INDUCTIVE SENSOR LVDT

Links to further documents for this series:
Installation guide
Teaching guide LVA2
Data sheet TEDS connector

LV SERIES

Key-Features:
- *Spring loaded or guided rod*
- *Optional with ball-joints*
- *Measurement ranges 2, 5, 10 and 25 mm*
- *Linearity up to ±0.1 %*
- *Resolution up to 1 µm*
- *Output with external electronics: 0...10 V, 4...20 mA*
- *Protection class up to IP67*
- *Operating temperature: -40...+120 °C, optional -40...+200 °C*
- *Optional with TEDS connector*

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WayCon Positionsmesstechnik

TECHNICAL DATA SENSOR LV

Measurement range MR	[mm]	2	5	10	25
Linearity [1]	[%]	±0.2			
Improved linearity (optional) [1]	[%]	±0.1			
Resolution	[µm]	0.8	1		
Sensitivity	[mV/V/mm]	68	74	64	41
Calibrated at		4 V_{RMS} / 5 kHz			
Excitation voltage	[V_{RMS}]	1...10			
Excitation frequency	[kHz]	2...10			
Connection		connector output M12, axial or cable output, axial (TPE cable, standard length 2 m)			
Cable length to electronics max.	[m]	100			
Protection class		versions without bellow (T / S / G): IP65 version with bellow (TF): IP67			
Operating temperature	[°C]	-40...+120 (version with 5 pole connector up to +85) / optional: -40...+200 [2]			
Temperature coefficient [1]	[%/K]	±0.02			
Versions [3]		spring-loaded rod with bellow (TF) or without bellow (T), guided rod (S), guided rod with ball joints (G)			
Spring force MR centre (version TF)	[N]	1.5	1.7		-
Spring force MR centre (version T)	[N]	1.4	1.5	1.6	1.5
Spring constant (version TF)	[N/mm]	0.15			-
Spring constant (version T)	[N/mm]	0.12			0.09
Motion frequency (1 mm stroke)	[Hz]	max. 100		max. 70	max. 25
Mounting	[mm]	clamping shaft: Ø 8 h6 or housing: Ø 12			
Housing		nickel-plated steel			
Weight (without cable)	[g]	50	55	60	80
Weight version G (without cable)	[g]	90	95	100	120

[1] Based on the measurement range. The listed values are combined with the linearity of the electronics.
[2] Not available with connector output or bellow. Changed cable output with PFA cable see „Options“ page 5.
[3] Version TF (spring-loaded rod with bellows) cannot be combined with measuring range 25 mm
Versions S (guided rod) and G (guided rod with ball joints) are mounted on bearings, including anti-roll protection and end stop on both sides
[4] Versions with spring-loaded rod (TF and T) only

