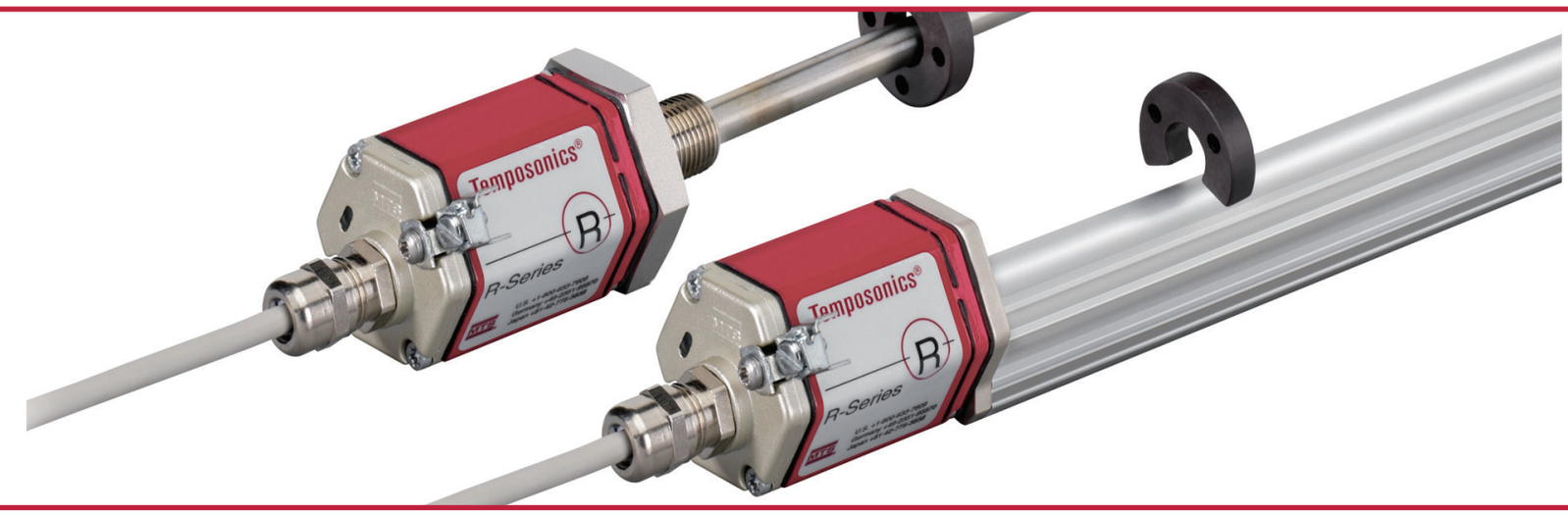
Temposonics®

Absolute, Non-Contact Position Sensors

MTS SENSORS

ATEX Approved Sensors
Temposonics® R- and G-Series

Instruction manual



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1. General

This sign identifies an important information

This sign indicates that, the personnel damage such as death or bodily injury, or considerable damage to property are susceptible to occur, unless appropriate precautions are taken.

Information related to the explosion and its protective measures.

The content of this technical documentation is intended to provide quick information for mounting, installation and commissioning by specialized automation personnel [1] or trained service technicians who are familiar with Temposonics® sensor projecting and handling.

Please, read this documentation carefully before Temposonics® sensor commissioning, follow the mentioned safety instructions.

Warranty [2]

In case of material deficiencies and faults which occur despite operation in compliance with the regulations, the warranty assumed by MTS for Temposonics® position sensors is 12 months starting with the reception of the product. The MTS liability is limited to repair or replacement of every defective part of the instrument. No warranty can be assumed for deficiencies due to improper handling or above average overload of the product, and for wear parts. MTS cannot be held responsible for consequences or side effects in case of infliction against the warranty conditions [2], independent of whether promised or expected, not even in case of manufacturer error or negligence.
In this respect, MTS explicitly precludes any further warranty. Neither MTS representatives, agents and dealers nor employees are authorized to increase or change the warranty conditions.

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[1] Specialized personnel means persons who
- are familiar with the automation safety concepts related to projecting
- are familiar with EMC questions and standards
- have undergone training for commissioning and servicing
- are familiarized with the operation of the instrument and know the information for correct operation provided in the product documentation.
- have a qualification similar to “authorized person” according to TRBS 1203

[2] See also MTS sales and delivery conditions www.mtssensor.de

2. Safety Instructions

Please, read this documentation carefully before sensor operation and follow the safety instructions!
Specified normal operating conditions

This product may be used only for the applications provided by the technical description and only in conjunction with third-party units and components recommended or approved by MTS. Prerequisites of correct and safe product operations are proper transport, storage, mounting, commissioning and careful operation.

1. The position measurement systems of all Temposonics® series are intended exclusively for measurement in industrial, trade and laboratory applications. The position sensors are considered as system accessories and must be connected to a suitable unit for electronic evaluation as e.g. included in a PLC, IPC, indicator or other electronic control facility.
2. The position sensors must be used only in safe condition. In order to maintain this condition and to ensure safe operation, installation, connection and service may be done only by specialized and qualified personnel.

Information related to danger

Information related to danger is intended for your personal safety and for the safety against damage of the described product or instruments connected to it. Safety hints and warnings for prevention of damage to the life and health of users or repair and maintance personnel, or for prevention of damage to property are highlighted in these instructions by the pictogram defined above.

2.1 Installation Instructions

Functional trouble:
If failure or disfunction of the sensor imply a risk of injury to persons or damage of production facilities, additional safety measures such as plausibility checks, limit switches, EMERGENCY OFF systems, protective devices etc. must be taken. In case of trouble, the sensor must be taken out of operation and protected against accidental operation.

Repairs:
Any sensor repairs may be done only by MTS or by an organization explicitly authorized by MTS.

