

# Temposonics®

Absolute, Non-Contact Position Sensors

## R-Series SSI

**Temposonics® RP and RH**  
Measuring length 25 - 7600 mm



Perfect data processing  
**0,5 µm**

- Rugged Industrial Sensor
- Linear and Absolute Measurement
- LEDs for Sensor Diagnostics
- Non-Contact Sensing with Highest Durability
- Superior Accuracy: Resolution up to 0,5 µm
- Linearity better 0,01 % F.S.
- Repeatability 0,001 % F.S.
- Direct SSI Output, Gray/Binary
- Synchronous Measurement for Real-time Sensing

## Sensor Diagnostic Display

Integrated LEDs (green/red) provide basic visual feedback for normal sensor operation and troubleshooting.



Green	Red	Description
ON	OFF	Normal function
ON	ON	Magnet not detected
ON	Flashing	Wrong quantity of Magnets
ON	Flashing	Sensor not synchronous*
Flashing	ON	Programming mode

\*for synchronous measurement only

## SSI (Synchronous Serial Interface)

The sensors fulfill all requirements of the SSI standard for absolute encoders. Its displacement value is encoded in a binary format and transmitted at high speed to the control device.

MTS offers the ideal solution for high dynamic applications by using different synchronisation modes. Corresponding to the application you can choose the following modes:

### Async

In asynchronous mode the Temposonics SSI sensor support the PLC with position values as fast as possible. The sensor works independently (free running mode).

### Syn1

In synchronous mode 1 the output of the Temposonics SSI sensor is matched to the data request cycle of the controller. The contouring error is as small as possible, the delay is equal to the cycle time of the sensor's stroke.

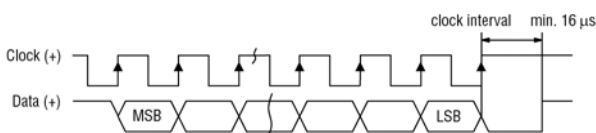
### Syn2

The synchronous mode 2 is most suitable for applications where the polling cycle of the controller can be faster than the measurement cycle time of the Temposonics SSI sensor. The values for the PLC will be oversampled up to 10 kHz. The delay is similar to the asynchronous mode.

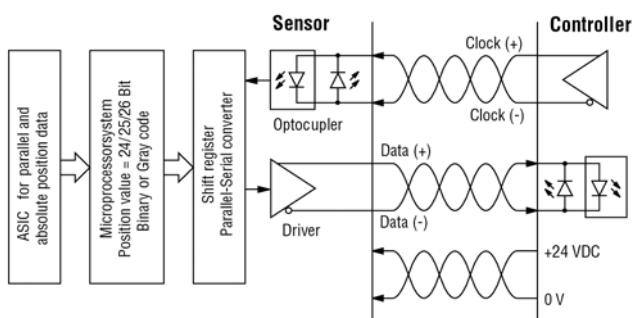
### Syn3

The function of the synchronous mode 3 is similar to Syn2 but here any delay will be compensated.

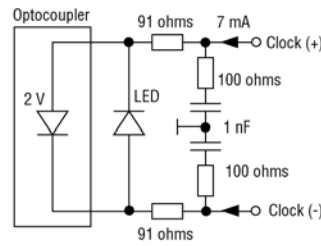
## Timing Diagram



## Logic Diagram



## Sensor Input



## Sensor Field Programming

Temposonics® R-Series sensors are preconfigured at the factory by model code designation. If needed, MTS offers an external service tool for modifying sensor parameters inside the active electrical stroke (minimum 25 mm between set-points) via the standard connection cable. There is no need to open the sensors electronics.

## USB-Programmer R-SSI

This hardware converter is required to communicate via USB-port of Windows PC to the sensor. Customized settings are possible by using a MTS programming software (CD-ROM) for:

- Data length
- Data format
- Resolution
- Measuring direction
- Synchronous / asynchronous measurement
- Offset, begin of the measurement range
- Alarm value (Magnet missing)
- Measurement filter
- Differential measurement: Distance between two magnets
- Speed measurement instead of position

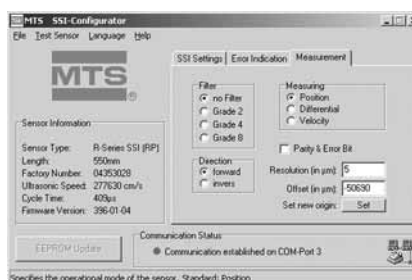
**Test sensor** function permits a fast control of installed sensor. Its position values are shown in a diagram.



## Programming-Kit, Part No. 253 135-1

(PC-Programmer, Power supply, USB-Cable, Sensor-Cable, Software)

## Windows Sensor Programming



## Technical Data

### Input

Measured variable	Displacement, displacement difference between 2 magnets, velocity, internal temperature
Measuring range	Profile 25 - 5000 mm / Rod 25 - 7600 mm / Flexible up to 20 m

### Output

Interface	SSI (Synchronous Serial Interface) - differential signal in SSI standard					
Data format	Binary or Gray, optional Parity and Errorbit and internal temperature					
Data length	8 ... 32 bit					
Update time	Measuring length	300	750	1000	2000	5000 mm
	Measurement rate	3,7	3,0	2,3	1,2	0,5 kHz
Data speed	70 kBaud*... 1 MBaud, depending on cable length:					
	Length	< 3	< 50	< 100	< 200	< 400 m
	Baud rate	1 MBd	< 400 kBd	< 300 kBd	< 200 kBd	< 100 kBd
Overvoltage protection	up to 36 VDC					

### Accuracy

Resolution	Displacement: 0,5 µm, 2 µm, 5 µm, 10 µm i.a. / velocity over 10 measured values: 0,1 mm/s (at 1 ms cycle time)					
Linearity	< ± 0,01 % F.S. (minimum ± 40 µm)					
	Option internal linearisation					
	Linearity tolerance:					
Repeatability	RP/RH	< 300 mm: typ. ± 15 µm, max. ± 25 µm, > 300 ... 600 mm: typ. ± 20 µm, max. ± 30 µm				
		> 600 ... 1200 mm: typ. ± 30 µm, max. ± 50 µm				
	RP	1200 ... 3000 mm: typ. ± 45 µm, max. ± 90 µm, 3 ... 5 m: typ. ± 85 µm, max. ± 150 µm				
Temperature coefficient	< ± 0,001 % F.S. (minimum ± 2,5 µm)					
Hysteresis	< 15 ppm/°C					
	< 4 µm typical 2 µm					

### Operating conditions

Magnet speed	Any
Operating temperature	-40 °C ... +75 °C
Dew point, humidity	90% rel. humidity, no condensation
Protection	Profile: IP65, Rod: IP67, IP68 for cable outlet, RS: IP69K
Shock test	100 g, single hit, IEC-Standard 68-2-27
Vibration test	15 g / 10 - 2000 Hz, IEC-Standard 68-2-6 Option: Vibration resistant 30 g (av)
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

### Design, material

Diagnostic display	LEDs beside connector
Profile model:	
Sensor head	Aluminum
Sensor stroke	Aluminum
Position magnet	Magnet slider or removable U-magnet
Rod model:	
Sensor head	Aluminum
Rod with flange	Stainless steel 1.4301 / AISI 304
Pressure rating	350 bar, 700 bar peak option: 800 bar, 1200 bar peak
Position magnet	Ring magnets, U-magnets
- Differentiation measurement	Min. magnet distance 50 mm (in the range of 50 - 75 mm double linearity)

