

# MAG100 CANopen

## MAGNETOSTRICTIVE SENSOR

Absolute measuring length up to 2.5 m linear position transducer



L.4 - DS0039 R02 MAG100 CANopen - 04/11/24



### CHARACTERISTICS

Measuring range up to 2.5 m
Designed for installation into hydraulic cylinders
High shock and vibration resistance
M18x1.5 threaded connection
Operating pressure up to 350 bar
Customizable cursor



### ADVANTAGES

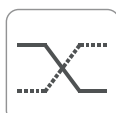
Absolute contactless linear position measurement
High resolution and linearity
Unlimited mechanical life
Rod, nipple and flange in AISI 316
Easy installation and field replacement
Position, speed and acceleration measurement



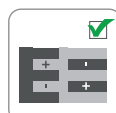
High protection level



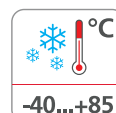
Shock/vibration resistant



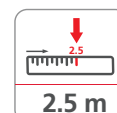
Redundant outputs



Reverse polarity protection



Wide temp. range



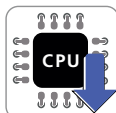
Max. length: 2.5 m



CANopen output



High accuracy



Firmware Upgradable



Directive 2011/65/EU



EU conformity

The company reserves the right to make any kind of design or functional modification at any moment without prior notice.

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### PRODUCT DESCRIPTION

MAG100 is a magnetostrictive position transducer with threaded connection, designed for mobile machines which can be installed inside oil-pressure cylinders.

The only external part is the head whose slim profile facilitates installation in confined spaces and allows easy maintenance operations. Its unique design, plus a wide range of cursor configurations, ensure easy installation and full compatibility with cylinder manufacturer specifications.

The temperature range from -40 to +85°C, the operating pressures up to 350 bar and the high resistance to vibration and shock make the sensor very robust, a fundamental feature in heavy-duty applications. High performance in terms of transduction of measurement defined as linearity, hysteresis and repeatability.



**Agricultural machinery**



**Construction**



**Earth moving**



**Handling and lifting**

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### PRODUCT CODE

ORDER CODE <sup>(1)</sup>	
M A G 1 0 0 .	a . b . c . d . e . f . g . h
a	Power supply range
2	◀ = 9 ... 30 V DC
6	◀ = 8 ... 36 V DC
b	Active stroke range
XXXX	◀ = mm (steps of 0100 mm)
c	Dead zone
20	◀ = 20 mm only for backwards compatibility
36	◀ = 36 mm for 0 to 1200mm strokes
63	◀ = 63 mm for 1201 to 2500mm strokes
d	Output type <sup>(2)</sup>
6	◀ = CANopen
28	◀ = CANopen with diagnostics
e	Connections
1	◀ = Male connector M12, 5-pin PUR cable 30 cm
f	Cursor type
X	◀ = none
0	◀ = Magnetic cursor 18 x 8 mm - AW2011A anodized
1	◀ = Magnetic cursor 18 x 10 mm - AW2011A anodized
g	Customization
X	◀ = None
?	◀ = Customization code
h	Approvals
1	◀ = Standard components <sup>(3)</sup>

(1) Not all combinations can be ordered. Please contact TSM for confirmation before placing an order.

(2) Redundant primary measures, acquired by a single logical unit and published on the CANOpen output by one or more PDOs, according to the selected mapping.

(3) MTTFd > 100 years (EN ISO 13849-1) a) b)

a) Standard component. It does not constitute a safety component as defined in the Machinery Directive 2006/42/CE.

b) Every second failure of an electronic component is regarded as a dangerous failure.

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### TECHNICAL SPECIFICATION

Measuring range	0.1...2.5 m
Magnetostrictive resolution	0.1 mm
Magnetostrictive linearity (Ta = 25°C)	up to 250mm < ± 0.1 mm from 250 to 2500mm ±0.04% FS
Magnetostrictive repeatability (Ta = 25°C)	±0.1 mm
Operating pressure	According to EN 13480-5 350 bar (Peak: 500 bar)
Protection class	IP67
Temperature range	-40°C ... +85°C
Temperature coefficient	±0.004 % FS/°C
Housing	Head and rod: stainless steel AISI316
Rod diameter	10 mm
Shock resistance	acc. to EN 60068-2-27 30 G, 11 ms 100 Shocks per axis
Vibration resistance	acc. to EN 60068-2-6 10 ... 150 Hz



### ELECTRICAL CHARACTERISTICS

Power supply range	see order code
Startup time	< 1.5 s
Inrush current	1.5A - 2ms @ 12VDC
Current consumption	48 mA (12 VDC, w/o load) 25 mA (24 VDC, w/o load)
CANopen profile conformity	CiA DS301
Interface	CANopen
Electromagnetic compatibility	acc. to EN 61326-1, EN 61326-3-1
EU conformity	EMC directive 2014/30/EU RoHS directive 2011/65/EU + 2015/863/EU



### OPERATING PRINCIPLE

The operating principle is based on the magnetostrictive effect. The application of periodic short current pulses in the magnetostrictive wire generates an induced magnetic field. The interaction of the magnetic cursor, connected to the moving object in the application, with this field generates a momentary torsional strain on the magnetostrictive wire which propagates along it as in a waveguide. When the ultrasonic wave reaches the end of the guide, it is detected by a sensitive element which converts it into an electrical signal. Since the velocity of propagation is known, the linear position is computed by measuring the time-of-flight of the pulse.



