

## M-Series Analog

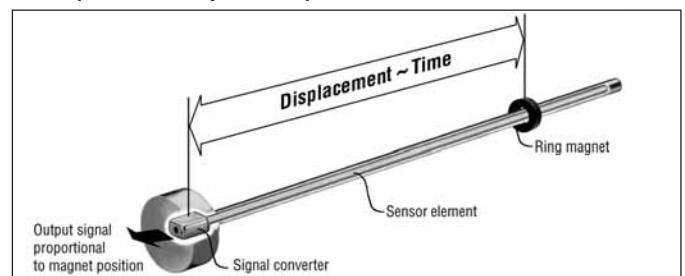
**Temposonics MH**  
Measuring length 50 - 2500 mm

**PRELIMINARY**



**Compact Sensor for Mobile Hydraulics**

- Linear, Absolute Measurement in Hydraulic Cylinders
- Contactless Sensing with Highest Durability
- Minimum Dimensions for Compact Mobile Hydrocylinders
- Replacing Potentiometers and Inductive Position Sensors
- Superior Accuracy: Linearity Tolerance better 0,04 %
- Repeatability 0,005 %
- Direct Analog Displacement Output: Current and Voltage
- Power Supply: 12 / 24 VDC
- EMC: Immunity against electromagnetic HF-fields up to 200 V/m
- Independent from Hydraulic Liquid



### Magnetostriction

### Form factor

The absolute **Temposonics®** linear position sensors are based on the MTS developed magnetostrictive measurement principle. That combines various magneto-mechanical effects and uses the physical height precise speed-measurement of an ultrasonic wave (torsion pulse in its sensor element) for position detecting. Sensor integrated signal processing transforms the measurements directly into market standard outputs. The contactless principle - an external movable magnet marks the position - eliminates the wear, noise and erroneous signal problems and guarantees the best durability without any recalibration.

**Temposonics® MH**, the compact stainless steel position sensor is designed for installation into hydraulic cylinders, specifically for use in clevis head mobile cylinders or any space limited cylinder applications.

1. The sensor head, a robust housing with built-in electronics.
2. The pressure-proof sensor pipe with flange protects the internal sensing element, the waveguide system. It fits into the bored piston rod.
3. The position magnet, only moving part is mounted on the piston bottom. This permanent magnet travels wearfree and contactless along the stationary sensor tube. Its magnetic field starts the measurement signal through the sensor's rod wall.

## Designed for the mobile world

M-Series sensors were designed with the “mobile” world in mind, and have been validated in the field by customers worldwide. Performance is second to none; high accuracy, 200 V/m EMI, position output. Ruggedness is “designed in”; 100 g shock and 25 g vibration rating. Cable and wire options are sized for direct connection to industry proven connectors. The model MH sensor can be fully sealed and embedded in a cylinder to ensure a long operating life.

