

## C-Serie OEM-Sensor PWM

Temposonics® C-Series  
Measuring Length 72 - 250 mm

Document Part No.  
551395 Revision A

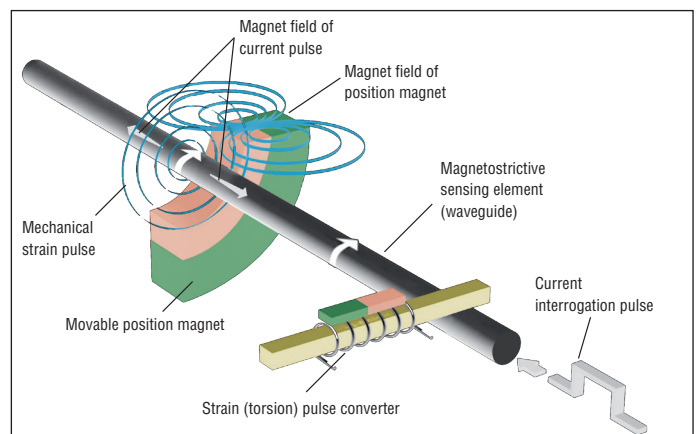


- Contactless measurement – entirely wear-free
- Low weight – ideal for small portable OEM products
- Cost-efficient
- Space-saving – the smallest sensor in the market offers all advantages of magnetostrictive measurement technology
- Low energy requirement – can be operated from 5 VDC supply
- No wear – no need for periodic re-adjustment
- Available with various position magnets
- Optional: assignment of output signal to measuring length

The OEM sensor is designed as a built-in product. The sensor is a function of the customer requirements according to the application, and considering the environment, environmental influences, including EMI protection effects.

### 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 high 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.



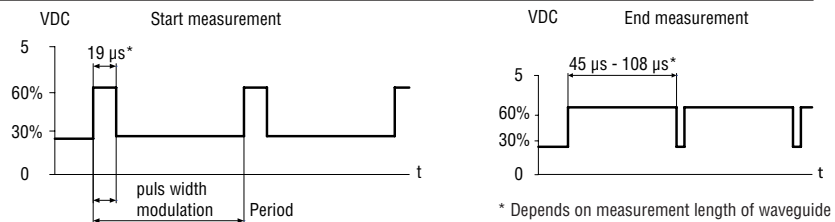
## Technical Data

### Input

Measured variables: Position  
Stroke length: 72, 109, 128, 148, 162, 186, 194, 217, 250 mm

### Output

PWM: 19 - 108  $\mu$ s  
Resolution: depends on control



\* Depends on measurement length of waveguide

### Accuracy

Linearity:  $\pm 0.15$  mm by means of magnet 401842, between 5 % and 95 % of stroke length  
Zero tolerance:  $\pm 1$  mm  
Hysteresis:  $\pm 25$   $\mu$ m  
Repeatability:  $\pm 25$   $\mu$ m  
Temperature variation:  $\pm 0.005$  % pro  $^{\circ}$ C  
Update time: 2.6 kHz (0.385 ms)

### Operation conditions

Operating temperature:  $-40^{\circ}$ C... $+75^{\circ}$ C  
Storage temperature:  $-20^{\circ}$ C... $+85^{\circ}$ C

### Pressure

up to 2500 m altitude

### IP Protection

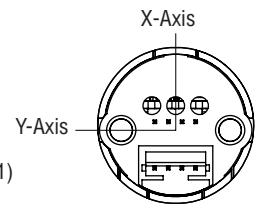
IP30  
3 - DIN 40 050 Part 9 – Protection against foreign bodies – Protected against foreign bodies from  $\varnothing 2.5$  mm  
0 - DIN 40 050 Part 9 – Protection against water – No protection

### Environmental testing

Shock test: IEC-68-2-27; 10g (11ms)  $\rightarrow$  Single hit; 10g (11ms) 1000 shocks per axis

Vibration test: IEC 60068-2-6 (10...2000 Hz) 10g Sinus (resonance frequencies excluded)

EMC-test: Emission according to EN 61000-6-3  
CISPR 16-2-3 – Disturbance field strength (measurement distance 3 m)  
CIPSR 16-2-1 – Disturbance current (DC voltage supply)  
Immunity according to EN 61000-6-2  
EN 61000-4-2 – ESD (Compliance only with corresponding protection housing, see H2 and M1)  
EN 61000-4-3 – Radiated electrosolenoidic radio-frequency, free radiated  
EN 61000-4-4 – Electrical fast transient (Burst)  
EN 61000-4-5 – Surge (Compliance only with corresponding protection housing)  
EN 61000-4-6 – Conducted radio-frequency, line guided (Compliance only with corresponding protection housing)  
EN 61000-4-8 – Power frequency solenoidic field



### Form factor, material

Housing: POM  
Protective pipe: nylon blue

### Electrical connection

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: PWM:  $> = 400$  W

Overvoltage protection: CS: up to 19 VDC short term  
CM: up to 29 VDC short term

Polarity protection: VDC - GND

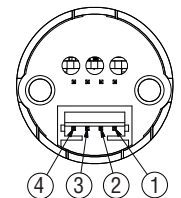
Operating voltage quality: CS: 5 VDC CS: 12 VDC

