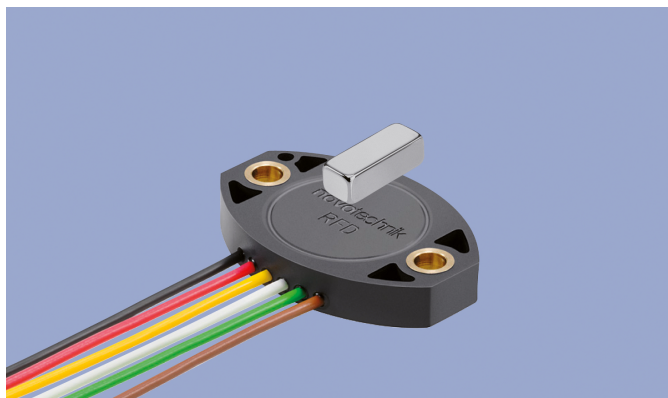
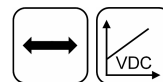


Project item
Please contact your local distributor

NOVOHALL
Short Stroke
Transducer
5 up to 50 mm
Touchless

TFD-4000
Ratiometric



Special Features

- Touchless hall technology
- 2 part design, mechanically decoupled
- High protection class, IP67, IP68, IP69
- Resolution up to 12 bit
- Wear-free
- Temperature range -40 °C up to +125 °C
- One and multi-channel versions
- Optimized for mechanical engineering and mobile applications
- Competitive price / performance ratio
- Extremely flat design
- Customized versions available on request

Applications

- Manufacturing Engineering (textile machinery, packaging machinery, sheet metal and wire machinery)
- Medical Engineering
- Mobile working machines (industrial trucks, construction machinery, agricultural and forestry machinery)
- Marine applications

The sensor utilizes a contactless magnetic technology to determine the measured position. A separate magnet or magnetic position marker is attached to the moving element to be measured. The orientation of the magnetic field is measured and an analog voltage representing the stroke is the output signal. The touchless position sensor TFD-4000 is ideally suited for positioning in measuring ranges from 0... 5 to 0... 50 mm.

The very compact physical dimensions allow 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 2 part design, with the TFD sensor itself and its magnetic position marker, offers great flexibility when mounting.

The accuracy of linear magnetic sensors is strongly influenced by the installation space. Our many years of experience in development, production and application of magnetic sensors as well as our state-of-the-art simulation tools allow us to provide you with optimal designs to suit your applications.

Description

| | |
|------------------------------|--|
| Material | Housing: high grade, temperature resistant plastic PBT GF with brass inserts |
| Mounting | With 2 pan head screws M4x14 (included in delivery) |
| Fastening torque of mounting | 250 ± 50 Ncm |
| Electrical connection | Lead wires 0.5 mm ² (AWG 20), PVC |

Mechanical Data

| | |
|-------------------------|-----------------------|
| Dimensions | See dimension drawing |
| Weight (w/o connection) | approx. 10 g |