## Technical Data

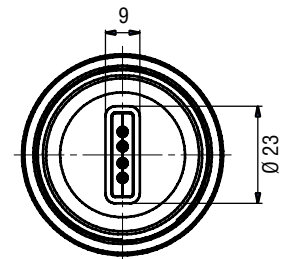
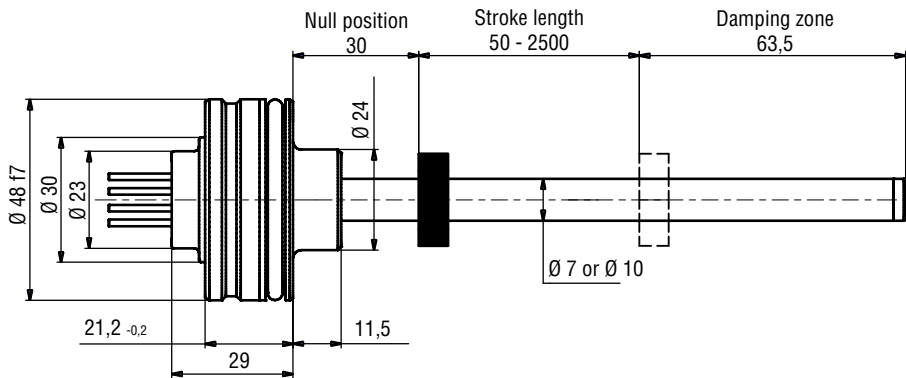
<b>Input</b>	
Measured Variables:	Displacement
Measuring Range:	50 - 2500 mm in 5 mm steps
<b>Output</b>	
Voltage:	0 - 5 VDC / 0,25... 4,75 / 0,5 ... 4,5 VDC; (Controller input resistance RL: $\geq$ 10 kOhm, short circuit-proof, electric strength up to 28 Vdc)
Current:	4 - 20 mA load resistor $\leq$ 250 Ohm with 12 V power supply, load resistor $\leq$ 500 Ohm with 24 V power supply)
<b>Accuracy</b>	
Resolution:	0,1 mm
Linearity, uncorrected:	$< \pm 0,04$ % F.S. (Minimum $\pm 0,100$ mm)
Repeatability:	$< \pm 0,005$ % F.S.
Update Frequency:	500 Hz
Ripple:	$< 0,02$ % F.S.
Set point tolerance:	$\pm 0,7$ mm
<b>Operating conditions</b>	
Mounting Position, Sensor:	Any orientation
Magnet Speed:	Any
Operating Temperature:	-40° C ... +105° C
Dew Point, Humidity:	90 % rel. humidity, no condensation
Sealing:	IP 67
Rod Pressure Rating:	300 bar, 450 bar peak pressure for 7 mm rod diameter 450 bar, 750 bar peak pressure for 10 mm rod diameter
Shock Rating:	100 g (single hit) / IEC-Standard 68-2-27
Vibration Rating:	25 g / 5 kHz / IEC-Standard 68-2-6
EMC-Test:	ISO 14982 Agricultural- and forest machines ISO 7637-1/2/3 Road vehicles Immunity belong to ISO 11452-5: electromagnetic HF-fields up to 200 V/m CE certified EMC for railway vehicles DIN EN 50121-3-2
<b>Form factor, Material</b>	
Material Sensor:	Stainless steel 1.4305 / AISI 304
Magnet Type:	Ring magnet
<b>Installation</b>	
Mounting:	Lose fit flange $\varnothing$ 48 mm
<b>Electrical connections</b>	
Connection Type:	Pigttailed PUR cable, 3 wires
Input Voltage:	12 / 24 VDC (10 - 32 V)
Ripple:	$< 1$ % peak to peak
Current Drain:	$< 60$ mA
Electric Strength:	500 VDC (0 V ground to machine ground)
Polarity Protection:	Up to -36 VDC
Overvoltage Protection:	Up to 36 VDC

## Temposonics-MH - High Pressure Compact Sensor Measuring Range 50 - 2500 mm.

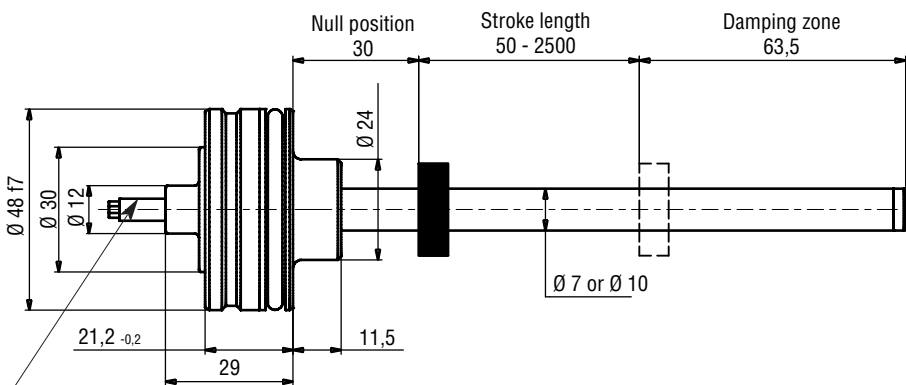
Temposonics-MH, the new compact stainless steel position sensor is designed for installation into hydraulic cylinders, specifically for use in clevis head mobile cylinders or any space limited cylinder applications. MH type sensors are ideal choices for a wide range of standard hydraulic cylinders. Magnetostrictive displacement sensors, high quality cylinders and precise control valves form ideal driving systems for technically demanding of mobile hydraulics.

