

**NOVOSTRICTIVE  
Transducer  
up to 4250 mm  
touchless, absolute**

Series TP1  
with analog Interface



**Special features**

- absolute transducer in robust profile design
- NOVOSTRICTIVE non-contacting magnetostrictive measurement principle
- position detection without contact
- wear-free, unlimited mechanical life span
- analog output signals: current or voltage
- start/end positions Teach-in via programming input
- optional galvanically isolated output
- excellent linearity to 50 µm
- resolution up to 0.001 mm regardless of stroke length
- low temperature coefficient <30 ppm/K
- insensitive to shock and vibration
- cable or connector version available
- protection class IP67 / IP68

TP1 transducers employ the NOVOSTRICTIVE touchless magnetostrictive measuring process for direct, precise, and absolute measurement of linear position, for motion control, positioning and measurement display applications.

This measurement principle uses position markers (magnets) as mechanical input devices. The position markers are available in free-floating or rail-guided versions.

Clamps allow easy and flexible transducer mounting, as well as precise adjustment of the installation position.

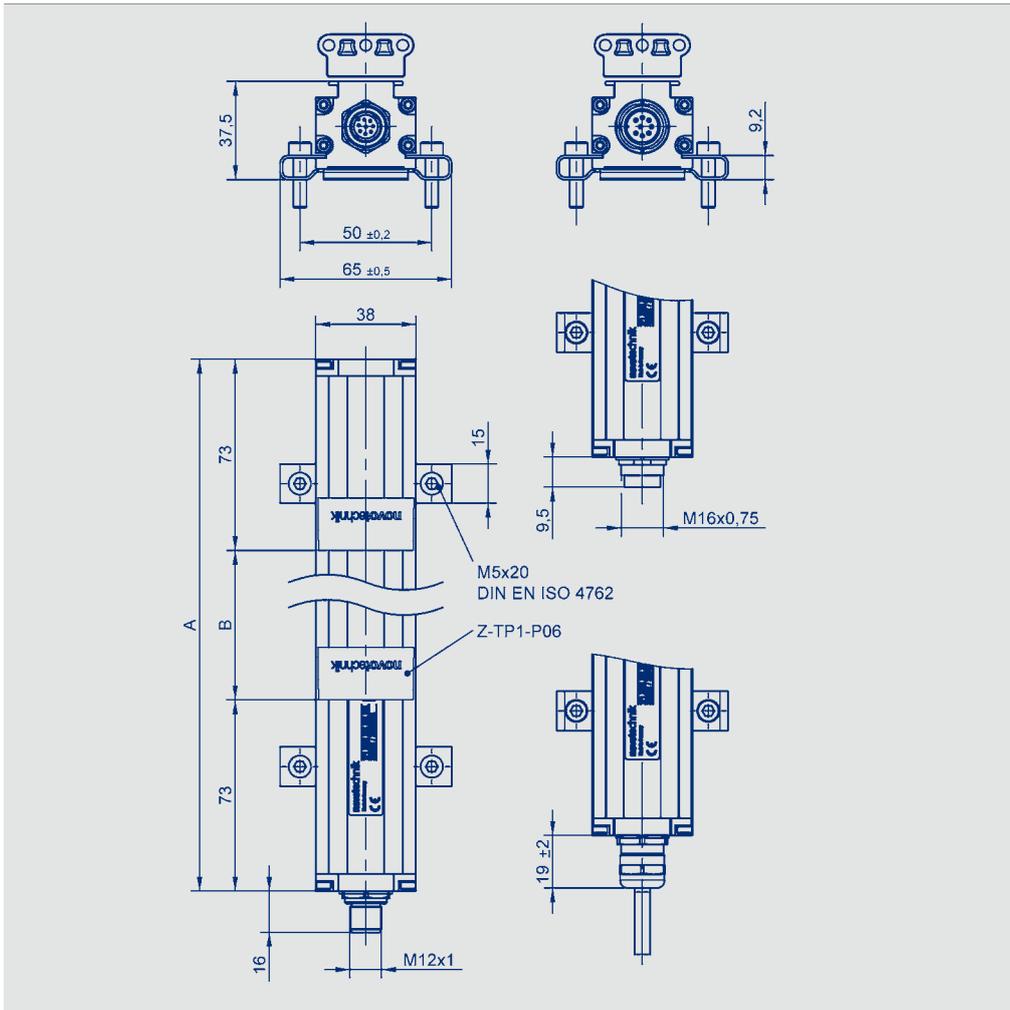
The transducer is mechanically very robust and resistant to high shock and vibration. The active sensing element is encased in an aluminum housing rated to IP68. This makes for excellent ingress protection from dust, moisture and oils.

A sophisticated ASIC in the transducer provides an absolute and proportional current or voltage output signal. A galvanically isolated DC/DC converter output version is available.

Additional interfaces see separate data sheet.

