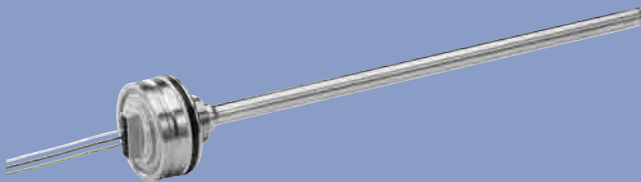


## Transducer up to 2500 mm touchless absolute

### TIM Series



#### Special features

- rod style transducer
- for integration in pneumatic and hydraulic cylinders
- touchless magnetostrictive measuring process
- non-contact guiding with ring-shaped position marker
- unlimited mechanical life
- no velocity limit for position marker
- absolute output voltage or current
- outstanding accuracy performance up to 0.04 %
- repeatability 0.01 % regardless of stroke length
- operating pressure up to 350 bar, peaks up to 530 bar
- wide range of supply voltage
- EMC for mobile applications
- immunity against HF fields up to 200 V/m
- screw flange M18x1.5 or plug-in flange Ø 48 mm
- other flanges on request
- optionally plug, cable or lead wire connection

The TIM Series of absolute position transducers can be integrated directly in the pressurized zone of pneumatic and hydraulic cylinders, providing compact and cost-effective position sensing.

The transducer consists of a stainless steel flange welded on a stainless steel pressure-proof rod and a moving position marker. Signal processing electronics are completely built into the flange. The transducer rod fits into a bored piston rod and the position marker is mounted on the bottom of the piston.

The complete transducer is mounted inside the cylinder and protected against external influences. This arrangement provides high durability and is ideal for mobile applications in harsh environments.

Mounting is also possible in clevis-head cylinders or any space limited cylinder applications.

Novotechnik's touchless magnetostrictive measuring process offers superior accuracy and high cycle rates. The measurement process is unaffected by environmental media like hydraulic liquids.

The high mechanical ruggedness of the transducer combined with the underlying measurement technique means that the system is highly resistant to shock and vibration.

The measurement is accomplished using a passive ring-shaped position marker which can be moved as a free-floating element. The touchless coupling makes installation even simpler.

The wear-free operation means unlimited mechanical

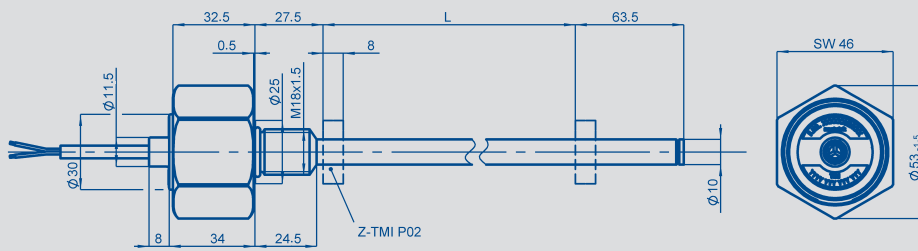
life expectancy and unlimited traverse speed of the position marker and permits stroke lengths up to 2500 mm.

The transducer's integrated signal processing transforms the position information directly into standard voltage or current outputs. Since the outputs are direct, no signal-conditioning electronics are needed when interfacing with controllers or meters.

The transducer complies with EMC requirements of agricultural and forest machines and vehicles.

