

Temposonics®

Magnetostrictive Linear Position Sensors

GT2 / GT3 ANALOG REDUNDANT WITH DNV GL CERTIFICATE Data Sheet

- Double or triple redundant
- For enhanced safety applications
- Pressure-resistant high-grade steel rod



MEASURING TECHNOLOGY

The absolute, linear position sensors provided by MTS Sensors rely on the company's proprietary Temposonics® magnetostrictive technology, which can determine position with a high level of precision and robustness. Each Temposonics® position sensor consists of a ferromagnetic waveguide, a position magnet, a strain pulse converter and supporting electronics. The magnet, connected to the object in motion in the application, generates a magnetic field at its location on the waveguide. A short current pulse is applied to the waveguide. This creates a momentary radial magnetic field and torsional strain on the waveguide. The momentary interaction of the magnetic fields releases a torsional strain pulse that propagates the length of the waveguide. When the ultrasonic wave reaches the end of the waveguide it is converted into an electrical signal. Since the speed of the ultrasonic wave in the waveguide is precisely known, the time required to receive the return signal can be converted into a linear position measurement with both high accuracy and repeatability.

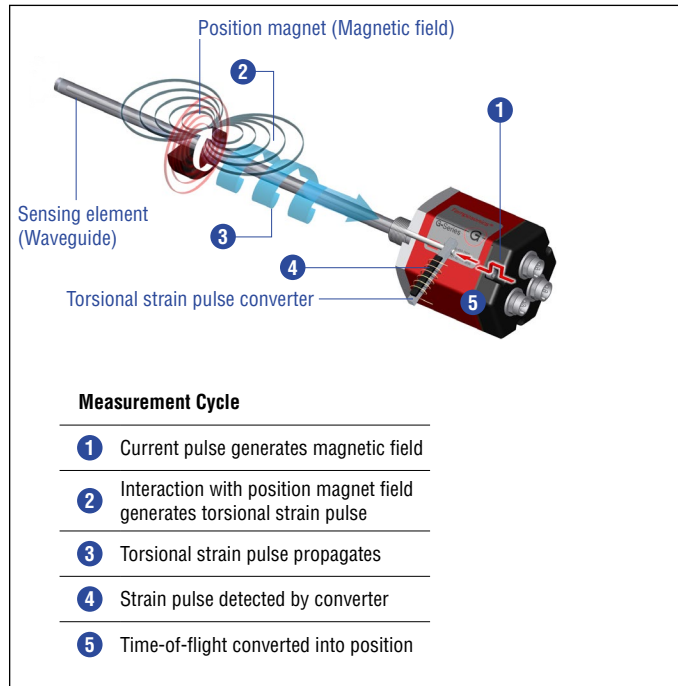


Fig. 1: Time-of-flight based magnetostrictive position sensing principle

GT2/GT3 SENSOR

Robust, non-contact and wear-free, the Temposonics® linear position sensors provide best durability and accurate position measurement solutions in harsh industrial environments. The position measurement accuracy is tightly controlled by the quality of the waveguide which is manufactured by MTS Sensors. The position magnet is mounted on the moving machine part and travels contactlessly over the sensor rod with the built-in waveguide.

Temposonics® GT is a sensor with double or triple redundancy. Two or three independent measuring systems are integrated in one sensor housing. In particular the sensor is suitable for enhanced safety applications. The waveguide is installed in a pressure-resistant high-grade steel rod. The Temposonics® GT sensor is suitable for linear position measurement in fluid cylinders on ships and floodgates.



Fig. 2: Typical application: floodgate

TECHNICAL DATA

Output	
Voltage	0...10 / 10...0 / -10...+10 / +10...-10 VDC (min. load controller: > 5 kΩ)
Current	4(0)...20 / 20...4(0) mA (min / max. burden: 0 / 500 Ω)
Measured value	Position, the position is measured separately on two or three position measuring systems
Accuracy	
Resolution	Analog
Cycle time	< 2.5 ms
Linearity	< ±0.02 % F.S. (minimum ±50 μm)
Repeatability	< ±0.001 % F.S. (minimum ±2.5 μm)
Hysteresis	< 4 μm
Operating conditions	
Operating temperature	-40...+75 °C
Humidity	90 % relative humidity, no condensation
Ingress protection	M16 connector: IP67 (if mating connectors are correctly fitted) Cable outlet: IP68 (for 2 m / 6 h)
Shock test	100 g (single shock) IEC-Standard 60068-2-27
Vibration test	4 g / 10...2000 Hz IEC-Standard 60068-2-6 (resonance frequencies excluded)
EMC test	Electromagnetic emission according to EN 61000-6-4 Electromagnetic immunity according to EN 61000-6-2 The sensor meets the requirements of the EMC directive 2014/30/EU and is marked with C €
Operating pressure	350 bar, 690 bar peak
Magnet movement velocity	Any
Design/Material	
Sensor electronics housing	Aluminum
Sensor rod with flange	Stainless steel 1.4306 (AISI 304L)
Stroke length	50...2900 mm
Mechanical mounting	
Mounting position	Any
Mounting instruction	Please consult the technical drawings
Electrical connection	
Connection type	M16 (6 pin) male connector or PUR-cable
Operating voltage	+24 VDC (-25 / +30 %)
Ripple	≤ 0.28 V _{PP}
Current consumption	100 mA typical (dependent on stroke length)
Dielectric strength	500 VDC (DC ground to machine ground)
Polarity protection	Up to -30 VDC
Overvoltage protection	Up to 36 VDC