Description	
Housing	Aluminium, anodized, metal end flanges
Mounting	adjustable clamps
Position marker	floating position marker, plastic guided position marker, ball coupling
Measuring principle	NOVOSTRICTIVE touchless magnetostrictive
Electrical connections	8-pin round connector, shielded, M12 x 1 8-pin round connector, shielded, IEC130-9 6-pin round connector, shielded, IEC IEC130-9 8-wire PUR / PVC-cable, 8 x 0.25 mm <sup>2</sup> , shielded: 1 m, 5 m or 10 m length
Electronic	SMD with ASIC, integrated Connector casing (shield) is connected to the sensor housing. Housing is capacitively decoupled from the electronics

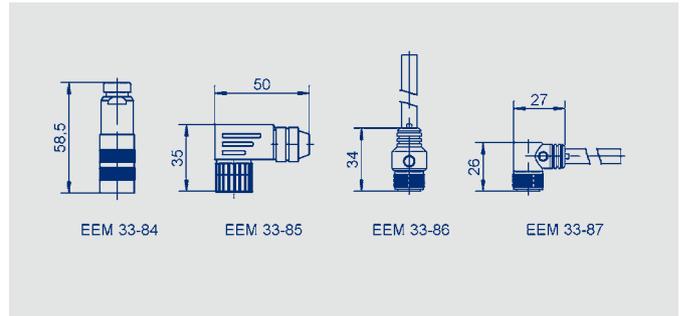
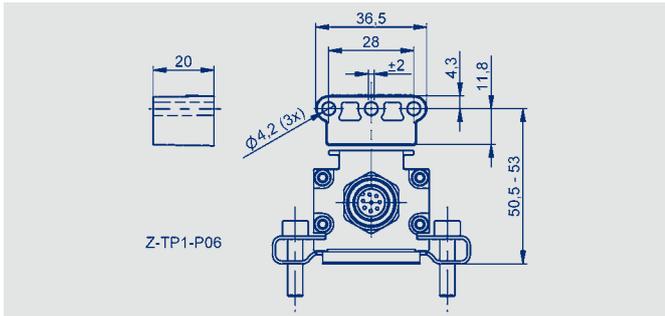
The analog interfaces offer a Teach-In function via the electrical connection.



Output connector Code 101, 102	Cable Code 201, 203, 205	Connector with cable EEM33-86, EEM33-87	Analog current	Analog voltage
PIN 1	YE	WH	0(4) ... 20 mA	do not connect
PIN 2	GY	BN	signal	signal GND
PIN 3	PL	GN	do not connect	+10 ... 0(-10) VDC
PIN 4	RD	YE	DIAG *	DIAG *
PIN 5	GN	GY	do not connect	0(-10) ... +10 VDC
PIN 6	BU	PL	supply GND	supply GND
PIN 7	BN	BU	+24 VDC	+24 VDC
PIN 8	WH	RD	PROG *	PROG *
Output connector Code 103	Analog voltage	Analog current		
PIN 1	0...10 VDC	0 (4)...20 mA		
PIN 2	signal GND	signal GND		
PIN 3	10...0 VDC	do not connect		
PIN 4	supply GND	supply GND		
PIN 5	+24 VDC	+ 24 VDC		
PIN 6	supply GND	supply GND		

