

## Technical Data / Description

# MH Series Temposonics® MB Analog

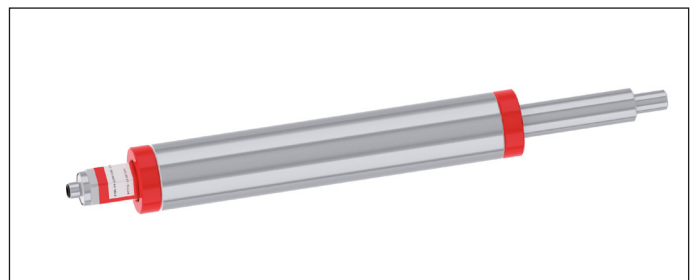
Magnetostrictive Linear Position Sensors

Document Part No.  
551220 Revision E



### Compact Sensor for Mobile Hydraulics

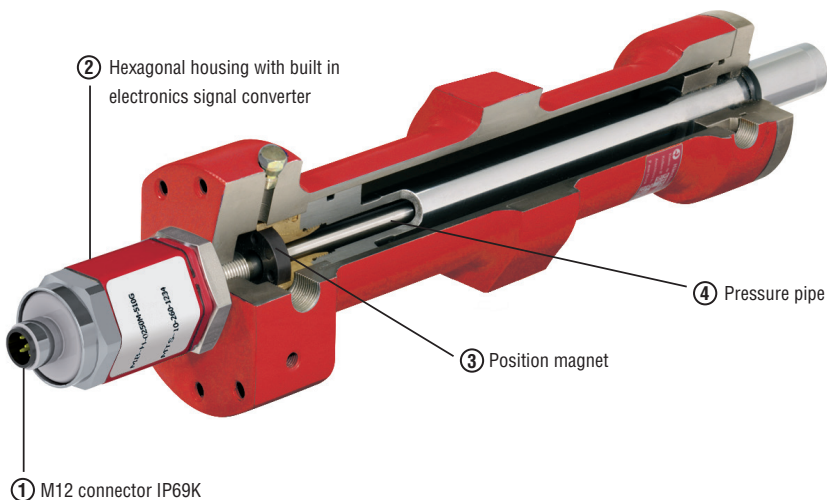
- Linear, absolute Measurement in Hydraulic Cylinders
- Non-Contact Sensing with Highest Durability
- Compact Dimensions
- Replacing Potentiometers and Inductive Position Sensors
- Accuracy: Linearity Tolerance < 0,15 mm full stroke
- Hysteresis <  $\pm 0,1$  mm
- Signal Output: Voltage
- Power Supply: 12 VDC
- Immunity against electromagnetic HF-fields up to 100 V/m
- Easy external mounting



Standard Differential Cylinder

## 1. Product description and technology

Temposonics sensors can be used in versatile mobile machines without any restriction and replace contact-based linear sensors like potentiometers. Highly dynamic systems are controlled safely by means of Temposonics® sensors, thus enhancing the productivity, availability and quality of the working process of the machine. Insensitive to vibration, shocks, dust and weathering influences and electro-magnetic disturbances. MB Sensors are designed for threaded port assembly in hydraulic cylinders.



### Simple Mechanics

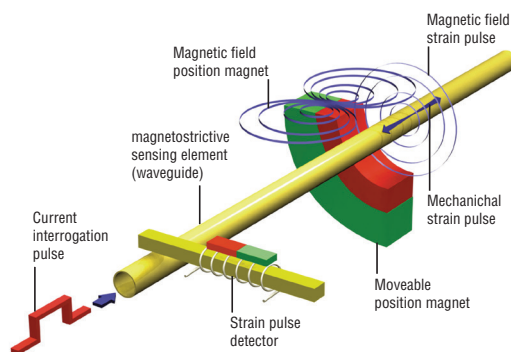
The extremely robust sensor consists of the following main parts:

- ① The M12 connector dust- and waterproof up to IP69K.
- ② The hexagonal housing with built-in electronics and signal converter.
- ③ The position magnet as only moving part, which is assembled into the piston bottom. This permanent magnet travels wear-free and contactless along the pressure pipe and measures the actual position.
- ④ The pressure pipe placed within the drilled piston rod contains the protected magnetostrictive sensing element.

