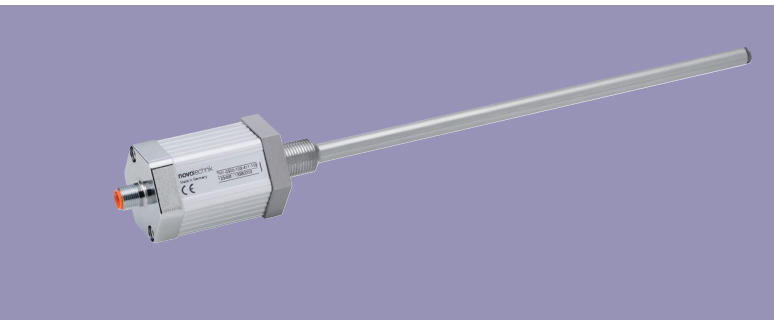


**NOVOSTRICTIVE  
Transducer  
up to 4250 mm  
touchless  
absolute  
Series TH1  
with Start-Stop-, SSI-,  
DyMoS-Interface**



**Special features**

- rod style integrable transducer
- NOVOSTRICTIVE touchless magnetostrictive measuring process
- non-contact position detection
- wear-free, unlimited mechanical life
- Start-Stop pulse interface with normed speed of operation 2800 m/s
- Synchronous Serial interface
- DyMoS-interface with data transfer monitoring
- excellent linearity up to 10 µm
- resolution up to 1 µm regardless of stroke length
- low temperature coefficient <15 ppm/K
- insensitive to shock and vibration
- cable or connector version available
- operating pressure up to 350 bar
- protection class IP67 / IP68

Transducers employing the NOVOSTRICTIVE touchless magnetostrictive measuring process for direct, precise and absolute measurement of travel and length in control, positioning and measuring technology.

The measurement is accomplished using a passive position marker which can be moved as a free-floating element. The non-contact coupling version makes installation even simpler, and the wear-free operation means unlimited mechanical life and unlimited operating speed of the position marker and permits stroke lengths up to 4250 mm.

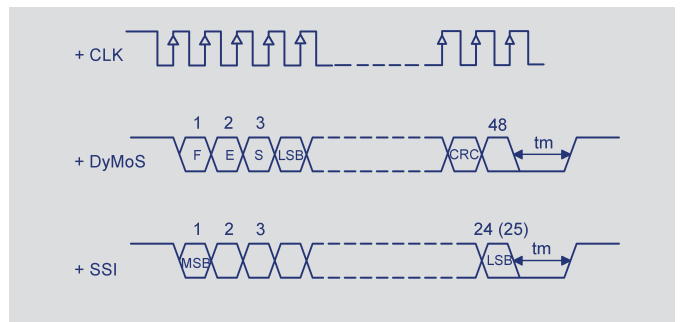
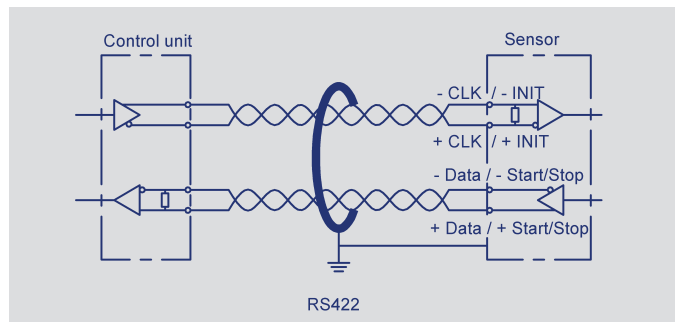
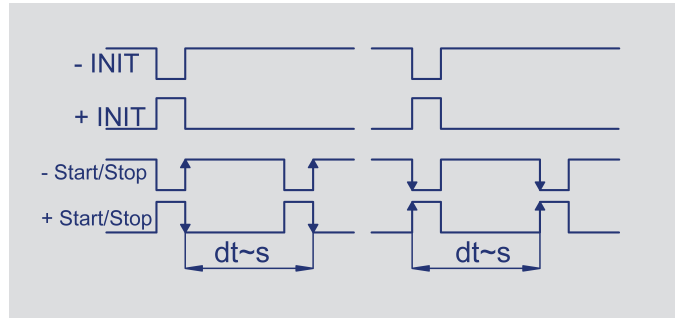
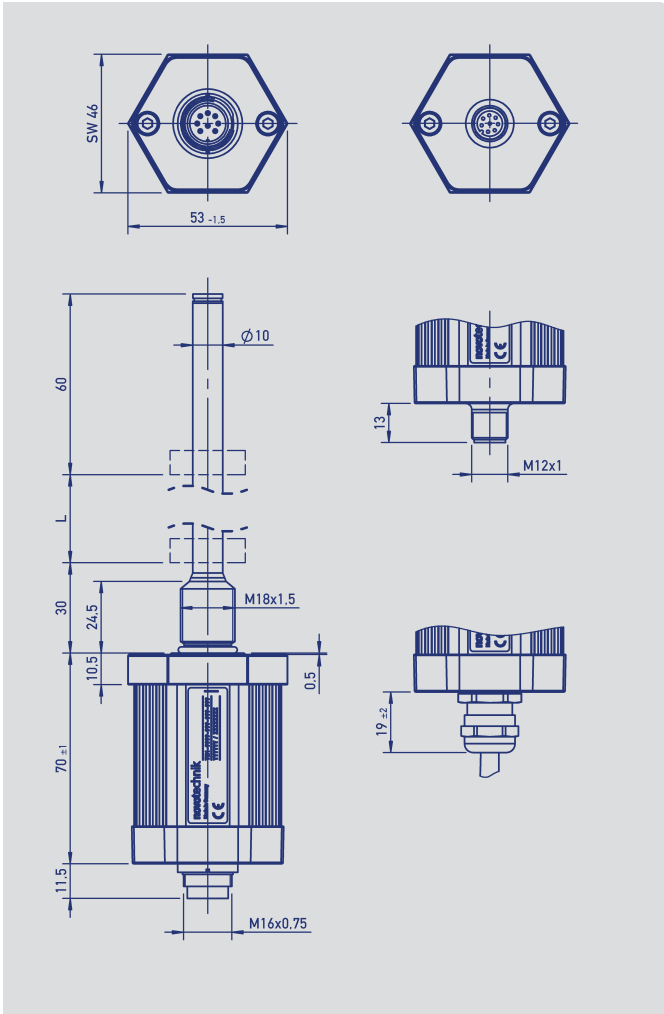
The temperature coefficient of the transducer is extremely low thanks to the measuring principle, design and selected materials. The high mechanical ruggedness of the transducer combined with the underlying measuring technique mean that the system is highly resistant to shock and vibration.

