

Absolute, Non-Contact Position Sensors

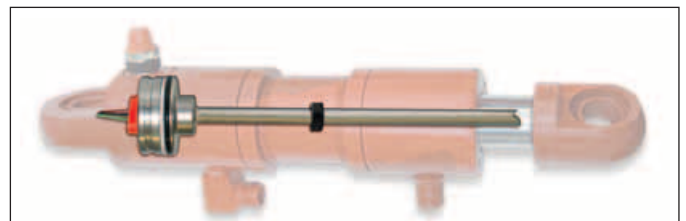
M-Series CANbus Interface

Temposonics MH
Measuring length 50 - 2000 mm



Compact Sensor for Mobile Hydraulics

- Linear, Absolute Measurement in Hydraulic Cylinders
- Contactless Sensing with Highest Durability
- Minimum Dimensions for Compact Mobile Hydrocylinders
- Superior Accuracy: Linearity Tolerance better $\pm 0,1$ mm
- Repeatability $\pm 0,1$ mm
- Direct CAN Output: Displacement + Speed
- Power Supply: 12 / 24 VDC
- EMC: Immunity against electromagnetic HF-fields up to 200 V/m
- IEC 68-2-6
- Shock rating: 100 g (single hit) / IEC 68-2-27



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 rating. Cable and wire options are sized for direct connection to proven connectors. The model MH sensor can be fully sealed and embedded in a cylinder to ensure a long operating life.

Temposonics-MH

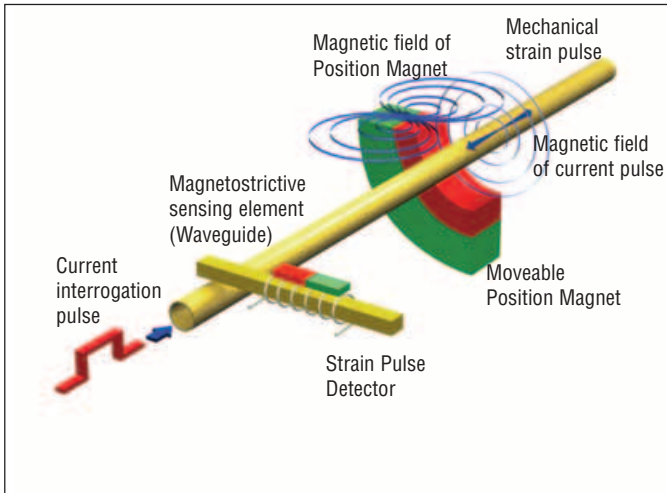
CANbus

Magnetostriction

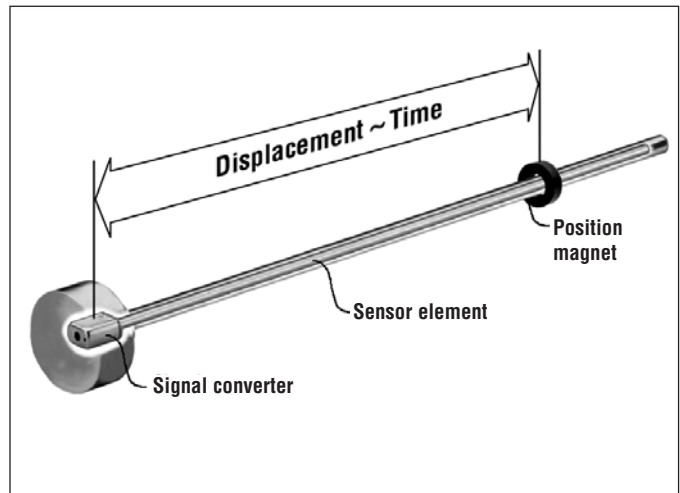
The absolute **Temposonics**® linear position sensors are based on the MTS developed magnetostrictive measurement principle. That combines various magneto-mechanical effects and uses the physical height precise speed-measurement of an ultrasonic wave (torsion pulse in its sensor element) for position 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.

