DS 202

Electronic Pressure Switch

Welded, oil-free Stainless Steel Sensor

accuracy according to IEC 60770: 0.5 % FSO

Electronic Pressure Switch

DS 202

Nominal pressure:

from 0 ... 6 bar
up to 0 ... 600 bar

Contacts:

1, 2 or 4 independent PNP contacts, freely configurable

Analogue output:

2-wire: 4 ... 20 mA
3-wire: 4 ... 20 mA / 0 ... 10 V
others on request

Special characteristics:

- indication of measured values on a 4-digit LED display
- rotatable and configurable display module

Optional versions:

- **IS-version**
  Ex ia = intrinsically safe for gases
- oxygen application
- customer specific versions

CE Ex

The electronic pressure switch **DS 202** is the successful combination of

- robust pressure transmitter
- digital display

and has been specially designed for numerous applications in various industrial sectors.

As standard the **DS 202** offers a PNP contact and a rotable display module with 4-digit LED display.

The transmitters are suitable for an unrestricted use in oxygen applications up to 600 bar and an intrinsically safe IS-Version.

Preferred areas of use are:

- Medical Technology
- Plant and Machine Engineering
- Refrigeration
- Oxygen application

Input pressure range												
Nominal pressure gauge	[bar]	6	10	16	25	40	60	100	160	250	400	600
Overpressure	[bar]	14	35	35	70	140	140	350	350	700	1200	1200
Burst pressure ≥	[bar]	35	85	85	175	350	350	850	850	1750	2800	2800
Vacuum resistance		unlimited										

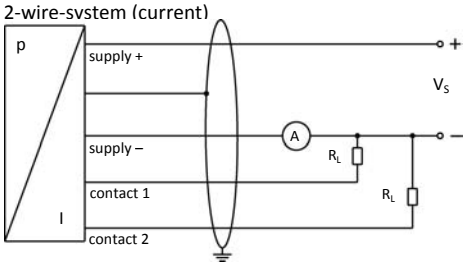
Contact [1]	
Number, type	standard: 1 PNP contact option: 2 independent PNP contacts 4 independent PNP contacts (possible with M12x1 8-pin for 4 … 20 mA / 3-wire)
Max. switching current	4 ... 20 mA / 2- and 3-wire: contact rating 125 mA, short-circuit resistant; $V_{switch} = V_S - 2V$ 0 ... 10 V / 3-wire: contact rating 500 mA, short-circuit resistant
Accuracy of contacts	≤± 0.5 % FSO
Repeatability	≤± 0.1 % FSO
Switching frequency	max. 10 Hz
Switching cycles	> 100 x 10^6
Delay time	0 ... 100 sec
[1] *with IS-protection max. 1 contact possible*	
Analogue output (optionally) / Supply	
2-wire current signal	4 ... 20 mA / V_S = 13 ... 36 V_{DC} permissible load: $R_{max} = [(V_S - V_{S\,min}) / 0.02\ A]\ \Omega$ response time: < 10 msec
2-wire current signal with IS-protection	4 ... 20 mA / V_S = 13 ... 28 V_{DC} permissible load: $R_{max} = [(V_S - V_{S\,min}) / 0.02\ A]\ \Omega$ response time: < 10 msec
3-wire current signal	4 ... 20 mA / V_S = 19 ... 30 V_{DC} permissible load: R_{max} = 500 kΩ adjustable (turn-down of span up to 1:5)[2]
3-wire voltage signal	0 … 10 V / V_S = 15 ... 36 V_{DC} permissible load: R_{min} = 10 kΩ
without analogue output	V_S = 15 ... 36 V_{DC}
Accuracy [3]	≤± 0.5 % FSO
[2] *with turn-down of span the analogue signal is adjusted automatically to the new measuring range* [3] *accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability)*	
Thermal effects (Offset and Span)	
Thermal error	± 0.3 % FSO / 10 K
in compensated range	0 … 70 °C
Permissible temperatures	
Permissible temperatures	medium: -40 ... 125 °C electronics / environment: -40 ... 85 °C storage: -40 ... 100 °C
Electrical protection	
Short-circuit protection	permanent
Reverse polarity protection	no damage, but also no function
Electromagnetic compatibility	emission and immunity according to EN 61326
Mechanical stability	
Vibration	10 g RMS (25 ... 2000 Hz) according to DIN EN 60068-2-6
Shock	500 g / 1 msec according to DIN EN 60068-2-27
Materials	
Pressure port	stainless steel 1.4571 (316 Ti)
Housing	stainless steel 1.4404 (316 L)
Display housing	PA 6.6, polycarbonate
Seals (media wetted)	none (welded)
Diaphragm	stainless steel 1.4542 (17-4PH)
Media wetted parts	pressure port, diaphragm
Explosion protection (only for 4 … 20 mA / 2-wire)	
Approval AX14-DS 202	IBExU 06 ATEX 1050 X Zone 1: II 2G Ex ia IIC T4 Gb (connector) / II 2G Ex ia IIB T4 Gb (cable)
Safety technical maximum values	U_i = 28 V, I_i = 93 mA, P_i = 660 mW, $C_i \approx 0$ nF, $L_i \approx 0$ µH
Max. switching current [4]	70 mA (max. permissible inductivity: 4.7 mH)
Permissible temperatures for environment	-20 ... 70 °C
Connecting cables (by factory)	cable capacitance: signal line/shield also signal line/signal line: 160 pF/m cable inductance: signal line/shield also signal line/signal line: 1 µH/m
[4] *the real switching current in the application depends on the power supply unit*	

Miscellaneous	
Display	4-digit, red 7-segment-LED display, digit height 7 mm, digit width 4.85 mm (angle 10°); range of indication -1999 ... +9999; accuracy 0.1 % ± 1 digit; digital damping 0.3 … 30 sec (programmable); measured value update 0.0 … 10 sec (programmable)
Current consumption (without contacts)	2-wire signal output current: max. 25 mA 3-wire signal output current: approx. 45 mA + signal current 3-wire signal output voltage: approx. 45 mA
Ingress protection	IP 65
Installation position	any
Weight	min. 160 g (depending on mechanical connection)
CE-conformity	EMC Directive: 2004/108/EC Pressure Equipment Directive: 97/23/EC (module A) [5]

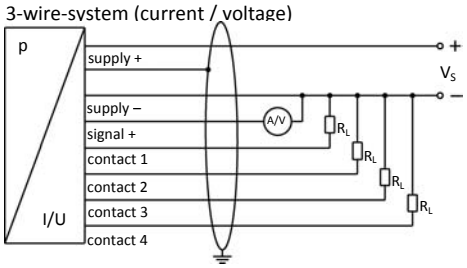
[5] *This directive is only valid for devices with maximum permissible overpressure > 200 bar*

Wiring diagrams

2-wire-system (current)



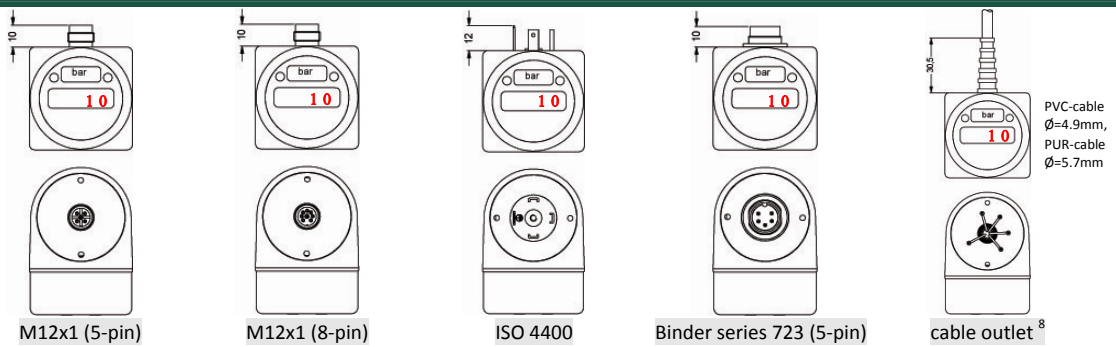
3-wire-system (current / voltage)



Pin configuration

Electrical connection	M12x1 plastic (5-pin)	M12x1 metal (5-pin)	M12x1 plastic (8-pin)	ISO 4400	cable colours (DIN 47100)
Supply +	1	1	1	1	wh (white)
Supply –	3	3	3	2	bn (brown)
Signal + (only 3-wire)	2	2	2	3	gn (green)
Contact 1	4	4	4	3	gr (grey)
Contact 2	5	5	5	-	pn (pink)
Contact 3	-	-	6	-	-
Contact 4	-	-	7	-	-
Shield	via pressure port	plug housing / pressure port	via pressure port	ground contact	gn/ye (green / yellow)

Electrical connections (dimensions in mm)



M12x1 (5-pin) | M12x1 (8-pin) | ISO 4400 | Binder series 723 (5-pin) | cable outlet [8]

[6] *different cable types and lengths available, permissible temperature depends on kind of cable;*
standard: 2 m PVC cable (without ventilation tube, permissible temperature: -5 ... 70 °C)

DS 214

Electronic Pressure Switch for very high pressure

Thinfilm Sensor

accuracy according to IEC 60770:
standard: 0.35 % FSO

Nominal pressure

from 0 ... 600 bar up to 0 ... 2200 bar

Contacts

1, 2 or 4 independent PNP contacts,
freely configurable

Analogue output

2-wire: 4 ... 20 mA
3-wire: 4 … 20 mA / 0 … 10 V
others on request

Special characteristics

- indication of measured values on a 4-digit LED display
- pressure sensor welded
- extremely robust and excellent long-term stability

Optional versions

- adjustability of span and offset (4 ... 20 mA / 3-wire)
- customer specific versions

The electronic pressure switch DS 214 for very high pressure up to 2200 bar has been designed especially for use in plant and machine engineering as well as in mobile hydraulics.

The DS 214 has one 1 contact with standard version, this can optionally be upgraded up to four independent contacts.

Via the rotatable modul with an integrated 4-digit display the DS 214 can be programmed easily and comfortably.

Preferred areas of use are

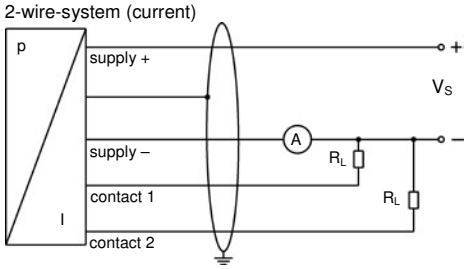
- Plant and Machine Engineering
- Commercial Vehicles and Mobile Hydraulics

CE

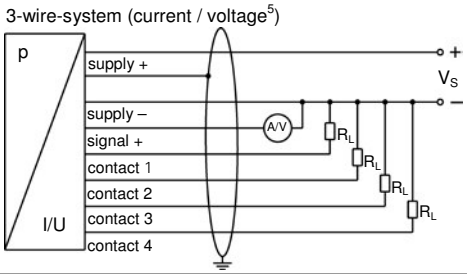
Input pressure range						
Nominal pressure gauge [bar]		600 [1]	1000	1600	2000	2200
Overpressure [bar]		800	1400	2200	2800	2800
[1] only available with pressure port G1/2" EN 837						
Contact [2]						
Standard	1 PNP contact					
Options	2 independent PNP contacts 4 independent PNP contacts (possible with M12x1, 8-pin for 4 ... 20 mA/3-wire)					
Max. switching current	4 ... 20 mA / 2- and 3-wire: contact rating 125 mA, short-circuit resistant; $V_{switch} = V_S - 2V$ 0 ... 10 V / 3-wire: contact rating 125 mA, short-circuit resistant					
Accuracy of contacts [3]	standard: ≤ ± 0.35 % FSO					
Repeatability	≤ ± 0.1 % FSO					
Switching frequency	max. 10 Hz					
Switching cycles	> 100 x 10^6					
Delay time	0 ... 100 sec					
[2] max. 1 contact for 2-wire current signal with plug ISO 4400 *no contact possible with 3-wire in combination with plug ISO 4400*						
Analogue output (optionally) / Supply						
2-wire current signal	4 ... 20 mA / V_S = 13 ... 36 V_{DC} permissible load: $R_{max} = [(V_S - V_{S\,min}) / 0.02\ A]\ \Omega$ response time: < 10 msec					
3-wire current signal	4 ... 20 mA / V_S = 19 ... 30 V_{DC} adjustable (turn-down of span 1:5) [4] permissible load: R_{max} = 500 Ω response time: < 3 sec					
3-wire voltage signal	0 … 10 V / V_S = 15 ... 36 V_{DC} permissible load: R_{min} = 10 kΩ response time: < 3 msec					
without analogue output	V_S = 15 ... 36 V_{DC}					
Accuracy [3]	standard: ≤ ± 0.35 %FSO IEC 60770					
[3] accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability) *[4] with turn-down of span the analogue signal is adjusted automatically to the new measuring range*						
Thermal effects (Offset and Span)						
Thermal error [% FSO]	≤ ± 0.25 / 10 K					
in compensated range [°C]	-20 ... 85					
Permissible temperatures						
Permissible temperatures	medium: -40 ... 140 °C electronics / environment: -25 ... 85 °C storage: -40 ... 100 °C					
Electrical protection						
Short-circuit protection	Permanent					
Reverse polarity protection	no damage, but also no function					
Electromagnetic compatibility	emission and immunity according to EN 61326					
Mechanical stability						
Vibration	10 g RMS (25 ... 2000 Hz)					
Shock	100 g / 11 msec					
Materials						
Pressure port	stainless steel 1.4542 (17-4 PH)					
Housing	stainless steel 1.4404 (316 L)					
Display housing	PA 6.6, polycarbonate					
Seals (media wetted)	none (welded version)					
Diaphragm	stainless steel 1.4542 (17-4 PH)					
Media wetted parts	pressure port, diaphragm					
Miscellaneous						
Display	4-digit, red 7-segment-LED display, digit height 7 mm, range of indication -1999 ... +9999; accuracy 0.1 % ± 1 digit; digital damping 0.3 … 30 sec (programmable); measured value update 0.0 … 10 sec (programmable)					
Current consumption (without contacts)	2-wire signal output current: max. 25 mA 3-wire signal output current: approx. 45 mA 3-wire signal output voltage: approx. 7 mA + signal current					
Ingress protection	IP 65					
Installation position	any					
Weight	min. 200 g (depending on mechanical connection)					
Operational life	> 100 x 10^6 cycles					
CE-conformity	EMC Directive: 2004/108/EC Pressure Equipment Directive: 97/23/EC (module A)					

Wiring diagrams

2-wire-system (current)



3-wire-system (current / voltage[5])

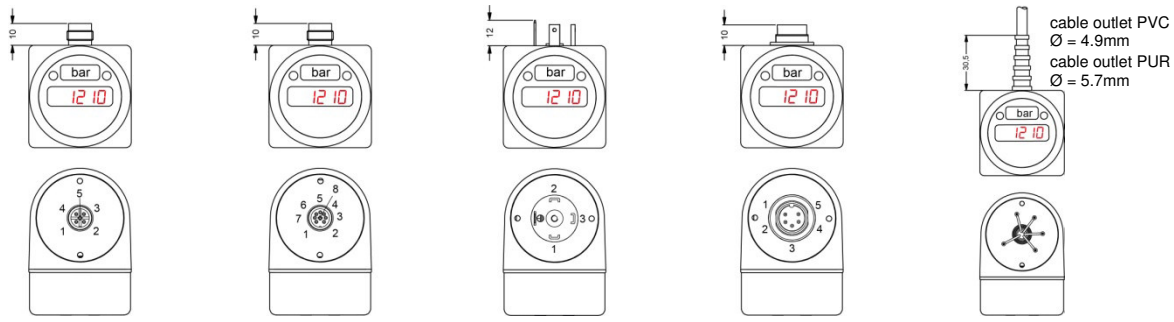


[5] max. 2 contacts possible

Pin configuration

Electrical connection	M12x1 plastic (5-pin)	M12x1 metal (5-pin)	M12x1 plastic (8-pin)	ISO 4400	Binder series 723 (5-pin)	cable colours (DIN 47100)
Supply +	1	1	1	1	1	wh (white)
Supply –	3	3	3	2	3	bn (brown)
Signal + (only 3-wire)	2	2	2	3	2	gn (green)
Contact 1	4	4	4	3	4	gy (grey)
Contact 2	5	5	5	-	5	pk (pink)
Contact 3	-	-	6	-	-	bu (blue)
Contact 4	-	-	7	-	-	rd (red)
Shield	via pressure port	plug housing/ pressure port	via pressure port	ground contact	plug housing/ pressure port	ye/gn (yellow / green)

Electrical connections (dimensions in mm)

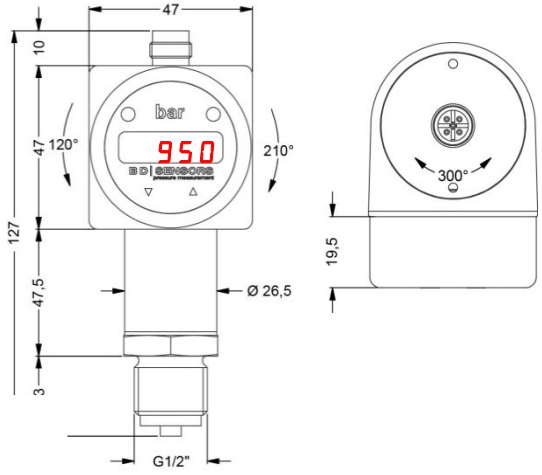


M12x1 (5-pin) | M12x1 (8-pin) | ISO 4400 | Binder series 723 (5-pin) | cable outlet [6]

[6] *different cable types and lengths available; standard: 2 m PVC cable (without ventilation tube, permissible temperature: -5 ... 70 °C)*

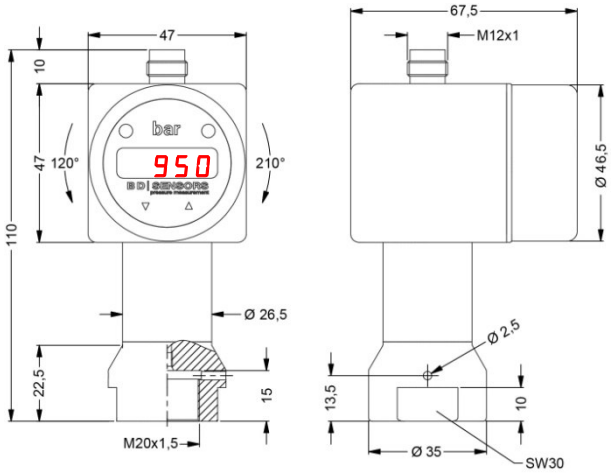
Mechanical connections (dimensions in mm)

standard



G1/2" DIN 837

option



M 20 x 1,5 internal thread

Ordering code DS 214

DS 214 □□□-□□□□-□-□-□-□□□-□□□-□-□□□

Pressure		
gauge	7 8 B	
Input [bar]		
600 [1]	6 0 0 3	
1000	1 0 0 4	
1600	1 6 0 4	
2000	2 0 0 4	
2200	2 2 0 4	
customer	9 9 9 9	consult
Analogue output		
without	0	
4 … 20 mA / 2-wire	1	
0 … 10 V / 3-wire	3	
4 … 20 mA / 3-wire, adjustable	7	
customer	9	consult
Contact		
1 contact [2]	1	
2 contacts [2]	2	
4 contacts [3]	4	
Accuracy		
0.35 %	3	
customer	9	consult
Electrical connection		
Male plug M12x1 (5-pin) / plastic version	N 0 1	
Male plug M12x1 (8-pin) / plastic version [3]	M 5 0	
Male plug M12x1 (5-pin) / metal version	N 1 1	
Male and female plug ISO 4400 [2]	1 0 0	
Male plug Binder series 723 (5-pin)	2 0 4	
Cable outlet incl. cable [4]	T A 0	
customer	9 9 9	consult
Mechanical connection		
G1/2" DIN 837 [5]	2 0 0	
M20x1.5 internal thread	D 2 8	
customer	9 9 9	consult
Seals		
without (welded version)	2	
customer	9	consult
Special version		
standard	0 0 0	
customer	9 9 9	consult

[1] only available with pressure port G1/2" EN 837

[2] with connector ISO 4400 and output 2-wire version only max. 1 contact possible; with 3-wire version no contact possible

[3] 4 contacts and M12x1, 8-pin only possible in combination and together with 4 ... 20 mA/3-wire; 0 ... 10 V/3-wire on request

[4] standard: 2 m PVC cable without ventilation tube, others on request

[5] According to EN 837, the pressure port and the complement, at pressure over 1000 bar must be preferably made of stainless steel with a tensile strength of R_P > 260 N/mm² in accordance with DIN 17440. The maximum allowed pressure is 1600 bar!

