

ED 701 – General Industry Pressure Transmitter



Standard industrial process connections

Complete range of electrical connections

4 ... 20 mA and Voltage outputs

Accuracy: 0.1%, 0.2% and 0.4% FS

Quick response time < 25 ms (option 5 ms)

High long-term stability

Excellent repeatability

Active compensation for temperature drifts

ATEX II 1G, II 2G, II 1/2G and II 1D



Description

The large choice of pressure and electrical connections makes the ED 701 series suitable for a large variety of applications. The ED 701 pressure transmitters are available in 4...20mA current loop or in voltage output signal versions. These transmitters offer a very high accuracy over a wide temperature range, an excellent repeatability and long time stability as well as a short response time (down to 5 ms).

The piezo-resistive silicon sensor is anodic bonded on a very stable glass base, which is attached to a stainless steel construction. This assembly guarantees an excellent thermal isolation.

The sensor is isolated from the process by a stainless steel diaphragm (1.4404 / 316L) and a filling liquid. The electronic is located within the hermetically sealed transmitter housing which gives the ED 701 an excellent resistance to humidity, shock and vibration. Protection class, from IP 65 to IP 67 only depends on the choice of the electrical connection.

The electronic is a state-of-the-art signal processing unit fitted with a fast micro-controller allowing the compensation of drift effects due to temperature on the sensor signal, over a wide temperature range with a fast response time.

The ED 701 is available with a great variety of pressure and electrical connections to meet all requirements. The electrical connection can be replaced easily and gives access to the Autozero adjustment.

The ED 701 is a very flexible transmitter suitable for all types of industrial applications. According to its ATEX approval the ED 701 can be used in potentially explosive atmospheres (gases, vapors and dust).

Ordering details

Ordering code digit: Positions	1	2	3	4	5	6	7	8	9	10	11	12
Pressure connection												
Male thread G $\frac{1}{2}$ " EN 837-1	1											
Male thread G $\frac{1}{4}$ " EN 837-1	2											
Male thread M20x1.5 DIN 16288	3											
Male thread G $\frac{1}{2}$ " DIN 3852 with O'ring	4											
Male thread G $\frac{1}{8}$ " EN 837-1	5											
Female thread G $\frac{1}{2}$ " DIN 3852	6											
Female thread G $\frac{1}{4}$ " DIN 3852	7											
Male thread $\frac{1}{2}$ "- 14NPT, ASP N152	A											
Female thread $\frac{1}{4}$ "-18NPT, ASP N152	B											
Male thread $\frac{7}{16}$ "- 20UNF	E											
Output signal												
4 ... 20 mA		2										
0 ... 10 V DC		4										
0 ... 5 V DC		5										
Approval												
CE conform					0							
ATEX					1							
Electrical connection												
2 meter shielded cable 3 conductors, IP 65						1						
2 meter shielded cable 3 conductors, IP 67						9						
Fischer Plug, IP 67						2						
DIN 41524 Binder Plug, IP 65						3						
DIN 43650 Plug, IP 65						4						
Bendix 6 pole Plug, IP 65						5						
M12, 4 pole Industrial Plug, IP 67						6						
$\frac{1}{2}$ " NPT, cable length 1 m, IP 67						7						
Field Housing, cable gland brass nickel-plated, IP 67 ¹⁾						A						
Field Housing, cable gland stainless steel, IP 67 ¹⁾						B						
Field Housing cable gland PA, IP 67 ¹⁾						C						
Field Housing M12 Plug, stainless steel, IP 67						D						
Accuracy												
Medium temperature up to 125°C												
0.4% FS, compensated temperature range -10°...+125°C						1						
0.2% FS, compensated temperature range -10°...+125°C						2						
0.1% FS, compensated temperature range -10°...+80°C						3						
5 ms response time												
0.4% FS, 5 ms, compensated temperature range -10°...+80°C						6						
0.2% FS, 5 ms, compensated temperature range 0°...+60°C						7						
High medium temperature												
Only possible with the cooling adapters (see Accessories)												
Pressure unit												
Gauge pressure (100 mbar up to 40 bar)							3					
Absolute pressure (400 mbar up to 40 bar)							4					
Negative gauge pressure (0...-100 mbar, -1...24 bar)							5					
Pressure range												
100 mbar up to 40 bar: gauge pressure									See table			
500 mbar up to 40 bar: absolute pressure									Pressure range			

1) Field Housing: The cable gland are compatible with cable diameter of 5 mm to 12 mm.

