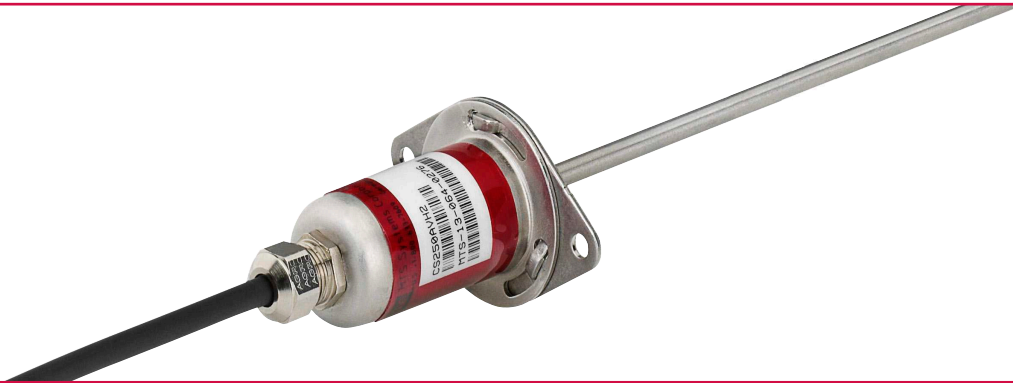


## C-Series H2-Sensor Analog

**Temposonics® C-Series**  
Measuring Length 72...250 mm

**Document Part No.**  
**551397 Revision A**

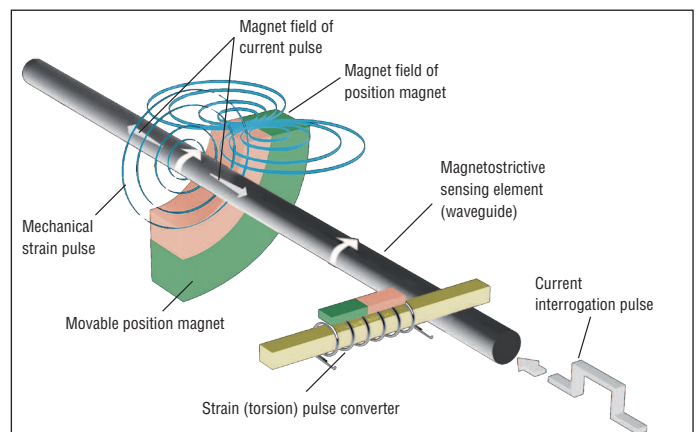


- Contactless measurement – entirely wear-free
- Low weight – ideal for small portable OEM products
- Cost-efficient
- Space-saving
- Low energy requirement – can be operated from 5 VDC or 12 VDC supply
- No need for periodic re-adjustment
- Available with various position magnets
- Optional: direct or inverse analog output signal
- Optional: assignment of output signal to measuring length

**The sensor is a function of the customer requirements according to the application, and considering the environment, environmental influences, including EMC protection effects.**

