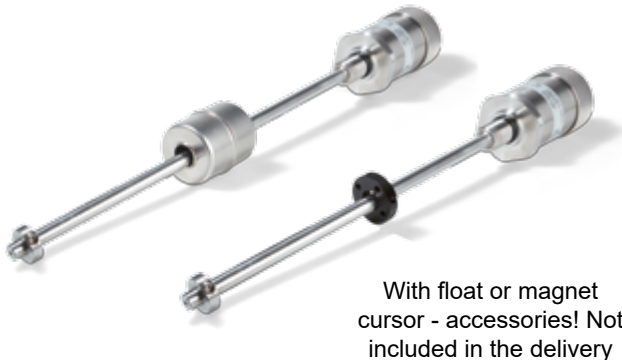


# Data Sheet for Linear Sensors

Magnetic (magnetostrictive) linear transducer with analogue output

Series HMA2



With float or magnet cursor - accessories! Not included in the delivery

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

- Measuring strokes from 50 mm to 2000 mm
- High IP protection class IP67 and 350 bar operating pressure (peak pressure max. 500 bar)
- Made of stainless steel AISI 316
- Contactless technology, with external cursor
- Mounting via external flange (metric / inch)
- Electromagnetic compliance EMC 2014/30/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	50 / 100 / 130 / 150 / 200 / 225 / 300 / 400 / 450 / 500 / 600 / 700 / 750 / 800 / 900 / 1000 / 1250 / 1500 / 1750 / 2000
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 / 10..0V	4..20 mA / 20..4mA	0..20 mA / 20..0 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			

# Data Sheet for Linear Sensors

Magnetic (magnetostrictive) linear transducer with analogue output

Series HMA2

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	50 / 100 / 130 / 150 / 200 / 225 / 300 / 400 / 450 / 500 / 600 / 700 / 750 / 800 / 900 / 1000 / 1250 / 1500 / 1750 / 2000
Lifetime (90% effective electrical travel) 2.)	Theoretically infinite		
Max. operational speed	< 10 m/s		
Max. acceleration	≤ 100 m/s <sup>2</sup>		
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		
Mounting parts (included in delivery)	None		
Cursor	Not included in delivery		
Material housing, flange and rod	Stainless steel AISI 316		
Material housing cap	Anodized Aluminium		
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 mandatory, to be ordered separately (not included in delivery):

### Free magnetic cursor, drawings see page 5

#134599, Type G33 closed, with mounting holes

#134600, Type O33 open design

#134601, Type G25 closed, without mounting holes

#134602, Type S12 floating, for liquids

### Recommended accessories (please order separately)

#### Connectors for solder mounting (series STE M12) or with moulded cable (series STK M12)

#125482, mating connector, M12, 5-polig, IP67, straight, shieldable (STE M12 5Pol IP67 G S)

#125483, mating connector, M12, 5-polig, IP67, angled, shielded (STE M12 5POL IP67 W GS)

#118645, mating connector, M16, 6-polig, IP67, straight, shieldable (STE M16 6POL IP67 G S)

#118646, mating connector, M16, 6-polig, IP67, angled, shielded (STE M16 6POL IP67 W S)

#127287, mating connector with cable, M12, 5-polig, IP67, straight, shielded, 2 m (STK M12 5POL IP67 G GS 2M AWG24)

#134755, mating connector with cable, M12, 5-polig, IP67, angled, shielded, 2 m (STK M12 5POL IP67 W GS 2M AWG24)

8-pole connector M16/M12 - on request

More variants and technical data see data sheet [www.megatron.de](http://www.megatron.de) : **STEM** and **STKM**

# Data Sheet for Linear Sensors

Magnetic (magnetostrictive) linear transducer with analogue output

Series HMA2

## Order Code

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

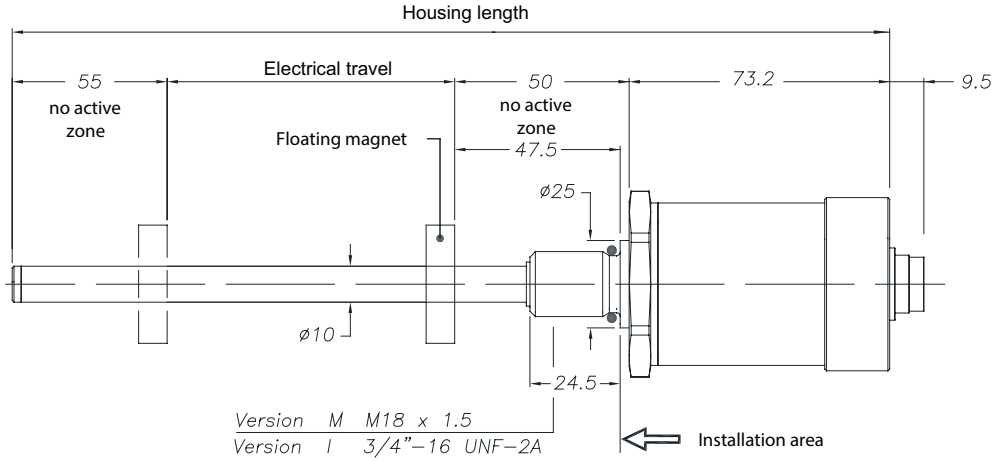
## Plenty of customer specific solutions available on request for series production

