The ***Magnetostrictive*** Position Sensors

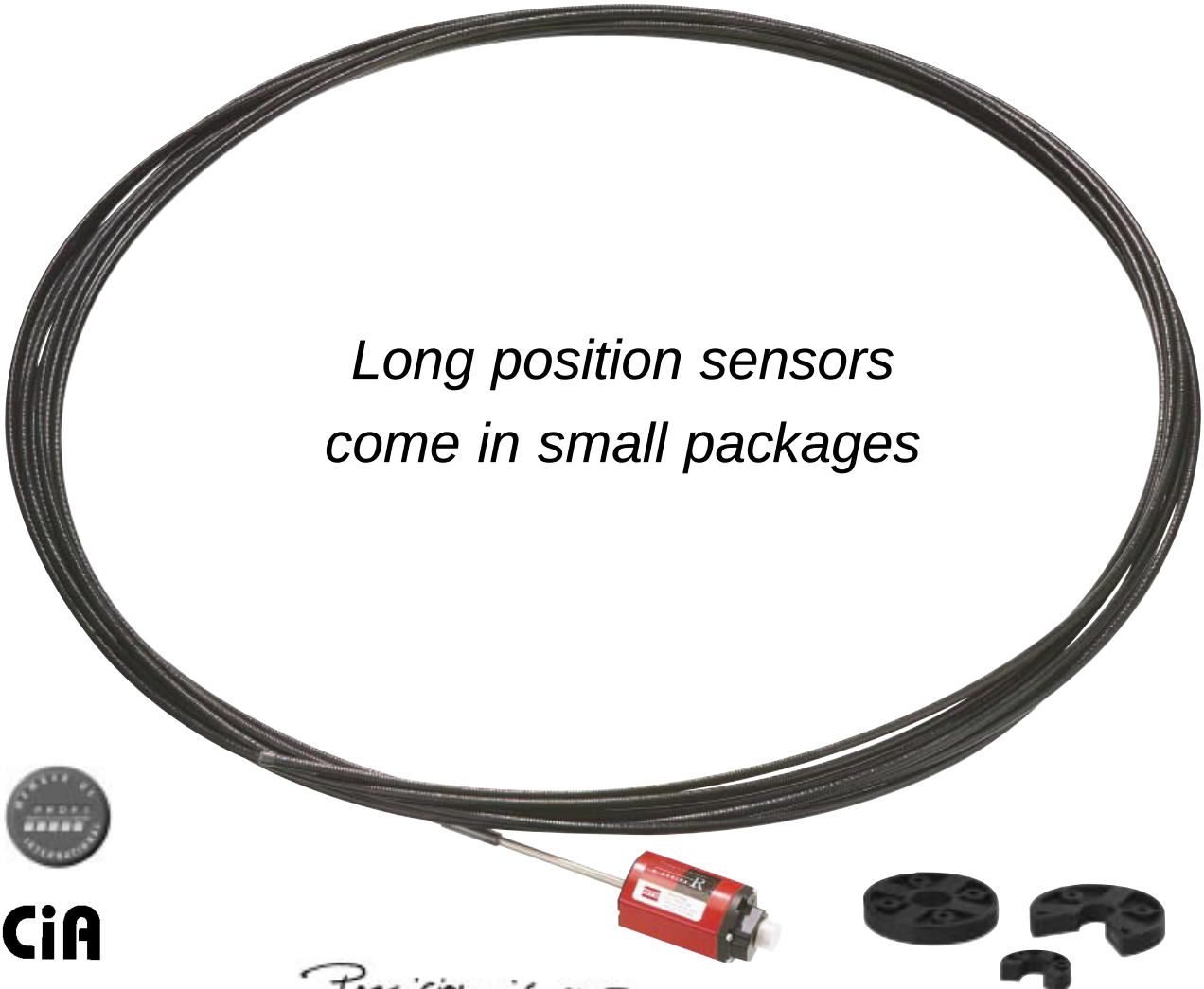
MTS® SENSORS GROUP

Temposonics® R-Series

Rod Model RF

...a very flexible Sensor

- ***Absolute Sensor for Linear Measurement along an Arc***
- ***Contactless Sensing with Highest Durability***
- ***Rugged Industrial Sensor, EMC shielded and CE certified***
- ***Superior Accuracy***
- ***Linearity Tolerance: better 0,02 %***
- ***Repeatability 0,001%***
- ***Direct Output Signal: Analog / SSI / CANbus / Profibus-DP***
- ***1 Sensor for Multi-Position Measurement: up to 15 Positions simultaneously***
- ***Measuring Range: 250 mm - 10 Meters (8350 mm)***



Long position sensors
come in small packages

Precision is our Strength !

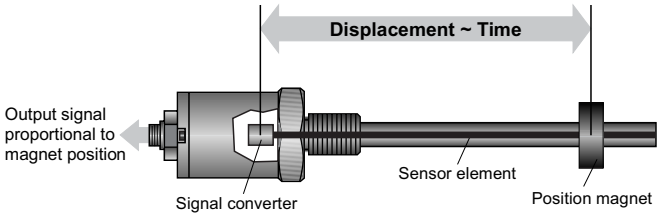
CiA

CE

ISO 9001 CERTIFIED

ANALOG • SSI • CANbus • Profibus-DP

...offers Multi-Position measurement

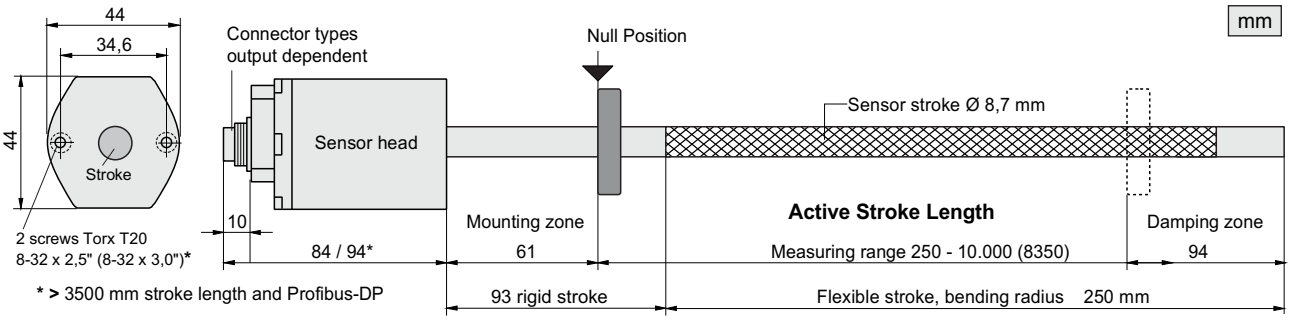


Operating principle:
Magnetostrictive ultrasonic speed measurement = Position sensing

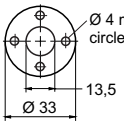
TEMPOSONICS are highly repeatable position sensors for measuring linear movements. Their absolute nature provides instant recognition of machine position after power loss recovery. Using the unique **magnetostrictive principle**, which MTS pioneered, the sensor precisely senses the position of an external magnet through the housing wall to measure displacements with a high degree of resolution. This time-based method with up to 10'000 measurements/second provides sensors of highest accuracy. The non-contact sensing eliminates the wear, noise and erroneous signal problems and guarantees the best durability without any recalibration.

