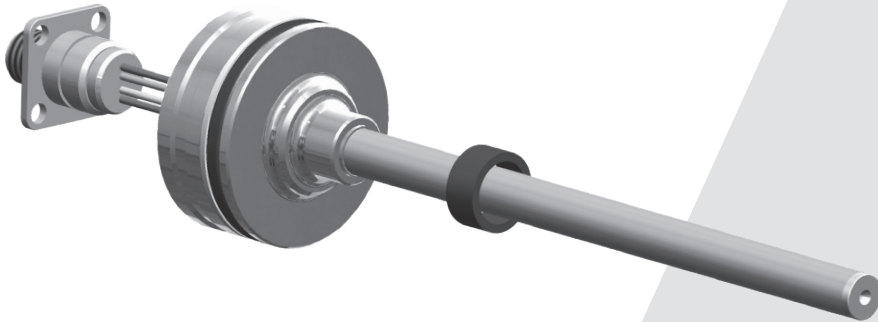




MAGNETOSTRICTIVE LINEAR POSITION SENSOR

The magnetostrictive linear displacement sensors 7M are designed to be used in harsh environment with heavy operational conditions like equipment and mobile machines.

The small dimensions make them suitable for the integration into hydraulic cylinders, as alternative to the traditional inductive / potentiometric sensors.



- **Contactless – no wear**
- **Unlimited timelife of the sensor**
- **Absolute position detection**
- **High reliability**
- **High stability of the signal / high EMC immunity**
- **Shock and vibration resistant**
- **Compact dimensions**
- **Easy installation inside hydraulic cylinders**
- **Compatible with existing solutions**

Main features

- Electrical stroke 50 ÷ 4000 mm.
- Typical resolution 0.1 mm.
- Output: analogue (V-mA), digital CANopen, CAN SAE J1939
- Working temperature of the electronics, max. 105 °C
- Operating Pressure 350 Bar
- Max temperature of the hydraulic fluid 85 °C

Applications fields:

- **Agriculture machines**
(Tractors, combined harvesters, bailers etc.)
- **Construction machinery and equipment**
(excavator, loaders, paving machines etc)
- **Handling machines and equipment**
(stationary cranes, truck mounted cranes, forklifts, Aerial platforms etc.)
- **Forestry equipments**
(harvesting heads, mobile saws etc.)
- **Garbage treatment and garbage trucks**



MAGNETOSTRICTIVE LINEAR SENSOR - 7M

Technical features

Measured value: position, speed (CANopen-CAN SAE J1939)

Electrical stroke: 50-4000 mm. (step 5-50 mm. See chart)

Mounting position: any

Electrical specifications

Power supply: 9 - 36 Vdc

Dielectric strength: 500Vdc (power supply ground to machine ground) $R > 10 \text{ Mohm}$ 60s (Voltage suppressor 36V)

Overvoltage protection: yes

Polarity protection: yes

Load: $R_L > 10 \text{ Kohm}$ – voltage output / $< 500 \text{ ohm}$ output mA-24Vdc, / $< 250 \text{ ohm}$ output mA – 12 Vdc.

Power consumption typical: 30 mA (24 Vdc)

Analogue output: voltage / current

Digital output: CANopen / CAN SAE J1939

Typical resolution: 0,1 mm

Non active zone: mounting area 30 mm.
damping area 30-36 mm. stroke up to 1200 mm. 63 mm. stroke $> 1200 \text{ mm}$.

Typical linearity: 0.04% f.s. Min +/- 0.1 mm.

Hysteresis: typ. +/- 0.1 mm.

Internal sample rate: 1 msec (1KHz)

Zero point tolerance: 1 mm.

Environmental and mechanical specifications:

Rod diameter: 10 mm. - AISI 304L (1.4306)

Head diameter: 48 mm. AISI 303 (1.4305)

Sealing: O-ring 40.87x3.53 mm HNBR, back up ring 42.6x48x1.4 PTFE

Shock: IEC 60068-2-27 – 100g (11ms) single shock, 50g (11 ms) 1000 shocks per axis

Protection degree: IP69K EN 60529 with M12x1 connector – plugged in.