## Simple mechanics

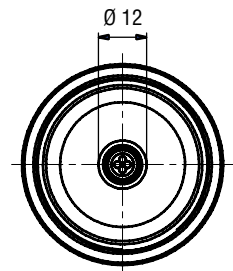
- The extremely rugged sensor consist of 3 main parts
- The sensor head, a robust housing with built-in electronics.
  - The pressure-proof sensor pipe (up to 450 bar) with flange protects the internal sensing element, the waveguide system. It fits into the bored piston rod.
  - The position magnet, only moving part is mounted into the piston bottom. This permanent magnet travels wearfree and contactless along the stationary sensor tube. Its magnetic field starts the measurement signal through the sensors rod wall.



Wire exit option

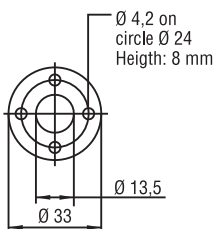


Mating cable  $\varnothing$  5 mm



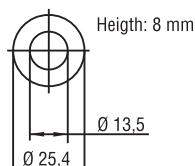
Cable exit option

## Position Magnets



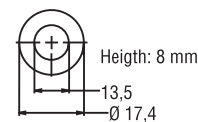
**Ring magnet OD33**  
Part No. 201 542-2

PA-Ferrit-GF20  
Gewicht ca. 14g  
Operating temperature:  
-40 ... +100°C  
Surface pressure max. 40 N/mm<sup>2</sup> in axial direction  
Fastening Torque for M4 screws max. 1 Nm



**Ring magnet OD25.4**  
Part No. 400 533

Composite PA-Ferrite-GF20  
Weigth ca. 14g  
Operating temperature:  
-40 ... +100°C  
Surface pressure max. 40 N/mm<sup>2</sup> in axial direction



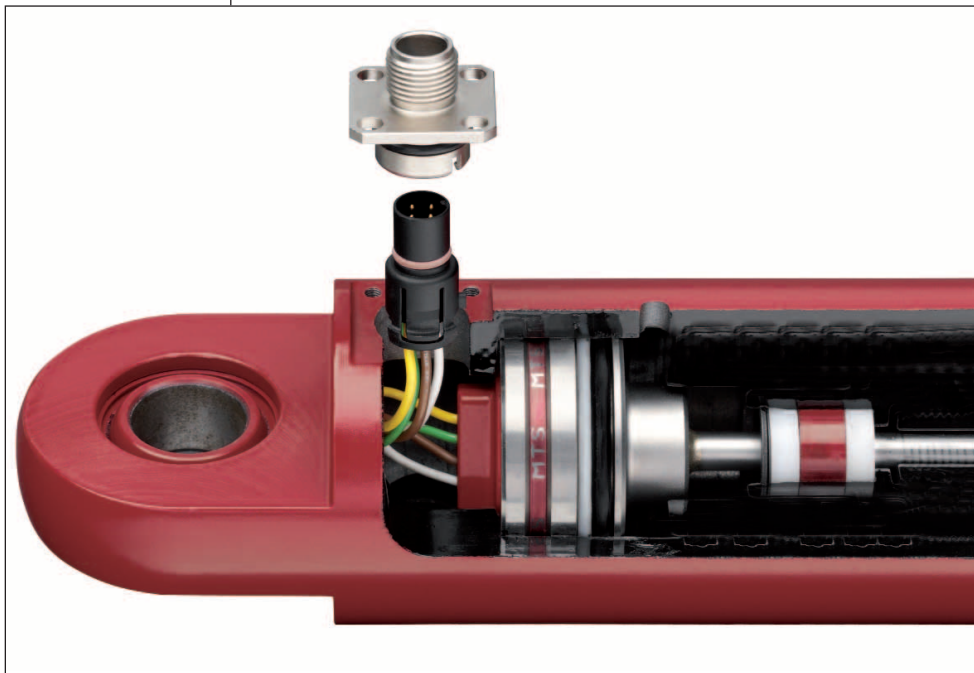
**Ring magnet OD17.4**  
Part No. 401 032

Composite PA-Ferrite  
Weigth ca. 10g  
Operating temperature:  
-40 ... +100°C  
Surface pressure max. 10 N/mm<sup>2</sup> in axial direction

**Temposonics-MH**  
*Analog*



Temposonics® connector system (IP 69K)

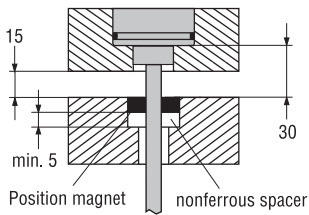


The robust Temposonics Model MH sensor's new stainless-steel position sensor is designed for direct stroke measurement in standard compact hydraulic cylinders. The Temposonics Model MH sensor can be installed from the head side or the rod side of the cylinder depending on the cylinder design.