### Measuring technology

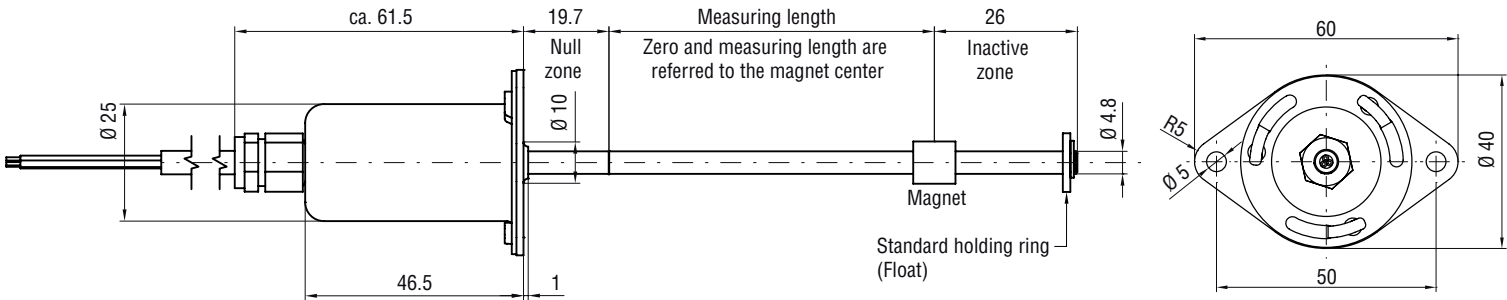
For position measurement, the absolute, linear Temposonics® position sensors make use of the properties offered by the specially designed magnetostrictive waveguide. Inside the sensor a torsional strain pulse is induced in the waveguide by momentary interaction of two magnetic fields. One field is produced by a moving position magnet, which travels along the outside of the sensor rod, and the other field is generated by a current pulse applied to the waveguide. The interaction between these two magnetic fields produces a strain pulse, which is detected at the head of the sensor. The position of the moving magnet is determined precisely by measuring the time elapsed between the application of the current pulse and the arrival of the strain pulse. The result is a reliable position measurement system capable of ensuring accurate and repeatable measurement.



**Technical data**

|                              |  |
|------------------------------|--|
| <b>Input</b>                 |  |
| Measured value:              | Position   |
| Stroke length:               | 72, 109, 128, 148, 162, 186, 194, 217, 250 mm  |
| <b>Output</b>                |  |
| Voltage:                     | 0.1 - 4.9 VDC  |
| Resolution:                  | analog output signal   |
| Signal without magnet:       | not specified  |
| Feature:                     | At 5 VDC operating voltage output is ratiometric to operating voltage  |
| <b>Accuracy</b>              |  |
| Linearity:                   | ±0.15 mm by means of magnet 401 842, between 5 % and 95 % of stroke length   |
| Zero tolerance:              | ±1 mm  |
| Hysteresis:                  | ±25 µm   |
| Repeatability:               | ±25 µm   |
| Temperature coefficient:     | ±0.005 % per °C  |
| Update time:                 | 500 Hz (2 ms)  |
| <b>Operation conditions</b>  |  |
| Operating temperature:       | -40 °C...+75 °C (+105 °C after consulting MTS)   |
| Storage temperature:         | -40 °C...+85 °C  |
| <b>Pressure</b>              |  |
|                              | up to 2500 m altitude  |
| <b>IP Protection</b>         |  |
|                              | IP67<br>6 - DIN 40 050 Part 9 – Protection against foreign bodies: dustproof, complete protection against contact<br>7 - DIN 40 050 Part 9 – Protection against water – Temporary immersion  |
| <b>Environmental testing</b> |  |
| Shock test:                  | IEC-68-2-27<br>10 g (11ms) → Single hit<br>10 g (11ms) 1000 shocks per axis  |
| Vibration test:              | IEC 60068-2-6 (10...2000 Hz) 10 g Sinus (resonance frequencies excluded)   |
| EMC-test:                    | Electromagnetic emission EN 61000-6-4<br>CISPR 16-2-3 – Disturbance field strength (measuring distance 3 m)<br>CISPR 16-2-1 – Disturbance current (DC voltage supply)<br>Electromagnetic immunity EN 61000-6-2<br>EN 61000-4-2 – Electrostatic discharge (ESD)<br>EN 61000-4-3 – Radiated electrosolenoidic radio frequency, free radiated<br>EN 61000-4-4 – Electrical fast transient (Burst)<br>EN 61000-4-5 – Surge<br>EN 61000-4-6 – Conducted radio-frequency, line guided<br>EN 61000-4-8 – Power frequency solenoidic field |
| <b>Design, material</b>      |  |
| Housing:                     | Stainless steel 1.4404 (AISI 316L)   |
| Protective tube:             | Stainless steel 1.4404 (AISI 316L)   |
| <b>Electrical connection</b> |  |
| Supply voltage:              | CS: 5 VDC (tolerance range 4.75 - 5.5 VDC), CM: 12 VDC (tolerance range 9 - 15 VDC)  |
| Max. power consumption:      | max. 40 mA   |
| Output load:                 | analog: > = 10 kΩ  |
| Overvoltage protection:      | CS: up to 19 VDC short term<br>CM: up to 29 VDC short term   |
| Polarity protection:         | VDC - GND  |
| Operating voltage quality:   | Load control: CS: 5 VDC ±0.1 % CM: 12 VDC: ±0.15 %<br>Grid control: ±0.05 %<br>Ripple: < 50 mVpp < 100 mVpp  |
| <b>Mechanical connection</b> |  |