Ordering details (continued)

Ordering code digit: Positions

1 2 3 4 5 6 7 8 9 10 11 12

Wetted parts

All stainless steel

1

Oil filling

FDA approved white oil (Standard)²⁾

1

Silicon oil)³⁾

0

2) ED 701 with FDA approved white oil: the medium temperature is limited to -10° ... + 125 °C.

3) ED 701 with silicon oil: the medium temperature is limited to -30° ... + 125 °C.

Standard ED 701 – Delivery

Calibration temperature:

The ED 701 are calibrated at + 25 °C. If another calibration temperature is needed, the option /9007/TTTT has to be mentioned, as part of the ordering code (see Options).

Electrical connections:

No cable socket will be provided. Such accessories have to be ordered separately (see Accessories).

Test Certificate:

Each ED 701 will be delivered with a Test Certificate at the calibration temperature (6 points). If not specified, the Certificate will be in German (see Options).

O-Ring seals:

The pressure connection 4 (Ordering code Position 1) is always delivered with a NBR O-Ring. Other O-Rings are available (see Accessories). The other pressure connections are delivered without any O-rings.

Options

Description

Ordering code

Specific pressure range:

An application specific pressure range can be defined here. The range must be given in plain text.

Example: /SETR 500 mbar... 2500 mbar

/SETR

Specific calibration temperature (temperature of the medium):

Example: /9007/0100. The ED 701 will be calibrated for a medium temperature of 100 °C (ex factory).

This option is reducing the compensated temperature range at ± 25 °C of the calibration temperature.

/9007/TTTT

Language of the Test Certificate and Operating Manual:

Both documents are available in German, French and English. The desired language must be specified in plain text with the ordering code. Standard will be German.

Pressure range

Code	Range mbar	Code	Range mbar	Code	Range bar	Code	Range bar
126	0...100	D46	0...-400 ²⁰⁾	L25	1...10	L55	0...30
B06	0...150	D56	0...-500 ²⁰⁾	015	0...0.6	105	0...40
136	0...160	D66	0...-600 ²⁰⁾	025	0...1	D85	0...-1 ²⁰⁾
A56	0...200	A76	0...2000	035	0...1.6	E05	-0.1...1 ²⁰⁾
146	0...250	196	0...2500	A15	0...2	E15	-0.1...2 ²⁰⁾
B26	0...300	206	0...4000	045	0...2.5	315	-1...0 ²⁰⁾
B36	0...350	A86	0...5000	L35	0...2.8	H05	-1...1 ²⁰⁾
156	0...400	216	0...6000	055	0...4	525	-1...3 ²⁰⁾
A66	0...500	P76	0...7300	A25	0...5	535	-1...5 ²⁰⁾
166	0...600	226	0...10000	065	0...6	545	-1...9 ²⁰⁾
B46	0...700	P86	0...18300	L45	0...7	E65	-1...1.6 ²⁰⁾
176	0...1000	H66	-100...100 ²⁰⁾	L05	0...8	F05	-1...2 ²⁰⁾
P46	0...1250	H76	-200...200 ²⁰⁾	075	0...10	F15	-1...10 ²⁰⁾
B56	0...1400	H86	-500...500 ²⁰⁾	L15	0...12	F45	-1...12.5 ²⁰⁾
186	0...1600	C46	-200...0 ²⁰⁾	085	0...16	F25	-1...20 ²⁰⁾
D06	0...-100 ²⁰⁾	C56	-500...0 ²⁰⁾	A35	0...20	F35	-1...24 ²⁰⁾
D16	0...-160 ²⁰⁾			095	0...25		
D26	0...-200 ²⁰⁾						

20) Negative gauge pressure ranges: only available with the pressure unit code 5 (Ordering code Position 6).