Temposonics-RF is very flexible - when space is a problem.

MTS adds flexible sensor models Temposonics-RF to its family of highly accurate linear position sensors. The flexible sensor provides proven non-contact and trouble-free performance for very long stroke lengths and linear measurements on an arc.
The new flexible sensors are available with all R-Series outputs including analog, serial digital and bus interfaces. Standard stroke lengths for the sensor are up to 10 meters and special applications available by consulting the factory. Temposonics flexible sensors can be used for linear measurement along an arc such as an index table.
The flexible sensors incorporate the Temposonics SE (Sensing Element) technology that is the same building block all MTS Temposonics sensor models use. The flexible sensors are housed in a teflon coated stainless steel housing that is flexible and that can be bent in an arc to an **250 mm minimum bend** radius arc. Specifications are measured with flexible sensor element at a 0° degree bend radius. Most operating parameters are identical to its rigid cousin. Temposonics-RF sensors are recommended for long-length applications because they are simply coiled **(400 mm radius)** for shipping, which simplifies logistics and handling.

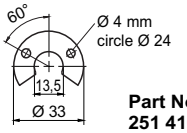


Position magnets (Pls. order separately)



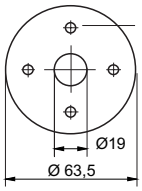
Part No.
201 542

Standard Ring magnet Ø33
Hight: 8 mm
Material: PA 66-GF 30, magnets compound-filled, weight ca. 10 g, operating temperature -40...+75° C



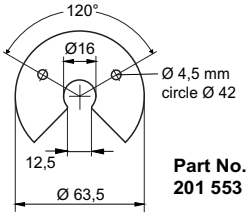
Part No.
251 416

Open Ring magnet Ø33
Hight: 8 mm
Material: PA 66-GF 30, magnets compound-filled, weight ca. 8 g, operating temperature -40...+75° C



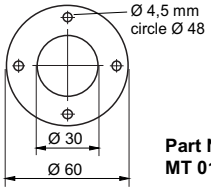
Part No.
201 554

Ring magnet Ø63,5
Hight: 9,5 mm
Material: PA 66-GF 30, magnets compound-filled, weight ca. 35 g, operating temperature -40...+75° C



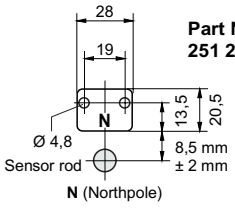
Part No.
201 553

Open Ring magnet Ø63,5
Hight: 9,5 mm
Material: PA 66-GF 30, magnets compound-filled, weight ca. 25 g, operating temperature -40...+75° C



Part No.
MT 0162

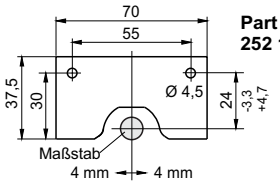
Ring magnet Ø60
Hight: 15 mm
Material: AlCuMgPb, magnets compound-filled, weight ca. 90 g, operating temperature -40...+75° C



Part No.
251 298-2

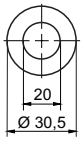
Position magnet 28 x 20,5
Hight: 8 mm
Epoxy coated magnets, side-panels: stainless steel 1.4301 / AISI 304, weight ca. 25 g, operating temperature -40...+75°C

Only for 1-Magnet measurement



Part No.
252 185

Position magnet 70 x 37,5
Hight: 12 mm
Material: AlMg 4.5 Mn, black anodized magnets compound-filled, weight ca. 75 g, operating temperature -40...+75° C



Part No.
402 316

Ring magnet Ø30,5
Hight: 8 mm
Material: Composite PA-Ferrit, weight ca. 15 g, operating temperatur -40...+100° C

Input **Measured variables:** - Displacement
- Velocity (CANbus)
- Multi-Position measurement up to 15 position simultaneously (CANbus, Profibus)

Measuring range: 250 -10.000 mm (Profibus-DP 8350 mm)

Output **Interfaces:** Analog, SSI, CANbus, Profibus-DP

Accuracy **Resolution:** Output dependent
Linearity, uncorrected: < ± 0,02 % F.S. (Minimum ± 100 µm)
Repeatability: < ± 0,001 % F.S. (Minimum ± 2,5 µm)
Hysteresis: < 4 µm

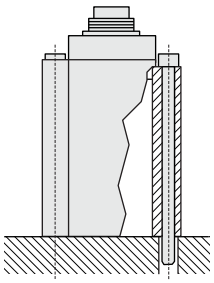
Operating Conditions **Sensor mounting position:** Any orientation
Position magnet speed: Any
Operating temperature: - 40° C ... +75° C
Dew point, humidity: 90% rel. humidity, no condensation
Sealing: IP 30 (IP 65 rating only for professional mounted guide pipe IP 65 and if mating connectors are correctly fitted)
EMC test: Electromagnetic Emission EN 50 081-1
Electromagnetic Susceptibility EN 50 082-2
DIN IEC 801-4 / Type 4 / **CE qualified**
Shock rating: 100 g (single hit), IEC-Standard 68-2-27
Vibration rating: 5 g / 10 - 150 Hz, IEC-Standard 68-2-6

Form Factor, Material **Sensor head:** Aluminum diecasting housing
Sensor stroke: Flexible stainless steel pipe (teflon coated), minimum bend radius 250 mm, radius for shipping 400 mm.
Magnet type: Different types (see page 2)

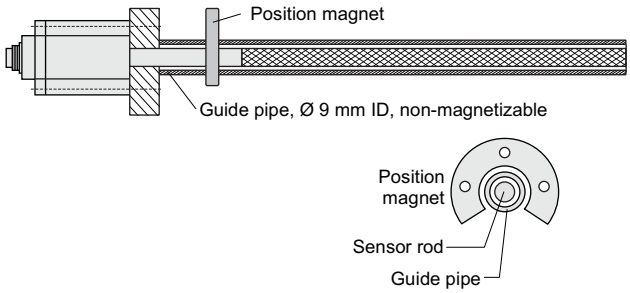
Electrical Connection **Connection type:** Connector or cable outlet (Output dependent)

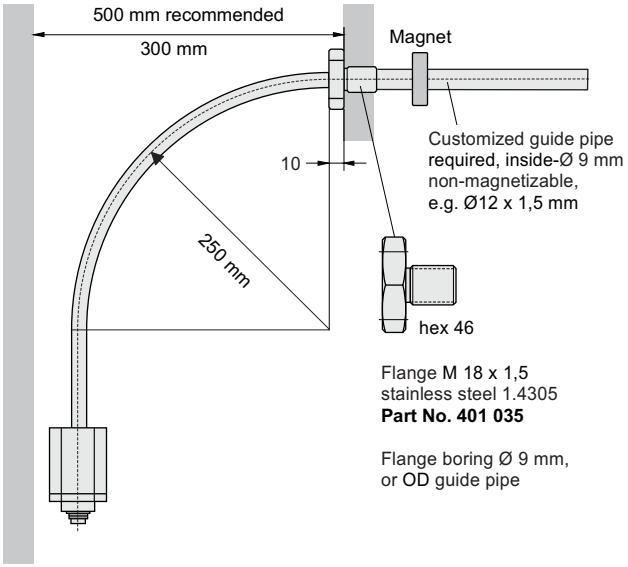
Sensor installation

Mounting of sensor head requires the use of 2 non-ferrous screws 8-32 x 2,5" (8-32 x 3,0"), supplied with the sensor. Long sensors require a guide pipe support (inside diameter of 9 mm) of non-magnetizable material, straight or bent to the desired shape.
For easy installation the sensor can be supplied with a hex flange (below), bored for above mounting screws.