Protection degree: IP67 EN 60529 Sensor head

Vibrations: IEC 60028-2-6 - 20 g (r.m.s) (10...2.000Hz) resonance points excluded

Operating Pressure: Dynamic pressure 350 bar, Static pressure 450 bar, Test pressure 625 bar (max. 5 minutes)

Operating temperature electronics: $-40+105 \text{ }^{\circ}\text{C}$

Hydraulic fluid temperature: $-30+85 \text{ }^{\circ}\text{C}$

Storage temperature: $-25+65 \text{ }^{\circ}\text{C}$

Humidity: up to 90% HR, no condensation

Electromagnetic compatibility EMC

EMC: EU Directive 2014/30/EU CE marking

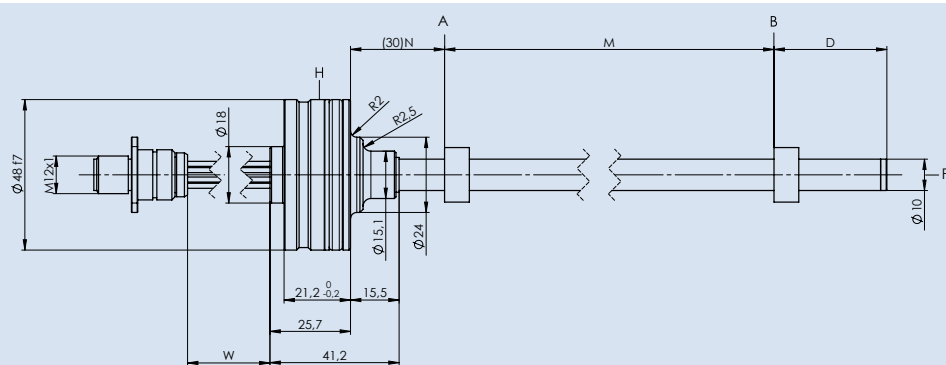
Generic standards: EN 61000-6-2

Agriculture and forestry machines: EN 14982

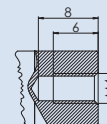
Constructions machinery: EN 13309

Transient pulses: ISO 7637-2 pulse 5b - voltage 56 Vdc

MAGNETOSTRICTIVE LINEAR SENSOR - 7M



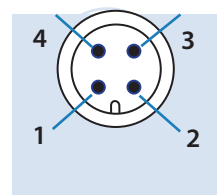
Threaded rod M > 1200 mm.



STAINLESS STEEL HEAD	H	Ø 48 mm
MOUNTING ZONE	N	30 mm
MEASURING RANGE	M	50 ÷ 4000 mm
ZERO	A	0
SPAN	B	Span (full scale)
DAMPING ZONE	D	30-36 mm. stroke =< 1200 mm. 63 mm. stroke up to 4000 mm.
ROD	P	Ø 10 mm
WIRES LENGTH	W	60 ÷ 240 mm
CABLE LENGTH	W	0.3 - 10 m

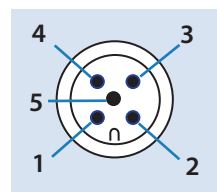
ELECTRICAL CONNECTION

A = M12 – 4 pin connector for analogue output Vdc – mA



PIN	PINOUT 1	PINOUT 2	PINOUT 3
1	n.c.	Vdc	Vdc
2	Vdc	n.c.	Signal
3	Gnd	Gnd	Gnd
4	Signal	Signal	n.c.

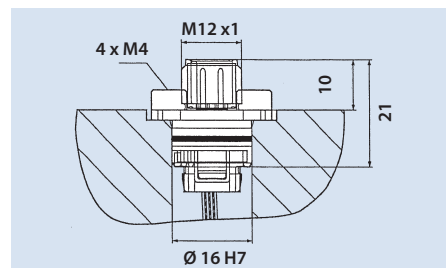
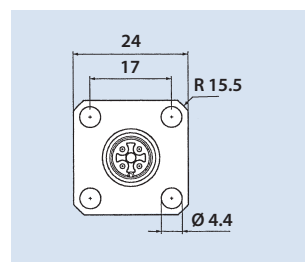
B = M12 – 5 pin connector for digital output Can Open



PIN	PINOUT 1	PINOUT 2
1	n.c.	Vdc
2	Vdc	n.c.
3	Gnd	Gnd
4	CAN_H	CAN_H
5	CAN_L	CAN_L

Electrical connection

M12x1 connector with flange
(to be fixed to the cylinder)

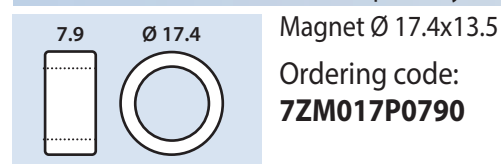


W= PUR Wiring diagram

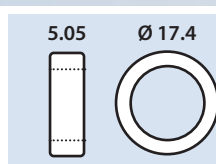


Cable	Analogue output PINOUT 1	Output CAN PINOUT 2
Blue	Vdc	Vdc
White	Gnd	Gnd
Green	Signal	CAN_H
Red	n.c.	CAN_L