Code	Range psi	Code	Range psi	Code	Range in H ₂ O
05D	0...1.5	17D	0...300	17G	0...40
06D	0...2.5	18D	0...400	18G	0...50
07D	0...3	32D	0...500	19G	0...60
08D	0...4	70D	-1.5...1.5 ²⁰⁾	22G	0...100
09D	0...6	71D	-3...3 ²⁰⁾	30G	0...300
45D	0...7.5	72D	-6...6 ²⁰⁾	40G	0...750
10D	0...10	80D	-15...15 ²⁰⁾		
11D	0...15	60D	-1.5...0 ²⁰⁾		
12D	0...30	61D	-3...0 ²⁰⁾		
13D	0...60	62D	-6...0 ²⁰⁾		
51D	0...75	81D	-15...30 ²⁰⁾		
14D	0...100	82D	-15...60 ²⁰⁾		
15D	0...150	83D	-15...150 ²⁰⁾		
16D	0...200				

Code	Range mm H ₂ O	Code	Range m H ₂ O	Code	Range m H ₂ O	Code	Range m H ₂ O
177	0...1000	028	0...1	L58	0...30	H08	-1...1 ²⁰⁾
P47	0...1250	038	0...1.6	L78	0...32	H18	-2...2 ²⁰⁾
187	0...1600	A18	0...2	108	0...40	H28	-5...5 ²⁰⁾
A77	0...2000	048	0...2.5	A48	0...50	H38	-10...10 ²⁰⁾
197	0...2500	L38	0...2.8	118	0...60	C08	-2...0 ²⁰⁾
207	0...4000	058	0...4	L88	0...64	C18	-5...0 ²⁰⁾
A87	0...5000	A28	0...5	L68	0...70	D88	0...-1 ²⁰⁾
217	0...6000	068	0...6	128	0...100	E08	-0.1...1 ²⁰⁾
P77	0...7300	L48	0...7	L98	0...128	E18	-0.1...2 ²⁰⁾
227	0...10000	L08	0...8	B08	0...150	E68	-1...1.6 ²⁰⁾
P87	0...18300	078	0...10	138	0...160	F08	-1...2 ²⁰⁾
		L28	1...10	A58	0...200	F18	-1...10 ²⁰⁾
		L18	0...12	148	0...250	F28	-1...20 ²⁰⁾
		088	0...16	B28	0...300	F38	-1...24 ²⁰⁾
		A38	0...20	B38	0...350	F48	-1...12.5 ²⁰⁾
		098	0...25	158	0...400		

Code	Range MPa	Code	Range KPa	Code	Range KPa	Code	Range KPa
013	0...0.6	072	0...10	A62	0...500	392	-60...0 ²⁰⁾
023	0...1	L22	1...10	162	0...600	402	-100...0 ²⁰⁾
033	0...1.6	L12	0...12	B42	0...700	C92	0...-60 ²⁰⁾
A13	0...2	082	0...16	172	0...1000	D02	0...-100 ²⁰⁾
043	0...2.5	A32	0...20	P42	0...1250	642	-10...15 ²⁰⁾
053	0...4	092	0...25	B52	0...1400	652	-15...10 ²⁰⁾
883	-0.1...0.9 ²⁰⁾	L52	0...30	182	0...1600	662	-15...25 ²⁰⁾
E03	-0.1...1 ²⁰⁾	L72	0...32	A72	0...2000	672	-25...15 ²⁰⁾
E13	-0.1...2 ²⁰⁾	102	0...40	192	0...2500	682	-20...40 ²⁰⁾
		A42	0...50	202	0...4000	692	-40...20 ²⁰⁾
		112	0...60	H32	-10...10 ²⁰⁾	702	-40...60 ²⁰⁾
		L82	0...64	H42	-20...20 ²⁰⁾	712	-60...40 ²⁰⁾
		L62	0...70	H52	-50...50 ²⁰⁾	722	-60...100 ²⁰⁾
		122	0...100	H62	-100...100 ²⁰⁾	732	-100...60 ²⁰⁾
		132	0...160	352	-10...0 ²⁰⁾	742	-100...150 ²⁰⁾
		A52	0...200	362	-16...0 ²⁰⁾	G02	-100...200 ²⁰⁾
		142	0...250	C22	-20...0 ²⁰⁾	922	-100...300 ²⁰⁾
		B22	0...300	372	-25...0 ²⁰⁾	932	-100...500 ²⁰⁾
		B32	0...350	382	-44...0 ²⁰⁾		
		152	0...400	C32	-50...0 ²⁰⁾		