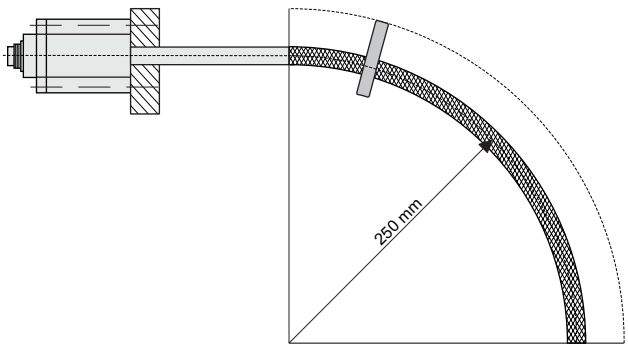


Example: Straight measurements





Example: Curvilinear measurements



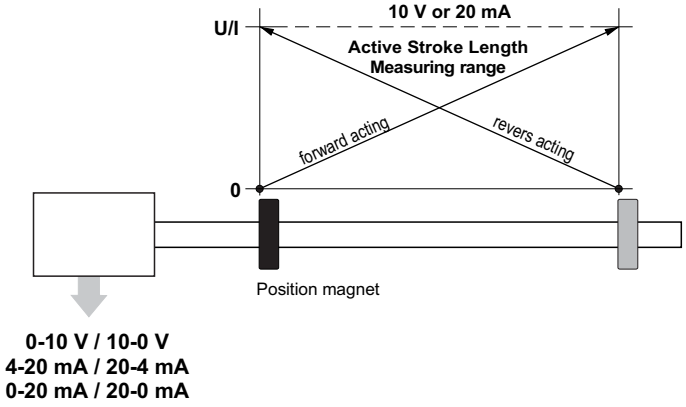
Note
A flexible sensor requires supports or anchoring to maintain proper alignment between sensor rod and the magnet, otherwise the sensor output signal can be interfered or lost.

Output
Voltage: 0 - 10 Vdc or 10 - 0 Vdc (Controller input resistance RL: 5 k)
Current: 4(0) - 20 mA or 20 - 4(0) mA (Burden 0...500)
Null/Span setup: 100 % of measuring range (minimum range 25 mm)
Resolution: 16 bit; 0,0015 % (minimum 10 µm)
Update frequency: 1 kHz up to 1500 mm / 0,2 kHz for 10 meters measuring range

Electrical Connection
Connection type: 6 pin connector or integral cable
Input voltage: 24 Vdc (+20 % / -15 %)
Current drain: 90 mA typical
Ripple: < 1 % peak to peak
Electric strength: 500 V (DC ground to machine ground)

Analog Output

Analog RF sensors feature 16 bit resolution via a D/A converter and its output is updated at high speed. The sensing system provides direct analog outputs including voltage and current. Dual position outputs of a common type are standard with each sensor. Voltage and current outputs allow **100 % adjustments** of zero and span setpoints. **Minimum adjustment range is 25 mm**. Since the outputs are direct, no signal conditioning electronics are needed when interfacing with controllers or meters.

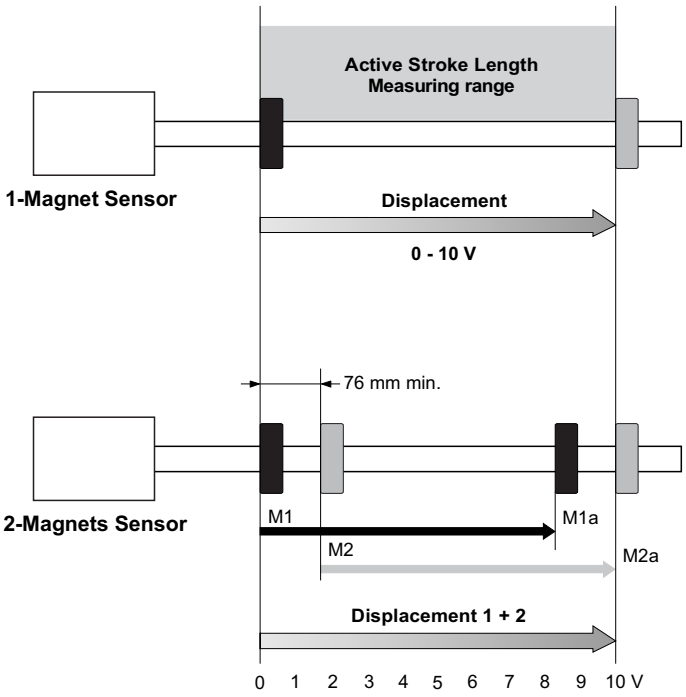


Temposonics-RF smart analog sensors can be delivered with following operation modes:

• **One Output:** provides one displacement measurement over the entire active range of the sensor's stroke length with 1 magnet.

• **Two Outputs:** provides two identical displacement outputs; a separate output is provided for each of two magnets positioned along the sensor length.

Note: A gap of at least 76 mm must be maintained between the magnets. Therefore, the output range of each magnet equals the active stroke length of the sensor less 76 mm. Minimum measuring range for dual magnet system is 150 mm.

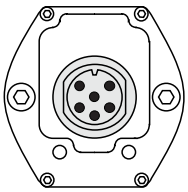


Example: Output 0 - 10 V
• M1 = Magnet 1 / Start point (0 V)
• M1a = Magnet 1 / End point
• M2 = Magnet 2 / Start point
• M2a = Magnet 2 / End point (10 V)

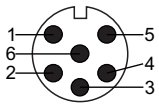
Programming
Using two pushbuttons inside the sensorhead, the following parameters can be programmed:
1. Measuring direction (forward/reverse)
2. Start and end positions of the ordered output, can be programmed at any setpoints inside the active measuring range.

Note
Temposonics-RF sensors are supplied with either Vdc or mA output from the factory and cannot be reprogrammed in the field.