Type designations	TP1 - _ - - - - 101 - 41 _ - - - - Analog voltage	TP1 - _ - - - - _101 - 41 _ - - - - Analog current	
<b>Electrical Data</b>			
Electrical measuring range (dimension B)	0050 up to 4250	0050 up to 4250	mm
Absolute linearity	$\leq \pm 0.02$ (min. $\pm 50 \mu\text{m}$ )	$\leq \pm 0.02$ (min. $\pm 50 \mu\text{m}$ )	$\pm$ % F.S.
Tolerance of electr. zero point	$\pm 0.5$ (min. 2 x reproducibility)	$\pm 0.5$ (min. 2 x reproducibility)	mm
Output signal	Voltage 0.1 ... 10 VDC (load $\geq 5 \text{ k}\Omega$ ) -10 ... 10 VDC (load $\geq 5 \text{ k}\Omega$ )	Current 0.1 ... 20 mA (load $\leq 500 \text{ k}\Omega$ ) 4 ... 20 mA (load $\leq 500 \text{ k}\Omega$ )	
Resolution	16	16	bit
Reproducibility	$\leq 0.03$	$\leq 0.03$	% FS
Hysteresis	$\leq 0.01$	$\leq 0.01$	% FS
Supply voltage	24 (19 ... 30)	24 (19 ... 30)	VDC
Supply voltage by galvanic isolation	24 (18 ... 36) see ordering specifications		VDC
Supply voltage ripple	$\leq 10$	$\leq 10$	% V <sub>ss</sub>
Current consumption	$\leq 100$	$\leq 100$	mA
Output update rate max. *	16	16	kHz
Temperature coefficient	$\leq 30$ (min. 0.01 mm/K)	$\leq 30$ (min. 0.01 mm/K)	ppm/K
Overvoltage protection	40 (temporary / 1 min.)	40 (temporary / 1 min.)	VDC
Polarity protection	up to U <sub>max</sub>	up to U <sub>max</sub>	VDC
Signal output protection	up to U <sub>max</sub>	up to U <sub>max</sub>	VDC
Insulation resistance (500 VDC)	$\geq 10$	$\geq 10$	m $\Omega$
<b>Mechanical Data</b>			
Dimensions	see drawing	see drawing	
Body length (dimension A)	dimension B + 146	dimension B + 146	$\pm 2$ mm
Standard defined measuring range (dimension B)	50, 75, 100, 125, 150, 175, 200, 225, 250, 275, 300, 325, 350, 375, 400, 425, 450, 475, 500, mm 550, 600, 650, 700, 750, 800, 850, 900, 950, 1000, 1100, 1200, 1300, 1400, 1500, 1600, 1700, 1800, 1900, 2000, 2250, 2500, 2750, 3000, 3250, 3500, 3750, 4000, 4250 Other lengths on request.		
<b>Environmental Data</b>			
Operating temperature range	-40 ... +85	-40 ... +85	°C
Storage temperature range	-40 ... +105	-40 ... +105	°C
Operating humidity range	0...95 (no condensation)	0...95 (no condensation)	% R.H.
Life	mechanically unlimited (with floating position marker)	mechanically unlimited (with floating position marker)	
MTTF (ISO 13849-1, parts count method, w/o load)	23	23	years
Functional safety	When using our products in safety-related systems please contact us		
Shock per DIN IEC68T2-27	100 (11 ms) (single hit)	100 (11 ms) (single hit)	g
Vibration per DIN IEC68T2-6	20 (5...2000 Hz, A <sub>max</sub> = 0.75 mm)	20 (5...2000 Hz, A <sub>max</sub> = 0.75 mm)	g
Protection class per DIN EN 60529	IP67 with fastened connector IP68 with cable connection	P67 with fastened connector IP68 with cable connection	
Max. traverse speed with valid output signal	10		ms <sup>-1</sup>
Max. traverse acceleration with valid output signal	200		ms <sup>-2</sup>
<b>CE-Conformity</b>			
Emission	RF noise field strength EN 55011, class B		
Noise immunity	ESD EN 61000-4-2 Radiated immunity EN 61000-4-3 Burst EN 61000-4-4 Conducted disturbances induced by RF fields EN 61000-4-6		

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



## Ordering specifications

Preferred types printed in bold

Mechanical version  
101: Profile design

Electrical interface  
4: Analog interface

Output signal analog interfaces 4 \_ \_  
1: Voltage output  
2: Current output

Analog interfaces voltage output 41\_  
1: 0 VDC...10 VDC und 10 VDC...0 VDC  
4: 0 VDC...10 VDC galvanic isolated  
6: -10 VDC ... +10 VDC galvanic isolated

Analog interfaces current output 42\_  
1: 0 mA... 20 mA  
2: 20 mA... 0 mA  
3: 4 mA... 20 mA  
4: 20mA... 4 mA

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

T P 1 - 0 8 0 0 - 1 0 1 - 4 1 1 - 1 0 2

Series

Electrical measuring range  
Standard lengths 0050 up to 4500 mm  
0050 up to 0500 mm in 25 mm-steps, 0500 up to 1000 mm in 50 mm-steps,  
1000 up to 2000 mm in 100 mm-steps, 2000 up to 4250 mm in 250 mm-steps.  
Other lengths on request

## Included in delivery

Mounting clamps Z46 electr. isolating incl. cylinder screws.

## Required accessories

Floating position marker Z-TP1-P06, P/N 005693,  
Z-TP1-P07, P/N 005694,  
Guided position marker Z-TP1-P08, P/N 005695.  
Other position markers on request.

## Recommended accessories

Straight connector IEC 130-9 8-pin, EEM 33-84,  
6-pin, EEM 33-82.  
Angled connector IEC 130-9 8-pin, EEM 33-85,  
6-pin, EEM 33-94.  
PUR-cable with 8-pin female connector M12 x 1, 8 x 0.25 mm<sup>2</sup>, shielded:  
2 m length, EEM 33-86,  
5 m length, EEM 33-90,  
10 m length, EEM 33-92;  
PUR-cable with 8-pin female angled connector, M 12 x 1, 8 x 0.25 mm<sup>2</sup>, shielded:  
2 m length, EEM 33-87,  
5 m length, EE 33-91,  
10 m length, EEM 33-93.  
Actuating rods Z-TP1-S01... for position marker Z-TP1-P08.

## Available on request

Standard cable 10 m  
Specific connectors  
Digital, incremental and fieldbus interfaces (s. separate data sheets).