### 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
Position magnet	Mounting plate and screws from antimagnetical material

### Electrical connection

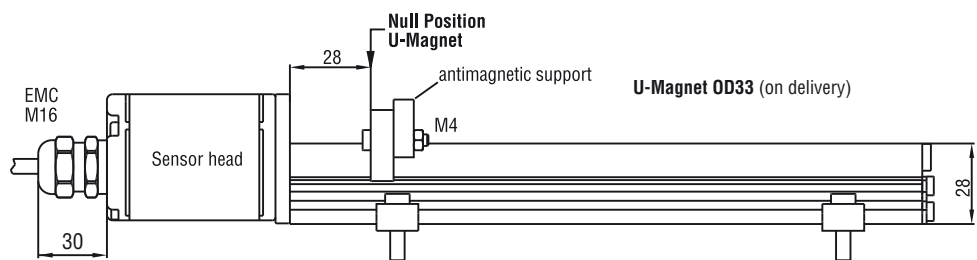
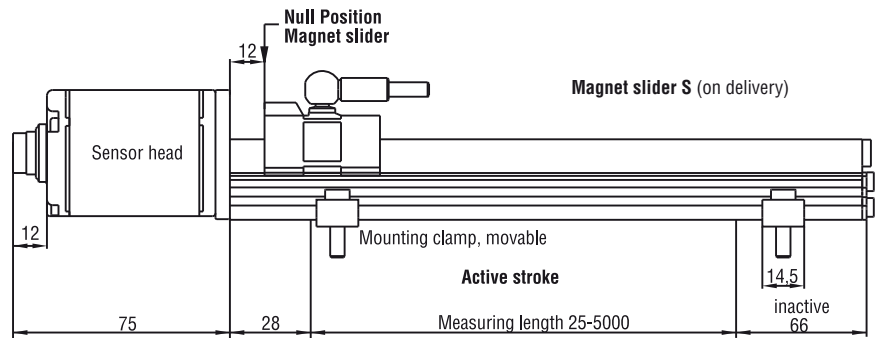
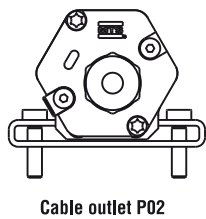
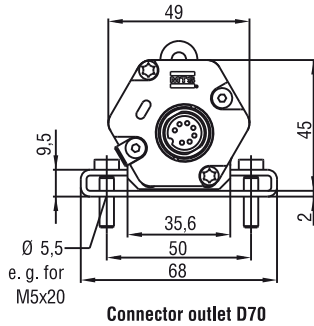
Connection type	7 pin connector M16 or cable outlet
Input voltage	24 VDC (-15 / +20 %)
- Polarity protection	up to -30 VDC
- Overvoltage protection	up to 36 VDC
Current drain	100 mA typical
Ripple (LF)	< 1 % S-S
Electric strength	500 VDC (DC ground to machine ground)

\* with standard monoflop of 16 µs

## 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.



Wiring	Pin	Cable	Function
<p>Male insert sensor plug rear of cable connector</p>	1	grey	Data (-)
	2	pink	Data (+)
	3	yellow	Clock (+)
	4	green	Clock (-)
	5	brown	+24 VDC
	6	white	0 V (GND)
	7	do not connect	

All dimensions in mm

### Standard position magnet upon delivery (see chapter Accessories)

#### Position magnets

Magnet slider S (Part No. 252 182)  
 Magnet slider V (Part No. 252 184)  
 U-Magnet OD33 (Part No. 251 416-2)

#### Connection types

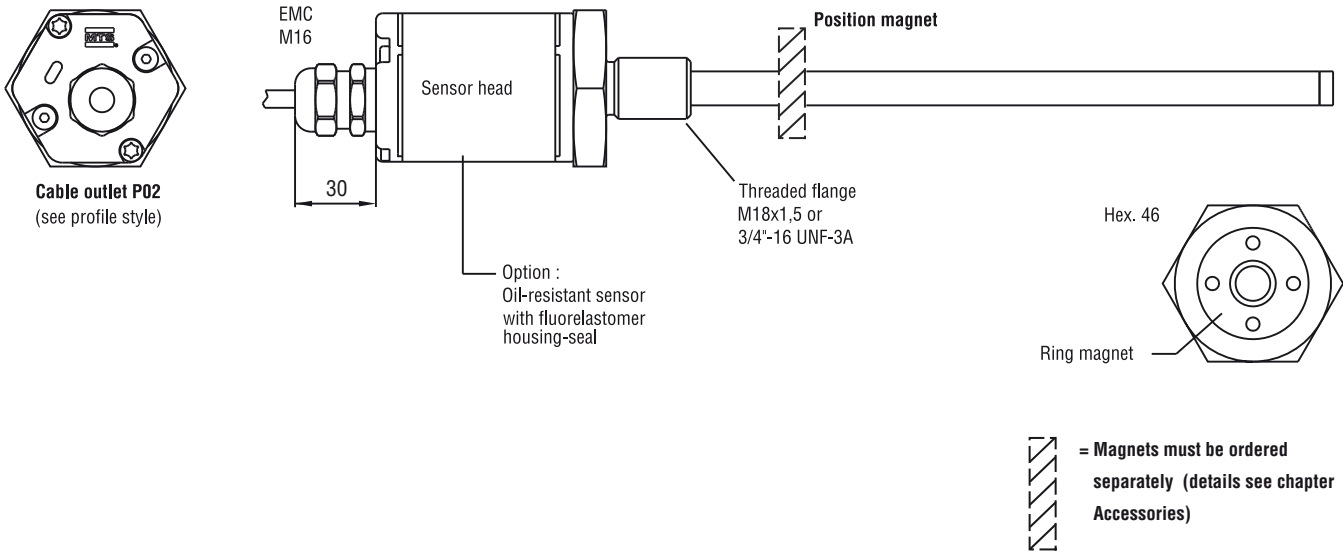
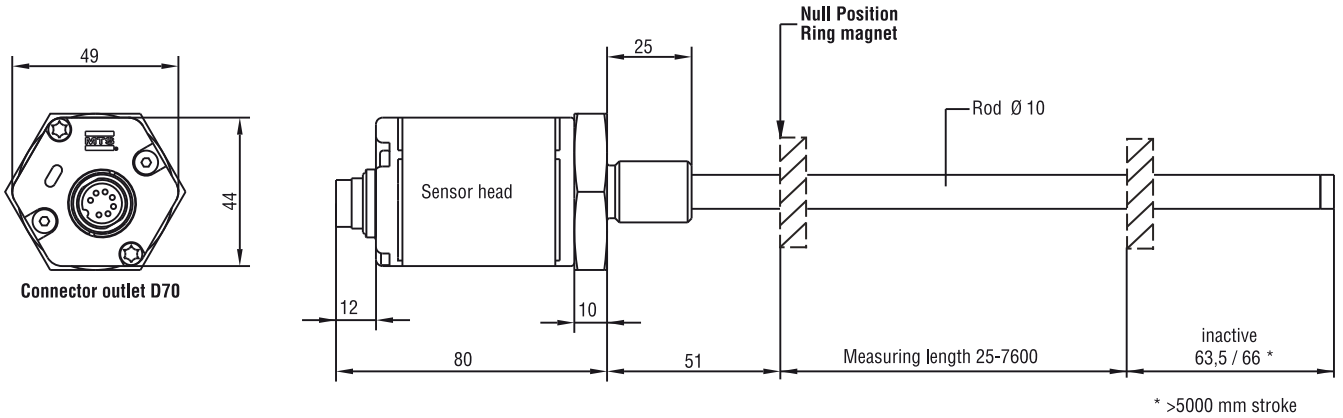
7 pin female connector M16 (Part No. 370 624)  
 7 pin female connector M16, 90° (Part No. 560 779)