### ELECTRICAL CONNECTION

#### M12 X 5 PINS

<b>Pinout</b>	
1	CAN-GND*
2	+Vin
3	GND*
4	CAN-H
5	CAN-L

\* GND and CAN\_GND terminals are internally connected to each other and identical in their function

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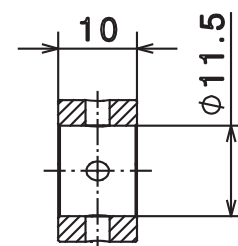
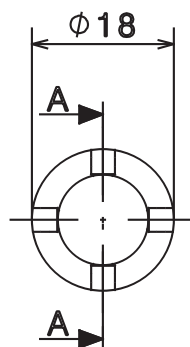
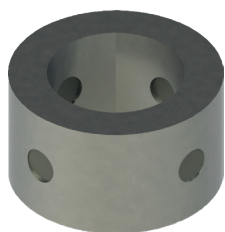
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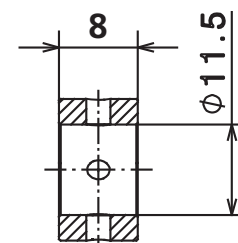
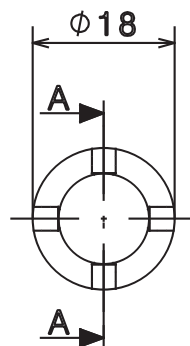
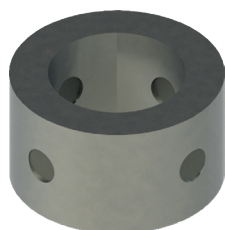
### CURSOR TYPES

#### 1] Magnetic cursor 18 x 10 mm - AW2011 anodized\*\*



Section A-A

#### 2] Magnetic cursor 18 x 8 mm - AW2011 anodized\*\*



Section A-A

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\*\*Do not separate the magnetic cursor from the sensor. For correct operation, each sensor must be mounted in the cylinder with its own supplied cursor.

