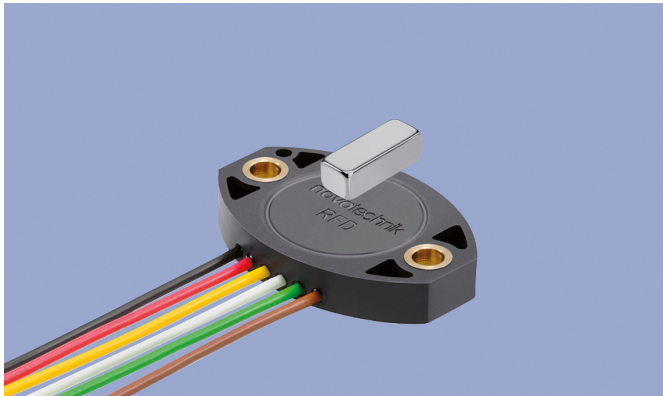
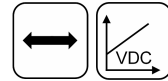


**Project item**  
Please contact our technical support  
**+1 508 485 2244**  
<https://www.novotechnik.com/salessupport.php>

**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
- Single and dual-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 <sup>2</sup> (AWG 20), PVC

#### Mechanical Data

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

## Ordering Specifications

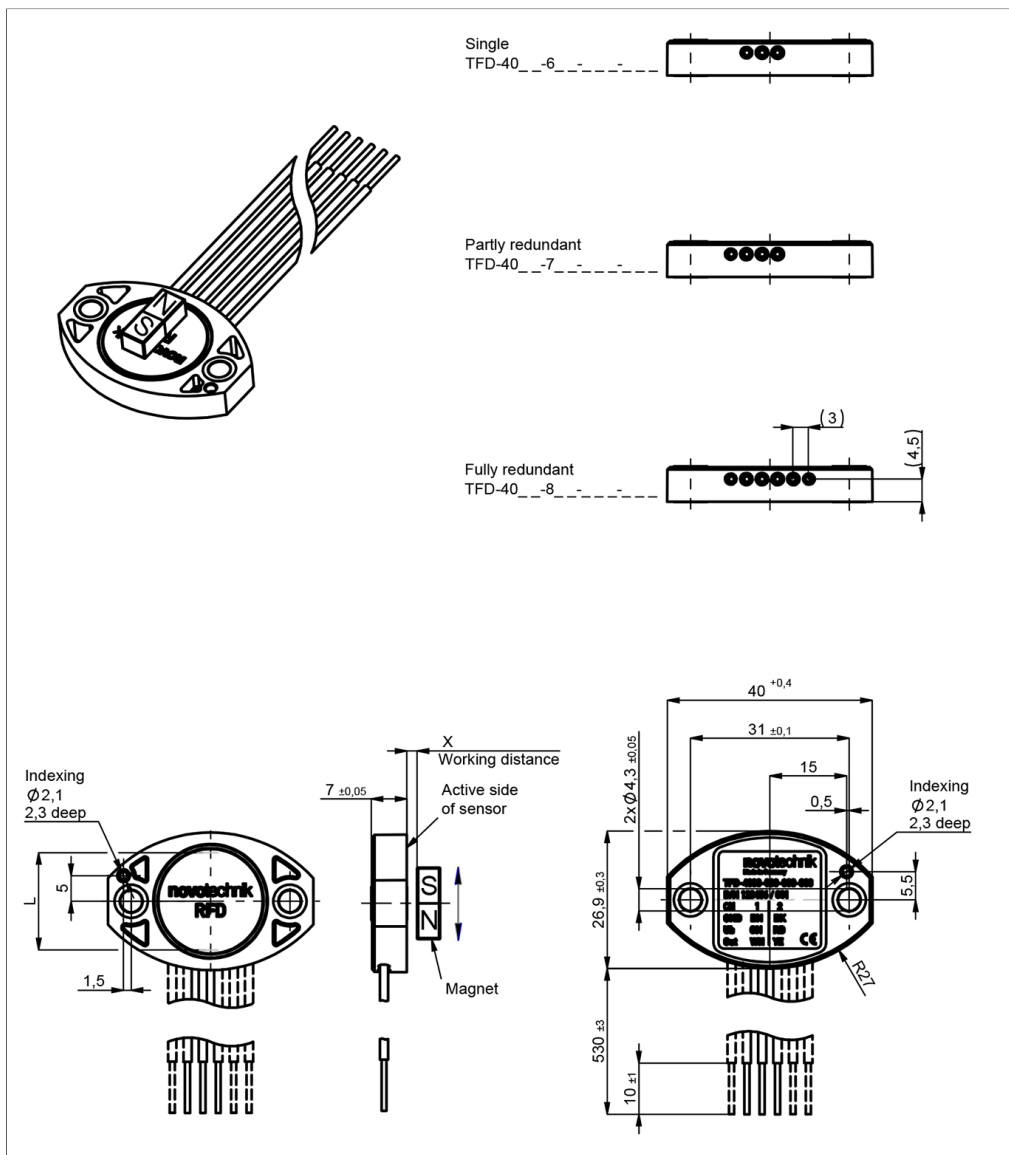
Ordering Specifications		Supply voltage $U_b$	
Preferred types printed in bold		2: $U_b = 5$ VDC	
		Output signal	
		1: 5 ... 95% ratiometric to supply voltage $U_b$ (0.25 ... 4.75 VDC)	
		Output characteristic	
		1: Rising characteristic	
		3: Crossed outputs, channel 1 rising (partly redundant)	
		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 $U_b$ , 1x output)	
		7: Partly redundant version (1x supply voltage $U_b$ , 2x output)	
		8: Fully redundant version (2x supply voltage $U_b$ , 2x output)	
		Series	
		Mechanical version	
		4021: Standard design	

