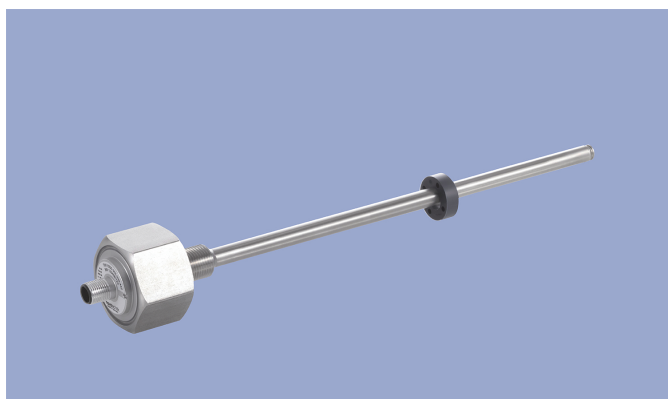


**NOVOSTRICTIVE  
Transducer  
Touchless**

**TM1**

Screw flange  
CAN SAE J1939

**Industrial**



**Special Features**

- Compact design for tight spaces
- Touchless magnetostrictive measurement technology
- Operating pressure up to 350 bar, peaks up to 450 bar
- Non-contacting position detection with ring-shaped position marker
- 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 industrial applications
- Other configurations see separate data sheets

**Applications**

- Manufacturing Engineering
- Level measurement
- Actuators

The absolute linear transducer TM1 enables a compact and cost-effective position measurement. It consists of a stainless steel flange welded to a pressure-resistant rod and can therefore be used under harsh environmental conditions. 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: SS 1.4307 / AISI 304L
	Flange cover: AISiMgBi
	Rod: SS 1.4571 / AISI 316Ti
	Sealing: O-ring NBR 90 SH A
Mounting	Screwed via thread M18x1.5
Electrical connection	Connector M12x1, A-coded