20) Negative gauge pressure ranges: only available with the pressure unit code 5 (Ordering code Position 6)..

Technical data

Measurement characteristics

Pressure range

Gauge pressure: from 0 ... 100 mbar up to 0 ... 40 bar.
Absolute pressure: from 0 ... 500 mbar up to 0 ... 40 bar.
The standard pressure ranges are listed in the pressure range table. Other specific ranges are available with the option SETR.

Over pressure limits

Pressure range						
0...P (bar)	0.1...0.35	0.4...1.0	1.6...5	6...20	25...35	40
Maximum pressure						
P _{max} [bar]	1	3	15	60	105	120

Accuracy

0.1%, 0.2% und 0.4% classes (see ordering code Position 5).

Hysteresis and repeatability ± 0.05% FS

Long term stability ± 0.2% FS / year

Response time (10 ... 90%)

25 ms
5 ms with the accuracy codes 6 und 7
(Ordering code Position 5).

Temperature influence (in compensated range)

Depending on the accuracy class:

Ordering code, Position 5 = 1 and 6 (class 0.4%)

Zero: TC ± 0.20% FS / 10K.
Span: TC ± 0.15% FS / 10K.

Ordering code, Position 5 = 2 and 7 (class 0.2%)

Zero: TC ± 0.15% FS / 10K.
Span: TC ± 0.10% FS / 10K.

Ordering code, Position 5 = 3 (class 0.1%)

Zero: TC ± 0.05% FS / 10K.
Span: TC ± 0.05% FS / 10K.

Operating temperature of the oil filling

Ordering code, Position 11
ED 701 with FDA approved white oil (Standard): -10°C ... +125°C
ED 701 with silicon oil: -30°C ... +125°C

Ambient temperature (housing)

-10°C ... +80°C

Storage temperature

-10°C ... +80°C

Materials specification

Wetted part

Stainless Steel W.1.4435 (fitting body) and W.1.4404 (AISI 316L, diaphragm)

Parts not in contact with medium

Stainless Steel W.1.4301, W.1.4305 and electrical connector material.

Certificate EN10204 3.1 available on request

Electrical specification

Supply voltage 10 ... 30 V DC (4...20 mA)
10 ... 28 V DC (4...20 mA EEX)
15 ... 30 V DC (0...10 V DC)

Insolation Resistance >1 GOhm, 500 V DC

Load (current output) $R_L < 50 \times U_B - 450$

Load (voltage output) $R_L \geq 5 \text{ kOhm}$

Protected against reverse signal polarity.

Switch ON time

5 sec.

EMC

Influence of EMC Less than 0.15% FS

Conformity EN 61000-6-3, EN 61000-6-2, EN 61326, EN 50121-4

ATEX data

Intrinsically safe conforming to EN 50020 and EN 50281-1-1

Applications:

II 1G II 1D Device located in zone 0/zone 20

II 1/2G II 1D Pressure connection in zone 0/zone 20
Housing and electrical connection in zone 1/zone 20

II 2G II 1D Device located in zone 1/zone 20

Intrinsically safety EEx ia IIC. The device can only be connected to an approved intrinsically safe current loop with the following boundary values:

$U_0 = 28 \text{ V}$ $I_k = 100 \text{ mA}$ $P = 1.5 \text{ W}$

The device internal capacity and inductivity values are:

$C_i = 1 \text{ nF}$ $L_i = 0.1 \text{ mH}$

For the application in EEx zone you have to respect the conditions mentioned in the ATEX Type Examination Certificate. You find the certificates and manuals under <http://www.bourdon-haenni.com/en/downloads/>

Environmental specification

Humidity According to EN 60068-2-38

Vibrations According to EN 60068-2-6

Shocks According to EN 60068-2-31

Protection class

Rating IP 65 and IP 67, depending on electrical plug.