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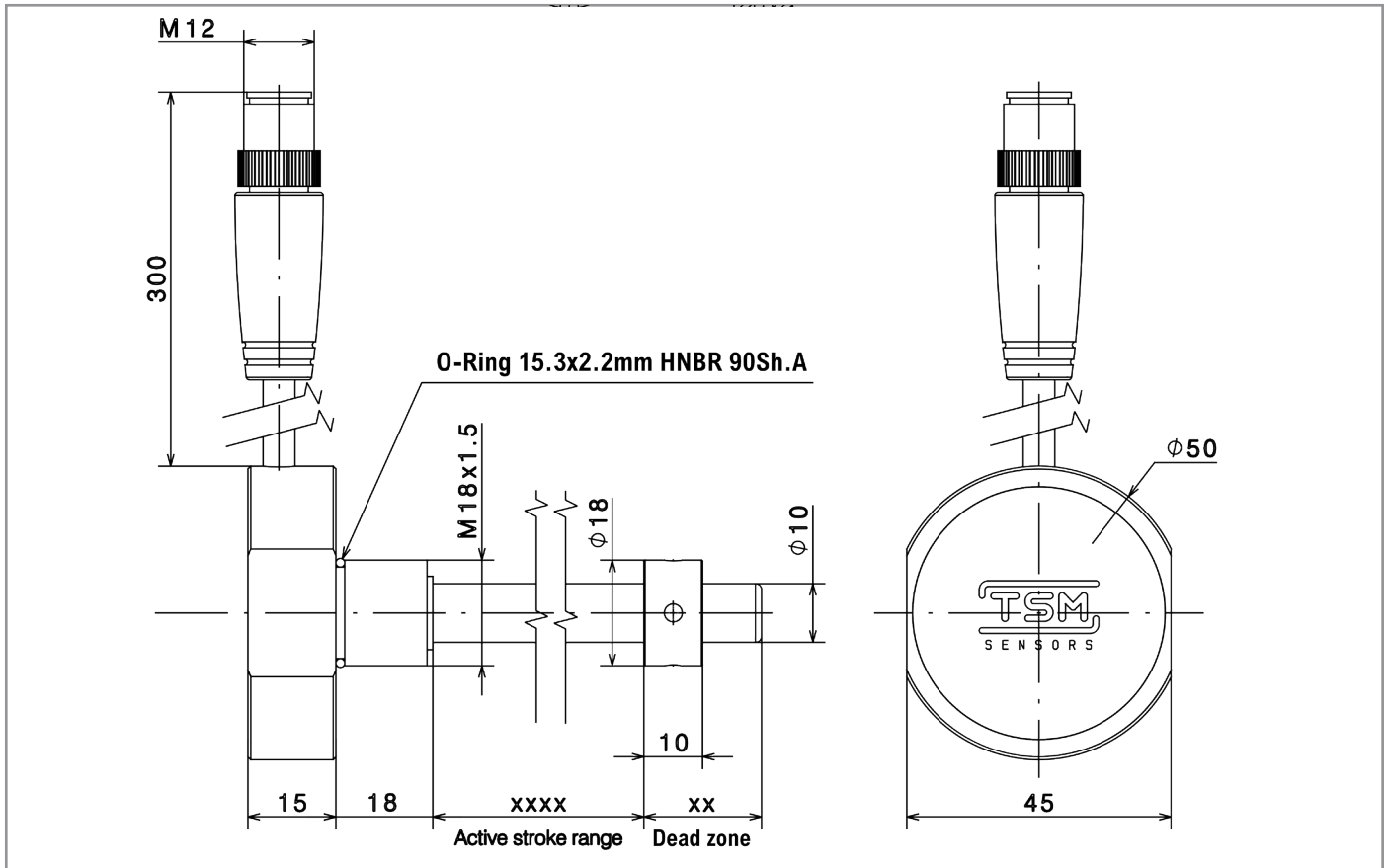
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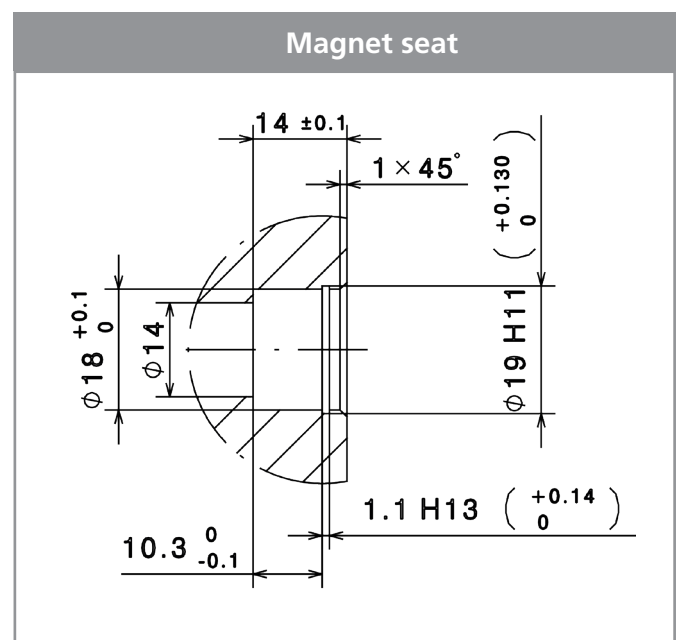
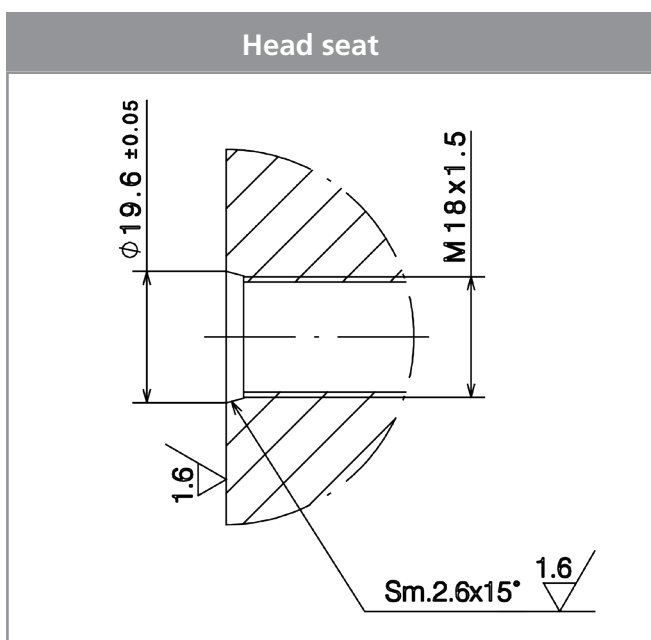
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### DIMENSIONS [mm]



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**WARNING:** For installation apply a maximum tightening torque of 60 Nm