1/ with position magnet # 251 416-2

TECHNICAL DRAWING

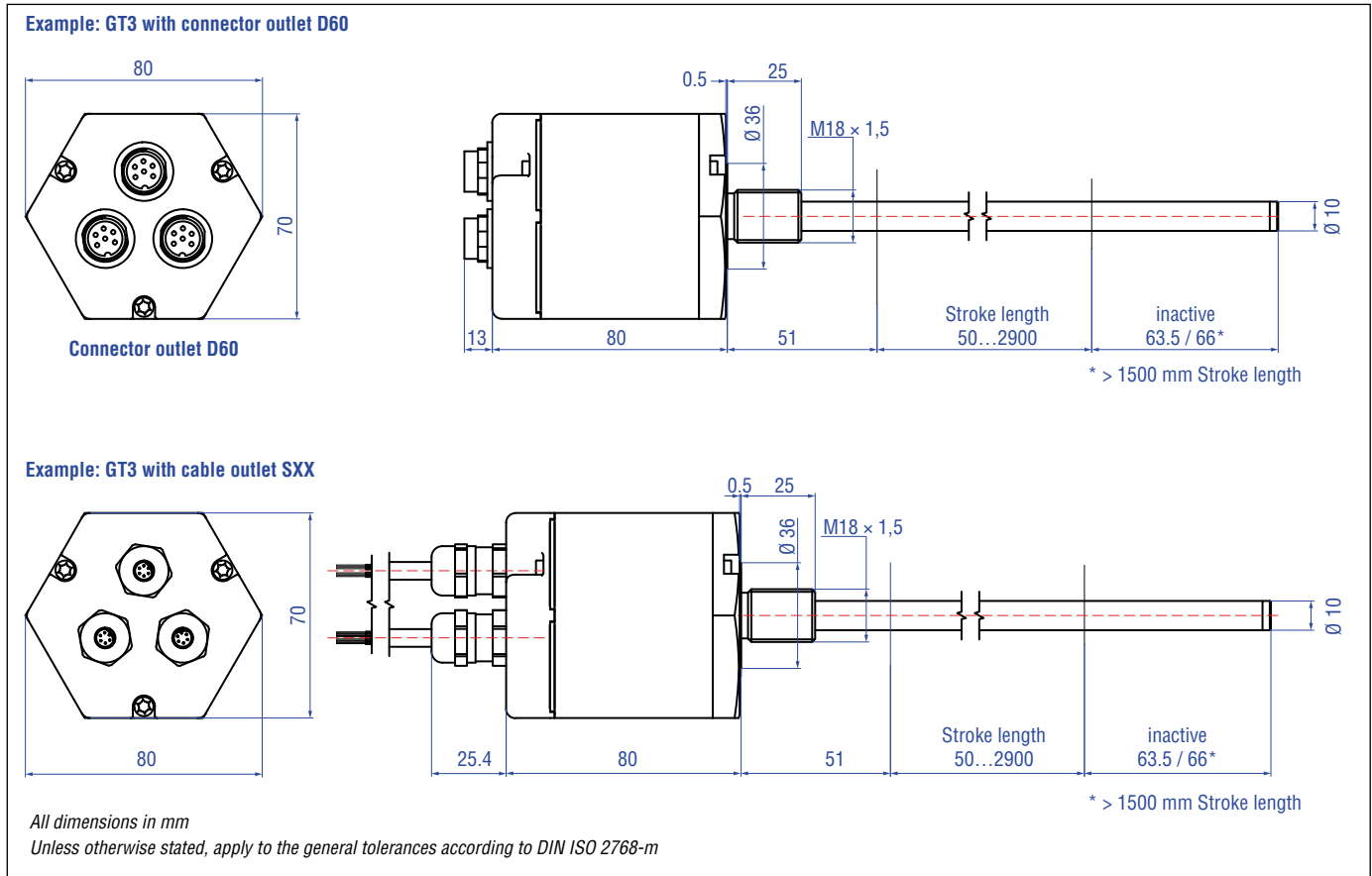


Fig. 3: Temposonics® GT2/GT3 sensor

Connector wiring

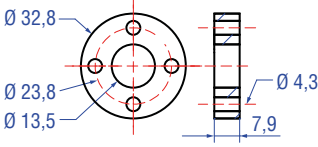
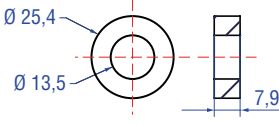
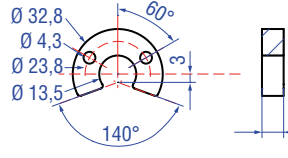
D60 / SXX

