

R-Series DeviceNet

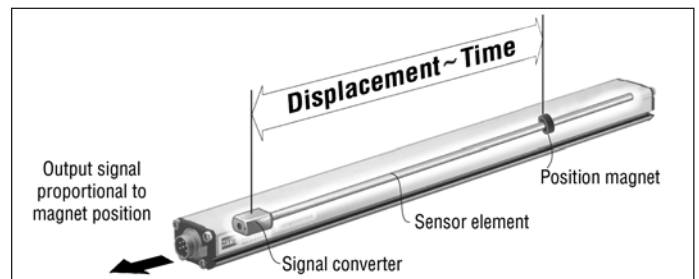
Temposonics RP and RH
Measuring length 25 - 7600 mm



Intelligent Design



- Rugged Industrial Sensor
- Linear and Absolute Measurement
- LEDs for Sensor Diagnostic
- Contactless Sensing with Highest Durability
- Superior Accuracy: Resolution up to 2 μm
- Linearity better 0,01 %
- Repeatability 0,001 %
- Sensor-based intelligence
- Direct DeviceNet Output



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 high 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.

The extremely robust sensor, ideal for continuous operation under harshest industrial conditions is completely modular in mechanic and electronic design.

- A profile or rod-shaped sensor housing protects the sensing element in which gives rise to the measurement signal.
- The sensor head accommodates the complete modular electronic interface with active signal conditioning. Double encapsulation ensures high operating safety and optimum EMC protection.
- The position transmitter, a permanent magnet - fixed at the mobile machine part - drives contactlessly over the sensor's stroke and starts measuring through the housing wall.

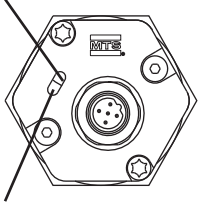
Temposonics-RP+RH

DeviceNet

New...a sensor diagnostic display

Bi-color LEDs in the cover of sensor electronics head inform on the actual sensor condition and the DeviceNet communication.

Network Status LED



Module Status LED

Network Status LED	
Green	Normal function
Green flashing	Waiting of instructions from DeviceNet Master
Red	Initialisation error
Red flashing	No answer from DeviceNet Master
Module Status LED	
Green	Normal function
Red	No Magnet

CAN Bus Interface

Temposonics position sensors fulfill - as slave devices - all requirements of the CAN-Bus (ISO 11898). The sensors electronics convert the displacement measurements into bus oriented outputs and transfer these data directly to the control unit. The bus interface is appropriate for serial data transfer of 500 Mbit/s maximum. Sensor integrated software supports the **DeviceNet** protocol for a comprehensive customized configuration of the sensor-bus system.

DeviceNet Protocol

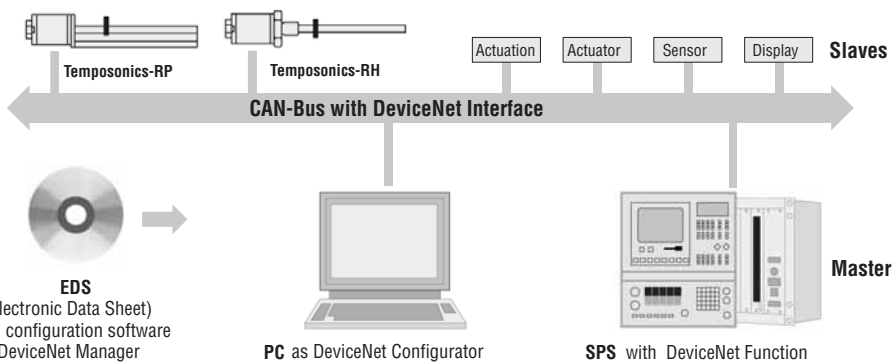
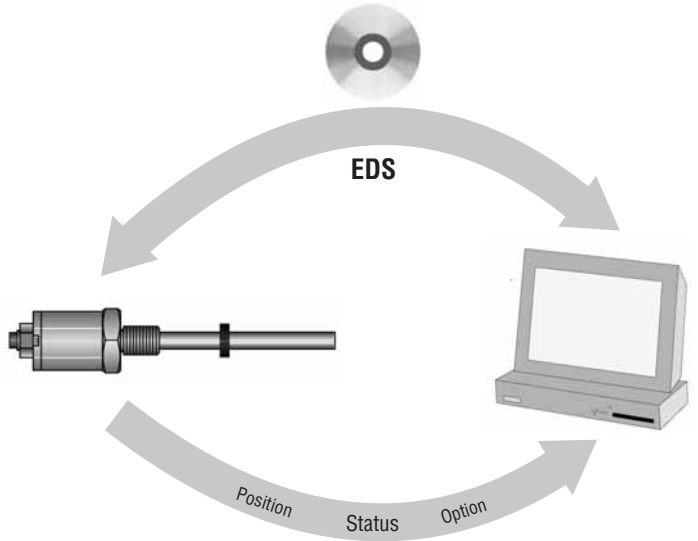
The DeviceNet Data Protocol of Temposonics Sensors for standard 1-magnet-measurement always includes following applications data

