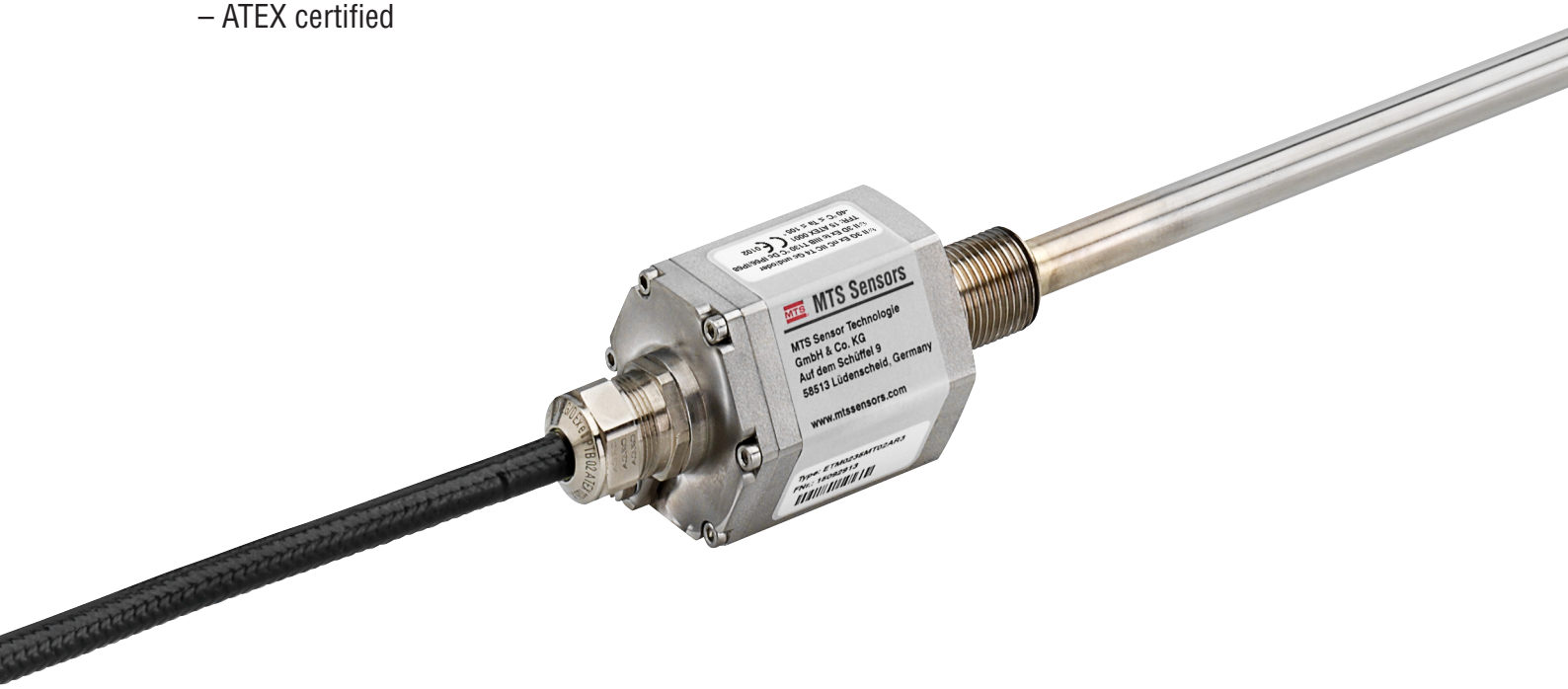
MTS SENSORS

Temposonics®

Magnetostrictive Linear Position Sensors

ET Start/Stop
Data Sheet

– High operating temperature
– Compact sensor housing
– ATEX certified



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 electronics housing. The result is a reliable position measurement with high accuracy and repeatability.

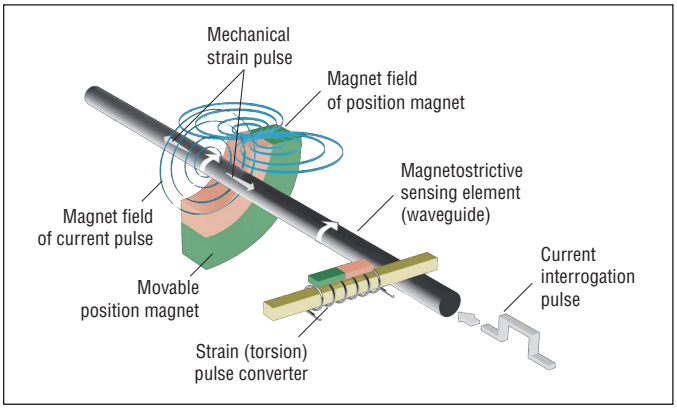


Fig. 1: Time-based magnetostrictive position sensing principle

ET 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.