Connector outlet D60

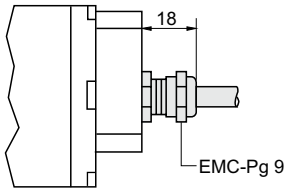


6 pin male receptacle M16



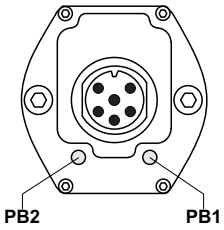
Front face of sensor plug
or rear of cable connector

Cable outlet R02



2 m PVC cable 6 x 0,14 mm²
EMC shield, bending radius
50 mm at fixed installation

Programming switch

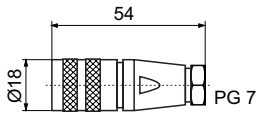


Push buttons for sensor setup
(remove screws)

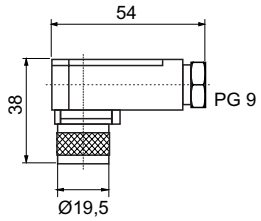
Connector/Cable Wiring

Pin	Color	Function
1	gray	**Output 1: Displacement 1** 0 - 10 V / 10 - 0 V 4 - 20 mA / 20 - 4 mA 0 - 20 mA / 20 - 0 mA
2	pink	DC Ground
3	yellow	**Output 2: Displacement 2** 0 - 10 V / 10 - 0 V 4 - 20 mA / 20 - 4 mA 0 - 20 mA / 20 - 0 mA
4	green	DC Ground
5	brown	+ 24 Vdc (+20%/-15%)
6	white	DC Ground (0 V)

Cable connectors (Pls. order separately)



6 pin female connector M16
Part No. ST C0 9131 D



6 pin 90° female connector M16
Insert adjustable in 45° positions
Part No. ST C0 9131-6

Housing: Zinc diecasting, nickel plated
Termination: Solder
Contact insert: Silver plated
Cable clamp: Pg 7/9
Cable-Ø: 6 mm (Pg 7), 8 mm (Pg 9)
Cable type: 6 wires, twisted pairs, shield
e.g. 3 x 2 x 0,14 mm²

Output
Interface: SSI (Synchronous Serial Interface) - RS 422/485 standard
Data format: Binary or Gray encodes
Data length: 25 or 24 bit (upon request)
Resolution: 5 µm max.

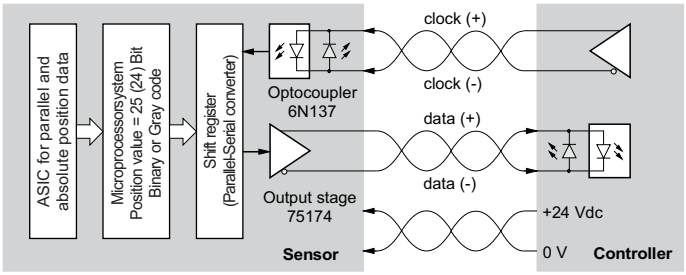
Electrical Connection
Connection type: 7 pin connector or integral cable
Input voltage: 24 Vdc (+20 % / -15 %)
Current drain: 70 mA typical
Ripple: < 1 % peak to peak
Electric strength: 500 V (DC ground to machine ground)

SSI (Synchronous Serial Interface)

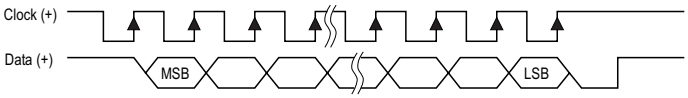
Temposonics-RF digital sensors offer an SSI output in which resolution up to **5 µm** is standard. The displacement value is encoded in a **25- or 24-bit Binary** or **Gray** code format and transmitted at high speed via SSI interface in **RS 422/485** standard to the control device.
Main feature of SSI is the synchronized data transfer. Synchronization in a closed-loop control system is made simple. A clock pulse train from a controller is used to gate out sensor data: one bit of position data is transmitted to the controller per one clock pulse received by the sensor. The absolute, parallel position data is continually updated by the sensor and converted by the shiftregister into serial information. Between each clock pulse train there is a minimum dwell of 25 µs during which fresh data is moved into the register. Data is shifted out when the sensor receives a pulse train from the controller. When the least significant bit (LSB) goes HIGH and the minimum dwell time has elapsed, new data is available to read.

The **S**ynchronous **S**erial **I**nterface is the most widely used output between sensors and controllers.

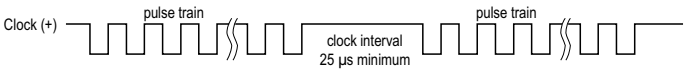
Logic diagram



Timing diagram



Clock pulse sequence



Measuring frequency

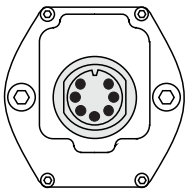
Measuring range:	up to 300	750	1000	2000	5000	10.000 mm
Measurements/second:	4,3	3,2	2,5	1,3	0,5	0,25 kHz

Data transmission speed

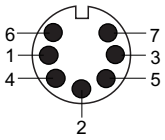
Cable length:	< 3	< 50	< 100	< 200	< 400 m
Baud rate:	1,5 MBd	< 400 kBd	< 300 kBd	< 200 kBd	< 100 kBd

The baud rate - cable length dependent - has a maximum of 1,5 MBaud and a minimum of 70 kBaud. Pls. use shielded cable with twisted pairs.

Connector outlet D70

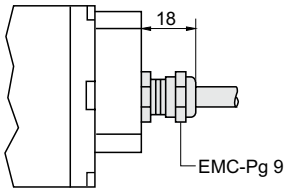


7 pin male receptacle M16



Front face of sensor plug
or rear of cable connector

Cable outlet P02

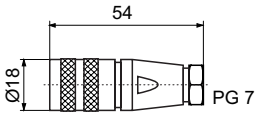


2 m PUR cable 7 x 0,14 mm²
EMC shield, bending radius
50 mm at fixed installation

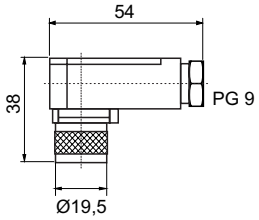
Connector/Cable Wiring

Pin	Color	Function
1	gray	Data (--)
2	pink	Data (+)
3	yellow	Clock (+)
4	green	Clock (--)
5	brown	+ 24 Vdc
6	white	0 V
7	*Do not connect*	

Cable connectors (Pls. order separately)



7 pin female connector M16
Part No. ST C0 9131 D07



7 pin 90° female connector M16
Insert adjustable in 45° positions
Part No. ST C0 9131-7

Housing: Zinc diecasting, nickel plated
Termination: Solder
Contact insert: Silver plated
Cable clamp: Pg 7/9
Cable-Ø: 6 mm (Pg 7), 8 mm (Pg 9)
Cable type: 7 wires, twisted pairs, shield
e.g. PUR cable 7 x 0,14 mm²

Output

Interface: CAN-Fieldbus System, ISO-DIS 11898
Data protocol: CANopen: Encoder Profile DS 406, CiA Standard DS 301 / CANbasic: CAN 2.0 A