- Position
- Error detection
- Polling & Bit-strobe communications modes

Plug and Play

makes the installation of the Temposonics position sensor with DeviceNet interface quick and easy. After initial system configuration, the user is not required to have extensive knowledge concerning network timing and sensor technology. Each sensor is provided with an Electronic Data Sheet EDS, an operation manual and a detailed Statement of Conformance. All sensor-specific parameters are installed into the network using the ESD file.

A PC programming tool, such as DeviceNet Manager offered by Rockwell, is used to set the node identifier and baud rate. The Statement of Conformance contains the network regulations defined and recommended by the Open DeviceNet Vendor Association (ODVA), that the DeviceNet specifications. Temposonics sensors with Devicenet output can be directly connected to a DeviceNet Bus.

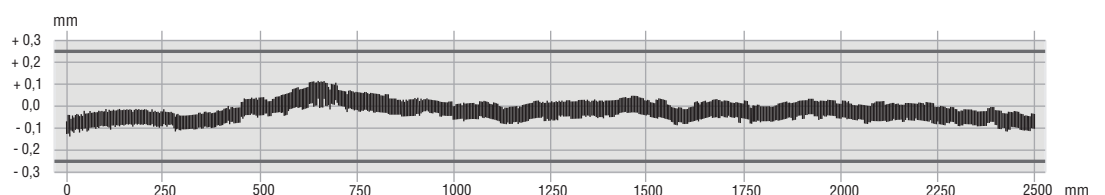


Technical Data

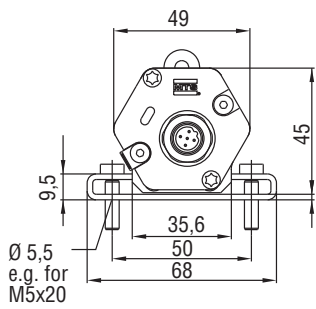
Input	
Measured variables	Displacement
Measuring range	Profile 25 - 5000 mm / Rod 25 - 7600 mm
Output	
Interface	CAN-Fieldbus System ISO 11898
Data protocol	DeviceNet Release 2.0
Baud rate, kBit/s	500 250 125
Cable length, m	< 100 < 250 < 500
<i>The sensor will be supplied with ordered baud rate, which is changeable by customer</i>	
Overvoltage protection	up to 36 VDC
Accuracy	
Resolution	
- Displacement	5 µm 2 µm
-Update time	0,5 ms up to 1200 mm / 1,0 ms up to 2400 / 2,0 ms up to 4800 / 4,0 ms up to 7600 mm stroke length
Linearity	< ± 0,01 % F.S. (Minimum ± 40 µm), independent of outside temperatures
Repeatability	< ± 0,001 % F.S. (Minimum ± 2,5 µm)
Temperature coefficient	< 15 ppm/°C
Hysteresis	< 4 µm
Operating conditions	
Magnet speed	Any
Operating temperature	-40 °C ... +75 °C
Dew point, humidity	90% rel. humidity, no condensation
Protection ¹	Profile style: IP65 / Rod style: IP67, IP68 for cable outlet
Shock test	100 g, single hit, IEC-Standard 68-2-27
Vibration test	15g / 10 - 2000 Hz, IEC-Standard 68-2-6
Standards, EMC test	Electromagnetic emission EN 50081-1 Electromagnetic immunity EN 50082-2 EN 61000-4-2/3/4/6, Level 3/4, Criterium A, CE-qualified
Form factor, material	
Diagnostic display	LEDs beside connector
<u>Profile model:</u>	
Sensor head	Aluminum
Sensor stroke	Aluminum
Position magnet	Magnet slider or removable U-magnet
<u>Rod model:</u>	
Sensor head	Aluminum
Rod with flange	Stainless steel 1.4301 / AISI 304
-Pressure rating	350 bar, 700 bar peak
Position magnet	Ring magnets, U-magnets
Installation	
Mounting position	Any orientation
Profile	Movable mounting clamps or T-slot nuts M5 in base channel
U-Magnet, removable	Mounting plate and screws from antimagnetical material
Rod	Threaded flange M18 x 1,5 or 3/4" -16 UNF-3A, Hex nut M18
Position magnet	Mounting plate and screws from antimagnetical material
Electrical connection	
Connection type	5 pin DeviceNet connector M12x1
Input voltage	24 VDC (-15 / +20 %); UL Recognition requires an approved power supply with energy limitation (UL 61010-1), or Class 2 rating according to the National Electrical Code (USA) / Canadian Electrical Code.
- Polarity protection	up to -30 VDC
- Overvoltage protection	up to 36 VDC
Current drain	90 mA typical
Ripple	< 1 % S-S
Electric strength	500 V (DC ground to machine ground)