### Magnetostriction

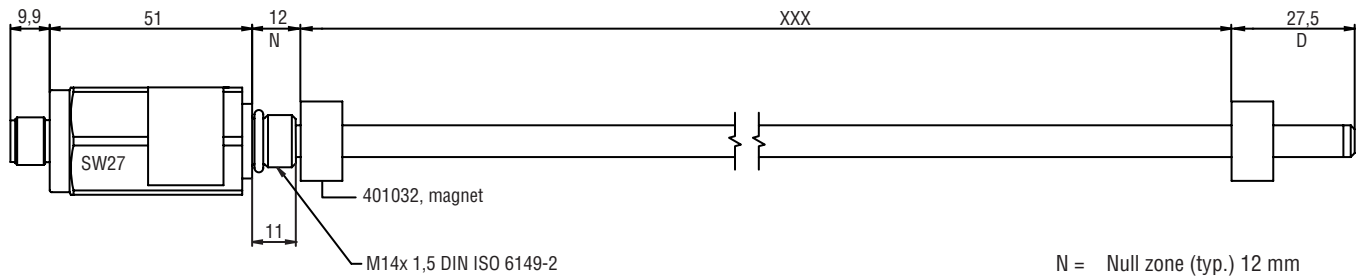
Temposonics linear sensors are based on the magnetostrictive technology. By measuring the actual position with a non-contact position magnet the sensor operates 100% wear-free. The absolute operating principle enables reliable readings without any reference point or recalibration. A mechanical strain pulse is triggered by the travelling position magnet. The runtime of this ultrasonic wave is measured precisely and compiled into standard electronic output signals.

### Measuring principle



- Compact dimensions
- Suitable for operating pressures up to 280 bar
- Supply voltage (12 VDC)
- Easy installation and replacement
- Output signal:
  - Analog: VDC

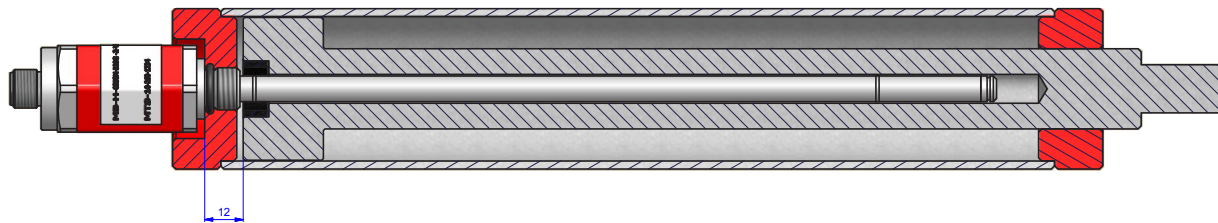
## 2. Dimensions and mechanical Installation



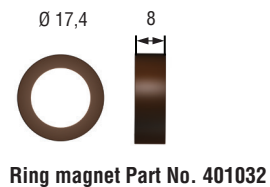
N = Null zone (typ.) 12 mm  
D = Damping zone 27,5 mm  
xxx = Measuring range, see ordering code

## 3. Installation

- a. Standard Application: Differential Cylinder  
(Magnet installation in piston)