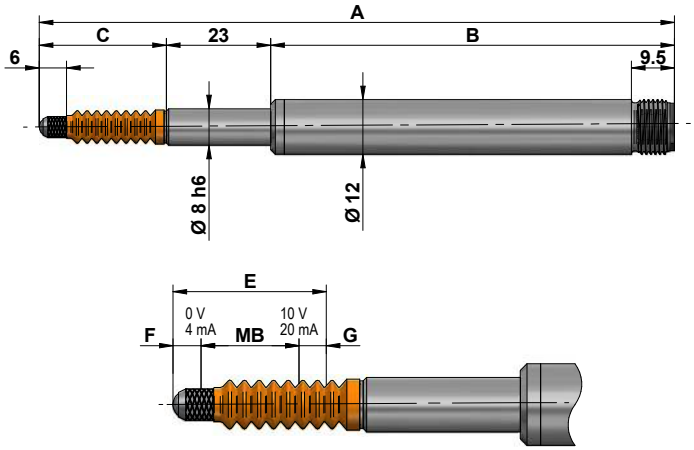
TECHNICAL DATA ELECTRONICS

		DIN rail electronics LVA2	**DIN rail electronics LVA3**	**Cable electronics LVC2**
Output		0...10 V / 4...20 mA		
Resolution		13.3 bit (approx. 10,000 steps)	Limited by noise	
Noise	[mV_{RMS}]	<3	<2	
Measurement range teachable		Yes	No	
Supply	[VDC]	18...30	18...26	
Current consumption (without load)	[mA]	<80 (at 24 V)		
Isolation voltage	[VDC]	500		
Isolation resistance at 500 VDC	[GΩ]	10		
Cut-off frequency		max. 10 % of excitation frequency		
Sensor supply	[V_{RMS}]	3	4	
Carrier frequency	[kHz]	5		
Protection class		IP40		IP64 [1] / optional: IP67
Operating temperature	[°C]	-25...+85		
Storage temperature	[°C]	-25...+85		
Temperature coefficient	[% F.S./K]	Sensitivity: <±0.02 Zero point: <0.003	<±0.015	
Mounting		DIN rail		2 x mounting holes M4 or 4 x mounting feet
Housing		Polyamide PA6.6		Aluminium (powder-coated)

[1] When using the mounting holes, the LVC2 housing must be properly closed again to maintain the IP64 protection class.

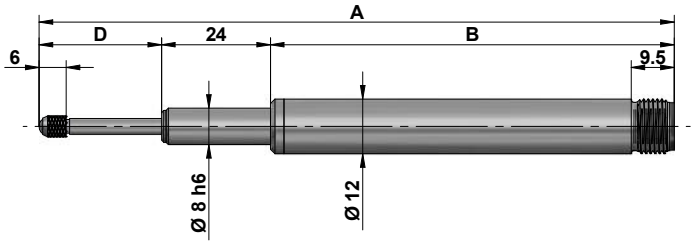
TECHNICAL DRAWING SENSOR LV

Version with bellow (TF)

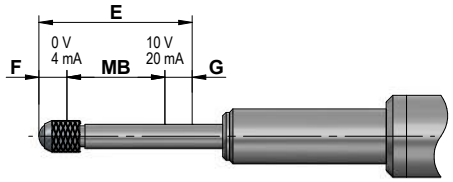


Measurement range	MB	2	5	10
Total length	A	113	126	140
Housing length	B	69	79	89
Rod outer position	C	21	24	28
Total stroke	E	5	8	12
Start stroke approx.	F	1.5	1.5	1
End stroke approx.	G	1.5	1.5	1

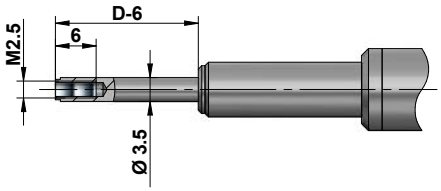
Version without bellow (T and S)



Version T

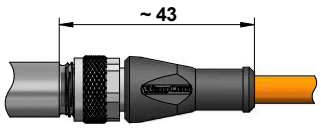


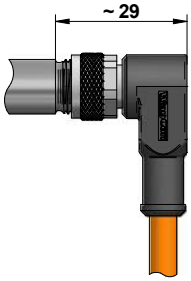
Version S



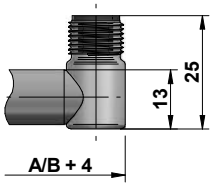
Measurement range	MB	2	5	10	25
Total length	A	113	126	140	191.5
Housing length	B	69	79	89	132.5
Rod outer position	D	20	23	27	36
Total stroke	E	5	8	12	29
Start stroke approx.	F	1.5	1.5	1	2
End stroke approx.	G	1.5	1.5	1	2

