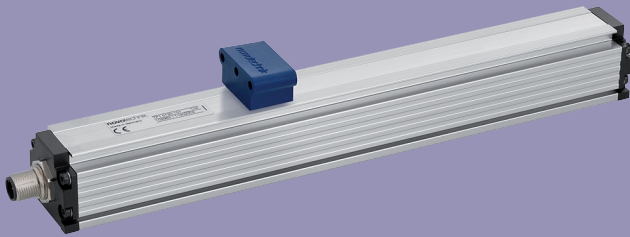


**NOVOSTRICTIVE
Transducer
up to 4250 mm
touchless - absolute**

Series TP1
with incremental
quadrature interface



Special features

- absolute transducer in robust profile design
- NOVOSTRICTIVE non-contacting magnetostrictive measurement principle
- non-contact position detection
- wear-free, unlimited mechanical life span
- incremental quadrature interface
- Power-On Burst with absolute position information
- excellent linearity up to 10 µm
- resolution up to 0.001 mm regardless of stroke length
- low temperature coefficient <15 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.

TP1 with incremental output can directly connected to standard quadrature encoder input channels.

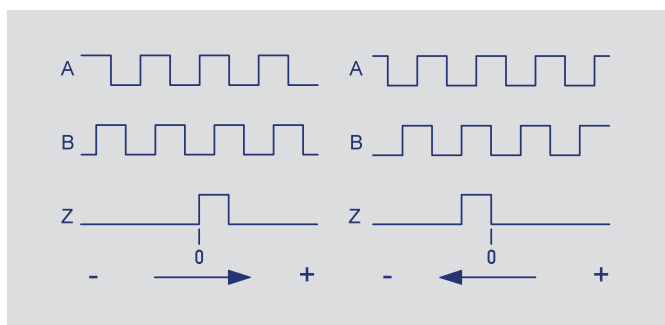
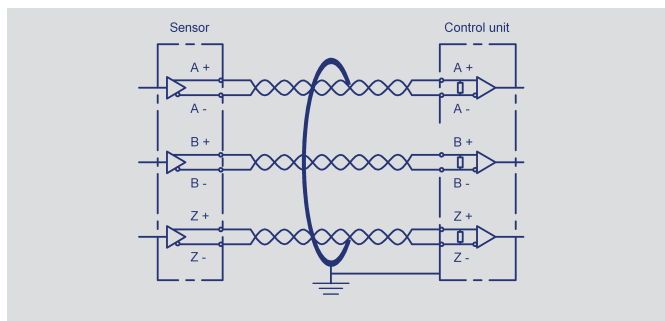
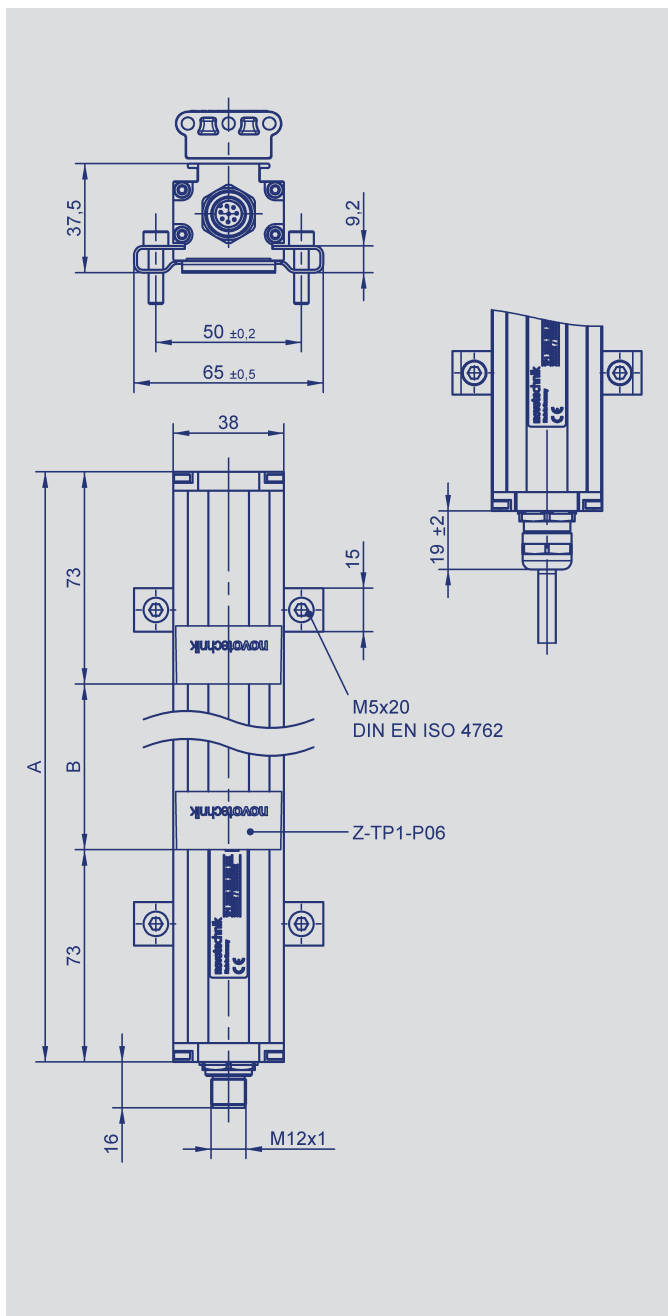
The advanced ASIC provides two digital output signals which are 90 degrees out of phase, and also a reference Z-pulse. Communication is via RS422.

