

Data Sheet for Linear Sensors

Magnetic (magnetostrictive) linear transducer with analogue output

Series HMA2



With float - accessories!
 Not included in the
 delivery

Displacement transducers of HMA2 series are designed mainly for hydraulic applications.

- Measuring strokes from 50 mm to 4000 mm
- High IP protection class IP67 and 350 bar operating pressure (peak pressure max. 500 bar)
- Made of stainless steel AISI 316
- With external cursor - encapsulation of the sensor element
- Mounting via external flange (metric / inch)
- Electromagnetic compliance EMC 2014/30/EU
- RoHS 2011/65/ EU

The sensors are designed for an operating pressure of 350 bar with peak values of 500 bar. The distance measurement takes place via an external cursor. Thanks to this product design a complete sealing is ensured therefore IP67 is achieved.

Electrical Data	HMA2 AL	HMA2 A	HMA2 AH
Effective electrical travel 1.)	50 / 100 / 130 / 150 / 200 / 225 / 300 / 400 / 450 / 500 / 600 / 700 / 750 / 800 / 900 / 1000 / 1250 / 1500	50 / 100 / 130 / 150 / 200 / 225 / 300 / 400 / 450 / 500 / 600 / 700 / 750 / 800 / 900 / 1000 / 1250 / 1500 / 1750 / 2000 / 2250 / 2500	50 / 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
Independent linearity (best straight line) 1.)	≤ ±0,04% (Min. ±0,090 mm)	≤ ±0,02% (Min. ±0,060 mm)	≤ ±0,01% (Min. ±0,060 mm)
Output signal	0..10 V / 4..20 mA / 0..20 mA		
Theoretical resolution 1.)	Almost infinite	16 bit (max. 5 mVpp)	
Repeatability 1.)	< 0,02 mm	< 0,01 mm	
Backlash (Hysteresis) 1.)		< 0,01 mm	
Update rate	1 ms (50..900 mm) / 1,5 ms (1250..1500 mm)	0,5 ms (50..300 mm) / 1 ms (400..1000 mm) / 1,5 ms (1250..2000 mm) / 2 ms (2250..3000 mm) / 3 ms (3250..4000 mm)	
Supply voltage	24 V ±20 %		
Power consumption (no load) @ 0..10 V	≤35 mA	≤70 mA	≤70 mA**
Power consumption (no load) @ 4..20 mA / 0..20 mA	≤70 mA	≤90 mA	≤90 mA**
Output load @ 0..10 V	≥ 10 kOhm	≥ 5 kOhm	
Output load @ 4..20 mA / 0..20 mA	50..500 Ohm	< 500 Ohm	
Max. power ripple VSUP		< 1Vpp	
Output noise	--	< 5mVpp	
Output value @ 0..10 V		≤ 12 V	
Output value @ 4..20 mA / 0..20 mA		≤ 30 mA	
Alarm output value @ 0..10 V		≤ 10,5 V	
Alarm output value @ 4..20 mA / 0..20 mA		≤ 21 mA	
Insulation voltage 1.)	50 V	500 V (Suppressor diode 30V 0,4J mounted against voltage spikes)	
Reverse polarity protection / overvoltage protection / protection against power supply at the output: Yes			

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Mechanical Data, Environmental Conditions, Miscellaneous	HMA2 AL	HMA2 A	HMA2 AH
Mechanical stroke 1.)	50 / 100 / 130 / 150 / 200 / 225 / 300 / 400 / 450 / 500 / 600 / 700 / 750 / 800 / 900 / 1000 / 1250 / 1500	50 / 100 / 130 / 150 / 200 / 225 / 300 / 400 / 450 / 500 / 600 / 700 / 750 / 800 / 900 / 1000 / 1250 / 1500 / 1750 / 2000 / 2250 / 2500	50 / 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
Lifetime (90% effective electrical travel) 2.)	Theoretically infinite		
Max. operational speed	< 10 m/s		
Max. acceleration	≤ 100 m/s ²		
Operational temperature	-20..+75°C	-30..+75°C	-30..+85°C*
Storage temperature	-40..+100°C		
Protection grade (IEC60529)	IP67		
Vibration (IEC 68-2-6, Test Fc)	12 g / 10..2000 Hz		15 g / 10..2000 Hz
Shock (IEC 68-2-27, Test Ea)	100 g, halfsine, 11 ms		
Housing length: Versions ≤ 1000 mm +178,2 mm Versions > 1000 mm +183,2 mm	50 / 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		
Mounting parts (included in delivery)	None		
Cursor	Not included in delivery		
Material housing	Stainless steel AISI 316		
Material cursor	Free cursor made of plastic / floating cursor made of stainless steel AISI 316		
Electrical connection	5 pole M12 / 6 pole M16 / 8 pole M16 or M12 plug / Round cable 1 m		
Sensor mounting	External flange		