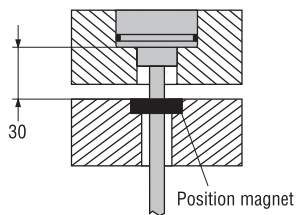
### Sensor installation

The method of installation is entirely dependent on the cylinder design. While the most common method of installation is from the rod side of the cylinder, installation from the head side of the cylinder is also possible. In both installation methods, the sensor seals the cylinder by using an O-Ring and backup ring which is installed on the sensor housing.

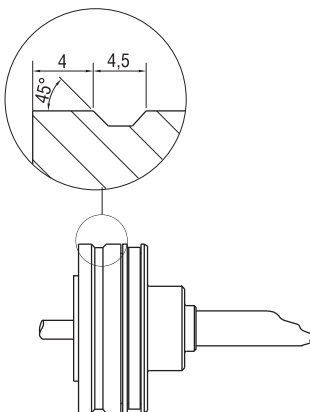
#### Magnetizable material



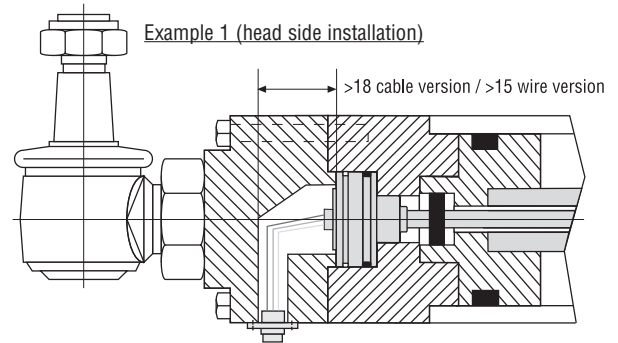
#### Non-magnetizable material



#### Detail Flange housing

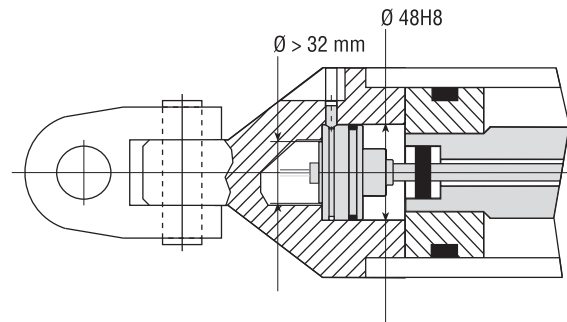


### Installation Versions

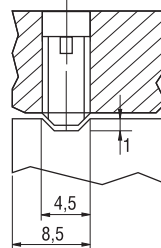


#### Example 2 (rod side installation)

The sensor should be fixed with set screw



e.g. retaining with set screw DIN 913 M5x10 (with flat point!)  
maximum torque 0,5 Nm



### Installation Notes

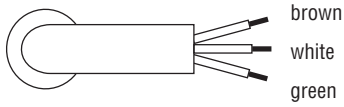
- Use a non-ferrous circlip to prevent wear on the magnet and the sensor pipe.
- The bore in the piston rod is dependent on hydraulic pressure and piston velocity etc. The minimum drilling must be 10 (7 mm rod) or 13 mm (10 mm rod).