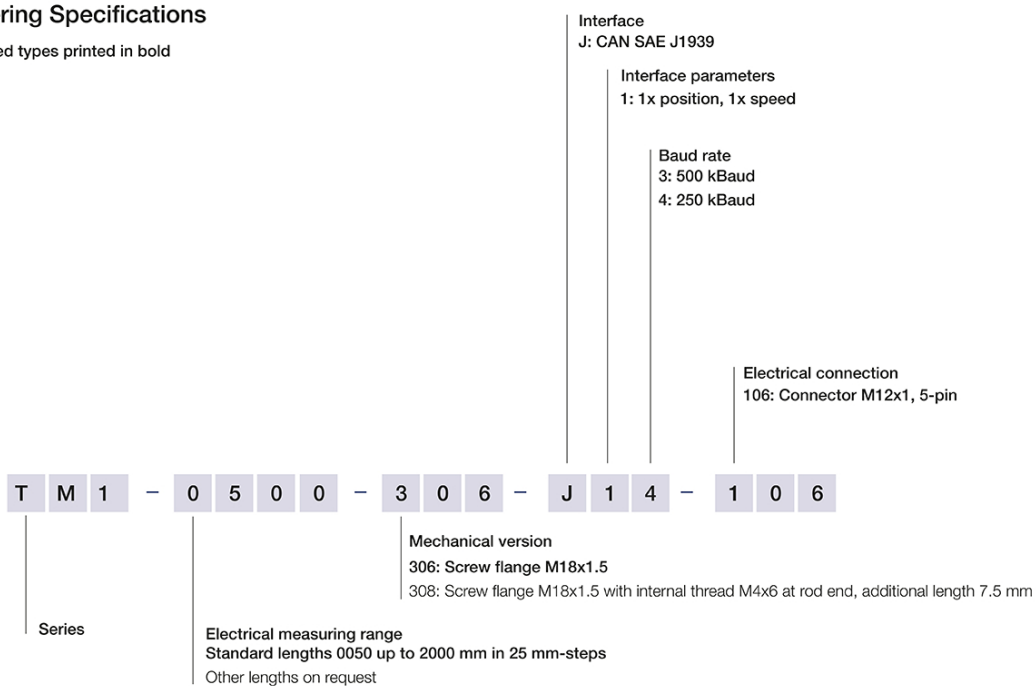
**Mechanical Data**

Dimensions	See dimension drawing
------------	-----------------------

## Ordering Specifications

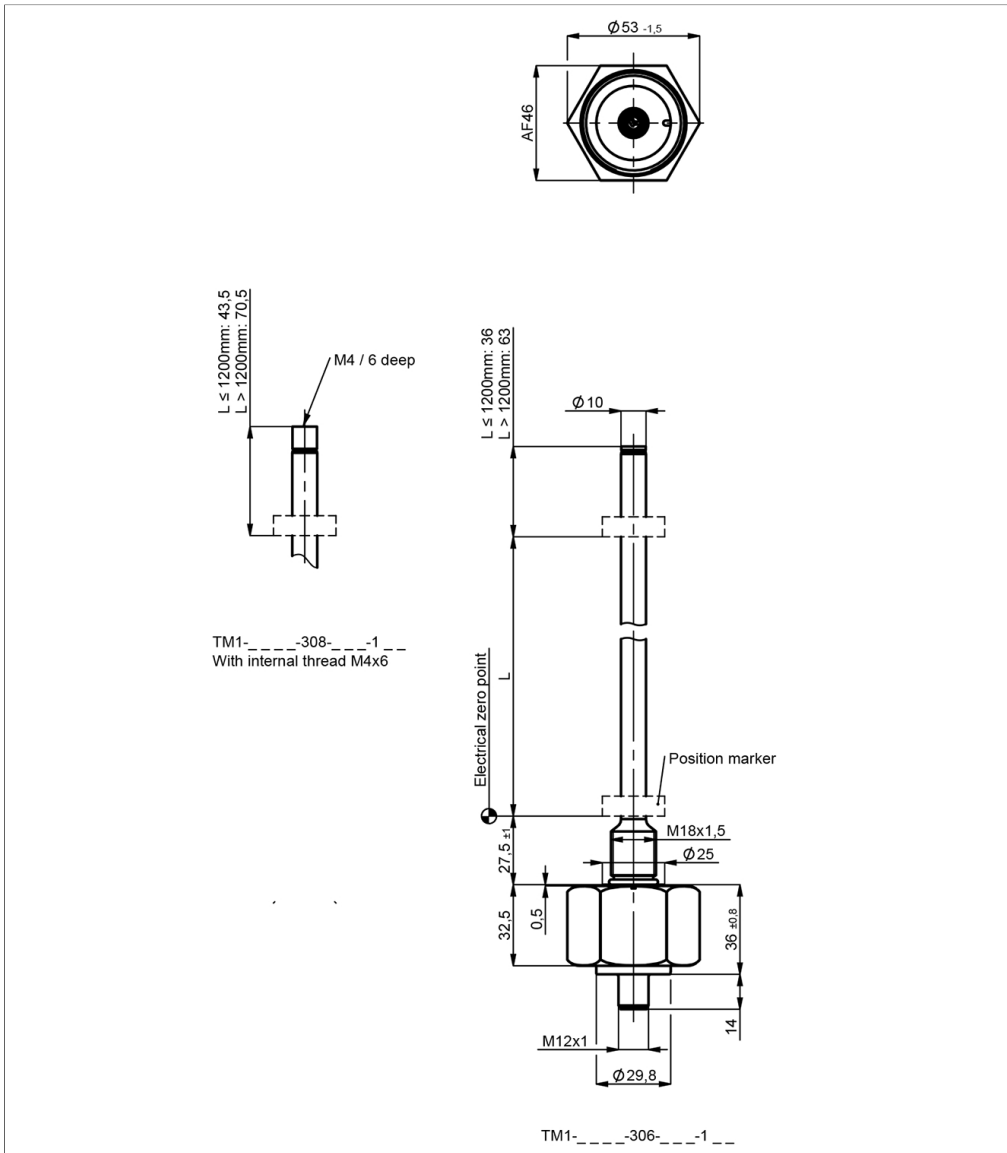
### Ordering Specifications

Preferred types printed in bold



**Drawing**

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



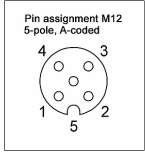
## Technical Data

<b>Type</b>	<b>TM1-____-306-J__-106</b> <b>CAN SAE J1939</b>
Measured variables	Position, speed and temperature
Electrical measuring range (dim. L)	0 ... 50 mm up to 0 ... 2000 mm
Measuring range speed	25 ... 1000 mm/s
Protocol	CAN SAE J1939
Programmable parameters	Offset position, averaging, baud rate, transmit mode, transmit cycle, source address
Node ID	128 ... 247 (dynamic address claiming)
Baud rate	250, 500 kBaud
Update rate (output)	1 kHz (internal measuring rate 0.5 kHz)
Resolution	≤ 0.1 mm
Resolution speed	2 mm/s
Absolute linearity	≤ ±0.04 %FS (min. 300 μm)
Tolerance of electr. zero point	±1 mm
Repeatability	≤ ±0.1 mm
Hysteresis	≤ ±0.1 mm
Temperature error	≤ ±15 ppm/K (min. 0.01 mm/K)