Should the position marker exceed the maximum allowed velocity, the TP1 will still output the proper number of pulses, at the appropriate frequency, to represent the proper position. Therefore, no errors in static position will result from overspeed.

The optional Power-On Burst provides the absolute position of the sensor, immediately after power-on initialization. This allows the controller to know the absolute position without performing a physical re-reference movement.

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
Measurement principle	NOVOSTRICTIVE touchless magnetostrictive
Electrical connections	8-pin round connector, shielded, M12 x 1 8-wire PUR / PVC-cable, 8 x 0.25 mm ² , 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

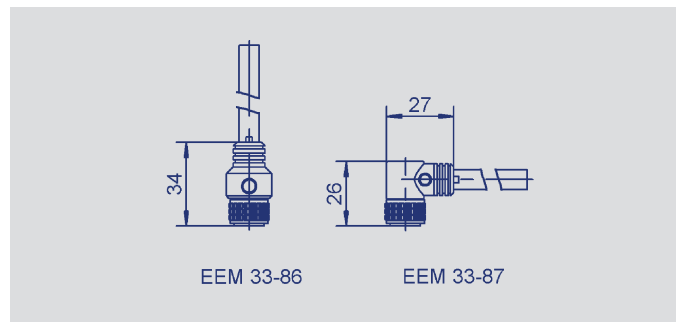
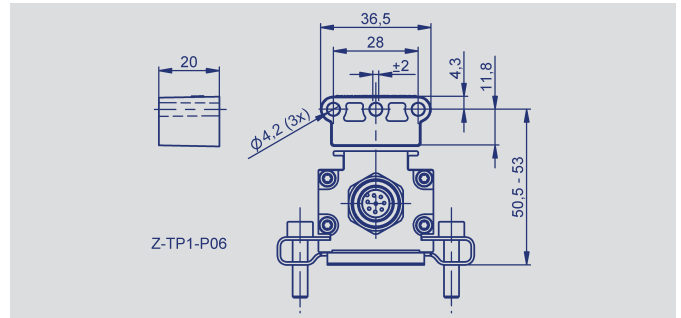


Output connector Code 102	Cable Code 201, 203, 205	Connector with cable signal EEM33-86, EEM33-87
PIN 1	YW	WH A+
PIN 2	GY	BN B+
PIN 3	GN	GN B-
PIN 4	WH	YE Z+
PIN 5	RD	GY Z-
PIN 6	BU	PK supply GND
PIN 7	BN	BU +24 VDC
PIN 8	PK	RD A-

Quadrature interface		
Transmission standard for A/B/Z	RS422 differential / incremental	
Max. pulse frequency power on (initialization)	156	kHz
High speed mode	78	kHz
Low speed mode (standard)		
Max. operating speed	2,2	m/s
High speed mode	1,1	m/s
Low speed mode (standard)		
Frequency A/B- signal	variable, depending on operating speed	
Missing increments at overstep of max. operating speed	no	
Length Z- pulse	1 increment	

