

## Preliminary Data sheet

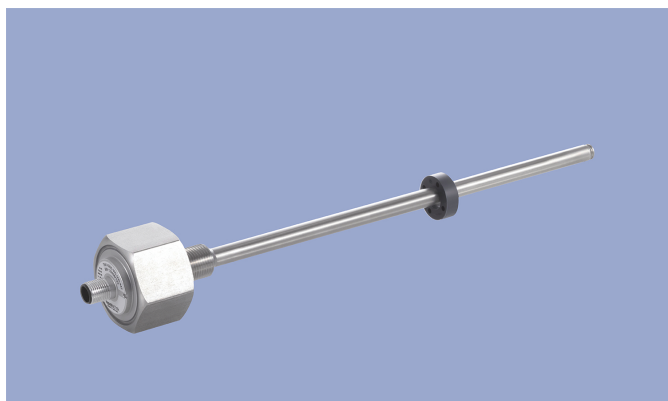
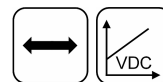
### NOVOSTRICTIVE Transducer Touchless

#### TM1

Screw flange

Voltage

#### Mobile Applications



#### Special Features

- For integration in pneumatic and hydraulic cylinders
- Touchless magnetostrictive measurement technology
- Operating pressure up to 350 bar, peaks up to 450 bar
- Ring-shaped position marker does not contact sensor
- Unlimited mechanical life
- No velocity limit for position marker
- Absolute output
- Outstanding accuracy performance up to 0.04 %
- Wide range of supply voltage
- Optimized for use in mobile applications with highest EMC requirements such as ISO pulses and high interferences to ISO 11452, exceeds E1 requirements
- Other configurations see separate data sheets

#### Applications

Hydraulic or pneumatic cylinders in

- Agricultural and forestry machinery
- Construction machines
- Vehicles with loading and unloading devices
- Vehicles with extension arms

The absolute position transducer can be used directly in-cylinder and thus enables a compact and cost-effective position measurement. The sensor consists of a stainless steel flange welded to a pressure tight rod and can therefore be used in harsh environments.

The magnetostrictive measuring technology offers excellent accuracy for measuring lengths up to 2000 mm.

The passive ring-shaped position marker allows a mechanically decoupled measurement.

#### Description

Material	Flange: stainless steel 1.4307 / AISI 304L Flange cover: AlSiMgBi Rod: stainless steel 1.4571 / AISI 316Ti Sealing: O-ring NBR 90 SH A
Mounting	Screwed into cylinder via bushing M18x1.5 for screw plug hole per ISO 6149
Electrical connection	Cable 3x 0.5 mm <sup>2</sup> (AWG 20), PUR, unshielded / Connector M12x1, A-coded

#### Mechanical Data

Dimensions	See dimension drawing
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## Ordering Specifications