ET sensor specifications:
– High operating temperature up to +105 °C
– Compact sensor housing
– ATEX certified
– Parameter upload function for start/stop interface

Protection type
Ⓔx II 3G Ex nC IIC T4 Gc
Ⓔx II 3D Ex tc IIIC T130 °C Dc IP66 / IP68
–40 °C ≤ Ta ≤ 105 °C

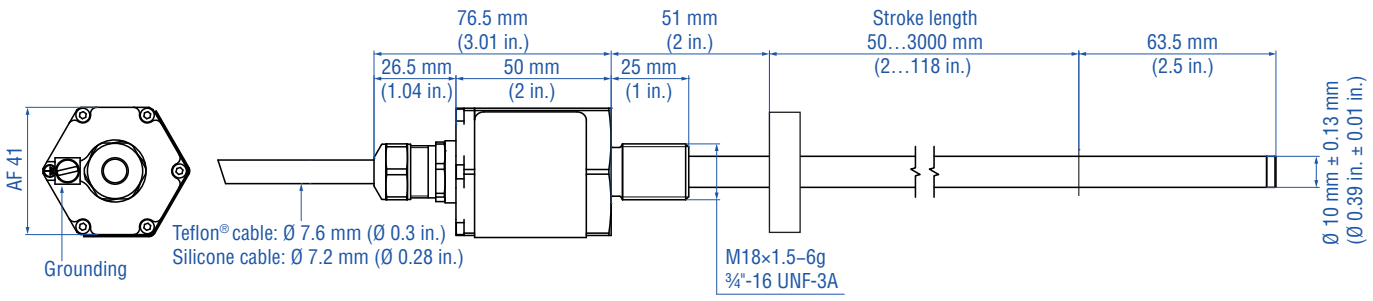
Fig. 2: Typical application: for example metal processing

TECHNICAL DATA

Output	
Interface	Start/Stop
Data protocol	RS-422 differential signal additionally available: serial parameter upload of stroke length, offset, gradient, status and manufacturer number
Measured value	Position
Measurement parameters	
Resolution	Controller dependent
Cycle time	Controller and stroke length dependent Recommendation: stroke length 50…1000 mm (2 … 40 in.): 500 µs stroke length 1001…2000 mm (40 … 79 in.): 900 µs stroke length 2001…3000 mm (79…118 in.): 1250 µs
Linearity [1]	< ±0.02 % FS (minimum ±60 µm)
Repeatability	0.005 % FS (minimum ±20 µm)
Operating conditions	
Operating temperature	–40…+105 °C (–40…+221 °F)
Humidity	90 % humidity, no condensation
Ingress protection	Option f = A - ATEX: IP66, IP68 2 bar (29 psi) @ 30 minutes Option f = N - Non-ATEX: IP68
Shock test	100 g (single shock) / IEC-Standard 60068-2-27
Vibration test	15 g / 10…2000 Hz IEC 60068-2-6 (resonance frequencies excluded)
EMC test	Electromagnetic emission according to EN 61000-6-3 Electromagnetic immunity according to EN 61000-6-2
Magnet movement velocity [2]	Any
Design/Material	
Sensor electronics housing	Stainless steel 1.4305, AISI 303; option 1.4404, AISI 316L
Sensor rod	Stainless steel 1.4306, AISI 304L; option 1.4404, AISI 316L
Stroke length	50…3000 mm (2…118 in.)
Operating pressure	Up to 350 bar (5076 psi)
Mechanical mounting	
Mounting position	Any
Mounting instruction	Please consult the technical drawings and the operation manual (document number: 551677)
Electrical connection	
Connection type	Cable outlet Option f = A - ATEX: cable with Teflon® jacket [3] Option f = N - Non-ATEX: cable with Teflon® jacket, cable with silicone jacket
Operating voltage	24 VDC (–15 / +20 %)
Ripple	≤ 0.28 Vpp
Current consumption	max. 50 mA
Dielectric strength	ATEX: 700 VDC Non-ATEX: 500 VDC
Polarity protection	Up to –30 VDC
Overvoltage protection	Up to ≤ 32 VDC

1/ With position magnet # 251 542-2
2/ If there is contact between the moving magnet including the magnet holder and the sensor rod, make sure that the maximal speed of the moving magnet is ≤ 1 m/sec. (ATEX requirement due to ESD [Electro Static Discharge])
3/ The sensor is ATEX certified inclusive Teflon® cable. Therefore a change of the cable is only allowed by the manufacturer. A change to another type of cable is only feasible as part of an ATEX recertification.