Supply voltage Ub	12/24 VDC (8 ... 34 VDC)
Supply voltage ripple	≤ 10% Ub
Power drain w/o load	< 1.5 W
Overvoltage protection	40 VDC (6 s)
Polarity protection	yes (supply lines and outputs)
Short circuit protection	yes (all outputs vs. GND and supply voltage)
Insulation resistance (500 VDC)	≥ 10 MΩ
Bus termination internal	w/o (internal load resistance 120 Ω on request)
<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)	391 years
Traceability	Serial number on type labeling: production batch of the sensor assembly and relevant sensor components
<b>EMC Compatibility</b>	
EN 61000-4-2 ESD (contact/air discharge)	4 kV, 8 kV
EN 61000-4-3 Electromagnetic fields (RFI)	10 V/m
EN 61000-4-4 Fast transients (burst)	1 kV
EN 61000-4-6 Cond. disturbances (HF fields)	10 V eff.
EN 55016-2-3 Radiated disturbances	Industrial and residential area

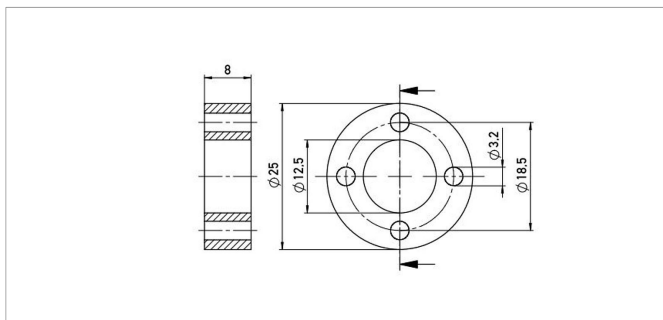
FS = Full scale: Signal span according to electrical measuring range

**Connection Assignment**

Signal	Connector code 106
Supply voltage Ub	Pin 2
GND	Pin 3
CAN_H	Pin 4
CAN_L	Pin 5
CAN_SHLD	Pin 1
	Connect cable shielding to protection earth