**T F D - 4 0 2 1 - 6 1 4 - 2 1 1 - 4 0 1**

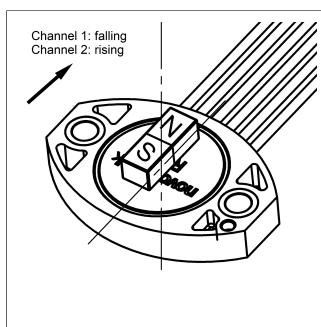
### Accessories included in delivery

- 2x Pan head screws M4x14

**Drawing**



CAD data see  
[www.novotechnik.de/en/download/cad-data/](http://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 $U_b$	
Load	5 ... 95% (0.25 ... 4.75 V) in electrical measuring range (dim. L)	
Number of channels	$\geq 10 \text{ k}\Omega$	
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	
Repeatability	12 bits	
Hysteresis	$\leq \pm 0.1 \text{ \%FS}$	
Temperature error	$\leq \pm 0.1 \text{ \%FS}$	
Supply voltage $U_b$	$\pm 0.5 \text{ \%FS}$	
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)	
<b>Environmental Data</b>	$\geq 10 \text{ M}\Omega$	
Max. operational speed	Mechanically unlimited	
Vibration IEC 60068-2-6	20 g, 5 ... 2000 Hz, $A_{\text{max}} = 0.75 \text{ mm}$	
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)	
<b>EMC Compatibility</b>		
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	

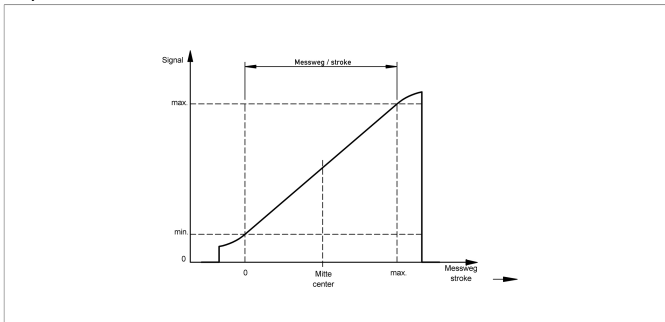
FS = Full scale: Signal span according to electrical measuring range  
**Available on request:** SPI or PWM interface

