 / ...P04 / ...P08 / ...P23	0...1.6 mm

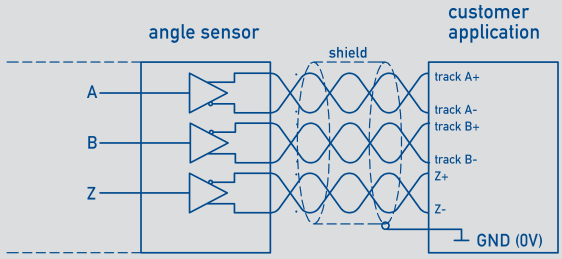
Incremental protocol



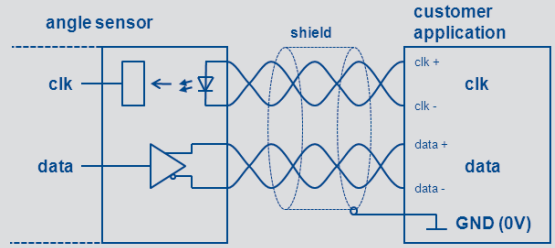
SSI protocol



Incremental connection



SSI connection



Connections Incremental	
Signal	**cable outlet**
Supply voltage Ub	Green
Supply voltage GND	Brown
Track A	Yellow
Track A inverted	Grey
Track B	Red
Track B inverted	Pink
Track Z	White
Track Z inverted	Blue

Connections SSI	
Signal	**cable outlet**
Supply voltage Ub	Green
Supply voltage GND	Brown
Signal output SSI Data+	Red
Signal output SSI Data-	Yellow
Clock input SSI Clk+	Pink
Clock input SSI Clk-	Blue
Not assigned	White
Not assigned	Grey

Technical Data SSI Interface

	RFC-48_ _-_ _ _-4_ _-_ _ _ Supply voltage 5 VDC	
Mechanical Data		
Dimensions	see dimension drawing	
Mounting	with 2 M4 screws (included)	
Mechanical travel	360 continuous	°
Maximum operational speed	infinite	
Weight	approx. 50	g
Electrical Data		
Supply voltage Ub	5 (4.5 ... 5.5)	VDC
No-load supply current	typ. 27	mA
Reverse voltage protection	yes, only supply lines and outputs	
Short circuit protection	yes (vs. GND and Ub), all outputs	
Measuring range	360	°
Max. clock rate	1	MHz
Outputs	Data + / Data -	
Inputs	Clk + / Clk - RS422-compatible via optocouplers, electrically isolated	
Protocol	SSI 13 Bit (12 bit data + 1 stop bit)	
Encoding	Gray Code	
Update rate	34 KHz (at Clk = 1 MHz)	
Resolution across 360°	12	Bit
Repeatability	0.1	°
Hysteresis	standard 0.7	°
Linearity	typ. ≤ ±0,5	%
TC	typ. 30	ppm/K
Insulation resistance (500 VDC)	≥ 10	MΩ
Cross-section cable	ca. 0.22 mm^2 / AWG 24	
Environmental Data		
Temperature range	-40...+85	°C
Vibration (IEC 60068-2-6)	5...2000 A_{max} = 0.75 a_{max} = 20	Hz mm g
Shock (IEC 60068-2-27)	100 (6 ms)	g
Life	mechanical unlimited	
MTTF	148	years
Protection class (DIN 40050 / IEC 529)	IP67 / IP69K	
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	

Technical Data Incremental Interface

	RFC-48_ _-_ _ _-5_ _-_ _ _ Supply voltage 5 VDC	
Mechanical Data		
Dimensions	see dimension drawing	
Mounting	with 2 M4 screws (included)	
Mechanical travel	360 continuous	°
Maximum operational speed	30 000 turn per minute, beyond this please contact us	
Weight	approx. 50	g
Electrical Data		
Supply voltage Ub	5 (4.5 ... 5.5)	VDC
No-load supply current	typ. 23	mA
Reverse voltage protection	yes, only supply lines and outputs	
Short circuit protection	yes (vs. GND and Ub), all outputs	
Measuring range	360	°
Outputs	A+ / A- B+ / B- Z+ / Z-	
Length Z-pulse	= distance between 2 edges A / B	
Ohmic load at outputs	> 1,2 KΩ per channel A / B / Z	
Update rate internal	500 typ.	ns
Resolution (related on 360°)	12 (11 / 10 / 9 / 8)	Bit
Repeatability	0.1	°
Hysteresis	standard 0.7	°
Linearity	typ. ≤ ±0.5	%
TC	typ. 30	ppm/K
Insulation resistance (500 VDC)	≥ 10	MΩ
Cross-section cable	approx. 0.22	mm^2
Environmental Data		
Temperature range	-40...+85	°C
Vibration (IEC 60068-2-6)	5...2000 A_{max} = 0.75 a_{max} = 20	Hz mm g
Shock (IEC 60068-2-27)	100 (6 ms)	g
Life	mechanical unlimited	
MTTF	246	years
Protection class DIN 40050 / IEC 529	IP67 / IP69K	
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	

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Ordering specifications

Preferred types printed in bold:
- delivery time up to 25 pcs. within 10 working days
- no low volume surcharge

Interface
4: Synchronous-Serial interface, Gray coded
5. Incremental interface A / B / Z

Interface parameter for SSI interface (4 _ _)
11: Supply 5 V (4.5 ... 5,5 V), output RS422 comp., rising curve cw
12: Supply 5 V (4.5 ... 5,5 V), output RS422 comp., rising curve ccw

Interface parameter for Incremental interface (5 _ _)
10: Supply 5 V (4.5 ... 5,5 V), output RS422 comp.

Electrical connection
431: Round cable 8-pol., L = 0.5 m (0.22 mm²; shielded)
531: M12 connector, 8-pol. on request

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

Series

Resolution (SSI interface)
12: 12 bit - 4096 steps

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)

Model
2: digital interface

Mechanical version
4801: Elongated hole mounting for fixation and adjustment
4802: Round hole mounting

Order example: RFC 4801 212 411 431: standard version, 1-channel with 12 bit resolution, 5 V Ub, SSI interface, Gray coded, Rising output characteristics CW, 8pol. round cable, shielded 0.22 mm^2

Required accessories
Position marker Z-RFC-P02, Art.No. 005661
(Informationen about working distances and other position markers see separate data sheet)

Recommended accessories
Process-controlled indicators MAP... with display.

Available on request
- Cable versions
- Customized connector outputs
- Driver configurations for 120 ohm load
- Signal type UVW instead of ABZ for motor commutation
- High side or low side outputs
- Absolute position via incremental interface at power on (power on burst)
- SSI other resolutions
- SSI faster update rates
- SPI (serial peripheral Interface) - output (up to 14 bit resolution - for low cost OEM-applications)