### Examples:

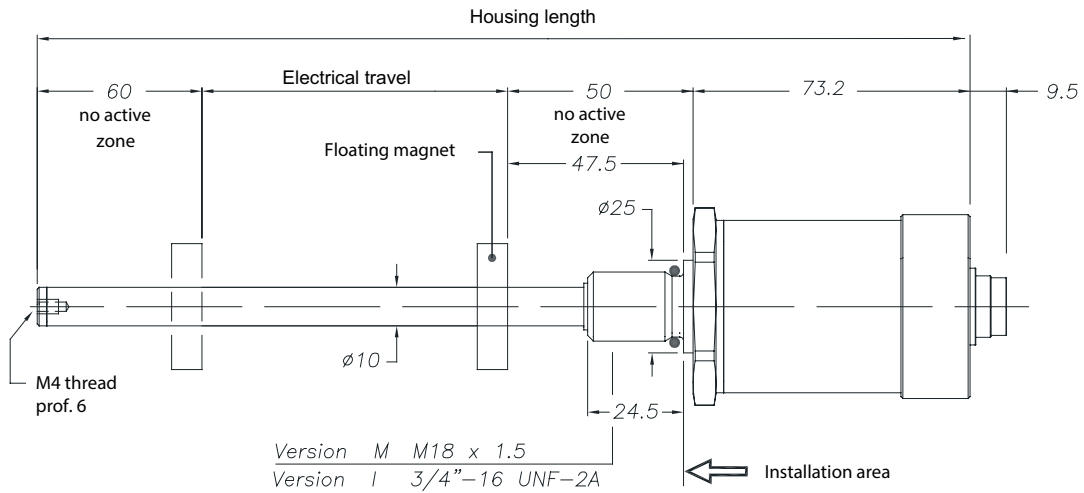
- Digital output (SSI, Gray-Code or Binary, 24 or 25 bit)
- Cable confection with/without connector, special cable lengths, and more

### Drawing

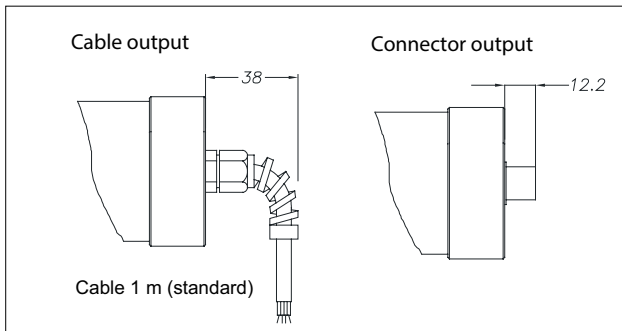
Strokes from 50 to 1000 mm



Strokes from 1100 to 2500 mm

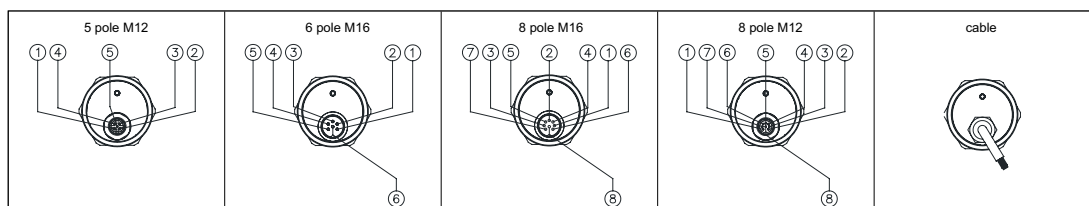


Dimensions in mm



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



# Data Sheet for Linear Sensors

Magnetic (magnetostrictive) linear transducer with analogue output

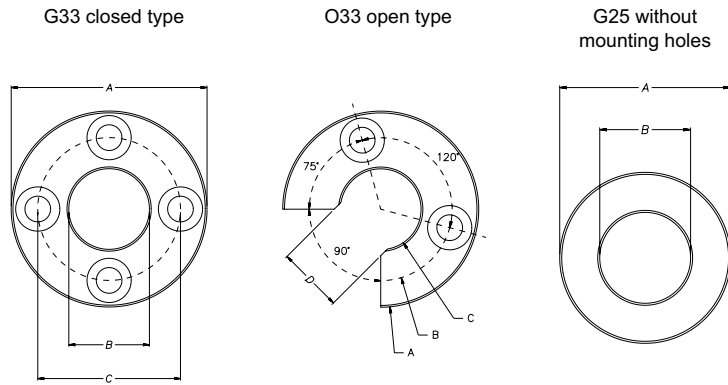
Series HMA2

## 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

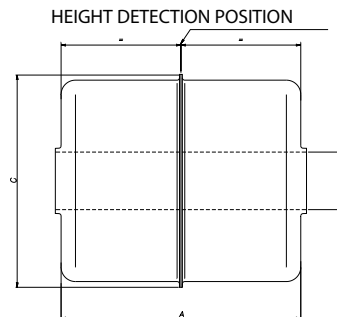
Included in order of cursor G33/O33:  
 Brass nuts M4  
 Brass washers D4  
 Brass screws M4x25



