

# PPM12 - Inductive sensor (LVDT) – Measurement range from 2 to 200 mm



## Technical characteristics:

Measurement range [mm]	0...2	0...5	0...10	0...25	0...50	0...100	0...200
Linearity	0,30% (0,20% optional)						
Types	Free core						
	Push rod guided						
	Sprung load						
Protection class	IP65 or IP68 / 10bar						
Supply voltage / frequency	3 Veff / 3 kHz						
Vibration stability DIN IEC 68T2-6	10 G						
Shock stability	200 G / 2 ms						
Excitation voltage	3 Veff / 3 Hz						
Supply frequency	2 ... 10 kHz						
Operating temperature	-40...+120°C (150°C optional)						
Mounting	Ø8 mm h6						
Connection	4-core axial/radial cable or M12 axial/radial connector						
Housing	Stainless steel						
Cable	TPE (standard)	Ø 4.5 mm ; 0.14 mm <sup>2</sup> non-halogen					
	PTFE	Ø 3.7 mm ; 0.24 mm <sup>2</sup> Temp. Max 205°C					
Max. cable length	100 m between sensor and electronics						
<b>Sprung load (max. range 50mm)</b>							
Spring force min /max (N)	0,5/0,6	0,6/0,7	0,6/0,7	0,7/0,75	0,75/0,8		
Band pass (Hz) (approx.)	55	50	50	35	20		
Spring stiffness (N/mm)	0,016	0,011	0,007	0,004			
Weight (without cable) (approx.)	48g	55g	72g	105g			
Lifetime	>10 000 000 cycles						
<b>Free core</b>							
Max acceleration of core	100G						
Lifetime	Infinite						
Weight (without cable) (approx.)	36g	42g	47g	59g	85g	136g	238g

## Electrical characteristics:

	IMA external electronics (built-in)	KAB (cable electronics)
Output signal	0...20 mA ; 4...20 mA (Load < 500 Ohm) 0...5 V ; ±5 V (Load > 5 kOhm) 0...10 V ; ±10 V (Load > 5 kOhm)	0...20 mA ; 4...20 mA (Load < 500 Ohm) 0...5 V ; ±5 V (Load > 5 kOhm) 0...10 V ; ±10 V (Load > 5 kOhm)
Temperature coefficient	150 ppm/°C for min signal 400 ppm/°C for max signal	460 ppm/°C
Ripple	< 20m Veff	< 20m Veff
Max frequency	300 Hz/-3dB	/
Offset range	Offset +/-20%, gain +/-50%	/
Isolation resistance	>1 GOhm at 500 VDC	/
Isolation voltage	Supply <> output 500 VDC	/
Power supply	24 VDC (18...36V) or 15 VDC (9...18V)	24 VDC (18...36V) or 15 VDC (9...18V)
Current consumption	<150mA with load and 80mA without (Supply 24 VDC) <300mA with load and 100mA without (Supply 24 VDC)	65 mA (24 VDC), 140 mA (12 VDC)
Sensor supply	3 Veff , 3kHz	3 Veff (Supply 15...26V) 2,4 Veff (Supply 12...20V)
Operating temperature	0 ... +60°C	0 ... +60°C
Storage temperature	-20 ... +80°C	-20 ... +80°C
Housing	UL94-VO	Aluminium
Mounting	On Din-Rail	/



The output signal is referring to the electric measuring range. If the sensor is operated outside the measuring range or the measuring range is exceeded, the signal is also outside the defined range (i.e. >10V/20mA or <0V/4mA). Please keep this in mind for control systems with cable break detection lower than 4mA or for a maximum input voltage >10V of measuring instruments. If necessary install the sensor before connecting to the pic.

**Running direction of signal:**

- If the push rod is moving into the sensor (e.g. sprung load pushed in), the signal is reducing.
- If the push rod is moving out, the output signal is increasing.
- The running direction of the signal can also be inverted on demand.

**Technical dimensions:**

Range (mm)	Body length A axial (mm) cable	Body length B : cable or radial connector (mm)	Body length C, axial connector (mm)	D core length (mm)	E Push rod length (mm)
0...2	58	64	67	22	54
0...5	64	70	73	25	60
0...10	74	80	83	30	70
0...25	104	110	113	45	100
0...50	154	160	163	70	150
0...100	254	260	263	120	250
0...200	454	460	463	220	450

Other ranges on demand.

Type: free core, unguided push rod

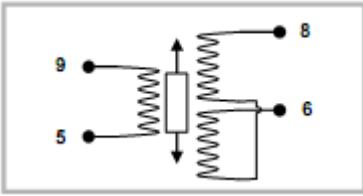
Type: Push rod guided

Type: free core, unguided push rod

Please note that the stated end travel and start travel (see detailed picture) are standard values. When calibrating the sensors, we are aiming for best linearity. On your demand, precise values can be respected and have to be defined during the ordering.