# Temposonics-MH

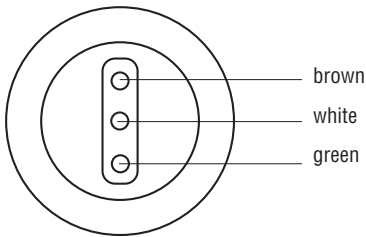
Analog

## Cable outlet

PUR-cable, 3 x 0,5 mm<sup>2</sup>, Ø 5 mm,  
flexible, oil resisting



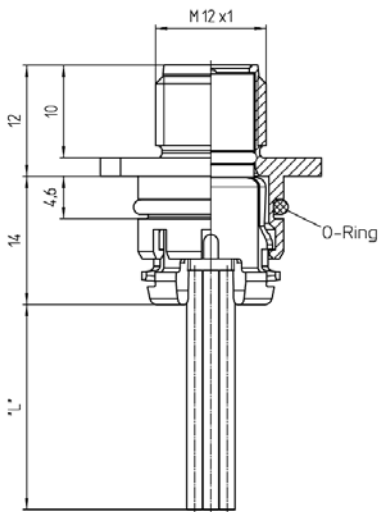
## Single wire outlet



## Wiring

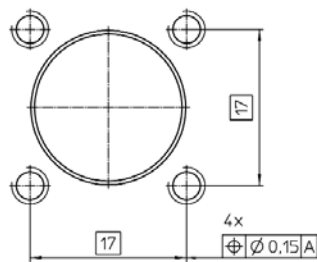
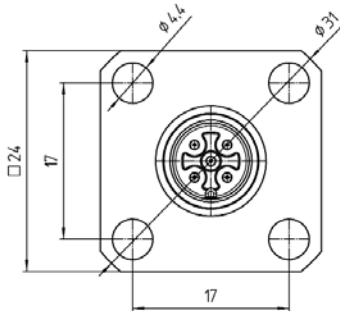
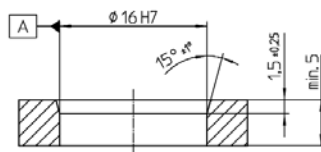
Wire color	Signal
brown	+12/24 VDC
white	DC Ground (0V)
green	Output: Voltage range

## Connector system (IP 69K)



## Wiring

Pin	Signal
1	N.C.e
2	+12/24 VDC
3	DC Ground (0V)
4	Output



**Temposonics**



**MH** = Hydraulic rod

**Style**

**C** = Flange housing Ø 48 mm / Rod-Ø 10 mm

**D** = Flange housing Ø 48 mm / Rod-Ø 7 mm  
(available on request)

**R** = Flange housing Ø 48 mm / Rod-Ø 10 mm  
with rod end plug, threaded hole M4

**Measuring Range (Order Length)**

0050 - 2500 mm in 5 mm steps

**Connection Type**

**Wire exit:**

**N\_\_A** = 3 single wires, 0,5 mm<sup>2</sup>, 10 mm increments

**N10A** = 100 mm (min. wire length)

**N20A** = 200 mm

**N99A** = 990 mm

**N\_\_E** = 4 single wires, 0,5 mm<sup>2</sup> with system connector M12 IP69k, 4 pin, 10 mm increments

**N07E** = 70 mm min. wire length

**N17E** = 170 mm max. wire length

(Longer wires on request / min. order quantities)

**Cable exit:**

**T\_\_A** = PUR cable, 3 conductors, 0,5 mm<sup>2</sup>, pigtailed, 0,1 m increments

**T05A** = 0,5 m min. length

**T99A** = 9,9 m max. length

**Input Voltage**

**3** = +12/24 VDC

**Signal Output**

**V10** = 0 - 5 V

**V11** = 0,25 - 4,75 V

**V12** = 0,5 - 4,5 V

**A01** = 4 - 20 mA

**Scope of Delivery**

- Position Sensor
- O-Ring
- Backup-Ring

Pls. order magnets separately.

Accessories see below.

**Accessories (selection)**

Ring magnet OD33

Ring magnet OD25,4

Ring magnet OD17,4

Magnet spacer OD32

(use with magnet part no. 201 542-2)

6 pin wall mount receptacle, male

**Part No.**

201 542-2

400 533

401 032

400 633

St C0 9131 S06

[www.mtssensor.com](http://www.mtssensor.com)  
[www.temposonics-shop.de](http://www.temposonics-shop.de)

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**Germany**

MTS Sensor Technologie  
GmbH & Co. KG  
Auf dem Schüffel 9  
D-58513 Lüdenscheid  
Tel.: +49-2351-9587-0  
Fax: +49-2351-56491  
info@mtssensor.de  
www.mtssensor.de

**USA**

MTS Systems Corporation  
Sensors Division  
3001 Sheldon Drive  
Cary, NC 27513, USA  
Tel.: +1-919-677-0100  
Fax: +1-919-677-0200  
info@mtssensors.com  
www.mtssensors.com

**Japan**

MTS Sensors Technology Corp.  
Ushikubo Bldg.  
737 Aihara-cho, Machida-shi  
Tokyo 194-0211, Japan  
Tel.: +81-42-775-3838  
Fax: +81-42-775-5516  
info@mtssensor.co.jp  
www.mtssensor.co.jp