### Connection Assignment

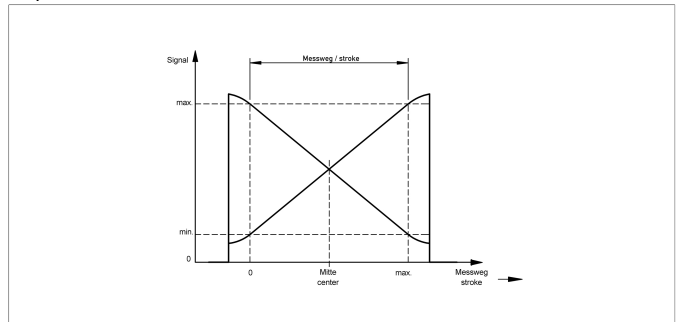
Signal	Lead wires code 40_	Lead wires code 41_	Lead wires code 42_
	Single-channel	Partly redundant	Fully redundant
Supply voltage $U_b$	GN	GN	GN
GND	BN	BN	BN
Signal output	WH	WH	WH
Signal output 2	-	YE	YE
Supply voltage $U_b$ 2	-	-	RD
GND 2	-	-	BK

**Technical Data  
Output  
Characteristics**

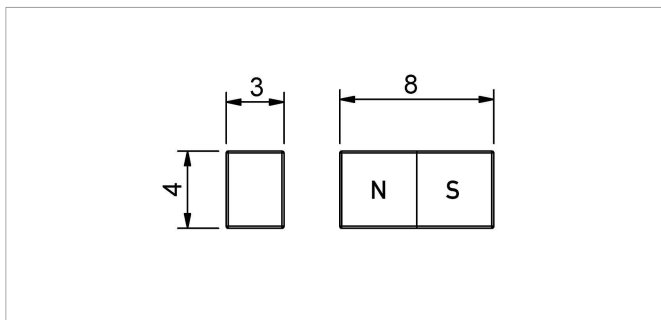
Output characteristic



Output characteristic



## Position Markers



### Z-TFC-P03

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

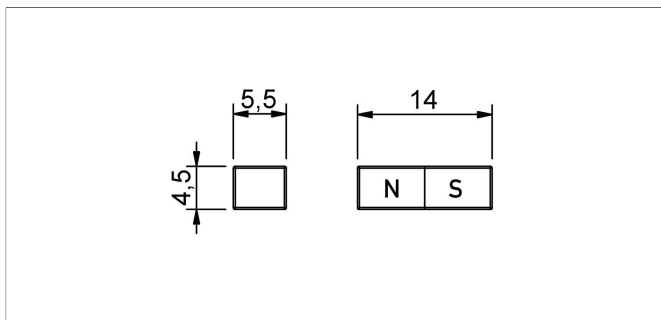
We recommend mounting on non-magnetizable materials, otherwise the specified working distances will vary (e.g. reduction of approx. 20% with axial mounting on a magnetizable shaft).

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

Permitted lateral offset  $\pm 1$  mm

Operating temp.  $-40 \dots +125^\circ\text{C}$

P/N	Pack. unit [pcs]
400104225	1



### Z-TFC-P04

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

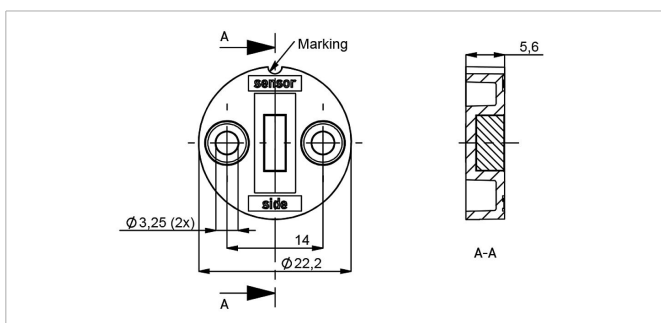
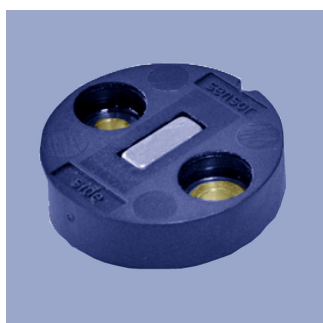
We recommend mounting on non-magnetizable materials, otherwise the specified working distances will vary (e.g. reduction of approx. 20% with axial mounting on a magnetizable shaft).