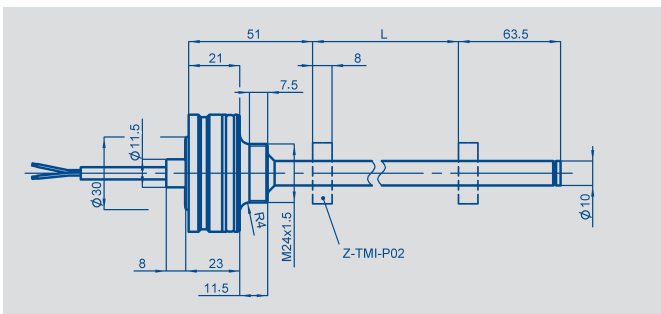
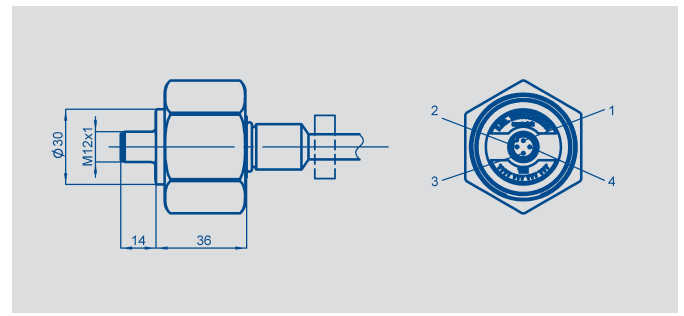
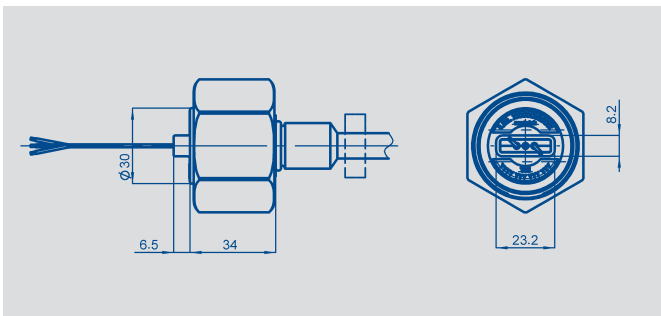
In addition to the standard configuration, the modular design allows customer specific terminal flanges and mounting variations.

Description	
Housing	Rod and flange stainless steel
Mounting	Bushing M18x1.5 for screw plug hole per ISO6149 Plug-in flange Ø 48f7 for mounting bore Ø 48H8
Position marker	Ring position marker, plastic
Measuring technique	Touchless, magnetostrictive
Electrical connection	4-pin round connector, unshielded, M12x1 (only screw flange) 3 conductor cable, unshielded, 1 m long (0.5 mm <sup>2</sup> ) 3 lead wires, 100 mm long (0.5 mm <sup>2</sup> ) Lead wires with 4-pin plug system M12x1, IP69k
Electronics	Integrated SMD with ASIC



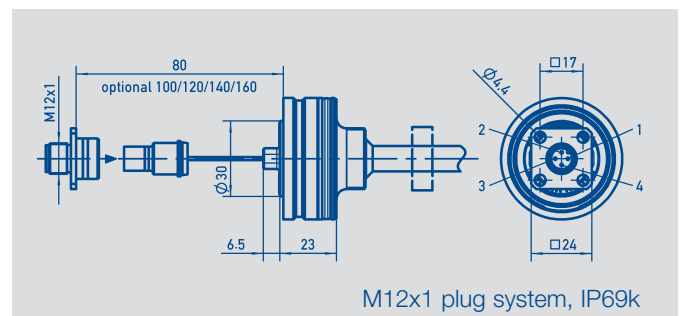
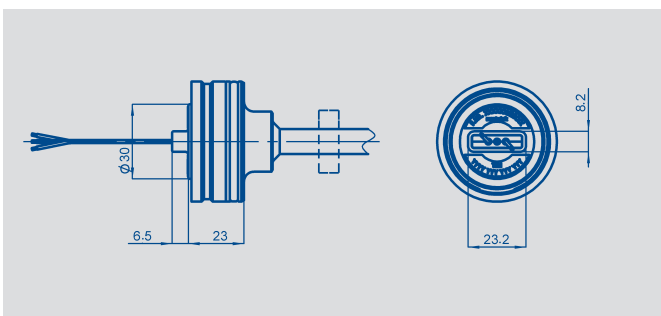
### Screw flange M18x1.5