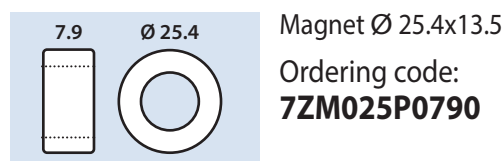
Accessories (to be ordered separately)



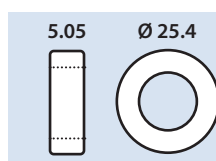
Magnet Ø 17.4x13.5
Ordering code:
7ZM017P0790



KIT spacers Ø 17.4x13.5 POM (acetal plastic)
2 pcs
Ordering code:
7ZS017D0500



Magnet Ø 25.4x13.5
Ordering code:
7ZM025P0790



KIT spacers Ø 25.4x13.5 POM (acetal plastic)
2 pcs
Ordering code:
7ZS025D0500

Connector M12 4 pin, female, **straight**, PUR Cable 5 m Ordering

code: **7ZWM12S4P05000**

Connector M12 4 pin, female, **90°**, PUR Cable 5 m Ordering

code: **7ZWM12A4P05000**

Connector M12 5 pin, female, **straight**, PUR Cable 5 m Ordering

code: **7ZWM12S5P05000**

Connector M12 5 pin, female, **90°**, PUR Cable 5 m Ordering

code: **7ZWM12A5P05000**

Ordering code: MAGNETOSTRICTIVE LINEAR SENSOR **7M**, ANALOGUE AND DIGITAL OUTPUT

MODEL **7M** (Rod Version)

Version:

- A** : Diameter 10 mm. - Damping 36 mm. (stroke up to 1200 mm.)
B : Diameter 10 mm. - Damping 30 mm. (stroke up to 1200 mm.)
C : Diameter 10 mm. - Damping 63 mm. - M4 Threaded rod terminal (stroke > 1200 mm.)

Measuring Range (mm.)

- 0050 - 500 mm. (5 mm. steps)
 > 0500 - 1000 mm. (10 mm. steps)
 > 1000 - 2000 mm. (25 mm. steps)
 > 2000 - 4000 mm. (50 mm. steps)

Measuring unit:

M: mm

Power supply:

1 : 9 - 36 Vdc

Electrical connection:

Analogue output

- A1** : M12 - 4 pin connector - pin out 1 (analogue)
A2 : M12 - 4 pin connector - pin out 2 (analogue)
A3 : M12 - 4 pin connector - pin out 3 (analogue)

Digital output

- B1** : M12 - 5 pin connector - pin out 1 (digital)
B2 : M12 - 5 pin connector - pin out 2 (digital)

W1: PUR pigtailed cable - analogue

W2: PUR pigtailed cable - digital

Wires length connection (only for option A-B)

- A** : 60 mm. **E** : 100 mm. **J** : 180 mm.
B : 70 mm. **F** : 120 mm. **K** : 200 mm.
C : 80 mm. **G** : 140 mm. **L** : 220 mm.
D : 90 mm. **H** : 160 mm. **M** : 240 mm.

Cable length connection (only for option W1-W2)

- N** : 300 mm. **S** : 1.500 mm. **W** : 5.000 mm.
P : 500 mm. **T** : 2.000 mm. **X** : 8.000 mm.
Q : 750 mm. **U** : 2.500 mm. **Y** : 10.000 mm.
R : standard 1.000 mm. **V** : 3.000 mm.

Output signal

Voltage:

- V0** = 0 - 10 Vdc
V1 = 10 - 0 Vdc
V2 = 0.25 - 4.75 Vdc.
V3 = 0.5 - 4.5 Vdc.
V4 = 0.5 - 9.5 Vdc
V5 = 4.75 - 0.25 Vdc.
V6 = 4.5 - 0.5 Vdc.
V7 = 9.5 - 0.5 Vdc

Current:

- A1** = 4 - 20 mA.
A2 = 20 - 4 mA.

Digital CANopen

- C1** : CANopen baud rate 50 Kbit
C2 : CANopen baud rate 125 Kbit
C3 : CANopen baud rate 250 Kbit (factory default value)
C4 : CANopen baud rate 500 Kbit
C5 : CANopen baud rate 800 Kbit
C6 : CANopen baud rate 1000 Kbit

Digital CAN SAE J1939

- J3** : CAN SAE J1939 baud rate 250 Kbit (factory default value)
J4 : CAN SAE J1939 baud rate 500 Kbit

Node ID (only for digital output)

- Default value for CANopen = **7F**
- Value for CAN SAE J1939 = **FD**
- Value for Analogue Output = **00**



O.M.F.B. S.p.A. Hydraulic Components

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