Linearity protocol

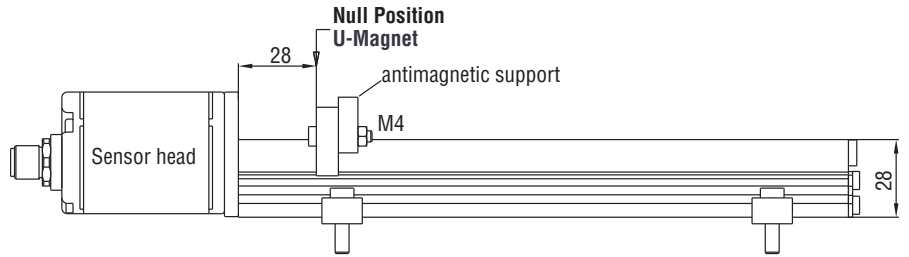
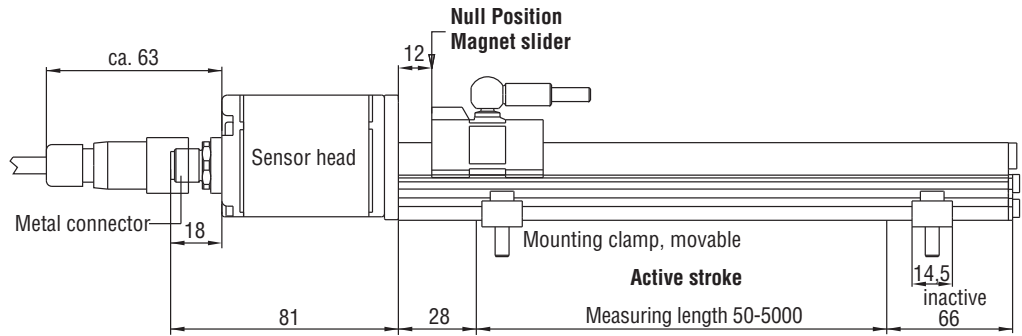
Temposonics-RP, stroke 2500 mm
Tolerance allowed: ± 0,25 mm
Tolerance measured: ± 0,116 mm
uncorrected



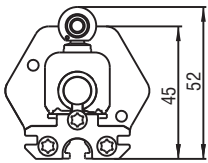
¹ The IP rating is not part of the UL recognition



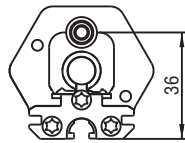
Connector outlet D51



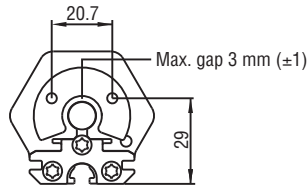
Selection of position magnets (on delivery)



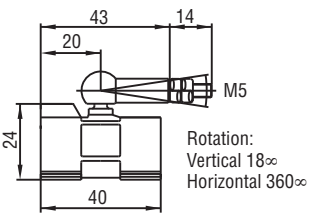
Magnet slider S
Part No. 252 182



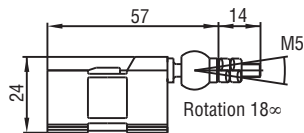
Magnet slider V
Part No. 252 184



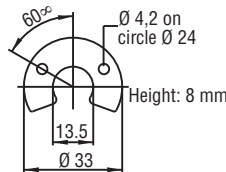
U-Magnet M OD33
Part No. 251 416-2



GFK, Magnet Hardferrite
Ball joint CuZn39Pb3 nickel plated
Weight ca. 30 g
Operating temperature:
-40 ... +75°C