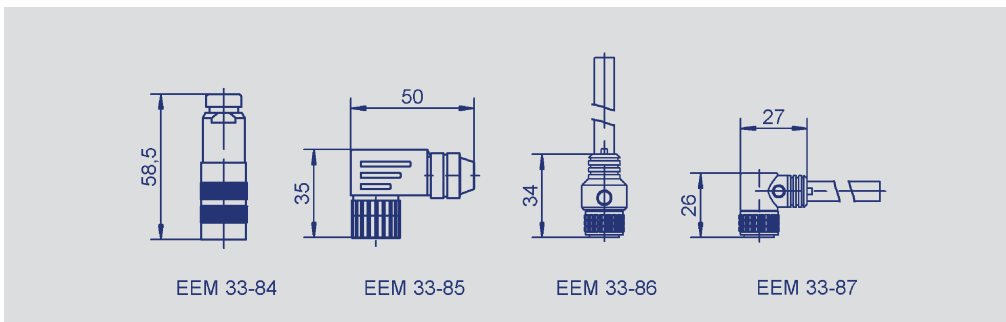
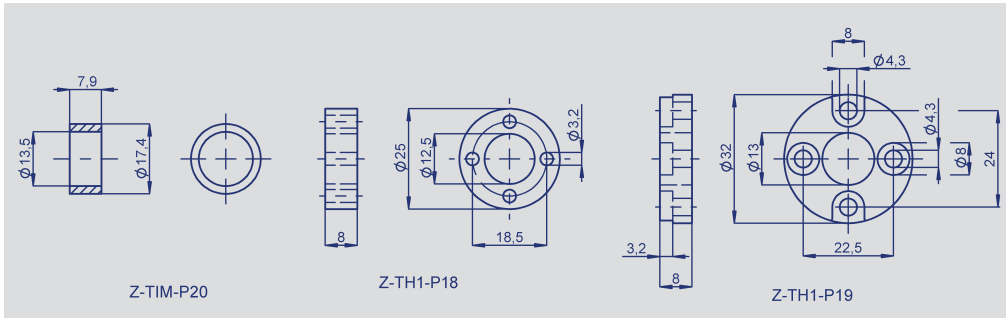
The rod-shape of the transducer allows integration in the pressurized zone of hydraulic and pneumatic cylinders. The contactless ring-shaped magnet ensures simple fitting of the transducer.

A sophisticated ASIC in the transducer provides for standard absolute output signals. The pulse interface allows a fully tolerated processing of both edges of the Start/Stop signal and an usage of up to 3 position markers.