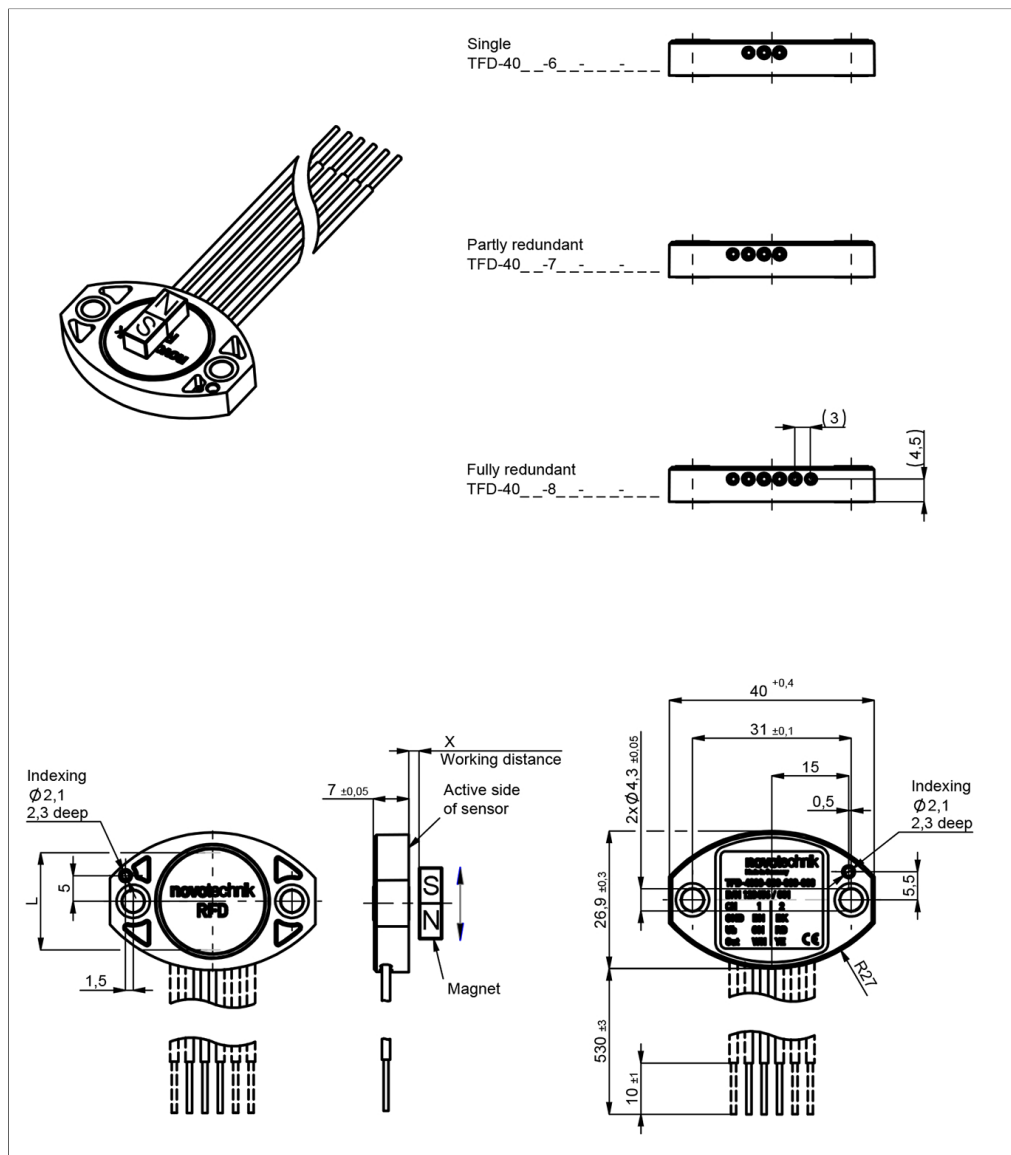
Ordering Specifications

| Ordering Specifications | | Supply voltage Ub | |
|---------------------------------|-----------------------|---|------------|
| Preferred types printed in bold | | 2: Ub = 5 VDC | |
| | | Output signal | |
| | | 1: 5 ... 95% ratiometric to supply voltage Ub (0.25 ... 4.75 VDC) | |
| | | Output characteristic | |
| | | 1: Rising characteristic | |
| | | 3: Crossed outputs, channel 1 rising (partly redundant) | |
| | | 4: Crossed outputs, channel 1 rising (fully redundant) | |
| | | Other output characteristics on request | |
| | | Electrical connection | |
| | | 401: Lead wires, 3x L = 0.5 m (single) | |
| | | 411: Lead wires, 4x L = 0.5 m (partly redundant) | |
| | | 421: Lead wires, 6x L = 0.5 m (fully redundant) | |
| | | Other lengths and assembled connectors on request | |
| | | Electrical measuring range | |
| | | 14: 0 ... 8 mm up to 0 ... 14 mm | |
| | | 24: 0 ... 15 mm up to 0 ... 24 mm | |
| | | Other lengths from 0 ... 5 mm up to 0 ... 50 mm on request | |
| | | Number of channels | |
| | | 6: One-channel version (1x supply voltage Ub, 1x output) | |
| | | 7: Partly redundant version (1x supply voltage Ub, 2x output) | |
| | | 8: Fully redundant version (2x supply voltage Ub, 2x output) | |
| Series | Mechanical version | | |
| T F D | 4021 | 636 | 211 |
| | | | 401 |
| | 4021: Standard design | | |

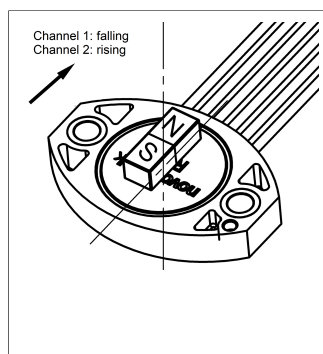
Accessories included in delivery

- 2x Pan head screws M4x14

Drawing



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



If the magnet is located centrally to the sensor, the sensor is near the electrical center position. Direction of output characteristic with north pole alignment (color marking) or marking according to sketch: Signal channel 1 falling, signal channel 2 rising when moving in direction of the electrical connection.