LR-Cal LR
DRUCK & TEMPERATUR LEITENBERGER

DS 217

Pressure Switch with welded Stainless Steel Sensor

Characteristics:

- accuracy according to IEC 60770: 0.5 % FSO
- nominal pressure ranges from 0 … 6 bar up to 0 … 600 bar
- 1 analogue output and up to 2 contacts
- display and housing rotatable
- suitable for oxygen applications

CE

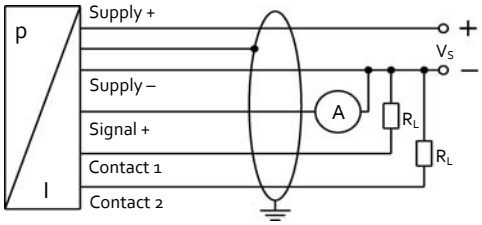
Input pressure range												
Nominal pressure gauge	[bar]	6	10	16	25	40	60	100	160	250	400	600
Overpressure (static)	[bar]	14	35	35	70	140	140	350	350	700	1 200	1 200
Burst pressure ≥	[bar]	28	70	70	140	280	280	700	700	1 400	1 500	1 500
Vacuum resistance		unlimited										
Output signal / Supply												
Analogue output												
Standard		without analogue output										
Option		3-wire: 4 ... 20 mA / V_S = 24 V_{DC} ± 10 %										
Accuracy [1]		≤± 0.5 % FSO										
Permissible load		3-wire: R_{max} = 500 Ω										
Influence effects		supply: 0.05 % FSO / 10 V					load: 0.05 % FSO / kΩ					
Measuring rate		10 Hz										
[1] *accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability)*												
Contact (standard)												
Number / type		standard: 1 PNP contact option: max. 2 independent PNP contact; 1 analogue output										
Switching current		standard: contact rating max. 500 mA, short-circuit resistant										
Accuracy of switching points		≤ ± 1.5 % FSO										
Repeatability		≤ ± 0.5 % FSO										
Switching frequency		max. 10 Hz										
Switching cycles		> 100 x 10^6										
Delay time		0 ... 100 sec										
Thermal effects (Offset and Span) / Permissible temperatures												
Thermal error		≤± 0.5 % FSO / 10 K			in compensated range -25 ... 85 °C							
Permissible temperatures		medium: -25 ... 125 °C			electronics / environment: -25 ... 85 °C					storage: -40 ... 85 °C		
Electrical protection												
Short-circuit protection		permanent										
Reverse polarity protection		no damage, but also no funcition										
Electromagnetic compatibility		emission and immunity according to EN 61326										

Mechanical stability		
Vibration	10 g (25 … 2000 Hz)	according to DIN EN 60068-2-6
Shock	500 g / 1 msec	according to DIN EN 60068-2-27
Materials		
Pressure port / Housing	stainless steel 1.4571 (316 Ti) / stainless steel 1.4301 (304)	
Display housing	PA 6.6, polycarbonate	
Seal sensor	none (welded)	
Diaphragm	stainless steel 1.4542 (17-4PH)	
Media wetted parts	pressure port, seal pressure port, diaphragm	
Miscellaneous		
Weight	approx. 160 g	
Display	4-digit, red LED display, digit height 7 mm, digit width 4.85 mm (angle 10°); range of indication -1999 ... +9999; accuracy 0.1% ± 1 digit; digital damping 0.3 … 30 sec (programmable); measured value update 0.0 … 10 sec (programmable)	
Long term stability	≤± 0.3 % FSO / year at reference conditions	
CE-conformity	EMC Directive: 2004/108/EC	Pressure Equipment Directive: 97/23/EC (module A) [2]

[2] *This directive is only valid for devices with maximum permissible overpressure > 200 bar.*

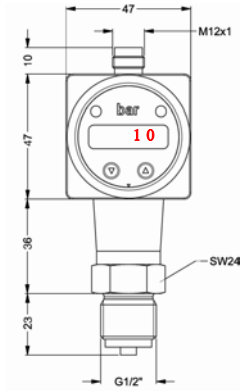
Wiring diagrams

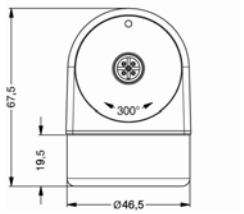
3-wire-system (current)



Pin configuration	
Electrical connections	M12x1 (5-pin) plastic
supply +	1
supply –	3
signal + (only for 3-wire)	2
contact 1	4
contact 2	5
shield	via pressure port

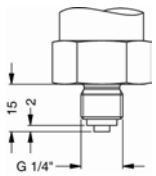
Connections (dimensions in mm)



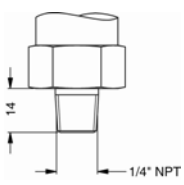


G1/2" EN 837

Mechanical connections - optional

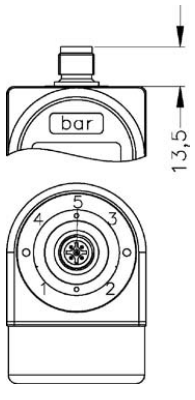


G1/4" EN 837



1/4" NPT

Electronical connections



M12x1 (5-pin)

LR-Cal

DRUCK & TEMPERATUR LEITENBERGER

Ordering code DS 217

DS 217 □□□ - □□□□ - □ - □ - □ - □ - □□□ - □□□ - □ - □□□

Pressure																									
gauge		7	8	P																					
Input	**[bar]**																								
6					6	0	0	1																	
10					1	0	0	2																	
16					1	6	0	2																	
25					2	5	0	2																	
40					4	0	0	2																	
60					6	0	0	2																	
100					1	0	0	3																	
160					1	6	0	3																	
250					2	5	0	3																	
400					4	0	0	3																	
600					6	0	0	3																	
customer					9	9	9	9																	consult
Analogue output																									
without analogue output									0																
4 … 20 mA / 3-wire									7																
customer									9																consult
Contact																									
1 contact										1															
2 contacts										2															
Accuracy																									
0.5 % FSO											5														
customer											9														consult
Electrical connection																									
male plug M12x1 (5-pin) / plastic version												N	0	1											
customer												9	9	9											consult
Mechanical connection																									
G 1/2" EN837															2	0	0	2							
G1/4" EN 837															4	0	0	2							
1/4" NPT															N	4	0	2							
customer															9	9	9	9							consult
Special version																									
standard																			0	0	0				
oxygen application																			0	0	7				
customer																			9	9	9				consult

Rel. 20170926

Electronic Pressure Switch Type DS 230
for pressure control, with digital display (4 digits)
1 or 2 solid state contacts (switching outputs)
Accuracy ±1% FS (BFSL), equal to ±2% as per IEC 60770
Self-monitoring

- Pressure Ranges from 0-2 bar to 0-400 bar (Gauge Pressure)
- Tamper proof, rugged construction, vibration- and shock-proof
- **LED-Display:** 4 digits (digit height 7.62 mm)
  Housing and Display rotatable
- **1 or 2 switching outputs**, free configurable
  Hysteresis- or Window-mode, Delay time ON/OFF
- **High control comfort**, various software-features
  access protection, free configurable display, MAX, MIN etc.
- Very good long time stability

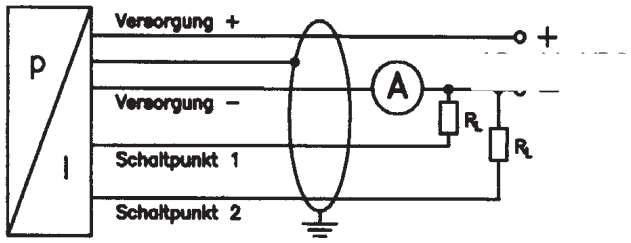
Areas of application of the **DS 230** are from pneumatics to hydraulics and the item is suitable for most varied MSR functions - precisely and long-term stable.

The **DS 230** is suitable with all media compatible with stainless steel and ceramics. On the 4-digits LED display is represented the system pressure. Besides the display supports the programming of the DS 230 by means of transparency keyboard. The software as functions, e.g. access protection, configuring the display and the switching outputs etc.

The set points are completely free configurable within the range from 0 to 100% of nominal pressure.

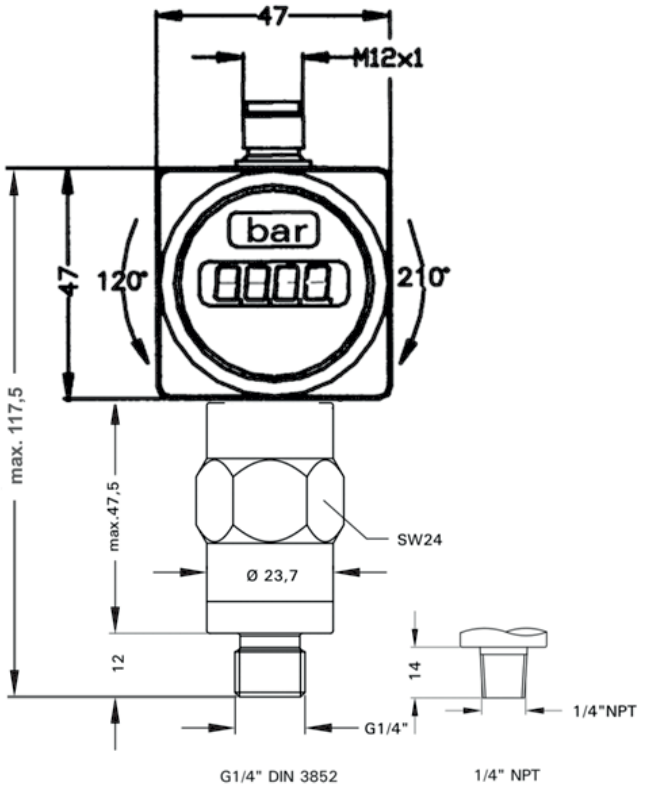
As additional highlight you can turn the display of the **DS 230**, so that final positions can be adapted due to the installtion position fast.

Electrical Connection:	Pin
Supply + Supply -	1 3
Set Point 1 Set Point 2	4 5
Ground: via pressure port	



Supply 18...36 VDC

(Range 0-400 bar has other case dimension)



DS 230

Electronic Pressure Switch DS 230
with digital display and 1 or 2 switch outputs

Technical Data:

Pressure Ranges:								
Nominal Pressure P_N rel(bar)	2	5	10	20	50	100	250	400
Overpressure P_{max}	4	10	20	40	100	200	400	600
Power Supply:	18...36 VDC							
Set Points (Switching Outputs):								
Number / Type:	1 or 2 independent PNP (Open Collector), contact rating max. 125 mA, short-ciurcuit proofed							
Switching Frequ./Cycles:	Frequency max. 10 Hz; Cycles min. 100 x 10^6							
Delay time:	0...9,9 s							
Thermal Effects:	Thermal effects in compensated range -25...+85/C: ±0,5% FSO / 10 K							
Mechanical Stability:	Vibration: 10 g RMS (20...2000 Hz), Shock: 100 g / 11 ms							
Permissible Temperatures:	Medium: +25...+125/C; Electronic/Ambient: 0...+70/C; Storage: -40...+85/C							
Electrical Connection:	Male connector M12 x 1 (5 pins, plastic (WITHOUT female plug), Protection IP 67							
Mechanical Connections:	1/4" BSP (DIN 3852); optional 1/4" NPT male							
Display:								
Display:	4 digits, red LED, digit height 7 mm			Indicating Range:	-1999...+9999			
Accuracy:	0.3% ±1 Digit; display update: 0.0...10 s (programmable)							
Materials:	Pressure connection: Stainless steel 1.4305; Seal: FKM; Diaphragm Ceramic Al_2O_3 96% Housing: Plastic PA 6.6; Indicator housing: Polycarbonat. (Wetted parts: pressure connection, seal and diaphragm)							

Order-Code:

D	S	2	3	0	-					-		-		-		-		-	0	0	0

Input (Range in bar)									
0 - 2.....	2	0	0	1					
0 - 5.....	5	0	0	1					
0 - 10.....	1	0	0	2					
0 - 20.....	2	0	0	2					
0 - 50.....	5	0	0	2					
0 - 100.....	1	0	0	3					
0 - 250.....	2	5	0	3					
0 - 400.....	4	0	0	3					
Switching Outputs									
1 Switching Output.....					1				
2 Switching Outputs.....					2				
Accuracy									
±1% FS BSFL (±2% IEC 60770).....						5			
Electrical Connection									
M12x1 (5 pins).....							N	01	
Mechanical Connection									
1/4" BSP as per DIN 3852.....									300
1/4" NPT male.....									N40

Optional there are available female plugs for the electrical connection M12x1:
Straight execution = Order-Code DMU-S-D-000057, Angle 90/ execution = Order-Code DMU-S-D-000082

Electronic Pressure Switches with additional analogue output: see type DS 200

DRUCK & TEMPERATUR
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DS 200P

Electronic Pressure Switch
Process Industry

Pressure Ports And
Process Connections With
Flush Welded
Stainless Steel Diaphragm

accuracy according to IEC 60770:
standard: 0.35 % FSO
option: 0.25 % FSO

Electronic Pressure Switch

DS 200P

Nominal pressure:

from 0 ... 100 mbar up to 0 ... 40 bar

Contacts:

1, 2 or 4 independent PNP contacts,
freely configurable

Analogue output:

2-wire: 4 ... 20 mA
3-wire: 0 … 20 mA / 0 … 10 V
others on request

Special characteristics:

- indication of measured values on a 4-digit LED display
- rotable and configurable display module
- configurable contacts
  (switch on / switch off points,
  hysteresis / window mode,
  switch on / switch off delay)

Optional versions:

- **IS-version**
  Ex ia = intrinsically safe for gases
- customer specific versions

The electronic pressure switch **DS 200P** is the successful combination of

- intelligent pressure switch
- digital display

and is suitable for the usage with viscous and pasty media.

As standard the **DS 200P** offers a PNP contact and a rotatable display module with 4-digit LED display.

Optional versions like e.g. an intrinsically safe version, max. 4 contacts and an analogue output complete the profile.

Preferred areas of use are:

Food industry

Pharmacy

Material and test certificates:

- material test report
  according to DIN EN 10204-3.1.
- specific test report
  according to DIN EN 10204-2.2.

DS 200P

Electronic Pressure Switch — Technical Data

Input pressure range[1]																
Nominal pressure (P_N) gauge / abs.	[bar]	-1 ... 0	0.10	0.16	0.25	0.40	0.60	1	1.6	2.5	4	6	10	16	25	40
Overpressure	[bar]	5	0.5	1	1	2	5	5	10	10	20	40	40	80	80	105
Burst pressure ≥	[bar]	7.5	1.5	1.5	1.5	3	7.5	7.5	15	15	25	50	50	120	120	210
Vacuum resistance		P_N ≥ 1 bar: unlimited vacuum resistance											P_N < 1 bar: on request			

[1] *consider the pressure resistance of fitting and clamps*

Contact [2]	
Standard	1 PNP contact
Options	2 independent PNP contacts 4 independent PNP contacts (possible with M12x1, 8-pin for 4 ... 20 mA/3-wire; 0 ... 10 V/3-wire on request)
Max. switching current	4 ... 20 mA / 2- and 3-wire: contact rating 125 mA, short-circuit resistant; $V_{Switch} = V_S$ - 2V 0 ... 10 V / 3-wire: contact rating 500 mA, short-circuit resistant
Accuracy of contacts [3]	standard: P_N < 0.4 bar: ≤± 0.5 % FSO P_N ≥ 0.4 bar: ≤± 0.35 % FSO option: P_N ≥ 0.4 bar: ≤± 0.25 % FSO
Repeatability	≤ ± 0.1 % FSO
Switching frequency	max. 10 Hz
Switching cycles	> 100 x 10^8
Delay time	0 ... 100 sec

[2] *max. 1 contact for 2-wire current signal with plug ISO 4400 as well as 2-wire current signal with IS-protection*
no contact possible with 3-wire in combination with plug ISO 4400
[3] *accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability)*

Analogue output (optionally) / Supply		
2-wire current signal	4 ... 20 mA / V_S = 13 ... 36 V_{DC} permissible load: $R_{max} = [(V_S - V_{S\,min}) / 0.02\ A]\ \Omega$	response time: < 10 msec
2-wire current signal with IS-protection	4 ... 20 mA / V_S = 13 ... 28 V_{DC} permissible load: $R_{max} = [(V_S - V_{S\,min}) / 0.02\ A]\ \Omega$	response time: < 10 msec
3-wire current signal	4 ... 20 mA / V_S = 19 ... 30 V_{DC} adjustable (turn-down of span 1:5) [4] permissible load: R_{max} = 500 Ω	response time: < 0.5 sec
3-wire voltage signal	0 … 10 V / V_S = 15 ... 36 V_{DC} permissible load: R_{min} = 10 kΩ	response time: < 10 msec
Without analogue output	V_S = 15 ... 36 V_{DC}	
Accuracy [3]	standard: P_N < 0.4 bar: ≤± 0.5 % FSO P_N ≥ 0.4 bar: ≤± 0.35 % FSO option: P_N ≥ 0.4 bar: ≤± 0.25 % FSO	

[4] *with turn-down of span the analogue signal is adjusted automatically to the new measuring range*

Thermal errors (Offset and Span) [6] **/ Permissible temperatures**				
Nominal pressure P_N	[bar]	-1 … 0	< 0.40	≥ 0.40
Tolerance band	[% FSO]	≤± 0.75	≤± 1.5	≤± 0.75
in compensated range	[°C]	-20 ... 85	0 ... 50	-20 ... 85
Permissible temperatures [6]		medium: -40 ... 125 °C for filling fluid silicon oil -10 ... 125 °C for filling fluid food compatible oil electronics / environment: -40 ... 85 °C		storage: -40 ... 100 °C
Permissible temperature medium for cooling element 300°C		filling fluid silicon oil	overpressure: -40 … 300 °C	vacuum: -40 ... 150 °C[5]
		filling fluid food compatible oil	overpressure: -10 ... 250 °C	vacuum: -10 ... 150 °C

[5] *also for $P_{abs} \leq 1$ bar*
[6] *an optional cooling element can influence thermal effects for offset and span depending on installation position and filling conditions.*
[7] *max. temperature of the medium for nominal pressure gauge > 0 bar: 150 °C for 60 minutes with a max. environmental temperature of 50 °C*

Electrical protection	
Short-circuit protection	permanent
Reverse polarity protection	no damage, but also no function
Electromagnetic compatibility	emission and immunity according to EN 61326

Mechanical stability		
Vibration	5 g RMS (25 ... 2000 Hz)	according to DIN EN 60068-2-6
Shock	100 g / 11 msec	according to DIN EN 60068-2-27

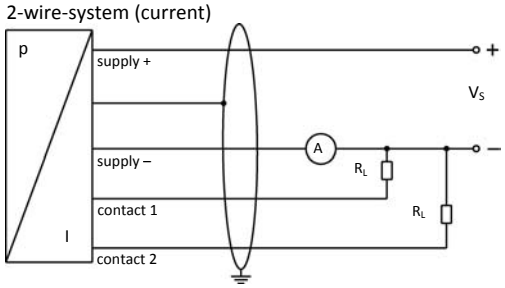
Filling fluids	
Standard	silicon oil
Options	food compatible oil (with FDA approval) (Mobil DTE FM 32; Category Code: H1; NSF Registration No.: 130662) others on request

Materials		
Pressure port / Housing	stainless steel 1.4404 (316 L)	others on request
Display housing	PA 6.6, Polycarbonate	
Seals (media wetted)	standard: FKM (recommended for medium temperatures ≤ 200 °C) option: FFKM (recommended for medium temperatures > 200 °C) clamp and dairy pipe: without	
Diaphragm	stainless steel 1.4435 (316 L) / Tantalum and Hastelloy® C-276 (2.4819) on request	

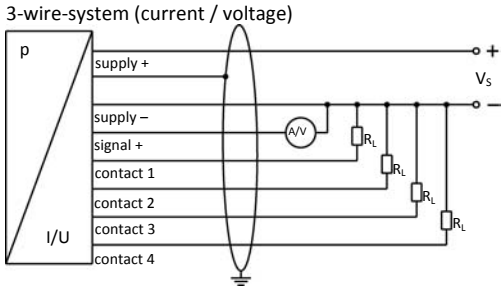
Media wetted parts	pressure port, seals, diaphragm
Explosion protection (only for 4 … 20 mA / 2-wire)	
Approval AX14-DS 200P	IBExU 06 ATEX 1050 X zone 1: II 2G Ex ia IIC T4 Gb (connector) / II 2G Ex ia IIB T4 Gb (cable)
Safety technical maximum values	U_i = 28 V, I_i = 93 mA, P_i = 660 mW, C ≈ 0 nF, L_i ≈ 0 µH
Max. switching current [8]	70 mA (max. permissible inductivity: 4.7 mH)
Permissible temperatures for environment	-20 ... 70 °C
Connecting cables (by factory)	cable capacitance: signal line/shield also signal line/signal line: 160 pF/m cable inductance: signal line/shield also signal line/signal line: 1 µH/m
[8] *the real switching current in the application depends on the power supply unit*	
Miscellaneous	
Display	4-digit, red 7-segment-LED display, digit height 7 mm, range of indication -1999 ... +9999; accuracy 0.1 % ± 1 digit; digital damping 0.3 … 30 sec (programmable); measured value update 0.0 … 10 sec (programmable)
Current consumption (without contacts)	2-wire signal output current: max. 25 mA 3-wire signal output current: approx. 45 mA + signal current 3-wire signal output voltage: approx. 45 mA
Ingress protection	IP 65
Installation position	any (standard calibration in a vertical position with the pressure port connection down; different installation position for P_N ≤ 2 bar have to be specified in the order)
Weight	approx. 160 ... 250 g
Operational life	> 100 x 10^8 cycles
CE-conformity	EMC Directive: 2004/108/EC

Wiring diagrams

2-wire-system (current)



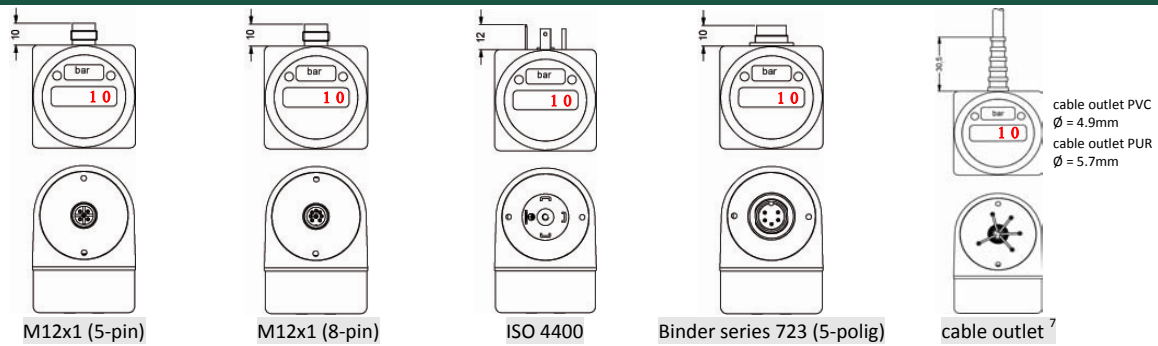
3-wire-system (current / voltage)



