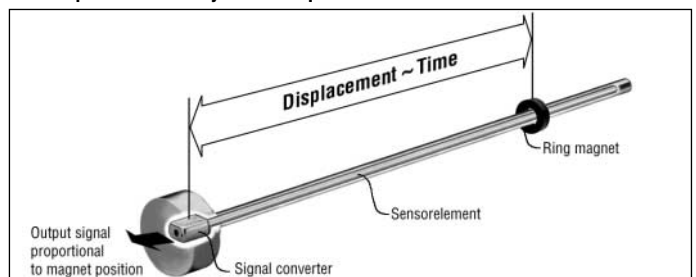


M-Series Displacement + Velocity

Temposonics MH
Measuring length 50 - 2000 mm



- Linear, Absolute Measurement in Hydraulic Cylinders
- Contactless Sensing with Highest Durability
- Minor 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.

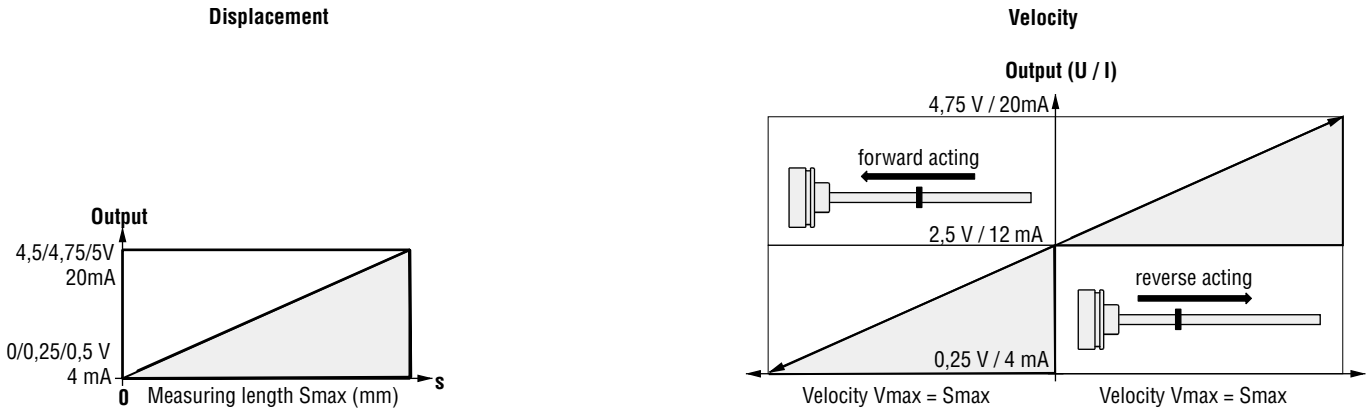
1. The sensor head, a robust housing with built-in electronics.
2. The pressure-proof sensor pipe with flange protects the internal sensing element, the waveguide system. It fits into the bored piston rod.
3. The position magnet, only moving part is mounted on the piston bottom. This permanent magnet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

Temposonics-MH

Displacement + Velocity

Analog Output

Temposonics-MH sensors provide analog output of 0 - 5 V. The analog output signal is proportional to the magnet position along the active measuring sensor stroke. The measuring range is factory set and does not need recalibration. Since the outputs are direct, no signal-conditioning electronics are needed when interfacing with controllers or meters.