Installation and Repair:
In order to maintain the operability of the product, it is indispensable to follow the rules given below:

1. Protect the sensors against mechanical stress during installation and operation.
1a. The probe of the basis sensor according 3.4 has to be attached to the housing that meets all requirements of the standards EN60079-0, EN60079-15, EN61241-0, EN61241-1 with regards to thermal conditioning as well as shock- and IP-testing.
1b. The basic sensor according 3.4 has to be attached to the potential equalization bonding over a dedicated connection. It is to be treated in accordance with the erection regulations in the user country. The potential equalization connection is loosely attached to the partly assembled device. This connection must be established by mounting of the device in accordance with the aforementioned regulations.
2. Do not open or disassemble the sensors.
3. Connect the sensors very carefully related to polarity, supply voltage and form as well as duration of control pulses.
4. Use only appropriate power supplies.
5. Compliance with the permissible sensor limit values for e.g. operating voltage, environmental conditions etc. as specified in the product documentation is indispensable.
6. Check the position sensor function regularly including documentation.
7. Before switching on the system, make sure that danger for persons due to starting machinery is precluded.
8. Connectors must not be detached in the presence of explosive athmosphere. A warning label is mandatory (e.g. “Caution! Only disconnect in safe areas!”)
9. Connectors have to be secured against accidental unfastening, for example with low strength thread locker. A torque von 0,5..1,5 Nm on an equivalent M10 thread has to be achieved.
10. Connectors must not be energized when disconnected.
11. Unused connectors have to be closured with appropriate caps.

3. Product Description

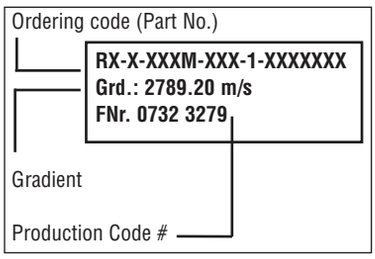


Fig: 1 Sensor Example

Product Types
Position sensors Temposonics® R- and G-Series.

Sensor models:
- Temposonics® - RP / GP (Profile housing)
- Temposonics® - RH / GH (Rod housing)
- Measuring range: 50...1650 mm
- Output Signal: Selectable R-Series: Analogue / SSI / CANbus
  G-Series: Analogue / Start-Stop

ATEX Identification according 3.2 and 3.3

II 3G Ex nA IIC T4 Gc
and / or
II 3D Ex tc IIIB IP65 T100°C DC
and / or
II 3D Ex tc IIIB IP67 T100°C Dc
TFR: 07 ATEX 027 Edition 3
-20 °C ≤ Ta ≤ 75 °C
Pmax = 4 Watt
Derating 6,5 KW^{-1} ≥ 49°C

ATEX Identification according to 3.4

II 3G Ex nA IIC T4
and / or
II 3D Ex tD A22 IP67 T100°C
TFR: 08 ATEX 002X Edition 2
-20 °C ≤ Ta ≤ 75 °C
Pmax = 4 Watt
Derating 6,5 KW^{-1} ≥ 49°C

Industrial Field of Application:
Temposonics® position sensors are used for displacement measurement and conversion in mechanical and plant engineering applications.

3.1 Operating Principle and System Design

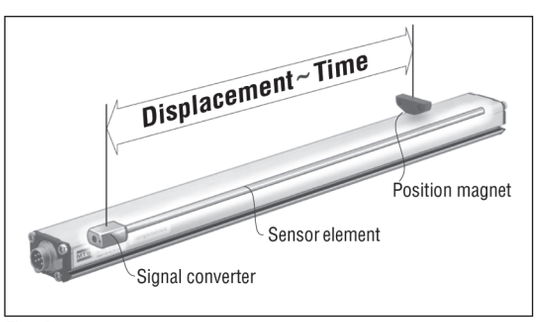


Fig.: 2
Magnetostrictive ultrasonic speed measurement = position measurement

Temposonics® are absolute position sensors for measuring linear movements. The sensor associates various magneto-mechanical effects in a magnetostrictive measurement principle, which uses the defined propagation speed of an ultrasonic wave – a torsional pulse in the sensor element – for displacement measurement. This contactless principle features a permanent magnet without separate power supply, which marks the position point through the sensor housing wall. The torsion pulse speed measurement can be converted directly into high-accuracy standard market output signals, strictly proportional to the measured displacement.
The non-contact sensors eliminate the wear, noise and erroneous signal problems and guarantee the best durability without any recalibration. Their absolute nature provides instant recognition of machine position after power loss recovery.