Type designations	TP1 - - - - - 101 - 8 - - - - - Incremental Quadrature interface	
Electrical Data		
Electrical measuring range (dimension B)	0050 up to 4250	mm
Absolute linearity	$\leq \pm 10 \mu\text{m}^{**}$ up to 1000 mm $\leq \pm 25 \mu\text{m}^{**}$ up to 2500 mm $\leq \pm 40 \mu\text{m}^{**}$ up to 4250 mm	
Tolerance of electr. zero point	± 0.5	mm
Output signal	RS422 differential / incremental	
Resolution (4 times interpretation)	1 or 5	μm
Reproducibility	≤ 6	μm
Hysteresis	≤ 4	μm
Supply voltage	24 (13...34)	VDC
Supply voltage ripple	≤ 10	%Vss
Current consumption	≤ 100	mA
Temperature coefficient	≤ 15 (min. 0.01 mm/K)	ppm/K
Overvoltage protection	40 (permanent)	VDC
Polarity protection	up to U_{max} .	
Signal output protection	7 (permanent)	VDC
Insulation resistance (500 VDC)	≥ 10	M $\frac{1}{2}$
Mechanical Data		
Dimensions	see drawing	
Body length (dimension A)	dimension B + 146	± 2 mm
Environmental Data		
Operating temperature range	-40...+85	$^{\circ}\text{C}$
Storage temperature range	-40...+105	$^{\circ}\text{C}$
Operating humidity range	0...95 (no condensation)	%R.H.
MTTF (ISO 13849-1, parts count method, w/o load)	27	years
Shock per DIN IEC68T2-27	100 (11 ms) (single hit)	g
Vibration per DIN IEC68T2-6 20	(10...2000 Hz, $A_{\text{max}}=0.75$ mm)	
Protection class per DIN EN 60529	IP67 with fastened connector	
IP68 with cable connection		

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



Mechanical data when used with floating position marker		
Max. traverse speed with valid output signal	2.2 resp. 1.1	ms-1
Max. traverse acceleration with valid output signal	200	ms-2
Life	mechanically unlimited	
Standard measuring range (dimension B)	50, 75, 100, 125, 150, 175, 200, 225, 250, 275, 300, 325, 350, 375, 400, 425, 450, 475, 500, 550, 600, 650, 700, 750, 800, 900, 1000, 1100, 1200, 1300, 1400, 1500, 1600, 1700, 1800, 1900, 2000, 2250, 2500, 2750, 3000, 3250, 3500, 2750, 4000, 4250	mm
	Other lengths on request.	

CE-Conformity	
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

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<p>Ordering specifications</p> <p>Preferred types printed in bold</p>	<p>Mech. version 101: Profile design</p>	<p>Electrical interface 8: Incremental Quadrature interface</p> <p>Output signal incremental interface 8 _ _ 4: Resolution 5 µm variable frequency, high speed mode, power-on burst 6: Resolution 1 µm variable frequency, high speed mode, power-on burst 7: Resolution 5 µm variable frequency, low speed mode, power-on burst 9: Resolution 1 µm variable frequency, low speed mode, power-on burst</p> <p>Incremental interface 8 _ _ 1: RS422 differential (A+ A- B-Z+ Z-)</p> <p>Electrical connection 102: 8-pin round connector M12x1 201: NT Standard cable 1 m 203: NT Standard cable 3 m 205: NT Standard cable 5 m</p>
<p>T P 1 - 0 8 0 0 - 1 0 1 - 8 1 1 - 1 0 2</p>		
<p>Series</p>	<p>Electrical measuring range Standard lengths 0050 up to 4250 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.</p>	

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 marker on
request

Recommended accessories
PUR-cable with 8-pin female
connector M12 x 1,
8 x 0.25 mm², 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, M12 x 1,
8 x 0.25 mm², shielded:
2 m length, EEM 33-87,
5 m length, EEM 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
Other resolutions
Burst on demand
Z-pulse Teach-In
Analog, digital and fieldbus
interfaces
(see separate data sheets).

Important
Avoid equalizing currents in the
cable shield caused by poten-
tial differences. Twisted pair
cable is recommended.