**High Pressure Rod Design**

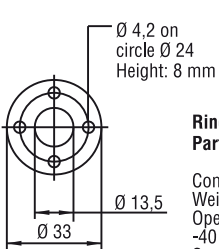
**Temposonics®-RH** with a pressure-resistant stainless steel flange and sensing rod is suitable for use in hydraulic cylinders and externally in all applications where space is a problem. Position measurement is via ring or U-magnets travelling along the sensing rod without any mechanical contact.

**Advantage...**

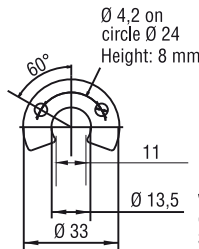
the completely operable sensor cartridge can be replaced for servicing easily without opening the fluid circuit.



**Standard Position Magnets (not on delivery, please order separately)**



**Ring magnet OD33**  
**Part No. 201 542-2**  
 Composite PA-Ferrite-GF20  
 Weight ca. 14 g  
 Operating temperature: -40 ... +100°C  
 Surface pressure max. 40 N/mm<sup>2</sup>  
 Fastening Torque for M4 screws max. 1 Nm



**U-Magnet OD33**  
**Part No. 251 416-2**  
 PA-Ferrit-GF20  
 Weight ca. 11 g  
 Operating temperature: -40 ... +100°C  
 Surface pressure max. 40 N/mm<sup>2</sup>  
 Fastening torque for M4 screws max. 1 Nm

All dimensions in mm

**Standard position magnet not on delivery (see chapter Accessories)**

**Position magnets**

- Ring magnet OD33 (Part No. 201 542-2)
- Ring magnet OD25,4 (Part No. 400 533)
- U-Magnet OD33 (Part No. 251 416-2)

**Connection types**

- 7 pin female connector M16 (Part No. 370 624)
- 7 pin female connector M16, 90° (Part No. 560 779)

## Temposonics®

### Sensor model

RP - Profile

RH - Rod

### Design

#### Profile Temposonics®-RP:

**S** - Magnet slider, joint at top

**V** - Magnet slider, joint at front

**G** - Magnet slider, joint at top, backlash free

**M** - U-Magnet, OD33

#### Rod Temposonics®-RH:

**M** - Flange M18 x 1,5 (Standard)

**V** - Flange M18 x 1,5 (Fluorelastomer housing-seal)

**D** - Flange M18 x 1,5 with bushing on rod end

**R** - Flange M18 x 1,5 with thread M4 at rod end

**J** - Flange M22 x 1,5, rod Ø 12,7 mm, 800 bar

**S** - Flange 3/4" - 16 UNF - 3A

### Measuring length

**Profile** - 0025...5000 mm

**Rod** - 0025...7600 mm

Standard: See chart

Other length upon request.

Stroke Length Standard RP	
Stroke Length	Ordering Steps
≤ 500 mm	25 mm
500 - 2500 mm	50 mm
2500 - 5000 mm	100 mm
> 5000 mm	250 mm

Stroke Length Standard RH	
Stroke Length	Ordering Steps
< 500 mm	5 mm
500 - 750 mm	10 mm
750 - 1000 mm	25 mm
1000-2500 mm	50 mm
2500 - 5000 mm	100 mm
> 5000 mm	250 mm

### Connection type

**D70** - 7 pin male receptacle M16

**P02** - 2 m PUR-cable w/o connector, option: P01-P10 (1-10 m)

### Input voltage / Conditions of use

**1** - +24 VDC

**A** - +24 VDC / vibration resistant (measuring length 25 ... 2000 mm)

### Output

**S [1][2][3][4][5][6][7][8][9]** = Synchronous Serial Interface

**[1]** Data length: **1** - 25 Bit • **2** - 24 Bit • **3** - 26 Bit

**[2]** Output format **B** - Binary • **G** - Gray

**[3]** Resolution (mm): **1** - 0,005 • **2** - 0,01 • **3** - 0,05 • **4** - 0,1 • **5** - 0,02 • **6** - 0,002 • **8** - 0,001 • **9** - 0,0005

**[4]** Performance: **1** - Standard • **8** - Noise reduction filter (8 values) • **D** - No filter + error delay 10 cycles

**G** - Noise reduction filter (8 values) + error delay 10 cycles • **K** - Peak reduction filter (8 values)

**N** - Peak reduction filter (8 values) + error delay 10 cycles

**[5][6]** Signal options: **00** - Measuring direction forward

**01** - Measuring direction reverse

**02** - Measuring direction forward, synchronised measurement

**05** - Measuring direction forward, Bit 25 = Alarm, Bit 26 = Parity even

**16** - Measuring direction forward, internal linearization

**99** - for optional further combinations (use next fields **[7],[8],[9]**)

**[7]** Measurement contents **1** - Position • **2** - Differential • **3** - Velocity • **4** - Position + Temperature (only with data length = 24 bit)

**5** - Differential + Temperature (only with data length = 24 bit) • **6** - Velocity + Temperature (only with data length = 24 bit)

**[8]** Direction and sync. mode **1** - Forward async • **2** - Forward sync1 • **3** - Forward sync2 • **4** - Forward sync3 • **5** - Reverse async • **6** - Reverse sync1

**7** - Reverse sync2 • **8** - Reverse sync3

**[9]** Intern Linearization & Communication Diagnostics **0** - No further option • **1** - Linearity Correction Option • **2** - Additional alarm bit + parity even bit (not available for temperature output, only data length 26 bit) • **4** - Additional alarm bit + parity even bit and Linearity Correction Option (not available for temperature output, only data length 26 bit)

**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 and O-Ring. Magnets must be ordered separately. Use signed magnets for sensors w/LCO

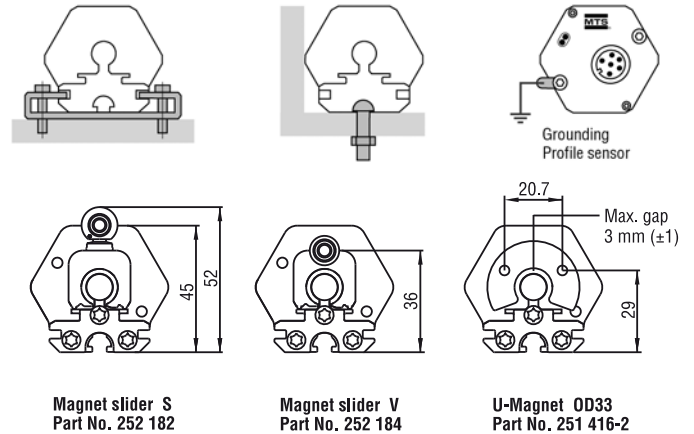
Accessories page 57 and following.