1.) According IEC 60393

2.) Determined by climatic conditions according to IEC 68-1, para. 5.3.1 without load collectives

* Please note possible temperature restrictions for electrical connections

** The devices must be supplied with a Class 2 Power Supply (as for NEC) or LPS Power Supply (as for EN 60950). If devices are permanently connected to the machine it's requested an external switch or circuit breaker and external over current protection.

Accessories (not included in delivery):

For 5 pole connector M12:

- Mating connector (STEM12) #125482: M12 thread, 5-pole, IP67, straight, shieldable (IP67 STE M12 5POL IP67 G S)
- Mating connector (STEM12) #125483: M12 thread, 5-pole, IP67, angled, shielded (STE M12 5POL IP67 W GS)
- Mating connector with cable (STKM12) #127287: M12 thread, 5-pole, IP67, straight, shielded, 2 m (STK M12 5POL IP67 G GS 2M AWG24)
- Mating connector with cable (STKM12) #127665: M12 thread, 5-pole, IP67, angled, shielded, 5 m (STK M12 5POL IP67 W GS 5M AWG24)

For 6 pole connector M16:

- Mating connector (STEM16) #118645: M16 thread, 6-pole, IP67, straight, shieldable (STE M16 6POL IP67 G S)
- Mating connector (STEM16) #118646: M16 thread, 6-pole, IP67, angled, shieldable (STE M16 6POL IP67 W S)

More connectors with cable on request. Take a look in the data sheet STEM for connector without cable, STKM for connector with cable.

For 8-pole connector M16 / M12 - on request

Cursors:

- Free cursor type G33 closed #134599: Take a look at drawing
- Free cursor type O33 open #134600: Take a look at drawing
- Free cursor type G25 without mounting holes #134601: Take a look at drawing
- Float type S12 #134602: Take a look at drawing

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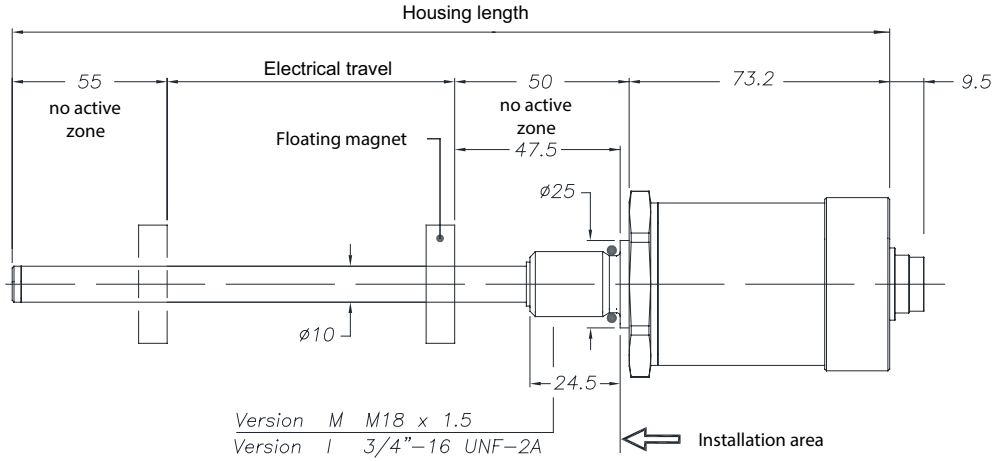
Series HMA2