GFK, Magnet Hardferrite
Ball joint CuZn39Pb3 nickel plated
Weight ca. 30 g
Operating temperature:
-40 ... +75°C



Composite PA-Ferrite-GF20
Weight ca. 11 g
Operating temperature:
-40 ... +100°C
Surface pressure max. 90 N/mm²
Fastening Torque for M4 screws max. 1 Nm

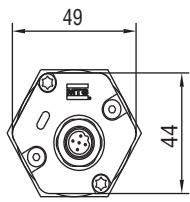
Stable Profile Design

Temposonics-RP offers modular construction, flexible mounting configurations and easy installation. Position measurement is contactless via two versions of permanent magnets.

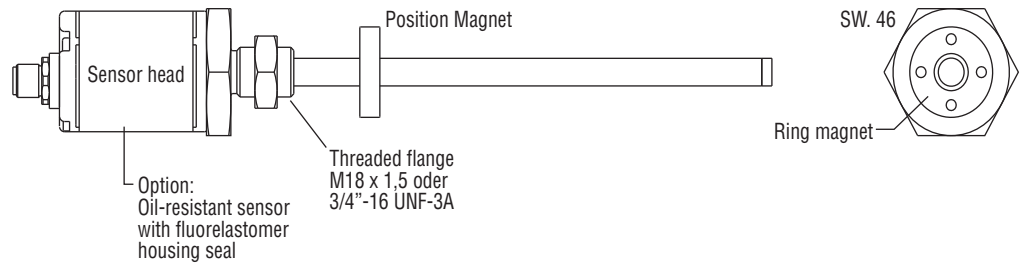
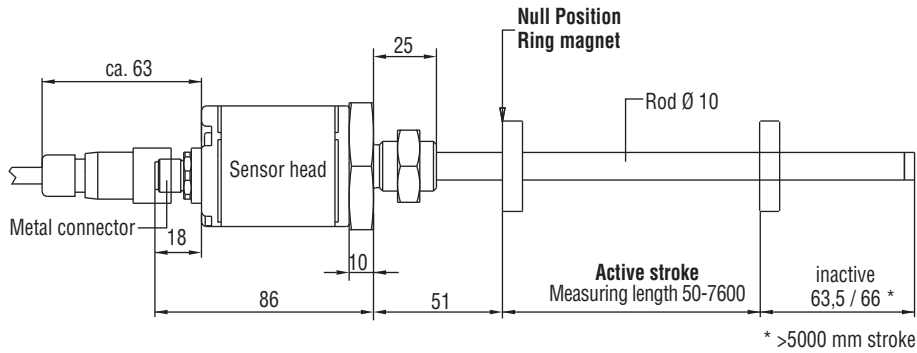
- A sliding magnet running in profile housing rails. Connection with the mobile machine part is via a ball jointed arm to taking up axial forces.
- A floating magnet, mounted directly on the moving machine part, travels over the profile at a low distance. Its air-gap allows the correction of small misalignments at installation.

Connection types

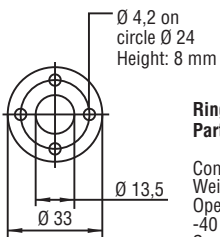
Connector outlet D51
5 pin male receptacle M12x1



Connector outlet D51

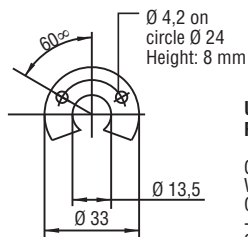


Selection of position magnets (not on delivery)



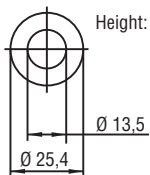
Ring magnet OD33
Part No. 201 542-2

Composite PA-Ferrite-GF20
Weight ca. 14g
Operating temperature:
-40 ... +100°C
Surface pressure max. 40 N/mm²
Fastening Torque for M4 screws max. 1 Nm



U-magnet M OD33
Part No. 251 416-2

Composite PA-Ferrite-GF20
Weight ca. 11g
Operating temperature:
-40 ... +100°C
Surface pressure max. 40 N/mm²
Fastening Torque for M4 screws max. 1 Nm



Height: 8 mm

Ring magnet OD25,4
Part No. 400 533

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

High Pressure Rod Design

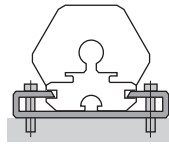
Temposonics-RH with a pressure-resistant stainless steel flange and sensing rod is suitable for use in hydraulic cylinders and externally in all applications where space is a problem. Position measurement is via ring or U-magnets travelling along the sensing rod without any mechanical contact.