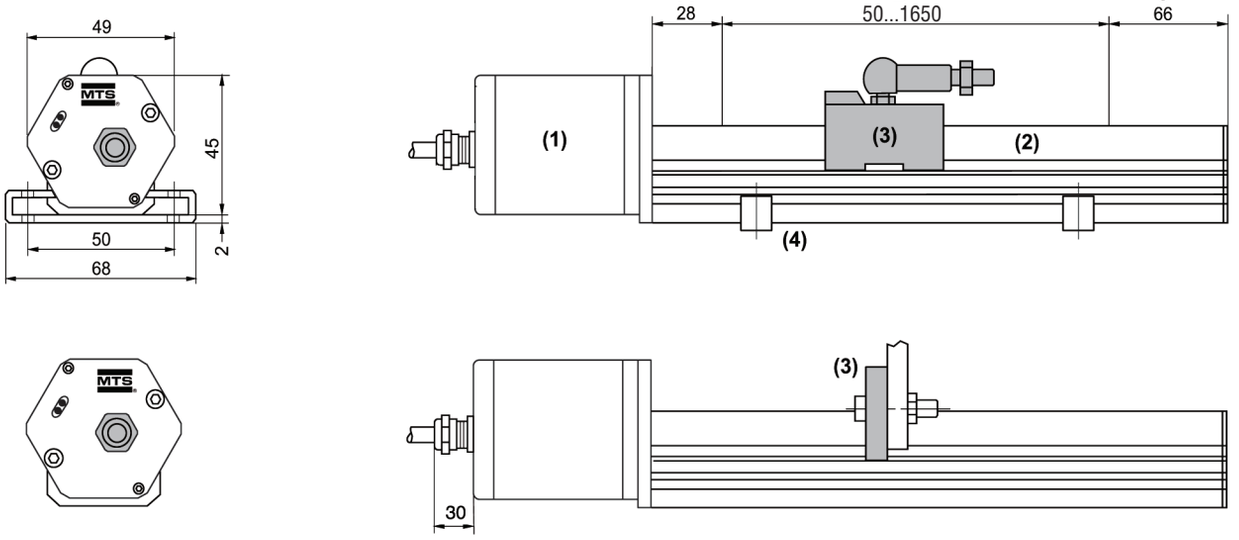
Modular Form Factor:
The extremely robust sensor, ideal for continuous operation under harshest industrial conditions is completely modular in mechanics and electronics design.
- A rod-shaped sensor housing protects the sensing element in which gives rise to the measurement signal.
- The sensor head 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.

3.2 Profile Models Temposonics®-RP / GP

TFR: 07 ATEX 027 Edition 3

Measurement is non-contact 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. An air-gap allows the correction of small misalignments at installation.

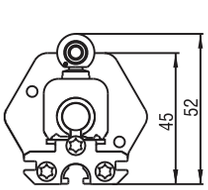


1 Sensor head with electronics
2 Sensor housing with built-in sensing element
3 Position magnet
4 Mounting clamp

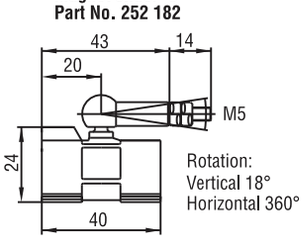
A Mounting zone
B Measuring range / Order length (depends on sensor type)
C Inactive zone

See in the corresponding data sheets for output dependent minimum variations of the sensors head dimension.

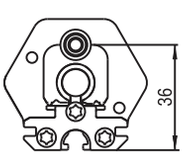
Selection of Profile Position Magnets



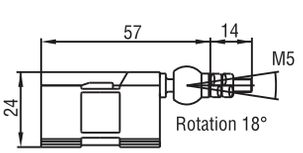
Magnet slider S
Part No. 252 182



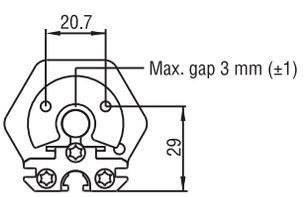
GFK, Magnet Hardferrite
Ball joint CuZn39Pb3 nickel plated
Weigth ca. 30 g
Operating temperature:
-40 ... +75°C



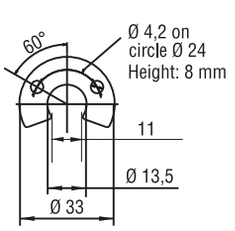
Magnet slider V
Part No. 252 184



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



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



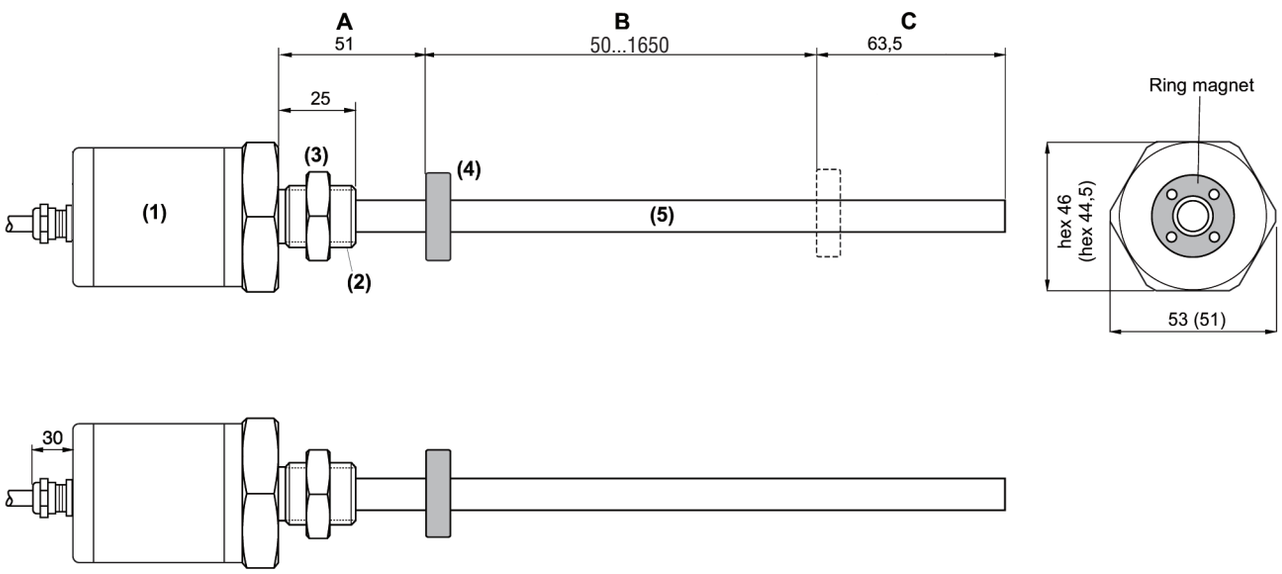
PA-Ferrit-GF20
Weigth ca. 11g
Operating temperature: -40 ... +100°C
Surface pressure max. 40 N/mm²
Fastening torque for M4 screws max. 1 Nm

3.3 Rod Models Temposonics®-RH / GH

TFR: 07 ATEX 027 Edition 3

The sensor with a pressure-resistant stainless steel flange and sensing rod is suitable for use in hydraulic 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.