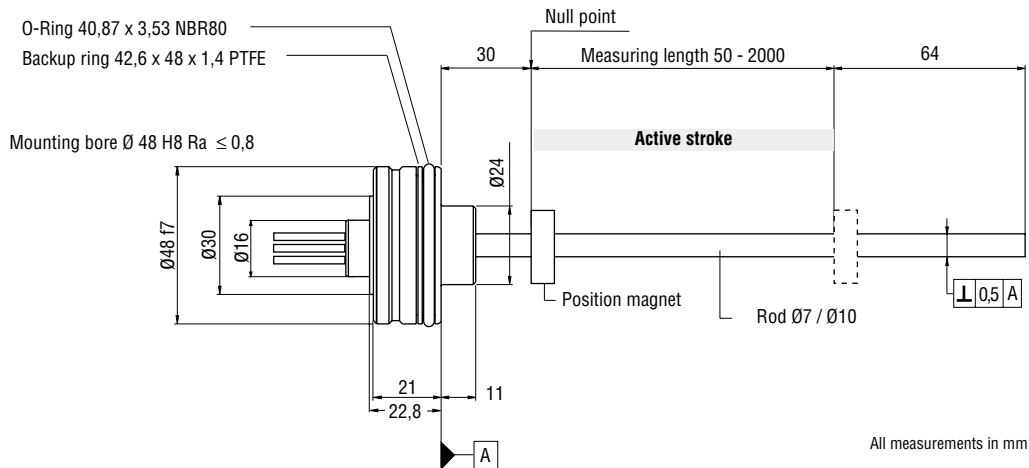
Technical Data

Input	
Measured Variables:	Displacement, Velocity (optional)
Measuring Range:	50 - 2000 mm in 5 mm steps
Output	
Voltage:	0 - 5 VDC / 0,25... 4,75 / 0,5 ... 4,5 VDC; Controller input resistance $R_L \geq 10 \text{ k}\Omega$, short circuit-proof, electric strength up to 28 VDC
Current:	4 - 20 mA (apparent power of the voltage transformer $\leq 250 \text{ Ohm}$ with 12 V power supply, apparent power of the voltage transformer $\leq 500 \text{ Ohm}$ with 24 V power supply)
Velocity:	0,25 ... 4,75 VDC, 4 ... 20 mA, 50 - 2000 mm/s according measuring length
Accuracy	
Resolution:	Infinite, restricted by output ripple
Linearity, uncorrected:	$< \pm 0,04 \%$ F.S. (Minimum $\pm 0,100 \text{ mm}$)
Repeatability:	$< \pm 0,005 \%$ F.S.
Update Frequency:	$> 1,25 \text{ kHz}$
Ripple:	$< 0,02 \%$ F.S.
Operating conditions	
Mounting Position, Sensor:	Any orientation
Magnet Speed:	Any
Operating Temperature:	$-40^\circ \text{ C} \dots +85^\circ \text{ C}$ (105° C)
Dew Point, Humidity:	90 % rel. humidity, no condensation
Sealing:	IP 65
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 / 10 - 2000 Hz / 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
Form factor, Material	
Material Sensor:	Stainless steel 1.4305 / AISI 304
Magnet Type:	Ring magnet
Installation	
Mounting:	Clearance fit flange $\varnothing 48 \text{ mm}$
Electrical connections	
Connection Type:	pigtails PUR cable or single wire
Input Voltage:	12 / 24 VDC (10 - 32 V)
Ripple:	$< 1 \%$ peak to peak
Current Drain:	$< 60 \text{ mA}$
Electric Strength:	500 V (0 V ground to machine ground)
Polarity Protection:	Up to -30 VDC
Overvoltage Protection:	Up to 36 VDC

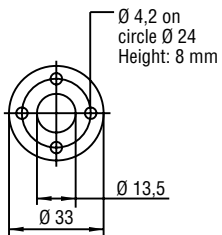
Temposonics-MH - High Pressure Compact Sensor
Measuring Range 50 - 2000 mm.

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.