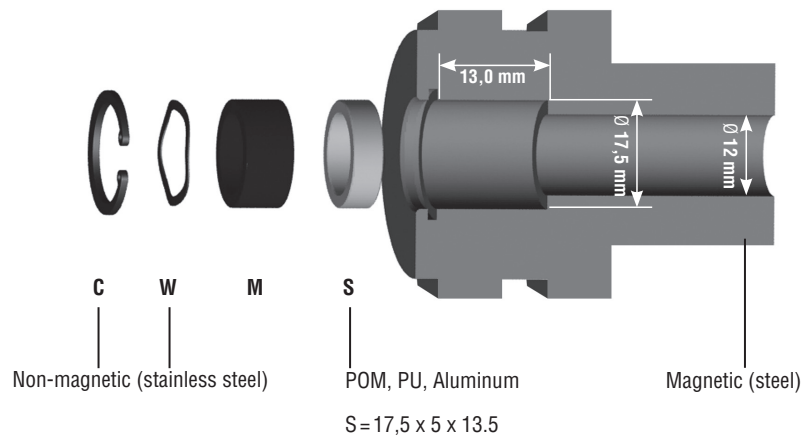


Position magnet (M) and magnet assembly with spacer (S) in piston



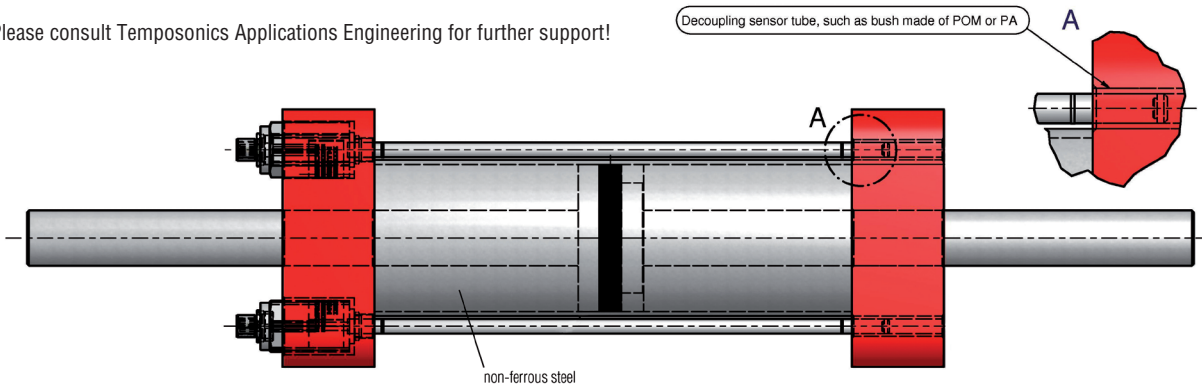
Ring magnet Part No. 401032

OD	17,4 mm
ID	13,5 mm
Height	8 mm
$P_A^*$	10 N/mm <sup>2</sup>

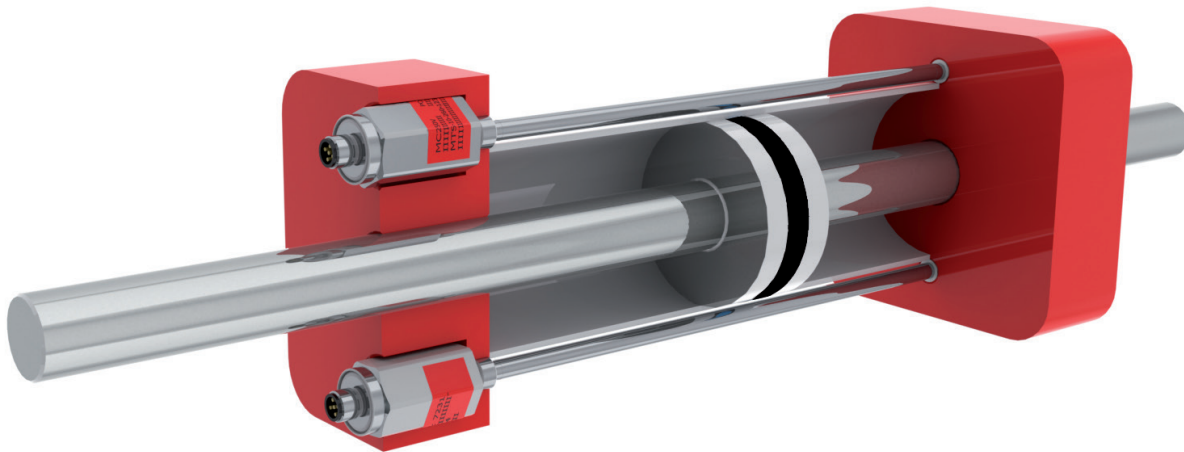


#### 4. Installation Example (Double Rod Cylinders)

Please consult Temposonics Applications Engineering for further support!