Physical prinziple



Physical prinziple (simplified illustration)



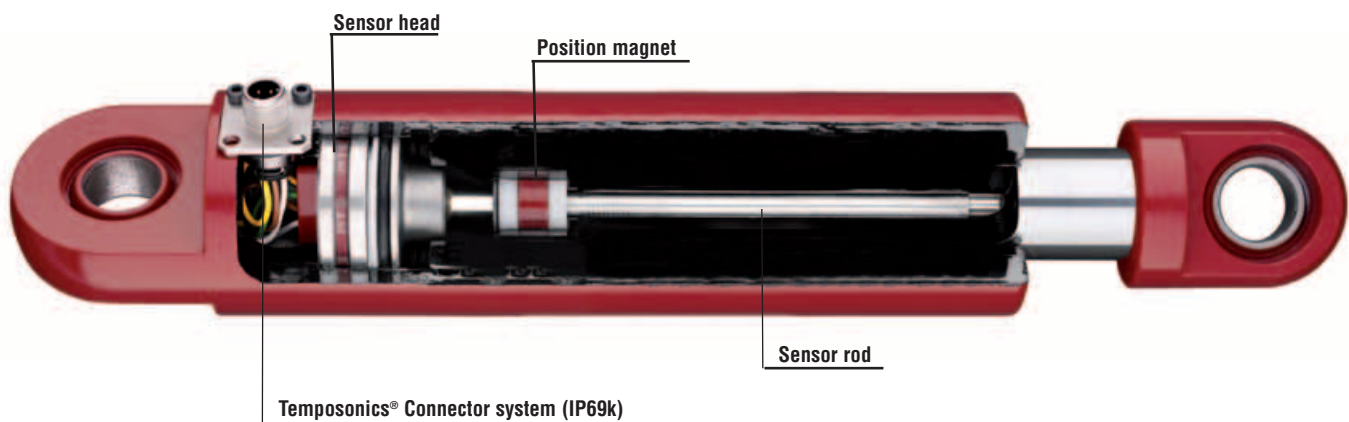
Temposonics-MH - High Pressure Compact Sensor Measuring Range 50 - 2500 mm.

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.
 - The innovative Connector system can easily be mounted in a few seconds, any soldering or crimping needless, dust- and waterproof upto IP69k

MH-Sensor in Cylinder



Technical Data

Input

Measured Variables: Displacement + speed
 Measuring Range: 50 - 2000 mm in 5 mm steps

Output

Interface: CANopen and CAN J1939
 Resolution: Displacement: 0,1 mm; speed: > 1mm/s

Accuracy

Linearity, uncorrected: $\pm 0,1$ mm
 Repeatability: $\pm 0,1$ mm
 Update Frequency: 0,5 / 1,0 kHz
 Ripple: < 0,02 % F.S.
 Set point tolerance: $\pm 0,1$ mm

Operating conditions

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 / 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

Material

Material Sensor: Stainless steel 1.4305 / AISI 304
 Magnet Type: Ring magnet

Installation

Mounting: Lose fit flange Ø 48 mm

Electrical connections

Connection Types: - M12 Connector system
 - 4 single wire outlet
 - PUR-cable
 Input Voltage: 12 / 24 VDC (10 - 32 V)
 Ripple: < 1 % peak to peak
 Electric Strength: 500 VDC (0 V ground to machine ground)
 Polarity Protection: Up to -36 VDC
 Overvoltage Protection: Up to 36 VDC