Baud rate, kBit/s:	1000	800	500	250	125	50	20
Cable length, m:	< 25	< 50	< 100	< 250	< 500	< 1000	< 2500

The sensor will be supplied with ordered baudrate (changable by customer)

Resolution:	CANopen	CANbasic
- Displacement:	5 µm	5 µm
- Velocity:	0,5 mm/s	1,0 mm/s

Cycle time: 1,0 ms up to 2400 / 2,0 ms up to 4800 / 4,0 ms up to 7600 mm measuring range

Electrical Connection

Connection type: 6 pin connector M16, 2 x 6 pin connector M16, integral cable
Input voltage: 24 Vdc (+20 % / -15 %)
Current drain: 90 mA typical
Ripple: < 1 % peak to peak
Electric strength: 500 V (DC ground to machine ground)

CANbus Data protocol

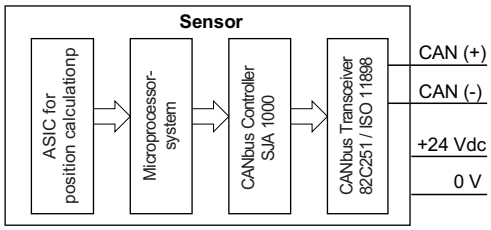
SOF	Arbitration		Control	Data Field	CRC	ACK			EOF	Interframe Space
1	11	1	6	0 - 8 Bytes	15	1	1	1	7	3 Bits
	ID-#			Applications data						

44 bit overhead
64 bit applications data

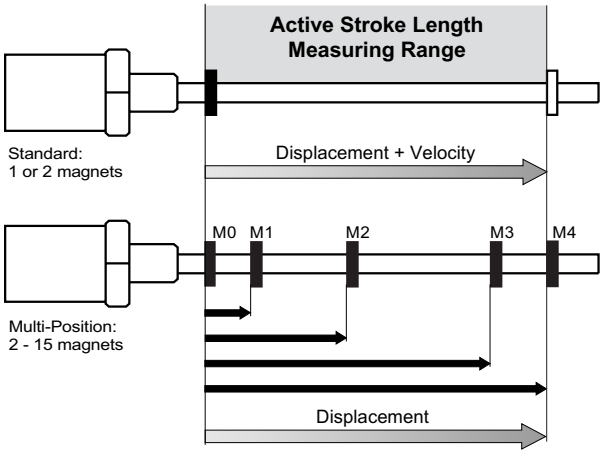
CANbus Interface

CAN (ISO 11898), an open fieldbus is designed for high-speed data exchange at machine level. Protocol architecture (OSI/ISO 7498) specifies the functional and technical parameters with which the intelligent digital automation devices can be networked via a master-slave serial link.
Fieldbus systems require local intelligence for additional functions (configuration, diagnostics, alarm etc.). The smart Temposonics sensors convert the measurements into bus oriented outputs - available with different CANbus protocols - and transmit the data directly to the machine controller.

Logic Diagram



CAN sensors provide different operation modes with one or multiple position magnets. Following measurements are available:
- **Standard:** 1. Displacement + velocity with 1 magnet (CANbasic) 2. Displacement + velocity with 1 or 2 magnets (CANopen).
- **Multi-Position:** Separate displacements for each of 2-15 magnets ***simultaneously***.



Note: A gap of at least 100 mm must be maintained between the magnets.

CANopen
Is corresponding to Encoder Profile DS406, Vers. 2.0, CiA Draft Standard DS 301. CANopen functionality describes communication objects (below), which are set via configuration tool (software): **Service Data Object, Process Data Object, PDO-Transmission Type, Synchronisation Object, Emergency Object and Nodeguard Object.**
• Each CANopen sensor will be delivered with an operating manual and an EDS. The sensor can transmits max. **2 position** and **velocity** values simultaneously. For this purpose, two process data objects (PDOs) are available in the CANopen protocol. Each of these PDOs can include position, speed and limit value data. The configuration of each PDO can be determined by the user. I.e. a mapping can be assigned to each PDO by means of the SDO service.
• Data formats: Position data are always designed as 32-bit integer value and the speed data are always designed as 16-bit integer value. Limit value status is designed as an 8-bit value.

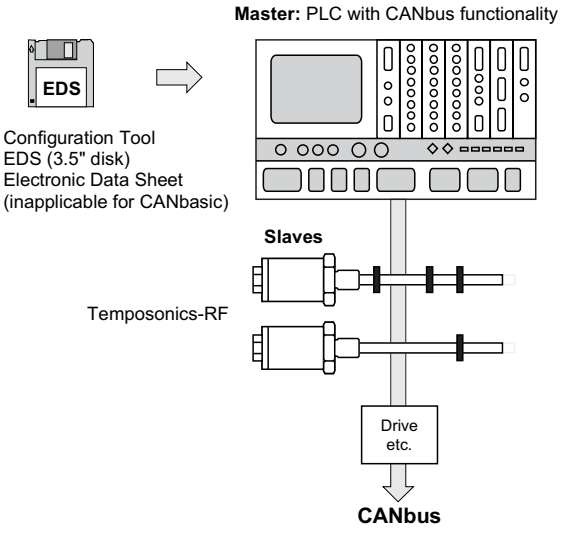
CANbasic
Compared with the strictly regulated CANopen protocol, CANbasic permits a simple, flexible adaption to customized profiles with a short bus access. Here, **no configuration tool** is needed because parameters are factory set.
MTS CANbasic protocol complies with CAN 2.0A standard and always includes the following applications data for a **1-Magnet** measurement: **Position, Velocity, Sensor Status and 5 Setpoints.**
For increasing machine efficiency, following parameters can be customized: **Setpoint Control:** 5 setpoints (2 x basic installation, 3 x controller), **Profile Capture:** Motion (displacement vs time) and Velocity (velocity vs time), **Customized Software.**

Multi-Position Measurement
Based on CANbasic protocol and provides the position measurement with maximum 15 magnets on a single sensor with built-in monitoring of the selected magnets quantity.

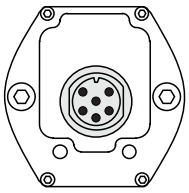
All flexible sensors can be operated with above CAN options. Their data protocols are factory set in the sensor processor, so all sensor variations can be connected directly to the fieldbus.

Conformance Test Certificate:
For Temposonics sensors is given by the CANbus user organisation CiA (CAN in Automation).

