

LVDT

Inductive Position Transducer



Series SM \varnothing 12 mm

- **ranges 2...200 mm**
- **linearity 0,2/0,3%**
- **\varnothing 12 mm, clamp- \varnothing 8 mm h6**
- **out: AC, 0...10 V, 0...5 V, 4...20 mA**
- **with external or integrated cable electronics**
- **repeatability up to 1,5 μ m**
- **housing nickled steel**
- **temperature -40...+120°C (150°C on request)**
- **customised version available**

Technical Data

sensor

measurement range [mm]	0...2	0...10	0...25	0...50	0...100	0...200
linearity	0,3% (0,2% optional)					
types	sprung load (up to range 0...50), free core, push rod guided/unguided					
bearing material	phosphor-bronze					
protection class	IP65 or IP68 / 10 bar					
vibration stability DIN IEC68T2-6	10 G					
shock stability DIN IEC68T2-27	200 G/2 ms					
supply voltage/frequency	3 Veff / 3 kHz					
supply frequency	2... 10 kHz					
temperature range	-40...+120°C (150° on request, Option H)					
mounting	ø8 mm h6 clamp diameter, or ø12 mm clamp brackets					
connection	4 core PVC-cable / PTFE cable (Option H) or M12-connection, coupling nut					
housing	nickled steel					
cable -PVC (standard)	ø4,7 mm, 2 twisted pair PVC-cores, 0,16 mm ²					
-PTFE (optional)	ø3,7 mm, 0,24 mm ² , max. temp. 205°C					
-PUR (optional)	ø3,9 mm, 0,14 mm ² , non halogen, highly flexible					
max. cable length	100 m between sensor and IMA external electronics					
sprung load (up to range 50mm):						
spring force min/max.	0,5/0,6	0,6/0,7	0,7/0,75	0,75/0,8		
max. cycles of tip at 1mm amplitude/s	55	50	35	20		
spring stiffness [N/mm]	0,016	0,011	0,007	0,004		
weight (without cable) [g]	48	55	72	105		
life time	> 10 Mio. cycles					
Free core / push rod:						
max. acceleration of core / push rod	100 G					
life time	infinite					
weight (without cable) [g]	36	47	59	85	136	238

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 >10 kOhm)
temperature coefficient	zero 150 ppm/°C, max. value 400 ppm/°C
ripple	< 20m Veff
max. frequency	300 Hz/-3 dB (Butterworth 5'th rang)
adjustment range	Offset ±20%, gain ±50%
isolation resistance	> 1 G Ohm at 500 VDC
isolation stability	supply <> signal 500 VDC
power supply	24 VDC (18..36 V) or 15 VDC (9..18 V)
current consumption	<150/80 mA with/without load (supply 24 VDC)
VDC)	
sensor supply	3 Veff, 3 kHz
working temperature	0...+60°C
storage temperature	-20...+80°C
housing	meets UL94-VO
mounting	on DIN rail

IMA external electronics (built-in)

0...20mA, 4...20mA (load <500 Ohm)
0...5 V, ±5 V (load >5 kOhm)
0...10 V, ±10 V (load >10 kOhm)
zero 150 ppm/°C, max. value 400 ppm/°C
< 20m Veff
300 Hz/-3 dB (Butterworth 5'th rang)
Offset ±20%, gain ±50%
> 1 G Ohm at 500 VDC
supply <> signal 500 VDC
24 VDC (18..36 V) or 15 VDC (9..18 V)
<150/80 mA with/without load (supply 24 VDC)
3 Veff, 3 kHz
0...+60°C
-20...+80°C
meets UL94-VO
on DIN rail

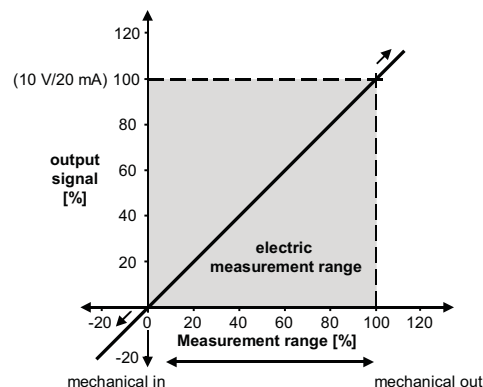
KAB cable electronics

0...20mA, 4...20mA (load <100 Ohm)
0...5 V, ±5 V (load > 5kOhm)
0...10 V (load >10kOhm)
460ppm/°C
< 20m Veff
-
-
-
-
24 VDC (18..36 V) or 15 VDC (9..18 V)
65 mA (24 VDC), 140 mA (12 VDC)
<300/100 mA with/without load (supply 15 VDC)
3,0 Veff (15...26V-supply)
2,4 Veff (12...20V-supply)
0...+60°C
-20...+80°C
aluminium shotpeeled
none

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, then the signal is also outside the defined range (i.e. >10V/20mA or <0V/4mA, in the graph: >100% or <0%).