## MOUNTING / INSTALLATION RP + RH

### 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 (2 mounting clamps up to 1250 mm + 1 clamp for every 500 mm) - whilst the magnet is mounted at the mobile machine part.

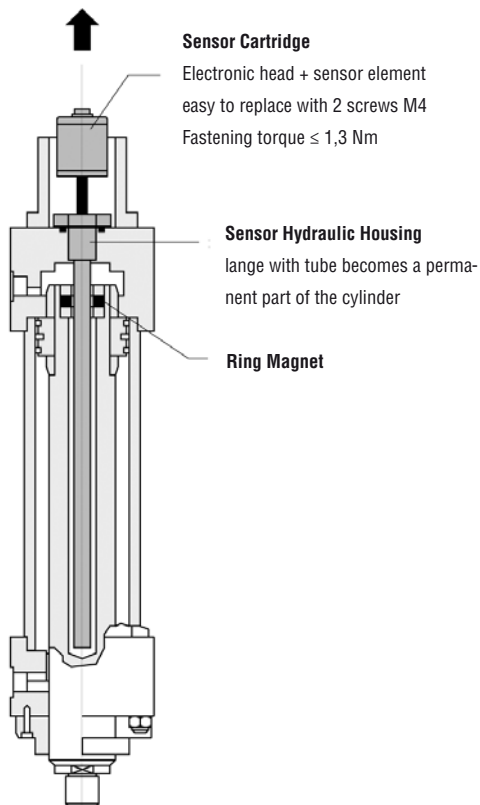


#### Rod Model

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

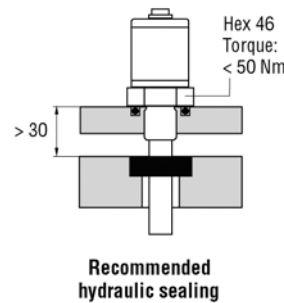
#### Hydraulic Sealing

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.

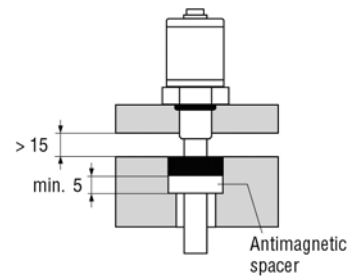


### Minimum assembly distance

#### 1. Non-magnetisable material



#### 2. Magnetisable 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.

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.

# Temposonics®

Absolute, Non-Contact Position Sensors



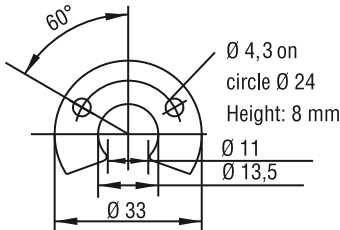

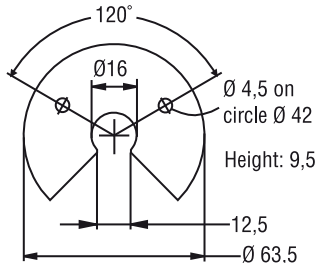

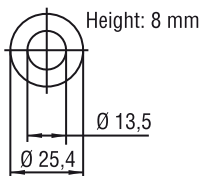

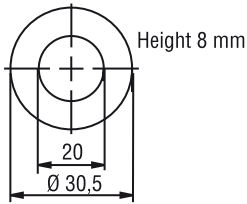

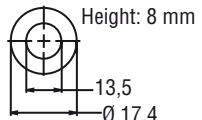

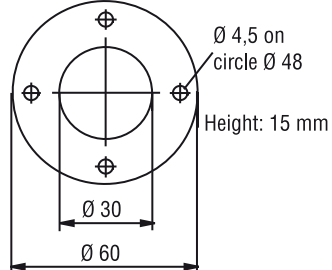
## Accessories



- Position Magnets
- Floats
- Connectors
- Clamps
- Cables
- Programming Tools
- High Pressure Housing, ...

## ACCESSORIES R-SERIES


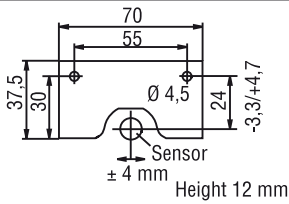

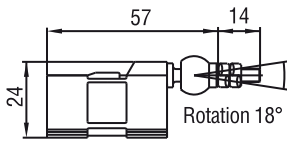

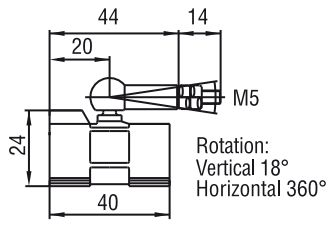

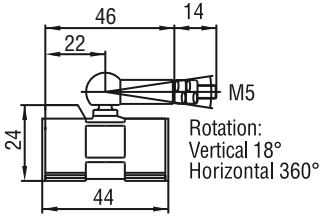

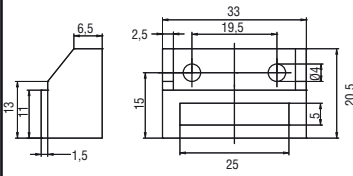

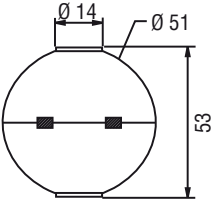

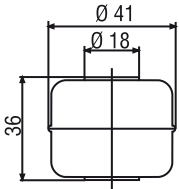

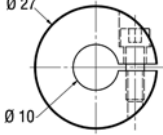
Position Magnets, Floats, Connectors, Clamps, Cables and Programming Tools