1. Temposonics® Connector system M12

MTS SENSORS presents the innovative Connector system for Temposonics® M-Series

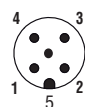
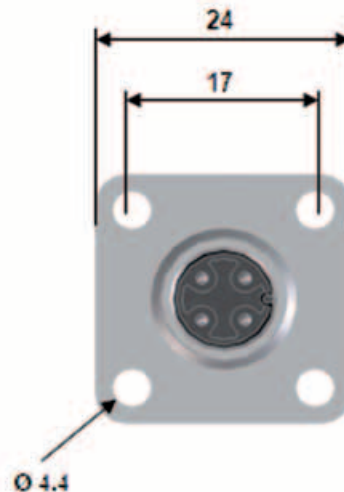
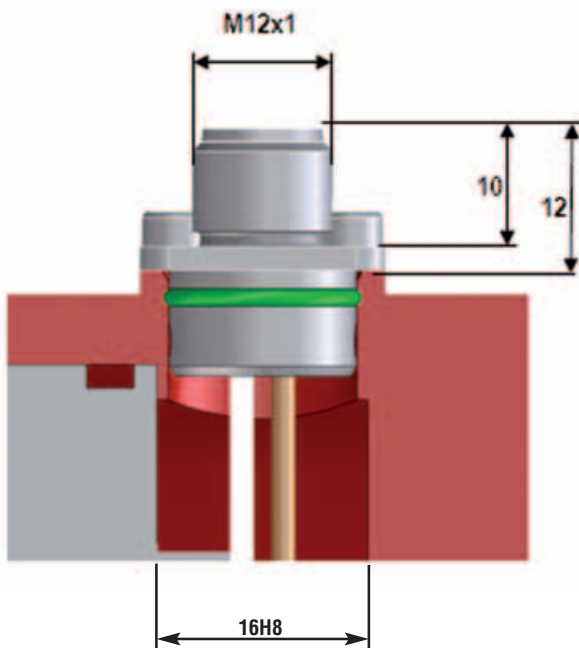
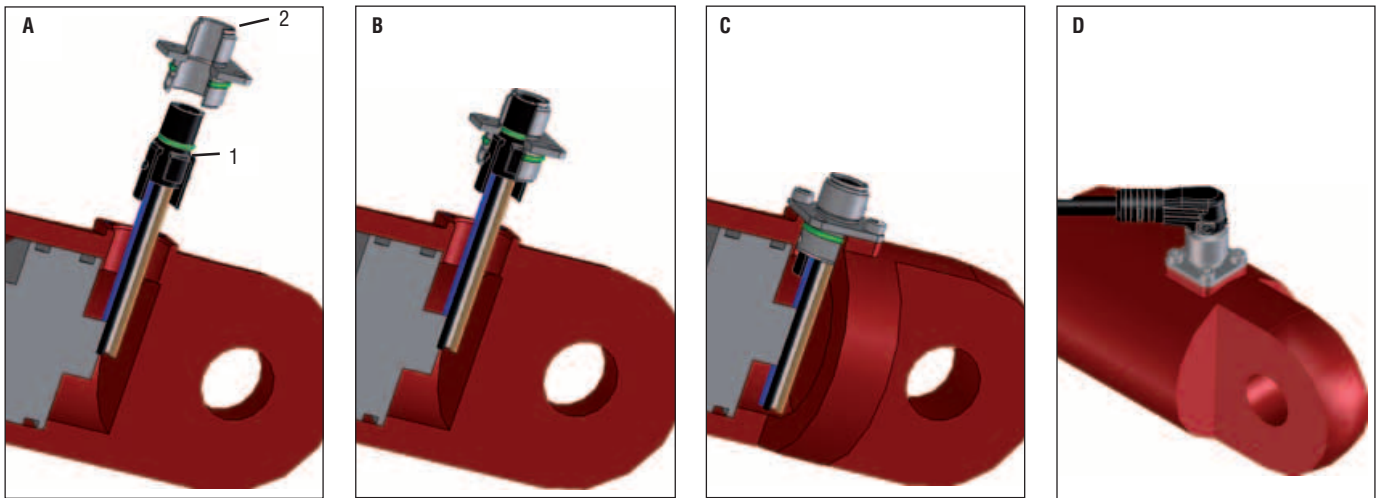
The Temposonics® Connector system meets the most exacting protection requirement important for the difficult environmental conditions of mobile hydraulics applications. Protection type IP69k makes the robust metal housing not only completely dust- and waterproof; even the harshest cleaning measures can't damage the sensor.

A The MH-Sensor by MTS is delivered together with the new connector system: The connector insert carrier is already connected to the sensor conductors.
i.e. No soldering, any colour or connection mistake.