Technical Data

| Type | TFD-4021-14-2_ _ _ _ _ Max. Measuring Range 14 mm | TFD-4021-24-2_ _ _ _ _ Max. Measuring Range 24 mm |
|---|---|--|
| Output signal | ratiometric to supply voltage Ub | |
| Load | 5 ... 95% (0.25 ... 4.75 V) in electrical measuring range (dim. L) | |
| Number of channels | ≥ 10 kΩ | |
| Update rate | 1 / 2 | |
| Electrical measuring range (dim. L) | typ. 2.5 kHz | 0 ... 15 mm up to 0 ... 24 mm |
| Resolution | 0 ... 8 mm up to 0 ... 14 mm | 0 ... 15 mm up to 0 ... 24 mm |
| Repeatability | 12 bits | |
| Hysteresis | ≤ ±0.1 %FS | |
| Temperature error | ≤ ±0.1 %FS | |
| Supply voltage Ub | ±0.5 %FS | |
| Current consumption w/o load | 5 VDC (4.5 ... 5.5 VDC) | |
| Polarity protection | typ. 15 mA (typ. 8 mA on request) | |
| Short circuit protection | yes (supply lines) | |
| Insulation resistance (500 VDC) | yes (all outputs vs. GND and supply voltage) | |
| Environmental Data | ≥ 10 MΩ | |
| Max. operational speed | Mechanically unlimited | |
| 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 | IP67 / IP68 / IP69 | |
| Operating temperature | -40 ... +125°C | |
| Life | Mechanically unlimited | |
| Functional safety | The sensor is not suitable for use in safety-related applications. | |
| MTTF (IEC 60050) | 7872 years (one-channel), 4441 years (partly redundant, per channel) or 4512 years (fully redundant, per channel) | |
| EMC Compatibility | | |
| ISO 10605 ESD (Handling/Component) | 8 kV / 15 kV | |
| ISO 11452-2 Radiated HF-fields | 200 V/m | |
| ISO 11452-5 Radiated HF-Fields, stripline | 200 V/m | |
| CISPR 25 Radiated emission | Level 5 | |
| EN 61000-4-4 Fast transients (burst) | 1 kV | |
| EN 61000-4-6 Cond. disturbances (HF fields) | 10 V eff. | |
| EN 61000-4-8 Magnetic fields | 30 A/m | |

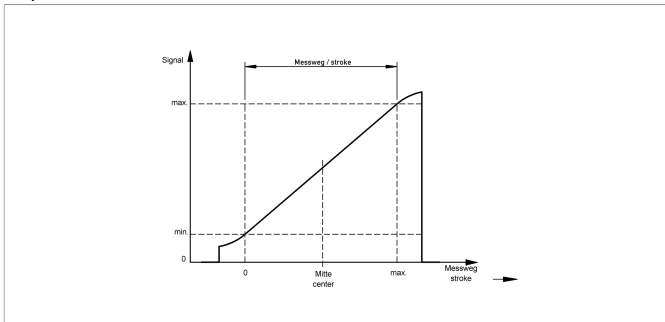
FS = Full scale: Signal span according to electrical measuring range
Available on request: SPI or PWM interface