Order Code

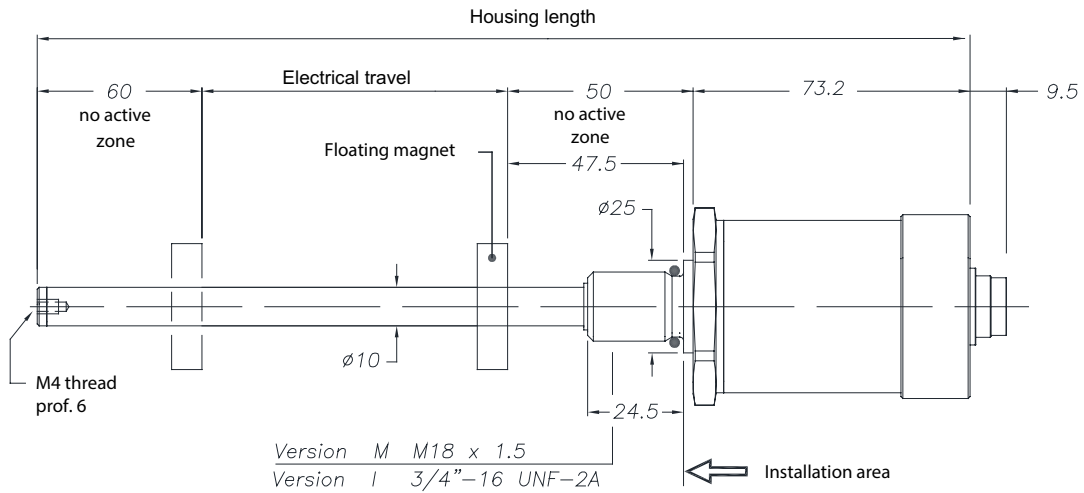
Description		Selection: standard=black/bold, possible options=grey/cursive					
Series:	HMA2						
Operating mode: Analog		A					
Performance:							
Low			L				
Standard			-				
High			H				
Effective electrical travel:							
50 mm					50		
100 mm					100		
130 mm					130		
150 mm					150		
200 mm					200		
225 mm					225		
300 mm					300		
400 mm					400		
450 mm					450		
500 mm					500		
600 mm					600		
700 mm					700		
750 mm					750		
800 mm					800		
900 mm					900		
1000 mm					1000		
1250 mm					1250		
1500 mm					1500		
1750 mm (not for Low "L")					1750		
2000 mm (not for Low "L")					2000		
2250 mm (not for Low "L")					2250		
2500 mm (not for Low "L")					2500		
2750 mm (only for High "H")					2750		
3000 mm (only for High "H")					3000		
3250 mm (only for High "H")					3250		
3500 mm (only for High "H")					3500		
3750 mm (only for High "H")					3750		
4000 mm (only for High "H")					4000		
Electrical connection:							
5 pole plug M12						S5	
6 pole plug M16						S6	
<i>Option 8 pole plug M16 (not for Low "L")</i>						<i>S816</i>	
<i>Option 8 pole plug M12 (not for Low "L")</i>						<i>S812</i>	
Round cable 1 m (not for Low "L")						K	
<i>Option cable length in m (xx = 2, 3, 4, 5, 10, 15 m)</i>						<i>Kxx</i>	
Output signal:							
0..10 V							2410
0..20 mA (not for Low "L")							2420
4..20 mA							2442
Design flange:							
M18x1,5							M
3/4"							I

