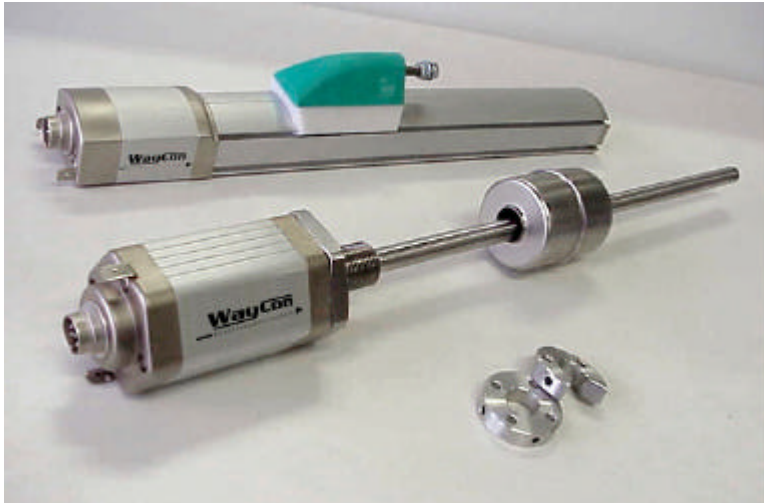


MAGNETOSTRIKTIV

Magnetostruktiver Transducer



*Series
MAW
MAZ*

- *Range 100...4000 mm*
- *Linearity of 0,02%*
- *Small case*
- *Sliding cursor or floating magnet*
- *IP67 Protection*
- *Displacement speed < 10 m/s*
- *Resolution < 0,1 mV or <0,2 μ A, 5 μ m (2 μ m on request)*
- *Working temperature range -40...+70°C*
- *Vibration resistant*
- *Analogue output 0...10 VDC, 4...20 mA, 0...20 mA, CANopen, SSI*
- *2 magnets for velocity and position available*

Description

An electric impulse is produced in the headpipe and creates a circular magnetic field. The permanent magnet related to the object to be measured is the sensor. The lines of the magnetic field of the permanent magnet are in a 90° angle with the ones produced by impulse of the electric current. The interaction of the magnetic fields causes a flexible deformation (magnetostriction) in the waveguide. This deformation spreads to either ends in the waveguide. The propagation speed reaches 2,850 m/sec. The mechanical impulse is absorbed at one end of the waveguide and changed at the other end into an electrical signal, by reversal of the magnetostrictive effect. A controller calculates the travel speed of the impulse which is proportional to the displacement.

This principle enables a contactless, wear-free and absolute measurement. The sensors operate reliably in hydraulic cylinders, machine tools, presses, woodworking machines, rolling systems, packaging machines, portal robot, cutting machines, in the mining industry and in the conveying engineering.

There are two different types of magnetostrictive sensors. The series of MAW is used in the automated measuring technique for the position and distance measurement. The object to be measured is connected thereby with the sliding cursor or the floating magnet. By the different installation possibilities these sensors are suitable for a multiplicity of applications. The series of MAZ is conceived for the installation in hydraulic cylinders. The ring permanent magnet move along a rod without any contact. The different execution of the ring magnets permits a simple installation in hydraulic systems. The sensors can be installed in systems with pressure up to 350 bar (overpressure 700 bar).

Technical Data

Range

100/130/150/200/225/300/400/450/500/600/700/750/800/900/1000/1250/1500/1750/2000/2250/2500/2750/3000/3250/3500/3750/4000