Connection Assignment

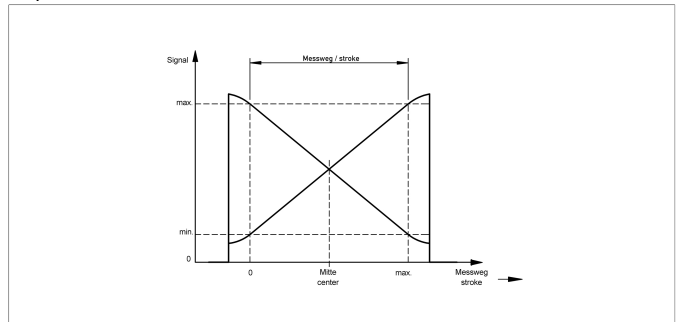
| Signal | Lead wires code 40_ | Lead wires code 41_ | Lead wires code 42_ |
|---------------------|------------------------|------------------------|------------------------|
| | One-channel | Partly redundant | Fully redundant |
| Supply voltage Ub | GN | GN | GN |
| GND | BN | BN | BN |
| Signal output | WH | WH | WH |
| Signal output 2 | - | YE | YE |
| Supply voltage Ub 2 | - | - | RD |
| GND 2 | - | - | BK |

**Technical Data
Output
Characteristics**

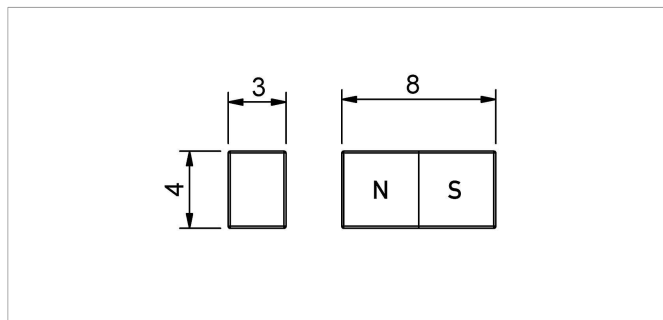
Output characteristic



Output characteristic



Position Markers



Z-TFC-P03

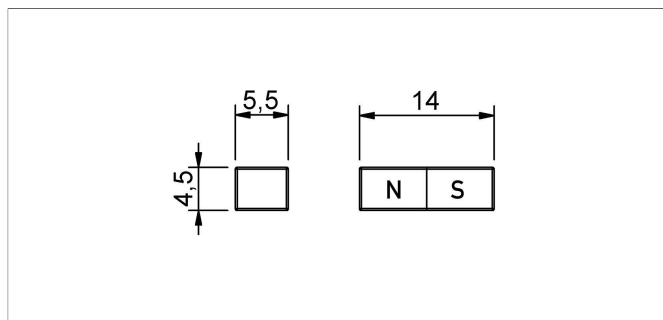
Magnet for direct application onto customer's shaft (see user manual).

We recommend mounting on non-magnetizable materials, otherwise the specified working distances will vary (e.g. reduction of approx. 20% with axial mounting on a magnetizable shaft).

Measuring range 0 ... 8 mm up to 0 ... 14 mm
Working distance One-channel 0.7 ± 0.5 mm,
redundant $0.3 + 0.5 / - 0.3$ mm

Permitted lateral offset ± 1 mm

| P/N | Pack. unit [pcs] |
|-----------|------------------|
| 400104225 | 1 |



Z-TFC-P04

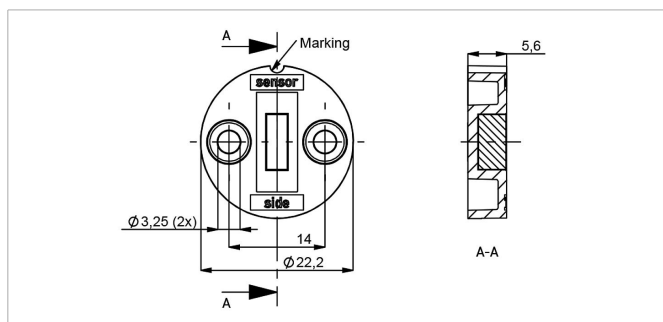
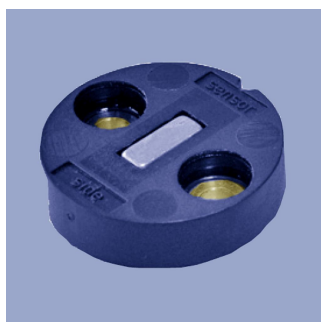
Magnet for direct application onto customer's shaft (see user manual).

We recommend mounting on non-magnetizable materials, otherwise the specified working distances will vary (e.g. reduction of approx. 20% with axial mounting on a magnetizable shaft).