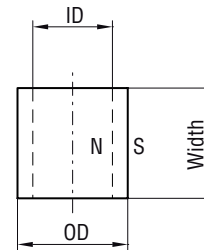
**The sensor is a function of the customer requirements according to the application, and considering the environment, environmental influences, including EMC protection effects.**



## Accessories

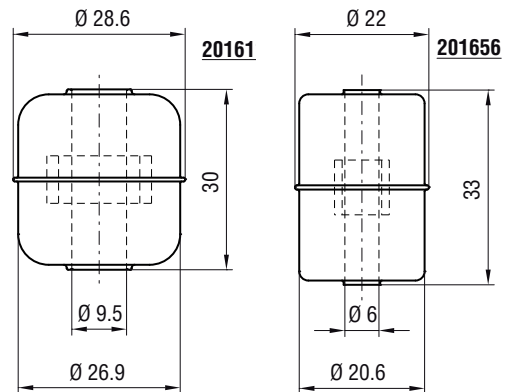
### Ring magnets

| Description         | Part no. | Inside Ø | Outside Ø | Width   |
|---------------------|----------|----------|-----------|---------|
| Ring magnet 6.5 mm  | 401 842  | 6.5 mm   | 9 mm      | 9 mm    |
| Ring magnet 19.3 mm | 400 424  | 19.3 mm  | 28 mm     | 4.9 mm  |
| Ring magnet 13.5 mm | 254 012  | 13.5 mm  | 20 mm     | 10.5 mm |



### Float

| Description | Part no. | Inside Ø | Outside Ø | Width |
|-------------|----------|----------|-----------|-------|
| Float 1     | 201 611  | 9.5 mm   | 28.6 mm   | 30 mm |
| Float 2     | 201 656  | 6 mm     | 22 mm     | 33 mm |



## Temposonics® order code

|  |  |  |  |          |          |          |          |
|--|--|--|--|----------|----------|----------|----------|
| <b>C</b>   |  |  |  | <b>A</b> | <b>V</b> | <b>H</b> | <b>2</b> |
| <b>Series</b><br>Sensor model C  |  |  |  |          |          |          |          |
| <b>Supply voltage</b><br>S - 5 VDC<br>M - 12 VDC                         |  |  |  |          |          |          |          |
| <b>Measuring length</b><br>72, 109, 128, 148, 162, 186, 194, 217, 250 mm |  |  |  |          |          |          |          |
| <b>Output</b><br>V - Analog  |  |  |  |          |          |          |          |
| <b>Housing</b><br>H2 - IP67 housing                                      |  |  |  |          |          |          |          |

**Example:**  
CM186AVH2      Sensor model C - Supply voltage 12 VDC - Measuring length 186 mm - Output analog - Housing IP67

### Magnet and float options (An additional quantity of 1 unit per sensor should be ordered)

| Description         | Function  | Article No. |
|---------------------|---|-------------|
| Ring magnet 6.5 mm  | standard  | 401 842     |
| Ring magnet 19.3 mm | optional after approval for applications requiring a magnet with more clearance | 400 424     |
| Ring magnet 13.5 mm | optional after approval for applications requiring a magnet with more clearance | 254 012     |
| Float 1 with magnet | optional after approval for applications  | 201 611     |
| Float 2 with magnet | optional after approval for applications  | 201 656     |

### IP67 - Protection-kit

|                             |  |             |
|-----------------------------|--|-------------|
| Protection-kit              | electronics housing, O-ring                              | 253 525     |
| Protective tube with flange | two-hole flange/order tube length with information - XXX | 253 526-XXX |

## Application examples:

The target in customer solutions is a high degree of efficiency and synergy to the product. During the design phase measurements need to be taken which enable the product to meet customer requirements suitable for the application.