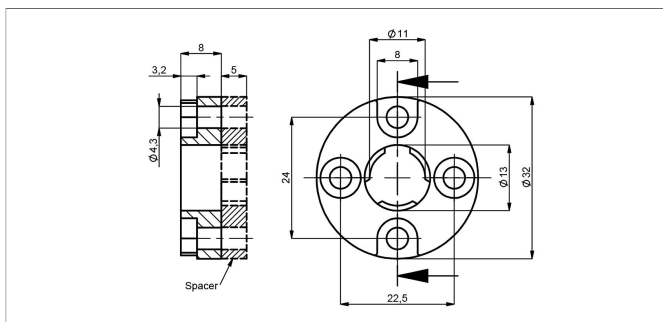
## Position Markers



### 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

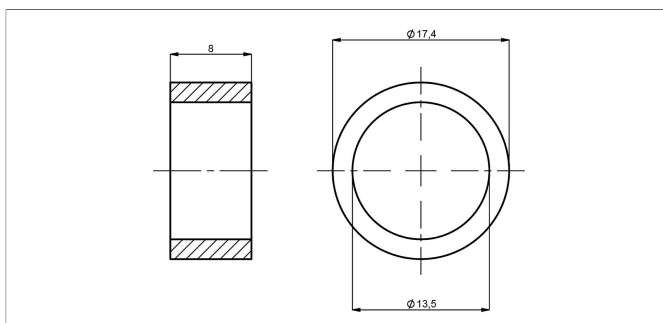
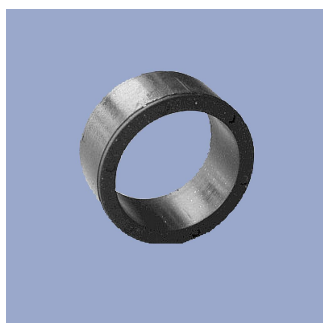


### Z-TH1-P19

#### Z-TH1-PD19 With spacer

Ring position marker for fixation with screws M4, optionally with or without spacer  
 Material PA6-GF, Spacer: POM-GF  
 Weight approx. 14 g  
 Operating temp. -40 ... +100°C  
 Surface pressure max. 40 N/mm<sup>2</sup>  
 Fastening torque max. 100 Ncm

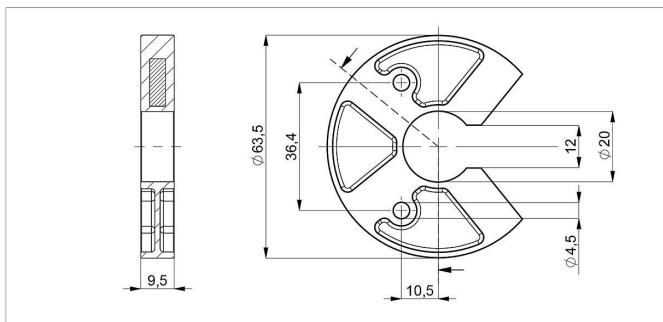
P/N	Spacer	Pack. unit [pcs]
400005698	-	1
400107117	incl.	1



### Z-TH1-P30

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

P/N	Pack. unit [pcs]
400106139	1



### Z-TH1-P25

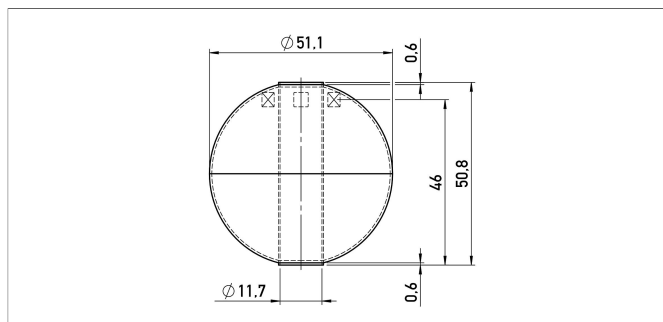
U-shaped position marker for fixation with M4 screws