Drawing

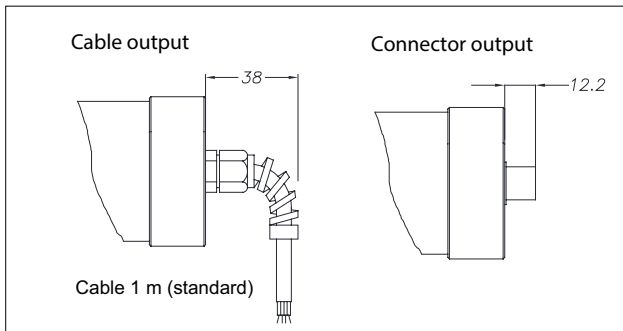
Strokes from 50 to 1000 mm



Strokes from 1100 to 2500 mm

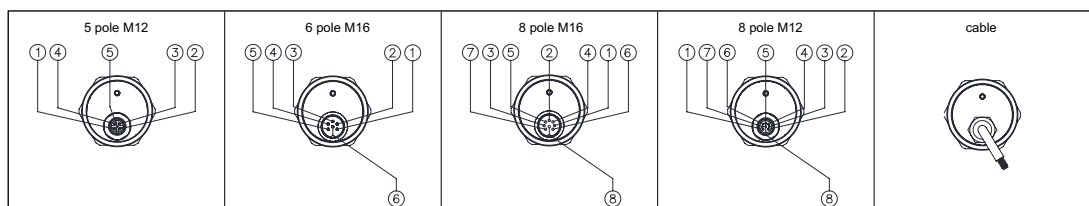


Dimensions in mm



Function	Connection				Color of cable
	5 pole M12 connector	6 pole M16 connector	8 pole M16 connector	8 pole M12 connector	
Output 1 (position): 0..10 V / 4..20 mA / 0..20 mA	1	1	5 (1*)	5	Grey
GND Output 1: (0 V)	2	2	2	1	Pink
Output 2 (inverse position): 10..0 V / 20..4 mA / 20..0 mA	3	3	3	3	Yellow
GND Output 2: (0 V)	2	4	6	6	Green
Power supply +	5	5	7	7	Brown
Power supply GND	4	6	8	6	White
n.c.	-	-	4	4	-
n.c.	-	-	1 (5*)	8	-

* only version 4..20 mA / 0..20 mA



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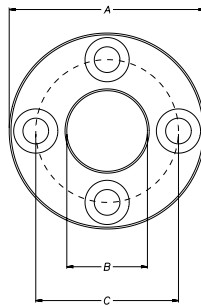
Drawing Cursor

Magnetic cursor G33, O33, G25

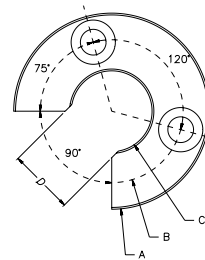
Dimensions	G33	O33	G25
A	32,8	32,8	25,4
B	13,5	13,5	13,5
C	23,9	23,9	-
D	-	11	-
Thickness	7,9	32,8	32,8

Included in order of cursor G33/O33:
 Brass nuts M4
 Brass washers D4
 Brass screws M4x25

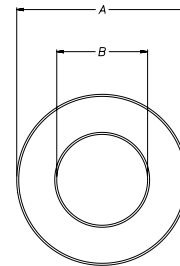
G33 closed type



O33 open type



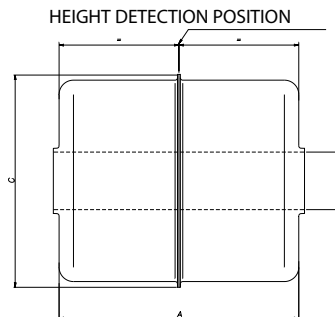
G25 without mounting holes



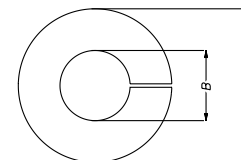
Dimensions in mm

Magnetic cursor type for liquids S12

Dimensions	S12
Length A	52,4
Ø B	12
Ø C	44
Material	AISI 316



Stopper included in order for liquid cursor S12:



Dimensions
 Ø A = 22 mm
 Ø B = 10.5 mm
 C = 7.2 mm
 Height = 7.9 mm

MATERIAL
 AISI 316

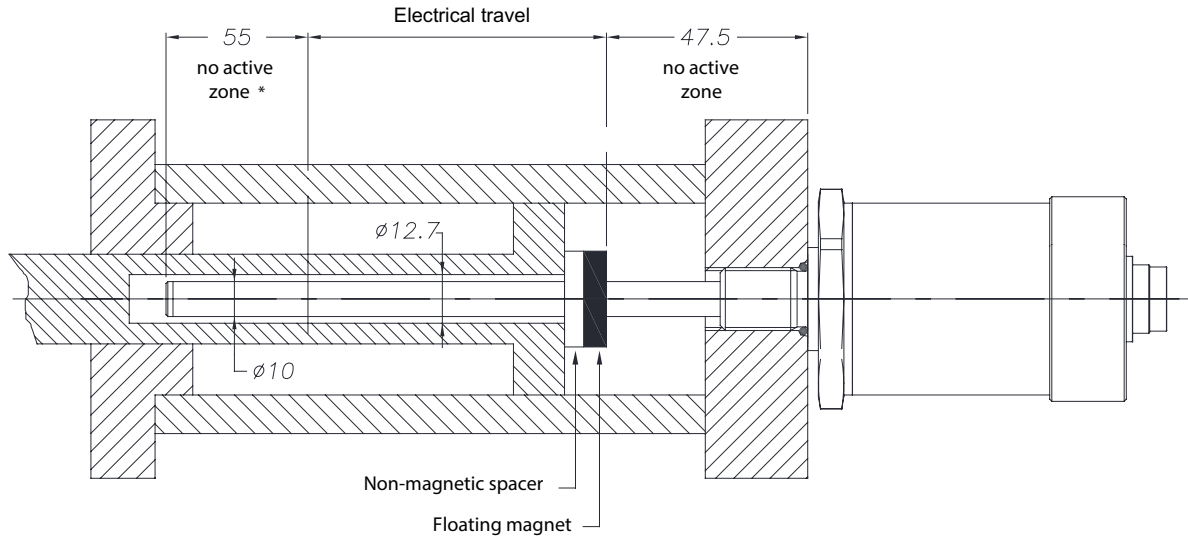
Delivery scope
 1 x Washer AISI316 D3
 1 x Screw AISI316 M3x8

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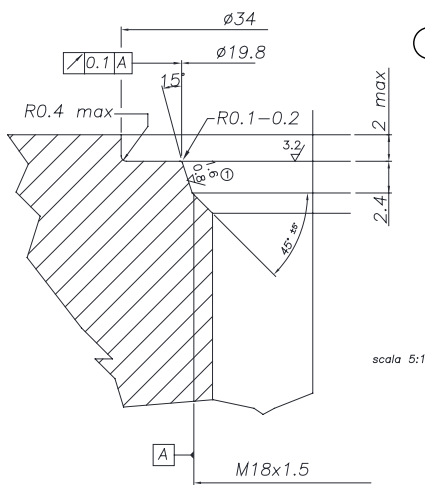
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Mounting

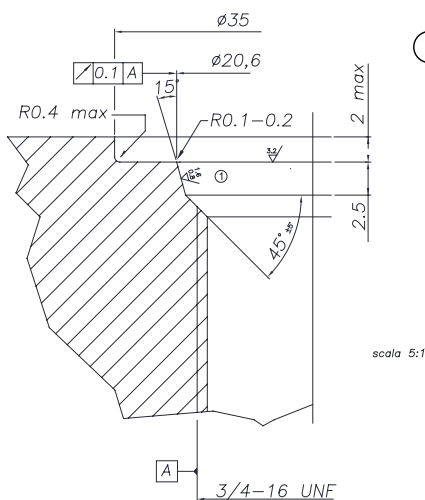
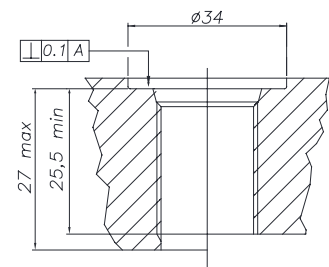


* for stroke up to 1000 mm (included) – over 1000 mm, the non-active zone becomes 60 mm because the tip includes a M4 threaded hole



- ① **THREAD M18x1,5**
 The sealing surface must be free from scratches longitudinal or spiral
 Ro 1.6 µm for sealing with NON-pulsating pressure
 Ro 0.8 µm for seals with pulsating pressure

Suggested o-ring:
 PARKER 6-349 15,4x2,1
 Material: Viton 90° Shore-A
 Mixes: PARKER N552-90



- ① **THREAD 3/4"-16UNF**
 The sealing surface must be free from scratches longitudinal or spiral
 Ro 1.6 µm for sealing with NON-pulsating pressure
 Ro 0.8 µm for seals with pulsating pressure

Suggested o-ring:
 PARKER 3-908 16,36x2,21
 Material: Viton 90° Shore-A
 Mixes: PARKER N552-90