### Ordering Specifications

Preferred types printed in bold

Supply voltage  $U_b$

8:  $U_b = 12/24$  VDC, 24VDC

Output signal

1: 0.1 ... 10 VDC

4: 0.5 ... 4.5 VDC

5: 0.25 ... 4.75 VDC

Output characteristic

1: Rising output characteristic, seen from flange

2: Falling output characteristic, seen from flange

Electrical connection

104: Connector M12x1, 4-pin

251: Cable, 3-pole, unshielded, 1 m

253: Cable, 3-pole, unshielded, 3 m

255: Cable, 3-pole, unshielded, 5 m

**T M 1** - **0 5 0 0** - **3 0 6** - **8 5 1** - **1 0 4**

Series

Mechanical version

306: Screw flange M18x1.5

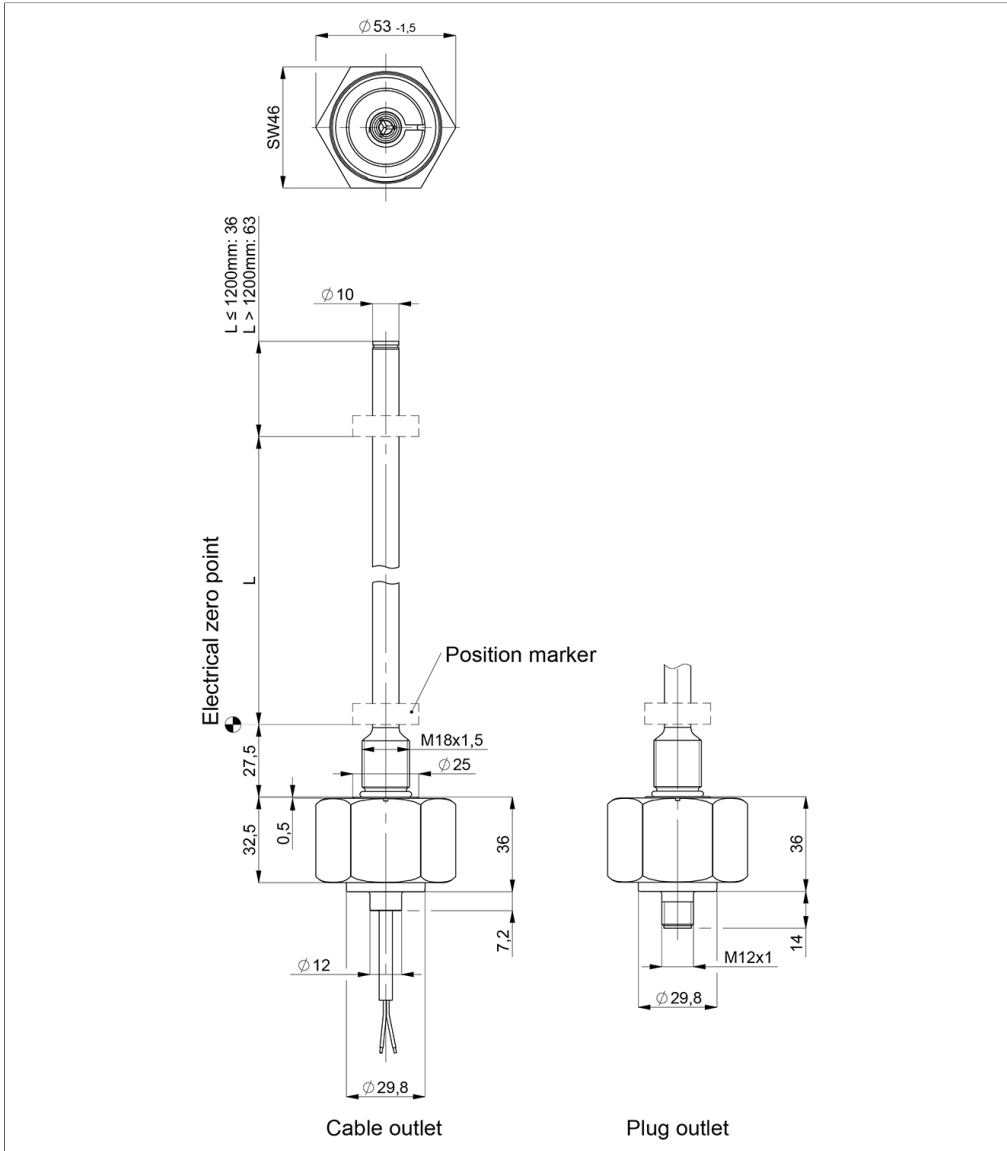
308: Screw flange M18x1.5 with internal thread M4x6 at rod end, additional length 7.5 mm

Electrical measuring range

Standard lengths 0050 up to 2000 mm in 25 mm-steps

Other lengths on request

**Drawing**



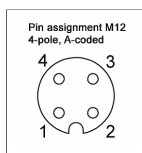
CAD data see  
[www.novotechnik.de/en/download/cad-data/](http://www.novotechnik.de/en/download/cad-data/)