Advantages…
The completely operable sensor cartridge can be replaced for servicing easily without opening the fluid circuit.
Measurement is non-contact via two versions of permanent magnets.

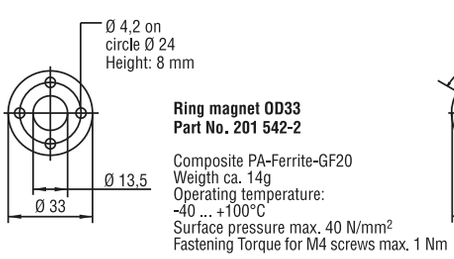


1 Sensor head with electronics
2 Threaded flange, M18 x 1,5 or 3/4" - 16 UNF-3A
3 Hex nut 18 x 1,5 (hex 27)
4 Position magnet
5 Sensor rod with built-in sensing element, Ø 10

A Mounting zone
B Measuring range / Order length (depends on sensor type)
C Inactive zone

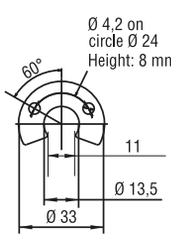
See in the corresponding data sheets for output dependent minimum variations of the sensors head dimension.

Selection of Rod Position Magnets



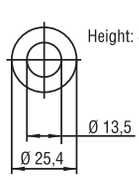
Ring magnet OD33
Part No. 201 542-2

Composite PA-Ferrite-GF20
Weigth 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

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



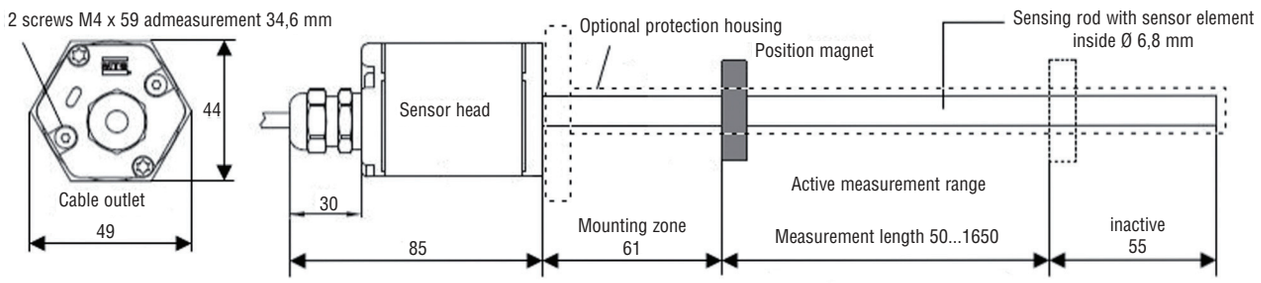
Ring magnet OD25,4
Part No. 400 533

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

3.4 Basic Sensor

R-Series: Type RH-B... resp. Type RH-G...
G-Series: Type GH-B... resp. Type GH-G...

TFR: 08 ATEX 002X Edition 2



The probe of the above basic sensor has to be attached to a housing, which meets the requirements of standards EN60079-0, EN60079-15, EN61241-0 and EN61241-1 in terms of thermal conditioning, shock- and IP-testing.

The installation of the basic sensor into the housing has to be done by trained personnel only. The screws have to be secured with thread locker e.g. Loctite 243 (Fig. 1), the fastening torque is 1,3 Nm. The gasket between the sensor head and the housing has to have the correct position and has to seal up the chink safely.

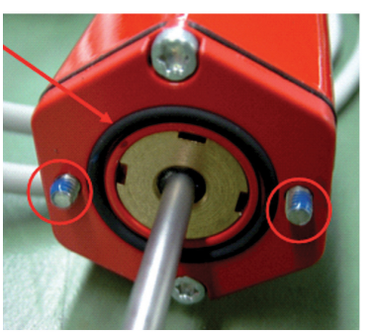


Fig. 1: Secure screws with thread locker, check the correct position of the gasket

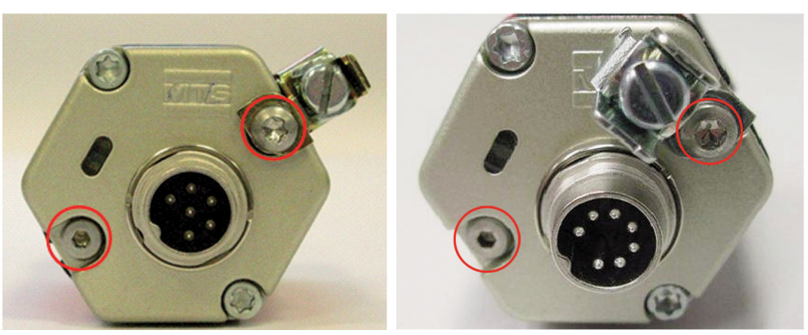


Fig. 2: Fasten screws with 1,3 Nm

The basic sensor has to be grounded over the dedicated connection (see Fig. 2). This connection has to be done in according to the local law and regulations. The ground connection is attached to the sensor. By mounting the sensor the fasting (Fig. 2) and protection must follow the rules (see chapter 7, installation details).