Product	Dimension	Material	Application
 <p><b>Standard magnet</b> Ring magnet OD33 Part No. 201 542-2</p>	 <p>Ø 4,3 on circle Ø 24 Height: 8 mm Ø 13,5 Ø 33</p>	<p>Composite PA-Ferrite-GF20 Weight ca. 14 g Operating temperature: -40 ... +100°C Surface pressure max. 40 N/mm<sup>2</sup> Fastening Torque for M4 screws max. 1 Nm</p>	<p>RH, RF, RD4  marked version for sensors with linearity correction option (LCO): <b>Part No. 253 620</b></p>
 <p><b>Standard magnet</b> U-magnet OD33 Part No. 251 416-2</p>	 <p>60° Ø 4,3 on circle Ø 24 Height: 8 mm Ø 11 Ø 13,5 Ø 33</p>	<p>Composite PA-Ferrite-GF20 Weight ca. 11 g Operating temperature: -40 ... +100°C Surface pressure max. 40 N/mm<sup>2</sup></p>	<p>RH, RF, RP  marked version for sensors with linearity correction option (LCO): <b>Part No. 254 226</b></p>
 <p>U-magnet OD63,5 Part No. 201 553</p>	 <p>120° Ø 16 Ø 4,5 on circle Ø 42 Height: 9,5 12,5 Ø 63,5</p>	<p>PA 66-GF30 Magnets compound-filled Weight ca. 26 g Operating temperature: -40 ... +75°C</p>	<p>RH, RF, RP</p>
 <p>Ring magnet OD25,4 Part No. 400 533</p>	 <p>Height: 8 mm Ø 13,5 Ø 25,4</p>	<p>Composite: PA-Ferrite Weight ca. 10 g Operating temperature: -40 ... +100°C Surface pressure max. 40 N/mm<sup>2</sup></p>	<p>RH, RF, RD4  marked version for sensors with linearity correction option (LCO): <b>Part No. 253 621</b></p>
 <p>Ring magnet OD30,5 Part No. 402 316</p>	 <p>Height 8 mm 20 Ø 30,5</p>	<p>Composite: PA-Ferrite Weight ca. 15 g Operating temperature: -40 ... +100°C Surface pressure max. 40 N/mm<sup>2</sup></p>	<p>RH, RF, RD4</p>
 <p>Ring magnet Part No. 401 032</p>	 <p>Height: 8 mm 13,5 Ø 17,4</p>	<p>PA-Neonbond compound Weight ca. 5 g Operating temperature: -40 ... +100 Surface Pressure max. 20 N/mm<sup>2</sup></p>	<p>RH, RD4 (not for multi-position measurement)</p>
 <p>Ring magnet OD60 Part No. MT 0162</p>	 <p>Ø 4,5 on circle Ø 48 Height: 15 mm Ø 30 Ø 60</p>	<p>Al CuMgPb Magnets compound-filled Weight ca. 90 g Operating temperature: -40 ... +75°C</p>	<p>RH, RF, RD4</p>

Notice: More magnets available on request. Product pictures may vary from original.

**ACCESSORIES R-SERIES**


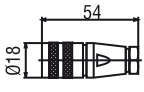

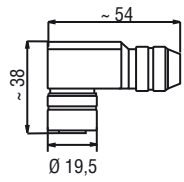

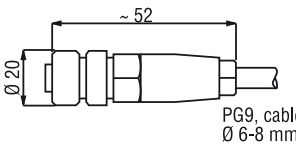

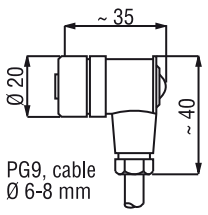

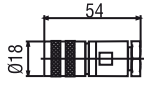

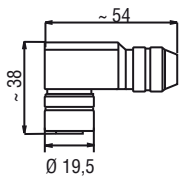

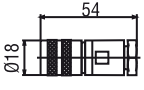
Position Magnets, Floats, Connectors, Clamps, Cables and Programming Tools

Product	Dimension	Material	Application
 <p>U-magnet 70 Part No. 252 185</p>	 <p>Sensor ± 4 mm Height 12 mm</p>	<p>AlMg4.5Mn, black anodised Magnets compound-filled Weight ca. 75 g Operating temperature: -40...+75°C</p>	<p>RH, RF, RP Resolution min. 10 µm</p>
 <p>Magnet slider V Part No. 252 184</p>	 <p>Rotation 18°</p>	<p>GFK, Magnet Hardferrite Weight ca. 30 g Operating temperature: -40 ... +75°C</p>	<p>RP</p>
 <p>Magnet slider S    Magnet slider G Part No. 252 182    Part No. 253 421</p>	 <p>Rotation: Vertical 18° Horizontal 360°</p>	<p>GFK, Magnet Hardferrite Weight ca. 30 g Operating temperature: -40 ... +75°C <b>Magnet slider S:</b> Ball joint CuZn 39Pb3 nickel plated <b>Magnet slider G - free from float:</b> Socket joint, high-strength plastics Ball joint CuZn39Pb3 nickel plated</p>	<p>RP</p>
 <p>Magnet slider P Part No. 253 673</p>	 <p>Rotation: Vertical 18° Horizontal 360°</p>	<p>GFK, Magnet Hardferrite Weight ca. 30 g Operating temperature: -40 ... +75°C with additional end plates</p>	<p>RP</p>
 <p>Block magnet Part No. 403 448</p>		<p>Weight: ca. 20 g Operating temperature: -40...+75°C</p>	<p>RH, RF, RP Resolution min. 10 µm</p>
 <p>Float 50 mm Part No. 251 447</p>		<p>1.4571 Stainless steel Density: 720 kg/m³ Max. Pressure: &lt; 40 bar Weight: 42 ± 3 g</p>	<p>RH, RF</p>
 <p>Float 41 mm Part No. 200 938-2</p>		<p>1.4404 Stainless steel Density: 740 kg/m³ Max. Pressure: =&lt; 8 bar Weight: 20 ± 2 g</p>	<p>RH, RF</p>
 <p>Collar Part No. 560 777</p>		<p>1.4301 Stainless steel</p>	<p>RH</p>

Notice: Product pictures may vary from original.

## ACCESSORIES R-SERIES


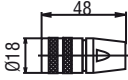

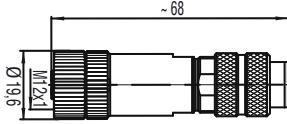

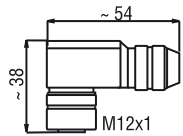

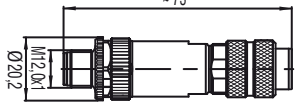

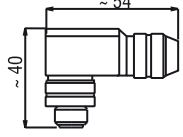

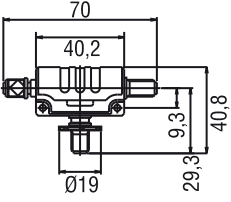

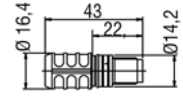
Position Magnets, Floats, Connectors, Clamps, Cables and Programming Tools

Product	Dimension	Material	Application
 <p>6 pin Connector (for cable Ø 6 mm)  <b>Part No. 370 623 (female)</b>            For cable Ø 6-8 mm  <b>Part No. 370 423</b></p>		Housing: Zinc nickel plated Termination: Solder Contact insert: Silver plated Max. Cable-Ø 6 mm or Ø 8 mm depending on design	Analog CAN
 <p>6 pin Connector M16, 90°  <b>Part No. 560 778 (female)</b></p>		Housing: Zinc nickel plated Termination: Solder Contact insert: Silver plated Max. Cable-Ø 8 mm	Analog CAN
 <p>5 pin connector, M12x1  <b>Part No. 370 618 (female)</b></p>		Housing: PA Termination: Screws clamp Contact insert: (CuZn/Sn) Max. Cable-Ø 6-8 mm	CAN
 <p>5 pin connector, M12x1, 90°  <b>Part No. 370 619 (female)</b></p>		Housing: PA Termination: Screws clamp Contact insert: (CuZn/Sn) Max. Cable-Ø 6-8 mm	CAN
 <p>7 pin Connector, M16  <b>Part No. 370 624 (female)</b></p>		Housing: Zinc nickel plated Termination: Solder Contact insert: Silver plated Cable clamp: PG9 Max. Cable-Ø 8 mm	SSI
 <p>7 pin Connector, M16, 90°  <b>Part No. 560 779 (female)</b></p>		Housing: Zinc nickel plated Termination: Solder Contact insert: Silver plated Max. Cable-Ø 8 mm	SSI
 <p>6 pin Connector, M16  <b>Part No. 370 423 (female)</b>  <b>Part No. 370 427 (male)</b></p>		Housing: Zinc nickel plated Termination: Solder Contact insert: Silver plated Cable clamp: PG9	Profibus (D63)

Notice: Product pictures may vary from original.