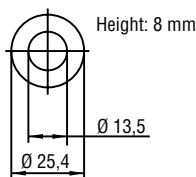


Position Magnets



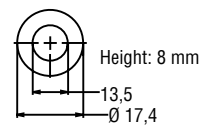
Ring magnet OD33
Part No. 201 542-2

Composite PA-Ferrite-GF20
Weigh ca. 14g
Operating temperature:
-40 ... +100°C



Ring magnet OD25,4
Part No. 400 533

Composite: PA-Ferrite
Weigh ca. 10g
Operating temperature:
-40 ... +100°C

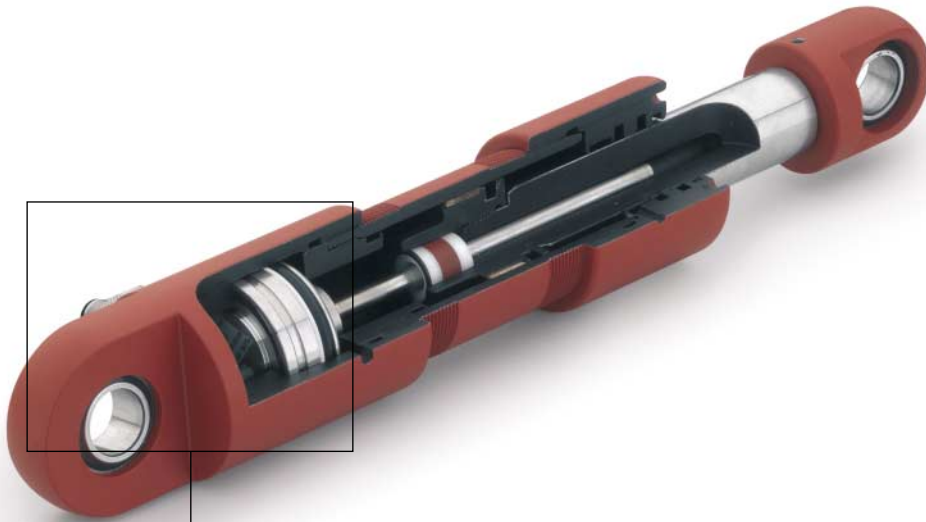


Ringmagnet OD17,4
Part No. 401 032

Composite PA-Ferrite
Weigh ca. 10g
Operating temperature:
-40 ... +100°C

Temposonics-MH

Displacement + Velocity



Mobile hydraulic cylinder with built-in TEMPOSONICS-MH



Installation

The robust Temposonics-MH sensor is due to its form factor, excellently suited for direct stroke measurement in standard compact fluid-cylinders.
The position magnet, mounted on the piston bottom, drives contactlessly along the measuring stroke and marks exactly the position through the rod wall - independent of the used hydraulic fluid - that guarantees a longlife and trouble-free operation.

Sensor

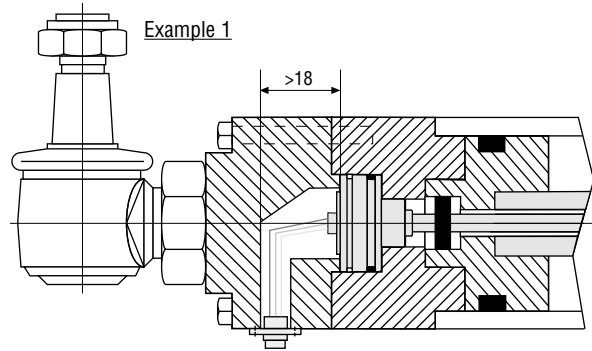
The stainless steel rod model sensor can be mounted in any position via the clearance fit flange \varnothing 48 mm.
Hydraulic sealing is by using an O-Ring and Backup-Ring in housing channel.
Non-magnetizable material should be used for the sensor mounting component. Taking the mounting dimensions shown below into account is indispensable.

Position Magnet

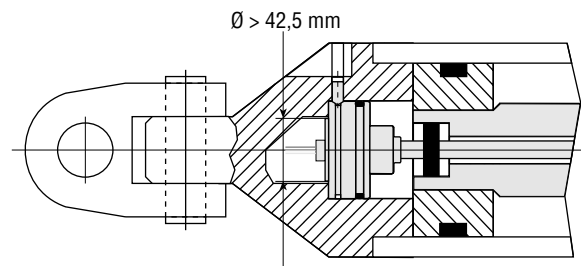
To have a neat magnetic field for measuring, non-magnetizable material must be used for the position magnet mounting components (screws, spacers, retaining ring etc.).

For further details according to cylinder design please contact directly MTS.