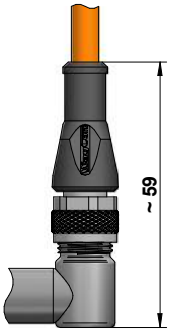
Connector output, axial



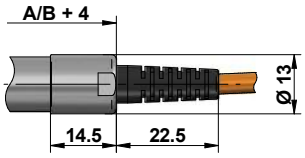


Connector output, radial

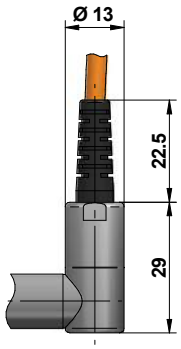




Cable output, axial

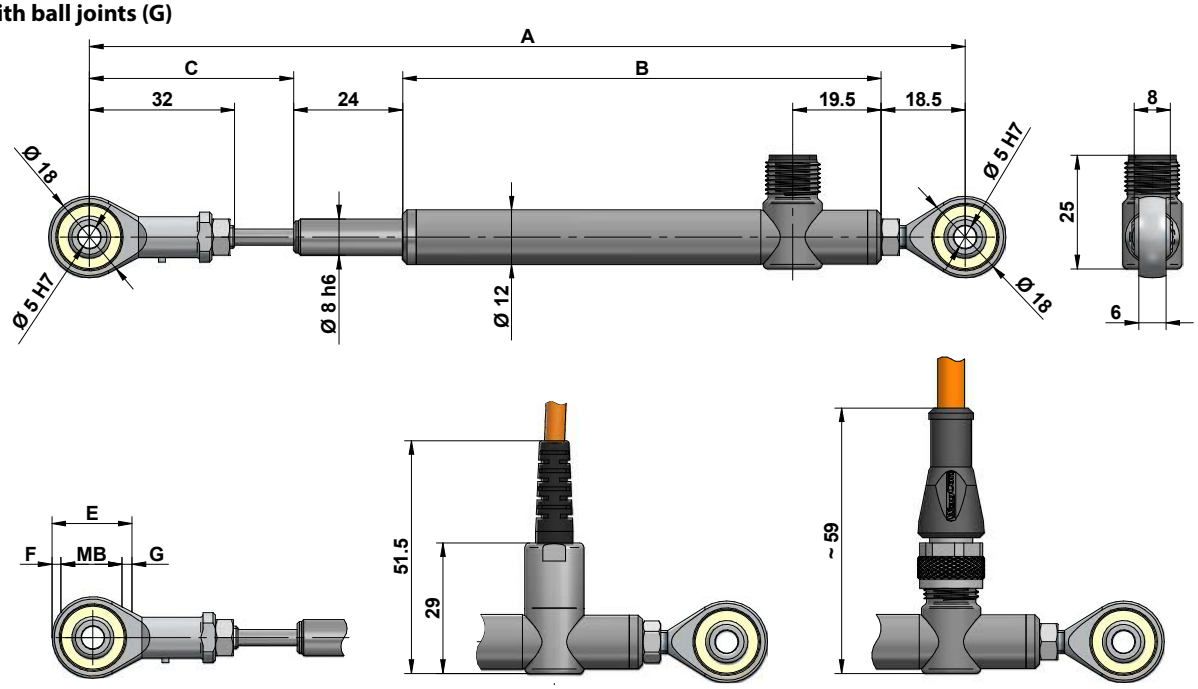


Cable output, radial



TECHNICAL DRAWING SENSOR LV

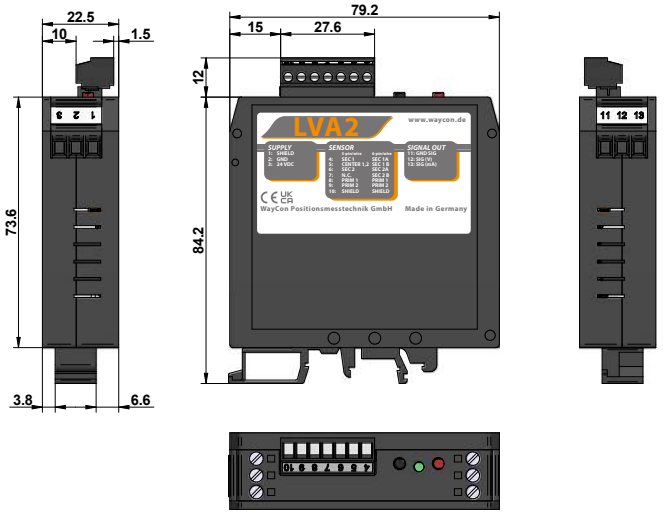
Version with ball joints (G)



