

NOVOHALL
Rotary Sensor
touchless technology
transmissive

Series RFD-4000



Special features

- fully touchless - no shaft or seals to wear
- measure directly through any non-ferromagnetic material
- electrical range up to 360°
- linearity $\pm 0.5\%$
- simple mounting
- lateral magnet offset up to $\pm 1.5\text{ mm}$
- protection class IP67, IP68, IP69
- single and redundant versions
- unlimited mechanical lifetime
- resolution 12 bit
- excellent price/performance ratio
- extremely flat 7 mm design

The RFD-4000 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 an analog voltage representing the angle is the output signal.

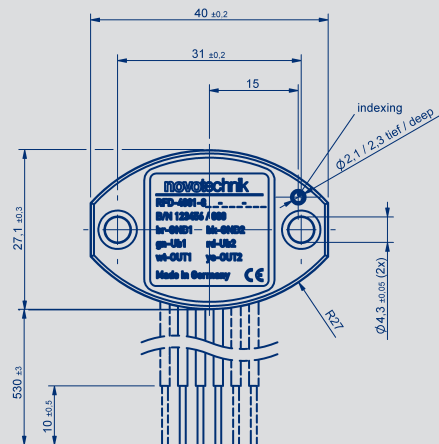
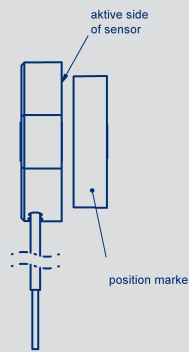
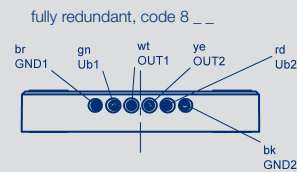
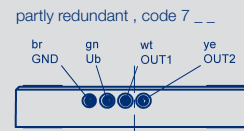
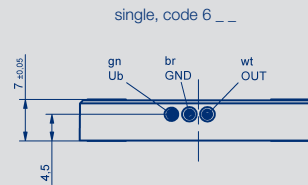
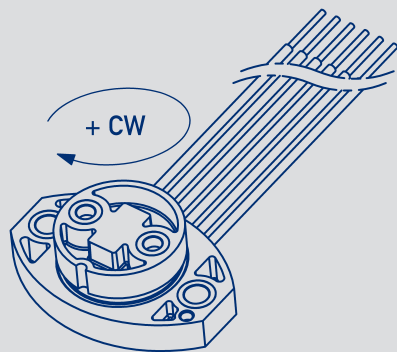
The very compact physical dimensions allows installation in small spaces. The housing is made of high grade temperature-resistant plastic material. The sensor is sealed and is not sensitive to dust, dirt, or moisture.

The two-part design, with the RFD 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 nonferromagnetic material.

Electrical connection is made via lead wires.

Description

| | |
|------------------------|--|
| Housing | high grade, temperature resistant plastic, Thermoplast with brass inserts |
| Electrical connections | lead wires 3 x 0.5 m (0.5 mm ²) single lead wires 4 x 0.5 m (0.5 mm ²) partly redundant lead wires 6 x 0.5 m (0.5 mm ²), fully redundant |



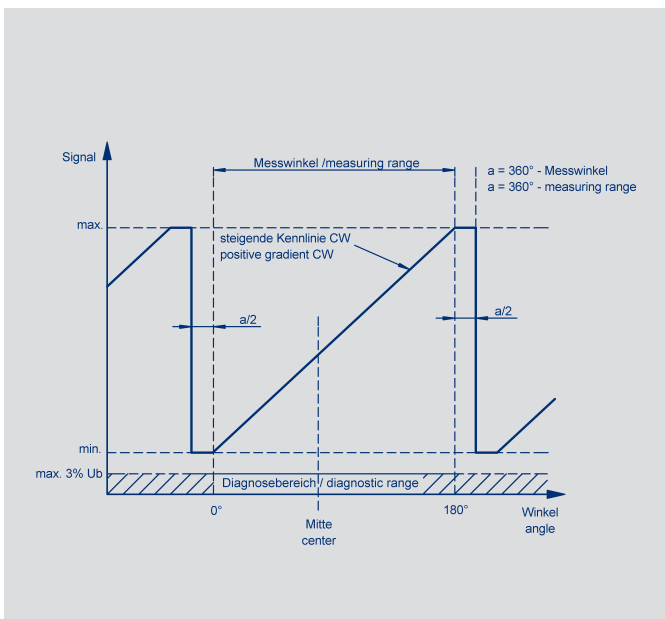
When the shaft marking points to the cable outlet, the sensor is in the electrical center position.

