INDUCTIVE SENSOR LVDT

Links to further documents for this series:
Installation guide
Calibration Instructions LVA
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*

Content

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		3 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
[2] Not available with connector output, 5 pole cable output or bellow. Changed cable output with PFA cable see „Options“ page 5.
[3] Versions with guided rod (S) or ball joints (G) are protected against falling out of the rod. Version with bellow (TF) not available for measurement range 25 mm.

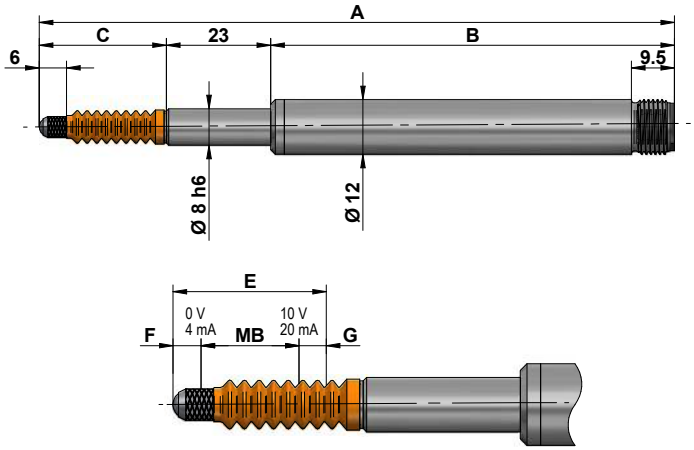
TECHNICAL DATA ELECTRONICS

		DIN rail electronics LVA	**Cable electronics LVC [1]**
Output		0...10 V / 4...20 mA	
Linearity [1]	[% F.S.]	<±0.01	
Noise	[mV_{RMS}]	<20	<5 (DC...20 MHz)
Supply	[VDC]	18...36	24 ±10 %
Current consumption (without load)	[mA]	<80 (at 24 V) / <100 (at 18 V)	<80 (at 24 V)
Isolation voltage	[VDC]	500	
Isolation resistance		1 GΩ at 500 VDC	
Cut-off frequency		max. 10 % of excitation frequency	
Sensor supply	[V_{RMS}]	3	4
Carrier frequency	[kHz]	5	
Protection class		IP40	
Operating temperature	[°C]	-25...+85	
Storage temperature	[°C]	-25...+85	
Temperature coefficient sensitivity	[% F.S./K]	<±0.04	<±0.02
Temperature coefficient zero point	[% F.S./K]	<±0.015	<±0.01
Mounting		DIN rail	2 x mounting holes M3
Housing		Polyamide PA6.6	Aluminium anodised

[1] Available for a measurement range up to 10 mm.
[2] To achieve an optimal measuring result, it is recommended to power up the electronics for 10 minutes before the measurement.

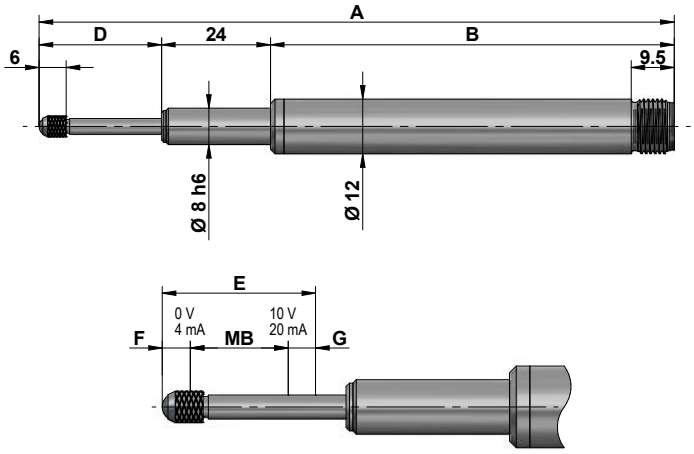
TECHNICAL DRAWING SENSOR LV

Version with bellow (TF)