Output signal	0...10 VDC / 4...20 mA 0...20 mA and inv. Signal Start/Stop (RS422 compatible) PWM(pulse width modulated) SSI (RS422/485), CANopen (DS-301)	Output load (analogue)	> 5 KOhm
Update time of the analogue output	< 1 ms (Length depending)	Protection against polarity inversion	ja
Scanning rate for Position	CANopen: from 1 to 4 ms SSI: from 0.5 to 3 ms	Type of magnet	Sliding cursor MAW Floating magnet MAW Ring magnet MAZ
Linearity	s. table	Protection	IP67
Resolution	< 0.1 mV o < 0.2 µA (analogue) 0,1 mm (digital) 5 µm CANopen (2 µm on request) 5, 10, 20 or 40 µm SSI (2 µm on request)	Displacement speed	<10 m/s
Nominal power supply	24 VDC ± 20%	Force required to move the sliding cursor	<1 N
Max. power supply ripple	1 Vpp	Max. acceleration	<100 m/s ²
Max. consumption	100 mA type	Temperature stability	<0.01% MB / °C
		Humidity	0...90% (non-condensing)
		Working Temperature	-40...+70°C
		Storage Temperature	-40...+100°C
		Shock Test	100g / 11 ms (IEC68T2-27)
		Vibration	12g / 10...2,000 Hz (IEC68T2-6)

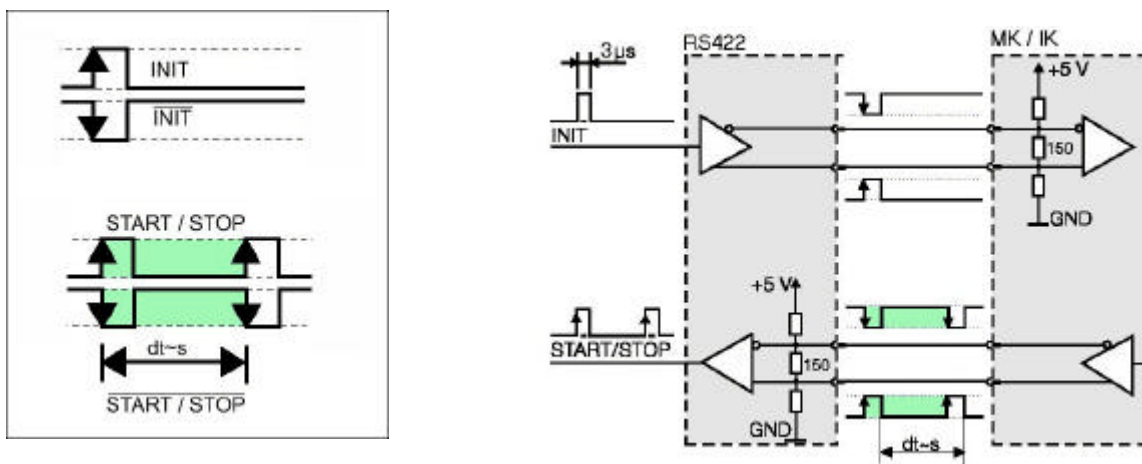
range	mm	100	130	150	200	225	300	400	450	500	600	700	750	800	900	1000
Model C. E.					1250	1500	1750	2000	2250	2500	2750	3000	3250	3500	3750	4000
Linearity	±%	0.03	0.025	< 0,02 of the electrical stroke (C. E.)												
Max. length A	mm	Range + 153 for Model MAW Range + 200 for Model MAZ														
Repeatability	±%	0,001 of the electrical stroke (C. E.)														
Hysteresis	mm	< 0.01														

Digital - Output

Two different digital output signals are available on themagnetostrictive sensors of the Maw D and the Maz D series: the Start-Stop signal and the PWM signal (Pulse Width Modulated). Both signals are RS422 compatible. Thus the signal transmission is free from interference up to 500 m.

Start-Stop signal:

The receiver module (e.g. SPS) supplies an impulse and determines thus the data transmission rate. With the first rising flank the electronics begins to capture the informations of the displacement to be measured. At the same time a start pulse at the output is generated, which activates a counter in the receiver module. At the end of the measurement - the magnet is at a fixed position - the electronics produces a stop pulse. The counter of the receiver module is stopped and the time unit is multiplied by 2,850 m/s.