Pin configuration

Electrical connection	M12x1 plastic (5-pin)	M12x1 metal (5-pin)	M12x1 plastic (8-pin)	ISO 4400	Binder series 723 (5-pin)	cable colours (DIN 47100)
Supply +	1	1	1	1	3	wh (white)
Supply –	3	3	3	2	4	bn (brown)
Signal + (only 3-wire)	2	2	2	3	5	gn (green)
Contact 1	4	4	4	3	2	gr (grey)
Contact 2	5	5	5	-	1	pn (pink)
Contact 3	-	-	6	-	-	-
Contact 4	-	-	7	-	-	-
Shield	via pressure port	plug housing/ pressure port	via pressure port	ground contact	plug housing/ pressure port	gn/ye (green/yellow)

Electrical connections (dimensions in mm)

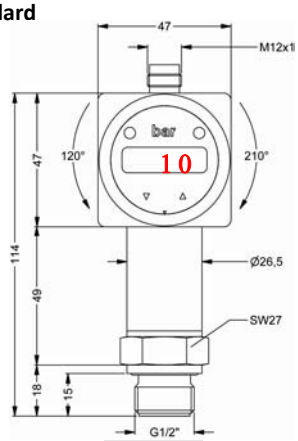


M12x1 (5-pin) | M12x1 (8-pin) | ISO 4400 | Binder series 723 (5-polig) | cable outlet [7]

[7] *different cable types and lengths available, permissible temperature depends on kind of cable;*
standard: 2 m PVC cable (without ventilation tube, permissible temperature: -5 ... 70°C)

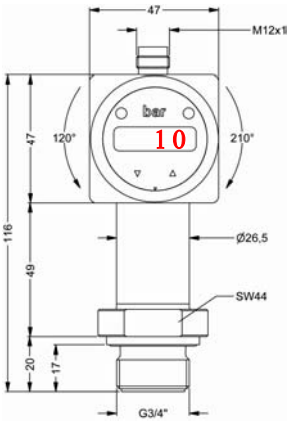
Mechanical connections (dimensions in mm)

Standard

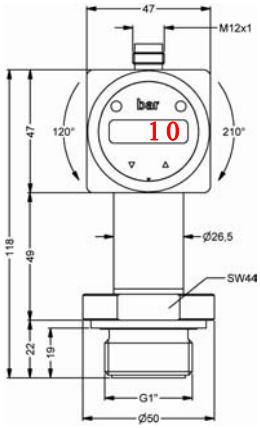


G1/2" flush
only for $P_N \geq 1$ bar

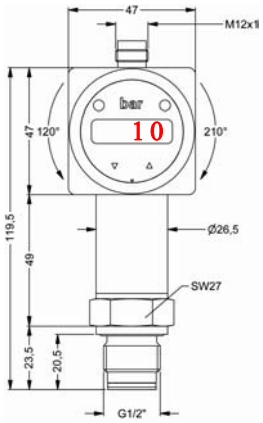
Option



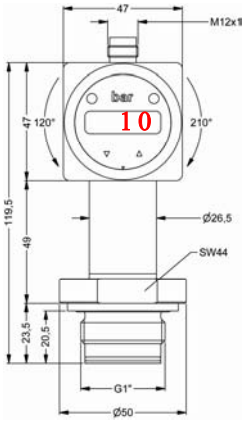
G3/4" flush



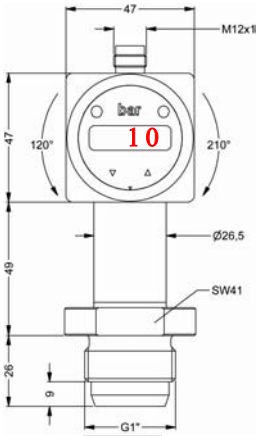
G1" flush



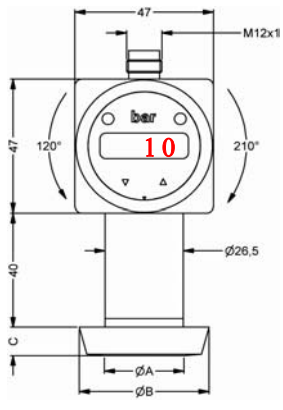
G1/2" flush with
radial o-ring



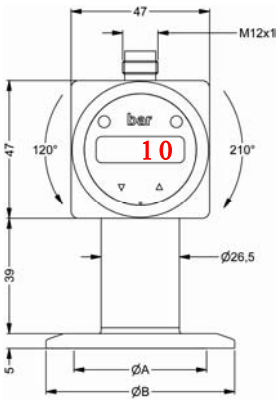
G1" flush with
radial o-ring



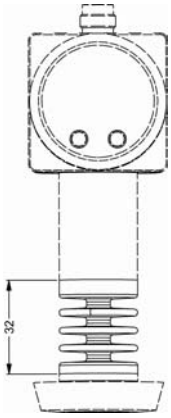
G1" cone



dairy pipe (DIN 11851)



clamp (ISO 2852)



cooling element 300 °C

dimension in mm			
size	DN 25	DN 40	DN 50
A	23	32	45
B	44	56	68.5

dimension in mm			
size	DN 25	DN 38	DN 51
A	23	32	45
B	50.5	50.5	64

⇨SIL- and SIL-Ex version: total length increases by 26.5 mm!

⇨metric threads and other versions on request

DS 200P

DS 200P ☐☐☐-☐☐☐☐-☐-☐-☐-☐☐☐-☐☐☐-☐-☐-☐-☐☐☐

Messgröße			
relativ		7 8 5	
absolut		7 8 6	
Eingang	[bar]		
	0,10	1 0 0 0	
	0,16	1 6 0 0	
	0,25	2 5 0 0	
	0,40	4 0 0 0	
	0,60	6 0 0 0	
	1,0	1 0 0 1	
	1,6	1 6 0 1	
	2,5	2 5 0 1	
	4,0	4 0 0 1	
	6,0	6 0 0 1	
	10	1 0 0 2	
	16	1 6 0 2	
	25	2 5 0 2	
	40	4 0 0 2	
	-1 … 0	X 1 0 2	
Sondermessbereiche		9 9 9 9	auf Anfrage
Analogausgang			
ohne		0	
4 … 20 mA / 2-Leiter		1	
0 … 10 V / 3-Leiter		3	
4 … 20 mA / 3-Leiter, verstellbar		7	
Ex-Schutz 4 … 20 mA / 2-Leiter [1]		E	
andere		9	auf Anfrage
Schaltausgang			
1 Schaltausgang [1, 2]		1	
2 Schaltausgänge [1, 2]		2	
4 Schaltausgänge [3]		4	
Genauigkeit			
Standard für $P_N > 0{,}4$ bar	0,35 %	3	
Standard für $P_N \leq 0{,}4$ bar	0,5 %	5	
Option für $P_N \geq$ 0,4 bar	0,25 %	2	
andere		9	auf Anfrage
Elektrischer Anschluss			
Stecker M12x1 (5-polig) / Kunststoffausführung		N 0 0	
Stecker 12x1 (8-polig) / Kunststoffausführung [3]		M 5 0	
Stecker M12x1 (5-polig) / Metallausführung		N 1 0	
Stecker und Kabeldose ISO 4400 [2]		1 0 0	
Stecker Binder Serie 723 (5-polig)		2 0 0	
Kabelausgang mit PVC-Kabel [4]		T A 0	
andere		9 9 9	auf Anfrage
Mechanischer Anschluss			
G1/2" mit frontbündig geschweißter Membrane (DIN 3852) [5]		Z 0 0	
G3/4" mit frontbündig geschweißter Membrane (DIN 3852)		Z 3 0	
G1" mit frontbündig geschweißter Membrane (DIN 3852)		Z 3 1	
G1" DIN 3852 mit rad. O-Ring und frontbündiger Membrane		Z 5 7	
G1/2" DIN 3852 mit rad. O-Ring und frontbündiger Membrane		Z 6 1	
G 1" Konus		K 3 1	
Clamp DN 25 (ISO 2852)		C 6 1	
Clamp DN 38 (ISO 2852)		C 6 2	
Clamp DN 51 (ISO 2852)		C 6 3	
Milchrohr DN 25 (DIN 11851) [6]		M 7 3	
Milchrohr DN 40 (DIN 11851) [6]		M 7 5	
Milchrohr DN 50 (DIN 11851) [6]		M 7 6	
andere		9 9 9	auf Anfrage
Trennmembrane			
Edelstahl 1.4435 (316L)		1	
Tantal		T	auf Anfrage
Hastelloy ® C-276 (2.4819)		H	
andere		9	auf Anfrage
Dichtung			
für Clamp oder Milchrohr:	keine	0	
für Zollgewinde:	FKM	1	
	FFKM	7	
	andere	9	auf Anfrage
Füllflüssigkeit			
Silikonöl		1	
Lebensmitteltaugliches Öl		2	
andere		9	auf Anfrage
Sonderausführungen			
Standard		0 0 0	
mit Temperaturentkoppler bis 300°C		2 0 0	
andere		9 9 9	auf Anfrage

[1] bei Ex-Ausführung ist max. 1 Schaltausgang möglich
[2] mit Stecker ISO 4400 ist bei 2-Leiter Ausführung nur max. 1 Schaltausgang möglich; bei 3-Leiter Ausführung ist kein Schaltausgang möglich
[3] 4 Schaltausgänge und M12x1, 8-polig nur in Kombination miteinander und mit 4 … 20 mA/3-Leiter erhältlich; 0 … 10 V/3-Leiter auf Anfrage
[4] Standard: 2 m PVC-Kabel ohne Belüftungsschlauch (Temperatureinsatzbereich: -5 … 70 °C), andere auf Anfrage
[5] möglich nur für $P_N \geq 1$ bar
[6] Nutüberwurfmutter muss bei der Herstellung auf dem Druckmessumformer montiert werden. Die Nutüberwurfmutter muss als separate Position bestellt werden.

DRUCK & TEMPERATUR
LEITENBERGER GMBH

DS 400P

Intelligent Electronic Pressure Switch Stainless Steel Version

Pressure ports and process connections with flush welded stainless steel diaphragm

accuracy according to IEC 60770:
standard: 0.35 % FSO
option: 0.25 % FSO

Electronic Pressure Switch

DS 400P

Nominal pressure:

from 0 ... 100 mbar up to 0 ... 40 bar

Contacts:

1 or 2 independent PNP contacts,
freely configurable

Analogue output:

2-wire: 4 ... 20 mA
3-wire: 0 … 20 mA / 0 … 10 V
others on request

Special characteristics:

- ► indication of measured values on a 4-digit LED display
- ► rotable and configurable display module
- ► configurable contacts
  (switch on / switch off points,
  hysteresis / window mode,
  switch on / switch off delay)
- ► hygienical version

Optional versions:

- ► **IS-version**
  Ex ia = intrinsically safe for gases
- ► customer specific versions

CE Ex

The electronic pressure switch **DS 400P** is the successful combination of

- ► intelligent pressure switch
- ► digital display

and has been developed for process industry; especially for food industry and pharmacy.

As standard the **DS 400P** offers a PNP contact and a rotable display module with 4-digit LED display.

Optional versions like e.g. an intrinsically safe version, max. 2 contacts and an analogue output complete the profile.

Preferred areas of use are:

Food Industry

Pharmacy

Material and test certificates:

- ► material test report
  according to DIN EN 10204-3.1.
- ► specific test report
  according to DIN EN 10204-2.2.

Input pressure range[1]																
Nominal pressure gauge / abs.	[bar]	-1 ... 0	0.1	0.16	0.25	0.4	0.6	1	1.6	2.5	4	6	10	16	25	40
Overpressure	[bar]	5	0.5	1	1	2	5	5	10	10	20	40	40	80	80	105
Burst pressure ≥	[bar]	7.5	1.5	1.5	1.5	3	7.5	7.5	15	15	25	50	50	120	120	210
Vacuum resistance		P_N ≥ 1 bar: unlimited vacuum resistance											P_N < 1 bar: on request			

[1] *consider the pressure resistance of fitting and clamps*

Contact [2]		
Number, type	standard: 1 PNP contact	option: 2 independent PNP contacts
Max. switching current	4 ... 20 mA / 2- and 3-wire: contact rating 125 mA, short-circuit resistant; $V_{switch} = V_S - 2V$ 0 ... 10 V / 3-wire: contact rating 500 mA, short-circuit resistant	
Accuracy of contacts [3]	standard: nominal pressure < 0.4 bar: ≤± 0.5 % FSO nominal pressure ≥ 0.4 bar: ≤± 0.35 % FSO option 1: nominal pressure ≥ 0.4 bar: ≤± 0.25 % FSO	
Repeatability	≤ ± 0.1 % FSO	
Switching frequency	2-wire: max. 10 Hz / 3-wire: 50 Hz	
Switching cycles	> 100 x 10^8	
Delay time	0 ... 100 sec	

[1] *with IS-protection max. 1 contact possible*
[2] *accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability)*

Analogue output (optionally) / Supply		
2-wire current signal	4 ... 20 mA / V_S = 13 ... 36 V_{DC} permissible load: $R_{max} = [(V_S - V_{S\,min}) / 0.02]$ Ω	response time: < 10 msec
2-wire current signal with IS-protection	4 ... 20 mA / V_S = 13 ... 28 V_{DC} permissible load: $R_{max} = [(V_S - V_{S\,min}) / 0.02]$ Ω	response time: < 10 msec
3-wire current signal	4 ... 20 mA / V_S = 24 V_{DC} ± 10 % adjustable (turn-down of span 1:5) [4] permissible load: R_{max} = 500 Ω	response time: < 30 msec
3-wire voltage signal	0 … 10 V / V_S = 24 V_{DC} ± 10 % adjustable (turn-down of span 1:5) [4] permissible load: R_{min} = 10 kΩ	response time: < 30 msec
Without analogue output	V_S = 15 ... 36 V_{DC}	
Accuracy [3]	standard: nominal pressure < 0.4 bar: ≤± 0.5 % FSO nominal pressure ≥ 0.4 bar: ≤± 0.35 % FSO option 1: nominal pressure ≥ 0.4 bar: ≤± 0.25 % FSO	

[4] *with turn-down of span the analogue signal is adjusted automatically to the new measuring range*

Thermal errors (offset and span) [5] **/ Permissible temperatures**				
Nominal pressure P_N	[bar]	-1 … 0	< 0.40	≥ 0.40
Tolerance band	[% FSO]	≤± 0.75	≤± 1.5	≤± 0.75
in compensated range	[°C]	-20 ... 85	0 ... 50	-20 ... 85
Permissible temperatures [6]		medium: -40 ... 125 °C for filling fluid silicon oil -10 ... 125 °C for filling fluid food compatible oil electronics / environment: -40 ... 85 °C		storage: -40 ... 100 °C
Permissible temperature medium for cooling element 300°C		filling fluid silicon oil	overpressure: -40 … 300 °C	vacuum: -40 ... 150 °C [7]
		filling fluid food compatible oil	overpressure: -10 ... 250 °C	vacuum: -10 ... 150 °C

[5] *an optional cooling element can influence thermal effects for offset and span depending on installation position and filling conditions*
[6] *max. temperature of the medium for nominal pressure gauge > 0 bar: 150 °C for 60 minutes with a max. environmental temperature of 50 °C*
[7] *also for $P_{abs} \leq 1$ bar*

Electrical protection	
Short-circuit protection	permanent
Reverse polarity protection	no damage, but also no function
Electromagnetic compatibility	emission and immunity according to EN 61326

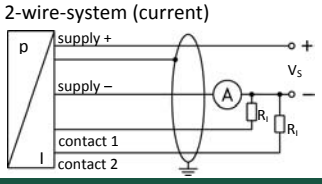
Mechanical stability				
Vibration according to DIN EN 60068-2-6	G 1/2":	20 g RMS (25 ... 2000 Hz)	others except G 1/2":	10 g RMS (25 … 2000 Hz)
Shock according to DIN EN 60068-2-27	G 1/2":	500 g / 1 msec	others except G 1/2“:	100 g / 1 msec

Filling fluids		
Standard	Silicon oil	
Optional	food compatible oil (with FDA approval) (Mobil DTE FM 32; Category Code: H1; NSF Registration No.: 130662)	others on request

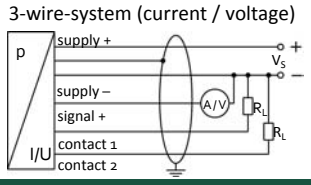
Materials	
Pressure port / Housing	stainless steel 1.4404 (316 L) others on request
Viewing glass	laminated safety glass
Seals (media wetted)	standard: FKM (recommended for medium temperatures ≤ 200 °C) option: FFKM (recommended for medium temperatures > 200 °C) others on request clamp and dairy pipe: without
Diaphragm	stainless steel 1.4435 (316L)
Media wetted parts	pressure port, seals, diaphragm
Explosion protection (only for 4 … 20 mA / 2-wire)	
Approval AX14-DS 400P	IBExU 06 ATEX 1050 X; Zone 0: II 1G Ex ia IIC T4 Ga (connector) / II 1G Ex ia IIB T4 Ga (cable)
Safety technical maximum values	U_i = 28 V, I_i = 93 mA, P_i = 660 mW
Max. switching current [8]	70 mA
Permissible temperatures for environment	in zone 0: -20 ... 60 °C with p_{atm} 0.8 bar up to 1.1 bar in zone 1: -20 ... 70 °C
Connecting cables (by factory)	cable capacitance: signal line/shield also signal line/signal line: 160 pF/m cable inductance: signal line/shield also signal line/signal line: 1 µH/m
[8] *the real switching current in the application depends on the power supply unit*	
Miscellaneous	
Display	4-digit, 7-segment-LED display, visible range 37.2 x 11 mm; digit height 10 mm, range of indication -1999 ... +9999; accuracy 0.1% ± 1 digit; digital damping 0.3 … 30 sec (programmable); measured value update 0.0 … 10 sec (programmable)
Current consumption (without contacts)	2-wire signal output current: max. 25 mA 3-wire signal output current: approx. 30 mA + signal current 3-wire signal output voltage: approx. 30 mA
Ingress protection	IP 67
Installation position	any (standard calibration in a vertical position with the pressure port connection down; differing installation position for P_N ≤ 4 bar have to be specified in the order)
Weight	min. 500 g (depending on mechanical connection)
Operational life	> 100 x 10^8 cycles
CE-conformity	EMC Directive: 2004/108/EC

Wiring diagrams

2-wire-system (current)



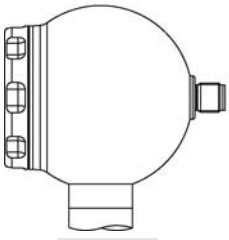
3-wire-system (current / voltage)



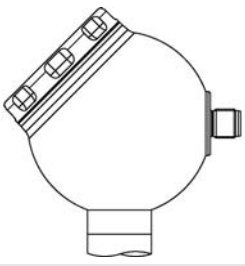
Pin configuration

Electrical connection	M12x1 metal (5-pin)	cable colours (DIN 47100)
Supply +	1	wh (white)
Supply –	3	bn (brown)
Signal + (only 3-wire)	2	gn (green
Contact 1	4	gr (grey)
Contact 2	5	pn (pink)
Shield	plug housing / pressure port	gn/ye (green / yellow)

Designs [9]

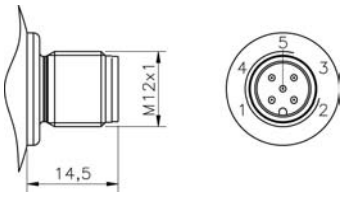


side display



45° display (others on request)

Electrical connections (dimensions in mm)

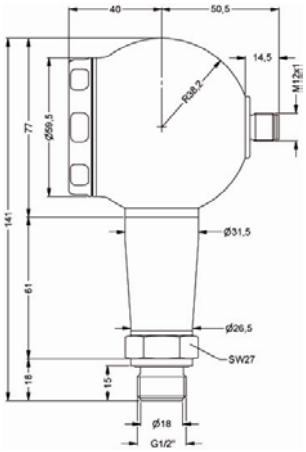


M12x1 (5-pin)