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

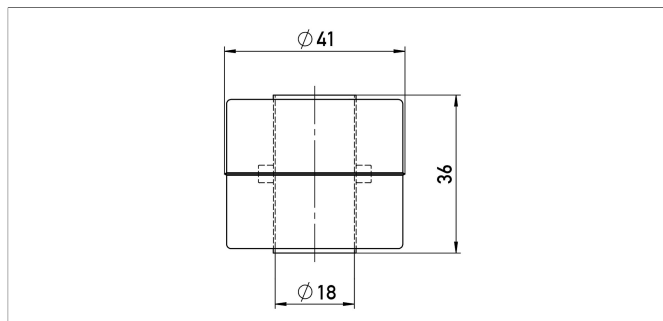
## Position Markers



### Z-TH1-P32

Ball-type floating position marker  
Material SS 1.4571 / AISI 316Ti  
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

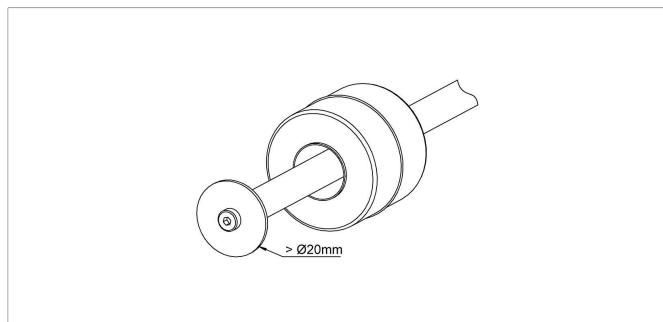
P/N	Pack. unit [pcs]
400105703	1



### Z-TH1-P21

Cylinder floating position marker  
Material SS 1.4404 / AISI 316L  
Weight approx. 20 g  
Operating temp. -40 ... +100°C  
Compression strength  $\leq 8$  bar  
Density 740 kg/m<sup>3</sup>  
Immersion depth in water approx. 26.6 mm

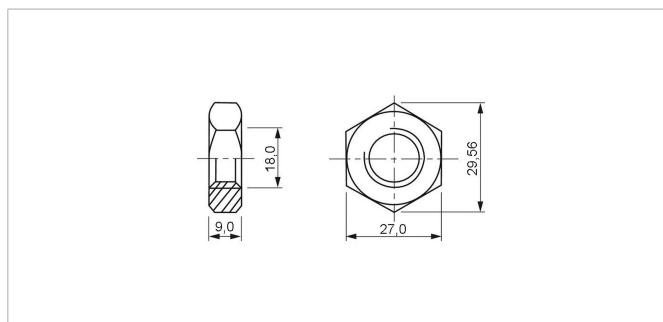
P/N	Pack. unit [pcs]
400056044	1



### Floating Position Marker - Installation Recommendation

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).

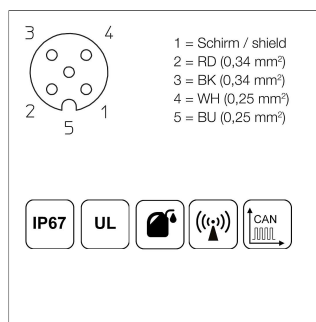
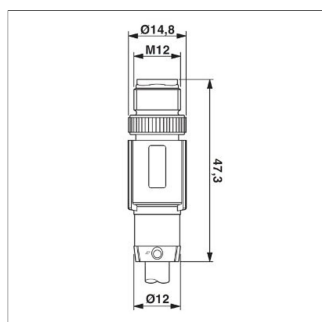


### Z-TH1-M01

Lock nut ISO 8675, M18x1.5-A2

P/N	Pack. unit [pcs]
400056090	1

## Connector System M12

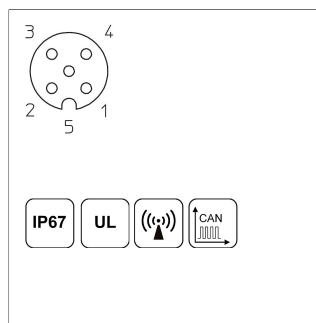
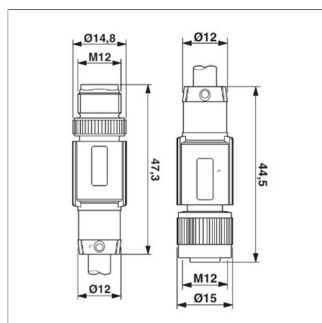