PWM signal:

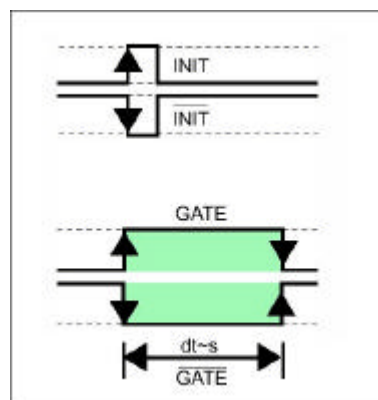
The Pulse Width Modulation is the second possibility for a digital position entry. In contrast to the start stop transfer, the output signal is permanently available at the receiver module. At the PWM transfer two data request options are to be chosen:

A) external data request

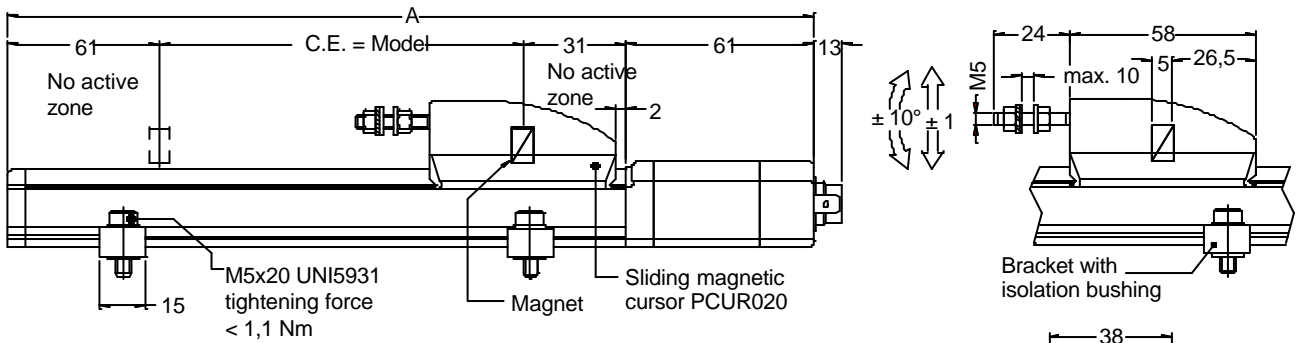
Electronics needs a signal from the receiver module to determine the position of the permanent magnet.

b) internal data request

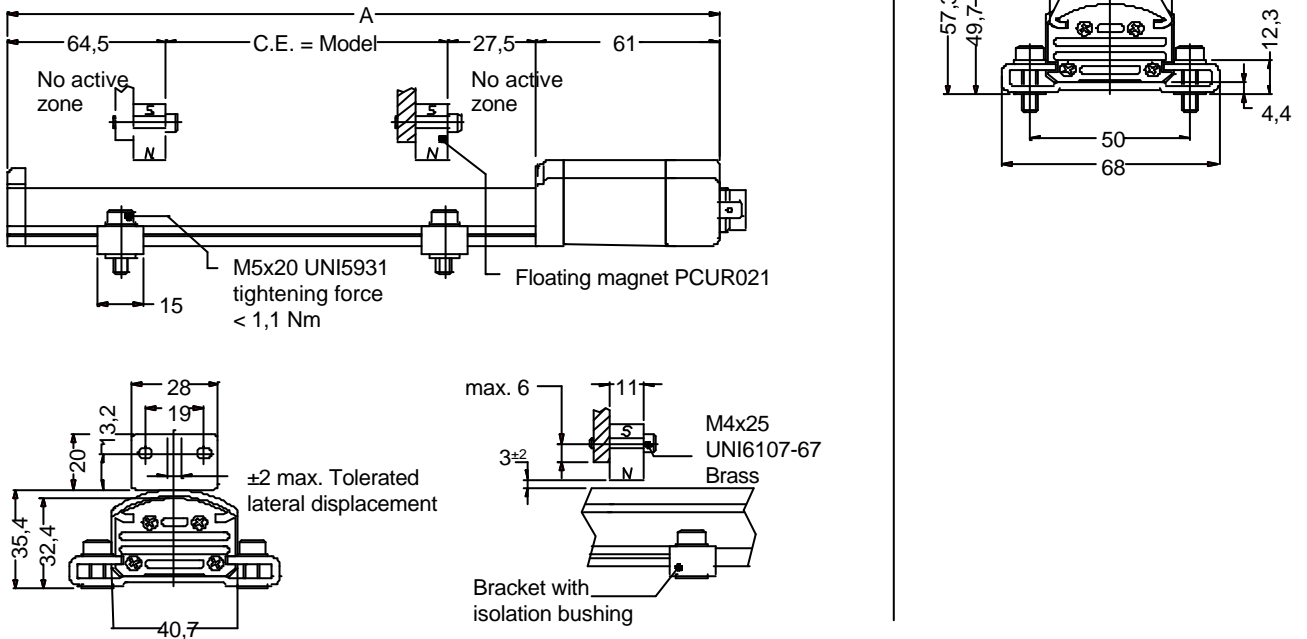
Electronics transmits automatically the output signal every 2 m/sec to the receiver module.