In addition to the familiar interfaces such as the SSI interface with 24, 25 or 26 bit and the Start/Stop pulse interface also a high-dynamic serial DyMoS interface with data transfer monitoring is offered. The advantages of conventional interfaces and bus interfaces have been combined in this DyMoS interface. In addition to the position value, the DyMoS interface also allows the actual velocity value to be sent. Additional interfaces see separate data sheet.

Description	
Housing	Aluminium, anodized. Rod: stainless steel
Mounting	Bushing M18x1.5 for screw plug hole per ISO6149
Position marker	Ring position marker
Measuring principle	NOVOSTRICTIVE, touchless magnetostrictive
Electrical connections	8-pin round connector, shielded, M12x1 8-pin round connector, shielded, IEC130-9 6-pin round connector, shielded, IEC130-9 8-wire PUR / PVC-cable, 8x0.25 mm <sup>2</sup> , shielded: 1 m, 3 m or 5 m length
Electronic	SMD with ASIC, integrated Connector casing resp. shield is connected to the sensor housing. Housing is capacitively decoupled from the electronic





Output connector Code 101, 102	Cable Code 201, 203, 205	Connector with cable EEM33-86, EEM33-87	Start-Stop-Impulse interface	SSI interface	DyMoS interface
PIN 1	YE	WH	+ INIT	+ CLK	+ CLK
PIN 2	GY	BN	+ Start/Stop	+ DATA	+ DATA 1
PIN 3	PK	GN	- INIT	- CLK	- CLK
PIN 4	RD	YE	do not connect	do not connect	- DATA 2
PIN 5	GN	GY	- Start/Stop	- DATA	- DATA 1
PIN 6	BU	PK	GND	GND	GND
PIN 7	BN	BU	+ 24 VDC	+ 24 VDC	+ 24 VDC
PIN 8	WH	RD	do not connect	do not connect	+ Data 2

Output connector Code 103	SSI interface	Start-Stop- Impulse interface
PIN 1	- DATA	- Start/Stop
PIN 2	+ DATA	+ Start/Stop
PIN 3	+ CLK	+ INT
PIN 4	- CLK	- INT
PIN 5	+ 24 VDC	+ 24 VDC
PIN 6	GND	GND

Type designations	TH1 - - - - - 1 - - - - - Start-Stop-Impulse interface	TH1 - - - - - 2 - - - - - Synchronous-Serial interface	TH1 - - - - - 13 - - - - - DyMoS interface
<b>Mechanical Data</b>			
Dimensions	see drawing		
<b>Electrical Data</b>			
Electrical measuring range (dimension B)	0050 up to 4250 0050 up to 1000 in 25 mm steps, 1100 up to 2000 in 100 mm steps, 2250 up to 4250 in 250 mm steps; Other lengths on request.		
Absolute linearity	≤ ± 50 μm	≤ ± 10 μm ** up to 1000 mm ≤ ± 25 μm ** up to 2500 mm ≤ ± 40 μm ** up to 4250 mm	≤ ± 10 μm ** up to 1000 mm ≤ ± 25 μm ** up to 2500 mm ≤ ± 40 μm ** up to 4250 mm
Tolerance of electrical zero point	± 0.5		
Output signal	RS422 Impulse	RS22 absolut 24, 25 or 26 bit	RS422 absolut 48 bit synchronous-serial
Resolution	standardized up to 2800 m/s (Other resolutions on request)	1 or 5 μm (Other resolutions on request)	5 μm (Other resolutions on request)
Reproducibility	≤ 6		% FS
Hysteresis	≤ 4		% FS
Supply voltage U <sub>b</sub>	24 (13 ... 34)		V
Supply voltage ripple	≤ 10		% V <sub>SS</sub>
Current consumption (w/o load)	≤ 100		mA
Output update rate max. *	16		kHz
Temperature coefficient	≤ 15 (min. 0.01 mm/K)		ppm/K
Overvoltage protection	40 (permanent)		VDC
Polarity protection	up to U <sub>max</sub>		VDC
Short circuit protection	7 (permanent)		VDC
Insulation resistance (500 VDC)	≥ 10		mΩ
<b>Environmental Data</b>			
Temperature range	-40 ... +85		°C
Storage temperature range	-40 ... +100		°C
Operating humidity range	0...95 (no condensation)		% R.H.
Shock (IEC 60068-2-27)	100 (11 ms)		g
Vibration (IEC 60068-2-6)	20 (5...2000 Hz, A <sub>max</sub> = 0.75 mm)		g
Life	mechanically unlimited		
MTTF (ISO 13849-1, parts count method, w/o load)	32		years
Functional safety	When using our products in safety-related systems please contact us		
Protection class (DIN EN 60529)	IP67 with fastened connector IP68 with cable connection		
Pressure rating			
Working pressure	≤ 350		bar
Pressure peaks	≤ 600		bar
Burst pressure	> 700		bar
Max. operating speed with valid output signal	10		ms <sup>-1</sup>
Max. operating acceleration with valid output signal	200		ms <sup>-2</sup>
EMC compatibility	EN 61000-4-2 electrostatic discharges (ESD) 4 kV, 8 kV EN 61000-4-3 electromagnetic fields: 10 V/m EN 61000-4-4 electrical fast transients (Burst) 1 kV EN 61000-4-6 conducted disturbances, induced by RF fields 10 V/m eff. EN 61000-4-8 Power frequency magnetic fields 3 A/m EN 55016-2-3 Radiated disturbances class B		