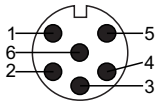
Fieldbus Topology
With smart MTS position sensors following bus-structure on machine level is possible



Connector outlet D60

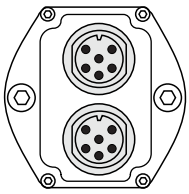


6 pin male receptacle M16

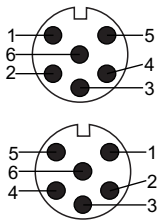


Front face of sensor plug
or rear of cable connector

Connector outlet D62

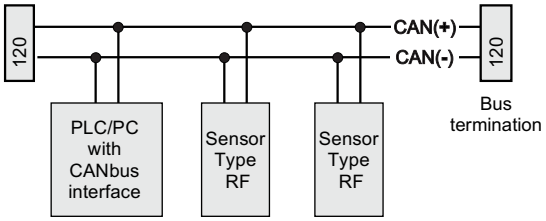


Dual 6 pin male receptacle M16

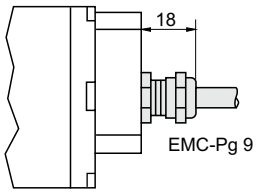


Front face of sensor plug
or rear of cable connector

Bus wiring (Linear topology)



Cable outlet P02

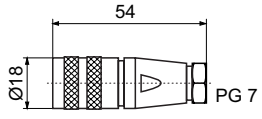


2 m PUR cable 7 x 0,14 mm²
EMC shield, bending radius
50 mm at fixed installation

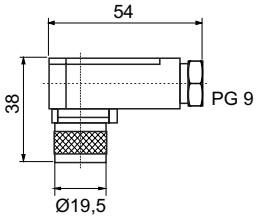
Connector/Cable Wiring

Pin	Color	Function
1	gray	CAN (--)
2	pink	CAN (+)
3	Do not connect	------
4	Do not connect	------
5	brown	+ 24 Vdc (+20/-15%)
6	white	0 V

Cable connectors (Pls. order separately)



6 pin female connector M16
Part No. ST C0 9131 D



6 pin 90° female connector M16
Insert adjustable in 45° positions
Part No. ST C0 9131-6

Housing: Zinc diecasting, nickel plated
Termination: Solder
Contact insert: Silver plated
Cable clamp: Pg 7/9
Cable-Ø: 6 mm (Pg 7), 8 mm (Pg 9)

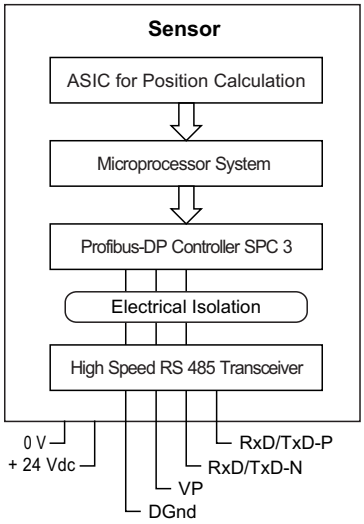
Output
Interface: Profibus-DP System, ISO 74498
Data protocol: Profibus-DP (EN 50 170)
Baud rate: Max. 12 Mbit/s
Resolution: 20 µm
Cycle time (1-Magnet measurement): 0,5 ms at 500 mm/1,0 ms at 2000 mm/2 ms at 4500/3,2 ms at 7600 mm measuring range (for each additional magnet: + 0,05 ms)

Electrical Connection
Connection types: 2 pcs. 6 pin connector M16 or 1 x 4 pin connctor M8 and 1 x 5 pin T-connector M12
Input voltage: 24 Vdc (+20 % / -15 %)
Current drain: 90 mA typical
Ripple: < 1 % peak to peak
Electric strength: 500 V (DC ground to machine ground)

PROFIBUS Interface

PROFIBUS is an open fieldbus, based on standard EN 50 170. Protocol architectur is oriented to OSI model (ISO 7498). PROFIBUS-DP (Decentralized Periphery) is designed for machi ne level and provides functions for diagnostics and monitoring, which are loaded into the bus via a configuration tool. TEMPOSONICS smart Profibus sensor is a slave implementation for direct connection to the bus. The sensor realizes the absolute position measuring with direct transmission of digitized data in RS 485 standard to control units. The interface is built up with Siemens ASIC SPC3 and contains a galvanic isolation between power supply and bus signals. That allows baudrates from 9600 baud to 12 Mbaud with an automatic search of transfer rate and a very fast system response time.

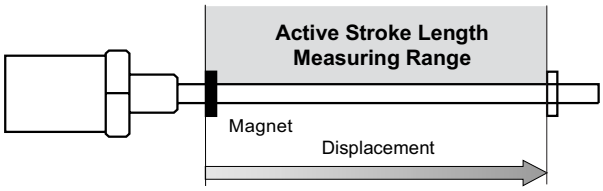
Logic diagram



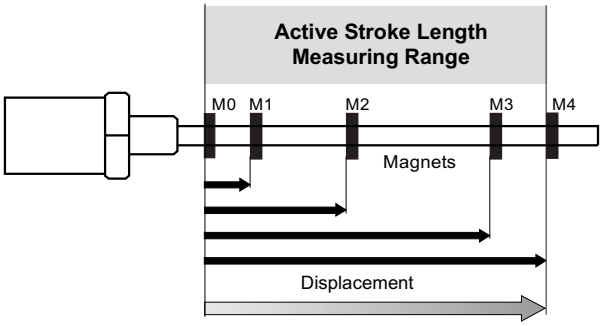
Configuration and diagnostics of Profibus sensors are done by the master. Temposonics-RF provides following features:
Sensor outputs:
Absolute position of max. 15 magnets, Sensor status and error detection, Magnet status (error/non-error), Options: 2 set-points for 1 magnet, Velocity for 1 magnet, Maximum/Minimum position with reset.
Selectable parameters:
Offset for each magnet, Measuring direction: Forward/reverse, Resolution: 0,02 / 0,05 / 0,1 / 0,2 mm, Measuring cycle: Non-synchronized or synchronized (option).

Profibus sensors provide different operation modes with one or multiple position magnets, therefore following measurements are available:

1. Standard measurement: 1-magnet sensor provides one displacement output over the entire active range of the sensor's stroke length.



2. Multi-Position measurement: 2-15 magnets sensor provides a separate displacement output for each magnet positioned along the sensor length ***simultaneously***.

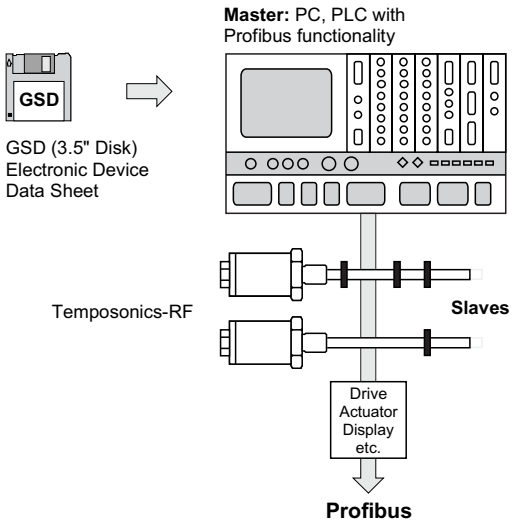


Note: A gap of at least 95 mm must be maintained between the magnets.

Data exchange: With Multi-Position measurement, 1 status byte and 3 bytes of position data for each position are transmitted. The status byte contains e.g. the error bit and the position number of the following measurement value. Dependent of sensor parameter setting, the position data can be transfered to the control unit in different formats (e.g. INTEL or MOTOROLA format).