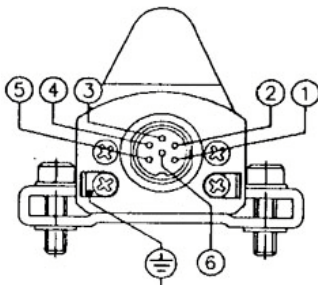
Dimensions Sliding cursor MAW



Dimensions Floating magnet MAW



Electrical Connections



Pin	analogue	digital	ssi	can
1	0...10 Vdc 4...20 mA 0...20 mA	(-) Gate	(-) Data	CAN L
2	GND Pin 1	(+) Gate	(+) Data	CAN H
3	10...0 Vdc 20...4 mA 20...0 mA	(+) Inquire	(+) Clock	CAN GND
4	GND Pin 3	(-) Inquire	(-) Clock	--
5	Power +Vdc	Power +Vdc	Power +Vdc	Power +Vdc
6	Power GND	Power GND	Power GND	Power GND

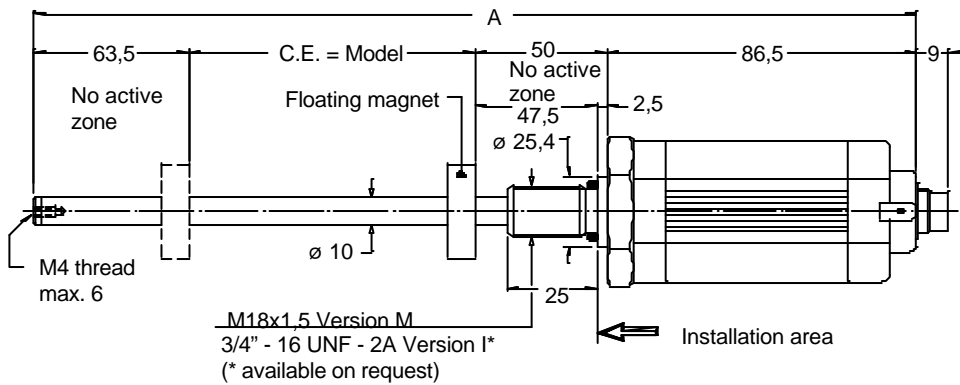
Warning: Do not connect Pin 2 or Pin 4 to the electrical ground or to the cable screen.