TECHNICAL DRAWING



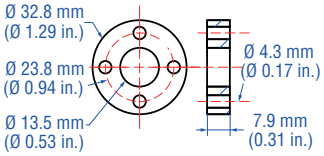
Controlling design dimensions are always in metric units
Unless otherwise stated, apply to the general tolerances according to DIN ISO 2768

CONNECTOR WIRING

Cable	Start/Stop
GY	Stop (–)
PK	Stop (+)
YE	Start (+)
GN	Start (–)
BN	+24 VDC (–15 / +20 %)
WH	DC Ground (0 V)

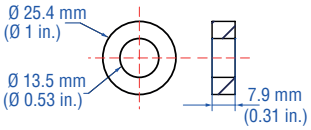
ACCESSORIES (More accessories see 551444)

Position magnets



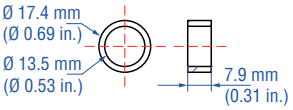
Standard ring magnet
Part no. 201 542-2

Material: PA ferrite GF20
Weight: ca. 14 g
Operating temperature:
–40…+105 °C (–40…+221 °F)
Surface pressure: max. 40 N/mm²
Fastening torque for M4 screws:
max. 1 Nm



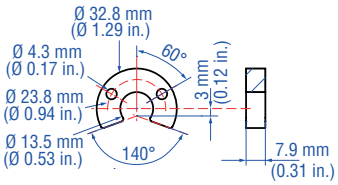
Ring magnet OD25.4
Part no. 400 533

Material: PA ferrite
Weight: ca. 10 g
Operating temperature:
–40…+105 °C (–40…+221 °F)
Surface pressure: max. 40 N/mm²



Ring magnet OD17.4
Part no. 401 032

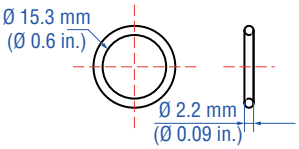
Material: PA neobind
Weight: ca. 5 g
Operating temperature:
–40…+105 °C (–40…+221 °F)
Surface pressure: max. 20 N/mm²



U-magnet OD33
Part no. 251 416-2

Material: PA ferrite GF20
Weight: ca. 11 g
Operating temperature:
–40…+105 °C (–40…+221 °F)
Surface pressure: max. 40 N/mm²
Fastening torque for M4 screws:
max. 1 Nm

Optional installation hardware



O-ring
Part no. 401 133

Material: Fluoroelastomer
75 ± 5 durometer
Application: M-style housings

Controlling design dimensions are always in metric units

ORDER CODE

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
E	T										1		R	3
a		b	c					d			e	f	g	

a	Sensor model
E T	Rod version

b	Specification
F	Flat faced flange, ¾"-16 UNF, rod Ø 10 mm Material sensor electronics housing and sensor rod: 1.4404, AISI 316L
M	Flat faced flange, M18×1.5, rod Ø 10 mm Material sensor electronics housing: 1.4305, AISI 303 Material sensor rod: 1.4306, AISI 304L
S	Flat faced flange, ¾"-16 UNF, rod Ø 10 mm Material sensor electronics housing: 1.4305, AISI 303 Material sensor rod: 1.4306, AISI 304L
W	Flat faced flange, M18×1.5, rod Ø 10 mm Material sensor electronics housing and sensor rod: 1.4404, AISI 316L

c	Stroke length
X X X X M	0050…3000 mm
X X X X U	002.0…118.0 in.

Standard stroke length (mm)

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…3000 mm	100 mm

Standard stroke length (in.)

Stroke length	Ordering steps
2… 20 in.	0.2 in.
20… 30 in.	0.5 in.
30… 40 in.	1.0 in.
40…100 in.	2.0 in.
100…118 in.	4.0 in.

d	Connection type
T X X	T02: 2 m (7 ft) Teflon® cable Option: T01…T10 (1…10 m / 3…33 ft)
V X X	V02: 2 m (7 ft) silicone cable Option: V01…V10 (1…10 m / 3…33 ft) **Note: Cable can only be used with non-ATEX certified sensor version (Option f = N).**

e	Operating voltage
1	+24 VDC (–15 / +20 %)

f	Certification
A	ATEX
N	Non-ATEX

g	Output
R 3	Start/Stop with sensor parameters upload function

DELIVERY

Sensor, O-ring

Accessories have to be ordered separately.

Operation manuals & software are available at:
www.mtssensors.com

NOTES

MTS®
SENSORS

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