MTS SENSORS

Temposonics®

Magnetostrictive Linear Position Sensors

DATA SHEET
GBS Analog

– High pressure resistant sensor rod
– High operating temperature up to 100 °C
– Flat & compact – ideal for the valve market

The Measurable Difference

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. The interaction between these two magnetic fields produces a strain pulse, which is detected by the electronics at the head of the sensor. One field is produced by a moving position magnet, which travels along the sensor rod with the waveguide inside. The other field is generated by a current pulse applied to the waveguide. 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 at the sensor head. The result is a reliable position measurement with high accuracy and repeatability.

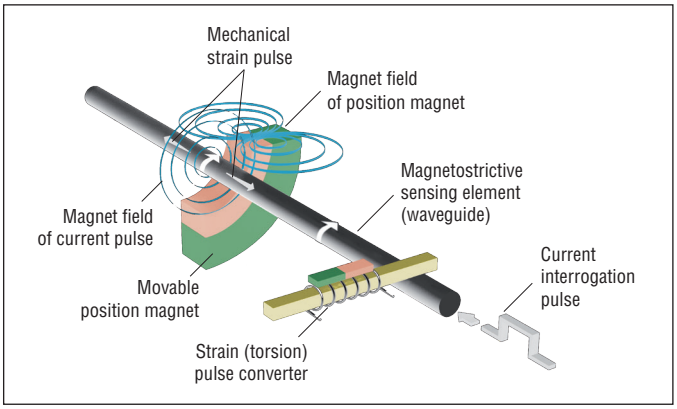


Fig. 1: Measuring principle

GBS SENSOR

Robust, non-contact and wear free, the Temposonics® linear position transducers 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. The position magnet is mounted on the moving machine part and travels non-contact over the sensor rod with the built-in waveguide.

Temposonics® GBS is a rod-style sensor with backwards compatibility for installation into hydraulic cylinders, e.g. in power engineering. With its flat and compact sensor housing and the collateral signal connection the sensor is ideal for small spaces. Due to the pressure-resistant sensor rod and its high operating temperature the Temposonics® GBS sensor is perfectly suitable for use in fluid technology. For improved signal quality the sensor automatically adapts to the strength of the magnet used in the application.

The set points, zero and span position of the measurement, can be modified after installation of the Temposonics® GBS sensor. Programming can be carried out using the standard connection cable. Optionally the sensor offers *Bluetooth*®[1] connectivity for programming. In case of *Bluetooth*® connectivity the set points can be modified even when the sensor is no longer accessible.

Fig. 2: Bluetooth® wireless technology

1/ The *Bluetooth*® word mark and logos are registered trademarks owned by Bluetooth SIG, Inc. and any use of such marks by MTS Sensor Technology is under license. Other trademarks and trade names are those of their respective owners.

Fig. 2: Montage of MTS Sensors and © Tsiumpa - Fotolia.com
For iOS operating system available in the future. Please take notice of delivery.