B The connector insert (1) is taken out of the cylinder through a bore hole. The flange housing (2) can be clicked in position easily from outside.

C Four standard screws must be tightened to mount the connector system on the cylinder

D The connector can be fired in different positions, angleplugs can be adjusted to different directions in 45°

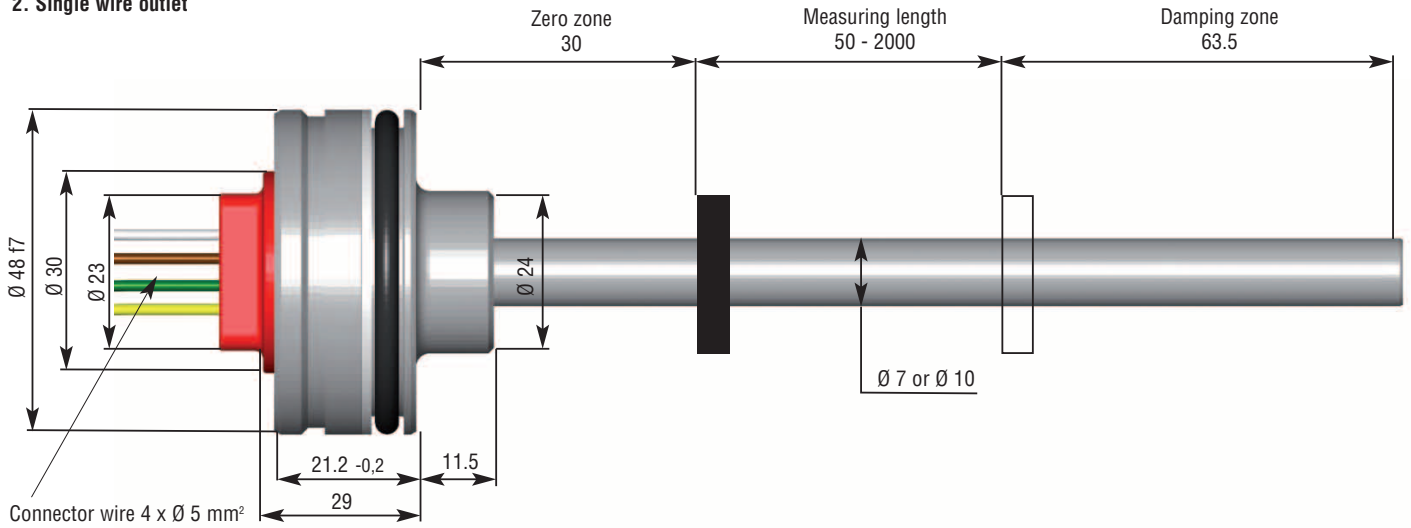


PIN assigment

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

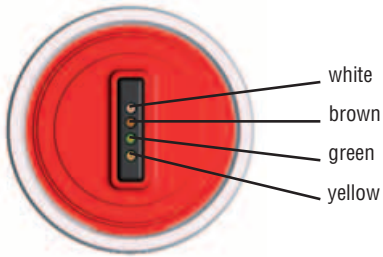
Wiring / Dimensions

2. Single wire outlet



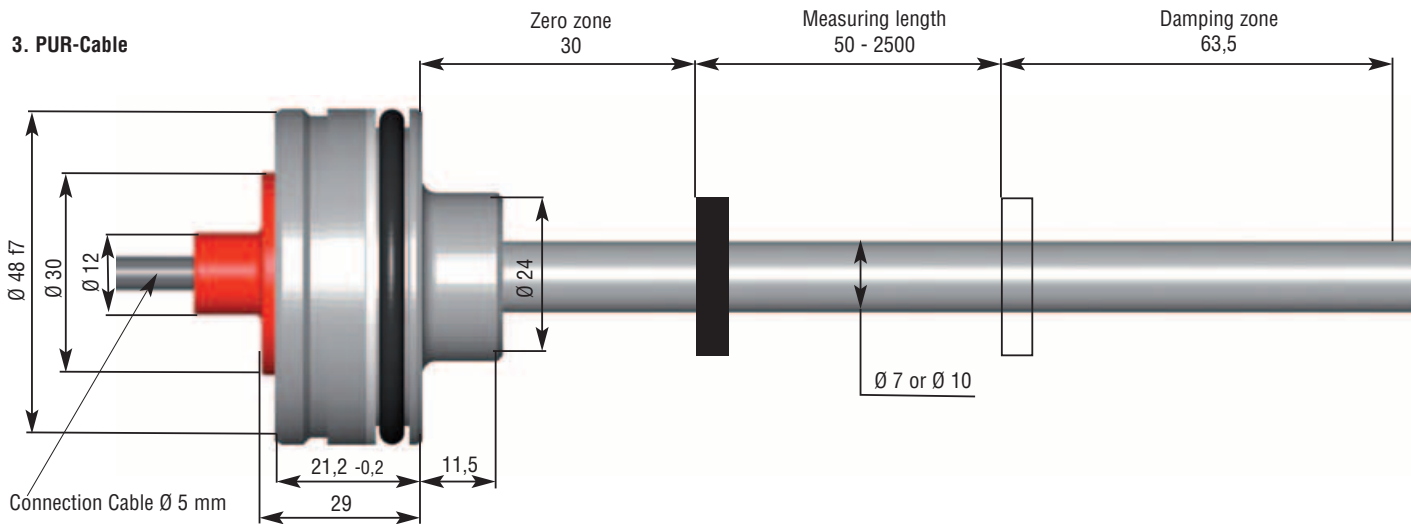
Single wire outlet

4 single wire, 0,5 mm²