Advantage...
the completely operable sensor cartridge can be replaced for servicing easily without opening the fluid circuit.

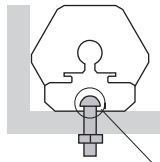
Flexible installation in any position

Profile model

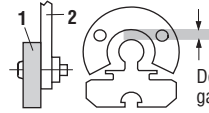
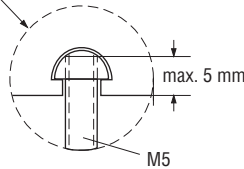
Normally, the sensor is firmly installed - fixed on a straight surface of the machine with movable mounting clamps or M5 screws in base channel - whilst the magnet is mounted at the mobile machine part.



Mounting clamp with screws M5x20
Tightening torque: max. 5 Nm



T-slot Nut in base channel



Do not exceed max. gap of 3 mm (± 1)

- 1 U-Magnet
- 2 Mounting plate and screws non-ferrous material

Rod model

Mount the sensor via flange thread or a hex nut. If possible, non-magnetizable material should be used for mounting support (dimensions as shown). With horizontal mounting, longer sensors (from 1 meter) must be provided with mechanical support.

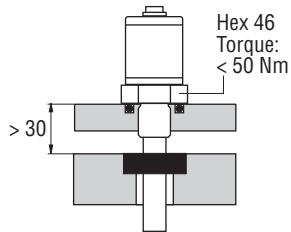
Hydraulic sealing

Recommended is sealing of the flange facing with O-Ring (e.g. 22,4 x 2,65) in a cylinder cover nut or an O-Ring 15,3 x 2,2 in undercut.

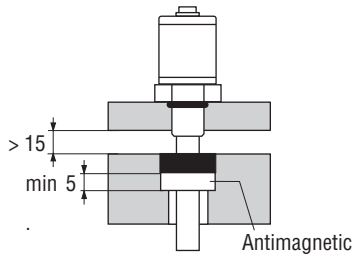
Minimum assembly distance

1. Non-magnetizable material

2. Magnetizable material



Recommended hydraulic sealing

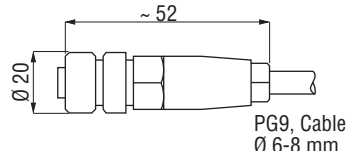


Alternative sealing
O-Ring 15,3 x 2,2

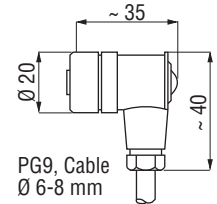
Wiring	Pin	Function
	1	shield
	2	+24 VDC (+20% / -15%)
	3	DC Ground
	4	CAN (+)
	5	CAN (-)

Male insert sensor plug rear of cable connector

Connector plug (recommended, not on delivery)

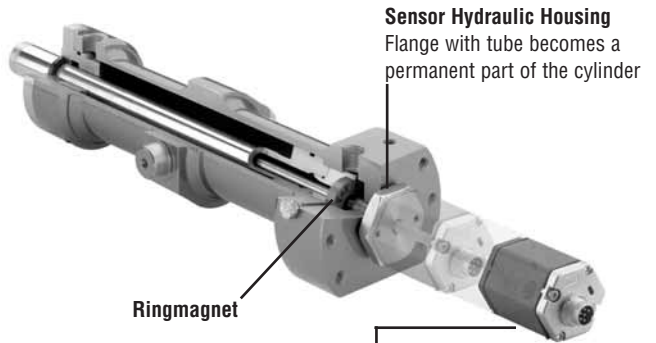


5 pol. female connector M12x1
DeviceNet "Micro"
Part No. 370 618



5 pol. female connector M12x1
DeviceNet "Micro"
insert adjustable in 90° positions
Part No. 370 619