TECHNICAL DATA

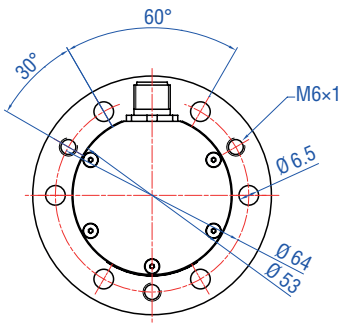
Input	
Measured value	position
Stroke length	25…3250 mm
Output	
Voltage	0…10 VDC and 10…0 VDC (min. load controller: > 5 kOhms)
Current	4(0)…20 mA or 20…4(0) mA (min./max. load: 0/500 Ohms)
Programming	programming of set points using optional accessories [2]
Accuracy	
Resolution	16 bit (minimum 1 µm)
Linearity	< ±0.02 % F.S. (minimum ±60 µm)
Repeatability	≤ ±0.005 % F.S. (minimum ±20 µm)
Sample rate	up to 1200 mm: 0.5 ms up to 2400 mm: 1 ms > 2400 mm: 2 ms
Operating conditions	
Magnet movement velocity	any
Operating temperature	–40…+90 °C, Option –40…+100 °C
Operating pressure	350 bar, 700 bar peak (at 10×1 min)
Ingress protection	IP67 with proper mating connector IP68 for cable outlet
Shock test	100 g (single shock) / IEC-Standard 60068-2-27
Vibration test	15 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 EC directives and is marked with CE
Design/Material	
Sensor electronics housing	stainless steel 1.4305 / AISI 303 [3]
Sensor rod with flange	stainless steel 1.4306; 1.4307 / AISI 304 L
Position magnet	ring magnet, PA ferrite
Installation	
Mounting position	any
Mounting	fitting flange Ø 18 f7, 6 bores for machine screws (ISO 4762)
Electrical connection	
Connection type	cable gland M12 a-code (5 pin) M16 (6 pin)
Operating voltage	+24 VDC (+20 % / –15 %)
Current consumption	100 mA typically dependent on stroke length
Ripple	≤ 0.28 Vpp
Dielectric strength	500 VDC (DC ground to machine ground)

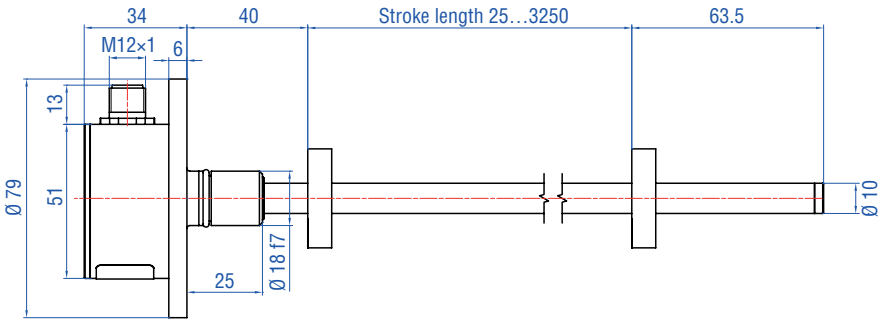
2/ Programming via Bluetooth wireless technology is only possible up to an operating temperature of 75 °C

3/ For option H (–40…+100 °C) and option W (programming via Bluetooth wireless technology) an aluminum cover plate is used