## Technical Data

Type	TM1-____-306-81-____	TM1-____-306-84-____ TM1-____-306-85-____
Output signal	0.1 ... 10 V	0.25 ... 4.75 V 0.5 ... 4.5 V
Load / burden	≥ 10 kΩ	
Update rate	0.5 kHz	
Measuring range	0 ... 50 mm up to 0 ... 2000 mm	
Linearity	≤ ±0.04 %FS (min. 300 μm)	
Tolerance of electr. zero point	±1 mm	
Resolution	0.1 mm	
Repeatability	≤ ±0.1 mm	
Hysteresis	≤ ±0.1 mm	
Temperature error	typ. 50 ppm/K (min. 0.01 mm/K)	
Supply voltage Ub	24 VDC (16 ... 34 VDC)	12/24 VDC (8 ... 32 VDC)
Supply voltage ripple	≤ 10% Ub	
Power drain w/o load	< 1 W	
Overvoltage protection	36 VDC (permanent)	
Polarity protection	yes (-36 VDC)	
Short circuit protection	yes (output vs GND and supply voltage up to 36 VDC)	
Insulation resistance (500 VDC)	≥ 10 MΩ	
<b>Environmental Data</b>		
Max. operational speed	Mechanically unlimited	
Vibration IEC 60068-2-6	20 g, 10 ... 2000 Hz, Amax = 0.75 mm	
Shock IEC 60068-2-27	100 g, 11 ms (single hit)	
Protection class DIN EN 60529	IP67	
Operating temperature	-40 ... +105°C	
Operating humidity	0 ... 95 % R.H. (no condensation)	
Working pressure	≤ 350 bar	
Pressure peaks	≤ 450 bar	
Burst pressure	> 700 bar	
Life	Mechanically unlimited	
Functional safety	If you need assistance in using our products in safety-related systems, please contact us	
MTTF (IEC 60050)	> 20 years	> 20 years
<b>EMC Compatibility</b>		
ISO 10605 ESD (Handling/Component)	8 kV / 15 kV	
ISO 11452-2 Radiated HF-fields	100 V/m	
ISO 11452-5 Radiated HF-Fields, stripline	200 V/m	
CISPR 25 Radiated emission	Level 5	
ISO 7637-2 Pulses on supply lines	(1, 2a, 2b, 3a, 3b) Level 4	
ISO 16750 Pulses on supply lines	(4, 5) Level 4	
ISO 7637-2 Transient Emissions	Level 3	
ISO 7637-3 Pulses on output lines	Level 4	
EN 13309 Construction machinery		
ISO 14982 Agricult./forestry machines		
The EMC measurements are conducted in a reference cylinder. The EMC properties can deviate when using different cylinders.		

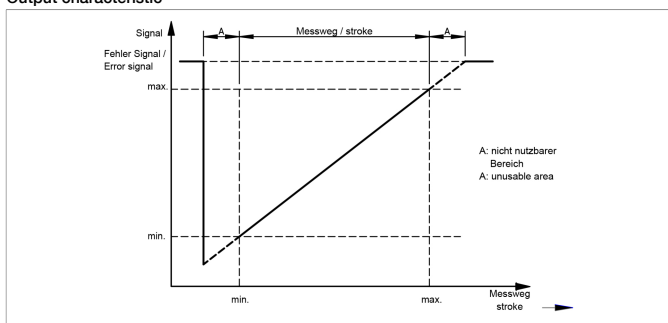
### Connection Assignment

Signal	Cable code 2_ _	Connector code 1_ _
Supply voltage Ub	BN	Pin 1
GND	WH	Pin 3
Signal output	GN	Pin 2
Do not connect	-	Pin 4