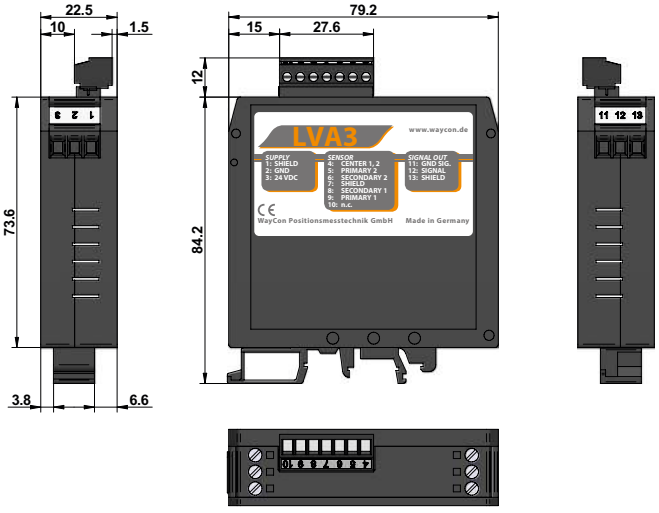
Measurement range	MB	2	5	10	25
Total length	A	166	179	193	253.5
Housing length	B	85.5	99.5	105.5	149
Rod outer position	C	38	41	45	62
Total stroke	E	5	8	12	29
Start stroke approx.	F	1.5	1.5	1	2
End stroke approx.	G	1.5	1.5	1	2

TECHNICAL DRAWING ELECTRONICS

DIN rail electronics LVA2

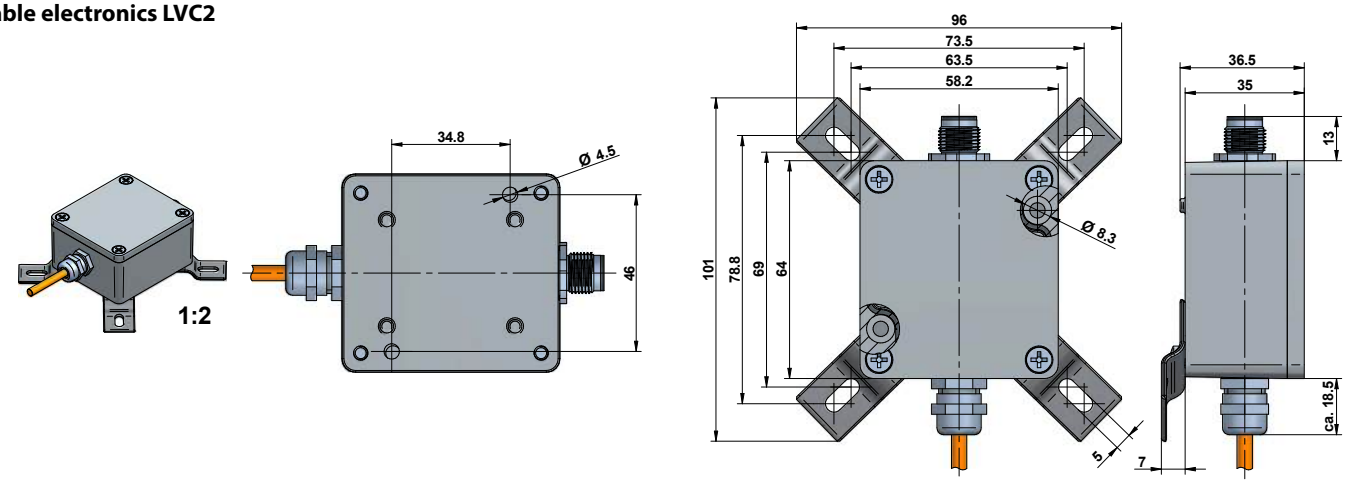


DIN rail electronics LVA3

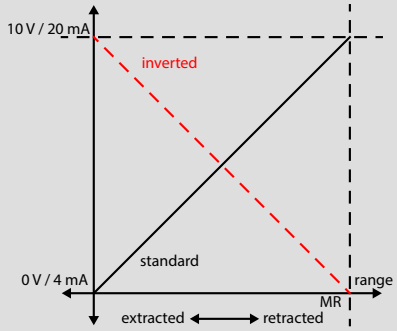
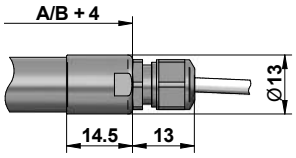