## ACCESSORIES R-SERIES


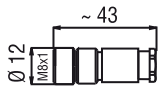

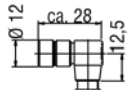

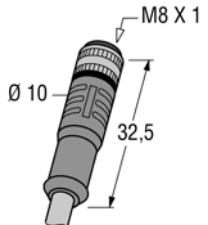

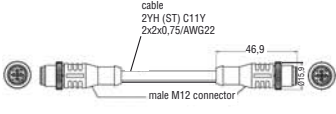

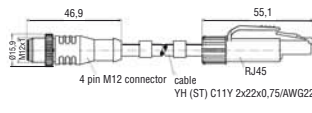

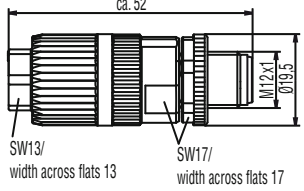

Position Magnets, Floats, Connectors, Clamps, Cables and Programming Tools

Product	Dimension	Material	Application
 <p>6 pin Bus endplug M16, male <b>Part No. 370 620</b></p>	 <p>Technical drawing showing dimensions: 48 (length), Ø18 (diameter).</p>	<p>Housing: Zinc nickel plated Contact insert: Silver plated</p>	Profibus (D63)
 <p>5 pin connector M12-B <b>Part No. 560 885 (female)</b></p>	 <p>Technical drawing showing dimensions: ~68 (length), Ø19,6 (diameter), M12x1 (thread).</p>	<p>Housing: Zinc nickel plated Termination: spring-type terminal Contact insert: Silver plated Cable-Ø: 6,5 - 8,5 mm</p>	Profibus (D53)
 <p>5 pin 90° connector M12-B <b>Part No. 370 514 (female)</b></p>	 <p>Technical drawing showing dimensions: ~54 (length), ~38 (width), M12x1 (thread).</p>	<p>Housing: Zinc nickel plated Termination: spring-type terminal Contact insert: Silver plated Cable-Ø: 6,5 - 8,5 mm</p>	Profibus (D53)
 <p>5 pin connector M12-B <b>Part No. 560 884 (male)</b></p>	 <p>Technical drawing showing dimensions: ~73 (length), Ø20,2 (diameter), M12x1 (thread).</p>	<p>Housing: Zinc nickel plated Termination: Srews clamp Contact insert: Silver plated Cable-Ø: 6,5 - 8,5 mm</p>	Profibus (D53)
 <p>5 pin 90° connector M12-B <b>Part No. 370 515 (male)</b></p>	 <p>Technical drawing showing dimensions: ~54 (length), ~40 (width).</p>	<p>Housing: Zinc nickel plated Termination: Srews clamp Contact insert: Silver plated Cable clamp: M16 Cable-Ø: 6,5 - 8,5 mm Cable type e.g.: K25</p>	Profibus (D53)
 <p>5 pin Bus T-connector M12 <b>Part No. 560 887</b></p>	 <p>Technical drawing showing dimensions: 70 (length), 40,2 (width), 40,8 (height), 9,3 (height), 29,3 (height), Ø19 (diameter).</p>	<p>Housing: PA 66 Contact insert: Silver plated</p>	Profibus (D53)
 <p>5 pin Bus endplug M12 <b>Part No. 560 888</b></p>	 <p>Technical drawing showing dimensions: 43 (length), 22 (width), Ø16,4 (diameter), Ø14,2 (diameter).</p>	<p>Housing: PA 66 Contact insert: Silver plated</p>	Profibus (D53)

Notice: Product pictures may vary from original.

## ACCESSORIES R-SERIES


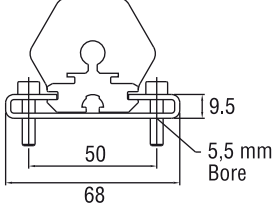

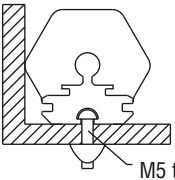

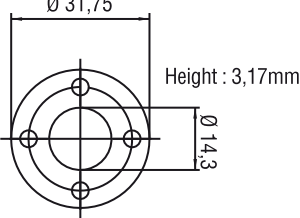

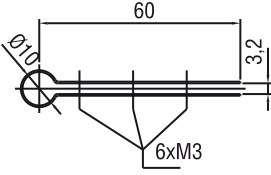



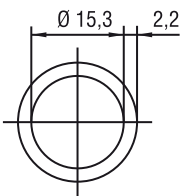

Position Magnets, Floats, Connectors, Clamps, Cables and Programming Tools

Product	Dimension	Material	Application
 <p>4 pin cable connector M8 <b>Part No. 370 504</b></p>	 <p>~ 43 Ø 12</p>	<p>Housing: Brass nickel plated Termination: Solder Contact insert: Au Max. Cable-Ø 5 mm</p>	<p>Profibus (D53) EtherCAT CAN (D54)</p>
 <p>4 pin cable connector M8, 90° <b>Part No. 560 886</b></p>	 <p>Ø 12 ca. 28 12,5</p>	<p>Housing: PA 66 Termination: Solder Contact insert: Au Max. Cable-Ø 5 mm</p>	<p>Profibus (D53) EtherCAT CAN (D54)</p>
 <p>Cable connector <b>Part No. 530 066</b> <b>Part No. 530 096</b> <b>Part No. 530 093</b></p>	 <p>M8 X 1 Ø 10 32,5</p>	<p>PUR-cable with 4 pin. female connector 5 m length free end 4 x 0,25 mm<sup>2</sup>, shielded for 24 V power supply</p> <p><b>Part No. 530 066</b> = 5 m length <b>Part No. 530 096</b> = 10 m length <b>Part No. 530 093</b> = 15 m length</p>	<p>Profibus (D53) EtherCAT CAN (D54)</p>
 <p>Cable connector <b>Part No. 530 064</b></p>	 <p>46,9 male M12 connector cable 2YH (ST) C11Y 2x2x0,75/AWG22</p>	<p>5 m industrial Ethernet cable (Cat 5e ES) w/2x4 pin M12-connectors (D-coded) PUR-jacket, green</p>	<p>EtherCAT</p>
 <p>Cable connector <b>Part No. 530 065</b></p>	 <p>46,9 55,1 4 pin M12 connector cable YH (ST) C11Y 2x2x0,75/AWG22 RJ45</p>	<p>5 m industrial Ethernet cable (Cat 5e ES) RJ45 connector and M12-connector (D-coded) PUR-jacket, green</p>	<p>EtherCAT</p>
 <p>4 pin Bus cable connector <b>Part No. 370 523</b></p>	 <p>ca. 52 M12 x1 Ø 19,5 SW13/ width across flats 13 SW17/ width across flats 17</p>	<p>IDC technology</p>	<p>EtherCAT</p>
 <p>End cap <b>Part No. 370 537</b></p>		<p>Aluminum</p>	<p>EtherCAT</p>

Notice: Product pictures may vary from original.