Load control:  $\pm 0.1$  %  $\pm 0.15$  %

Grid control:  $\pm 0.05$  %  $\pm 0.05$  %

Ripple:  $< 50$  mVpp  $< 100$  mVpp

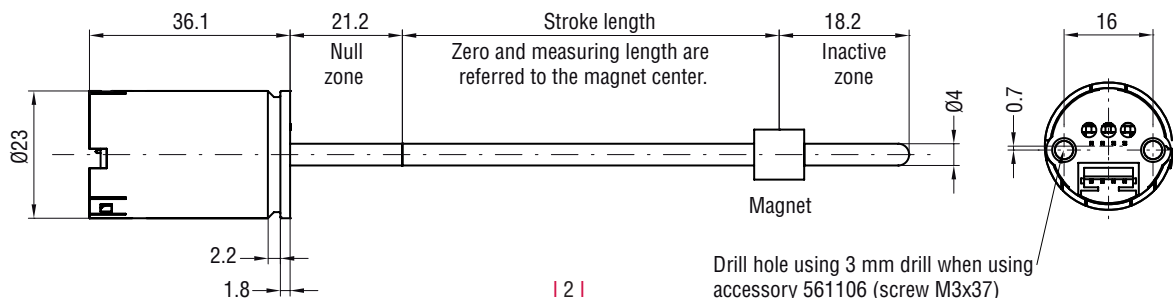
Pin	Signal
1	DC Ground
2	
3	Supply voltage
4	Output signal



for  $U_a$  at  $I_a$  0 - 100 %  
for  $U_a$  at  $U_{emin}$  -  $U_{emax}$

### Mechanical connection

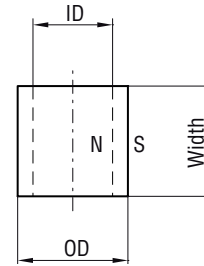
Screw connection: 2 screws M3x 37, max. tightening torque 0.4 Nm, with 3 mm bore hole  
Terminal connection: by means of O-rings (consultation with MTS required)



**Accessories**

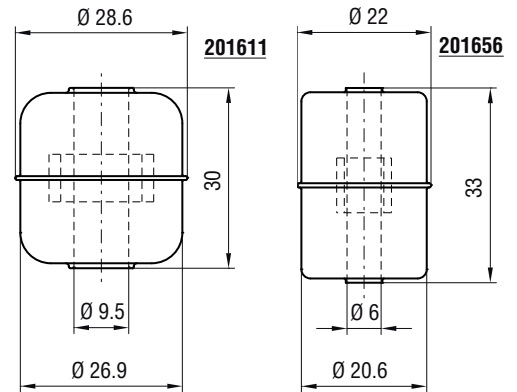
**Ring magnets**

Description	Article No.	Inside Ø	Outside Ø	Width
Ring magnet 6.5 mm	401842	6.5 mm	9 mm	9 mm
Ring magnet 19.3 mm	400424	19.3 mm	28 mm	4.9 mm
Ring magnet 13.5 mm	254012	13.5 mm	20 mm	10.5 mm



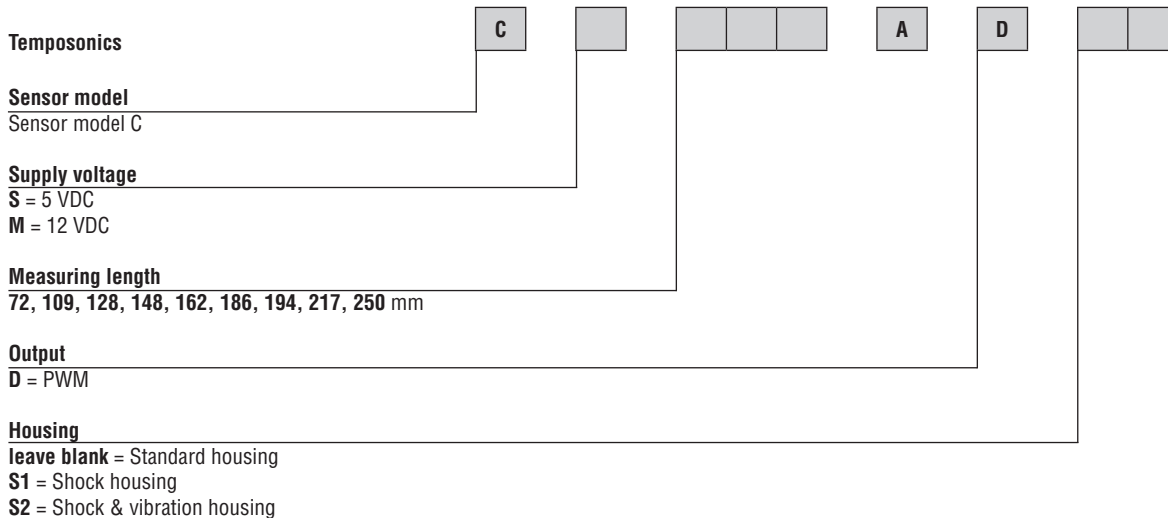
**Float**

Description	Article No.	Inside Ø	Outside Ø	Width
Float 1	201611	9.5 mm	28.6 mm	30 mm
Float 2	201656	6 mm	22 mm	33 mm



**Temposonics® Ordering**

**Ordering Information**



**Example:**

CS072AD Sensor model C - Supply voltage 5 VDC - Measuring length 72 mm - Output PWM - Standard housing  
 CM148ADS2 Sensor model C - Supply voltage 12 VDC - Measuring length 148 mm - Output PWM - Shock & vibration housing

**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	401842
Ring magnet 19.3 mm	optional after approval for applications requiring a magnet with more clearance	400424
Ring magnet 13.5 mm	optional after approval for applications requiring a magnet with more clearance	254012
Float 1 with magnet	optional after approval for applications	201611
Float 2 with magnet	optional after approval for applications	201656

**Connection type**

Description	Function	Article No.
JST connector KR-D	for insulation displacement connection without cable	370500
JST connector PHR-4	with cable 1 m	253396-1000

**Mounting**

Description	Function	Article No.
Screw	M3x 37 - DIN 7500 (2 pcs. per sensor)	561106

## 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  $0.5\text{m/s}^2$ ) 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 approvals 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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