**EEM-33-49/50/51**  
M12x1 Mating female connector, 5-pin, straight, A-coded, with molded cable, IP67, shielded (shield on knurl), open ended

Plug housing TPU  
Cable sheath PUR, Ø = 6.7 mm, -25 ... +90°C (socket), -20 ... +80°C (cable)

Lead wires PE, 2x0.25 mm<sup>2</sup>+2x0.34 mm<sup>2</sup>

P/N	Type	Length
400106368	EEM-33-49	2 m
400106371	EEM-33-50	5 m
400106372	EEM-33-51	10 m

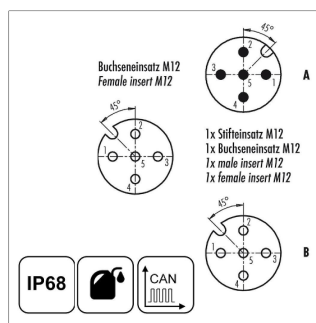
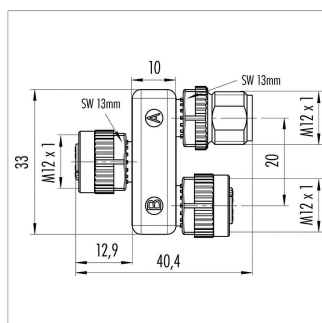


**EEM-33-52**  
M12x1 Mating female/male connector, 5-pin, straight, A-coded, with molded cable, IP67, shielded (shield on knurl), CAN-Bus

Plug housing PUR  
Cable sheath PUR, Ø = 6.7 mm, -25 ... +90°C (plug/socket), -20 ... +80°C (cable)

Lead wires PE, 2x0.25 mm<sup>2</sup>+2x0.34 mm<sup>2</sup>

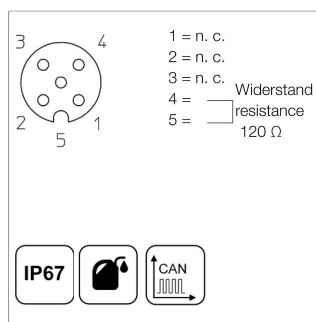
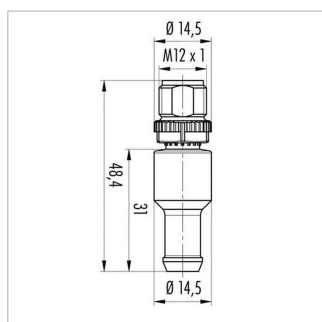
P/N	Type	Length
400106373	EEM-33-52	5 m



**EEM-33-45**  
M12x1 splitter / T-connector, 5-pin, A-coded, IP68, 1:1 connection, female - male - female, CAN-Bus

Plug housing PUR, -25 ... +85°C

P/N	Type
400056145	EEM-33-45



**EEM-33-47**  
M12x1 terminating resistor, 5-pin, A-coded, IP67, 120 Ω resistance, CAN-Bus

Plug housing PUR, -25 ... +85°C

P/N	Type
400056147	EEM-33-47

**IP67** Protection class IP67 DIN EN 60529

**IP68** Protection class IP68 DIN EN 60529

Very good Electromagnetic Compatibility (EMC) and shield systems

Very good resistance to oils, coolants and lubricants

Suited for applications in dragchains

**UL** UL - approved

CAN-Bus



Novotechnik U.S., Inc.  
155 Northboro Road

Southborough, MA 01772  
Phone 508 485 2244  
Fax 508 485 2430  
info@novotechnik.com  
www.novotechnik.com



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