[9] *different cable types and lengths available*

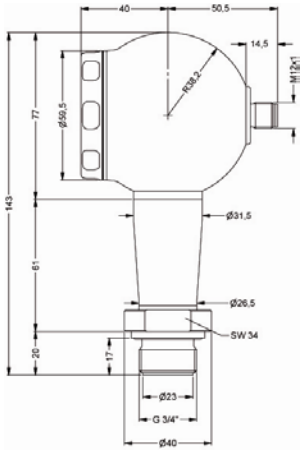
Mechanical connections (dimensions in mm)

standard

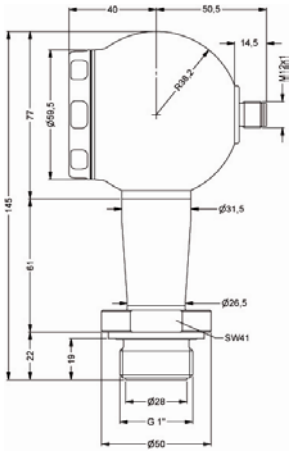


G1/2" flush only for $P_N \leq 40$ bar

optionally

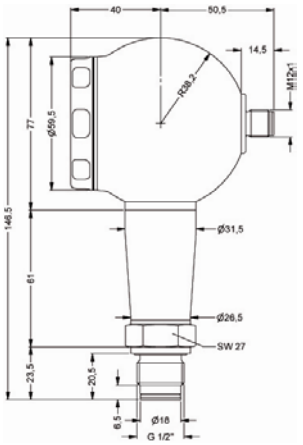


G3/4" flush

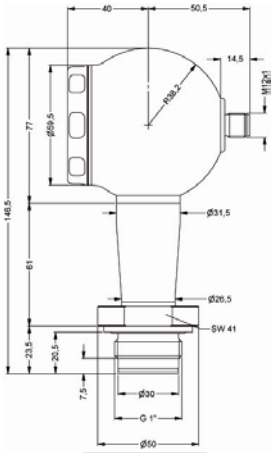


G1" flush

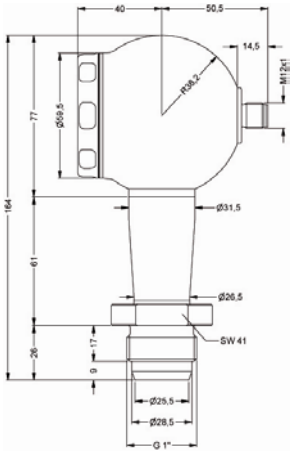
Optional



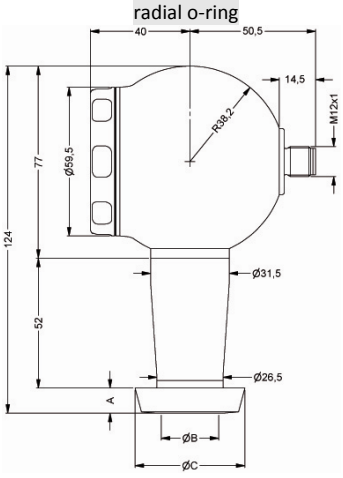
G1/2" flush with radial o-ring



G1" flush with radial o-ring

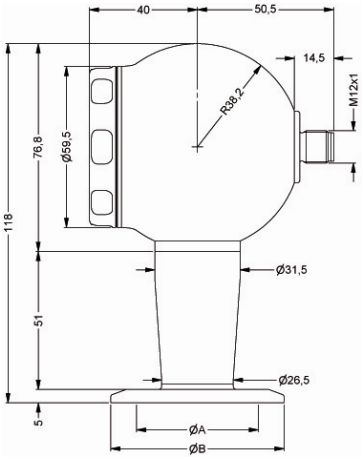


G1" cone



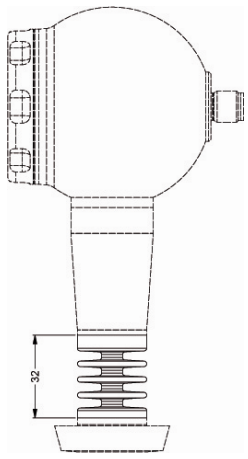
diary pipe (DIN 11851)

dimensions in mm			
size	DN 25	DN 38	DN 51
A	23	32	45
B	50.5	50.5	64



clamp (ISO 2852)

dimensions in mm			
size	DN 25	DN 40	DN 50
A	23	32	45
B	44	56	68.5



cooling element 300 °C

⇨ **metric threads and other versions on request**

DS 400P

DS 400P ☐☐☐-☐☐☐☐-☐☐-☐-☐-☐-☐☐☐-☐☐☐-☐-☐-☐-☐☐☐

		Code	
Messgröße			
relativ		7A5	
absolut [1]		7A6	
Eingang	[bar]		
0,10		1000	
0,16		1600	
0,25		2500	
0,40		4000	
0,60		6000	
1,0		1001	
1,6		1601	
2,5		2501	
4,0		4001	
6,0		6001	
10		1002	
16		1602	
25		2502	
40		4002	
-1 ... 0		X102	
Sondermessbereiche		9999	auf Anfrage
Bauform			
Edelstahl-Kugelgehäuse (Anzeige seitlich)		KH	
Edelstahl-Kugelgehäuse (Anzeige 45°)		K4	auf Anfrage
Analogausgang			
ohne		0	
4 ... 20 mA / 2-Leiter		1	
0 ... 10 V / 3-Leiter, verstellbar		3	
4 ... 20 mA / 3-Leiter, verstellbar		7	
Ex-Schutz 4 ... 20 mA / 2-Leiter [2]		E	
andere		9	auf Anfrage
Schaltausgang			
1 Schaltausgang		1	
2 Schaltausgänge [2]		2	
Genauigkeit			
Standard für $P_N \geq 0,4$ bar	0,35 %	3	
Standard für $P_N < 0,4$ bar	0,5 %	5	
Option für $P_N \geq 0,4$ bar	0,25 %	2	
andere		9	auf Anfrage
Elektrischer Anschluss			
Stecker M12x1 (5-polig) / Metallausführung		N10	
andere		999	auf Anfrage
Mechanischer Anschluss			
G1/2" mit frontbündig geschweißter Membrane (DIN 3852) [3]		Z00	
G3/4" mit frontbündig geschweißter Membrane (DIN 3852)		Z30	
G1" mit frontbündig geschweißter Membrane (DIN 3852)		Z31	
G1" DIN 3852 mit rad. O-Ring und frontbündiger Membrane		Z57	
G1/2" DIN 3852 mit rad. O-Ring und frontbündiger Membrane		Z61	
G 1" Konus		K31	
Clamp DN 25 (ISO 2852)		C61	
Clamp DN 38 (ISO 2852)		C62	
Clamp DN 51 (ISO 2852)		C63	
Milchrohr DN 25 (DIN 11851) [4]		M73	
Milchrohr DN 40 (DIN 11851) [4]		M75	
Milchrohr DN 50 (DIN 11851) [4]		M76	
andere		999	auf Anfrage
Trennmembrane			
Edelstahl 1.4435 (316L)		1	
andere		9	auf Anfrage
Dichtung			
für Clamp oder Milchrohr:	keine	0	
für Zollgewinde:	FKM	1	
	FFKM	7	auf Anfrage
	andere	9	auf Anfrage
Füllflüssigkeit			
Silikonöl		1	
Lebensmitteltaugliches Öl		2	
andere		9	auf Anfrage
Sonderausführungen			
Standard		000	
mit Temperaturentkoppler bis 300°C		200	
andere		999	auf Anfrage

[1] Absolutdruck möglich ab 1 bar
[2] bei Ex-Ausführung ist max. 1 Schaltausgang möglich
[3] nur möglich für Nenndruckbereiche $F_N \geq 1$ bar
[4] Nutüberwurfmutter muss bei der Herstellung auf dem Druckmessumformer montiert werden. Die Nutüberwurfmutter muss als separate Position bestellt werden.

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DS 4

Electronic OEM Pressure Switch Pneumatics

Applications:

- Pneumatics
- Vacuum technology

Characteristics:

- nominal pressure ranges from 0 ... 1 bar up to 0 ... 10 bar also -1 ... 0 bar
- 1 or 2 contacts
- compact design
- configurable via PC or programming device P6

CE

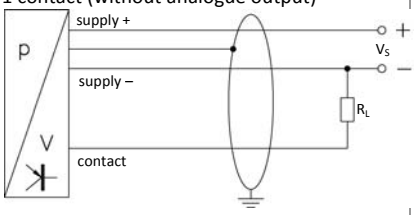
Input pressure range					
Nominal pressure gauge	[bar]	-1 ... 0	1	3.5	10
Overpressure	[bar]	2	2	7	13
Supply					
Supply voltage V_S		12 ... 30 V_{DC}			
Current consumption		max. 14 mA (without contacts)			
Output signal					
Contact [1]					
Number		standard: 1		optional: 2	
Type		PNP			
Switching performance		max. 300 mA, short-circuit proof			
Accuracy of contacts		IEC 60770: ≤± 1 % FSO			
Repeatability		≤ ± 0.2 % FSO			
Status indication		SP 1: green		SP 2: yellow	
Switching function [2]		standard: n/o		optional: n/c	
Switching mode [2]		standard: hysteresis mode		optional: window mode	
Switch on point [2]		standard: factory setting 80 % FSO others: specify on order; adjustable range 0 ... 100 % FSO			
Switch off point [2]		standard: factory setting 75 % FSO others: specify on order; adjustable range 0 ... 100 % FSO			
Switch on / switch off delay [2]		standard: off others: specify on order, adjustable range from 10 msec up to 90 sec (step 10 msec)			
Switching frequency		200 Hz (without switching delay)			
Switching cycles		> 100 x 10^6			
Analogue output [1] **(optionally)**					
Analogue output		1 ... 5 V / 3-wire			
Accuracy		IEC 60770 [3]: ≤ ± 2 % FSO			
Permissible load		R_{min} = 10 kΩ			

[1] *with optional analogue output max. 1 contact possible*
[2] *Parameters can be programmed by customer either with the programming kit CIS 680 / CIS 681 or with the programming device P6 (available as accessories).*
[3] *accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability)*

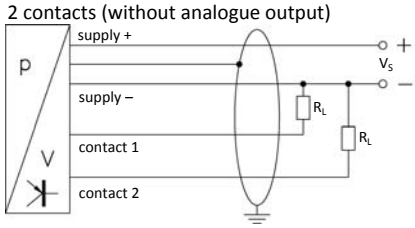
Thermal effects (Offset and Span) / Permissible temperatures			
Tolerance band	≤ ± 2 % FSO	in compensated range 0 ... 50 °C	
TC, average	≤ ± 0.4 % FSO / 10 K	in compensated range 0 ... 50 °C	
Permissible temperatures	medium / electronics / environment:	-25 ... 85 °C	storage: -40 ... 85 °C
Electrical protection			
Short-circuit protection	permanent		
Reverse polarity protection	no damage, but also no function		
Electromagnetic compatibility	emission and immunity according to EN 61326		
Mechanical stability			
Vibration	10 g RMS (20 ... 2000 Hz)		
Shock	100 g / 11 msec		
Materials			
Pressure port	aluminium		
Housing	PA 6.6 black		
Seal (media wetted)	NBR		
Sensor	silicon, RTV		
Media wetted parts	pressure port, seal, sensor		
Miscellaneous			
Media	compressed air, non-aggressive gases		
Weight	approx. 25 bis 35 g		
Installation position	any		
Ingress protection	IP 54		
CE-conformity	EMC Directive: 2004/108/EC		

Wiring diagrams

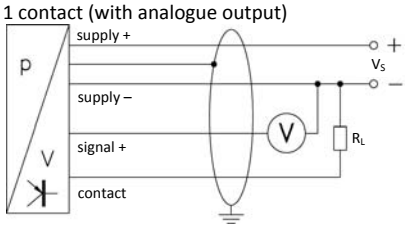
1 contact (without analogue output)



2 contacts (without analogue output)



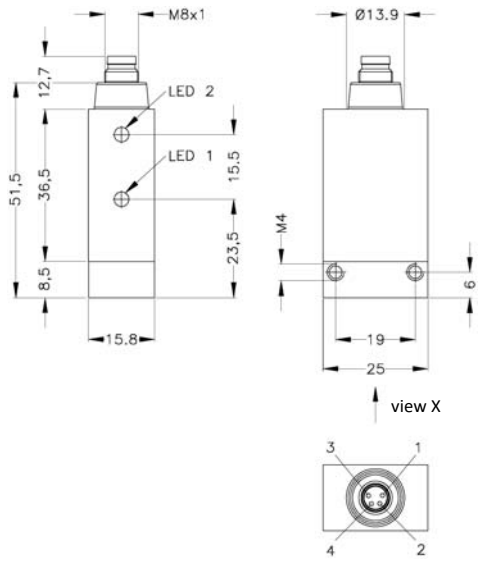
1 contact (with analogue output)



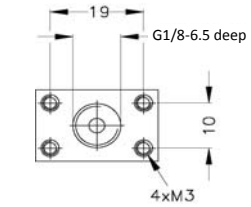
Pin configuration

Electrical connection	M8x1 (4-pin) 1 contact	M8x1 (4-pin) 2 contacts	M8x1 (4-pin) 1 contact, 1 analogue output
Supply +	1	1	1
Supply –	3	3	3
Signal +	-	-	2
Contact 1	4	4	4
Contact 2	-	2	-

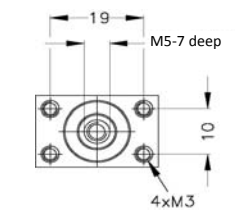
Dimensions (in mm)



Mechanical connections (view X)



G1/8" internal thread



M5 internal thread

DS 4

DS 4 ☐☐☐-☐☐☐☐-☐-☐-☐☐☐-☐☐☐-☐-☐☐☐-☐☐☐

Messgröße		
relativ	6 8 0	
Eingang [bar]		
1,0	1 0 0 1	
3,5	3 5 0 1	
10	1 0 0 2	
-1 ... 0	X 1 0 2	
Sondermessbereiche	9 9 9 9	auf Anfrage
Anzahl Schaltausgänge		
1 Schaltausgang	1	
2 Schaltausgänge [1]	2	
Analogausgang		
ohne Analogausgang	0	
1 ... 5 V / 3-Leiter [1]	C	
Elektrischer Anschluss		
M8x1 (4-polig)	Q 0 0	
andere	9 9 9	auf Anfrage
Mechanischer Anschluss		
G1/8" Innengewinde	Q 0 0	
M5 Innengewinde mit Nut für O-Ring [2]	R 0 0	
andere	9 9 9	auf Anfrage
Dichtung		
NBR	5	
andere	9	auf Anfrage
Einstellungscode		
Standard [3]	0 0 0	
nach Kundenvorgabe [3]	9 9 9	
Sonderausführungen		
Standard	0 0 0	
andere	9 9 9	auf Anfrage

[1] mit optionalem Analogausgang max. 1 Schaltausgang möglich
[2] flanschbar
[3] Die Parameter können kundenseitig durch die Programmier-Kits CIS 680 / CIS 681 oder durch das Programmiergerät P6 eingestellt werden (als Zubehör erhältlich).

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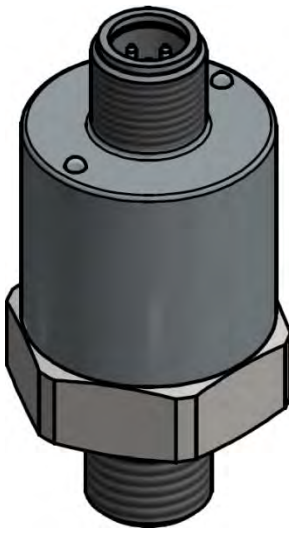
DS 6

Electronic
OEM Pressure Switch



Applications:

- mechanical engineering / hydraulics
- measuring, control and process technology

Characteristics:

- nominal pressure ranges from 0 … 2 bar up to 0 … 400 bar
- 1 or 2 contacts
- configurable via PC or programming device P6
- optional: oil- and fat free version

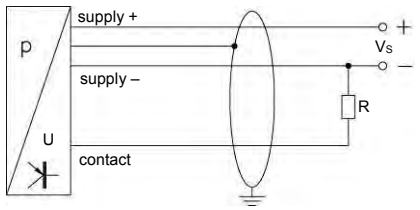
Input pressure range									
Nominal pressure gauge	[bar]	2	5	10	20	50	100	200	400
Nominal pressure abs.	[bar]	2	5	10	20	50	100	200	400
Overpressure	[bar]	7	12	25	50	120	250	400	600
Supply									
Supply voltage V_S		12 ... 30 V_{DC}							
Current consumption		max. 14 mA (without contacts)							
Contacts									
Number		standard: 1				optional: 2			
Type		PNP							
Switching performance		max. 300 mA, short-circuit proof							
Accuracy of contacts		IEC 60770: ≤ ± 1 % FSO							
Repeatability		≤ ± 0.2 % FSO							
Minimum hysteresis of contacts		≤ ± 0.5 % FSO							
Status indication		SP 1: green				SP 2: yellow			
Switching function [1]		standard: n/o				optional: n/c			
Switching mode [1]		standard: hysteresis mode				optional: window mode			
Switch on point [1]		standard: factory setting 80 % FSO others: specify on order; adjustable range 5 ... 100 % FSO							
Switch off point [1]		standard: factory setting 75 % FSO others: specify on order; adjustable range 5 ... 100 % FSO							
Switch on / switch off delay [1]		standard: off others: specify on order, adjustable range from 10 msec up to 90 sec (step 10 msec)							
Switching frequency		200 Hz (without switching delay)							
Switching cycles		> 100 x 10^6							
[1] Parameters can be programmed by customer either with the programming kit CIS-G or with the programming device P6 (available as accessories).									
Thermal effects (Offset and Span) / Permissible temperatures									
Thermal error		≤ ± 0.3 % FSO / 10 K				in compensated range -25 ... 85 °C			
Permissible temperatures		medium / electronics / environment: -25 ... 85 °C				storage: -40 ... 85 °C			

Electrical protection	
Short-circuit protection	permanent
Reverse polarity protection	no damage, but also no function
Electromagnetic compatibility	emission and immunity according to EN 61326
Mechanical stability	
Vibration	10 g RMS (20 ... 2000 Hz)
Shock	100 g / 11 msec
Materials	
Pressure port	stainless steel 1.4301 (304)
Housing	stainless steel 1.4305 (303)
Seals (media wetted)	standard: FKM option: EPDM
Diaphragm	ceramic Al_2O_3 96 %
Media wetted parts	pressure port, seals, diaphragm
Miscellaneous	
Weight	approx. 90 g
Installation position	any
Ingress protection	IP 67
CE-conformity	EMC Directive: 2014/30/EU Pressure Equipment Directive: 2014/68/EU (module A) [2]

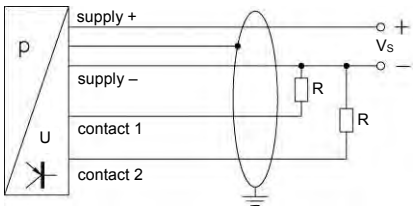
[2] *This directive is only valid for devices with maximum permissible overpressure > 200 bar*

Wiring diagrams

1 contact

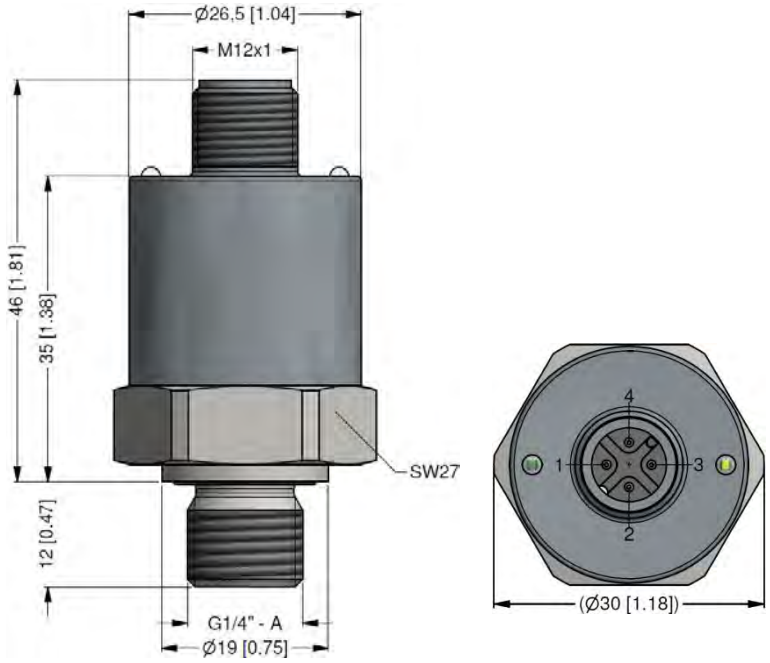


2 contacts



Pin configuration	
Electrical connection	M12x1 (4-pin), metal
Supply +	1
Supply –	3
Contact 1	4
Contact 2	2
Shield	plug housing

Dimensions (mm / in)



G1/4" DIN 3852

DS 6

DS 6 ☐☐☐-☐☐☐☐-☐-☐-☐☐☐-☐☐☐-☐-☐☐☐-☐☐☐

Messgröße	**Pressure**			
relativ	gauge	685		
absolut	absolute	686		
Eingang [bar]	**Input [bar]**			
2	2	2001		
5	5	5001		
10	10	1002		
20	20	2002		
50	50	5002		
100	100	1003		
200	200	2003		
400	400	4003		
Sondermessbereiche	customer	9999	auf Anfrage	consult
Anzahl Schaltausgänge	**Number of contacts**			
1 Schaltausgang	1 contact	1		
2 Schaltausgänge	2 contacts	2		
Analogausgang	**Analogue output**			
ohne Analogausgang	without analogue output	0		
Elektrischer Anschluss	**Electrical connection**			
M12x1 (4-polig), Metall	M12x1 (4-pin), metal	M13		
andere	customer	999	auf Anfrage	consult
Mechanischer Anschluss	**Mechanical connection**			
G1/4" DIN 3852	G1/4" DIN 3852	300		
andere	customer	999	auf Anfrage	consult
Dichtung	**Seals**			
FKM	FKM	1		
EPDM	EPDM	3		
andere	customer	9	auf Anfrage	consult
Einstellungscode	**Setting code**			
LEITENBERGER Standard	LEITENBERGER standard	000		
nach Kundenvorgabe	setting according to customer	999	auf Anfrage	consult
Sonderausführungen	**Special version**			
Standard	standard	000		
öl- und fettfrei	oil and grease free	008		
andere	customer	999	auf Anfrage	consult

[1] Die Parameter können kundenseitig durch die Programmier-Kits CIS-G oder durch das Programmiergerät P6 eingestellt werden (als Zubehör erhältlich).
Parameters can be programmed by customer either with the programming kit CIS-G or with the programming device P6 (available as accessories).

DRUCK & TEMPERATUR
LEITENBERGER GMBH

P 6

Programmiergerät P6 für Druckschalter DS 4 und DS 6

Produktmerkmale

- einfache Programmierung unabhängig vom PC
- schneller Anschluss zwischen Stromversorgung und Druckschalter
- bis zu fünf Konfigurationen speicher- und kopierbar
- alle Druckschalter Parameter editierbar (Schaltmodus, Einschalt- und Rückschaltpunkt, …)
- stabiles Kunststoff-Gehäuse
- 4-stellige LED-Anzeige

Das Programmiergerät **P 6** wurde speziell zur Konfiguration unserer elektronischen Druckschalter vor Ort, ohne PC, entwickelt. Das Programmiergerät ist einfach zwischen Hilfsenergie und Druckschalter anzuschließen.

Es kann für die Druckschaltern der Serie **DS 4** und **DS 6** verwendet werden.

Bei der Konzeption des Programmiergerätes wurde sehr großen Wert auf eine einfache Bedienung und Benutzerführung gelegt. Die einzelnen Funktionen lassen sich über ein in sich geschlossenes Menüsystem anhand von zwei frontseitig angeordneten Miniaturdrucktaster leicht konfigurieren. Die Einstellungen werden dauerhaft im integrierten EEPROM gespeichert und können bei Bedarf auf andere elektronische Druckschalter übertragen werden. Außerdem können am Druckschalter anliegende Referenzdrücke über die „Teach“-Funktion als Ein- oder Ausschaltwerte eingelesen werden.

