Temposonics®

Absolute, Non-Contact Position Sensors

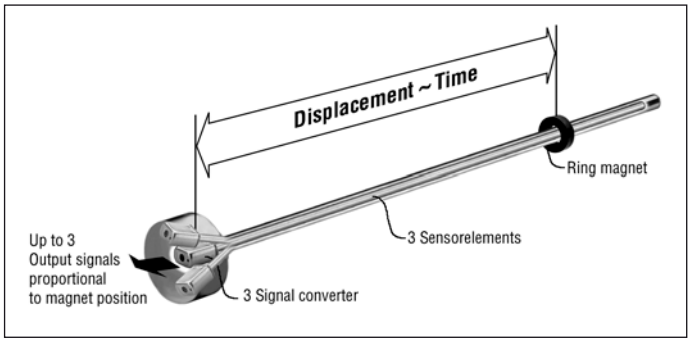
MTS® SENSORS

G-Series
Analog Redundant

Temposonics® GT2 and GT3
Measuring length 50 - 2900 mm

Redundancy for enhanced safety

- **Up to 3 totally separated, independent measuring systems in 1 housing**
- **Linear Absolute Measurement**
- **Contactless Sensing with Highest Durability**
- **Superior Accuracy: Linearity better 0,02 %**
- **Repeatability 0,001 %**
- **Direct Analog Output**
- **Compact design with a 10 mm measuring rod and standard mounting**



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 hight 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.

Form factor

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.

CE ISO 9001 CERTIFIED

Temposonics G-Series Redundant

The G-Series Redundant sensor is designed for applications with high safety requirements.
Two or three measuring systems, which work totally independent, are installed inside the compact sensor housing. Each measuring system contains its own canal with sensor element, evaluation electronics, output signal, separated power supply, connector and cable.

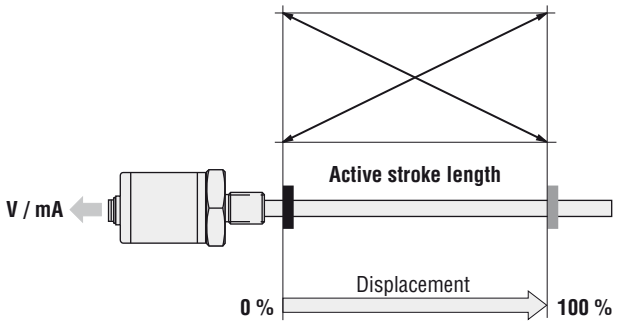
All sensor elements are integrated in one pressure proofed high-grade steel rod. Rod and fixing flange feature the approved standard dimensions with 10 mm diameter and M18x 1,5 winding. That qualifies the redundant sensor for measuring linear movements of control valves, linear drives, fluid cylinders and machines.

In particular applications with safety relevant functions benefit from a redundant position measurement:

- Valves and drives at power plants
- Pitch settings at water- or wind turbines or at marine propellers
- Ship control systems and floodgates.

Analog output

Temposonics G-Series with analog outputs provide direct analog outputs including voltage and current, forward or reverse acting. All outputs allow full adjustment of Null and Span setpoints (minimum range 50 mm between setpoints) inside the **active electrical stroke** length. Since the outputs are direct, no signal conditioning electronics are needed when interfacing with controllers or meters.



Sensor field programming

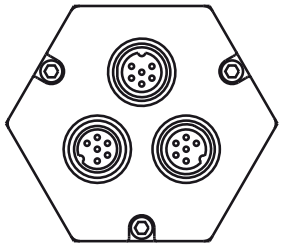
Temposonics G-Series sensors are preconfigured at the factory by model code designation. If needed, MTS offers different external service tools for modifying sensor parameters inside the **active electrical stroke** (minimum 50 mm between setpoints) via the standard connection cable. There is no need to open the sensors electronics. Following tools are available:

1. Hand-Programmer G-Analog
for setups of measuring length inside the ordered output by pushing an up/down-button.

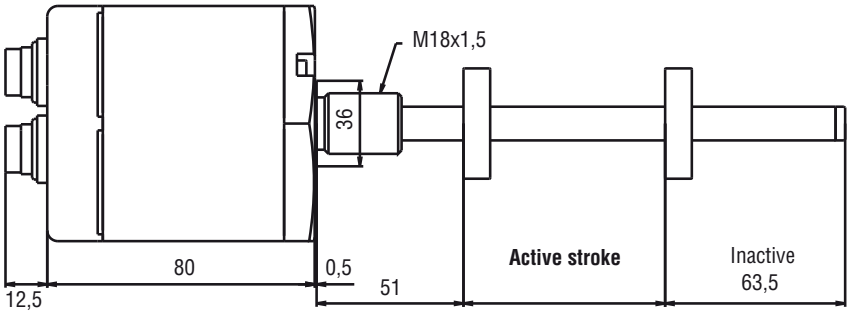
2. PC-Programmer G-Analog
This hardware converter is required to communicate via serial port of Window PC to the sensor. Customized settings are possible by using a MTS programming software (CD-ROM) for:
Analog: 1. Null and Span; 2. Forward and reverse acting;
3. Output: Voltage/Current and output values