Mounting

Position at calibration time: Vertical

Physical characteristics

Weight

Between 223 and 885 g depending of the version.

Dimensions

See drawings.

Disposal of product and packing

According to national laws or by returning to Bourdon-Haenni

Technical data

Zero adjustment and factory setting:

The zero adjustment and factory setting are directly available on the ED 701 by removing the electrical plug. A push button on the top of the electronic unit can be activated.

Zero adjustment: By pressing the push button the applied pressure will be considered as the new zero point and the output signal will be reset (i.e. 4 mA or 0 VDC). This function allows some corrections when the mounting position influences the measurement, when temperature or long term drifts occurs and when a resetting in a level measurement application is needed.

Factory setting (zero): The factory setting can be reloaded at any time. To do it the push button must be pressed during at least 10 seconds.

Oil filling

Standard: The standard oil filling is the FDA approved white oil (Paraffin oil). This is the best choice for all the applications in the food, beverages, pharmaceutical and biotech industries. ED 701 with this oil filling should not be used below -10°C and above $+125^{\circ}\text{C}$, it could severely damage the ED 701.

Alternative: The silicon oil can be recommended for all general industrial applications. ED 701 with silicone oil can be used in a temperature range from -30°C up to $+125^{\circ}\text{C}$.

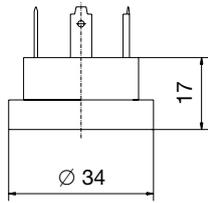
Pressure connection availability – Overview table

Code	Pressure connection	Material			Oil filling			Accuracy		
		1.4435	FDA	Silicon	P < 1 bar	P ≥ 1 bar	0.1% FS	0.2% FS	0.4% FS	
1	Male thread G $\frac{1}{2}$ " EN 837-1	●	●	●	●	●	●	●	●	
2	Male thread G $\frac{1}{4}$ " EN 837-1	●	●	●	●	●	●	●	●	
3	Male thread M20x1.5 DIN 16288	●	●	●	●	●	●	●	●	
4	Male thread G $\frac{1}{2}$ " DIN 3852 with O'ring	●	●	●	●	●	●	●	●	
5	Male thread G $\frac{1}{8}$ " EN 837-1	●	●	●	●	●	●	●	●	
6	Female thread G $\frac{1}{2}$ " DIN 3852	●	●	●	●	●	●	●	●	
7	Female thread G $\frac{1}{4}$ " DIN 3852	●	●	●	●	●	●	●	●	
A	Male thread $\frac{1}{2}$ " - 14NPT, ASP N152	●	●	●	●	●	●	●	●	
B	Male thread $\frac{1}{4}$ " - 14NPT, ASP N152	●	●	●	●	●	●	●	●	
E	Male thread $\frac{7}{16}$ " - 20UNF	●	●	●	●	●	●	●	●	

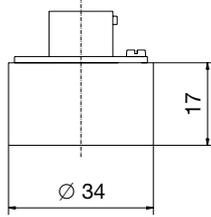
● Available

Drawing (all dimensions in mm)

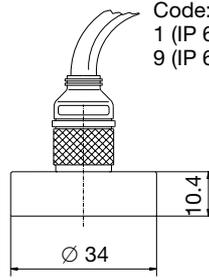
DIN 43650 plug
Code: 4



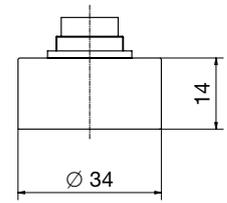
Bendix 6 pole plug
Code: 5



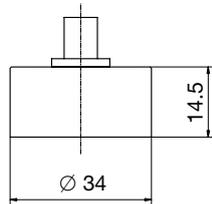
**Cable 3 conductors
IP 65 / IP 67**
Code:
1 (IP 65)
9 (IP 67)