Measuring range 0 ... 15 mm up to 0 ... 24 mm
Working distance One-channel 2.5 ± 0.9 mm,
redundant 2 ± 0.9 mm

Permitted lateral offset ± 1 mm

| P/N | Pack. unit [pcs] |
|-----------|------------------|
| 400104226 | 1 |



Z-TFC-P30

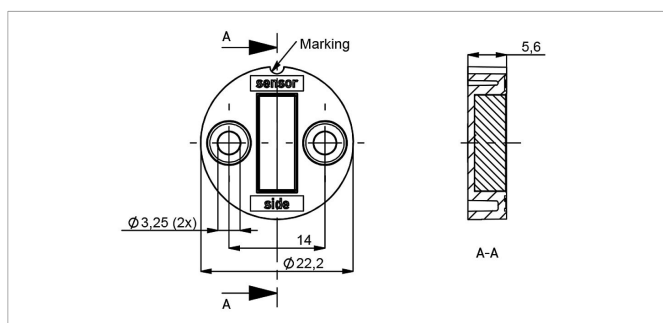
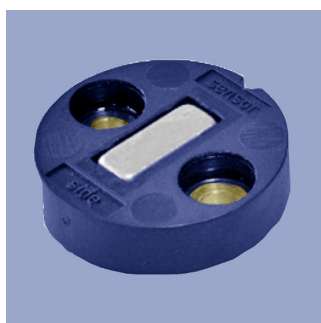
Position marker for frontal fixation with 2 cylinder screws M3x8 (included in delivery).

Measuring range 0 ... 8 mm up to 0 ... 14 mm
Working distance One-channel 0.7 ± 0.5 mm,
redundant $0.3 + 0.5 / - 0.3$ mm

Permitted lateral offset ± 1 mm

Material PBT-GF

| P/N | Pack. unit [pcs] |
|-----------|------------------|
| 400106758 | 1 |
| 400106757 | 25 |



Z-TFC-P31

Position marker for frontal fixation with 2 cylinder screws M3x8 (included in delivery).

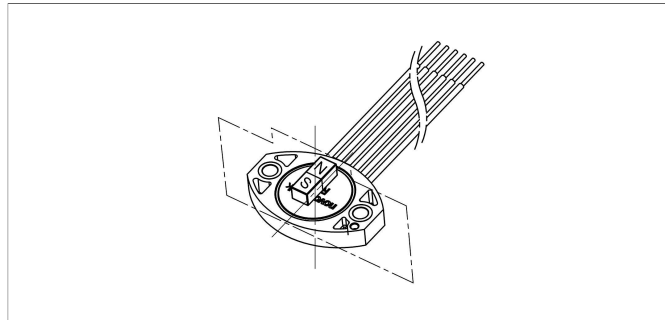
Measuring range 0 ... 15 mm up to 0 ... 24 mm
Working distance One-channel 2.5 ± 0.9 mm,
redundant 2 ± 0.9 mm

Permitted lateral offset ± 1 mm

Material PBT-GF

| P/N | Pack. unit [pcs] |
|-----------|------------------|
| 400106760 | 1 |
| 400106759 | 25 |

Position Markers



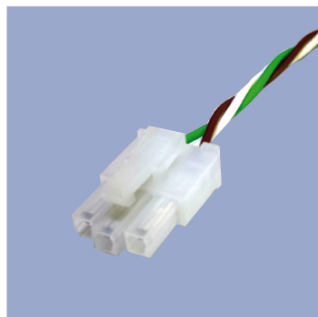
Installation Instruction

The accuracy of linear magnetic sensors is strongly influenced by the installation space. Using the latest simulation tools, we are able to design the measurement system optimally for your application. In order to select the best suitable magnet for your requirements please contact us. Between magnet / sensor unit and surrounding magnetic or magnetizable materials a minimum distance of 12 mm must be ensured. If this is not possible, the accuracy of the system will be affected and the data have to be verified.

Connecting Options on request



- M12 connector**
- Customized lengths
 - 3-, 4-, 6- and 8-pole versions
 - Protection class IP68
 - Ordering codes of standard versions see ordering specifications



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



- Tyco AMP Super Seal**
- Pin- and bushing housing
 - 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



- 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

Novotechnik
Messwertaufnehmer OHG
P.O.Box 4220
73745 Ostfildern (Germany)
Horbstrasse 12
73760 Ostfildern (Germany)
Phone +49 711 4489-0
Fax +49 711 4489-118
info@novotechnik.de
www.novotechnik.de



© Jan 5, 2022

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.