TECHNICAL DRAWING ELECTRONICS

Cable electronics LVC2



OPTIONS

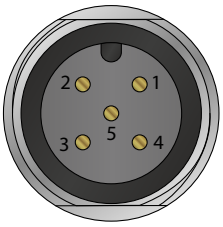
Option	Order code	Description	
Improved linearity	L10	The sensors linearity is improved to ±0.1 %.	
Inverted output signal (Only in combination with electronics LVA3 or LVC2)	IN	By default, the analog output signal of the electronics increases as the rod retracts. With the option IN the signal is inverted, i.e. the signal drops as the rod retracts.	
Increased temperature range High (Not in combination with TF, SA or SR)	H200	With this option, the temperature range of the sensor is increased to -40...+200 °C. (Changed cable output with PFA cable see drawing.)	
TEDS connector (in combination with cable output only, not in combination with electronic LVA3 or LVC2; more information about TEDS)	TD, TDP	TD: Assembling TDP: Assembling + programming	
Improved protection class IP67 for LVC2	IP67	The use of a special sealing compound protects the electronic components and thus achieves protection class IP67.	

ELECTRICAL CONNECTION

Sensor LV with 5 pole connection

Function	Cable output	Connector output	Connection cable K5P...
Primary 1	BN	Pin 1	BN
Primary 2	WH	Pin 2	WH
Secondary 2	BU	Pin 3	BU
Secondary 1	BK	Pin 4	BK
Center 1, 2	RD	Pin 5	GY

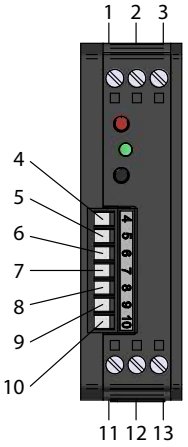
Connector, M12 (male)



ELECTRICAL CONNECTION

DIN rail electronics LVA2 and LVA3

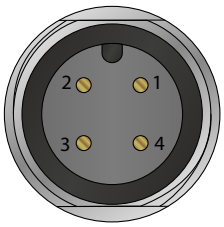
Terminal	Function LVA2	Function LVA3
1	Shield	Shield
2	GND_{supply}	GND_{supply}
3	+V	+V
4	Secondary 1	Center 1, 2
5	Center 1, 2	Primary 2
6	Secondary 2	Secondary 2
7	n. c.	Shield
8	Primary 1	Secondary 1
9	Primary 2	Primary 1
10	Shield	n. c.
11	GND_{signal}	GND_{signal}
12	Signal 0...10 V	Signal
13	Signal 4...20 mA	Shield



Cable electronics LVC2

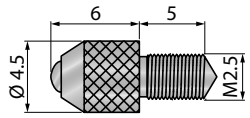
Function	Connector output	Connection cable K4P...
+V	Pin 1	BN
Signal	Pin 2	WH
GND_{supply}	Pin 3	BU
GND_{signal}	Pin 4	BK

Connector, M12 (male)

