Temposonics®
Absolute, Non-Contact Position Sensors

G-Series
SSI

Temposonics®-GB
Measuring length 50 - 3250 mm

Magnetostriction

The absolute Temposonics® linear position sensors are based on the MTS developed magnetostrictive measurement principle. That combines various magneto-mechanical effects and uses the physical height precise speed-measurement of an ultrasonic wave (torsion pulse in its sensor element) for position detecting. Sensor integrated signal processing transforms the measurements directly into market standard outputs. The contactless principle - an external movable magnet marks the position - eliminates the wear, noise and erroneous signal problems and guarantees the best durability without any recalibration.

These compact stainless steel position sensors are designed for installation into standard hydrocylinders, specifically for use with clevis head or any space limited cylinder applications.

Simple mechanics
• The sensor head accommodates the electronics with active signal conditioning
• The pressure-proof sensor pipe with fitting flange protects the internal sensor element. It fits into the bored piston rod.
• The position magnet - fixed at the piston bottom - drives wearfree over the sensor’s stroke and starts the measurement signal through sensor rod wall.

Absolute Sensor for Hydraulic Cylinders, without re-homing
Stainless Steel Rod Sensor
Contactless Sensing with Highest Durability
Rugged Industrial Sensor, EMC shielded and CE certified
Superior Accuracy: Linearity Tolerance better 0.02 %
Repeatability 0.001 %
Resolution up to 5 µm
Direct 25/24 bit SSI output (Gray or Binary)

Perfect data transmission
5 µm
Temposonics®-GB Pressure Proof Sensor for Standard Hydrocylinders

The interface of Temposonics®-GB linear sensors fulfills all requirements of the SSI standard for absolute rotary transducers. Its displacement value is encoded in a 25- or 24-bit Binary or Gray code format and transmitted at very high speed via a serial type interface in RS 422 standard to the control device. SSI provides effective synchronization in a closed-loop control system. A clock pulse train from a controller is used to gate out sensor data.

Measuring range
The output of position values are corresponding with the selected resolution scale. The start position of electrical stroke is here factory set at 40 mm.

Technical Data

### Input
- **Measuring Variable**: Displacement
- **Measuring Range**: 50 - 3250 mm

### Output
- **Interface**: SSI (Synchronous Serial Interface), RS 422 standard
- **Data format**: Binary or Gray encodes
- **Data length**: 25 or 24 bit (upon request)

### Accuracy
- **Resolution**: 5/10/20/50/100 µm
- **Linearity**: < ± 0.02 % F.S. (Minimum ± 60 µm)
- **Repeatability**: < ± 0.001 % F.S.
- **Temperature coefficient**: < 15 ppm/°C

### Operating conditions
- **Magnet speed**: Any
- **Operating temperature**: -40° C ... +75° C
- **Pressure rating**: 350 bar, 700 bar peak
- **Enclosure**: IP 67 if cable connector is correctly fitted
- **Shock rating**: 100 g (Single hit) / IEC-Standard 68-2-27
- **Vibration rating**: 5g / 10-150 Hz, IEC-Standard68-2-6
- **EMC Test**: Electromagnetic emission EN 61000-6-3
- **Electromagnetic immunity EN 61000-6-2 (EN 61326/A1)**
  - EN 61000-4, Criteria A, CE qualified
  - EN 61000-4-2/3/4/6, Criterium A CE qualified

### Form factor / Material
- **Sensor head**: Stainless steel 1.4305 / AISI 303
- **Rod with flange**: Stainless steel 1.4301 / AISI 304, LABS-free (Typ certified)
- **Magnet Type**: Ring magnet, PA-Ferrit

### Installation
- **Mounting**: Any orientation
- **Sensor mounting**: Flange Ø18h 6, 6 screws (ISO 4762)

### Electrical Connection
- **Connection Type**: 7 pin connector M16 x 0,75 or cable outlet (PUR cable 3x2x0,25 mm², Ø 7,9 mm)
- **Input voltage**: 24 VDC (+20 % / -15 %)
- **Polarity protection**: Up to 30 VDC
- **Overvoltage protection**: Up to 36 VDC
- **Current consumption**: 50 - mA, stroke length dependent
- **Ripple**: < 1 % peak to peak
- **Electric strength**: 500VDC (DC ground to machine ground)

Example:
- **Resolution**: 0.01 mm
- **Mounting zone**: 40 mm
- **Measuring length**: 300 mm
- **Measuring direction**: forward

Measuring frequency
- **Measuring range**: 300 - 3250 mm
- **Measurements/second**: 3.7 kHz

Data transfer speed: 70 kBaud ... 1.5 MBaud

Depending on controller selected baud rate, following maximum cable length is permitted.