**ACCESSORIES R-SERIES**

Position Magnets, Floats, Connectors, Clamps, Cables and Programming Tools

Product	Dimension	Material	Application
 Clamp Part No. 400 802	 9.5 50 68 5,5 mm Bore	Stainless steel	RP
 T-Nut Part No. 401 602	 M5 thread	Stainless steel	RP
 Spacer Part No. 400 633	 Ø 31,75 Height : 3,17mm Ø 14,3	Aluminum	RH
 Fixing clip Part No. MT 0200	 60 2,5 Ø10 6xM3	Brass Flat section and fastening screws: non-magnetic material	RH
 Metal protection cap for connector M16 Part No. 403 290			Analog, CAN, SSI, Profibus
 Hex nut Part No. 500 018		Edelstahl	RH-M
 O-ring Part No. 401 133	 Ø 15,3 2,2	Fluorelastomer FPM 75 Operating temperature: -10...+125°C	RH-M
 Cable Part No. 530 032	3 x 2 x 0,14 mm <sup>2</sup> Ø 6 mm	PVC -10 ... +80°C	Standard

Notice: Product pictures may vary from original.

## ACCESSORIES R-SERIES





Position Magnets, Floats, Connectors, Clamps, Cables and Programming Tools

Product	Dimension	Material	Application
 Cable <b>Part No. 530 052</b>	3 x 2 x 0,25 mm Ø 6,8 mm	Pelon PUR -40 ... +80°C	Halogen free Oil-resistant High flexible
 Cable <b>Part No. 530 116</b>	4 x 2 x 0,25 mm²	PUR (-30 ... +90°C)	Water proof wires
 Cable <b>Part No. 530 112</b>	4 x 2 x 0,25 mm²	Teflon (-90 ... +180°C)	Temperature
 Cable <b>Part No. 530 029</b>	7 x 0,14 mm² EMC protected Ø 7 mm	PUR -20 ... +70°C	SSI, CAN
 Cable <b>Part No. 530 040</b>	BUS + feed-in Ø 8 mm	PVC -30 ... +80°C	Profibus-DP D63
 Cable <b>Part No. 530 109</b>	BUS conductor, high flexible cable Ø 8 mm	PUR -30 ... +70°C	Profibus-DP D53
Product	Description		
 Hand-Programmer R-Analog <b>Part No. 253 124</b>	<b>Hand-Programmer R-Analog for 1-Magnet Sensor</b> is for easy teach-in-setups of measuring length and direction on desired Zero/Span positions.		

Notice: Product pictures may vary from original.

**ACCESSORIES R-SERIES**




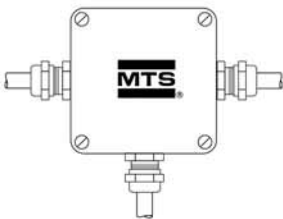
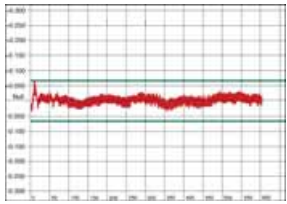
Position Magnets, Floats, Connectors, Clamps, Cables and Programming Tools

Product	Description
 <p>Cabinet-Programmer Part No. 253 408</p>	<p><b>Cabinet-Programmer R-Analog</b> Cabinet-Programmer R-Analog completes the accessories program of MTS absolute position sensors. The unit can be used for adjusting a connected 1-magnet sensor via the leads, using a simple teach-in procedure in the field.</p>
 <p>USB-Programmer R-Analog Part No. 253 134-1</p>	<p><b>USB-Programmer R-Analog for 1 or 2-Magnets Sensor (incl. Power supply, USB-Cable, Sensor-Cable and CD-ROM)</b> for setting and reading of position and output values by using a PC for</p> <ul style="list-style-type: none"> <li>- Zero/Span Magnet 1</li> <li>- Zero/Span Magnet 2</li> <li>- Velocity range</li> <li>- Free assignment of outputs to measured position or velocity</li> <li>- Error output value (e.g. magnet out of stroke)</li> </ul>
 <p>USB-Programmer R-SSI Part No. 253 135-1</p>	<p><b>USB-Programmer R-SSI (incl. Power supply, USB-Cable, Sensor-Cable and CD-ROM)</b> for setting and reading of</p> <ul style="list-style-type: none"> <li>- Data length</li> <li>- Data format</li> <li>- Resolution</li> <li>- Measuring direction</li> <li>- Synchronous / asynchronous measurement</li> <li>- Offset, begin of the measurement range</li> <li>- Alarm value (Magnet outside)</li> <li>- Measurement filter</li> <li>- Differential measurement</li> </ul>
 <p>Profibus Address-Programmer Kit for D63, D53 or cable connector Part No. 280 640</p>	<p><b>PROFIBUS Address Programmer</b> is used for setting the slave address to Temposonics® sensors with Profibus-DP Interface. The setup of slave address normally is done by the profibus standard service <b>SetSlaveAddress</b>. Since some master systems do not support this standard, or the customer controller system can not handle it, this MTS service tool can be used for the direct setup of the sensor. The programmer and the sensor will be supplied by the included power supply.</p>

Notice: Product pictures may vary from original.

## ACCESSORIES R-SERIES

Position Magnets, Floats, Connectors, Clamps, Cables and Programming Tools

Product	Description
 <p>CANopen Address-Programmer D62 6 pin. female connector M 16 <b>Part No. 252 382-D62</b> 6 pin female 90°-connector M16 <b>Part No. 252 382-D62A</b></p>	<p><b>CANopen Address Programmer</b> is used for setting the Node-Address to Temposonics® sensors with CANopen Interface. The setup of Node-Address normally is done by the CAN Bus standard <b>LMT-Service</b>. Since some master systems do not support this standard, or the customer controller system can not handle it, this MTS service tool can be used for the direct setup of the sensor.</p> <p>All you need for using the programmer is a 24 VDC power supply to the sensor. The programming tool will be supplied from the Temposonics® position sensor.</p>
 <p>Profibus Master Simulator <b>Part No. 401 727</b></p>	<p><b>PROFIBUS Master Simulator</b> The Master Simulator can be used to check the sensors functions and to change the slave address. The magnet positions can be read out and the diagnostic data as well.</p> <p>Cable D 53 <b>Part No. 252 383</b> Cable D63 <b>Part No. 401 726</b></p>
 <p>Display and control unit with SSI input <b>Part No. IX 345</b></p>	<p>Housing: 96 x 48 x 141 mm Cutout: 91 x 44 mm 6-segment LED Display for SSI</p>
 <p>Profibus Filter box <b>Part No. 252 916</b></p>	<p>Housing: 80 x 75 x 58 mm The box is used for EMC-conformal feeding of 24 VDC supply voltage into the Profibus-DP hybrid cable.</p>
 <p>Linearity diagram <b>Part No. 625 096</b></p>	<p>DIN A 4 printout with sensor data and graphic with the linearity gradient Printout with linearity gradient from the sensor. This gradient can be used to choose a special linear segment also for linearity correcture in sections.</p>

Notice: Product pictures may vary from original.

## ACCESSORIES R-SERIES

ATEX [ATmosphere EXplosive]



### Approved Sensors: R-Series

- Analog Output
- CAN Bus [All Versions]
- SSI Output

**Note:** 1. All products are available in Profile and Rod Version.  
2. Signal dependent selectable with PUR, PVC or Teflon cable.