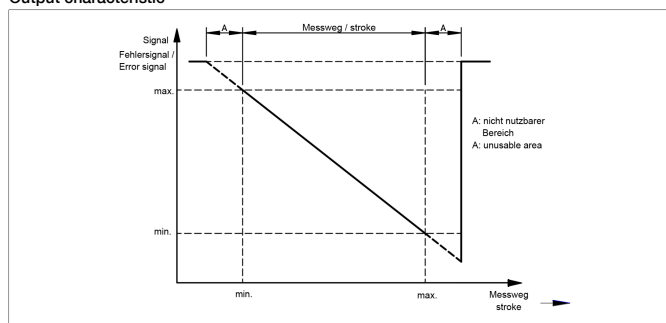


**Technical Data  
Output  
Characteristics**

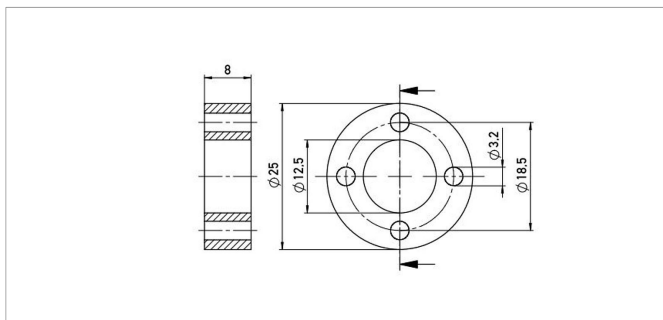
Output characteristic



Output characteristic



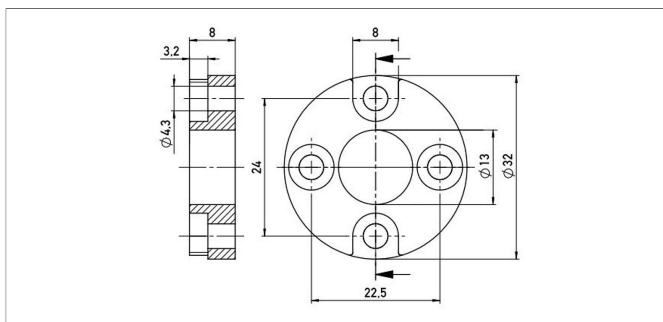
## Position Markers



### Z-TH1-P18

Ring position marker for fixation with screws M3  
 Material PA6-GF  
 Weight approx. 12 g  
 Operating temp. -40 ... +100°C  
 Surface pressure max. 40 N/mm<sup>2</sup>  
 Fastening torque max. 100 Ncm  
 of mounting

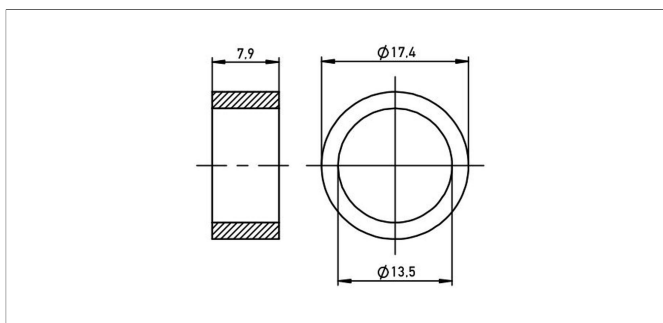
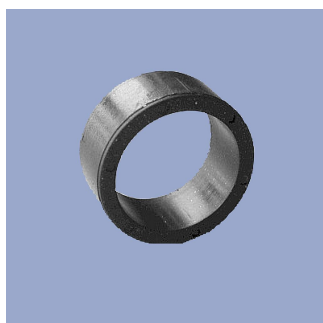
P/N	Pack. unit [pcs]
400005697	1



### Z-TH1-P19

Ring position marker for fixation with screws M4  
 Material PA6-GF  
 Weight approx. 14 g  
 Operating temp. -40 ... +100°C  
 Surface pressure max. 40 N/mm<sup>2</sup>  
 Fastening torque max. 100 Ncm  
 of mounting

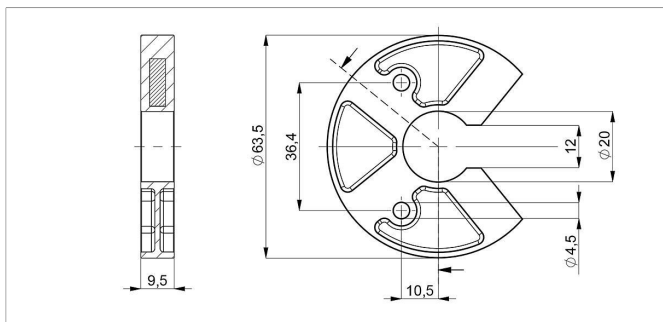
P/N	Pack. unit [pcs]
400005698	1



### Z-TIM-P20

Ring position marker for mounting via lock washer and retaining ring  
 Material PA-Neonbond Compound  
 Weight approx. 5 g  
 Operating temp. -40 ... +100°C  
 Surface pressure max. 10 N/mm<sup>2</sup>