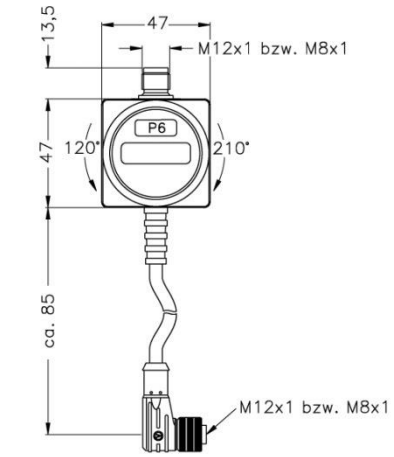
Allgemeines	
Betriebsspannung U_B	24 V_{DC} ± 10 % / ca. 70 mA
Schutzart	IP 65
Gehäusematerial	PA 6.6, Polycarbonat
Gewicht	ca. 150 g

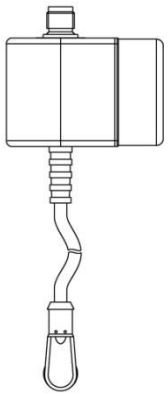
Anschlussbelegungstabelle

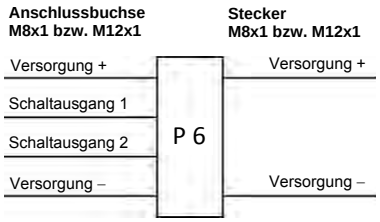
Elektrische Anschlüsse	Stecker am Programmiergerät		Anschlussbuchse am Kabelende	
	für DS 4: M8x1 (4-polig) Kunststoff	für DS 6: M12x1 (5-polig) Kunststoff	für DS 4: M8x1 (4-polig) Kunststoff	für DS 6: M12x1 (5-polig) Kunststoff
Versorgung +	1	1	1 [1]	1 [1]
Versorgung –	3	3	3	3
Schaltausgang 1	-	-	4 [1]	4 [1]
Schaltausgang 2	-	-	2 [1, 2]	5 [1]
Analogsignal (optional)	-	-	2 [2]	2

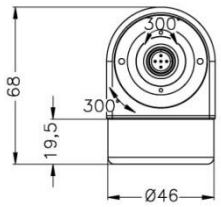
[1] *wird zur Datenkommunikation zwischen P 6 und dem Druckschalter verwendet*
[2] *Der Druckschalter DS 4 kann optional mit einem Analogausgang oder zweitem Schaltausgang ausgestattet sein. Dieser liegt an Pin 2 an.*

Abmessungen (in mm) / Anschlussschaltbild









Das Programmiergerät für Druckschalter DS 4 gibt es nur mit Anschlusssteckern M8x1 (4-polig), während das Programmiergerät für Druckschalter DS 6 immer Anschlussstecker M12x1 (5-polig) besitzt.

Bestellschlüssel

Ausführung:	**Bestellschlüssel:**
- P 6 für Druckschalter DS 4	P6 - DS4 - Q00 - 1 - 000 (mit Anschlussstecker M8x1 - 4-polig)
- P 6 für Druckschalter DS 6	P6 - DS6 - N01 - 1 - 000 (mit Anschlussstecker M12x1 - 5-polig)

LR-Cal
DRUCK & TEMPERATUR LEITENBERGER

Rel. 20210323

IO-Link

LDS 350-IO

Electronic Pressure Switch with IO-Link Interface

Stainless Steel Sensor

accuracy according to IEC 60770:
standard: 0.5 % FSO / 0.35 % FSO
option: 0.25 % FSO

Nominal pressure

from 0 ... 100 mbar up to 0 ... 600 bar

Digital output signal

IO-Link according to specification V 1.1
smart sensor profile
data transfer 38.4 kbit/sec

Switchable output signal

PNP / NPN / 4 … 20 mA / 0 … 10 V

Special characteristics

- indication of measured values on a 4-digit LED display
- rotatable and configurable display module
- parameter settings via IO-Link or menu (VDMA-conform)
- additional information via IO-Link accessible

Optional versions

- different mechanical connections
- customer specific versions

The electronic pressure switch **LDS 350-IO** is interesting for all users in plant and machine engineering, due to the integrated IO-Link interface to exchange process data, diagnostic reports and status messages with a superordinate control level, as standard. In addition, further information can be retrieved that allow conclusions to the application process.

Especially in mechanical engineering, great demand for flexible operating conditions have to be satisfied. Therefor the multi-rotatable display module offers best readability for the user by a quick and easy adjustment. Also, the switchability of the output signal as switching signal or analogue signal (mA / V) increases flexibility and integration in different applications.

Preferred areas of use are

- Plant and machine engineering
- Environmental engineering (water – sewage – recycling)

CE ROHS REACH IO-Link

Input pressure range											
Nominal pressure gauge	[bar]	0.10	0.16	0.25	0.40	0.60	1	1.6	2.5	4	6
Nominal pressure absolute	[bar]	-	-	-	0.40	0.60	1	1.6	2.5	4	6
Overpressure (static)	[bar]	0.5	1	1	2	5	5	10	10	20	40
Burst pressure ≥	[bar]	1.5	1.5	1.5	3	7.5	7.5	15	15	25	50

Input pressure range											
Nominal pressure gauge / absolute	[bar]	10	16	25	40	60	100	160	250	400	600
Overpressure (static)	[bar]	40	80	80	105	210	600	600	1000	1000	1000
Burst pressure ≥	[bar]	50	120	120	210	420	1000	1000	1250	1250	1800
Vacuum resistance	[bar]	p_N ≥ 1 bar: unlimited vacuum resistant p_N < 1 bar: on request									

Supply	
Voltage supply	V_S = 18 ... 30 V_{DC}
Output signals	
Output signal 1	IO-Link / SIO (PNP / NPN) switchable
Output signal 2	4 … 20 mA / 3-wire or 0 … 10 V / 3-wire or PNP / NPN switchable
Signal characteristics switching signal	
Accuracy of switching points [1]	≤ ± 0.35 % FSO
Repeatability	≤ ± 0.1 % FSO
Max switching current	150 mA
Switching frequency	max. 170 Hz
Delay time	0.0 … 50.0 sec
Response time	< 12 msec
Signal characteristics analogue signal	
Accuracy [1]	standard: nominal pressure < 0.4 bar: ≤ ± 0.50 % FSO nominal pressure ≥ 0.4 bar: ≤ ± 0.35 % FSO option: nominal pressure ≥ 0.4 bar ≤ ± 0.25 % FSO
Long term stability	≤ ± 0.3 % FSO / year at reference conditions
Load (4 … 20 mA / 3-wire)	R_{max} = 330 Ω
Load (0 … 10 V / 3-wire)	R_{min} = 10 kΩ
Influence effects	supply: 0.05% FSO load: ≤ 0.1 % FSO
Adjustability	offset: ± 5 % span: -10 %
[1] accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability)	
Thermal effects (offset and span)	
Thermal error	≤ ± 0.3 % FSO / 10 K
in compensated range	-25 ... 85 °C
Permissible temperatures	
Permissible temperatures	medium: -40 ... 125 °C electronics / environment / storage: -40 ... 85 °C
Electrical protection	
Short-circuit protection	permanent
Reverse polarity protection	no damage, but also no function
Electromagnetic compatibility	emission and immunity according to EN 61326
IO-Link	
Interface	IO-Link 1.1; slave
Data transfer	38.4 kbit/sec (COM 2)
Mode	SIO / IO-Link
Standard	IEC 61131-2 IEC 61131-9

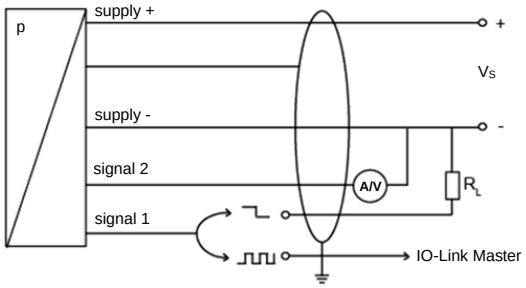
Mechanical stability		
Vibration	10 g / 25 Hz … 2 kHz	according to DIN EN 60068-2-6
Shock	500 g / 1 msec	according to DIN EN 60068-2-27
Materials		
Display housing	PA 6.6	
Pressure port / housing	stainless steel 1.4404 (316L)	
Seal	standard: FKM options: EPDM welded version (only for pressure port according to EN 837 with $p_N \leq 40$ bar) others on request	
Diaphragm	stainless steel 1.4435 (316L)	
Media wetted parts	pressure port, seal, diaphragm	
Miscellaneous		
Display	4-digit, 7-segment-LED display on black base body, white, blue foil digit height 7 mm range of indication -1999 ... +9999 visible range 22.5 x 10.5 mm 4 LEDs for unit switching (bar, mbar, PSI, MPa) LED status display for IO-Link and contacts	
Operation	2 buttons	
Featured	functions according to VDMA 24574-1	
Turn-on time	110 msec	
Weight	approx. 230 g	
Operational life	100 million load cycles	
Current consumption	< 50 mA (without contacts)	
Ingress protection	IP 67	
Installation position	any [2]	
CE-conformity	EMC Directive: 2014/30/EU Pressure Equipment Directive: 2014/68/EU (module A) [3]	

[2] Pressure transmitters are calibrated in a vertical position with the pressure connection down. If this position is changed on installation there can be slight deviations in the zero point for pressure ranges $p_N \leq 1$ bar.
[3] This directive is only valid for devices with maximum permissible overpressure > 200 bar.

Wiring diagrams

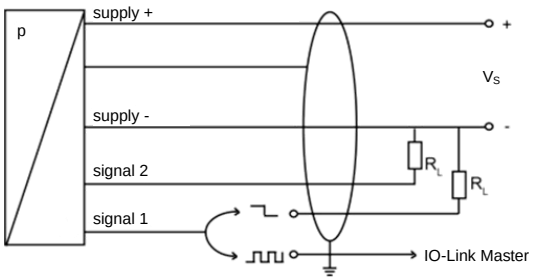
3-wire-system / configuration of analogue output:

signal 1: IO-Link or contact
signal 2: analogue output



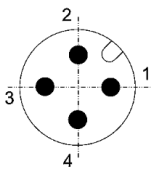
3-wire-system / configuration of contact:

signal 1: IO-Link or contact
signal 2: contact

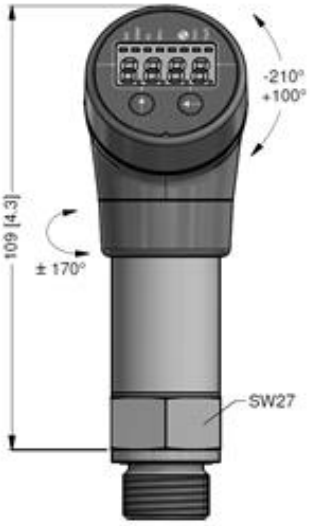


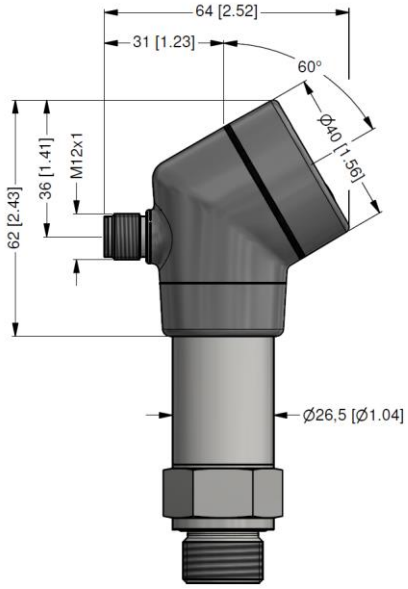
Electrical connection

Pin configuration	Description	M12x1 (4-pin), metal
Supply +	supply	1
Supply –	supply	3
Output signal 1	IO-Link / SIO (PNP / NPN)	4
Output signal 2	4 … 20 mA – 3-wire / 0 …10 V – 3-wire (PNP / NPN)	2
Shield	shielding	plug housing

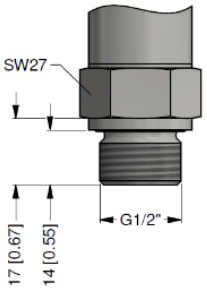


Dimensions (mm / in)

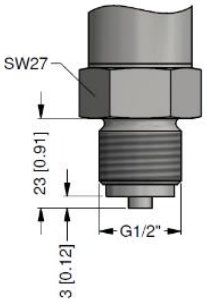




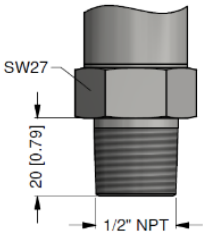
Mechanical connections (dimensions mm / in)



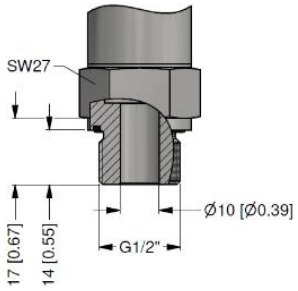
G1/2" DIN 3852



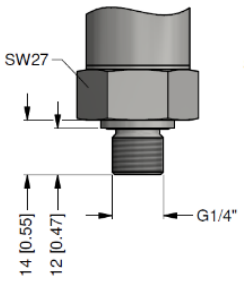
G1/2" EN 837



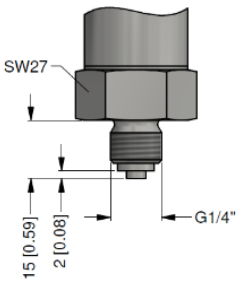
1/2" NPT



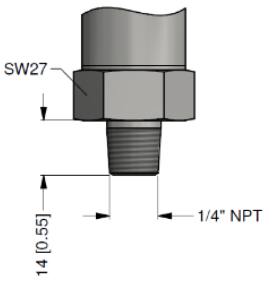
G1/2" open port
DIN 3852 (p_N ≤ 40 bar)



G1/4" DIN 3852



G1/4" EN 837



1/4" NPT

⇨ **metric threads and other versions on request**

LR-Cal LTR

DRUCK & TEMPERATUR LEITENBERGER

Ordering code **LDS 350-IO**

LDS 350-IO ☐☐☐-☐☐☐☐-☐☐-☐-☐☐☐-☐☐☐-☐-☐☐☐

	Pressure	Input	Output	Accuracy	Electrical connection	Mechanical connection	Seal	Special version	
Pressure									
gauge	7 E 0								
absolute [1]	7 E 1								
Input [bar]									
0.10 [1]		1 0 0 0							
0.16 [1]		1 6 0 0							
0.25 [1]		2 5 0 0							
0.40		4 0 0 0							
0.60		6 0 0 0							
1.0		1 0 0 1							
1.6		1 6 0 1							
2.5		2 5 0 1							
4.0		4 0 0 1							
6.0		6 0 0 1							
10		1 0 0 2							
16		1 6 0 2							
25		2 5 0 2							
40		4 0 0 2							
60		6 0 0 2							
100		1 0 0 3							
160		1 6 0 3							
250		2 5 0 3							
400		4 0 0 3							
600		6 0 0 3							
customer		9 9 9 9							consult
Output									
IO-Link + PNP/NPN + analogue output [2]			I X						
Accuracy									
standard for $p_N \leq 0.4$ bar — 0.50 % FSO				5					
standard for $p_N > 0.4$ bar — 0.35 % FSO				3					
option for $p_N \geq 0.4$ bar — 0.25 % FSO				2					
customer				9					consult
Electrical connection									
male plug M12x1 (4-pin) / metal					M 1 B				
customer					9 9 9				consult
Mechanical connection									
G1/2" DIN 3852						1 0 0			
G1/2" EN 837						2 0 0			
G1/4" DIN 3852						3 0 0			
G1/4" EN 837						4 0 0			
G1/2" DIN 3852 open port [3]						H 0 0			
1/2" NPT						N 0 0			
1/4" NPT						N 4 0			
customer						9 9 9			consult
Seal									
FKM							1		
EPDM							3		
without (welded version) [4]							2		
customer							9		consult
Special version									
standard								0 0 0	
customer								9 9 9	consult

[1] absolute pressure possible from 0.4 bar

[2] contact PNP/NPN switchable; analogue output 0 ... 10 V / 4 … 20 mA switchable

[3] not possible for nominal pressure $p_N > 40$ bar

[4] welded version only with pressure ports according to EN 837, possible for $p_N \leq 40$ bar

DRUCK & TEMPERATUR
LEITENBERGER GMBH

DS 400

Intelligent Electronic Pressure Switch
Stainless Steel

Stainless Steel Sensor

accuracy according to IEC 60770:
standard: 0.35 % FSO
option: 0.25 % FSO

Electronic Pressure Switch

DS 400

Nominal pressure:

from 0 ... 100 mbar
up to 0 ... 600 bar

Contacts:

1 or 2 independent PNP contacts,
freely configurable

Analogue output:

2-wire: 4 ... 20 mA
3-wire: 0 … 20 mA / 0 … 10 V
others on request

Special characteristics:

- indication of measured values on a 4-digit LED display
- rotatable and configurable display module

Optional versions:

- **IS-version**
  Ex ia = intrinsically safe for gases
- pressure sensor welded
- customer specific versions

CE Ex

The electronic pressure switch **DS 400** is the successful combination of

- intelligent pressure switch
- digital display

and has been specially designed for numerous applications in various industrial sectors.

As standard the **DS 400** offers a PNP contact and a display module, which is mounted rotable in the ball housing.

Additional optional versions like e.g. an intrinsically safe version, a second contact and an analogue output complete the profile.

Preferred areas of use are:

Plant and Machine Engineering

Heating and Air Conditioning

Environmental Engineering
(water – sewage – recycling)

Input pressure range											
Nominal pressure gauge / abs.	[bar]	-1 … 0	0.10	0.16	0.25	0.40	0.60	1	1.6	2.5	4	6
Overpressure	[bar]	5	0.5	1	1	2	5	5	10	10	20	40
Burst pressure	[bar]	7.5	1.5	1.5	1.5	3	7.5	7.5	15	15	25	50

Nominal pressure gauge / abs.	[bar]	10	16	25	40	60	100	160	250	400	600
Overpressure	[bar]	40	80	80	105	210	210	600	1000	1000	1000
Burst pressure	[bar]	50	120	120	210	420	420	1000	1250	1250	1250
Vacuum resistance		$P_N \geq 1$ bar: unlimited vacuum resistance $P_N < 1$ bar: on request									

Contact [1]	
Number, type	standard: 1 PNP contact option: 2 independent PNP contacts
Max. switching current	4 ... 20 mA / 2- and 3-wire: contact rating 125 mA, short-circuit resistant; $V_{switch} = V_S - 2V$ 0 ... 10 V / 3-wire: contact rating 500 mA, short-circuit resistant
Accuracy of contacts [2]	Standard: Nenndruck < 0,4 bar : ≤± 0,5 % FSO; Nenndruck ≥ 0,4 bar: ≤± 0,35 % FSO Option: Nenndruck ≥ 0,4 bar:≤± 0,25 % FSO
Repeatability	≤ ± 0.1 % FSO
Switching frequency	2-wire: max. 10 Hz 3-wire: 50 Hz
Switching cycles	> 100 x 10^6
Delay time	0 ... 100 sec

[1] with IS-protection max. 1 contact possible
[2] accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability)

Analogue output (optionally) / Supply		
2-wire current signal	4 ... 20 mA / V_S = 13 ... 36 V_{DC} permissible load: $R_{max} = [(V_S - V_{S\,min}) / 0.02]$ Ω	response time: < 10 msec
2-wire current signal with IS-protection	4 ... 20 mA / V_S = 13 ... 28 V_{DC} permissible load: $R_{max} = [(V_S - V_{S\,min}) / 0.02]$ Ω	response time: < 10 msec
3-wire current signal	4 ... 20 mA / V_S = 24 V_{DC} ± 10 % adjustable (turn-down of span 1:5) [3] permissible load: R_{max} = 500 Ω	response time: < 30 msec
3-wire voltage signal	0 … 10 V / V_S = 24 V_{DC} ± 10 % adjustable (turn-down of span 1:5) [3] permissible load: R_{min} = 10 kΩ	response time: < 30 msec
Without analogue output	V_S = 15 ... 36 V_{DC}	
Accuracy [2]	≤± 0.25 % FSO	

[3] with turn-down of span the analogue signal is adjusted automatically to the new measuring range

Thermal effects (Offset and Span)				
Nominal pressure P_N	[bar]	-1 … 0	< 0.40	≥ 0.40
Tolerance band	[% FSO]	≤± 0.75	≤± 1	≤± 0.75
in compensated range	[°C]	-20 ... 85	0 ... 70	-20 … 85

Permissible temperatures	
Permissible temperatures	medium: -40 ... 125 °C electronics / environment: -40 ... 85 °C storage: -40 ... 100 °C
Electrical protection	
Short-circuit protection	permanent
Reverse polarity protection	no damage, but also no function
Electromagnetic compatibility	emission and immunity according to EN 61326
Mechanical stability	
Vibration	10 g RMS (25 ... 2000 Hz) according to DIN EN 60068-2-6
Shock	500 g / 1 msec according to DIN EN 60068-2-27
Materials	
Pressure port	stainless steel 1.4404 (316L)
Housing	stainless steel 1.4404 (316L)
Viewing glass	laminated safety glass
Seals (media wetted)	standard: FKM option: NBR; welded version [4] on request others on request
Diaphragm	stainless steel 1.4435 (316 L)
Media wetted parts	pressure port, seals, diaphragm

[4] welded version only for pressure ports according to EN 837; possible for nominal pressure ranges P_N ≤40 bar

Explosion protection (only for 4 … 20 mA / 2-wire)	
Approval AX14-DS 400	IBExU 06 ATEX 1050 X; Zone 0: II 1G Ex ia IIC T4 Ga (connector) / II 1G Ex ia IIB T4 Ga (cable)
Safety techn. maximum values	U_i = 28 V, I_i = 93 mA, P_i = 660 mW, $C_i \approx 0$ pF, $L_i \approx 0$ µH
Max. switching current [5]	70 mA
Permissible temperatures for environment	in zone 0: -20 ... 60 °C with p_{atm} 0.8 bar up to 1.1 bar in zone 1: -25 ... 70 °C
Connecting cables (by factory)	cable capacitance: signal line/shield also signal line/signal line: 100 pF/m cable inductance: signal line/shield also signal line/signal line: 1 µH/m