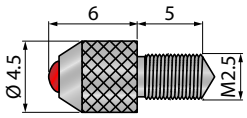


ACCESSORIES PROBE TIPS

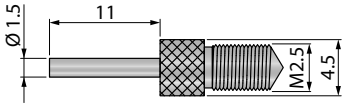
Standard: ball probe tip, steel



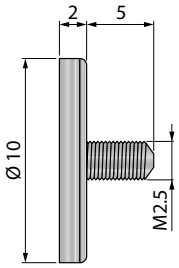
TP-K-6-R: ball probe tip, ruby



TP-S-11-S: probe pin, steel

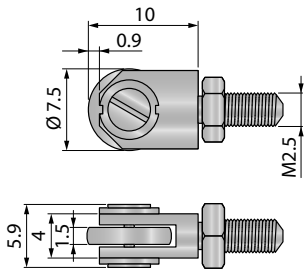


TP-T-10-S: probe plate, steel



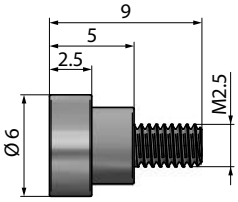
TP-R-7.5-S: probe roller, steel

Suitable for surface roughness with max. edge height (90°): 1 mm



TP-T-6-M: magnetic probe tip

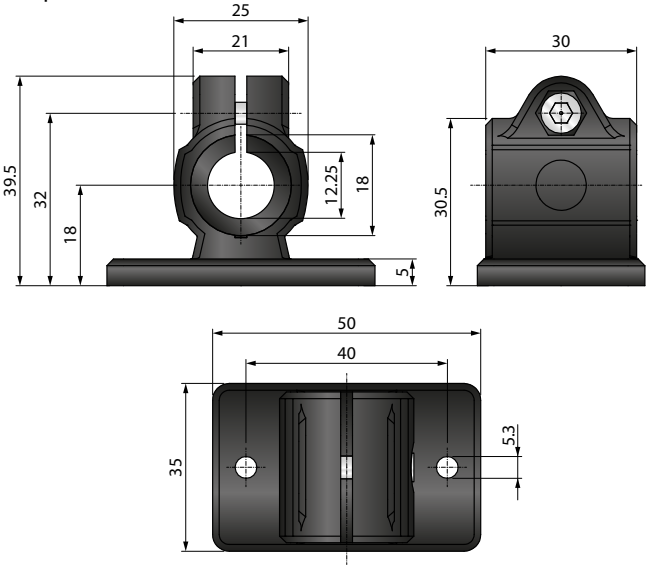
Magnetic holding force: approx. 560 g
Temperature range: up to 120 °C



ACCESSORIES CLAMPING PIECES

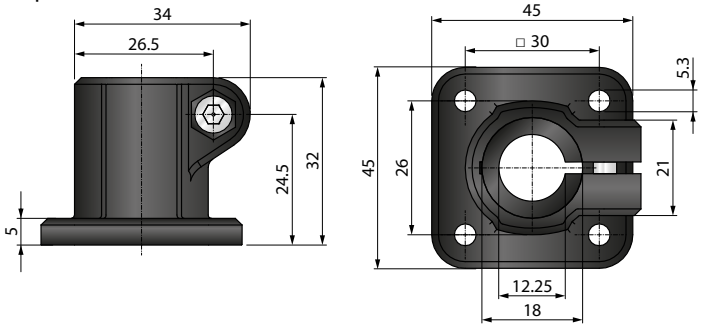
Flange clamping piece FKPA-1218

Material: PA6-GB30
Temperature: 0…80 °C



Foot clamping piece FSKPA-1218

Material: PA6-GB30
Temperature: 0…80 °C



ORDER CODE SENSOR LV

LV – □ – □ – □ – □

Version	
Spring loaded with bellow, IP67 [1]	TF
Spring loaded without bellow, IP65	T
Guided rod without bellow, IP65	S
Guided rod with ball joints, IP65 [2]	G

Measurement range MR [mm]	
2 / 5 / 10 / 25	e. g. 5

Connection for LVA3 and LVC2	
Connector output M12, axial, 5 pol. [3]	SA512
Connector output M12, radial, 5 pol. [3]	SR512
Cable output 2 m, axial, 5 poles	KA502
Cable output 5 m, axial, 5 poles	KA505
Cable output 10 m, axial, 5 poles	KA510
Cable output 2 m, radial, 5 poles	KR502
Cable output 5 m, radial, 5 poles	KR505
Cable output 10 m, radial, 5 poles	KR510