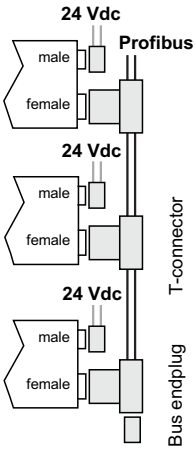
Using the configuration tool, based on GSD files (3,5" disk on delivery), integration of the TEMPOSONICS sensor into the fieldbus system is done via the on-site Pofibus Master.

Fieldbus structure
Smart MTS position sensors for high-speed serial link on machine level.

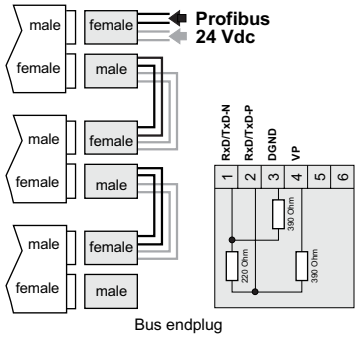


Bus Wiring

Connector outlet D52



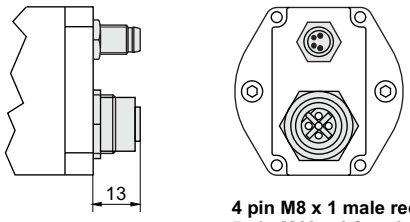
Connector outlet D63

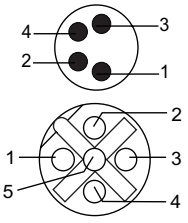


Advantages:
- Minimized stub-line length
- No external T-connectors required
- One shielded hybrid cable for the bus and input voltage

Advantages:
- Standardized bus connector M12
- Separate input voltage
- No bus breakdown at sensor disconnection

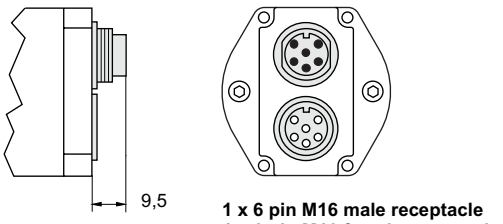
Connector outlet D52

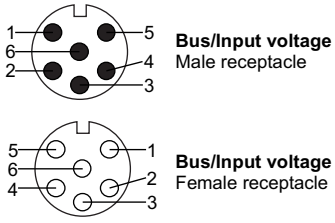




Front face of sensor plug
or rear of cable connector

Connector outlet D63





Front face of sensor plug
or rear of cable connector

Wiring Connectors D52 / Bus-cable (Cable type K 58, page 16)

1. Power supply connector M8

Pin	Function
1	+24 V DC (+20%/-15%)
2	NC
3	0 V (GND)
4	NC

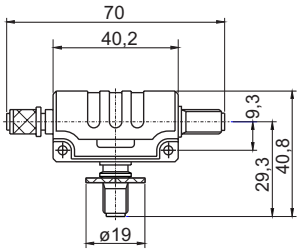
2. Bus connector M12

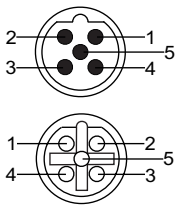
Pin	Color	Function
1	----	VP+5, only for bus termination
2	green	RxD / TxD-N (Bus)
3	----	DGND, only for bus termination
4	red	RxD / TxD-P (Bus)
5	shield	Shield
	housing	Shield

Wiring Connectors D63 / Bus-cable (Cable type K 53, page 16)

Pin	Color	Function
1	green	RxD / TxD-N (Bus)
2	red	RxD / TxD-P (Bus)
3	----	DGND (female receptacle only, bus termination)
4	----	VP (female receptacle only, bus termination)
5	black	+24 Vdc
6	blue	0 V
7	yellow/green	Shielding, machine ground

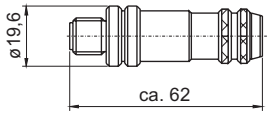
Cable connectors, connection type D52
Pls. order separately



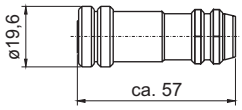


Front face of sensor plug
or rear of cable connector

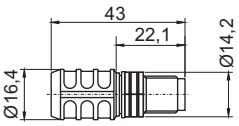
5 pin T-connector M12 x 1
Part No. 560 887
Housing: PU
Contact insert: Silver plated
Coupling ring: Brass, silver plated



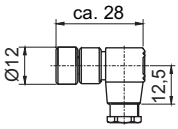
5 pin Cable connector M12 x 1
Part No. 560 884
Housing: Brass
Termination: Screws
Contact insert: Pins, silver plated
Cable-Ø max.: 6-8 mm



5 pin Cable connector M12 x 1
Part No. 560 885
Housing: Brass
Termination: Screws
Contact insert: Sockets, silver plated
Cable-Ø max.: 6-8 mm

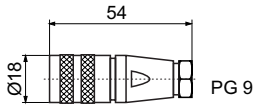


5 pin Bus endplug M12 x 1
Part No. 560 888
Housing: Brass
Contact insert: Pins, silver plated
Nominal voltage: 50 Vdc
Internernal resistance:
2 x 390 ohms(1/4 W)
and 220 ohms (1/4 W)



4 pin Cable connector M8 x 1
for input voltage
Part No. 560 886
Housing: Brass
Termination: Solder
Contact insert: Pins, silver plated
Cable-Ø max.: 5 mm

Cable Connectors, connection type D63
Pls. order separately

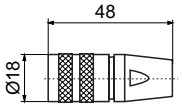


1) 6 pin female connector M16
Part No. ST C0 9131D06 PG9

2) 6 pin male connector M16
Part No. ST C0 9131H06 PG9

Housing: Zinc diecasting, nickel plated
Termination: Solder
Contact insert: Silver plated
Cable clamp: Pg 7/9
Cable-Ø: 8 mm (Pg 9)

Bus-Endplug



6 pin Bus endplug M16, male
Part No. ST A0 9131H06

Housing: Zinc diecasting, nickel plated
Termination: Solder
Contact insert: Silver plated

VALID FOR ALL SENSOR OUTPUTS

On delivery: **Position sensor, Instruction manual with configuration tool on 3.5" Disk for Fieldbus sensors with CANopen and Profibus outputs.**
Pls. order separately: Position magnets, accessories e.g. connectors etc.