[5] *the real switching current in the application depends on the power supply unit*

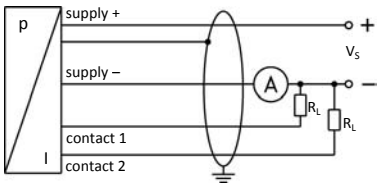
Miscellaneous	
Display	4-digit, 7-segment-LED display, visible range 37.2 x 11 mm; digit height 10 mm, range of indication -1999 ... +9999; accuracy 0.1 % ± 1 digit; digital damping 0.3 … 30 sec (programmable); measured value update 0.0 … 10 sec (programmable)
Current consumption (without contacts)	2-wire signal output current: max. 25 mA 3-wire signal output current: approx. 30 mA + signal current 3-wire signal output voltage: approx. 30 mA
Ingress protection	IP 67
Installation position	any [6]
Weight	approx. 400 g
Operational life	> 100 x 10^6 cycles
CE-conformity	EMC Directive: 2004/108/EC Pressure Equipment Directive: 97/23/EC (module A) [7]

[6] *Pressure switches are calibrated in a vertical position with the pressure connection down. If this position is changed on installation there can be slight deviation in the zero point for pressure ranges $P_N \leq 1$ bar.*

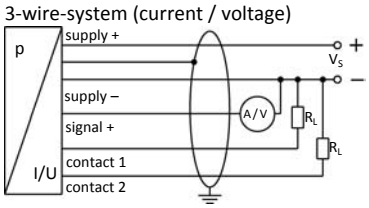
[7] *This directive is only valid for devices with maximum permissible overpressure > 200 bar*

Wiring diagrams

2-wire-system (current)



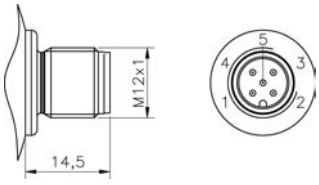
3-wire-system (current / voltage)



Pin configuration

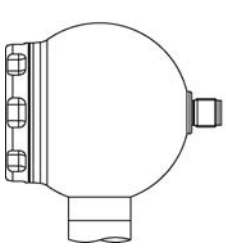
Electrical connection	M12x1 metal (5-pin)	cable colours (DIN 47100)
Supply +	1	wh (white)
Supply –	3	bn (brown)
Signal + (only 3-wire)	2	gn (green)
Contact 1	4	gr (grey)
Contact 2	5	pn (pink)
Shield	plug housing / pressure port	gn/ye (green / yellow)

Electrical connection (dimensions in mm)

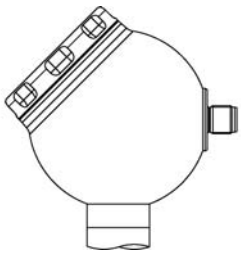


M12x1 (5-pin)

Designs [8]



side display

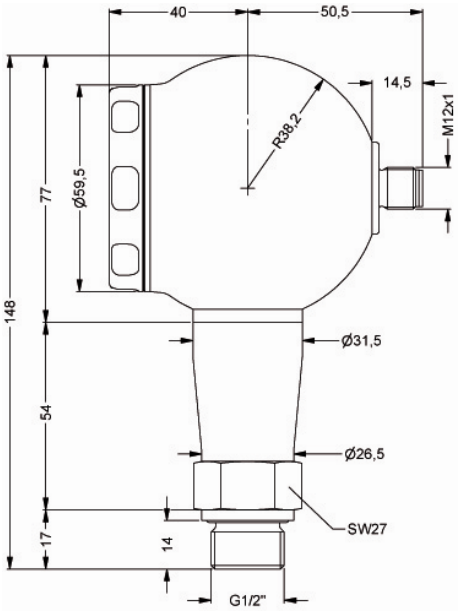


45° display (on request)

[8] *all designs in horizontal rotatable housing as standard*

Mechanical connections (dimensions in mm)

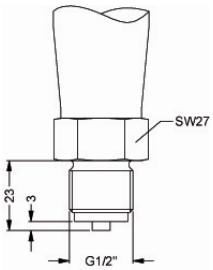
standard



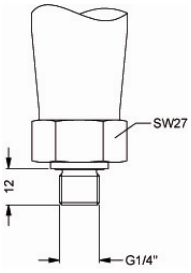
G1/2" DIN 3852

⇨ **for nominal pressure P_N > 400 bar increases the length of devices with IS-vesion by 19 mm and of devices without IS-version by 39 mm**

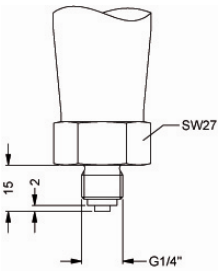
optionally



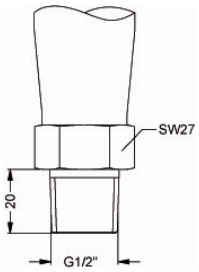
G1/2" EN 837



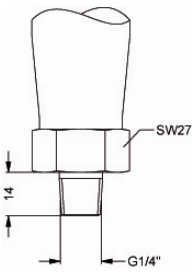
G1/4" DIN 3852



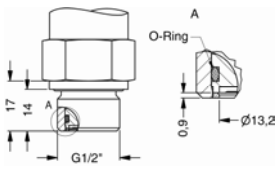
G1/4" EN 837



1/2" NPT



1/4" NPT



G1/2" flush DIN 3852
(P_N from 0.1 up to 40 bar)

⇨ **metric threads and other versions on request**

DS 400

DS 400 ☐☐☐-☐☐☐☐-☐☐-☐-☐-☐-☐☐☐-☐☐☐-☐-☐☐☐

Messgröße	Code	
relativ [1]	7 A 0	
absolut	7 A 1	

Eingang [bar]	Code	
0,10	1 0 0 0	
0,16	1 6 0 0	
0,25	2 5 0 0	
0,40	4 0 0 0	
0,60	6 0 0 0	
1,0	1 0 0 1	
1,6	1 6 0 1	
2,5	2 5 0 1	
4,0	4 0 0 1	
6,0	6 0 0 1	
10	1 0 0 2	
16	1 6 0 2	
25	2 5 0 2	
40	4 0 0 2	
60	6 0 0 2	
100	1 0 0 3	
160	1 6 0 3	
250	2 5 0 3	
400	4 0 0 3	
600	6 0 0 3	
-1 ... 0	X 1 0 2	
Sondermessbereiche	9 9 9 9	auf Anfrage

Bauform	Code	
Edelstahl-Kugelgehäuse (Anzeige seitlich)	K H	
Edelstahl-Kugelgehäuse (Anzeige 45°)	K 4	auf Anfrage

Analogausgang	Code	
ohne	0	
4 ... 20 mA / 2-Leiter	1	
0 ... 10 V / 3-Leiter, verstellbar	3	
4 ... 20 mA / 3-Leiter, verstellbar	7	
Ex-Schutz 4 ... 20 mA / 2-Leiter [2]	E	
andere	9	auf Anfrage

Schaltausgang	Code	
1 Schaltausgang	1	
2 Schaltausgänge [2]	2	

Genauigkeit		Code	
Standard für $P_N \geq 0,4$ bar	0,35 %	3	
Standard für $P_N < 0,4$ bar	0,5 %	5	
Option 1 für $P_N \geq 0,4$ bar	0,25 %	2	
andere		9	auf Anfrage

Elektrischer Anschluss	Code	
Stecker M12x1 (5-polig) / Metallausführung	N 1 0	
andere	9 9 9	auf Anfrage

Mechanischer Anschluss	Code	
G1/2" DIN 3852	1 0 0	
G1/2" EN 837	2 0 0	
G1/4" DIN 3852	3 0 0	
G1/4" EN 837	4 0 0	
G1/2" DIN 3852 mit [4] frontbündiger Messzelle	F 0 0	
1/2" NPT	N 0 0	
1/4" NPT	N 4 0	
andere	9 9 9	auf Anfrage

Dichtung	Code	
FKM	1	
ohne (Schweißversion) [5]	2	auf Anfrage
NBR	5	
andere	9	auf Anfrage

Sonderausführungen	Code	
Standard	0 0 0	
andere	9 9 9	auf Anfrage

[1] ab 60 bar: Messanfang bei Umgebungsdruck
[2] bei Ex-Ausführung ist max. 1 Schaltausgang möglich
[3] Kabel in verschiedenen Ausführungen und Längen lieferbar (nicht im Preis enthalten); angegebener Code für PVC-Kabel ohne Belüftungsschlauch
[4] nur möglich für Nenndruckbereiche $P_N \leq 40$ bar
[5] Schweißversion nur Anschlüsse nach EN 837; möglich für Nenndruckbereiche $P_N \leq 40$ bar

DRUCK & TEMPERATUR
LEITENBERGER GMBH

DS 401

Intelligent Electronic Pressure Switch Case Stainless Steel

Ceramic Sensor

accuracy according to IEC 60770:
0.5 % FSO

Electronic Pressure Switch

DS 401

Nominal pressure:

from 0 ... 400 mbar
up to 0 ... 600 bar

Contacts:

1 or 2 independent PNP contacts, freely configurable

Analogue output:

2-wire: 4 ... 20 mA
3-wire: 0 … 20 mA / 0 … 10 V
others on request

Special characteristics:

- indication of measured values on a 4-digit LED display
- rotatable and configurable display module

Optional versions:

- **IS-version**
  Ex ia = intrinsically safe for gases
- pressure port PVDF
- customer specific versions

The electronic pressure switch **DS 401** is the successful combination of

- intelligent pressure switch
- digital display

and has been specially designed for universal usage in industry applications; with flush diaphragm the **DS 401** is suitable for the usage in viscous, pasty or highly contaminated media. The rotatable stainless steel housing is predestined for rough conditions and difficult installing conditions, caused by the high functionality and robustness.

As standard the **DS 401** offers a PNP contact and is optionally available with a second, independent contact. Additionally the **DS 401** could be equipped with an analogue output.

Preferred areas of use are:

- Plant and Machine Engineering
- Environmental Engineering (water – sewage – recycling)
- Water
- Hydraulic Oil

Input pressure ranges																			
Nominal pressure gauge	[bar]	-1...0	0.4	0.6	1	1.6	2.5	4	6	10	16	25	40	60	100	160	250	400	600
Nominal pressure abs.	[bar]	-	-	0.6	1	1.6	2.5	4	6	10	16	25	40	60	100	160	250	400	600
Level gauge	[mH_2O]	-	4	6	10	16	25	40	60	100	160	250	400	600	-	-	-	-	-
Overpressure	[bar]	4	1	2	2	4	4	10	10	20	40	40	100	100	200	400	400	600	800
Burst pressure ≥	[bar]	7	2	4	4	5	5	12	12	25	50	50	120	120	250	500	500	650	880
Vacuum resistance		P_N ≥ 1 bar: unlimited vacuum resistance P_N < 1 bar: on request																	

Contact [1]	
Number, type	standard: 1 PNP contact option: 2 independent PNP contacts
Max. switching current	4 ... 20 mA / 2- and 3-wire: contact rating 125 mA, short-circuit resistant; $V_{Switch} = V_S$ - 2V 0 ... 10 V / 3-wire: contact rating 500 mA, short-circuit resistant
Accuracy of contacts [2]	≤± 0.5 % FSO
Repeatability	≤± 0.2 % FSO
Switching frequency	2-wire: max. 10 Hz / 3-wire: 50 Hz
Switching cycles	> 100 x 10^6
Delay time	0 ... 100 sec

[1] *with Ex-protection max. 1 contact possible*
[2] *accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability)*

Analogue output (optionally) / Supply		
2-wire current signal	4 ... 20 mA / V_S = 13 ... 36 V_{DC} permissible load: $R_{max} = [(V_S - V_{S\,min}) / 0.02]$ Ω	response time: < 10 msec
2-wire current signal, Ex-protection	4 ... 20 mA / V_S = 13 ... 28 V_{DC} permissible load: $R_{max} = [(V_S - V_{S\,min}) / 0.02]$ Ω	response time: < 10 msec
3-wire current signal	4 ... 20 mA / V_S = 24 V_{DC} ± 10 % adjustable (turn-down of span 1:5) [3] permissible load: R_{max} = 500 Ω	response time: < 30 msec
3-wire voltage signal	0 ... 10 V / V_S = 24 V_{DC} ± 10 % adjustable (turn-down of span 1:5) [3] permissible load: R_{min} = 10 kΩ	response time: < 30 msec
Without analogue output	V_S = 15 ... 36 V_{DC}	
Accuracy [2]	≤± 0.5 % FSO	

[3] *with turn-down of span the analogue signal is adjusted automatically to the new measuring range*

Thermal effects (Offset and Span) / Permissible temperatures	
Thermal error	≤± 0.2 % FSO / 10 K
in compensated range	-25 ... 85 °C
Permissible temperatures [4]	medium: -40 ... 125 °C electronics / environment: -40 ... 85 °C storage: -40 ... 100 °C

Electrical protection	
Short-circuit protection	permanent
Reverse polarity protection	no damage, but also no function
Electromagnetic compatibility	emission and immunity according to EN 61326

Mechanical stability		
Vibration	10 g RMS (25 ... 2000 Hz)	according to DIN EN 60068-2-6
Shock	500 g / 1 msec	according to DIN EN 60068-2-27

Materials	
Pressure port / housing	1.4404 (316L) PVDF (for P_N ≤ 60 bar)
Display housing	stainless steel 1.4301 (304)
Viewing glass	laminated safety glass
Seals (media wetted)	standard: FKM option: EPDM, NBR others on request
Diaphragm	ceramics Al_2O_3 96 %
Media wetted parts	pressure port, seals, diaphragm

Explosion protection (only for 4 … 20 mA / 2-wire)	
Approval AX14-DS 401	IBExU 06 ATEX 1050 X zone 0: II 1G Ex ia IIC T4 Ga (connector) / II 1G Ex ia IIB T4 Ga (cable)
Safety technical maximum values	U_i = 28 V, I_i = 93 mA, P_i = 660 mW
Max. switching current [4]	70 mA
Permissible temperatures for environment	in zone 0: -20 ... 60 °C with p_{atm} 0.8 bar up to 1.1 bar in zone 1: -20 ... 70 °C
Connecting cables (by factory)	cable capacitance: signal line/shield also signal line/signal line: 160 pF/m cable inductance: signal line/shield also signal line/signal line: 1 µH/m

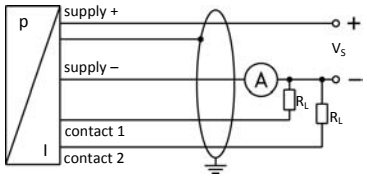
[4] *the real switching current in the application depends on the power supply unit*

Miscellaneous	
Display	4-digit, 7-segment-LED display, visible range 37.2 x 11 mm; digit height 10 mm, range of indication -1999 ... +9999; accuracy 0.1 % ± 1 digit; digital damping 0.3 … 30 sec (programmable); measured value update 0.0 … 10 sec (programmable)
Option oxygen application [5]	for $P_N \leq 25$ bar: O-ring in special material with oxygen-approval (FKM)
Current consumption (without contacts)	2-wire signal output current: max. 25 mA 3-wire signal output current: approx. 30 mA + signal current 3-wire signal output voltage: approx. 30 mA
Ingress protection	IP 67
Installation position	any
Weight	approx. 400 g
Operational life	> 100 x 10^6 pressure cycles
CE-conformity	EMC Directive: 2004/108/EC Pressure Equipment Directive: 97/23/EC (module A) [6]

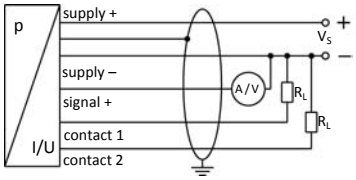
[5] *not possible with flush pressure ports*
[6] *This directive is only valid for devices with maximum permissible overpressure > 200 bar*

Wiring diagrams

2-wire-system (current)



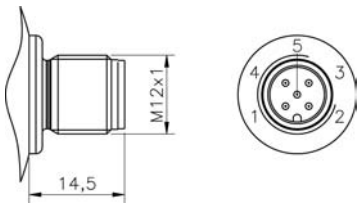
3-wire-system (current / voltage)



Pin configuration

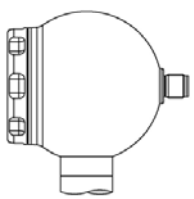
Electrical connections	M12x1 metal (5-pin)	cable colours (DIN 47100)
Supply +	1	wh (white)
Supply –	3	bn (brown)
Signal + (only 3-wire)	2	gn (green)
Contact 1	4	gr (grey)
Contact 2	5	pn (pink)
Shield	plug housing / pressure port	gn/ye (green / yellow)

Electrical connections (dimensions in mm)

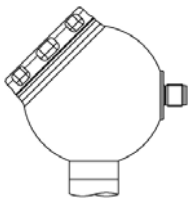


M12x1 (5-pin)

Design [7]



side display

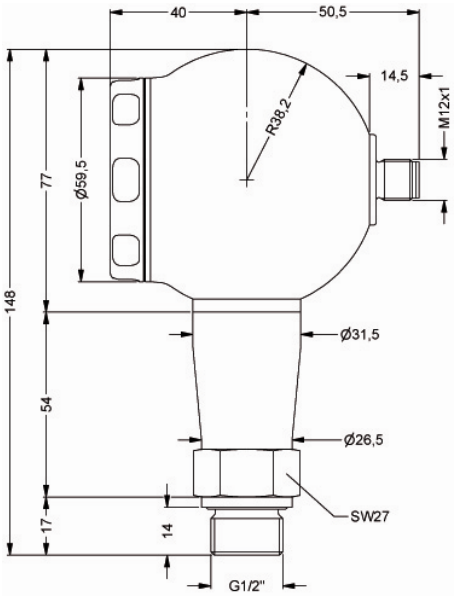


45° display (on request)

[7] *all designs in horizontal rotatable housing as standard*

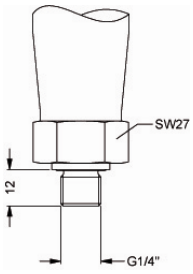
Mechanical connections (dimensions in mm)

standard

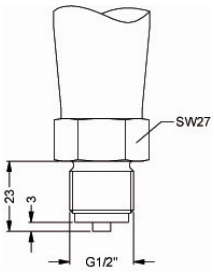


G1/2" DIN 3852

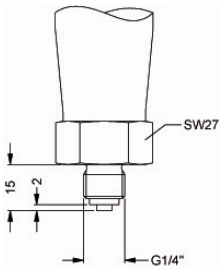
optionally



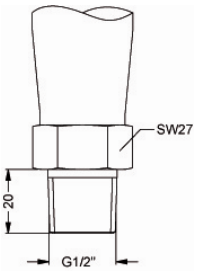
G1/4" DIN 3852



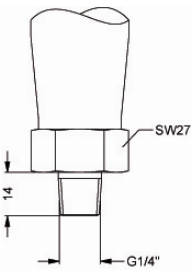
G1/2" EN 837



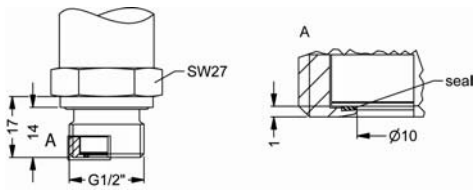
G1/4" EN 837



1/2" NPT



1/4" NPT



G1/2" flush DIN 3852
(P_N from 0.4 up to 40 bar)

⇨ **metric threads and other versions on request**

DRUCK & TEMPERATUR
LEITENBERGER GMBH

Spezifikationsblatt / *specification sheet*

DS 401

DS 401 □□□-□□□□-□□-□-□-□-□□□-□□□-□-□-□-□□□

Messgröße

	Code	
relativ	7 A 2	
relativ in mH_2O	7 A E	
absolut	7 A 3	

Eingang

[mH_2O]	[bar]	Code	
4	0,4	4 0 0 0	
6	0,6	6 0 0 0	
10	1	1 0 0 1	
16	1,6	1 6 0 1	
25	2,5	2 5 0 1	
40	4	4 0 0 1	
60	6	6 0 0 1	
100	10	1 0 0 2	
160	16	1 6 0 2	
250	25	2 5 0 2	
400	40	4 0 0 2	
600	60	6 0 0 2	
	100	1 0 0 3	
	160	1 6 0 3	
	250	2 5 0 3	
	400	4 0 0 3	
	600	6 0 0 3	
	-1 ... 0	X 1 0 2	
Sondermessbereiche		9 9 9 9	auf Anfrage

Bauform

	Code	
Edelstahl-Kugelgehäuse (Anzeige seitlich)	K H	
Edelstahl-Kugelgehäuse (Anzeige 45°)	K 4	auf Anfrage

Analogausgang

	Code	
ohne	0	
4 ... 20 mA / 2-Leiter	1	
0 ... 10 V / 3-Leiter, verstellbar	3	
4 ... 20 mA / 3-Leiter, verstellbar	7	
Ex-Schutz 4 ... 20 mA / 2-Leiter [1]	E	
andere	9	auf Anfrage

Schaltausgang

	Code	
1 Schaltausgang	1	
2 Schaltausgänge [1]	2	

Genauigkeit

	Code	
0,5 %	5	
andere	9	auf Anfrage

Elektrischer Anschluss

	Code	
Stecker M12x1 (5-polig) / Metallausführung	N 1 0	
andere	9 9 9	auf Anfrage

Mechanischer Anschluss

	Code	
G1/2" DIN 3852	1 0 0	
G1/2" EN 837	2 0 0	
G1/4" DIN 3852	3 0 0	
G1/4" EN 837	4 0 0	
G1/2" DIN 3852 mit frontbündiger Messzelle [2]	F 0 0	
G1/2" DIN 3852 offener Anschluss	H 0 0	
1/2" NPT	N 0 0	
1/4" NPT	N 4 0	
andere	9 9 9	auf Anfrage

Dichtung

	Code	
FKM	1	
EPDM [3]	3	
NBR	5	
andere	9	auf Anfrage

Druckanschluss

	Code	
Edelstahl 1.4404 (316L)	1	
PVDF [4]	B	
andere	9	auf Anfrage

Trennmembrane

	Code	
Keramik Al_2O_3 96%	2	
andere	9	auf Anfrage

Sonderausführungen

	Code	
Standard	0 0 0	
Sauerstoff-Ausführung [5]	0 0 7	
andere	9 9 9	auf Anfrage

[1] bei Ex-Ausführung ist max. 1 Schaltausgang möglich
[2] G1/2" frontbündig bis 25 bar und G3/4" frontbündig bis 60 bar möglich; Absolutdruck auf Anfrage
[3] möglich für Nenndruckbereiche $P_N \leq 160$ bar
[4] PVDF-Ausführung nur mit G1/2" DIN 3852 offener Anschluss (bis 60 bar); Ex-Schutz nicht möglich
[5] Sauerstoff-Ausführung nur mit FKM-Dichtung möglich bis 25 bar

DRUCK & TEMPERATUR
LEITENBERGER GMBH

DS 200

Electronic Pressure Switch

Stainless Steel Sensor

accuracy according to IEC 60770:
standard: 0.35 % FSO
option: 0.25 % FSO

Electronic Pressure Switch

DS 200

Nominal pressure:

from 0 ... 100 mbar
up to 0 ... 600 bar

Contacts:

1, 2 or 4 independent PNP contacts,
freely configurable

Analogue output:

2-wire: 4 ... 20 mA
3-wire: 0 … 20 mA / 0 … 10 V
others on request

Special characteristics:

- indication of measured values on a 4-digit LED display
- rotatable and configurable display module

Optional versions:

- **IS-version**
  Ex ia = intrinsically safe for gases
- pressure sensor welded
- customer specific versions

CE Ex

The electronic pressure switch **DS 200** is the successful combination of

- intelligent pressure switch
- digital display

and has been specially designed for numerous applications in various industrial sectors.