	Version
-	Standard
O	Sensor with options

Option	**Description**
L10	Improved linearity ±0,1 %
IN	Inverted output signal [4]
H200	Temperature range -40...+200 °C
TD	TEDS: assembling + programming [5]
TDP	TEDS: assembling + programming + 35 measurement points [5]

Option	**Not combinable with**
H200	TF, SA, SR
TD	SA, SR, electronics LVA3, LVC2
TDP	SA, SR, electronics LVA3, LVC2

[1] bellow not combinable with measurement range 25 mm
[2] ball joints not combinable with axial cable or connector output
[3] versions with 5 pole connector output: temperature range -40...+85 °C
[4] only if used with electronics LVA3 or LVC2
[5] for more information about TEDS connectors see here

ORDER CODE ELECTRONICS LVA2

LVA2 – □ – □ – □ □

Supply	
24 VDC	24

Output signal	
Voltage 0...10 V	10V
Current 4...20 mA	420A

	Carrier frequency
5	5 kHz

	Sensor supply
3	3 V

ORDER CODE ELECTRONICS LVA3

LVA3 – □ – □ – □ □ – □

Supply	
24 VDC	24

Output signal	
Voltage 0...10 V	10V
Current 4...20 mA	420A

Sensor supply	
4 V	4

	Sensitivity
3	300 mV (for range 2 mm)
8	800 mV (for range 5 mm)
14	1400 mV (for range 10 mm)
20	2000 mV (for range 25 mm)

	Carrier frequency
5	5 kHz

ORDER CODE ELECTRONICS LVC2

LVC2 – □ – □ – □ □ – □ – □ □ – □

Supply	
24 VDC	24
Output signal	
Voltage 0...10 V	10V
Current 4...20 mA	420A
Sensor supply	
4 V	4
Carrier frequency	
5 kHz	5
Sensitivity	
300 mV (for range 2 mm)	3
800 mV (for range 5 mm)	8
1400 mV (for range 10 mm)	14
2000 mV (for range 25 mm)	20

	Protection class
-	Standard IP64
IP67	Improved protection class IP67
	Connection to supply [1]
S	Connector M12, 4 poles
	Connection to sensor
K	Sensor cable, permanently connected [2]
BK02	Cable 2 m with connect. M12, female [3]
BK05	Cable 5 m with connect. M12, female [3]
BK10	Cable 10 m with connect. M12, female [3]

[1] further on request.
[2] for sensor with cable output. Please specify the cable length in the sensor order code.
[3] for sensor with connector output.
Please note that the connector at the end of the cable has a temperature range of -25...+85 °C.

ACCESSORIES

Probe tips	
TP-K-6-R	Ball probe tip, ruby
TP-T-10-S	Probe plate, steel
TP-S-11-S	Probe pin, steel
TP-R-7.5-S	Probe roller, steel
TP-T-6-M	Magnetic probe tip

Mounting accessories	
FKPA-1218	Flange clamping piece, polyamide
FSKPA-1218	Foot clamping piece, polyamide

Sensor cable with connector (female) M12, 5 poles, shielded	
K5P2M-S-M12-LV	2 m, straight connector
K5P5M-S-M12-LV	5 m, straight connector
K5P10M-S-M12-LV	10 m, straight connector
K5P2M-SW-M12-LV	2 m, angular connector
K5P5M-SW-M12-LV	5 m, angular connector
K5P10M-SW-M12-LV	10 m, angular connector

Electronics cable with connector (female) M12, 4 poles, shielded	
K4P2M-S-M12	2 m, straight connector
K4P5M-S-M12	5 m, straight connector
K4P10M-S-M12	10 m, straight connector
K4P2M-SW-M12	2 m, angular connector
K4P5M-SW-M12	5 m, angular connector
K4P10M-SW-M12	10 m, angular connector

Digital displays for sensors with analog output, 2 channel	
WAY-AX-S	Touch screen, supply: 18...30 VDC
WAY-AX-AC	Touch screen, supply: 115...230 VAC

For more information and options please refer to the WAY-AX data sheet.

Subject to change without prior notice.

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