P/N	Pack. unit [pcs]
400005699	1



### Z-TH1-P25

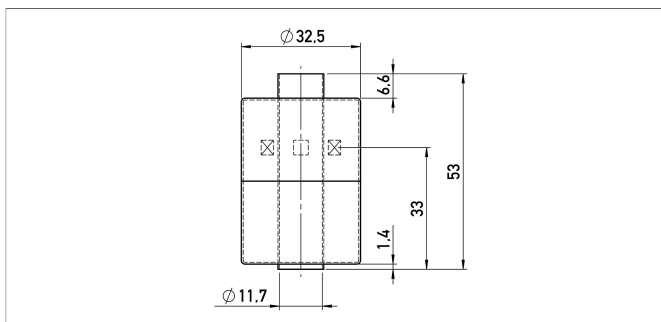
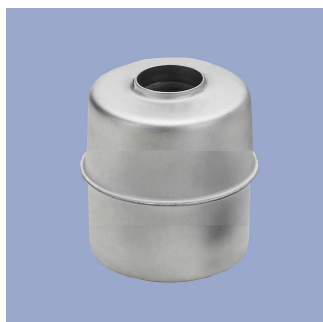
U-shaped position marker for fixation with M4 screws

Caution: for dimension of electrical zero point please follow the user manual!

Material PA6-GF  
 Operating temp. -40 ... +105°C  
 Surface pressure max. 40 N/mm<sup>2</sup>  
 Fastening torque max. 100 Ncm  
 of mounting

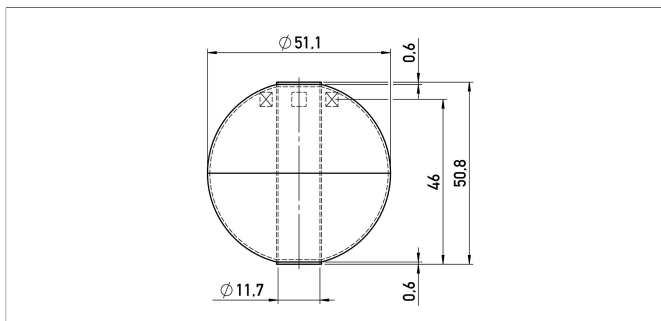
P/N	Pack. unit [pcs]
400105076	1

## Position Markers



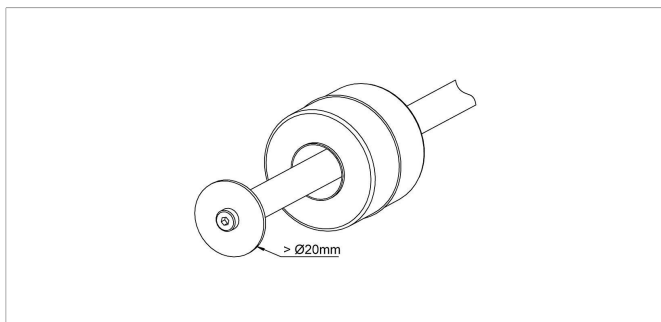
**Z-TH1-P31**  
Cylinder floating position marker  
Material Stainless steel 1.4404  
Weight approx. 20 g  
Operating temp. -40 ... +100°C  
Compression strength  $\leq 24$  bar  
Density 740 kg/m<sup>3</sup>  
Immersion depth in water approx. 26.6 mm

P/N	Pack. unit [pcs]
400105704	1

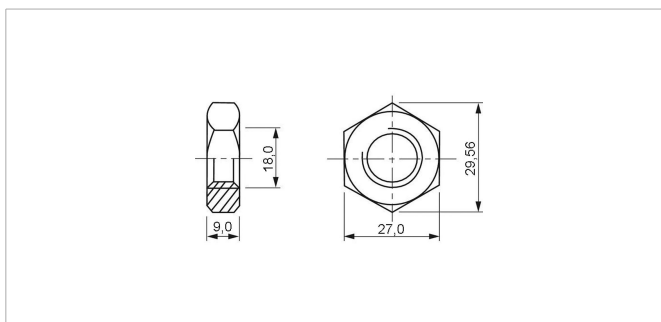


**Z-TH1-P32**  
Ball-type floating position marker  
Material Stainless steel 1.4571  
Weight approx. 42 g  
Operating temp. -40 ... +100°C  
Compression strength  $\leq 40$  bar  
Density 720 kg/m<sup>3</sup>  
Immersion depth in water 36.7 mm