As standard the **DS 200** offers a PNP contact and a rotatable display module with 4-digit LED display.

Optional versions like e.g. an intrinsically safe version, max. 4 contacts and an analogue output complete the profile.

Preferred areas of use are:

Plant and Machine Engineering

Heating and Air Conditioning

Environmental Engineering
(water – sewage – recycling)

DS 200

Electronic Pressure Switch

Technical Data

Input pressure range											
Nominal pressure gauge / abs.	[bar]	-1…0	0.10	0.16	0.25	0.40	0.60	1	1.6	2.5	4	6
Level gauge	[mH_2O]	-	1	1.6	2.5	4	6	10	16	25	40	60
Overpressure	[bar]	5	0.5	1	1	2	5	5	10	10	20	40
Burst pressure ≥	[bar]	7.5	1.5	1.5	1.5	3	7.5	7.5	15	15	25	50

Nominal pressure gauge / abs.	[bar]	10	16	25	40	60	100	160	250	400	600
Level gauge	[mH_2O]	100	160	250	400	600	-	-	-	-	-
Overpressure	[bar]	40	80	80	105	210	210	600	1000	1000	1000
Burst pressure ≥	[bar]	50	120	120	210	420	420	1000	1250	1250	1250
Vacuum resistance		$P_N \geq 1$ bar: unlimited vacuum resistance $P_N < 1$ bar: on request									

Contact [1]	
Standard	1 PNP contact
Options	2 independent PNP contacts 4 independent PNP contacts (possible with M12x1, 8-pin for 4 ... 20 mA/3-wire; 0 ... 10 V/3-wire on request)
Max. switching current	4 ... 20 mA / 2- and 3-wire: contact rating 125 mA, short-circuit resistant; $V_{switch} = V_S - 2V$ 0 ... 10 V / 3-wire: contact rating 500 mA, short-circuit resistant
Accuracy of contacts [2]	standard: $P_N < 0.4$ bar: ≤± 0.5 % FSO $P_N \geq 0.4$ bar: ≤± 0.35 % FSO option: $P_N \geq 0.4$ bar: ≤± 0.25 % FSO
Repeatability	≤ ± 0.1 % FSO
Switching frequency	max. 10 Hz
Switching cycles	> 100 x 10^6
Delay time	0 ... 100 sec

[1] *max. 1 contact for 2-wire current signal with plug ISO 4400 as well as 2-wire current signal with IS-protection*
no contact possible with 3-wire in combination with plug ISO 4400
[2] *accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability)*

Analogue output (optionally) / Supply		
2-wire current signal	4 ... 20 mA / V_S = 13 ... 36 V_{DC} permissible load: $R_{max} = [(V_S - V_{S\,min}) / 0.02]$ Ω	response time: < 10 msec
2-wire current signal with IS-protection	4 ... 20 mA / V_S = 13 ... 28 V_{DC} permissible load: $R_{max} = [(V_S - V_{S\,min}) / 0.02]$ Ω	response time: < 10 msec
3-wire current signal	4 ... 20 mA / V_S = 19 ... 30 V_{DC} adjustable (turn-down of span 1:5) [3] permissible load: R_{max} = 500 Ω	response time: < 3 sec
3-wire voltage signal	0 … 10 V / V_S = 15 ... 36 V_{DC} permissible load: R_{min} = 10 kΩ	response time: < 3 msec
without analogue output	V_S = 15 ... 36 V_{DC}	
Accuracy [3]	standard: $P_N < 0.4$ bar: ≤± 0.5 % FSO; $P_N \geq 0.4$ bar: ≤± 0.35 %FSO option: $P_N \geq 0.4$ bar: ≤± 0.25 % FSO	

[3] *with turn-down of span the analogue signal is adjusted automatically to the new measuring range*

Thermal effects (Offset and Span)				
Nominal pressure P_N	[bar]	-1 … 0	< 0.40	≥ 0.40
Tolerance band	[% FSO]	≤± 0.75	≤± 1	≤± 0.75
in compensated range	[°C]	-20 ... 85	0 ... 70	-20 … 85

Permissible temperatures				
Permissible temperatures	medium: -40 ... 125 °C	electronics / environment:	-40 ... 85 °C	
	storage: -40 ... 100 °C			

Electrical protection	
Short-circuit protection	permanent
Reverse polarity protection	no damage, but also no function
Electromagnetic compatibility	emission and immunity according to EN 61326

Mechanical stability		
Vibration	10 g RMS (25 ... 2000 Hz)	according to DIN EN 60068-2-6
Shock	500 g / 1 msec	according to DIN EN 60068-2-27

Materials				
Pressure port	stainless steel 1.4404 (316 L)			
Housing	stainless steel 1.4404 (316 L)			
Display housing	PA 6.6, polycarbonate			
Seals (media wetted)	standard: FKM	option:	NBR; welded version [4]	others on request
Diaphragm	stainless steel 1.4435 (316 L)			
Media wetted parts	pressure port, seals, diaphragm			

[4] *welded version only for pressure ports according to EN 837; possible for nominal pressure ranges P_N ≤40 bar*

Explosion protection (only for 4 … 20 mA / 2-wire)	
Approval AX14-DS 200	IBExU 06 ATEX 1050 X; zone 1: II 2G Ex ia IIC T4 Gb (connector) / II 2G Ex ia IIB T4 Gb (cable)
Safety technical maximum values	U_i = 28 V, I_i = 93 mA, P_i = 660 mW, C ≈ 0 nF, L_i ≈ 0 µH
Max. switching current [5]	70 mA (max. permissible inductivity: 4.7 mH)
Permissible temperatures for environment	-20 ... 70 °C
Connecting cables (by factory)	cable capacitance: signal line/shield also signal line/signal line: 160 pF/m cable inductance: signal line/shield also signal line/signal line: 1 µH/m

[5] *the real switching current in the application depends on the power supply unit*

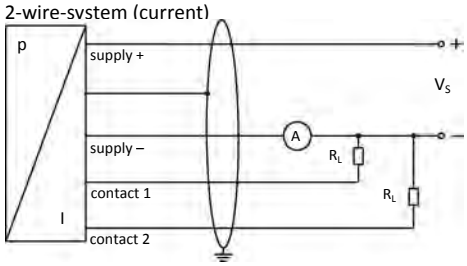
Miscellaneous	
Display	4-digit, red 7-segment-LED display, digit height 7 mm, range of indication -1999 ... +9999; accuracy 0.1 % ± 1 digit; digital damping 0.3 … 30 sec (programmable); measured value update 0.0 … 10 sec (programmable)
Current consumption (without contacts)	2-wire signal output current: max. 25 mA 3-wire signal output current: approx. 45 mA + signal current 3-wire signal output voltage: approx. 45 mA
Ingress protection	IP 65
Installation position	any [6]
Weight	min. 160 g (depending on mechanical connection)
Operational life	> 100 x 10^6 cycles
CE-conformity	EMC Directive: 2004/108/EC Pressure Equipment Directive: 97/23/EC (module A) [7]

[6] *Pressure switches are calibrated in a vertical position with the pressure connection down. If this position is changed on installation there can be slight deviation in the zero point for pressure ranges $P_N \leq 1$ bar.*

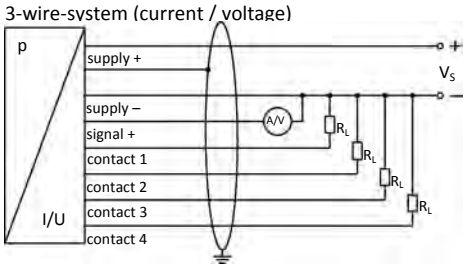
[7] *This directive is only valid for devices with maximum permissible overpressure > 200 bar*

Wiring diagrams

2-wire-system (current)



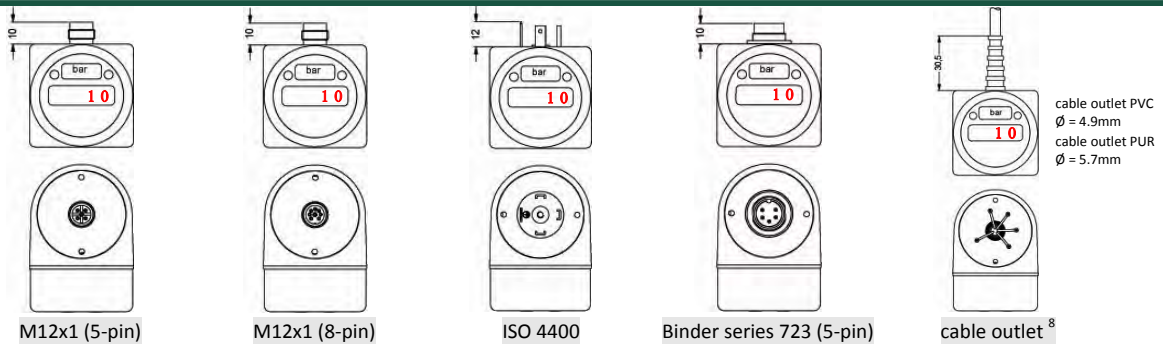
3-wire-system (current / voltage)



Pin configuration

Electrical connection	M12x1 plastic (5-pin)	M12x1 metal (5-pin)	M12x1 plastic (8-pin)	ISO 4400	Binder series 723 (5-pin)	cable colours (DIN 47100)
Supply +	1	1	1	1	3	wh (white)
Supply –	3	3	3	2	4	bn (brown)
Signal + (only 3-wire)	2	2	2	3	5	gn (green)
Contact 1	4	4	4	3	2	gr (grey)
Contact 2	5	5	5	-	1	pn (pink)
Contact 3	-	-	6	-	-	-
Contact 4	-	-	7	-	-	-
Shield	via pressure port	plug housing/ pressure port	via pressure port	ground contact	plug housing/ pressure port	gn/ye (green/yellow)

Electrical connections (dimensions in mm)

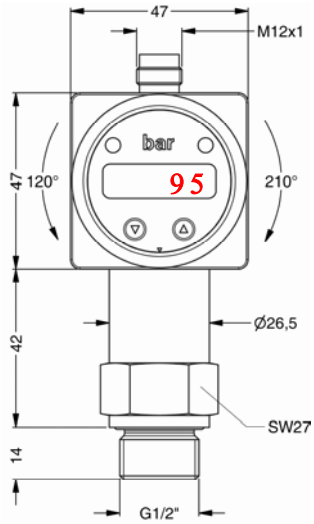


M12x1 (5-pin) | M12x1 (8-pin) | ISO 4400 | Binder series 723 (5-pin) | cable outlet [8]

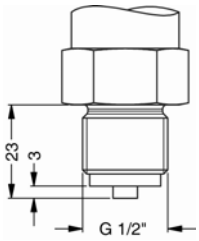
[8] *different cable types and lengths available; standard: 2 m PVC cable (without ventilation tube, permissible temperature: -5 ... 70 °C)*

Mechanical connections (dimensions in mm)

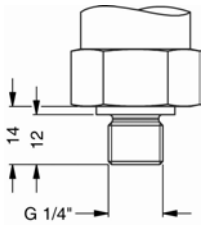
standard



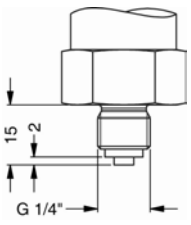
optionally



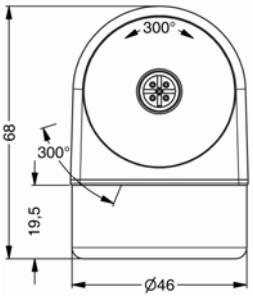
G1/2" EN 837



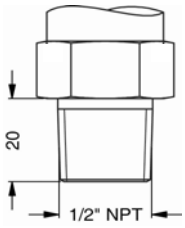
G1/4" DIN 3852



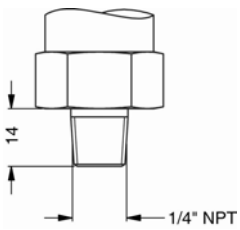
G1/4" EN 837



G1/2" DIN 3852



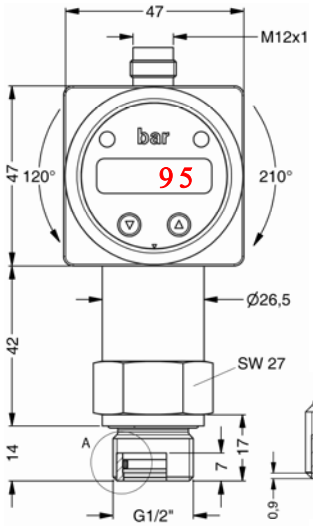
1/2" NPT



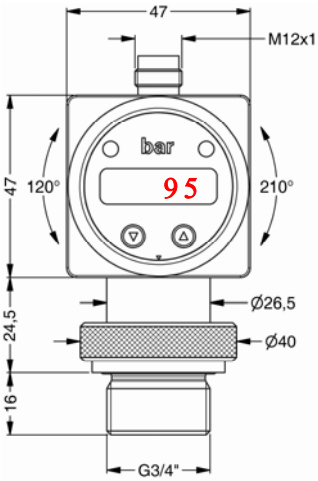
1/4" NPT

⇨ **for nominal pressure P_N > 400 bar increases the length of devices with IS-vesion by 19 mm and of devices without IS-version by 39 mm**

optionally for P_N from 0.1 up to 40 bar



G1/2" flush
DIN 3852



G3/4" flush DIN 3852
(absolute pressure on request)

⇨ **metric threads and other versions on request**

DRUCK & TEMPERATUR
LEITENBERGER GMBH

DS 200

DS 200 ☐☐☐-☐☐☐☐-☐-☐-☐-☐☐☐-☐☐☐-☐-☐☐☐

Messgröße			Pressure			Code	
relativ in bar			gauge in bar [1]			7 8 0	
relativ in mH_2O			gauge in mH_2O [1]			7 8 H	
absolut in bar			absolute in bar [2]			7 8 1	
Eingang	**[mH_2O]**	**[bar]**	**Input**	**[mH_2O]**	**[bar]**		
	1	0,10		1	0.10 [2]	1 0 0 0	
	1,6	0,16		1.6	0.16 [2]	1 6 0 0	
	2,5	0,25		2.5	0.25 [2]	2 5 0 0	
	4	0,40		4	0.40	4 0 0 0	
	6	0,60		6	0.60	6 0 0 0	
	10	1,0		10	1.0	1 0 0 1	
	16	1,6		16	1.6	1 6 0 1	
	25	2,5		25	2.5	2 5 0 1	
	40	4,0		40	4.0	4 0 0 1	
	60	6,0		60	6.0	6 0 0 1	
	100	10		100	10	1 0 0 2	
	160	16		160	16	1 6 0 2	
	250	25		250	25	2 5 0 2	
	400	40		400	40	4 0 0 2	
	600	60		600	60	6 0 0 2	
		100			100	1 0 0 3	
		160			160	1 6 0 3	
		250			250	2 5 0 3	
		400			400	4 0 0 3	
		600			600	6 0 0 3	
		-1 … 0			-1 … 0	X 1 0 2	
		Sondermessbereiche			customer	9 9 9 9	auf Anfrage
Analogausgang			**Analogue output**				
ohne			without			0	
4 … 20 mA / 2-Leiter			4 … 20 mA / 2-wire			1	
0 … 10 V / 3-Leiter			0 … 10 V / 3-wire			3	
4 … 20 mA / 3-Leiter, verstellbar			4 … 20 mA / 3-wire, adjustable			7J	
Ex-Schutz 4 … 20 mA / 2-Leiter			intrinsic safety 4 … 20 mA / 2-wire [3]			E	
andere			customer			9	auf Anfrage
Schaltausgang			**Contact**				
1 Schaltausgang			1 contact [3, 4]			1	
2 Schaltausgänge			2 contacts [3, 4]			2	
4 Schaltausgänge			4 contacts [5]			4	
Genauigkeit			**Accuracy**				
Standard für $P_N > 0,4$ bar		0,35 %	standard for $P_N > 0.4$ bar		0.35 %	3	
Standard für $P_N \leq 0,4$ bar		0,5 %	standard for $P_N \leq 0.4$ bar		0.5 %	5	
Option für $P_N \geq 0,4$ bar		0,25 %	option for $P_N \geq 0.4$ bar		0.25 %	2	
andere			customer			9	auf Anfrage
Elektrischer Anschluss			**Electrical connection**				
Stecker M12x1 (5-polig) / Kunststoffausführung			male plug M12x1 (5-pin) / plastic version			N 0 1	
Stecker M12x1 (8-polig) / Kunststoffausführung			male plug M12x1 (8-pin) / plastic version [5]			M 5 0	
Stecker M12x1 (5-polig) / Metallausführung			male plug M12x1 (5-pin) / metal version			N 1 1	
Stecker und Kabeldose ISO 4400			male and female plug ISO 4400 [4]			1 0 0	
Stecker Binder Serie 723 (5-polig)			male plug Binder series 723 (5-pin)			2 0 4	
Kabelausgang mit PVC-Kabel			cable outlet incl. cable [6]			T A 0	
andere			customer			9 9 9	auf Anfrage
Mechanischer Anschluss			**Mechanical connection**				
G1/2" DIN 3852			G1/2" DIN 3852			1 0 0	
G1/2" EN 837			G1/2" EN 837			2 0 0	
G1/4" DIN 3852			G1/4" DIN 3852			3 0 0	
G1/4" EN 837			G1/4" EN 837			4 0 0	
G1/2" DIN 3852 mit frontbündiger Messzelle			G1/2" DIN 3852 with flush sensor [7]			F 0 0	
G3/4" DIN 3852 mit frontbündiger Messzelle			G3/4" DIN 3852 with flush sensor [7]			K 0 0	
1/2" NPT			1/2" NPT			N 0 0	
1/4" NPT			1/4" NPT			N 4 0	
andere			customer			9 9 9	auf Anfrage
Dichtung			**Seals**				
FKM			FKM			1	
ohne (Schweißversion)			without (welded version) [8]			2	
andere			customer			9	auf Anfrage
Sonderausführungen			**Special version**				
Standard			standard			0 0 0	
andere			customer			9 9 9	auf Anfrage

[1] ab 60 bar: Messanfang bei Umgebungsdruck
from 60 bar: measurement starts with ambient pressure

[2] Absolutdruck möglich ab 0,4 bar
absolute pressure possible from 0.4 bar

[3] bei Ex-Ausführung ist max. 1 Schaltausgang möglich
with Ex version max. 1 contact is possible

[4] mit Stecker ISO 4400 ist bei 2-Leiter Ausführung nur max. 1 Schaltausgang möglich; bei 3-Leiter Ausführung ist kein Schaltausgang möglich
with connector ISO 4400 and output 2-wire version only max. 1 contact possible; with 3-wire version no contact possible

[5] 4 Schaltausgänge und M12x1, 8-polig nur in Kombination miteinander und mit 4 ... 20 mA/3-Leiter erhältlich; 0 ... 10 V/3-Leiter auf Anfrage
4 contacts and M12x1, 8-pin only possible in combination and together with 4 ... 20 mA/3-wire; 0 ... 10 V/3-wire on request

[6] Standard: 2 m PVC-Kabel ohne Belüftungsschlauch, andere auf Anfrage
standard: 2 m PVC cable without ventilation tube, others on request

[7] nicht möglich für Nenndruckbereich $P_N > 40$ bar; für G3/4“ frontbündig Absolutdruck auf Anfrage
not possible for nominal pressure $P_N > 40$ bar; for G3/4“ flush nominal pressure abs. on request

[8] Schweißversion nur Anschlüsse nach EN 837; möglich für Nenndruckbereiche $P_N \leq 40$ bar
welded version only with pressure ports according to EN 837; possible for nominal pressure ranges $P_N \leq 40$ bar

DRUCK & TEMPERATUR
LEITENBERGER GMBH

DS 201

Electronical Pressure Switch

Ceramic Sensor

accuracy according to IEC 60770:
0.5 % FSO

Electronic Pressure Switch

DS 201

Nominal pressure:

from 0 ... 400 mbar
up to 0 ... 600 bar

Contacts:

1, 2 or 4 independent PNP contacts, freely configurable

Analogue output:

2-wire: 4 ... 20 mA
3-wire: 0 … 20 mA / 0 … 10 V
others on request

Special characteristics:

- indication of measured values on a 4-digit LED display
- rotatable and configurable display module

Optional versions:

- **IS-version**
  Ex ia = intrinsically safe for gases
- pressure port PVDF
- customer specific versions

The electronic pressure switch **DS 201** is the successful combination of

- intelligent pressure switch
- digital display

and has been specially designed for universal usage in industry applications. The **DS 201** is available with flush pressure ports for viscous, pasty and highly contaminated media.