Options:  
connector outlet  
cable outlet  
lead wires outlet



### Plug-in flange Ø 48 mm

Options:  
cable outlet  
lead wires outlet



M12x1 plug system, IP69k

Type designations	TIM xxxx 3xx 84x xxx TIM xxxx 3xx 85x xxx TIM xxxx 3xx 86x xxx	TIM xxxx 3xx 91x xxx	TIM xxxx 3xx 82x xxx	
<b>Electrical Data</b>				
Defined electrical range (dimension L)	from 0050 to 2500	from 0050 to 2500	from 0050 to 2500	mm
Independent linearity	0.04 (min. ± 0.2 mm)	0.04 (min. ± 0.2 mm)	0.04 (min. ± 0.2 mm)	± % F.S.
Tolerance of electr. zero point	≤ 1	≤ 1	≤ 1	mm typical
Tolerance of electr. end point	≤ 1	≤ 1	≤ 1	mm typical
Output signal	0.5 ... 4.5 VDC 0.25 ... 4.75 VDC 0.1 ... 5.0 VDC (load 10 k)	0.1 ... 10.0 VDC (load 10 k)	4.0 ... 20.0 mA (burden 500 at 24 VDC) (burden 250 at 12 VDC)	
Output short-circuit-proof	against supply (max. ... 27 VDC) and GND			
Update rate	> 500	> 500	> 500	Hz
Resolution	Infinite, restricted by output ripple	Infinite, restricted by output ripple	Infinite, restricted by output ripple	
Repeatability	0.01 (min. ± 0.05 mm)	0.01 (min. ± 0.05 mm)	0.01 (min. ± 0.05 mm)	± % FS
Ripple	0.04	0.04	0.04	% FS
Supply voltage	9 ... 34	16 ... 34	9 ... 34	VDC
Supply voltage ripple	< 1 % peak to peak	< 1 % peak to peak	< 1 % peak to peak	
Power drain without load	< 1	< 1	< 1	W
Temperature coefficient	≤ 30	≤ 30	≤ 30	ppm/K
Overvoltage protection	48 (without function)	48 (without function)	48 (without function)	VDC
Polarity protection	-36	-36	-36	VDC
Electric strength	500 V (GND to housing)			
<b>Mechanical Data</b>				
Dimensions	see drawing	see drawing	see drawing	see drawing
Standard defined electr. range (dimension L)	0050 up to 1000 in 50 mm steps, 1000 up to 2000 in 100 mm steps, 2000 up to 2500 in 250 mm steps other length in 10 mm steps on request			
<b>Environmental Data</b>				
Operating temperature range	-40 ... +105 with cable or wire connection; -40 ... +85 with connector outlet			°C
Operating humidity range	0...95 (no condensation)			% R.H.
Shock per DIN IEC68T2-27	100 (11 ms) (single hit)			g
Vibration per DIN IEC68T2-6	25 (10...2000 Hz, A <sub>max</sub> = 0.75 mm)			g
Protection class per DIN EN 60529	IP67 (M12x1 plug system IP69k)			
Pressure rating				
Working pressure	≤ 350	≤ 350	≤ 350	bar
Pressure peaks	≤ 530	≤ 530	≤ 530	bar
Burst pressure	> 700	> 700	> 700	bar
Traverse speed of position marker	unlimited	unlimited	unlimited	ms <sup>-1</sup>
Traverse acceleration of position marker	unlimited	unlimited	unlimited	ms <sup>-2</sup>
Life	unlimited (mechanical)	unlimited (mechanical)	unlimited (mechanical)	movements
EMC compatibility *	EN ISO 14982 ISO 7637-1/2/3 ISO 11452-5 (HF fields up to 200 V/m) Other EMC compatibilities on request	EN ISO 14982 ISO 7637-1/2/3 ISO 11452-5 (HF fields up to 200 V/m) Other EMC compatibilities on request	EN ISO 14982 ISO 7637-1/2/3 ISO 11452-5 (HF fields up to 200 V/m) Other EMC compatibilities on request	