Pin assignment

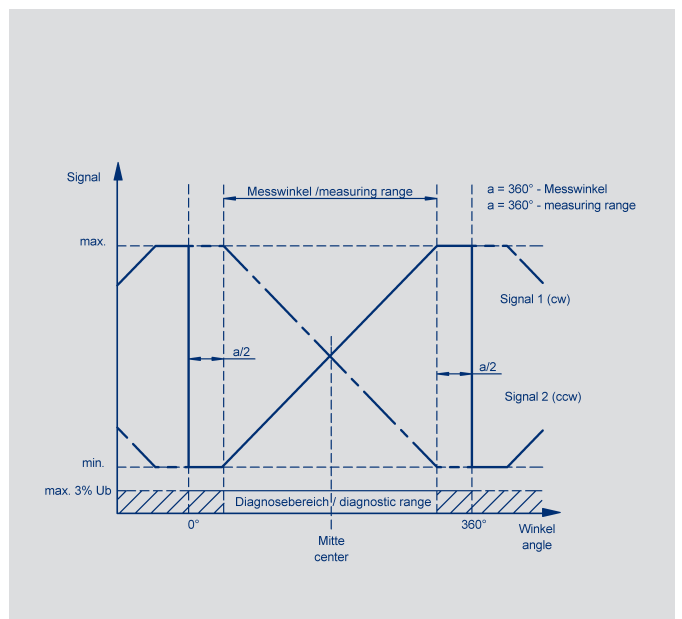
| Colour | single code 6 __ | partly redundant code 7 __ | fully redundant code 8 __ |
|--------|--------------------|----------------------------|---------------------------|
| Green | Supply voltage +Ub | Supply voltage + Ub | Supply voltage +Ub 1 |
| Brown | GND | GND | GND 1 |
| White | Output | Output 1 | Output 1 |
| Red | - | - | Supply voltage +Ub 2 |
| Black | - | - | GND 2 |
| Yellow | - | Output 2 | Output 2 |

CAD data see
www.novotechnik.de/en/download/cad-data/

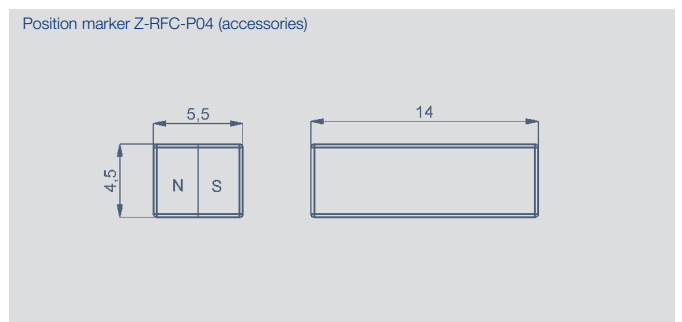
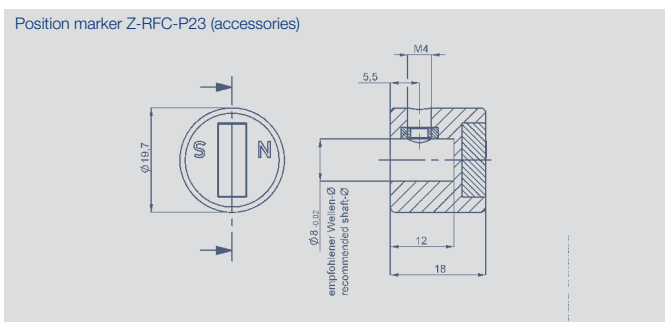
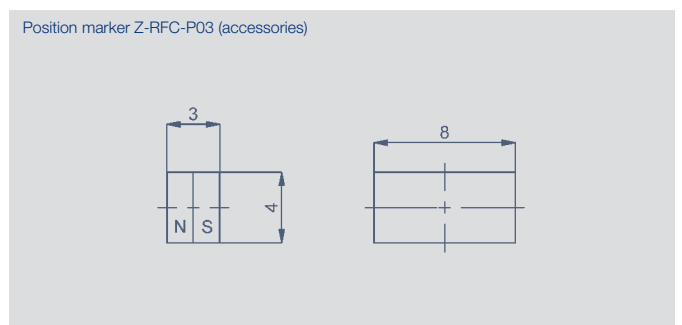
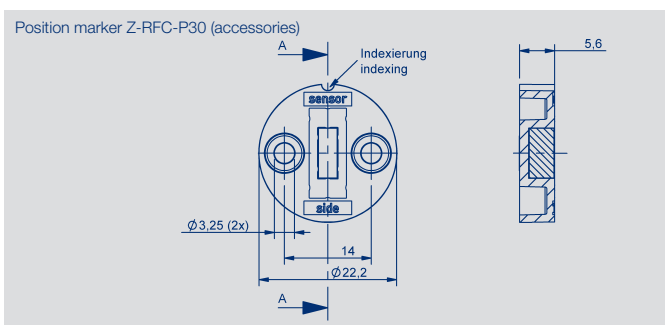
Output characteristics single (code 6 _ _)