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 plc.

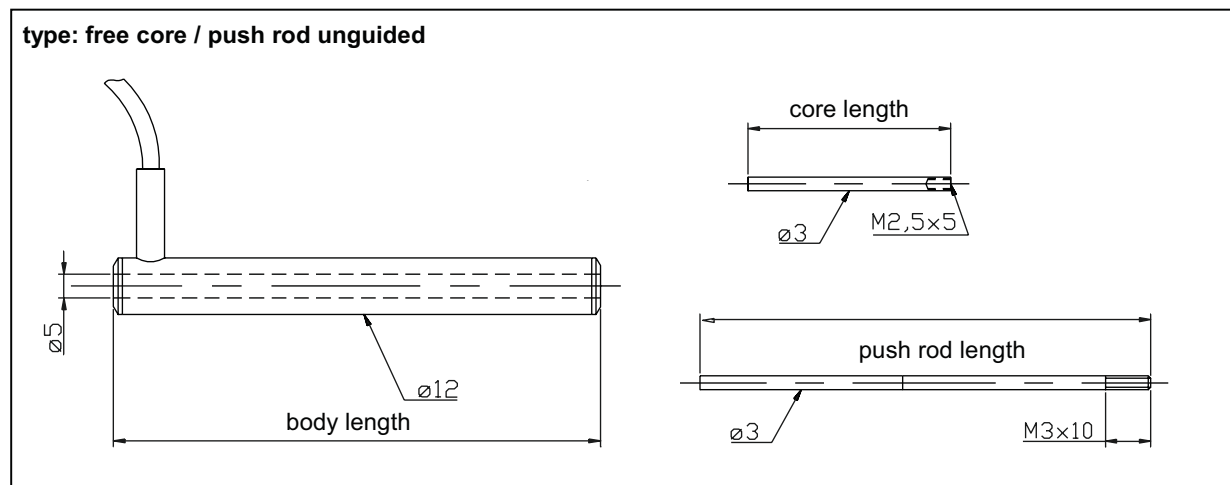
Running direction of signal: If the push rod is moving into the sensor (e.g. sprung load pushed in), then the signal is reducing. If the push rod is moving out, then the output signal is increasing. The running direction of the signal can also be inverted.



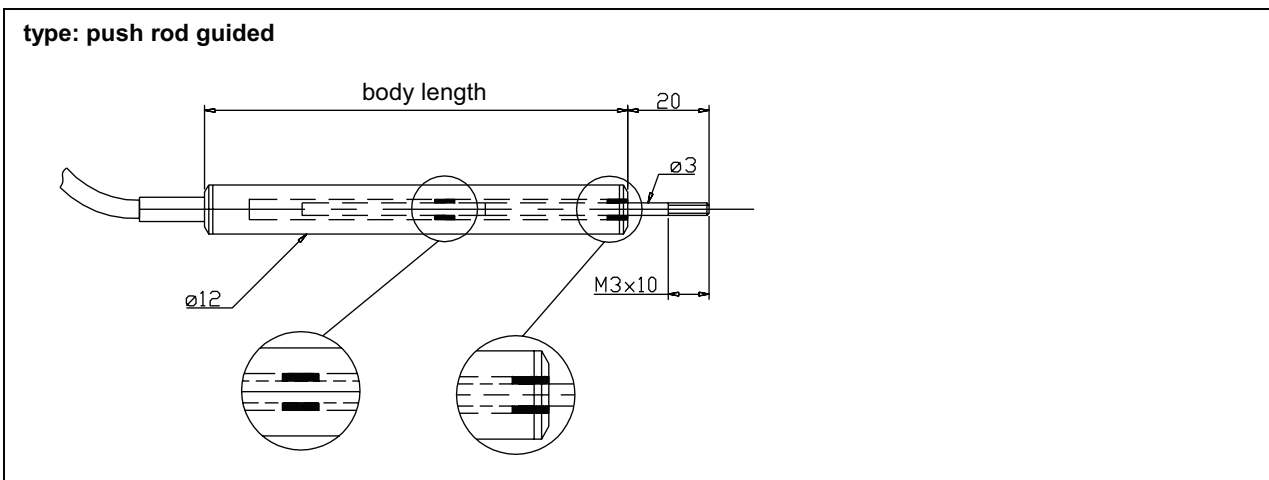
Technical Dimensions

range (FS) [mm]	body length axial cable [mm]	body length radial cable [mm]	body length connector M12 [mm]	core length [mm]	push rod length [mm]
0...2	58	68	67	22	54
0...5	64	78	73	25	60
0...10	74	84	83	30	70
0...25	104	114	113	45	100
0...50	154	164	163	70	150
0...100	254	264	263	120	250
0...200	454	464	463	220	450