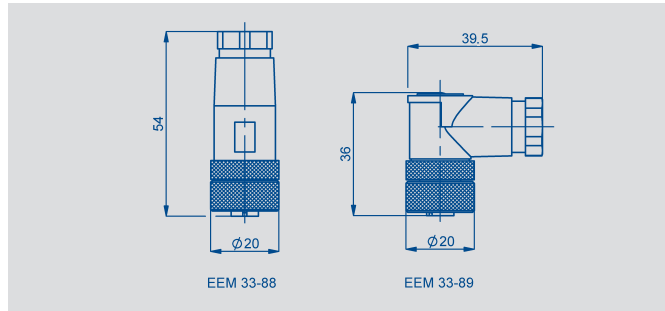
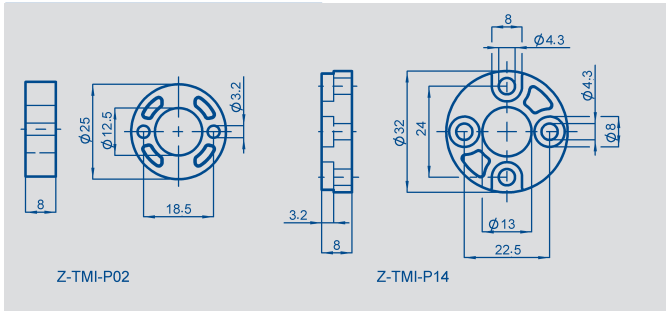
\* The EMC measurements were accomplished in a reference cylinder. The values can deviate when using different cylinders.

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Subject to change



## Ordering specifications

### Operating voltage $U_b$

8: 12/24 VDC mobile electronic (9.0 VDC ... 34.0 VDC)  
9: 24 VDC mobile electronic (16.0 VDC ... 34.0 VDC)

### Output signal / supply voltage 12/24 VDC ( $U_{b8}$ )

2: 4 mA ... 20 mA  
4: 0.5 VDC ... 4.5 VDC  
5: 0.25 VDC ... 4.75 VDC  
6: 0 VDC ... 5 VDC

### Output signal / supply voltage 24 VDC ( $U_{b9}$ )

1: 0 VDC ... 10 VDC

### Output characteristics

1: Positive gradient, seen from flange

### Electrical connection

103: 4 pin round connector M12x1  
251: NT standard cable 1 m  
253: NT standard cable 3 m  
255: NT standard cable 5 m  
351: NT lead wires 100 mm  
408: NT lead wires 80 mm, with M12x1  
410: NT lead wires 100 mm, with M12x1  
412: NT lead wires 120 mm, with M12x1  
414: NT lead wires 140 mm, with M12x1  
416: NT lead wires 160 mm, with M12x1

## Required accessories

Ring position marker  
Z-TMI-P02, Art.No. 005652,  
Z-TMI-P14, Art.No. 005657;  
Other pos. marker on request.

## Recommended accessories

Connector M12x1,  
EEM 33-88, IP67,  
Art.No. 005633;  
Angled connector M12x1,  
EEM 33-89, IP67,  
Art.No. 005634;

## Available on request

Current output 0 mA ...  
20 mA;  
Negative gradient seen from  
flange;  
TLI compatible position mar-  
ker Z-TIM-P17, Art.No.  
005670;  
TLI compatible electrical con-  
nection;  
Industrial versions see data  
sheet TMI

T I M 0 5 0 0 3 0 1 8 5 1 2 5 1

Series

**Defined electr. range**  
Several standard lengths  
from 0050 to 2500 mm

### Mech. configuration

301: Plug-in flange  $\varnothing$  48 mm, rod  $\varnothing$  10,0 mm  
302: Screw flange M18x1.5, rod  $\varnothing$  10,0 mm  
303: like 301, but with femal thread M4x6 at the rod end and additional length 7.5 mm  
304: like 302, but with femal thread M4x6 at the rod end and additional length 7.5 mm

Description	Connector pin Code 103, 40x	Cable Code 25x	Lead wires Code 351
Open	PIN 1	-	-
Supply voltage $U_b$	PIN 2	BN brown	BN brown
DC Ground GND	PIN 3	WH white	WH white
Output signal	PIN 4	GN green	GN green

Potential differences between supply GND and signal GND must be avoided.