Protocol CANopen

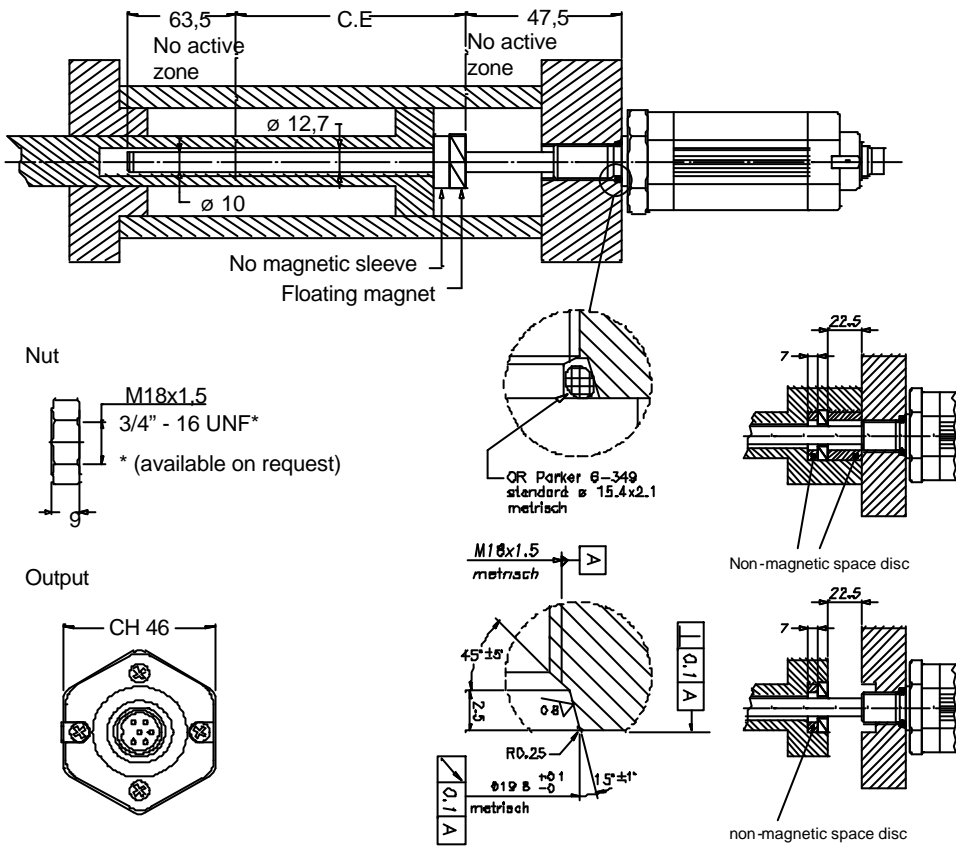
SOF	Arbitration	Control	Data Field	CRC	ACK	EOF	Interframe Space
1	11	1	6	0-8 Bytes	1	1	7
							> 3 Bits

Dimensions MAZ

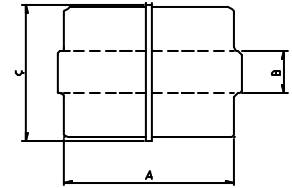
Hydraulic



Mounting example

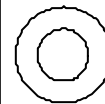


Float



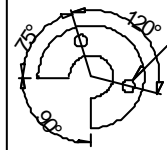
Type	PCUR026	PCUR027
Length A		52,4
Ø B mm	12	15
Ø C mm		42
Material	steel AISI 316	

Floating magnet PCUR 024



int. \varnothing 13,5
ext. \varnothing 25,4
depth 7,9

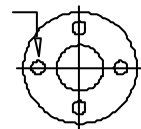
PCUR 023



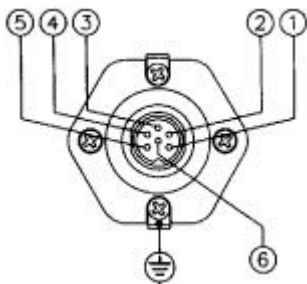
2 x \varnothing 4,1
on \varnothing 23,9
int. \varnothing 13,5
ext. \varnothing 32,8
depth 7,9

PCUR 022

4 x \varnothing 4,1
on \varnothing 23,9
int. \varnothing 13,5
ext. \varnothing 32,8
depth 7,9



Electrical connections



Pin	analogue	digital	ssi	can
1	0...10 Vdc 4...20 mA 0...20 mA	(-) Gate	(-) Data	CAN L
2	GND Pin 1	(+) Gate	(+) Data	CAN H
3	10...0 Vdc 20...4 mA 20...0 mA	(+) Inquire	(+) Clock	CAN GND
4	GND Pin 3	(-) Inquire	(-) Clock	--
5	Power +Vdc	Power +Vdc	Power +Vdc	Power +Vdc
6	Power GND	Power GND	Power GND	Power GND

Warning: Do not connect Pin 2 or Pin 4 to the electrical ground or to the cable screen.