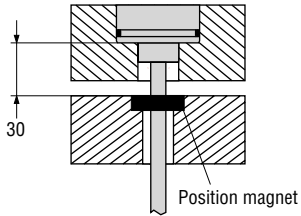
Installation Versions



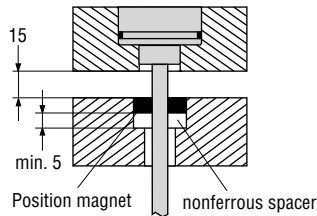
Example 2
The sensor will be fixed with setscrew



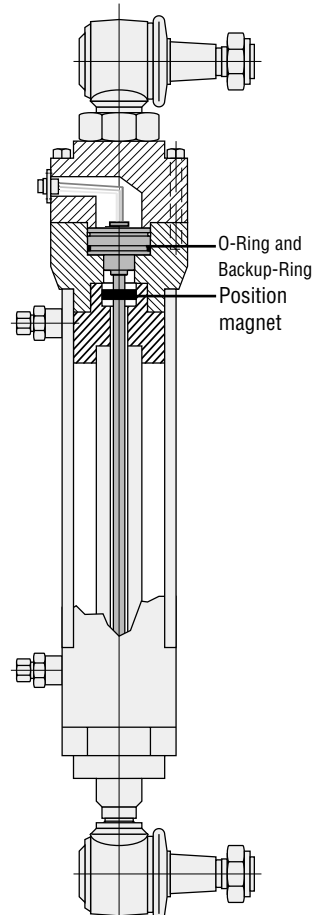
Non-magnetizable material



Magnetizable material



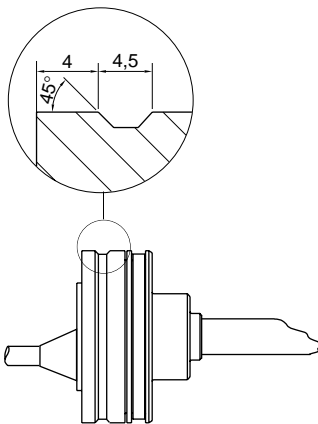
Mounting example:
Mobile hydraulic cylinder with built-in TEMPOSONICS-MH



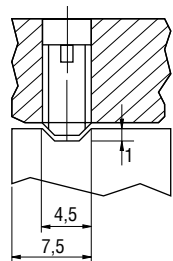
Installation Notes

- Use a rod bush (e.g. teflon) 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).
- Do not exceed the peak pressure of 450 or 530 bar (see page 2).

Detail Flange housing



e.g. retaining with set screw DIN 914 M5x10 maximum torque 0,5 Nm

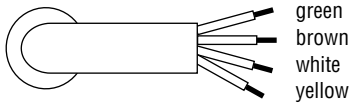


Temposonics-MH

Displacement + Velocity

Cable outlet

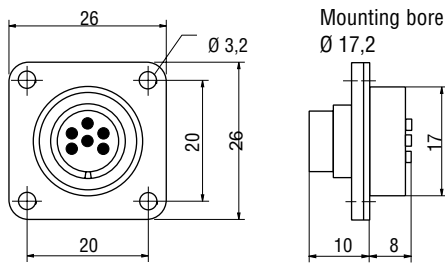
PUR-cable, 3 x 0,34 mm², Ø 4,5 - 6 mm, flexible, oil resisting



Wiring

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

Male connector (Accessories)