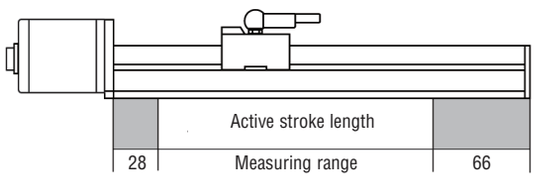
Cable Connections

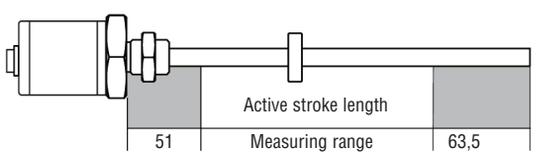
Cable color (cable connection) DIN 47100	R-Series			G-Series	
	Analogue	SSI	CAN	Analogue	Start/Stop
grey (1) pink (2)	Output 1 0-10 V / 4-20 mA Ausgang 1 Ground	Data (-) Data (+)	CAN (-) CAN (+)	0-10 V / 4-20 mA Output Ground	Stop (-) Stop (+)
yellow (3) green (4)	Output 2 0-10 V / 4-20 m Output 2 Ground	Clock (+) Clock (-)	No connection No connection	Programming (+) Programming (-)	Start (+) Start (-)
brown (5)	+24 VDC	+24 VDC	+24 VDC	+24 VDC	+ 24 VDC
white (6)	DC Ground	DC Ground	DC Ground	DC Ground	DC Ground
blue (7)	...	No connection	...	...	...

4. Installation

Measuring Range
All the technical data of each Temposonics® sensor are checked and recorded at the final quality inspection. At the same time the active electrical stroke (see data sheet) is adjusted.

With all sensors described in the manual, the areas left and right of the stroke length are inactive (mounting area, damping) and should not be used for measurements. Nevertheless, the stroke length can be overtravelled.





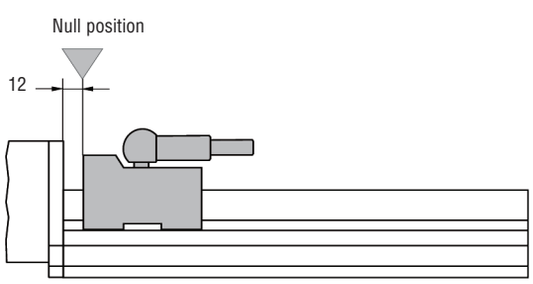


Fig. 3
Temposonics® Profile models with magnet slider S and V

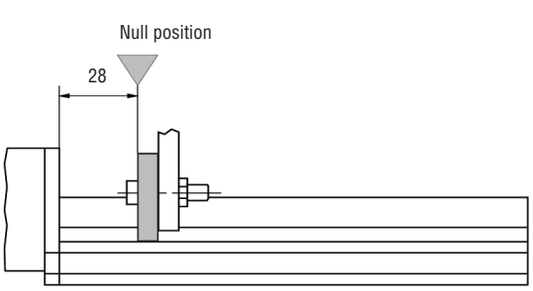


Fig. 4
Temposonics® Profile models with U-Magnet OD33 (corresponding magnet M)

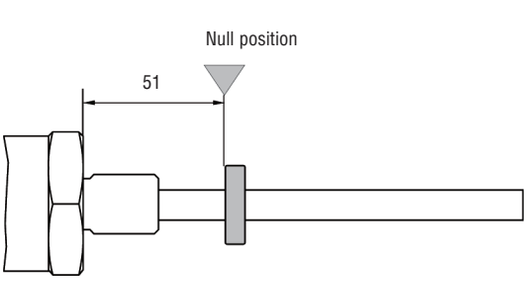


Fig. 5
Temposonics® Rod models with ring magnet

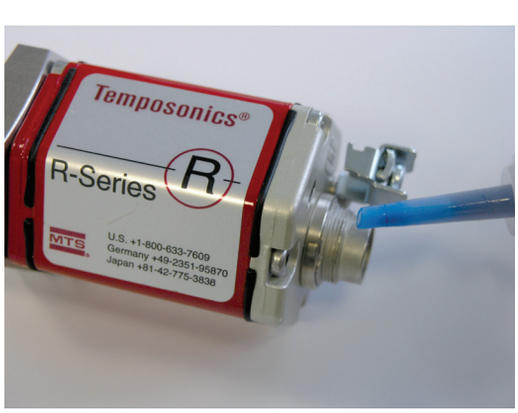
Connectors (if applicable)
It has to be assured that the connectors can not easily or accidentally be disconnected with the sensor energized. This is achieved by securing the connector in a mechanical way, e.g. with a low strength thread locker. If any vibration during the operation may cause parts of the plugs to loosen, then the plugs have to be provided with a light firm varnish used for securing screws. An extraction force of 0.5 .. 1.5 Nm has to be achieved at an equivalent M10 thread.

Use a low strength thread locker in a sparing way, otherwise the opening torque will become too high.

Additional warning hints on labels are mandatory according to the ATEX regulations (e.g. “Caution! Only disconnect in safe areas!”).

Unused connectors must be closed with appropriate caps.

On sensors with the identification number RX-X-XXXXM-D3X-1-X-XXXXXXX the connector must be protected from being hit by external forces.



5.1 Technical Information: R-Series

Input	
Measurement quantity	Analogue: position, speed CANbus: position, speed SSI: position, position difference between 2 magnets, velocity
Measurement length	Profile version: 50...1650 mm Rod version: 50...1650 mm
Output	
Analogue Version	
Voltage	0…10 / 10…0 / -10…+10 / +10….-10 V DC (min. load controller > 5 KΩ)
Current	4(0)…20 mA / 20…4(0) mA (min / max. load : 0/500 Ω)
CANbus Version	CANopen CIA Standard DS 301 V3.0 / encoder profile DS 406 V3.1, CANbasic CAN 2.0A

Baudrate, kBit/s	1000	800	500	250	125	50	20
	< 25	< 50	< 100	< 250	< 500	< 1000	< 250

SSI Version	
Data format	Binary or Gray, Optional Parity and Error bit
Data length	8….32 Bits