In this respect, close cooperative partnership between the customer and MTS is desirable.

All constructive measures relating to operating parameters (vibration, temperature and ESD) require consultation with MTS. This also includes the CE marking of components used for installation.



### Level measurement in medical technology

An analyser for immunodiagnosics applications uses magnetostrictive level sensors in containers to monitor the levels of consumables and of the collected waste products of the analysis. Through continuous measurement, it is always known how much fluid is in the containers. This enables continuous reloading without interruption of the analysis and anticipatory planning.



### Increased dosing accuracy, reduced consumption

The dosing accuracy during preparation of damping solution and precise control of the IPA concentration are of considerable importance for the production and process stability in printing systems. The continuous discussion relating to the toxic load of the ambient air at work places and the need for cost reduction in printing companies also requires further reduction of isopropyl alcohol in the damping solution. The Temposonics® OEM-sensor plays an important part for dosing of damping solutions and thus for decreasing the overall costs.



### Position feedback in process measurement and control systems

The valve position feedback combines well-proven sensor technology and state-of-the-art design for optimized applications. Our development activity focused on the requirements and wishes expressed by our customers in the liquid processing industry.

In addition to safe control and monitoring of all functions of process valves in breweries, dairies, facilities for production of fruit juice and production plants in the pharmaceutical industry, the C-Series provides a high degree of efficiency.



### Position feedback in steering systems

The customer-specific sensors are used to monitor the steering position of rear drives and to provide position feedback. Based on the linear C-series position sensor, these sensors are equipped with a special housing, which was developed by the end user and realized by MTS. The sensors measure the stroke of steering cylinders on the port side and the bow side. Typically installed in multi-engine boats, the boat control system uses the sensor signal to permit control of the boat movement using a joystick: A solution termed "Steer-By-Wire".



### Cabin suspension

To reduce the human vibration, directive 2002/44/EC (human vibration directive) of the European Union has been implemented into national law in March 2007. This directive defines binding limit values (reference period of 8 hours < value 0.5 m/s<sup>2</sup>) for the hand-and-arm area as well as whole-body vibration values, which must not be exceeded.

These limit values are met by effectively reducing the induced vehicle vibration using C-series position sensors in a cabin suspension system. The cabin suspension system permits reduction of the accelerations mainly in the Z axis. Due to this reduction, the vibration load acting on the driver is alleviated considerably, without affecting driving experience and operability.

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The availability of components on the market is subject to considerable fluctuation and to accelerated technical progress.

Therefore we reserve the right to alter certain components of our products depending on their availability.

In the event that product approbations or other circumstances related to your application do not allow a change in components, a continuous supply with unaltered components must be agreed by specific contract.

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**MTS**  
SENSORS

**MTS Sensor Technologie  
GmbH & Co. KG**  
**MTS Automotive Sensors GmbH**  
Auf dem Schüffel 9  
58513 Lüdenscheid, Germany  
Tel. + 49-23 51-95 87 0  
Fax + 49-23 51-5 64 91  
E-Mail: [info@mtssensor.de](mailto:info@mtssensor.de)  
[www.mtssensor.de](http://www.mtssensor.de)

**MTS Systems Corporation**  
Sensors Division  
3001 Sheldon Drive  
Cary, N.C. 27513, USA  
Tel. + 1-919-677-0100  
Fax + 1-919-677-0200  
E-Mail: [sensorsinfo@mts.com](mailto:sensorsinfo@mts.com)  
[www.mtssensors.com](http://www.mtssensors.com)

**MTS Sensors Technology Corp.**  
737 Aihara-cho,  
Machida-shi, Japan  
Tel. + 81-42-775-3838  
Fax + 81-42-775-5516  
E-Mail: [info@mtssensor.co.jp](mailto:info@mtssensor.co.jp)  
[www.mtssensor.co.jp](http://www.mtssensor.co.jp)