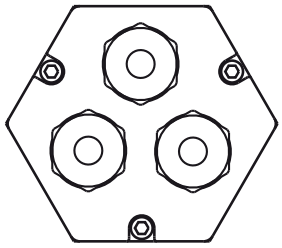
Technical Data

Input	
Measured variables	Position
Measuring range	50 - 2900 mm
Output	
Sensor model GT2	Two output channels
Sensor model GT3	Three output channels
Voltage	0...10 / 10...0 / -10...+10 / +10...-10 VDC (min. load controller: > 5 kOhms)
Current	4(0)...20 mA / 20...4(0) mA (min/max. load: 0/500 Ohms)
Null/Span adjustment	100 % of electrical stroke (Min. range 50 mm)
Accuracy	
Position measurement:	
- Resolution	Analog: Infinite
- Linearity	< ± 0,02 % F.S. (Minimum ± 50 µm)
- Repeatability	< ± 0,001 % F.S. (Minimum ± 2,5 µm)
- Hysteresis	< 4 µm
- Update time (ms)	Analog: < 1 ms typical
- Ripple	< 0,01 % F.S.
Operating conditions	
Magnet speed	any
Operating temperature electronic housing	-40 °C ... +75 °C
Dew point, humidity	90% rel. humidity, no condensation
Protection	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
	(Resonance frequencies causing excess of 15 g are excluded)
Standards, EMC test	Electromagnetic emission EN 61000-6-4, CISPR 16
	Electromagnetic immunity EN 61000-6-2
	EN 61000-4-2/3/4/6, Level 3/4, Criterium A, CE-qualified
Form factor, material	
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
Rod	Threaded flange M18 x 1,5, nut M18
Position magnet	Mounting plate and screws from antimagnetical material
Electrical connection	
Connection type	6 pin connector M16 or integral PUR-cable with open ends
Input voltage	24 VDC (-15 / +20 %)
- Polarity protection	up to -30 VDC
- Overvoltage protection	up to 36 VDC
Current drain	100 mA typical (each channel)
Ripple	< 1 % S-S
Electric strength	500VDC (DC ground to machine ground)

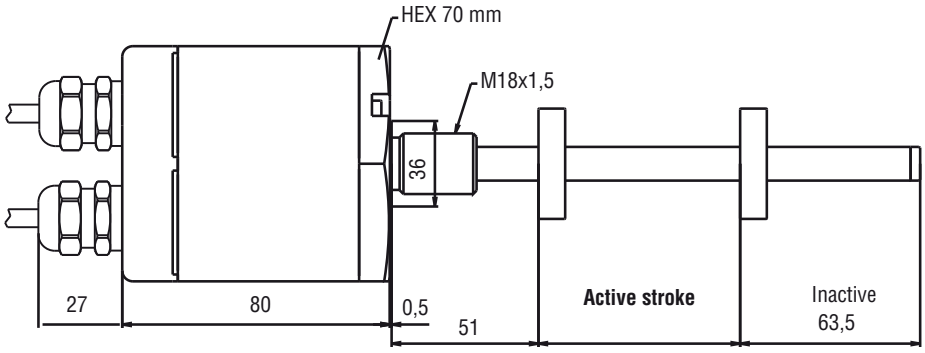


Connector outlet D60

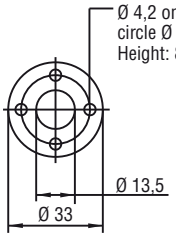




Cable outlet H02

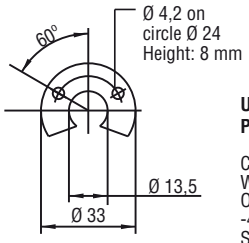


Selection of position magnet (not on delivery)



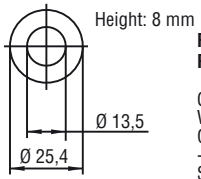
Ring magnet OD33
Part No. 201 542-2

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



U-magnet OD33
Part No. 251 416-2

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



Ring magnet OD25,4
Part No. 400 533

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

High Pressure Rod Design

Temposonics-GT 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.