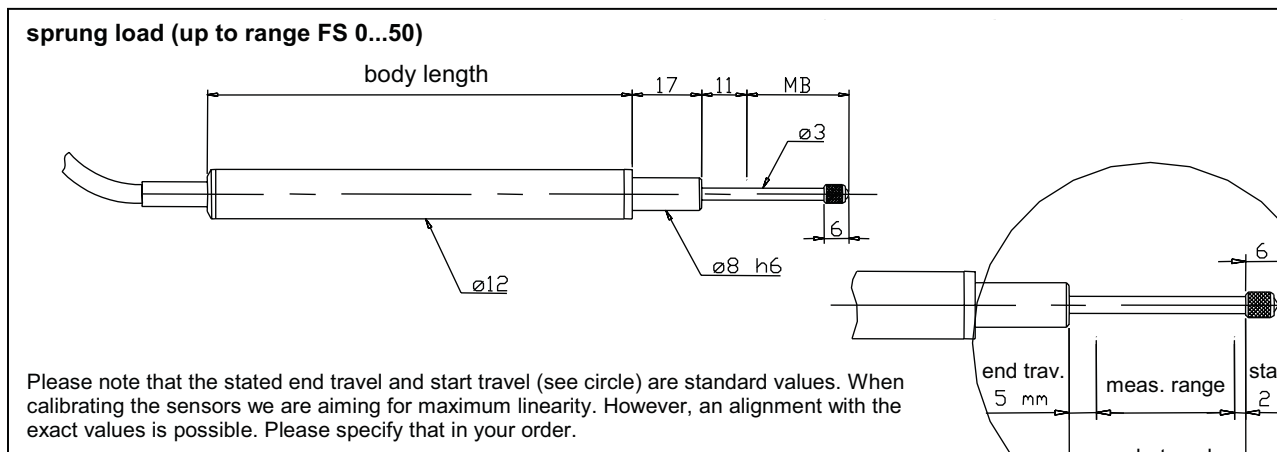
type: free core / push rod unguided



type: push rod guided



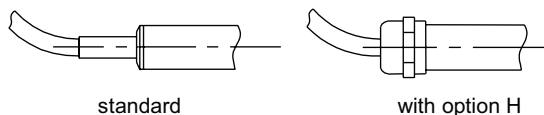
sprung load (up to range FS 0...50)



Please note that the stated end travel and start travel (see circle) are standard values. When calibrating the sensors we are aiming for maximum linearity. However, an alignment with the exact values is possible. Please specify that in your order.

Cable outputs (optional)

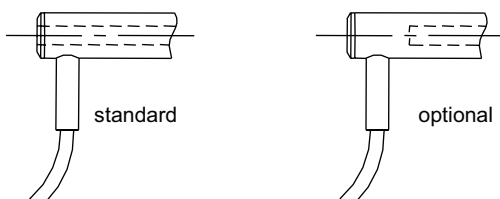
Axial cable output



Sensors with an axial cable output have the smallest body length. For installation, the bending radius should not be less than 3 times the cable diameter. The standard cable length is 2m.

Instruments with option H for temperatures up to 150°C feature a PG-threaded fitting with SW14

Radial cable output

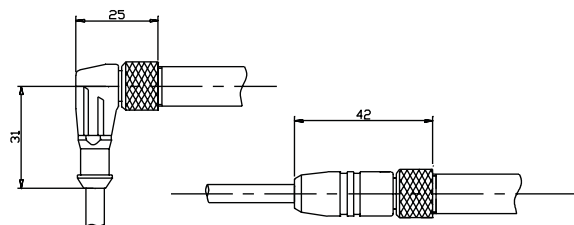


Sensors with a radial cable output have a through hole. Please use this version for application at heavy dirt exposure. The movement of the push rod removes the dirt from the sensor and conveys it to the rear. The standard cable length is 2m.

For normal application the sensor can - on request - be supplied with a closed rear end body (without additional charge). Please specify that in your order.

A combination of option H (150°C) and KR (radial cable output) is not possible.

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.

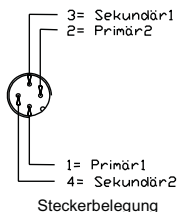
The connector is protected from accidental removal by a threaded fitting (M12). The cable lengths are 2/5/10m.

The connector pair has protection class IP65.