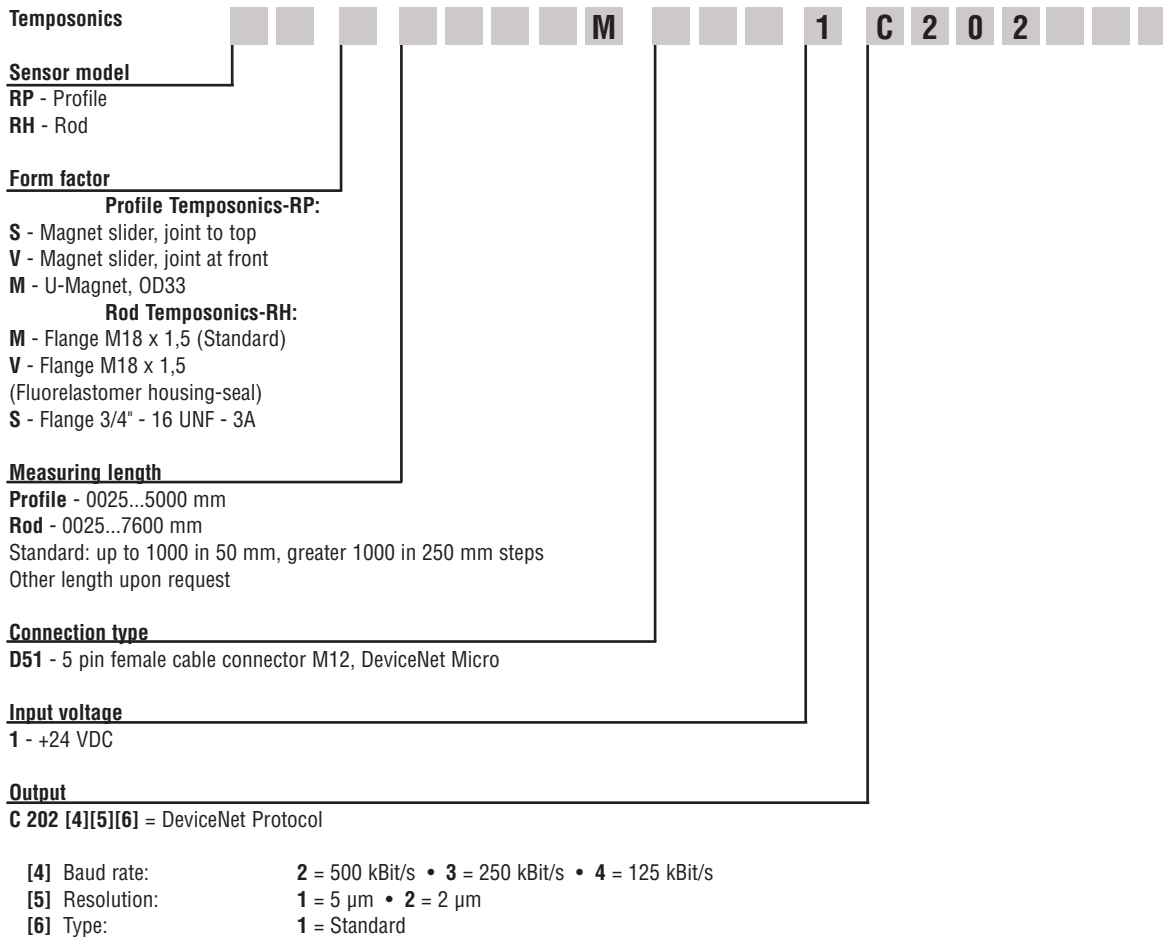
Notice!
DeviceNet cable specification:
Thin cable, Table B.3 - B.6
e.g. Belden YR 399 39 E34 972



Cylinder installation

When used for direct stroke measurement in fluid cylinders, the sensor's high pressure, stainless steel rod installs into a bore in the piston head/rod assembly as illustrated. That guarantees a longlife and trouble-free operation - independent of used hydraulic fluid.

The sensor cartridge can be removed from the flange and rod housing while still installed in the cylinder. This procedure allows quick and easy sensor cartridge replacement, without the loss of hydraulic pressure.



On delivery Profile model: Sensor, Position magnet, 2 mounting clamps up to 1250 mm + 1 clamp for every additional 500 mm.
On delivery Rod model: Sensor, hex nut, pls. order magnet (see below) separately.
CANopen only: Installation guide + CD-ROM (Electronic Data Sheet)

Accessories (selection)	Part No.
Magnet slider type »S«	252 182
Magnet slider type »V«	252 184
U-Magnet OD33, corresponding type »M«	251 416-2
Ring magnet OD33, Standard	201 542-2
Ring magnet OD25,4	400 533
O-Ring 15,3 x 2,2 Fluorelastomer FPM 75	401 133
Mounting clamp	400 802
T-slot nut M5 for base channel mounting	401 602
5 pin female cable connector M12 DeviceNet Micro	370 618
5 pin 90°-female cable connector M12 DeviceNet Micro	370 619

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