P/N	Pack. unit [pcs]
400105703	1



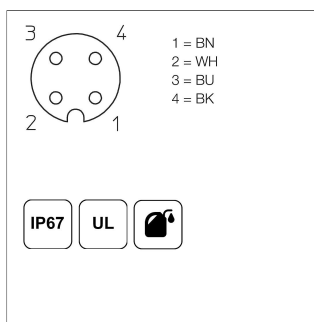
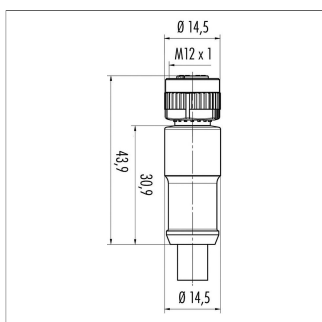
When using floating position markers, we recommend to secure the marker against loss with a washer at the rod end.  
For this purpose, a sensor version with inner thread at the rod end is required (s. ordering code).



**Z-TH1-M01**  
Lock nut ISO 8675, M18x1.5-A2

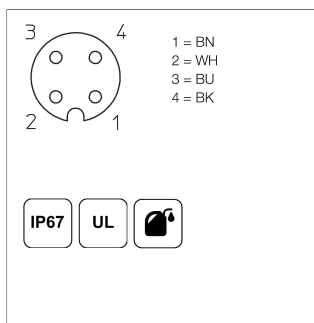
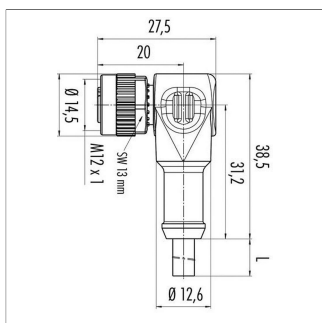
P/N	Pack. unit [pcs]
400056090	1

## Connector System M12



**EEM-33-35/36/37**  
M12x1 Mating female connector, 4-pin, straight, A-coded, with molded cable, not shielded, IP67, open ended  
Plug housing PA  
Cable sheath PUR, Ø = max. 6 mm, -40 ... +85°C (fixed)  
Lead wires PP, 0.34 mm<sup>2</sup>

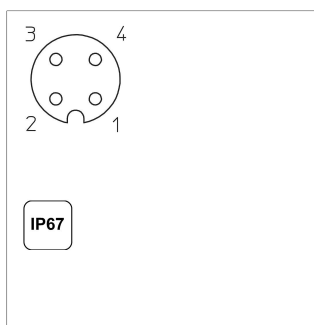
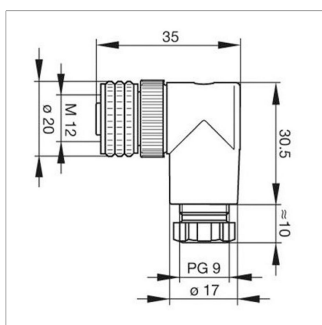
P/N	Type	Length
400056135	EEM-33-35	2 m
400056136	EEM-33-36	5 m
400056137	EEM-33-37	10 m



**EEM-33-38/39/40**  
M12x1 Mating female connector, 4-pin, angled, A-coded, with molded cable, not shielded, IP67, open ended

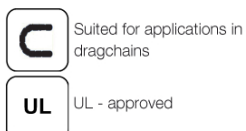
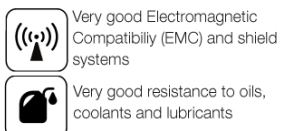
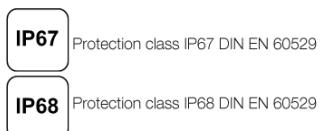
Plug housing PA  
Cable sheath PUR, Ø = max. 6 mm, -40 ... +85°C (fixed)  
Lead wires PP, 0.34 mm<sup>2</sup>

P/N	Type	Length
400056138	EEM-33-38	2 m
400056139	EEM-33-39	5 m
400056140	EEM-33-40	10 m



**EEM-33-89**  
M12x1 Mating female connector, 4-pin, angled, A-coded, with coupling nut, screw termination, IP67, not shieldable  
Operating temp. -25 ... +90°C  
Plug housing PBT  
For wire gauge 6 ... 8 mm, max. 0.75 mm<sup>2</sup>

P/N	Type
400005634	EEM-33-89





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