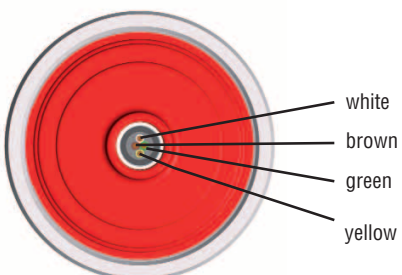
Wire color	Signal
white	DC Ground (0V)
brown	+12/24 VDC
green	CAN low
yellow	CAN high

3. PUR-Cable



Cable outlet

PUR-cable, 4 x 0,5 mm², Ø 5 mm,
flexible, oil resistant



Wire color	Signal
white	DC Ground (0V)
brown	+12/24 VDC
green	CAN low
yellow	CAN high

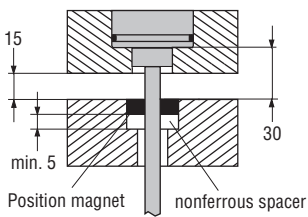
Mechanical installation

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

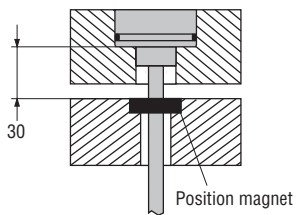
Sensor installation

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 is sealed by an O-Ring and backup ring which is ready installed on the sensor housing.