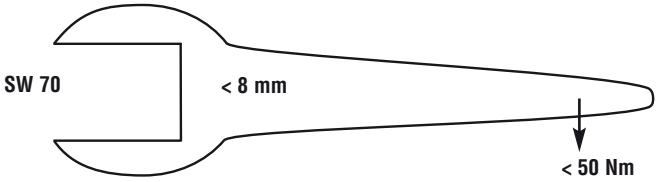
Connection types

1. Connector outlet D60
6 pin Male receptacle M16

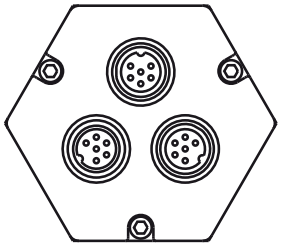
2. Cable outlet H02
2 m PUR cable 3 x 2 x 0,25 mm²
Cable Ø 6,8 mm

Screened unshielded twisted pair
50 mm bending radius at fixed installation

Flexible installation in any position



When mounting the sensor a basic tool with max. 8 mm dimension has to be used. Thereby attention must be paid, that the tool is placed at the flange exclusively.



Connector outlet D60

Connector	Pin	Cable	Analog
	1	grey	V/mA
	2	pink	DC Ground
	3	yellow	PC-Programming
	4	green	PC-Programming
	5	brown	+ 24 VDC (-15 / +20 %)
	6	white	DC Ground

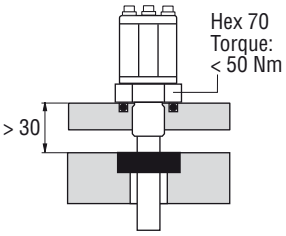
Male insert connector
rear of cable connector

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.

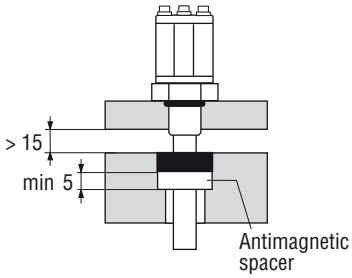
Minimum assembly distance

1. Non-magnetizable material



Recommended hydraulic sealing

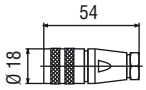
2. Magnetizable material



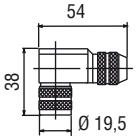
On delivery:
O-Ring 15,3 x 2,2
See ISO 6149-1

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.

Cable connector (recommended, not on delivery)



6 pin female connector M16, PG9
Part No. 370 423



Housing: Zinc nickel plated
Termination: Solder
Contact insert: Silver plated
Cable clamp: PG7
Max. Cable-Ø 6mm
Cable clamp: PG9, M16
Max. Cable-Ø 8 mm

6 pin 90° female connector M16
insert adjustable in 45° positions
Part No. 560 778

Temposonics ☐☐☐☐ ☐☐☐☐ **M** ☐☐☐ **1** ☐☐

Sensor model
GT2 = Dual redundant
GT3 = Triple redundant

Form factor
M = Flange M18 x 1,5 (Standard)

Measuring length
0050 … 2900 mm*

Connection type
D60 = 6 pin male receptacle M16
H02 = 2m PUR-cable w/o connector, option H01-H10 (1-10m)

Input voltage
1 = +24 VDC

Output
V0 = Voltage 0 to +10 VDC
V1 = Voltage +10 to 0 VDC
V2 = Voltage -10 to +10 VDC
V3 = Voltage +10 to -10 VDC
A0 = Current 4 to 20 mA
A1 = Current 20 to 4 mA
A2 = Current 0 to 20 mA
A3 = Current 20 to 0 mA

On delivery rod model: Sensor, O-Ring, pls. order magnet separately.

Accessories (selection)	**Part No.**
Ring magnet OD33, Standard	201 542-2
Ring magnet OD25,4	400 533
U-magnet OD33	251 416-2
Hex nut	500 018
6 pin female cable connector M16, PG9	370 423
6 pin 90°-female cable connector M16,	560 778
PUR-cable 3 x 2 x 0,25 mm^2	530 052
MTS-Servicetools	
Analog Hand-Programmer G	253 853
Analog PC-Programmer G, incl. power supply (100-240 VAC / 24VDC) Connection cable and programming software (CD)	253 145

***Stroke Length Notes**

Stroke	**Ordering Steps**
< 500 mm	5 mm
500 - 750	10 mm
750 - 1000	25 mm
1000 - 2500	50 mm
> 2500	100 mm

Notes

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www.temposonics-shop.de

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