## AC Output



### Assignment for standard-cable:

White (5): primary 2  
 Black (6): secondary 2  
 Brown (9): primary 1  
 Blue (8): secondary 1

### Assignment for PTFE-cable (option H):

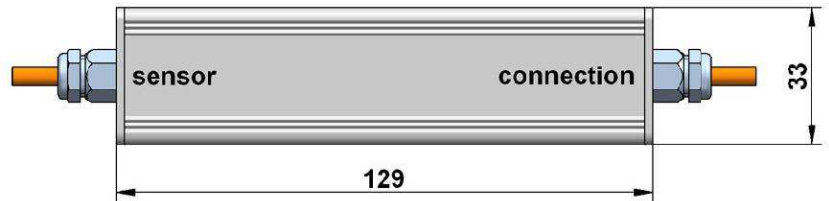
White (5): primary 2  
 Green (6): secondary 2  
 Yellow (9): primary 1  
 Brown (8): secondary 1

## Cable electronics KAB



cable length sensor-electronics  
 1m, 4m, 9m

cable length 1m



If not specified otherwise the cable electronics is placed at 1 m from the end of the cable. On request in your order, however, the cable electronics can be placed at any position.

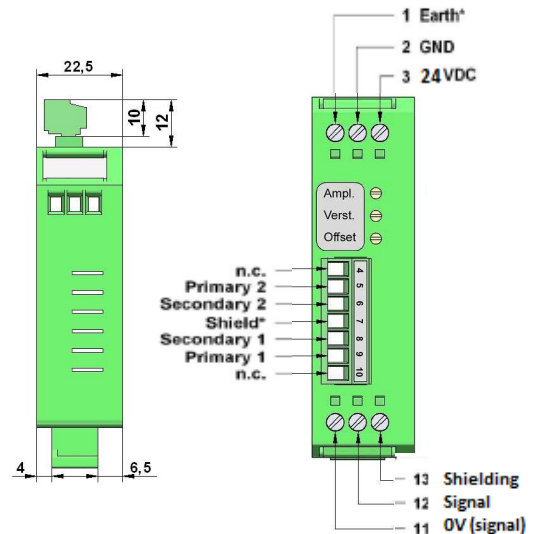
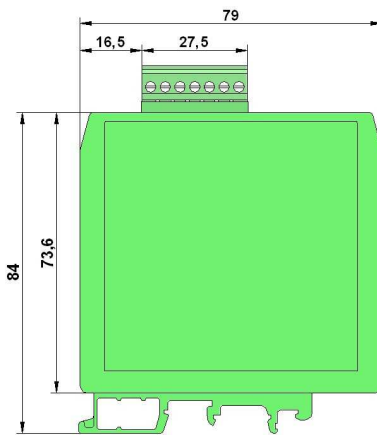
### Assignment for standard-cable:

**Brown:** supply V+  
**Blue:** GND  
**Black:** output GND  
**White:** output signal

### Assignment for PTFE-cable:

**Yellow:** supply V+  
**Brown:** GND  
**Green:** output GND  
**White:** output signal

## External electronics IMA

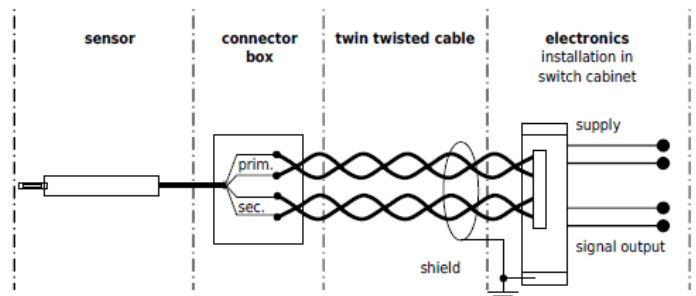


The external electronics IMA2-LVDT is designed to be installed in switch cabinets (Din-rail mounting). The connection to the sensor is conducted as connector with screw terminals.

Terminals 1, 13 and 7 are internally connected.

At harsh EMC environments, it is possible to install the electronics at a max. distance of 100 m in a switch cabinet. A twin twisted pair cable (4-cores, minimum cross section 0,5 mm<sup>2</sup>), single or double shielded, is to be used for the further wiring to connect the external electronics to the system.

It is recommended to ground the shield in the switch cabinet near the electronics (do not ground at the machine/ sensor). The sensor housing is grounded at the machine frame. To prevent interference, the cable length should not exceed 100 m.