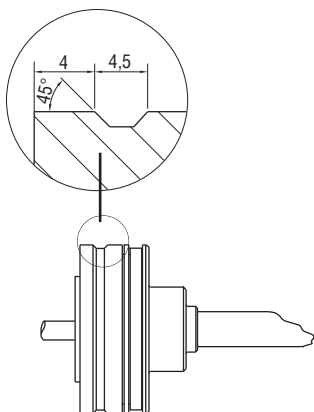
Magnetic material



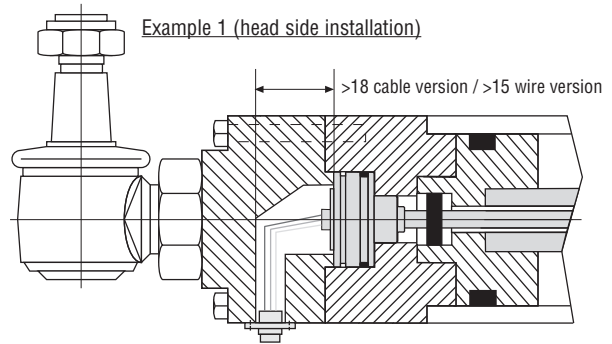
Non-magnetic material



Detail Flange housing

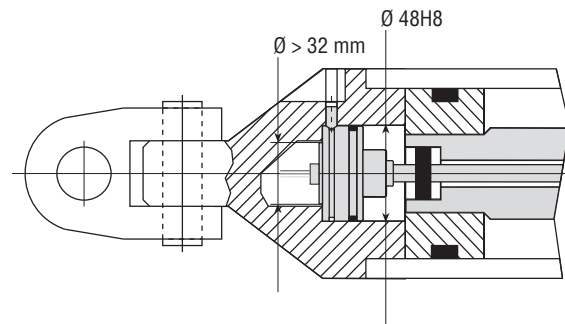


Installation Versions

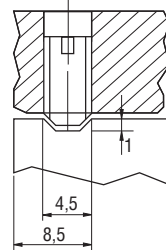


Example 2 (rod side installation)

The sensor should be fixed with a 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 fix the magnet
- The bore in the piston rod is dependent on hydraulic pressure and piston velocity etc. The minimum drilling should be 10 (7 mm rod) or 13 mm (10 mm rod).

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 - 2000 mm in 5 mm steps

Connection Type

Single wires with Connector system M12

- N__E** = 4 single wires, 0,5 mm² with Connector system M12 IP69k, 4 pin, 10 mm increments
- N08E** = 80 mm min. wire length
- N16E** = 160 mm max. wire length (Longer wires on request / min. order quantities)

Wire exit:

- N__A** = 3 single wires, 0,5 mm², 10 mm increments
- N10A** = 100 mm (min. wire length)
- N20A** = 200 mm
- N99A** = 990 mm

Cable exit:

- T__A** = PUR cable, 3 conductors, 0,5 mm², pigtailed, 0,1 m increments
- T05A** = 0,5 m min. length
- T99A** = 9,9 m max. length

Input Voltage

3 = +12/24 VDC

Digital Output

- C01__** = CANOpen standard version
- J01__** = CANbus MTS J939 standard version
- 17th digit: Baud rate
- 18th + 19th digit: Node-ID, hex 01 ... 7F (without indication put in "7F")

Scope of Delivery

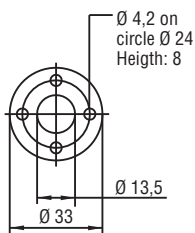
Position Sensor, O-Ring, Backup-Ring
Please order magnets separately.

Accessories (selection)

Part No.

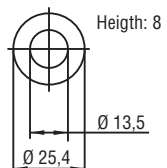
Ring magnet OD33	201 542-2
Ring magnet OD25,4	400 533
Ring magnet OD17,4	401 032
Magnet spacer OD32	400 633
(use with magnet part no. 201 542-2)	
6 pin wall mount receptacle, male	St C0 9131 S06

Position Magnet



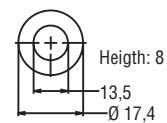
Ring magnet OD33
Part No. 201 542-2

PA-Ferrit-GF20
Gewicht ca. 14g
Operating temperature:
-40 ... +100°C
Surface pressure max. 10 N/mm² in axial direction
Fastening Torque for M4 screws max. 1 Nm



Ring magnet OD25,4
Part No. 400 533

Composite PA-Ferrite-GF20
Weigh ca. 14g
Operating temperature:
-40 ... +100°C
Surface pressure max. 10 N/mm² in axial direction



Ring magnet OD17,4
Part No. 401 032

Composite PA-Ferrite
Weigh ca. 10g
Operating temperature:
-40 ... +100°C
Surface pressure max. 10 N/mm² in axial direction

17th digit	
Baud rate	Index
1000 kBit	0
800 kBit	1
500 kBit	2
250 kBit	3
125 kBit	4
reserved	5
50 kBit	6
20 kBit	7
10 kBit	8

www.mtssensor.com
www.temposonics-shop.de

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