Update Time	Measuring length	300	750	1000
	Measurements / ms	3,7	3,0	2,3 KHz

Data speed	Length	< 3	< 50	< 100	< 200	< 400 m
	Baud rate	1,0 MBd	< 400 KBd	< 300 KBd	< 200 KBd	< 100 KBd

Accuracy	
Position Measurement	
Resolution	depends on the output
Linearity	< ± 0.01 % of full scale (Minimum ± 50 µm)
Repeatability	< ± 0.001 % of full scale (Minimum ± 2,5 µm)
Speed Measurement	
Magnet speed	< 1m/s
Operating temperature	- 20°C…+ 75°C, Pmax= 4 Watt, derating 6,5 K/W ≥ 49°C
Dew point, humidity	90% rel. humidity, no condensation
Protection	Profile: IP 65, rod: IP67
Shock test	100 g Single hit, IEC-Standard 68-2-27
Vibration	15 g / 10 – 2000 Hz IEC-Standard 68-2-6
EMC test standards	Transient emission EN 61000-6-3 Interference resistance EN 61000-6-2 EN 61000, Criteria A, CE-qualified
Formfactor, Material	
Sensor housing	Aluminium
Sensor stroke	Profile version: Aluminium, rod version: Stainless steel 1.4301 / AISI 304
Position magnet	Magnet slider or removable U-magnet
Installation	
Mounting position	Any orientation
Profile version	Movable mounting clamps fixed with M5 × 20 screws or T-Slot nuts M5 in base channel
Rod version	Threaded Flange M18 × 1.5 or ¾"- 16 UNF-3A, Hex nut M18
Electrical connection	
Connection type	Cable outlet or connector (D60, D70, D62, D51) Cable Types: PUR cable K59, Teflon cable K34, PVC cable K27
Current consumption	120 mA typically
Ripple	< 1 % S-S
Electrical strength	500 VDC (0 V to machine ground)

5.2 Technical Information: G-Series

Input	
Measurement quantity	Analogue: position Digital: position
Measurement length	Profile version: 50...1650 mm Rod version: 50...1650 mm
Output	
Analogue version	
Voltage	0…10 / 10…0 / -10…+10 / +10….-10 V DC (min. load controller > 5 KΩ)
Current	4(0)…20mA / 20…4(0) mA (min / max. Load: 0/500 Ω)
Digital Version	Start / Stop Pulse (RS422 Serial Differential Signal)
Accuracy	
Position measurement	
Null / span adjustment	100% of electrical stroke (Min range 50 mm)
Resolution	Analogue: infinite Digital (Start/Stop): 0,1mm, 0,01; 0,005 mm (controller dependent)
Linearity	< ± 0,02 % of full scale (Minimum ± 50 µm)
Repeatability	< ± 0,001 % of full scale (Minimum ± 2,5 µm)
Speed Measurment	
Magnet speed	< 1m/s
Operating temperature	-20 °C…+75 °C, Pmax= 4 Watt, derating 6,5 K/W ≥ 49°C
Dew point, humidity	90% rel. humidity, no condensation
Protection	Profile: IP 65, Rod: IP67
Shock test	100 g Single hit, IEC-Standard 68-2-27
Vibration	15g / 10 – 2000 Hz IEC-Standard 68-2-6
EMC test standards	Transient emission EN 61000-6-3 Interference resistance EN 61000-6-2 EN 61000, Criteria A, CE-qualified
Formfactor, material	
Sensor housing	Aluminum
Sensor stroke	Profile version: Aluminium, rod version: stainless steel 1.4301 / AISI 304
Position magnet	Magnet slider or removable U-magnet
Installation	
Mounting position	Any orientation
Profile version	Movable mounting clamps fixed with M5 × 20 screws or T-Slot nuts M5 in base channel
Rod version	Threaded flange M18 × 1.5 or ¾"- 16 UNF-3A, Hex nut M18
Electrical Connection	
Connection type	Cable outlet or connector (D60) Cable Types: PUR cable K59, Teflon cable K34, PVC cable K27
Current consumption	100 mA typically
Ripple	< 1 % S-S
Electrical strength	500 V (DC Ground to machine ground)

6. Sensor Model Article coding

R Series: Analogue

RX-X-XXXXM-XXX-1-XXXXXXX-EX
ab-c-defgM-hij-1-klmnopq-rs

Where,

a = Model Name R-Series
b = Housing Version: P = Profile / H = Hydraulic Rod
c = Rod Version: M = Flange M18 × 1.5 or S = ¾"- 16 UNF-3A or
B = basic unit
Profile Version: S = Captive sliding magnet with ball joint at top or
V = Captive sliding magnet with ball joint at front or
M = U- Magnet
defgM = Measuring Length in millimeter (50...1650 mm)
hij = Connection Type: H = PUR cable K59 or T = Teflon cable K34 or
R = PVC cable K27 with length in meter or
D60 = connector 6 pin male receptacle M16
D3x = 5 pol. male connector M12
1 = Excitation input voltage (+24 V)
klmnopq = Analog Type Versions (Voltage or current)
A01 = 4….20 mA or A11 = 20…4 mA or A21 = 0…20 mA or
A31 = 20…0 mA
V01 = 0…10 V or V11 = 10…0 V or V21 = -10…+10 V or
V31 = +10…-10 V
rs = EX = ATEX approved

G Series: Analogue and Start/Stop

GX-X –XXXXM-XXX-1-XXX-EX
ab-c-defgM-hij-1-klm-no

Where,

a = Model Name G-Series
b = Housing Version: P = Profile / H = Hydraulic Rod
c = Rod Version: M = Flange M18 × 1.5 or S = ¾"- 16 UNF-3A or
B = basic unit
Profile Version: S = Captive sliding magnet with ball joint at top or
V = Captive sliding magnet with ball joint at front or
M = U- Magnet
defgM = Measuring length in millimeter (50...1650 mm)
hij = Connection Type: H = PUR cable K59 or T = Teflon cable K34 or
R = PVC cable K27 with length in meter or
D60 = connector 6 pin male receptacle M16
1= Excitation input voltage (+24 V)
klm = Analog Type Versions (Voltage or current) / Start-Stop
V0 = 0…10 V or V1 = 10…0 V or V2 = -10…+10 V or
V3 = +10…-10 V
A0 = 4…20 mA or A1 = 20…4 mA or A2 = 0…20 mA or
A3 = 20…0 mA
R01 = Start/Stop
no = EX = ATEX approved