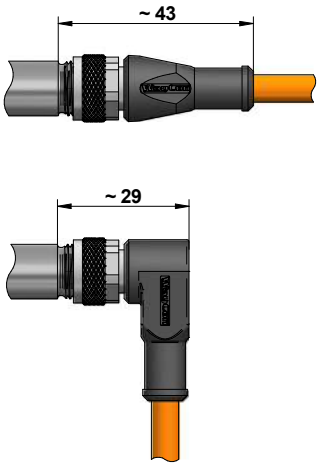
Measurement range	MB	2	5	10
Total length	A	113	126	140
Housing length	B	69	79	89
Rod outer position	C	21	24	28
Total stroke	E	5	8	12
Start stroke approx.	F	1.5	1.5	1
End stroke approx.	G	1.5	1.5	1

Version without bellow (T and S)

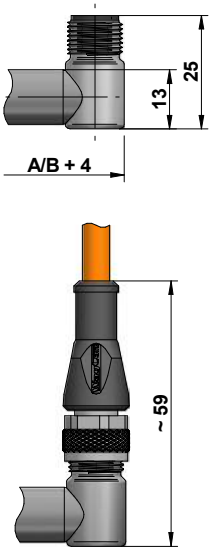


Measurement range	MB	2	5	10	25
Total length	A	113	126	140	191.5
Housing length	B	69	79	89	132.5
Rod outer position	D	20	23	27	36
Total stroke	E	5	8	12	29
Start stroke approx.	F	1.5	1.5	1	2
End stroke approx.	G	1.5	1.5	1	2