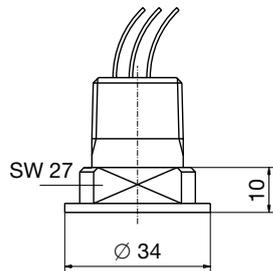
**DIN 41524
Binder plug**
Code: 3



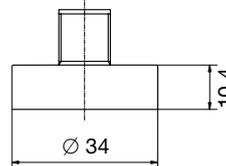
Fischer plug
Code: 2



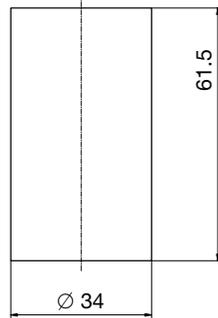
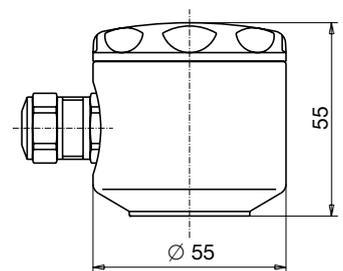
NPT 3 conductors
Code: 7



M12 industrial plug
Code: 6

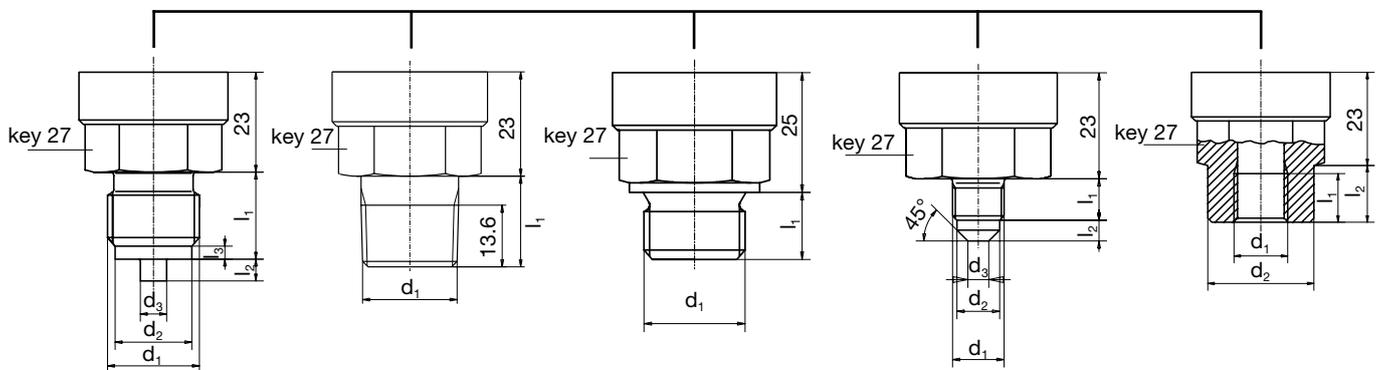


Field housing
Code: A, B, C and D



Code	Thread	d ₁	l ₁
A	1/2"-14NPT		20

Code	Thread	d ₁	d ₂	d ₃	l ₁	l ₂
E	7/16"-20UNF	9.2	4.5	9	4.5	

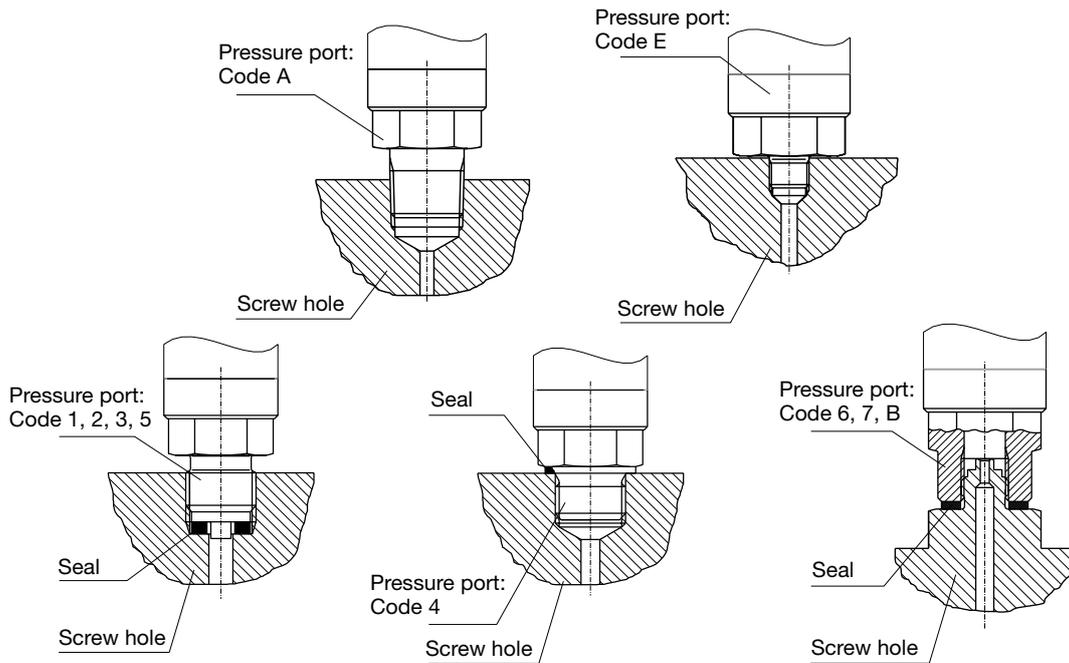


Code	Thread	d ₁	d ₂	d ₃	l ₁	l ₂	l ₃
1	G1/2"	17.5	6	20	3	3	
2	G1/4"	9.5	5	13	2	2	
3	M20x1.5	17.5	6	20	5	2	
5	G1/6"	8	5	10	2	2	

Code	Thread	d ₁	l ₁
4	G1/2"		14