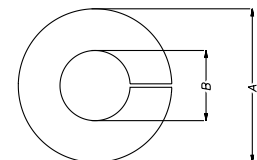
Dimensions in mm

### 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

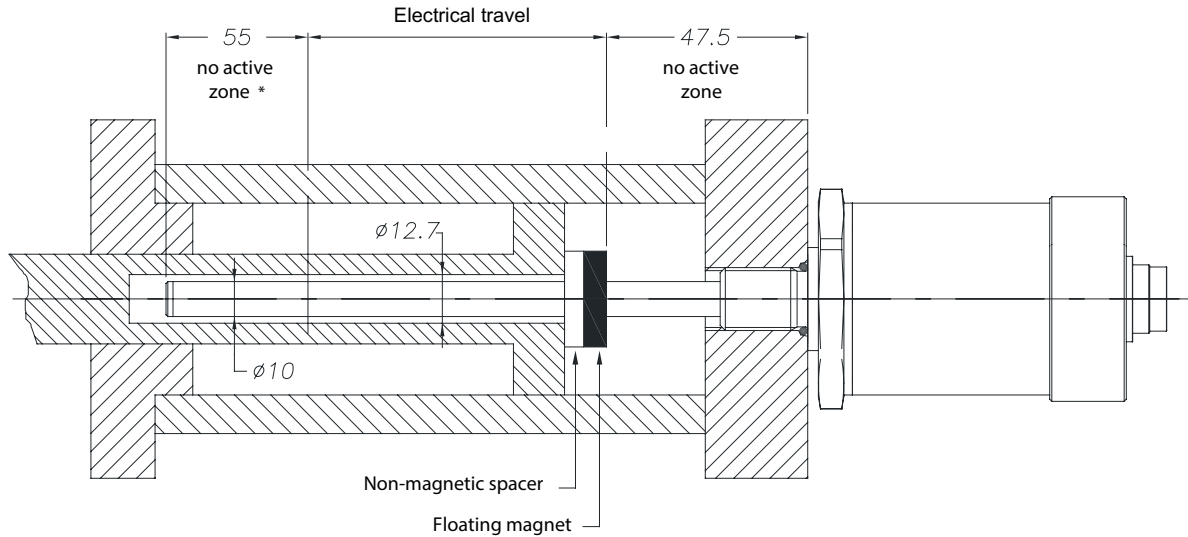
**Delivery scope**  
 1 x Washer AISI316 D3  
 1 x Screw AISI316 M3x8

# Data Sheet for Linear Sensors

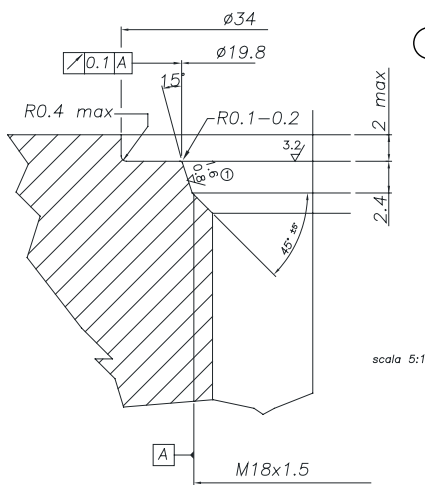
Magnetic (magnetostrictive) linear transducer with analogue output

Series HMA2

## Mounting

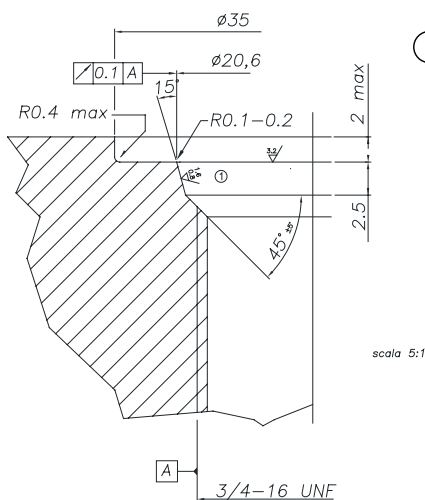
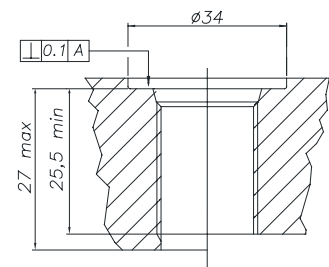


\* for stroke up to 1000 mm (included) – over 1000 mm, the non-active zone becomes 60 mm because the tip includes a M4 threaded hole



- ① THREAD M18x1,5  
The sealing surface must be free from scratches longitudinal or spiral  
Ro 1.6  $\mu\text{m}$  for sealing with NON-pulsating pressure  
Ro 0.8  $\mu\text{m}$  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  $\mu\text{m}$  for sealing with NON-pulsating pressure  
Ro 0.8  $\mu\text{m}$  for seals with pulsating pressure

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