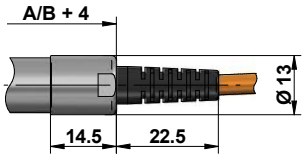
Connector output, axial



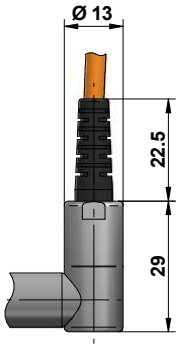
Connector output, radial



Cable output, axial

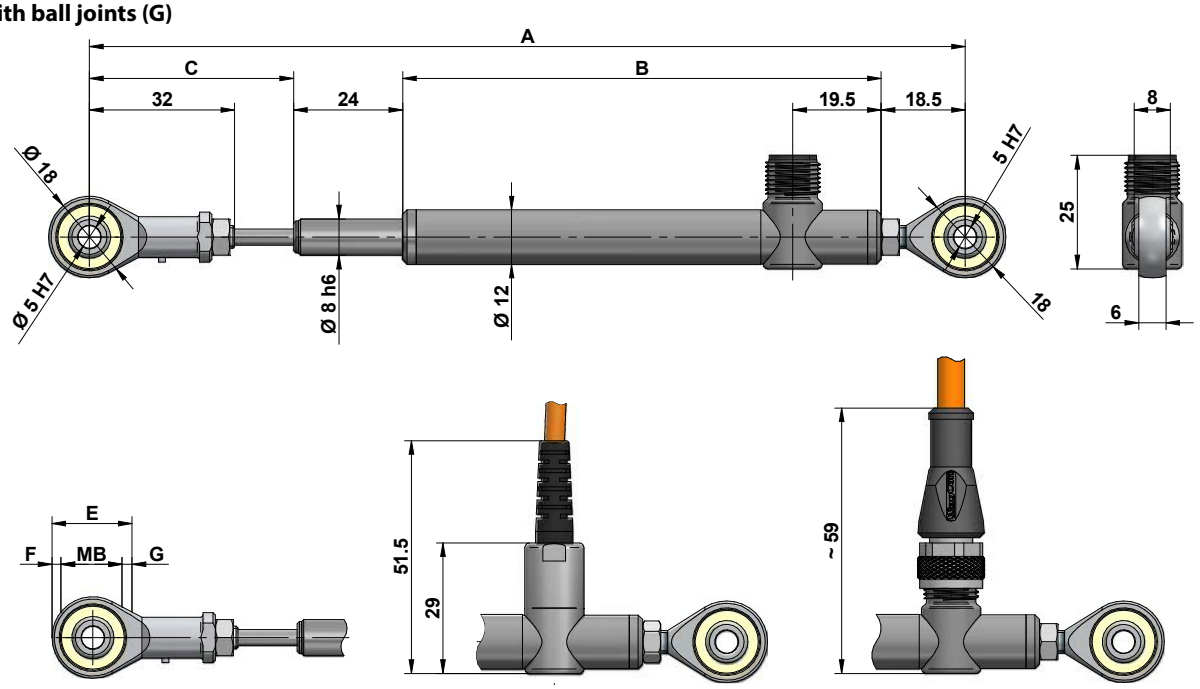


Cable output, radial



TECHNICAL DRAWING SENSOR LV

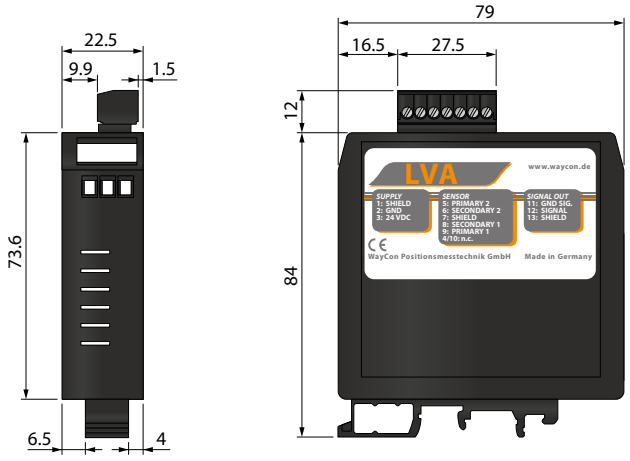
Version with ball joints (G)



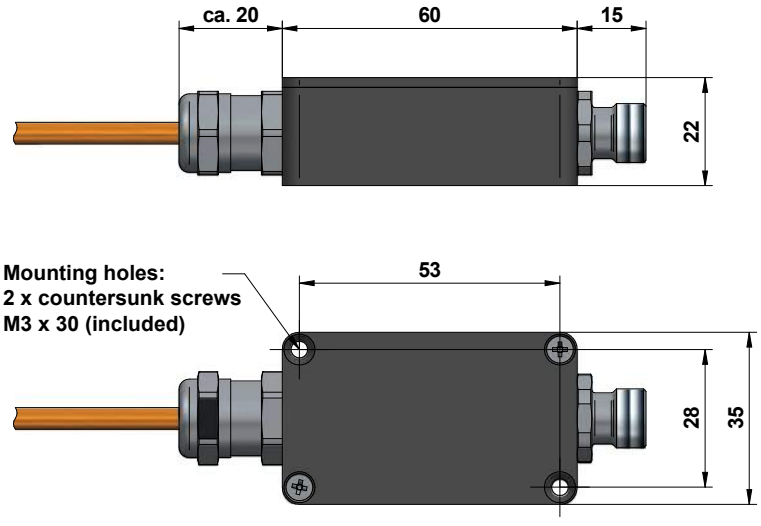
Measurement range	MB	2	5	10	25
Total length	A	166	179	193	253.5
Housing length	B	85.5	99.5	105.5	149
Rod outer position	C	38	41	45	62
Total stroke	E	5	8	12	29
Start stroke approx.	F	1.5	1.5	1	2
End stroke approx.	G	1.5	1.5	1	2

TECHNICAL DRAWING ELECTRONICS

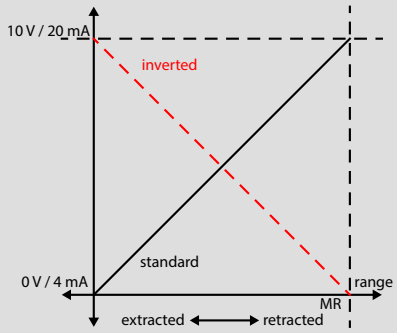
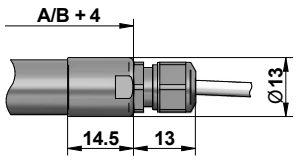
DIN rail electronics LVA