M16 connector	Pin	Cable	Function
	1	GY	Position
	2	PK	DC Ground
	3	YE	Programming tool
	4	GN	Programming tool
	5	BN	+24 VDC (-25 / 30 %)
	6	WH	DC Ground (0 V)


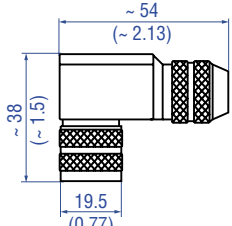
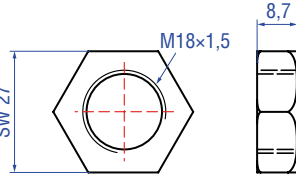
Fig. 4: Connector wiring D60 / SXX

ACCESSORIES



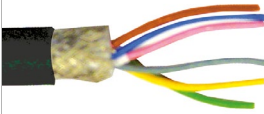
Position magnets

		
<p>Ring magnet OD33 Part no. 201 542-2</p> <p>Material: PA ferrite GF20 Weight: Ca. 14 g Surface pressure: Max. 40 N/mm² Fastening torque for M4 screws: 1 Nm Operating temperature: -40...+105 °C (-40...+221 °F)</p>	<p>Ring magnet OD25,4 Part no. 400 533</p> <p>Material: PA ferrite Weight: Ca. 10 g Surface pressure: Max. 40 N/mm² Operating temperature: -40...+105 °C (-40...+221 °F)</p>	<p>U-magnet OD33 Part no. 251 416-2</p> <p>Material: PA ferrite GF20 Weight: Ca. 11 g Surface pressure: Max. 40 N/mm² Fastening torque for M4 screws: 1 Nm Operating temperature: -40...+105 °C (-40...+221 °F)</p>

Cable connector ² Hex nut

		
<p>M16 connector (6 pin) female, straight Part no. 370 423</p> <p>Material: Zinc nickel plated Termination: Solder Cable Ø: 6...8 mm (0.24...0.31 in.) Operating temperature: -40...+100 °C (-40...+212 °F) Ingress protection: IP68 Fastening torque: 0.6 Nm</p>	<p>M16 connector (6 pin) female, angled Part no. 370 460</p> <p>Material: Zinc nickel plated Termination: Solder Cable Ø: 6...8 mm (0.24...0.31 in.) Operating temperature: -40...+95 °C (-40...+203 °F) Ingress protection: IP67 Fastening torque: 0.6 Nm</p>	<p>Hex-jam nut M18 Part no. 500 018</p> <p>Application: M18x1.5 thread Material: Steel, 2 zinc, plated</p>

MTS Servicetools

		
<p>Analog hand programmer – G-Series Part no. 253 853</p> <p>Programming for G-Series analog output sensor models</p>	<p>Programming kit – G Part no. 253 145-1</p> <p>Kit includes: interface converter box, power supply, setup software and cabling. Programming software for G-Series sensors.</p>	<p>PUR cable Part no. 530 114</p> <p>Material: PUR jacket; black Cable Ø: 5.9 mm Dimensions: 3 × 2 × 0.14 mm² Operating temperature: -40...+80 °C</p>

GT2 / GT3 Analog Redundant with DNV GL certificate

Data Sheet

ORDER CODE

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
G	T		M					M				1			C	A	1
a			b	c					d	e	f		g				

a Sensor model

G	T	2	Dual redundant
G	T	3	Triple redundant

b Design

M	Flange M18×1.5-6g
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c Stroke length

X	X	X	X	0050...2900 mm
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STANDARD STROKE LENGTH

Stroke length	Ordering steps
50 ... 500 mm	5 mm
500 ... 750 mm	10 mm
750...1000 mm	25 mm
1000...2500 mm	50 mm
2500...2900 mm	100 mm

d Connection type

D	6	0	M16 (6 pin) connector
S	X	X	PUR-cable w/o connector (part no. 530 114), Option: S01...S06 (1...6 m)

e Operating voltage

1	+24 VDC (-25 / +30 %)
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f Output

V	0	0...+10 VDC
V	1	+10...0 VDC
V	2	-10...+10 VDC
V	3	+10...-10 VDC
A	0	4...20 mA
A	1	20...4 mA
A	2	0...20 mA
A	3	20...0 mA

g Approval

C	A	1	DNV GL certificate
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DELIVERY



Sensor, O-ring

Accessories have to be ordered separately.

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