Measuring range: **Up to 1000 mm in 50 mm steps**
1000 - 10.000 mm in 250 mm steps
Option: Other length upon request

Position Sensor Temposonics **RF - x - xxxxxM - xxx - 1 - xxx**

Sensor model
RF = Flexible rod

Style
C = Basic-Sensor

Measuring range
00250 - 10.000 mm

Connection type
D60 = 6 pin male receptacle M16
R02 = 2 m PVC cable w/o connector (Option: 01 - 10 m)

Input voltage
1 = +24 Vdc

Output

1-Magnet (Position)	2-Magnets (Position 1 + 2)
V01 = 0 - 10 V	**V02** = 0 - 10 V
V11 = 10 - 0 V	**V12** = 10 - 0 V
A01 = 4 - 20 mA	**A02** = 4 - 20 mA
A11 = 20 - 4 mA	**A12** = 20 - 4 mA
A21 = 0 - 20 mA	**A22** = 0 - 20 mA
A31 = 20 - 0 mA	**A32** = 20 - 0 mA

Accessories

Description	Part No.
Ring magnet Ø 33 mm, Standard	201 542
Open ring magnet Ø 33 mm	251 416
Magnet 28 x 20,5 mm	251 298-2
Ring magnet Ø 63,5 mm	201 554
Open ring magnet Ø 63,5 mm	201 553
Ring magnet Ø 60 mm	MT 0162
Magnet 70 x 37,5 mm	252 185
Ring magnet Ø 30,5 mm	402 316
Flange, hex 46, stainless steel 1.4305	401 035
6 pin female cable connector M16	St C0 9131D
6 pin 90° female cable connector M16	St C0 9131-6
PVC cable 6 x 0,14 mm²	K 27

Position Sensor Temposonics **RF - x - xxxxxM - xxx - 1 - Sxxx1xx**

Sensor model
RF = Flexible rod

Style
C = Basic-Sensor

Measuring range
00250 - 10.000 mm

Connection type
D70 = 7 pin male receptacle M16
P02 = 2 m PUR cable w/o connector (Option: 01 - 10 m)

Input voltage
1 = +24 Vdc

Output
S [1][2][3][4][5][6] = Synchronous Serial Interface

[1] Data length: **1** = 25 bit • **2** = 24 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
[4] Performance: **1** = Standard
[5][6] Options: **00** = Forward measurement • **01** = Reverse measurement

Accessories

Description	Part No.
Ring magnet Ø 33 mm, Standard	201 542
Open ring magnet Ø 33 mm	251 416
Magnet 28 x 20,5 mm	251 298-2
Ring magnet Ø 63,5 mm	201 554
Open ring magnet Ø 63,5 mm	201 553
Ring magnet Ø 60 mm	MT 0162
Magnet 70 x 37,5 mm	401 035
Ring magnet Ø 30,5 mm	252 185
Flange, hex 46, stainless steel 1.4305	402 316
7 pin female cable connector M16	St C0 9131D07
7 pin 90° female cable connector M16	St C0 9131-7
PUR cable 7 x 0,14 mm^2	K 26

Position Ssensor Temposonics **RF - x - xxxxxM - xxx - 1 - Cxxxxxx - Zxx**

Sensor model
RF = Flexible rod

Style
C = Basic-Sensor

Measuring range
00250 - 10.000 mm

Connection type
D60 = 6 pin male receptacle M16
D62 = 2 x 6 pin male receptacles M16
P02 = 2 m PUR cable w/o connector (Option: 01 - 10 m)

Input voltage
1 = +24 Vdc

Output
C [1][2][3][4][5][6] = CANbus Protocol 1)

[1][2][3] Protocol: **101** = CANbasic (MTS) • **207** = Multi-Position Measurement • **304** = CANopen
[4] Baud rate: **1** = 1000 kBit/s • **2** = 500 kBit/s • **3** = 250 kBit/s • **4** = 125 kBit/s
[5] Resolution: **1** = 5 µm
[6] Cycle time: **1** = Standard

Number of Magnets for Multi-Position Measurement C207*
Z02 - Z15 = 2 - 15 pieces

CANopen only
On delivery:
Handling manual
and configuration
tool (EDS) on 3.5" Disk.

***Note:** Pls. specify magnet numbers for your sensing application and order separately*

1) Customized hardware and software upon request

Accessories

Description	Part No.
Ring magnet Ø 33 mm, Standard	201 542
Open ring magnet Ø 33 mm	251 416
Magnet 28 x 20,5 mm	251 298-2
Ring magnet Ø 63,5 mm	201 554
Open ring magnet Ø 63,5 mm	201 553
Ring magnet Ø 60 mm	MT 0162
Magnet 70 x 37,5 mm	401 035
Ring magnet Ø 30,5 mm	252 185
Flange, hex 46, stainless steel 1.4305	402 316
6 pin female cable connector M16	St C0 9131D
6 pin 90° female cable connector M16	St C0 9131-6
PUR cable 7 x 0,14 mm²	K 26
Service tool:	
CANopen Handheld-Programmer for set-up of CANopen nodes address	252 382

Temposonics-RF
Profibus-DP

Ordering Guide

Position Sensor Temposonics **RF - x - xxxxxM - xxx - 1 - Pxxx - Zxx**

Sensor model
RF = Flexible rod

Style
C = Basic-Sensor

Measuring range
00250 - 08350 mm

Connection Type
D63 = 6 pin male receptacle, 6 pin female receptacle, M16
D52 = 4 pin male receptacle M8, 5 pin female receptacle M12 (PNO)

Input voltage
1 = +24 Vdc

Output
P101 = Profibus-DP, Multi-Position measurement
P102 = Profibus-DP, Standard

Number of Magnets for Multi-Position Measurement P101*
Z02 - Z15 = 2 - 15 pcs.

On delivery;
Handling manual and configuration tool (GSD) on 3.5" Disc.

***Note:** Pls. specify magnet numbers for your sensing application and order separately*

Accessories	**Description**	**Part No.**
	Ring magnet Ø 33 mm, Standard	201 542
	Open ring magnet Ø 33 mm	251 416
	Magnet 28 x 20,5 mm	251 298-2
	Ring magnet Ø 63,5 mm	201 554
	Open ring magnet Ø 63,5 mm	201 553
	Ring magnet Ø 60 mm	MT 0162
	Magnet 70 x 37,5 mm	252 185
	Ring magnet Ø 30,5 mm	402 316
	Flange, hex 46, stainless steel 1.4305	401 035
Connector outlet D63	6 pin M16 female cable connector	ST C0 9131 D06 PG9
	6 pin M16 male cable connector	ST C0 9131 H06 PG9
	6 pin M16 Bus endplug, male	ST A0 9131 H06
	Bus cable (5 wires / 2x Bus, 2x power supply)	K 53 (specify length)
Connector outlet D52	5 pin T-connector M12	560 887
	5 pin Cable connector M12, male	560 884
	5 pin Cable connector M12, female	560 885
	5 pin Bus-endplug M12, male	560 888
	4 pin 90° Cable connector M8, female (power supply)	560 886
	Profibus cable, 2 wires	K 58 (specify length)
Servicetools	Profibus Handheld-Programmer for simply address set-up of	
	- Sensors with connector outlet D63	252 173-D63
	- Sensors with connector outlet D52	252 173-D52
	Profibus Mastersimulator 1131 for check-up sensor function	401 727
	Cable Mastersimulator - Sensors, connector outlet D63	401 726
	Cable Mastersimulator - Sensors, connector outlet D52	252 383

***Note:** Projecting and parameterizing a Profibus system will be done with servicetool of Profibus mastersystem supplyer.*

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