R Series: CANbus

RX-X –XXXXM-XXX-1-C-XXXXXX-EX
ab-c-defgM-hij-1-C-klmnop-qr

Where,

a = Model Name R-Series
b = Housing Version: P = Profile / H = Hydraulic Rod
c = Rod Version: M = Flange M18 × 1.5 or S = ¾"- 16 UNF-3A or B = basic unit
Profile Version: S = Captive sliding magnet with ball joint at top or V = Captive sliding magnet with ball joint at front or
M = U- Magnet
defgM = Measuring Length in millimeter (50...1650 mm)
hij = Connection Type: P = PUR cable K26 with length in meter or N10 = 6 m PUR cable K26 or D60 = connector 6 pin male receptacle M16 or
D62 = 2 x connector 6 pin male receptacle M16 or D51 = connector 5 pin male receptacle M12 or D3x = 5 pol. male connector M12
1 = Excitation input voltage (+24 V)
C = CANBus Interface
klm = Protocol: 101 = CANbasic (MTS) or 207 = Muti-Position measurement or 304 = CANopen
n = Baud rate: 1 = 1000 kbit/s or 2 = 500 kbit/s or 3 = 250 kbit/s or 4 = 125 kbit/s
o = Resolution: 1 = 5µm or 2 = 2µm
p = Type: 1 = Standard; 3 = customized
qr = EX = ATEX approved

R Series: SSI

RX-X –XXXXM-XXX-1-S-XXXXXX-EX
ab-c-defgM-hij-1-S-klmnop-qr

Where,

a = Model Name R-Series
b = Housing Version: P = Profile / H = Hydraulic Rod
c = Rod Version: M = Flange M18 × 1.5 or S = ¾"- 16 UNF-3A or B = basic unit
Profile Version: S = Captive sliding magnet with ball joint at top or
V = Captive sliding magnet with ball joint at front or
M = U- Magnet
defgM = Measuring Length in millimeter (50...1650 mm)
hij = Connection Type: P = PUR cable K26 with length in meter or D70 = connector 7 pin male receptacle M16
1 = Excitation input voltage (+24 V)
S = Synchronous Serial Interface (SSI)
k = Data length: 1 = 25 bit or 2 = 24 bit or 3 = 26 bit
l = Output format: B – Binary or G – Gray
m = Resolution (mm): 1 = 0,005 or 2 = 0,01 or 3 = 0,05 or 4 = 0,1 or 5 = 0,02 or 6 = 0,002 or 8 = 0,001
n = Performance: 1 = Standard
op = Options: 00 = Measuring direction forward or 01 = Measuring direction reverse or 02 = Measuring direction forward, synchronized measurement or
05 = Measuring direction forward, Bit 25 = Alarm, Bit 26 = Parity even
qr = EX = ATEX approved

Note: All the above mentioned series of sensors with the cable outlets are ATEX approved. The cable options include PUR, PVC and Teflon cables, connector options are receptacle M16. See the datasheets for the article codes.

7. Installation details

The explosion-proof sensor can be used as follows:

a) In zone 2 (Gas, Category 3G) in the explosion groups IIA, IIB and IIC.
b)In zone 22 (Dust, Category 3D) at dusts with a minimum ignition energy of > 3 mJ.

The qualification with regard to the surface temperature is T4; for all gases, vapours and mists with an ignition temperature >135°C the equipment is not an ignition source.

In dust-hazardous area, 100°C is the reference temperature for further considerations with regard to a safe distance from the glowing temperature (to be decided by the operator).

The execution of the construction has to be made according to the installation regulations. The relevant details of the valid standards e.g. EN60079-14 and/or EN61241-14 have to be followed strictly.

The devices are tested with external impact energies of 4 J. They have to be installed accordingly protected.

The devices have to be protected against electrostatic discharge.

Potential equalization has to be established. This has to be done according to the installation regulations of the operator's country (DIN VDE 0100 Part 540 (HD 60364-5-54) respectively EN 60204-1:2006 para. 18.2.2).

It is prohibited to run the sensors in constructions with cathodic corrosion protection; exceptions have to be arranged with the manufacturer. Outer parts of the equipment made up of from light alloy and should be protected from outside impact energy, in particular in connection with rusty metal parts.

Safety details
Parts being stuck (e.g. by frost or corrosion) may not be removed by force in the presence of hazardous atmosphere.

The connection cable has to be either led out of the hazardous area uncut or wired to outlets which comply with the type of protection required locally.

Application, Operation
The use of the devices is only approved for appropriate usage according to the regulations. In terms of violations of this obligation any forms of guarantee or manufacturer liability expires.

The usage in dust-hazardous area is allowed with non-conductible dust with a minimum ignition energy of > 3 mJ.

The specified environmental conditions have to be followed strictly.

The sensors may only be used in usual industrial atmosphere. In the presence of aggressive substances in the air please contact the manufacturer first.

Special attention has to be taken that no leakage currents (caused e.g. by frequency converter driven motors, welding machines and/or cathodic corrosion protection installations) are lead through the sensor.

Isolation measurements during the operating are normally not required. If required, only use energy limited DC-circuits for measuring. Otherwise the sensor may be damaged.

Expose only a minimal vibration to the sensors; see e.g. IEC 34-14.