### ATEX Conformity: Marking on MTS Approved Sensor

⊕ II 3G Ex nA II T4  
and/or  
⊕ II 3D tD A22 IP67 T100°C  
TFR: 07 ATEX 027  
-20°C ≤ Ta ≤ 75°C  
Pmax = 4 Watt  
Derated 6,5 K/W ≥ 49°C

### Applicable ATEX Regulations / Directives

**Directive 94/9/EG** ('Manufacturers Directive')  
Sets out directives for equipment manufacturers that are used in potentially explosive atmospheres.

**Related Norms:**

EN 60079-0:2006, EN 60079-15:2005  
EN 61241-0:2006, EN 61241 - 1:2004

MTS is a certified supplier for displacement sensors intended to be used in hazardous areas of the Category 3 according to the ATEX standard.

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

### Ordering Code

Temposonics® **R**        **M**    **1**    **E X**

**Model**

RP- Profile

RH - Rod

**Measuring Length in mm**

Profile - 0050...5000 mm

Rod - 0050...7600 mm

Standard: up to 1000 in 50 mm steps, greater 1000 in 250 mm steps

Other length upon request.

**Connection type:**

**R02** - 2 m PVC cable w/o connector, Option: R01-R10 (1-10 m)

**P02** - 2 m PUR cable w/o connector, Option: P01-P10 (1-10 m)

**T02** - 2 m Teflon cable w/o connector, Option: T01-T10 (1-10 m)

Note: This options are output signal dependent.

For details refer individual catalog section.

**Output**

Analog / CANbus / SSI

**Approved Versions**

ATEX

## ACCESSORIES R-SERIES

Precision Position Measurement High Pressure Housing



This High Pressure Housing is ATEX EEx approved and UL and cUL approved for use in hazardous locations with Temposonics® position sensors.

The ATEX, UL and cUL approvals cover flammable gases, vapors and liquids.

This housing is made to fit Temposonics® R-Series sensors with analog and digital outputs. Both fixed cable and connector versions can be used. When using a standard sensor in this housing you get a cost efficient solution for use in hazardous locations which also allows easy sensor replacement.

Several design combinations are available to fit your application:

M18 or 3/4" UNF Mounting flange thread - M20 or 1/2" NPT Cable gland thread - long or short - top-mounted, side-mounted, or dual side-mounted cable glands. See Combination Chart.

All parts are made of 316L Stainless steel. The housing is also available in non-approved versions ensuring an outstanding protection to the sensor when used in rugged applications with high humidity and aggressive gases.

### Protection Type:

ATEX:



II 2 G Ex d IIC T5 T<sub>amb</sub> -40°C to +60°C

II 2 D Ex tD 20/A21 IP68 T 100°C

ITS09ATEX16296X

In accordance with EN 60079-0:2006

EN 60079-1:2007, EN 60079-26:2004,

EN 60079-0:2006 and EN 61241-1:2004

Only with ATEX approved cable glands

Class 1, Division 1, Groups A, B, C, and D

hazardous locations, temperature code T5

As to fire, electrical shock and explosion

hazards only UL certificate no. 2PD0.

In accordance with UL 1203 standard.

Only with UL approved cable glands



### Material:

Stainless Steel AISI 316L (1.4404)

### Cable Gland Threads:

M20 x 1,5 or 1/2" NPT

### Ingress protection code:

IP68 (only with IP68 approved cable gland)

### Approved sensors:

G-Series Analog + Digital

L-Series Start / Stop

R-Series Analog

R-Series Profibus

R-Series CANBUS

R-Series SSI

R-Series DeviceNet

### Mounting Flange:

M18 x 1,5 or 3/4" - 16UNF - 3A

### Pressure rating:

350 Bar continuous

### Peak pressure:

530 Bar

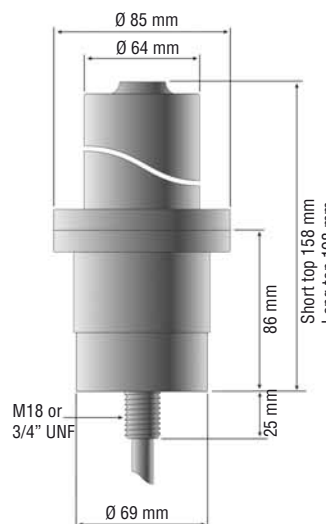
### Magnet type:

Ring magnets see page 58

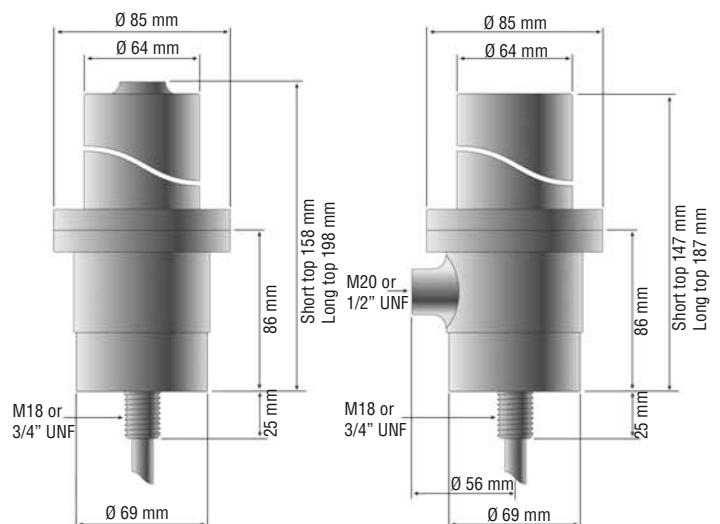
### Level Measurement:

Float on request

Top mounted cable gland



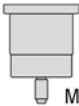
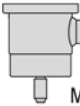
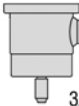
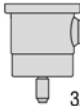
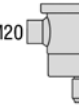


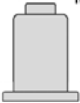
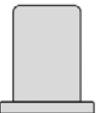
Side mounted cable gland



**ACCESSORIES R-SERIES**

Precision Position Measurement High Pressure Housing

Combination Chart:

Bottom \ Top	 M 18	 M 20	 1/2" NPT 3/4" UNF	 1/2" NPT 3/4" UNF	 M 20
Approval	ATEX	ATEX	ATEX	UL and cUL	ATEX
 M 20	<b>0100</b>				
		<b>0900</b>	<b>1000 ATEX</b>	<b>1000 UL/cUL</b>	<b>1300</b>
 M 20	<b>0300</b>				
		<b>1700</b>			<b>2100</b>

The long top is needed for Profibus sensors

**Ordering Information:**

Part-No. HPH -XXXX-XXXX-X-XXXXXX

Choose a design combination from the chart

Measuring length 50 - 7600 mm

Approved or Non-approved version

Only for version 1000: Please add type of approval:

- ATEX
- UL/cUL

Example: Approved short housing with M18 mounting threads and one side mounted cable gland with M20 threads and a measuring length of 650 mm:

**HPH-0900-0650-A**

Note!  
 Accessories see data sheet "High Pressure Housing"  
 Order separately: Sensor R-Series RH-B...  
 B = Basic version without hydraulic rod