Protocol CANopen

SOF	Arbitration	Control	Data Field	CRC	ACK	EOF	Interframe Space
1	11	1	6	0-8 Bytes	15	1 1 1	7
							> 3 Bits

Price List

100 mm	MAW-AD-100-GEA	414 €
130 mm	MAW-AD-130-GEA	414 €
150 mm	MAW-AD-150-GEA	418 €
200 mm	MAW-AD-200-GEA	421 €
225 mm	MAW-AD-225-GEA	422 €
300 mm	MAW-AD-300-GEA	427 €
400 mm	MAW-AD-400-GEA	441 €
450 mm	MAW-AD-450-GEA	444 €
500 mm	MAW-AD-500-GEA	451 €
600 mm	MAW-AD-600-GEA	458 €
700 mm	MAW-AD-700-GEA	465 €
750 mm	MAW-AD-750-GEA	470 €
800 mm	MAW-AD-800-GEA	481 €
900 mm	MAW-AD-900-GEA	488 €
1000 mm	MAW-AD-1000-GEA	501 €
1250 mm	MAW-AD-1250-GEA	553 €
1500 mm	MAW-AD-1500-GEA	579 €
1750 mm	MAW-AD-1750-GEA	604 €
2000 mm	MAW-AD-2000-GEA	625 €
2250 mm	MAW-AD-2250-GEA	682 €
2500 mm	MAW-AD-2500-GEA	740 €
2750 mm	MAW-AD-2750-GEA	796 €
3000 mm	MAW-AD-3000-GEA	853 €
3250 mm	MAW-AD-3250-GEA	909 €
3500 mm	MAW-AD-3500-GEA	966 €
3750 mm	MAW-AD-3750-GEA	1,022 €
4000 mm	MAW-AD-4000-GEA	1,079 €

Charges on -MAW Version (see below):

Digital output (RO, PEI-E)	0 €
SSI or Can Open	40 €

Optional:

PCUR020 Sliding cursor	23 €
PCUR021 Flooding magnet	14 €
CON023 Connector output 6-pin	15 €

Price List

100 mm	MAZ-AD-100-GEA	526 €
130 mm	MAZ-AD-130-GEA	527 €
150 mm	MAZ-AD-150-GEA	531 €
200 mm	MAZ-AD-200-GEA	536 €
225 mm	MAZ-AD-225-GEA	536 €
300 mm	MAZ-AD-300-GEA	545 €
400 mm	MAZ-AD-400-GEA	554 €
450 mm	MAZ-AD-450-GEA	559 €
500 mm	MAZ-AD-500-GEA	567 €
600 mm	MAZ-AD-600-GEA	576 €
700 mm	MAZ-AD-700-GEA	586 €
750 mm	MAZ-AD-750-GEA	590 €
800 mm	MAZ-AD-800-GEA	598 €
900 mm	MAZ-AD-900-GEA	609 €
1000 mm	MAZ-AD-1000-GEA	628 €
1250 mm	MAZ-AD-1250-GEA	691 €
1500 mm	MAZ-AD-1500-GEA	718 €
1750 mm	MAZ-AD-1750-GEA	741 €
2000 mm	MAZ-AD-2000-GEA	769 €
2250 mm	MAZ-AD-2250-GEA	911 €
2500 mm	MAZ-AD-2500-GEA	941 €
2750 mm	MAZ-AD-2750-GEA	970 €
3000 mm	MAZ-AD-3000-GEA	998 €
3250 mm	MAZ-AD-3250-GEA	1,202 €
3500 mm	MAZ-AD-3500-GEA	1,236 €
3750 mm	MAZ-AD-3750-GEA	1,271 €
4000 mm	MAZ-AD-4000-GEA	1,305 €

Charges on -MAZ Version (see below):

Digital output (RO, PEI-E) 0 €

SSI or Can Open 40 €

Optional:

PCUR 022 4-drill ring magnet 16 €

PCUR 023 2-drill ring magnet 16 €

PCUR 024 0-drill ring magnet 16 €

PCUR 026 Float 39 €

PCUR 027 Float 39 €

CON023 connector 6-pin 15 €

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