The protection against lightning has to be provided by the operator.

Assembly, Disassembly
At the assembly and disassembly follow the state-of-art technology. Especially working at electric constructions requires the compliance of special safety regulations. Some specific points for the startup:

- The device was installed according to the regulations.
- The demand for the applicable explosion category was taken into account.
- The device is not damaged.
- The place of the installation is clean.
- All screws are tightened.

Maintenance, Attendance
Definition of Expressions by IEC 60079-17

Attendance and Maintenance A combination of any actions carried out to retain an item in, or restore it to, conditions in which it is able to meet the requirements of the relevant specifications and perform its required functions.

Inspection
Action comprising careful scrutiny of an item carried out either without dismantling, or with the addition of partial dismantling as required, supplemented by means such as measurement, in order to arrive at a reliable conclusion as to the condition of an item.

Visual inspection
Inspection which identifies, without the use of access equipment or tools, those defects, such as missing bolts, which will be apparent to the eye.

Close inspection
Inspection which encompasses those aspects covered by a visual inspection and, in addition, identifies those defects, such as loose bolts, which will be apparent only by the use of access equipment, for example steps, (where necessary), and tools. Close inspections do not normally require the enclosure to be opened, or the equipment to be deenergized.

Detailed inspection
Inspection which encompasses those aspects covered by a close inspection and, in addition, identifies those defects, such as loose terminations, which will only be apparent by opening the enclosure, and/or using, where necessary, tools and test equipment.

Maintenance actions have to be carried out by qualified employees of MTS or by personnel with special training through MTS.
In ex-hazardous area only accessories, which meet the requirements of the European guidelines and the national law, are allowed to be used.

Maintenance actions implying dismounting of the machine have to be effected with the absence of hazardous atmosphere.

The replacement of components has to be made only with original spare parts, which are approved for the use in ex-hazardous area. This also applies for lubricants and auxiliary material.

The devices in ex-hazardous area have to be maintained and cleaned regular intervals. The intervals are defined by the operator according to the environmental demands on the location.

After maintenance and/or attendance all barriers and advices have to be placed in the original state.

Action	Visual inspection monthly	Close inspection every 6 month	Detailed inspection every 12 month
Visual inspection of the sensors for leak tightness, clear dust deposits	+		
Check for quit operation and warming with adequate measurement equipment	+	+	
Check of the electrical construction for inegrity and functionality			+
Check of the entire construction	Operator responsibiility		

The transmission behaviour of the devices is stable for long time periods, periodical adjustment or similar actions can be omitted. Other major maintenance actions can also be omitted.

As soon as faulty behaviour of the device is detected, remove the device or the affected assembly group. Inner parts or the electronics of the devices can not be maintained by the customer. If necessary send the device to the local representative, to get maintenance and/or repair services by the manufacturer.

Repairs by the customer are not permitted.

Fault Clearance
No Modifications of the devices are allowed.

Disposal
The disposal of the packaging materials and used parts has to take place under the regulations of the country in which the device is installed.

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MTS SENSORS

MTS Sensor Technologie GmbH & Co. KG
Auf dem Schüffel 9
58513 Lüdenscheid, Germany
Tel. + 49-23 51-95 87 0
Fax + 49-23 51-5 64 91
E-Mail: info.de@mtssensors.com
www.mtssensors.com

MTS Systems Corporation
Sensors Division
3001 Sheldon Drive
Cary, N.C. 27513, USA
Tel. + 1-919-677-0100
Fax + 1-919-677-0200
E-Mail: info.us@mtssensors.com
www.mtssensors.com

MTS Sensors Technology Corp.
737 Aihara-cho,
Machida-shi, Japan
Tel. + 81-42-775-3838
Fax + 81-42-775-5516
E-Mail: info.jp@mtssensors.com
www.mtssensors.com

EU Declaration of Conformity
EU-Konformitätserklärung
Déclaration UE de Conformité

EC14.014C

MTS Sensor Technologie GmbH & Co. KG, Auf dem Schüffel 9, 58513 Lüdenscheid, Germany

declares as manufacturer in sole responsibility that the position sensor type
erklärt als Hersteller in alleiniger Verantwortung, dass der Positionssensor Typ
déclaré en qualité de fabricant sous sa seule responsabilité que le capteur de position type

Temposonics R……..-EX
Temposonics G……..-EX
Temposonics CP14015RH…….-EX

comply with the regulations of the following European Directives:
den Vorschriften folgender Europäischen Richtlinien entsprechen:
sont conformes aux prescriptions des directives européennes suivantes :

2014/34/EU Equipment and protective systems for use in potentially explosive atmospheres
Geräte und Schutzsysteme zur Verwendung in explosionsgefährdeten Bereichen
Appareils et systèmes de protection à être utilisés en atmosphères explosibles

2014/30/EU Electromagnetic Compatibility
Elektromagnetische Verträglichkeit
Compatibilité électromagnétique

Applied harmonized standards:
Angewandte harmonisierte Normen:
Normes harmonisées appliquées :

EN 60079-0:2012+A11 :2013, EN 60079-15:2010, EN 60079-31:2014
EN 61326-1:2013, EN 61326-2-3:2013

Manufacturer assessment report:
Hersteller-Bewertungsbericht:
Rapport d'évaluation du fabricant: **ExGuide 07 ATEX 027 (Edition 3)**

Notified body for quality assurance control:
Benannte Stelle für Qualitätsüberwachung:
Organisme notifié pour l'assurance qualité: **Certification Management Limited**
Ellesmere Port CH65 4LZ, United Kingdom (2503)

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-20°C ≤ T_{amb} ≤ +75°C

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MTS Sensor Technologie GmbH & Co. KG

Thomas Muckenhaupt, M.Sc.Eng.
Head of Quality Management
ATEX Representative