Measuring range 0 ... 15 mm up to 0 ... 24 mm  
Working distance Single channel  $2.5 \pm 0.9$  mm, redundant  $2 \pm 0.9$  mm

Permitted lateral offset  $\pm 1$  mm

Operating temp.  $-40 \dots +125^\circ\text{C}$

P/N	Pack. unit [pcs]
400104226	1



### Z-TFC-P30

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

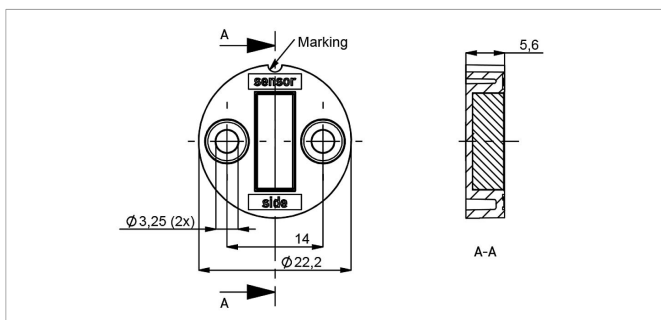
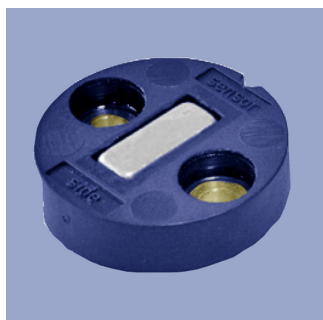
Measuring range 0 ... 8 mm up to 0 ... 14 mm  
Working distance Single channel  $0.7 \pm 0.5$  mm, redundant  $0.3 +0.5/-0.3$  mm

Permitted lateral offset  $\pm 1$  mm

Material PBT-GF

Operating temp.  $-40 \dots +125^\circ\text{C}$

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 Single channel  $2.5 \pm 0.9$  mm, redundant  $2 \pm 0.9$  mm

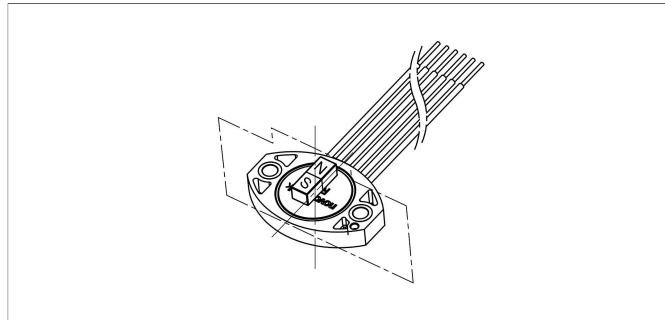
Permitted lateral offset  $\pm 1$  mm

Material PBT-GF

Operating temp.  $-40 \dots +125^\circ\text{C}$

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

## Position Markers



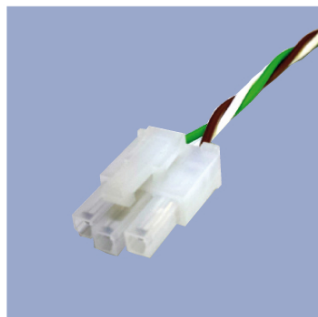
### Installation Instruction

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 U.S., Inc.  
155 Northboro Road

Southborough, MA 01772  
Phone 508 485 2244  
Fax 508 485 2430  
info@novotechnik.com  
www.novotechnik.com



© May 10, 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.