Output characteristics redundant (code 7 / 8 _ _)



Position marker examples



Technical data and further position markers see separate data sheet.
Novotechnik-approved magnets are used to achieve specified performance.

| | | |
|---|--|-------------------------|
| Type designations | RFD-4021- - - - - 2 - - - 4 - - | |
| Mechanical Data | | |
| Dimensions | see dimension drawing | |
| Mounting | with 2 M4 screws (included) | |
| Mechanical travel | 360 continuous | ° |
| Maximum operational speed | unlimited | |
| Weight | approx. 10 | g |
| Cross-section lead wires | 0.5 | mm ² |
| Electrical Data | | |
| Supply voltage Ub | 5 (4.5 ... 5.5) | V |
| No-load supply current | typ. 13 (8 on request) per channel | mA |
| Reverse voltage | yes, only supply lines | |
| Short circuit protection | yes, all outputs vs. GND and Ub | |
| Measuring range | 0 ... 30 up to 0 ... 360, in 10° steps | ° |
| Resolution | 12 | bit |
| Number of channels | 1 / 2 | |
| Update rate | 2500 | Hz |
| Repeatability | 0.1 | |
| Independent Linearity | ±0,5 (at RL = 10 kΩ vs. GND) | % |
| Output signal | ratiometric to supply voltage Ub 0.25 V ... 4.75 V (5 ... 95 %) 0.5 ... 4.5 V (10 ... 90 %) (load ≥ 10 kΩ) | |
| Temperature error at stroke angle 30 up to 170° | ±0,875 | % FS |
| Temperature error at stroke angle 180 up to 360° | ±0,6 | % FS |
| Insulation resistance (500 VDC) | ≥ 10 | MΩ |
| Environmental Data | | |
| Operating temperature | -40...+125 | °C |
| Vibration (IEC 60068-2-6) | 5...2000 Hz Amax = 0.75 mm amax = 20 g | |
| Shock (IEC 60068-2-27) | 50 (6 ms) | g |
| Life | mechanical unlimited | |
| MTTF (DIN EN ISO 13849-1 parts count method, w/o load) | 675 (single) 512 (per channel) partly redundant 516 (per channel) fully redundant | years years years |
| Functional Safety | If you need assistance in using our products in safety-related systems, please contact us | |
| Protection class DIN EN 60529 / DIN 40050 | IP67 / IP68 / IP69 | |
| EMC compatibility | ISO 11452-2 Radiated EM HF-Fields, Absorber Hall 200 V/m ISO 11452-5 Radiated EM HF-Fields, Stripline 200 V/m ISO TR10605 Packaging and Handling + Component Test 8/15 kV CISPR 25 Radiated Emission (conducted / field) class 5 EN 61000-4-4 Immunity against fast transient disturbance (Burst) 1kV EN 61000-4-6 Immunity against conducted disturbances inducted by HF Fields 10V/m eff. EN 61000-4-8 Immunity against Power Frequency Magnetic Fields 30 A/m | |
| Working distance A / magnet constant | see data sheet position marker | |
| Lateral magnet offset | see data sheet | |



Ordering specifications

Preferred types printed in bold:

- reduced delivery time for up to 25 pcs EXW
- best low volume pricing

Operating voltage U_b
2: $U_b = 5 \text{ VDC}$ (4.5 VDC ... 5.5 VDC)

Output signal range

- 1: 0.25 ... 4.75 V ratiometric to supply voltage
2: 0.5 ... 4.5 V ratiometric to supply voltage

Output characteristics

- 1: rising cw
2: rising ccw
3: crossed outputs, channel 1 rising cw (partly redundant)
4: crossed outputs, channel 1 rising cw (fully redundant)
other characteristics on request

Electrical connection

- 401: lead wires 3 x 0.5 m, single
411: lead wires 4 x 0.5 m, partly redundant
421: lead wires 6 x 0.5 m, fully redundant
other cable lengths and assembled connectors on request

R F D - **4 0 2 1** - **6 3 6** - **2 1 1** - **4 0 1**

Series

Mechanical specification
4021: standard

Measuring range

- 03: angle 0° ... 30° min.
...
06, 12, 18, 24, 36
...
36: angle 0° ... 360° max.
other angles on request

Number of channels

- 6: single output (three wires, one output)
7: partly redundant (four wires, two outputs)
8: fully redundant (six wires, two outputs)

Required accessories

Position marker Z-RFC-P30,
Art.No. 056086;
Position marker Z-RFC-P03,
Art.No. 005658;
Position marker Z-RFC-P04,
Art.No. 005659;
Position marker Z-RFC-P23,
Art.No. 056074
(further position markers see
separate data sheet
Positionmarker_rotary)

Recommended accessories

MAP process control
indicators with display

Available on request

SPI or PWM interface

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.