<table>
<thead>
<tr>
<th>Cable length</th>
<th>&lt; 3 m</th>
<th>&lt; 50 m</th>
<th>&lt; 100 m</th>
<th>&lt; 200 m</th>
<th>&lt; 400 m</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baud rate</td>
<td>1.5 Mbd</td>
<td>&lt; 400 kbd</td>
<td>&lt; 300 kbd</td>
<td>&lt; 200 kbd</td>
<td>&lt; 100 kbd</td>
</tr>
</tbody>
</table>

Example:
- **Start position**: 4000 = 40 mm
- **Middle**: 150 mm 19000 = 190 mm
- **End position**: 300 mm 34000 = 340 mm
- **Start position, underflow**: < 4000 = < 40 mm
- **End position, small overflow**: > 34000 = > 340 mm
- **End position exceeded or position magnet error**: Alarm value = 000000
Position magnets

- **Ring magnet OD33**
  - Part No.: 201 542-2
  - Ø 33 mm
  - Height: 8 mm
  - Composite: PA-Ferrite-GF20
  - Weight: ca. 14 g
  - Operating temperature: -40 ... +100°C
  - Surface pressure max. 40 N/mm²
  - Fastening torque for M4 screws: max. 1 Nm

- **Ring magnet OD25.4**
  - Part No.: 400 533
  - Ø 13.5 mm
  - Height: 8 mm
  - Composite: PA-Ferrite
  - Weight: ca. 10 g
  - Operating temperature: -40 ... +100°C
  - Surface pressure max. 40 N/mm²

Cylinder installation

Use a rod bush (e.g. teflon) to prevent wear on the magnet and the sensor pipe. The bore in the piston rod is dependent on hydraulic pressure and piston velocity etc. The minimum drilling must be 13 mm. Do not exceed the 700 bar peak pressure.

Any fitting position

Simple mounting

Small installation dimensions

The sensor’s high-pressure, stainless steel tube with fitting flange will be fixed via 6 machine screws M6 x 16 x A2-70 (ISO 4762) through the bores in the sensor head. The hydraulic sealing requires the use of a supplied O-Ring 15 x 2.

Using ferromagnetic supports, note that the magnet must be mounted with non-ferrous spacer and screws.

Position magnet

For accurate position measurements mount the magnet with non-ferrous fastening material (screws, supports etc.). Using ferromagnetic supports, note that the magnet must be mounted with non-ferrous spacer of 5 mm minimum and screws.

Note the minimum mounting dimensions as illustrated right.

Note:

Application that can damage the integral cable, please take connector output version. Sensor electronics and integral cable are encapsulated completely. Repairing electronic module is impossible.

Wiring Pin Cable Function
1 Gray Data (-)
2 Pink Data (+)
3 Yellow Clock (+)
4 Green Clock (-)
5 Brown +24 VDC
6 White 0 V (GND)
7 do not connect

Antimagnetic Support

Magnetizable support
Temposonics®
Sensor Model
GB
F
M
1
S

Form Factor
F - Fitting flange Ø18h6

Measuring length
0050 - 3250 in 50 mm steps
Options upon request

Connection Type
D70 - 7 pin male receptacle M16
U02 - 2 m PUR cable w/o connector
U05 - 5 m PUR cable w/o connector
U10 - 10 m PUR cable w/o connector

Input voltage
1 - +24 VDC

Signal Output
S (1)(2)(3)(4)(5)(6) SSI (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
• 02 - Forward, synchronous measurement

On Delivery
Sensor with O-Ring,
Magnet (below) must be ordered separately

Accessories (selected)
Description Part No.
Position magnet OD33 201 542-2
Position magnet OD25,4 400 533
7 pin female cable connector M16 370 624
7 pin 90º female cable connector M16 560 779
PUR cable 3x2x0,25 mm² 530115
O-Ring 15 x 2 Fluorelastomer FPM 75 560 853
Backup ring 561 115
MTS-Service tools:
PC-Programmer R-SSI incl. power supply 253 135
(100-240 VAC/24 VDC), connection cable and programming software (CD)
SSI display and control unit (96x48x150 mm) IX 340

Stroke length Standard
<table>
<thead>
<tr>
<th>Stroke</th>
<th>Ordering steps</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 500 mm</td>
<td>5 mm</td>
</tr>
<tr>
<td>500 - 750</td>
<td>10 mm</td>
</tr>
<tr>
<td>750 - 1000</td>
<td>25 mm</td>
</tr>
<tr>
<td>1000 - 2500</td>
<td>50 mm</td>
</tr>
<tr>
<td>&gt; 2500</td>
<td>100 mm</td>
</tr>
</tbody>
</table>

Cable connector
(recommended, not on delivery)

Housing: Zinc, nickle plated
Termination: Solder
Contact Insert: Silver plated
Cable clamp: PG9
Cable-Ø: 8 mm

Service Hotline: 01805 - mtssensor

www.mtssensor.com
www.temposonics-shop.de
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