\* Data are extrapolated, internal update rate depending on length.

\*\* Measured with 1 micron resolution. With a higher resolution, the permissible linearity error is increased by the resolution.



## Ordering specifications

Preferred types printed in bold

### Electrical interface

**1: Other digital interface**

**2: Synchronous-Serial interface**

Incremental, analog and fieldbus interface on request

### Output signal digital interface 1 \_ \_

**1: Interface Start-Stop Signal**

2: Impulse interface measuring time / pulse width

3: DyMoS interface 48 bit Synchronous-Serial

### Output signal Synchronous-Serial interface 2 \_ \_

**1: SSI 24 bit**

2: SSI 25 bit

7: SSI 26 bit (25 = Alarm; 26 = Parity Even)

### Impulse interface Start-Stop Signal 11\_

**4: For 1 up to 3 position marker variable**

### Impulse interface measuring time / pulse width 12\_

**1: Standard**

### DyMoS® interface 48 bit Synchronous-Serial 13\_

**1: Binary code; resolution 5 µm; (Pos. 1 + Vel. 1)**

2: Binary code; resolution 5 µm; (Pos. 1 + Pos. 2)

3: Binary code; resolution 5 µm; (Pos. 1 + Vel. 1) and (Pos. 2 + Vel. 2) two channel

### Synchronous-Serial interface 2 \_ \_

**1: Binary code; resolution 5 µm**

2: Gray code; resolution 5 µm

4: Binary code; resolution 1 µm

5: Gray code; resolution 1 µm

### Electrical connection

101: 8-pin round connector IEC130-9

**102: 8-pin round connector M 12x1**

103: 6-pin round connector IEC130-9

**201: NT standard cable 1 m**

203: NT standard cable 3 m

205: NT standard cable 5 m

Other cable lengths an assembled connectors on request

**T H 1 - 0 8 0 0 - 1 0 2 - 2 1 1 - 1 0 2**

Series

Electrical measuring range

Standard lengths  
 0050 up to 4250 mm

Mechanical version

**102: Screw flange M 18x1.5 zero point at 30 mm**

104: Screw flange M 18x1,5 zero point at 51 mm

106: like 102, but with femal thread M4x6 at the rod end and additional length 7.5 mm

108: like 104, but with femal thread M4x6 at the rod end and additional length 7.5 mm

Other mechanical configurations e.g. screw flange 3/4" 16UNF on request

Required accessories	Ring position marker				
	Z-TH1-P18, P/N 005697				
	Z-TH1-P19, P/N 005698				
	Z-TIM-P20, P/N 005699. Other position marker on request.				
Recommended accessories	Mating female connector straight, IEC 130-9	Mating female connector angled, IEC130-9	Cable set - female connector 12x1, 8-pin, straight, with molded PUR-cable, shielded, 8x0,25 mm², IP67, open-ended	Cable set - female connector 12x1, 8-pin, angled, with molded PUR-cable, shielded, 8x0,25 mm², IP67, open-ended	Mounting nut M18x1,5-A2
	8-pin, EEM 33-84, P/N. 005627	8-pin, EEM 33-85, P/N 005628	2 m length, EEM 33-86, P/N 005629	2 m length, EEM 33-87, P/N 005630	Z-TH1-M01, P/N 056090
	6-pin, EEM 33-82, P/N 005639	6-pin, EEM 33-94, P/N 005648	5 m length, EEM 33-90, P/N 005635	5 m length, EEM 33-91, P/N 005636	
			10 m length, EEM 33-92, P/N 005637	10 m length, EEM 33-93, P/N 005638	

**Important:** Avoid equalizing currents in the cable shield caused by potential differences. Shielded Twisted Pair (STP) cable is recommended.