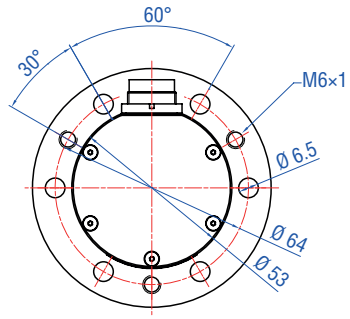
TECHNICAL DRAWING

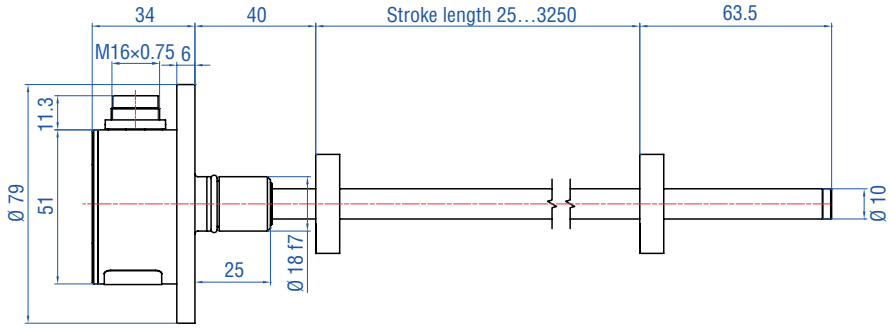
M12 connector



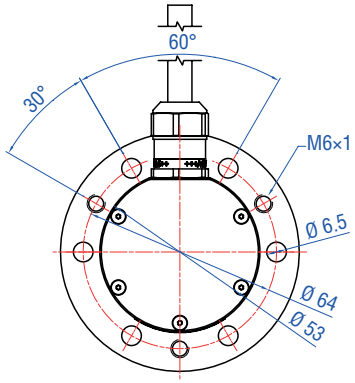


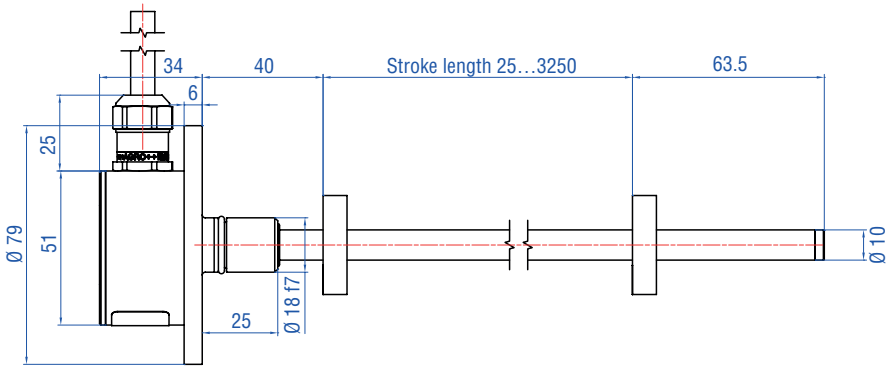
M16 connector





Cable outlet

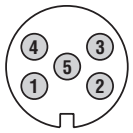




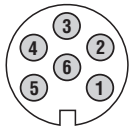
All dimensions in mm

CONNECTOR WIRING

M12 connector

D34	Pin	Voltage	Current
	1	+24 VDC (–15/+20 %)	+24 VDC (–15/+20 %)
	2	0…10 V	4(0)…20 mA *or* 20… 4(0) mA
	3	DC Ground (0 V)	DC Ground (0 V)
	4	10…0 V	n.c.
	5	DC Ground	DC Ground

M16 connector

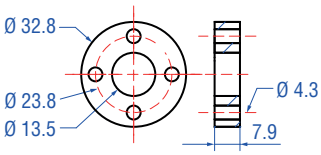
D60	Pin	Voltage	Current
	1	0…10 V	4(0)…20 mA *or* 20… 4(0) mA
	2	DC Ground	DC Ground
	3	10…0 V	n.c.
	4	DC Ground	DC Ground
	5	+24 VDC (–15/+20 %)	+24 VDC (–15/+20 %)
	6	DC Ground (0 V)	DC Ground (0 V)

Cable outlet

Pin	Cable	Voltage	Current
1	GY	0…10 V	4(0)…20 mA *or* 20… 4(0) mA
2	PK	DC Ground	DC Ground
3	YE	10…0 V	n.c.
4	GN	DC Ground	DC Ground
5	BN	+24 VDC (–15/+20 %)	+24 VDC (–15/+20 %)
6	WH	DC Ground (0 V)	DC Ground (0 V)

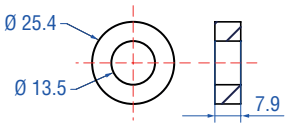
ACCESSORIES

Position magnets [4]



Ring magnet OD33
Part no. 201 542-2

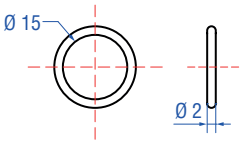
Material: PA ferrite GF20
Weight: ca. 14 g
Operating temperature: -40…+100 °C
Surface pressure: max. 40 N/mm²
Fastening torque for M4 screws:
max. 1 Nm



Ring magnet OD25,4
Part no. 400 533

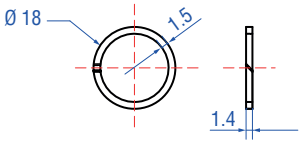
Material: PA ferrite
Weight: ca. 10 g
Operating temperature: -40…+100 °C
Surface pressure: max. 40 N/mm²

Optional installation hardware [4]