Code	Thread	d ₁	d ₂	l ₁	l ₂
6	G1/2"	28	15	17.5	
7	G1/4"	26	12	14	
B	1/4"-18NPT	26	10.2	12.5	

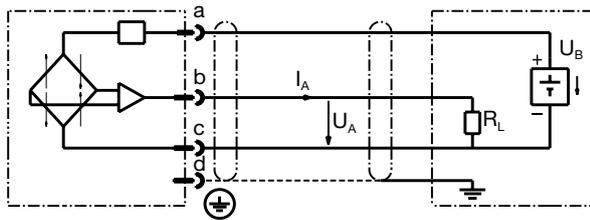
Mounting example



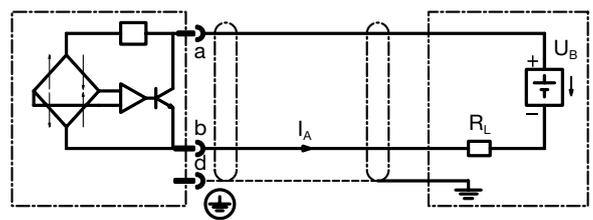
Connecting diagram

Electrical connection

For Voltage signal Output 0 ... max. 10 V



For 4 ... 20 mA current loop version



Pin assignment

Contact	DIN 43650 plug		Bendix 6 poles plug		Cable 3 conductors		DIN 41524 Binder plug	
a	4...20 mA	0...5/10 V DC	4...20 mA	0...5/10 V DC	4...20 mA	0...5/10 V DC	4...20 mA	0...5/10 V DC
b	1	1	B	B	Blue	Blue	3	3
c	2	2	E	E	Brown	Brown	1	1
d	-	3	-	D	-	Black	-	4
	GND	GND	Case	Case	Shield	Shield	Case	Case
View soldering side, cable socket								