Cable electronics LVC



OPTIONS

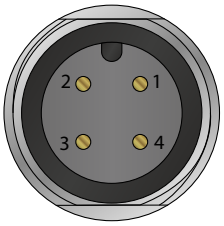
Option	Order code	Description	
Improved linearity	L10	The sensors linearity is improved to ±0.1 %.	
Inverted output signal (Only in combination with electronics LVA or LVC)	IN	By default, the analog output signal of the electronics increases as the rod retracts. With the option IN the signal is inverted, i.e. the signal drops as the rod retracts.	
Increased temperature range High (Not in combination with TF, SA, SR or 5 pole cable)	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 LVA or LVC; more information about TEDS)	TD, TDP	TD: Assembling TDP: Assembling + programming	

ELECTRICAL CONNECTION

Sensor LV for DIN rail electronics LVA

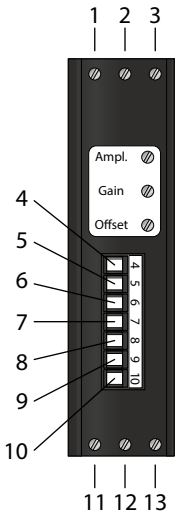
Function	Cable output	Connector output	Connection cable K4P...
Primary 1	BN	Pin 1	BN
Primary 2	WH	Pin 2	WH
Secondary 2	BU	Pin 3	BU
Secondary 1	BK	Pin 4	BK

Connector, M12 (male)



DIN rail electronics LVA

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

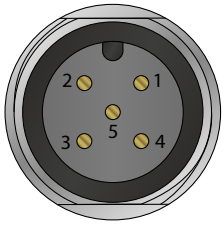


ELECTRICAL CONNECTION

Sensor LV for cable electronics LVC

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

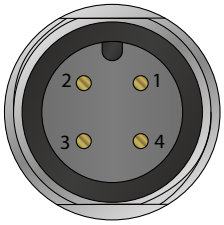
Connector, M12 (male)



Cable electronics LVC

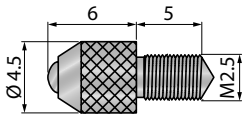
Function	Connector output	Connection cable K4P...
+V	Pin 1	BN
Signal	Pin 2	WH
GND_{supply}	Pin 3	BU
GND_{signal}	Pin 4	BK

Connector, M12 (male)