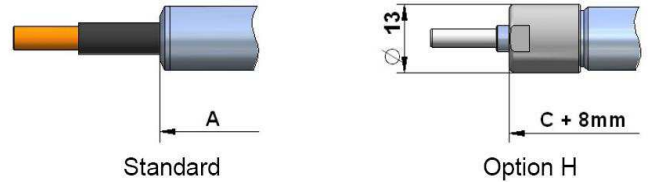


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### Cable output axial

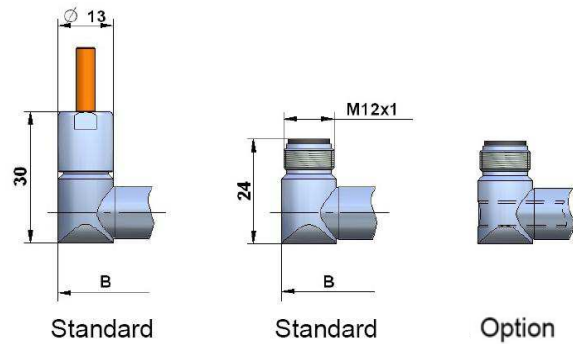
Sensors with cable output are the shortest ones. For installation, the bending radius should not be less than 3 times the cable diameter. The standard cable length is 2 m.

Instruments with option H for temperatures up to 150 °C feature a gland cable with a 13mm diameter nut.



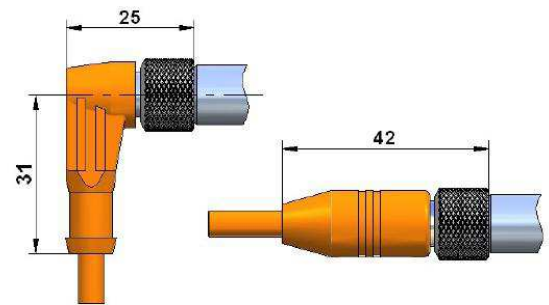
### Radial / Connector output

For normal application the sensors have a closed rear end body. Sensors that feature a radial cable output can be supplied with a through hole on request. Please use this version for applications at heavy dirt exposure. The movement of the push rod removes dirt from the sensor and conveys it to the rear.

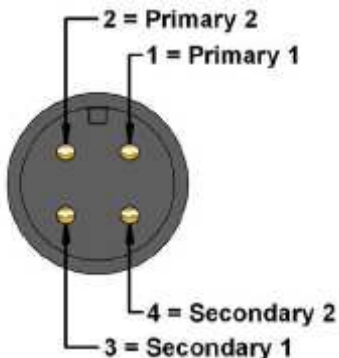


### Connector output (cable with straight or angular connector)

For sensors with connector output the cable has to be ordered separately. You can choose from a cable with a straight connector or with an angular connector. The connector is protected from accidental removal by a threaded fitting (M12). The cable lengths are 2/ 5/ 10 m. The connector pair has protection class IP65.



### Assignment M12-connector:



### Adjustment of zero point and gain

Please note that the zero point and gain may shift for long cable length between sensor and electronics. Thus install the sensor with the according cable length to the electronics and then adjust zero point and gain.

#### 1. Push rod entirely in – adjust offset

Move the sensor to the zero point of the measuring range and set the offset potentiometer on 0 mA/ 0 V for the output signal.

#### 2. Push rod entirely out – adjust gain

Move the sensor to the end of the measuring range (push rod moved out) and set the gain potentiometer on 16 mA / 10 V / 5 V for the output signal.

#### 3. Adjust offset (4...20 mA output only).

Set the offset potentiometer on 20 mA (+4 mA) for the output signal.

**4. Signal inversion:** If an inverted output signal is required (20...4 mA/ 10...0 V/ 5...0 V), swap clamps 6 and 8 (secondary coil) on the external electronics.

## Order code

<b>PPM12</b>				
Sensor series				
PPM12				
Measurement range				
2	= 0 to 2 mm			
5	= 0 to 5 mm			
10	= 0 to 10 mm			
25	= 0 to 25 mm			
50	= 0 to 50 mm			
100	= 0 to 100 mm			
200	= 0 to 200 mm			
Type				
A	= Free core			
S	= Push rod			
SG	= Push rod guided			
T	= Sprung load (Up To 0...50 Mm)			
Connectors				
SA	= Axial connector M12			
SR	= Radial connector M12			
KA	= Axial cable output			
KR	= Radial cable output			
Options				
IP68	= Protection class IP68			
H	= Temperature 150°C			
L20	= Improved linearity 0.20%			
FB	= Gaiter (up to 25 mm)			

Electronics type			
IMA-3A	= External electronics		
KAB	= Cable electronics		
Voltage supply			
12V	= 12 VDC		
24V	= 24 VDC		
Output			
020A	= 0...20 mA		
420A	= 4...20 mA		
10V	= 0...10 V		
5V	= 0...5 V		
±5V	= ± 5 V		
±10V	= ± 10 V		

## Connector cable:

### Cable with straight connector M12 (SA)

K4P2M-S-M12 2 m  
K4P5M-S-M12 5 m  
K4P10M-S-M12 10 m

### Cable with angular connector M12 (SA)

K4P2M-SW-M12 2 m  
K4P5M-SW-M12 5 m  
K4P10M-SW-M12 10 m