The total length of the sensor with connector is:
body length of the connector M12 (see table) +20mm (angular connector)
body length of the connector M12 (see table) +37mm (straight connector)

The following customised versions are available:

- specific measurement ranges (i.e. Xmm)
- pressure-tight instruments with built-in flange
- instruments for use underwater
- instruments with shortened body



Adjustment of zero point and amplification of the electronics

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

1. Push rod entirely in - adjust offset:

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

2. Push rod entirely out - adjust amplification:

Move the sensor to the mechanical end point (push rod moved out) and set the amplification potentiometer on 16mA/ 10V/ 5V for the output signal.

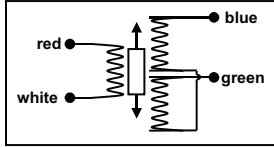
3. Adjust offset (4...20mA output)

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

Signal inversion

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

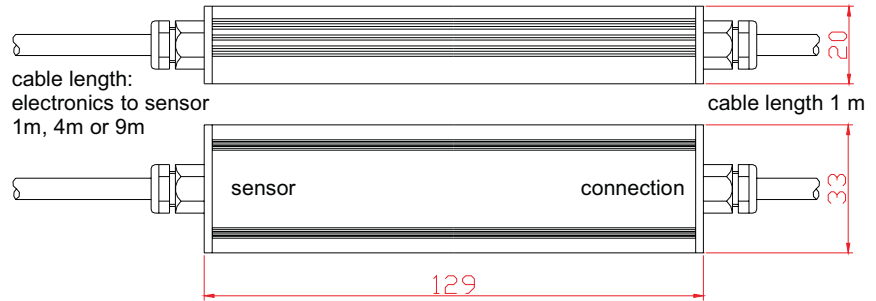
AC-output



wiring diagram:
 white (5): Primary 2
 green/black (6): Secondary 2
 red/brown (9): Primary 1
 blue (8): Secondary 1

wiring diagram for PTFE-connection:
 white (5): Primary 2
 green(6): Secondary 2
 yellow (9): Primary 1
 brown (8): Secondary 1

Cable electronics KAB



If not specified otherwise the cable electronics is situated at 1m from the end of the cable. On request in your order, however, the cable electronics is available at any distance.

wiring diagram:
 brown/red: supply V+
 blue: GND
 black/green: output GND
 white: output signal

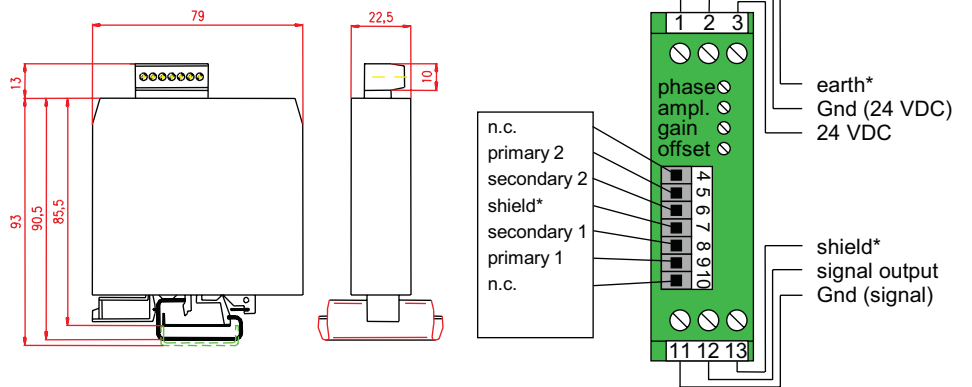
wiring diagram for PTFE-connection:
 yellow: supply V+
 brown: GND
 green: output GND
 white: output signal

External electronics IMA



external electronics IMA
(for DIN rail mounting)

dimensions:

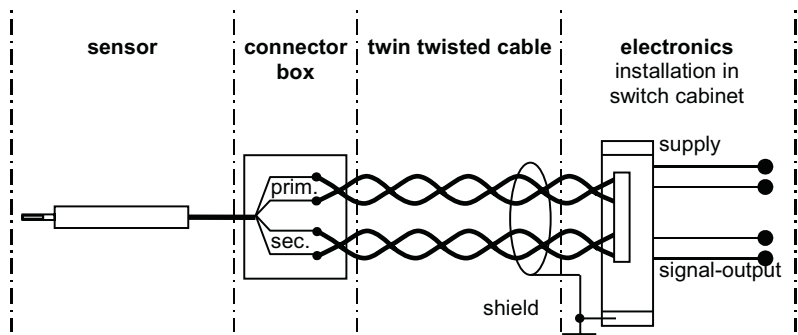


* clamps 1, 7 u. 13 are internally connected

connection:

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 clamps.

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 mm²), 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.



Order Code