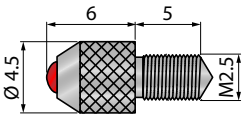


ACCESSORIES PROBE TIPS

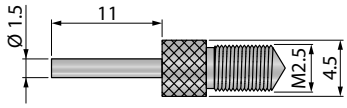
Standard: ball probe tip, steel



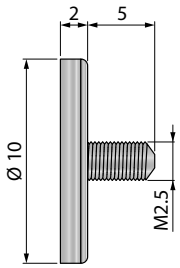
TP-K-6-R: ball probe tip, ruby



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

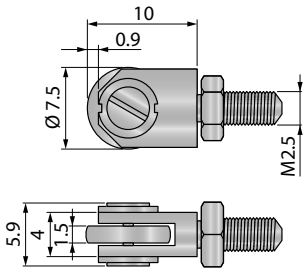


TP-T-10-S: probe plate, steel



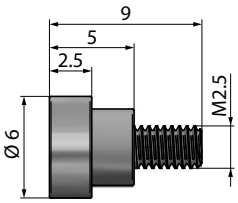
TP-R-7.5-S: probe roller, steel

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



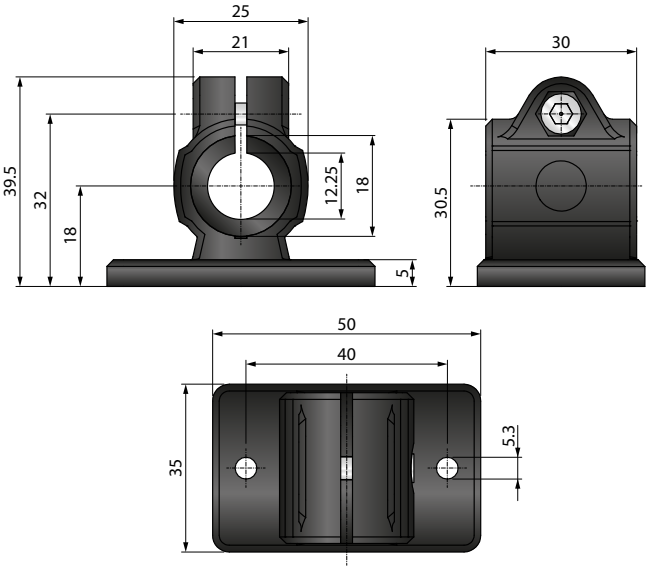
TP-T-6-M: magnetic probe tip

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

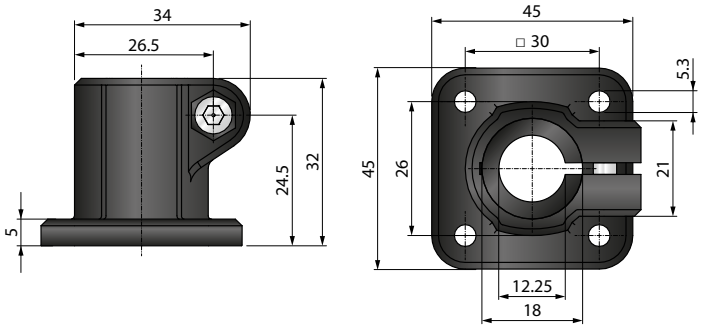


ACCESSORIES CLAMPING PIECES

Flange clamping piece FKPA-1218, polyamide



Foot clamping piece FSKPA-1218, polyamide



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 [3]	e. g. 5

Electronics code number	
Sensor without external electronics	000
For LVA with output 4...20 mA	300
For LVA with output 0...10 V	310
For LVC with output 4...20 mA	100
For LVC with output 0...10 V	110

Connection for electronics LVA	
Connector output M12, axial, 4 poles	SA12
Connector output M12, radial, 4 poles	SR12
Cable output 2 m, axial, 4 poles	KA02
Cable output 5 m, axial, 4 poles	KA05
Cable output 10 m, axial, 4 poles	KA10
Cable output 2 m, radial, 4 poles	KR02
Cable output 5 m, radial, 4 poles	KR05
Cable output 10 m, radial, 4 poles	KR10
Connection for electronics LVC	
Connector output M12, axial, 5 pol. [4]	SA512
Connector output M12, radial, 5 pol. [4]	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 [5]
H200	Temperature range -40...+200 °C
TD	TEDS: assembling + programming [6]
TDP	TEDS: assembling + programming + 35 measurement points [6]

Option	**Description**
H200	TF, SA, SR, KA5XX
TD	SA, SR, electronics LVA, LVC
TDP	SA, SR, electronics LVA, LVC

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

ORDER CODE ELECTRONICS LVA

LVA – □ – □ – □ – □ – □

Supply	
24 VDC	24

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

Sensor supply	
3 V	3

	Sensitivity
2	200 mV (for range 2 mm)
5	500 mV (for range 5 mm)
10	1000 mV (for range 10 mm)
15	1500 mV (for range 25 mm)

	Carrier frequency
5	5 kHz

ORDER CODE ELECTRONICS LVC

LVC – □ – □ – □ □ – □ – □ □

Supply 24 VDC	24
Output signal Voltage 0...10 V Current 4...20 mA	10V 420A
Sensor supply 4 V	4
Carrier frequency 5 kHz	5

	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]
	Sensitivity 3: 300 mV (for range 2 mm) 8: 800 mV (for range 5 mm) 14: 1400 mV (for range 10 mm)

[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

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

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

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