Pin assignment

Contact	Fischer plug		NPT 3 conductors		M12 industrial plug		Field housing	
a	4...20 mA	0...5/10 V DC	4...20 mA	0...5/10 V DC	4...20 mA	0...5/10 V DC	4...20 mA	0...5/10 V DC
b	1	1	Red	Red	3	3	1	1
c	2	2	Black	Black	1	1	2	2
d	-	3	-	Green	-	4	-	3
	Case	Case	Case	Case	Case	Case	4	4
View soldering side, cable socket								

Accessories

Adapter for high temperature (cooling device)

EN 837-1 DIN 3852

d G $\frac{1}{2}$ " G $\frac{1}{2}$ "

l_T

Code ²⁾	T _{med} max.	l_T	d	Connection	Material	Ordering code
1	300°C	123	40	G $\frac{1}{2}$ "	Stainless steel 1.4435	D 12361.0
1	200°C	95	27	G $\frac{1}{2}$ "	Stainless steel 1.4435	D 12361.1
1	150°C	68	27	G $\frac{1}{2}$ "	Stainless steel 1.4435	D 12361.21

EN 837-1 EN 837-1

d G $\frac{1}{2}$ " G $\frac{1}{2}$ "

l_T

Code ²⁾	T _{med} max.	l_T	d	Connection	Material	Ordering code
1	300°C	131	40	G $\frac{1}{2}$ "	Stainless steel 1.4435	D 12361.2
1	200°C	103	27	G $\frac{1}{2}$ "	Stainless steel 1.4435	D 12361.3
1	150°C	79	27	G $\frac{1}{2}$ "	Stainless steel 1.4435	D 12361.22

EN 837-1

d G $\frac{1}{2}$ " $\frac{1}{2}$ "-14-NPT

l_T

Code ²⁾	T _{med} max.	l_T	d	Connection	Material	Ordering code
1	300°C	125	40	$\frac{1}{2}$ "-14-NPT	Stainless steel 1.4435	D 12361.6
1	200°C	97	27	$\frac{1}{2}$ "-14-NPT	Stainless steel 1.4435	D 12361.7
1	150°C	70	27	$\frac{1}{2}$ "-14-NPT	Stainless steel 1.4435	D 12361.23

2) Cross reference to ordering code digit 1, process connection, see page 2

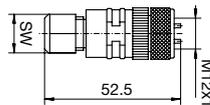
Electrical sockets

Description	Ordering code
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Cable socket connector DIN 43650 **E 6844.0**

Description	Ordering code
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Cable socket connector M12 **E 15560.0**

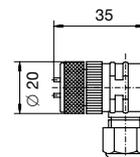


Description	Ordering code
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Cable socket connector Binder **E 13265.0**

Description	Ordering code
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Cable socket connector M12 **E 15560.1**

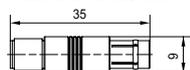


Description	Ordering code
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Cable socket connector Bendix **E 6586.1**

Description	Ordering code
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Cable socket connector Fischer **E 13267.0**



Accessories

Cable		Ordering code
Extension cable M12		E 15543.x LLL
Type	Shielded PVC Kabel Shielded PUR Kabel	0 1
Length	2 meters 5 meters 10 meters 20 meters	002 005 010 020

O-Rings

The O-rings for the pressure connection 4 (ordering code Position 1) are available in NBR, EPDM and Viton® (FPM).

The following operating temperature of the O-rings are only indicative values (dry air):

NBR (FDA): -25° ... +125 °C

EPDM (FDA): -40° ... +160 °C

FPM / Viton® (FDA): -20° ... +200 °C

Pressure connection	Designation	Material	Ordering code
4	O-Ring for male thread G $\frac{1}{2}$ " (at the rear)	NBR (FDA)	A8550.9110
4	O-Ring for male thread G $\frac{1}{2}$ " (at the rear)	FPM / Viton® (FDA)	A8550.9111
4	O-Ring for male thread G $\frac{1}{2}$ " (at the rear)	EPDM (FDA)	A8550.9112

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