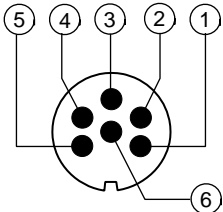
Wiring

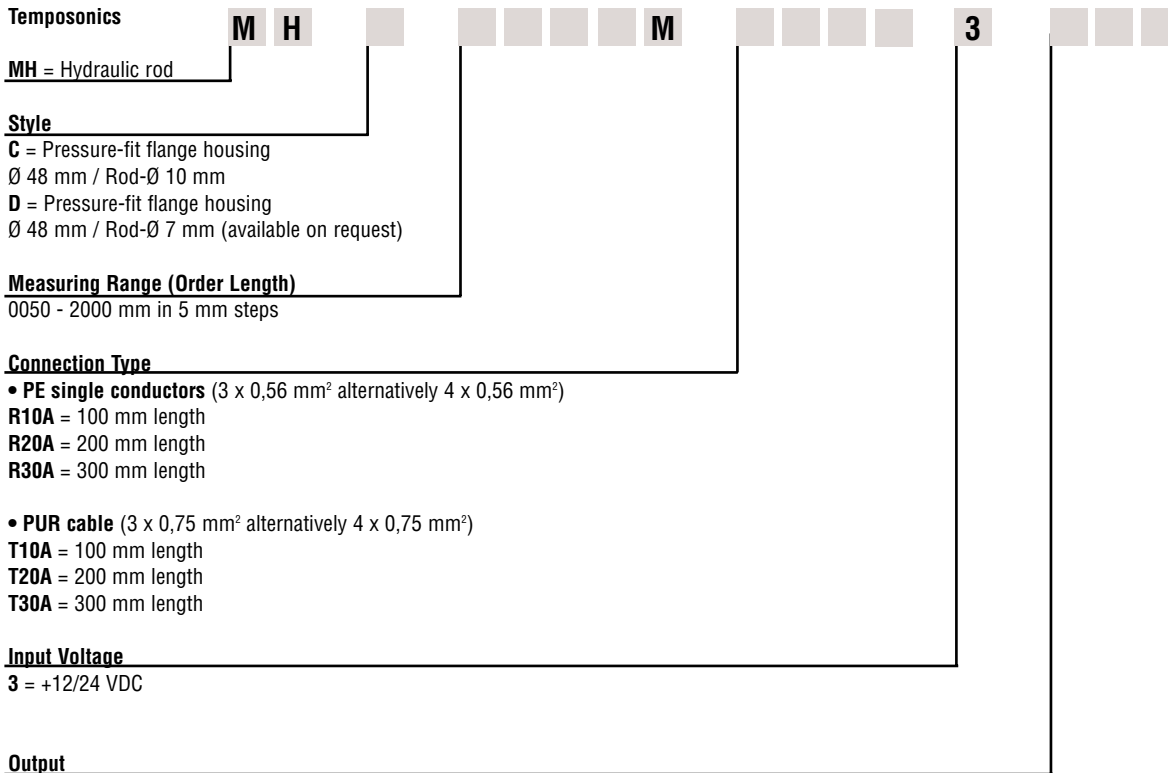
Pin	Wire color	Signal
1	green	Output: Voltage range
2	-----	NC
3	-----	NC
4	-----	NC
5	brown	+12/24 VDC
6	white	DC Ground (0V)

6 pin DIN wall mount flange receptacle for installation in customized cylinder end-cap

Part No. ST CO 9131 S06

Front face of pin insert or rear of female insert





Temposonics

MH = Hydraulic rod

Style

C = Pressure-fit flange housing
Ø 48 mm / Rod-Ø 10 mm
D = Pressure-fit flange housing
Ø 48 mm / Rod-Ø 7 mm (available on request)

Measuring Range (Order Length)

0050 - 2000 mm in 5 mm steps

Connection Type

• **PE single conductors** (3 x 0,56 mm² alternatively 4 x 0,56 mm²)

R10A = 100 mm length

R20A = 200 mm length

R30A = 300 mm length

• **PUR cable** (3 x 0,75 mm² alternatively 4 x 0,75 mm²)

T10A = 100 mm length

T20A = 200 mm length

T30A = 300 mm length

Input Voltage

3 = +12/24 VDC

Output

V10 = 0 ... 5 V

V11 = 0,25 ... 4,75 V

V20 = Two Outputs

Displacement: 0,25 ... 4,75 V

Velocity: forward 0,25 ... 4,75 V; reverse 2,5 ... 0,25 V mm/s

A01 = 4 - 20 mA

A20 = Two outputs

Displacement: 4 ... 20 mA

Velocity: forward 12 ... 20 mA; reverse 12 ... 4 mA mm/s

DI1 = PWM (pulse duration), 1 circulation

Scope of Delivery

- Position Sensor
- O-Ring
- Backup-Ring

Pls. order magnets separately.

Accessories see below.

Asseccories (selection)

Ring magnet OD33

Ring magnet OD25,4

Ring magnet OD17,4

6 pin wall mount receptacle, male

Part No.

201 542-2

400 533

401 032

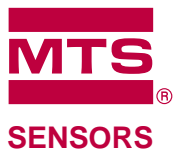
St C0 9131 S06

Temposonics-MH

Displacement + Velocity

www.mtssensor.de
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