#### Example of Customized Application: Double Rod Cylinder (Magnet installation radial in piston ring)



## 5. Electrical installation

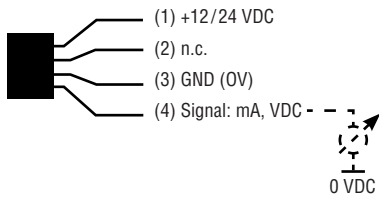
MB Analog (4 pin)



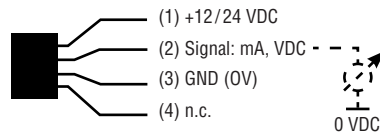
Top view male connector

PIN assignment analog 4 pin		
	G	H
<b>PIN 1</b>	VDC	VDC
<b>PIN 2</b>	n.c.	signal
<b>PIN 3</b>	GND	GND
<b>PIN 4</b>	signal	n.c.

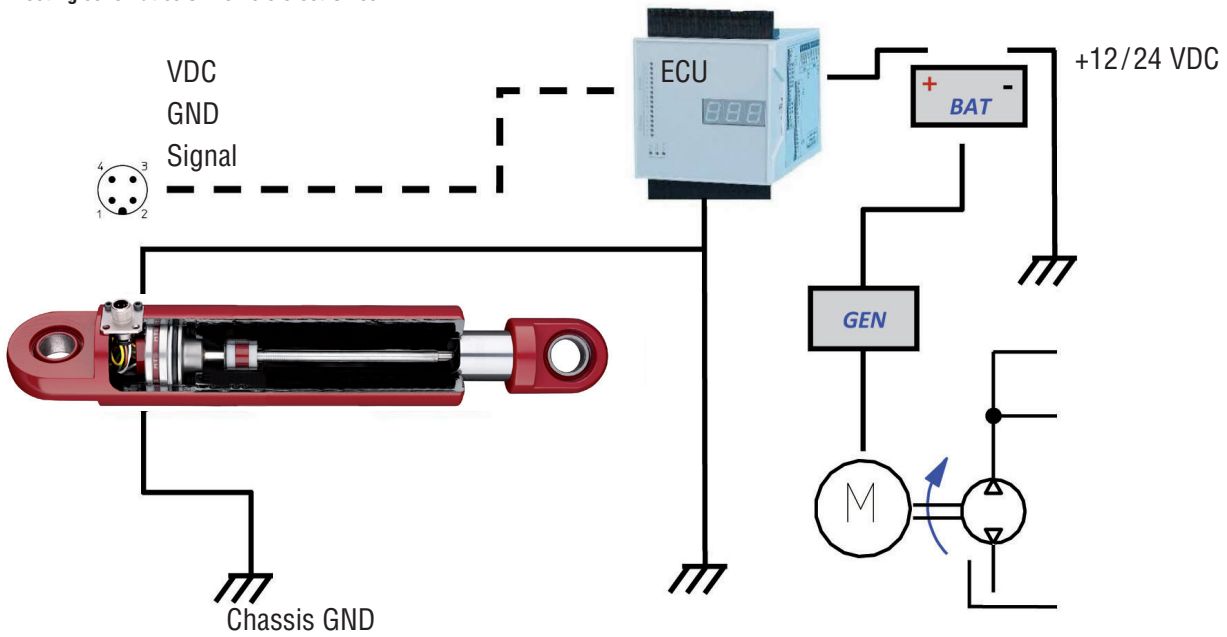
Pin assignment 'G'



Pin assignment 'H'



Connecting schematics on vehicle electronics:



## 6. Technical Data

<b>Input</b>	
Measured variables:	Position
Measuring range:	72, 109, 128, 148, 162, 186, 194, 217, 250 mm
<b>Output</b>	
Voltage:	0.5...4.5 VDC
Resolution:	Continuous analog output restricted by noise or AD converter of control unit
<b>Accuracy</b>	
Linearity:	± 0.15 mm
Hysteresis:	± 0.1 mm
Setpoint Tolerance:	± 1 mm
<b>Operation conditions</b>	
Assembly orientation:	In any direction
Storage temperature:	-25 °C...+65 °C
Fluid temperature:	-30 °C ... +85 °C
Operation temperature electronics, storage temp. :	-40 °C...+105 °C
<b>Pressure</b>	
Operating pressure ratings:	Ø 8 mm sensor rod PN : 250 bar Pmax: 325 bar
<b>IP rating</b>	
M12 connector	DIN 40050 Part 9: IP69K in connected state
<b>Environmental testing</b>	
Shock:	IEC-60068-2-27, 50 g (11 ms) single hit, 50 g (11 ms) at 1000 shocks per axis
Vibration:	IEC 60068-2-64 (10...2000 Hz) 15 g sinus
EMC:	ISO 14982 Agricultural and forestry machines radiated immunity ISO 11452-2 (antenna) ISO 11452-5 (stripline) radiated emission CISPR 12/16 ISO 7637-1: electric disturbance on vehicles ISO/TR 10665 E.S.D.
<b>Materials and dimensions</b>	
Sensor rod:	Stainless steel 1.4306 / AISI 304L (Ø 8 mm )
Housing (electronics):	Stainless steel 1.4305 / AISI 303
Pressure port:	ISO 6149 Hexagon housing SW27 with M14 x 1,5
O-ring:	11,3 x 2,2 mm NBR 80
<b>Electrical installation</b>	
Supply Voltage:	12 VDC (tolerance range 9 - 15 VDC)
Power drain:	< 1 W
Over voltage protection (GND-VDC)	up to 30 VDC
Polarity protection:	VDC - GND

## 7. Model configurator

### Temposonics ordering

M	B	H					M	4	1	0		2	V	1	2
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#### Sensor model

MB = SW27 housing

#### Form factor

H = Hexagon housing 27 hex  
with pressure port M14 x 1,5  
ISO 6149, rod Ø 8 mm

#### Stroke length

0072, 0109, 0128, 0148, 0162, 0186, 0194, 0217, 0250 mm

#### Connection type

4 pin M12 connector

G = pin assignment 1-3-4

H = pin assignment 1-3-2

#### Supply voltage

2 = +12 VDC

#### Output

V12 = 0.5...4.5 VDC

#### Scope of delivery:

Position sensor

**Please order magnets separately!**

Accessories (selection)	Part no.
ØD17,4 Ring magnet	401 032
<b>Temposonics® Testkit</b>	<b>280618</b>

#### Scope of delivery

- MH-Series analog/PWM Tester
- 12 VCD battery charger with adapter  
(adapter main plug EU, adapter main plug UK)
- cable with M12 connector
- cable with pigtailed wires
- carrying bag





# Temposonics

AN AMPHENOL COMPANY

**UNITED STATES**  
**Temposonics, LLC**  
Americas & APAC Region  
3001 Sheldon Drive  
Cary, N.C. 27513  
Phone: +1 919 677-0100  
E-mail: info.us@temposonics.com

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**GERMANY**  
**Temposonics**  
**GmbH & Co. KG**  
EMEA Region & India  
Auf dem Schüffel 9  
58513 Lüdenscheid  
Phone: +49 2351 9587-0  
E-mail: info.de@temposonics.com

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**ITALY**  
Branch Office  
Phone: +39 030 988 3819  
E-mail: info.it@temposonics.com

---

**FRANCE**  
Branch Office  
Phone: +33 6 14 060 728  
E-mail: info.fr@temposonics.com

---

**UK**  
Branch Office  
Phone: +44 79 21 83 05 86  
E-mail: info.uk@temposonics.com

---

**SCANDINAVIA**  
Branch Office  
Phone: + 46 70 29 91 281  
E-mail: info.sca@temposonics.com

---

**CHINA**  
Branch Office  
Phone: +86 21 2415 1000 / 2415 1001  
E-mail: info.cn@temposonics.com

---

**JAPAN**  
Branch Office  
Phone: +81 3 6416 1063  
E-mail: info.jp@temposonics.com

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