O-ring
Part no. 560 853

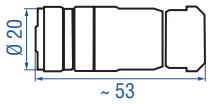
Material: Fluoroelastomer
75 ± 5 durometer



Back-up ring
Part no. 561 115

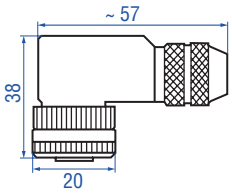
Material: PTFE + 60 % bronze

Cable connectors [4,5]



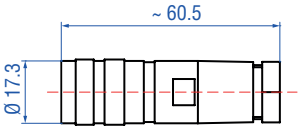
Female, straight, 5 pin M12
Part no. 370 677

Housing: GD-Zn, Ni / IP67
Termination: screw; max. 0.75 mm²
Contact insert: CuZn
Cable Ø: 4…8 mm



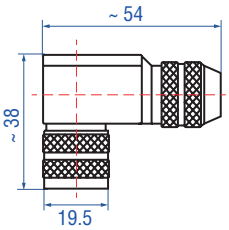
Female, angled, 5 pin M12
Part no. 370 678

Housing: GD-Zn, Ni / IP67
Termination: screw; max. 0.75 mm²
Contact insert: CuZn
Cable Ø: 5…8 mm



Female, straight, 6 pin M16
Part no. 370 423

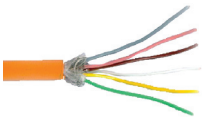
Housing: zinc nickel plated
Termination: solder
Contact insert: silver plated
Cable clamp: PG9
Cable Ø: 6…8 mm



Female, angled, 6 pin M16
Part no. 370 460

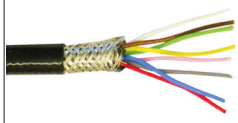
Housing: zinc nickel plated
Termination: solder
Contact insert: silver plated
Cable Ø: 6…8 mm

Cable



Cable
Part no. 530 052

Dimensions: 3 × 2 × 0.25 mm²
Cable Ø: 6.4 mm
Material: PUR jacket; orange
Operating temperature: –30…+80 °C
Twisted pair shielded



Cable
Part no. 530 112

Dimensions: 4 × 2 × 0.25 mm²
Cable Ø: 7.6 mm
Material: Teflon® jacket; black
Operating temperature: –100…+180 °C
Twisted pair shielded

Cable
Part no. 530 113

Dimensions: 3 × 2 × 0.25 mm²
Cable Ø: 7.2 mm
Material: silicone coating
Operating temperature: –50…180 °C
Twisted pair shielded

Programming tools

Analog hand programmer
Part no. 253 124

Analog cabinet programmer
Part no. 253 408

Programming kit
Part no. 254 555

4/ All dimensions in imm
5/ Max. fastening torque: 0.6 Nm

ORDER CODE

G	B	S						M				1						
		a	b						c			d	e		f	g		

a	Type of flange
S	Rod with fitting flange Ø 18 mm, 10 mm rod

b	Stroke length			
X	X	X	X	25…3250 mm

c	Connector type		
D	3	4	5 pin M12 male connector
D	6	0	6 pin M16 male connector
H	X	X	PUR cable (suitable for max. operation temperature of 80 °C) H01…H10 (1…10 m)
T	X	X	Teflon cable T01…T10 (1…10 m)
V	X	X	Silicone cable V01…V10 (1…10 m)

d	Operating voltage
1	+24 VDC, +20 %, –15 %

e		Output
V	0	0…10 V and 10…0 V
A	0	4…20 mA
A	1	20…4 mA
A	2	0…20 mA
A	3	20…0 mA

f	Operating temperature
S	–40…+90 °C
H	–40…+100 °C

g	Programming
C	Via cable
W	Via Bluetooth wireless technology

STANDARD STROKE LENGTH GBS

Stroke length	Ordering steps
< 500 mm	5 mm
500…750 mm	10 mm
750…1000 mm	25 mm
1000…2500 mm	50 mm
2500…≤ 3250 mm	100 mm

DELIVERY

Sensor

Accessories have to be ordered separately.