As standard the **DS 201** offers a PNP contact and a rotable display module with 4-digit LED display.

Optional versions like e.g. an intrinsically safe version, max. 4 contacts and an analogue output complete the profile.

Preferred areas of use are:

Plant and Machine Engineering

Environmental Engineering
(water – sewage – recycling)

Input pressure range [1]																			
Nominal pressure gauge [bar]	-1...0	0.4	0.6	1	1.6	2.5	4	6	10	16	25	40	60	100	160	250	400	600
Nominal pressure abs. [bar]	-	-	0.6	1	1.6	2.5	4	6	10	16	25	40	60	100	160	250	400	600
Level gauge [mH_2O]	-	4	6	10	16	25	40	60	100	160	250	400	600	-	-	-	-	-
Overpressure [bar]	4	1	2	2	4	4	10	10	20	40	40	100	100	200	400	400	600	800
Burst pressure ≥ [bar]	7	2	4	4	5	5	12	12	25	50	50	120	120	250	500	500	650	880
Vacuum resistance	$P_N \geq 1$ bar: unlimited vacuum resistance $P_N < 1$ bar: on request																	

[1] *PVDF pressure port possible for nominal pressure ranges up to 60 bar*

Contact [2]	
Standard	1 PNP contact
Options	2 independent PNP contacts 4 independent PNP contacts (possible with M12x1, 8-pin for 4 ... 20 mA/3-wire; 0 ... 10 V/3-wire on request)
Max. switching current	4 ... 20 mA / 2- and 3-wire: contact rating 125 mA, short-circuit resistant; $V_{Switch} = V_S$ - 2V 0 ... 10 V / 3-wire: contact rating 500 mA, short-circuit resistant
Accuracy of contacts [3]	≤± 0.5 % FSO
Repeatability	≤± 0.2 % FSO
Switching frequency	max. 10 Hz
Switching cycles	> 100 x 10^6
Delay time	0 ... 100 sec

[2] *max. 1 contact for 2-wire current signal with plug ISO 4400 as well as 2-wire current signal with IS-protection*
no contact possible with 3-wire in combination with plug ISO 4400

Analogue output (optionally) / Supply		
2-wire current signal	4 ... 20 mA / V_S = 13 ... 36 V_{DC} permissible load: $R_{max} = [(V_S - V_{S\,min}) / 0.02\ A]\ \Omega$	response time: < 10 msec
2-wire current signal with IS-protection	4 ... 20 mA / V_S = 13 ... 28 V_{DC} permissible load: $R_{max} = [(V_S - V_{S\,min}) / 0.02\ A]\ \Omega$	response time: < 10 msec
3-wire current signal	4 ... 20 mA / V_S = 19 ... 30 V_{DC} adjustable (turn-down of span 1:5) [4] permissible load: R_{max} = 500 Ω	response time: < 0,5 sec
3-wire voltage signal	0 ... 10 V / V_S = 15 ... 36 V_{DC} permissible load: R_{min} = 10 kΩ	response time: < 10 msec
Without analogue output	V_S = 15 ... 36 V_{DC}	
Accuracy [3]	≤ ± 0.5 % FSO	

[3] *accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability)*
[4] *with turn-down of span the analogue signal is adjusted automatically to the new measuring range*

Thermal effects (Offset and Span) / Permissible temperatures		
Thermal error	≤± 0.2 % FSO / 10 K	
in compensated range	-25 ... 85 °C	
Permissible temperatures [5]	medium:	-40 ... 125 °C
	electronics / environment:	-40 ... 85 °C
	storage:	-40 ... 100 °C

[5] *for pressure port of PVC the maximum permissible temperature is 50 °C*

Electrical protection	
Short-circuit protection	permanent
Reverse polarity protection	no damage, but also no function
Electromagnetic compatibility	emission and immunity according to EN 61326

Mechanical stability		
Vibration	10 g RMS (25 ... 2000 Hz)	according to DIN EN 60068-2-6
Shock	500 g / 1 msec	according to DIN EN 60068-2-27

Materials			
Pressure port / housing		pressure port	housing
	Standard:	stainless steel 1.4404	stainless steel 1.4404
	Option for G1/2" open port (up to 60 bar):	PVDF	stainless steel 1.4404
	Options for G3/4" flush (0.6 bar ≤ P_N ≤ 25 bar):	PVDF	PVDF
Display housing	PA 6.6, polycarbonate		
Seals (media wetted)	standard: FKM option: EPDM ($P_N \leq 160$ bar), NBR others on request		
Diaphragm	ceramics Al_2O_3 96 %		
Media wetted parts	pressure port, seals, diaphragm		

Explosion protection (only for 4 … 20 mA / 2-wire)	
Approval AX14-DS 201	IBExU 06 ATEX 1050 X zone 1: II 2G Ex ia IIC T4 Gb (connector) / II 2G Ex ia IIB T4 Gb (cable)
Safety tech. maximum values	U_i = 28 V, I_i = 93 mA, P_i = 660 mW, C ≈ 0 nF, L_i ≈ 0 µH
Max. switching current [6]	70 mA (max. permissible inductivity: 4.7 mH)
Permissible temperatures for environment	-20 ... 70 °C
Connecting cables (by factory)	cable capacitance: signal line/shield also signal line/signal line: 160 pF/m cable inductance: signal line/shield also signal line/signal line: 1 µH/m

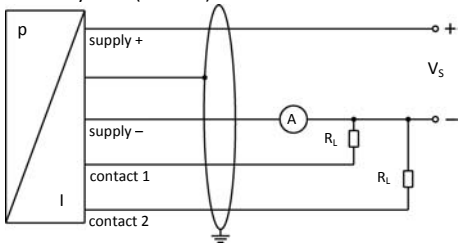
[6] *the real switching current in the application depends on the power supply unit*

Miscellaneous	
Display	4-digit, red 7-segment-LED display, digit height 7 mm, range of indication -1999 ... +9999; accuracy 0.1 % ± 1 digit; digital damping 0.3 … 30 sec (programmable); measured value update 0.0 … 10 sec (programmable)
Option oxygen application [7]	for P_N ≤ 25 bar: O-ring in special material with oxygen-approval
Current consumption (without contacts)	2-wire signal output current: max. 25 mA 3-wire signal output current: approx. 45 mA + signal current 3-wire signal output voltage: approx. 45 mA
Ingress protection	IP 65
Installation position	any
Weight	approx. 200 g
Operational life	> 100 x 10^6 cycles
CE-conformity	EMC Directive: 2004/108/EC Pressure Equipment Directive: 97/23/EC (module A) [8]

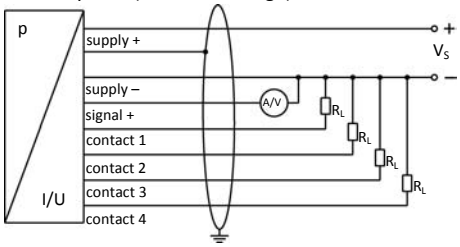
[7] *not possible with flush pressure ports*
[8] *This directive is only valid for devices with maximum permissible overpressure > 200 bar*

Wiring diagrams

2-wire-system (current)



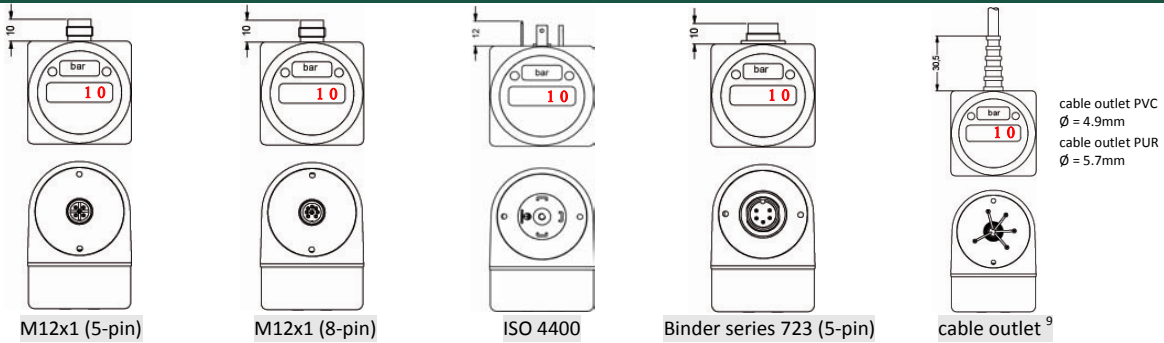
3-wire-system (current / voltage)



Pin configuration

Electrical connection	M12x1 plastic (5-pin)	M12x1 metal (5-pin)	M12x1 plastic (8-pin)	ISO 4400	Binder series 723 (5-pin)	cable colours (DIN 47100)
Supply +	1	1	1	1	3	wh (white)
Supply –	3	3	3	2	4	bn (brown)
Signal + (only 3-wire)	2	2	2	3	5	gn (green)
Contact 1	4	4	4	3	2	gr (grey)
Contact 2	5	5	5	-	1	pn (pink)
Contact 3	-	-	6	-	-	-
Contact 4	-	-	7	-	-	-
Shield	via pressure port	plug housing/ pressure port	via pressure port	ground contact	plug housing/ pressure port	gn/ye (green/yellow)

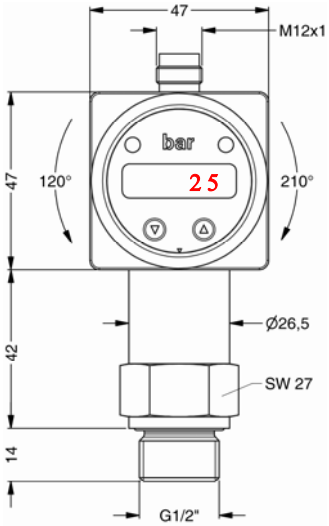
Electrical connections (dimensions in mm)

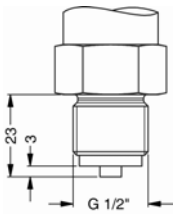


M12x1 (5-pin) | M12x1 (8-pin) | ISO 4400 | Binder series 723 (5-pin) | cable outlet [9]

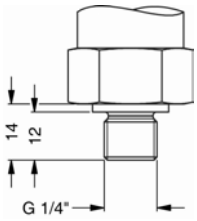
[9] *different cable types and lengths available, permissible temperature depends on kind of cable;*
standard: 2 m PVC cable (without ventilation tube, permissible temperature: -5 ... 70 °C)

Mechanical connections (dimensions in mm)

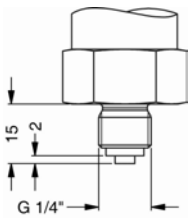




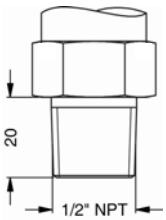
G1/2" EN 837



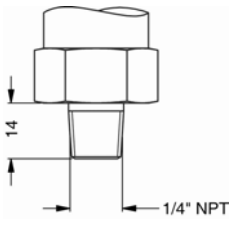
G1/4" DIN 3852



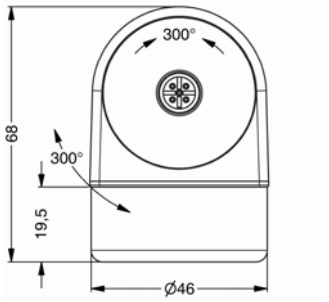
G1/4" EN 837



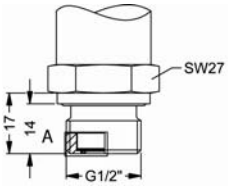
1/2" NPT

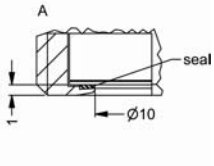


1/4" NPT

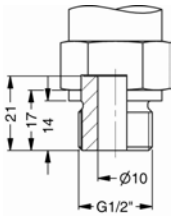


G1/2“ DIN 3852





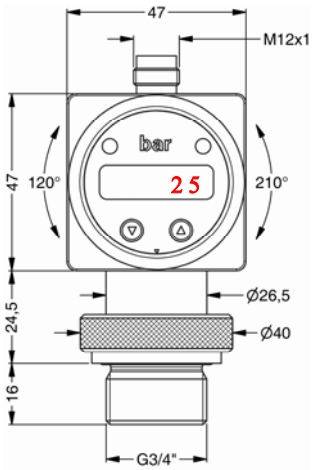
G1/2" (DIN 3852)
semi-flush; M20x1.5 [10]



G1/2" open port

⇨ **metric threads and others on request**

optionally for P_N from 0.6 up to 60 bar gauge



G3/4" flush (DIN 3852)

[10] *possible for nominal pressure ranges $P_N \leq 40$ bar*

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Spezifikationsblatt / *specification sheet*

DS 201

DS 201 ☐☐☐-☐☐☐☐-☐-☐-☐-☐☐☐-☐☐☐-☐-☐-☐-☐☐☐

	Code	
Messgröße		
relativ in bar	7 8 2	
relativ in mH_2O	7 8 E	
absolut in bar	7 8 3	
Eingang [mH_2O] [bar]		
4 0,4	4 0 0 0	
6 0,6	6 0 0 0	
10 1,0	1 0 0 1	
16 1,6	1 6 0 1	
25 2,5	2 5 0 1	
40 4,0	4 0 0 1	
60 6,0	6 0 0 1	
100 10	1 0 0 2	
160 16	1 6 0 2	
250 25	2 5 0 2	
400 40	4 0 0 2	
600 60	6 0 0 2	
100	1 0 0 3	
160	1 6 0 3	
250	2 5 0 3	
400	4 0 0 3	
600	6 0 0 3	
-1 ... 0	X 1 0 2	
Sondermessbereiche	9 9 9 9	auf Anfrage
Analogausgang		
ohne	0	
4 ... 20 mA / 2-Leiter	1	
0 ... 10 V / 3-Leiter	3	
4 ... 20 mA / 3-Leiter, verstellbar	7	
Ex-Schutz 4 ... 20 mA / 2-Leiter [1]	E	
andere	9	auf Anfrage
Schaltausgang		
1 Schaltausgang [1,2]	1	
2 Schaltausgänge [1,2]	2	
4 Schaltausgänge [3]	4	
Genauigkeit		
0,5 %	5	
andere	9	auf Anfrage
Elektrischer Anschluss		
Stecker M12x1 (5-polig) / Kunststoffausführung	N 0 0	
Stecker M12x1 (8-polig) / [3] Kunststoffausführung	M 5 0	
Stecker M12x1 (5-polig) / Metallausführung	N 1 0	
Stecker und Kabeldose ISO 4400 [2]	1 0 0	
Stecker Binder Serie 723 (5-polig)	2 0 0	
Kabelausgang mit PVC-Kabel [4]	T A 0	
andere	9 9 9	auf Anfrage
Mechanischer Anschluss		
G1/2" DIN 3852	1 0 0	
G1/2" EN 837	2 0 0	
G1/4" DIN 3852	3 0 0	
G1/4" EN 837	4 0 0	
G1/2" DIN 3852 mit [5] frontbündiger Messzelle	F 0 0	
G3/4" DIN 3852 mit [6] frontbündiger Messzelle	K 0 0	
G1/2" DIN 3852 offener Anschluss	H 0 0	
1/2" NPT	N 0 0	
1/4" NPT	N 4 0	
andere	9 9 9	auf Anfrage
Dichtung		
FKM	1	
EPDM [7]	3	
NBR	5	
andere	9	auf Anfrage
Druckanschluss		
Edelstahl 1.4404 (316L)	1	
PVDF [8,9]	B	
andere	9	auf Anfrage
Trennmembrane		
Keramik Al_2O_3 96%	2	
andere	9	auf Anfrage
Sonderausführungen		
Standard	0 0 0	
Sauerstoff-Ausführung [10]	0 0 7	
andere	9 9 9	auf Anfrage

[1] bei Ex-Ausführung ist max. 1 Schaltausgang möglich
[2] mit Stecker ISO 4400 ist bei 2-Leiter Ausführung nur max. 1 Schaltausgang möglich; bei 3-Leiter Ausführung ist kein Schaltausgang möglich
[3] 4 Schaltausgänge und M12x1, 8-polig nur in Kombination miteinander und mit 4 ... 20 mA/3-Leiter erhältlich; 0 ... 10 V/3-Leiter auf Anfrage
[4] Standard: 2 m PVC-Kabel ohne Belüftungsschlauch (Temperatureinsatzbereich: -5 ... 70 °C), andere auf Anfrage
[5] möglich für Nenndruckbereiche $P_N \geq 0{,}6$ bar bis PN ≤ 25 bar relativ, absolut auf Anfrage
[6] möglich für Nenndruckbereiche $P_N \geq 0{,}6$ bar bis $P_N \leq 60$ bar relativ
[7] möglich für Nenndruckbereiche $P_N \leq 160$ bar
[8] PVDF-Ausführung nur mit G3/4" DIN 3852 mit frontbündiger Messzelle (0,6 bar $\leq P_N \leq$ 25 bar)
[9] PVDF-Ausführung nur mit G1/2" DIN 3852 offener Anschluss (bis 60 bar) und G3/4" DIN 3852 mit frontbündiger Messzelle (0,6 bar $\leq P_N \leq$ 25 bar)
[10] Sauerstoff-Ausführung möglich bis 25 bar und in Verbindung mit FKM-Dichtung, frontbündige Ausführung auf Anfrage

DRUCK & TEMPERATUR
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DS 210

Electronic Pressure Switch

Without Media Isolation

accuracy according to IEC 60770:
0.35 % FSO

Electronic Pressure Switch

DS 210

Nominal pressure:

from 0 ... 10 mbar
up to0 ... 1000 mbar

Contacts:

1, 2 or 4 independent contacts
freely konfigurable

Analogue output:

2-wire: 4 ... 20 mA
3-wire: 0 … 20 mA / 0 … 10 V

others on request

Special characteristics:

- indication of measured values on a 4-digit LED display
- rotatable and configurable display module

Optional versions:

- **IS-version**
  Ex ia = intrinsically safe for gases
- customer specific versions

The electronic pressure switch **DS 210** is the successful combination of

- intelligent pressure switch
- digital display

and has been specially designed for measuring of very small overpressure and for vavuum applications. Permissible media are gases, pressurized air and thin non aggressive media.

As standard the **DS 210** offers a PNP-contact and a rotable display module.

Additional features like e.g. an intrinsically safe version, max. 4 contacts and an analogue output complete the profile.

Preferred areas of use are:

- Plant and Machine Engineereing
- Heating and Air Conditioning
- Laboratory Techniques

Input pressure range													
Nominal pressure gauge	[mbar]	-1000 ... 0	10	16	25	40	60	100	160	250	400	600	1000
Overpressure	[bar]	3	0.2	0.2	0.5	0.5	0.5	1	2	3	3	3	3
Burst pressure	[bar]	5	0.3	0.3	0.75	0.75	0.75	1.5	3	5	5	5	5

Contact [1]	
Standard	1 PNP contact
Options	2 independent PNP contacts 4 independent PNP contacts (possible with M12x1, 8-pin for 4 ... 20 mA/3-wire; 0 ... 10 V/3-wire on request)
Max. switching current	4 ... 20 mA / 2- and 3-wire: contact rating 125 mA, short-circuit resistant; $V_{switch} = V_S - 2V$ 0 ... 10 V / 3-wire: contact rating 500 mA, short-circuit resistant
Accuracy of contacts [3]	standard: ≤± 0.35 % FSO nominal pressure ≤ 100 mbar: ≤± 0.5 % FSO
Repeatability	≤ ± 0.1 % FSO
Switching frequency	max. 10 Hz
Switching cycles	> 100 x 10^6
Delay time	0 ... 100 sec

[1] max. 1 contact for 2-wire current signal with plug ISO 4400 as well as 2-wire current signal with Ex-protection
no contact possible with 3-wire in combination with plug ISO 4400

Analogue output (optionally) / Supply		
2-wire current signal	4 ... 20 mA / V_S = 18 ... 41 V_{DC} permissible load: $R_{max} = [(V_S - V_{S\,min}) / 0{,}02]$ Ω	response time: < 10 msec
2-wire current signal with Ex-protection	4 ... 20 mA / V_S = 17 ... 28 V_{DC} permissible load: $R_{max} = [(V_S - V_{S\,min}) / 0{,}02]$ Ω	response time: < 10 msec
3-wire current signal	4 ... 20 mA / V_S = 19 ... 30 V_{DC} adjustable (turn-down of span max. 1:5) [2] permissible load: R_{max} = 500 Ω	response time: < 3 sec
3-wire voltage signal	0 ... 10 V / V_S = 15 ... 36 V_{DC} permissible load: R_{min} = 10 kΩ	response time: < 3 msec
without analogue output	V_S = 15 ... 36 V_{DC}	
Accuracy	standard: ≤± 0.35 % FSO nominal pressure ≤ 100 mbar: ≤± 0.5 % FSO	

[2] with turn-down of span the analogue signal is adjusted automatically to the new measuring range
[3] accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability)

Thermal effects (Offset and Span)					
Nominal pressure P_N	[mbar]	-1000 ... 0	≤ 100	≤ 400	> 400
Tolerance band	[% FSO]	≤ ± 0.75	≤ ± 1.5	≤ ± 1	≤ ± 0.75
in compensated range	[°C]	-20 ... 85	0 ... 50	0 ... 70	-20 ... 85

Permissible temperatures			
Permissible temperatures	medium: -40 ... 125 °C	electronics / environment: -40 ... 85 °C	storage: -40 ... 100 °C

Electrical protection	
Short-circuit protection	permanent
Reverse polarity protection	no damage, but also no function
Electromagnetic compatibility	emission and immunity according to EN 61326

Mechanical stability		
Vibration	10 g RMS (25 ... 2000 Hz)	according to DIN EN 60068-2-6
Shock	500 g / 1 msec	according to DIN EN 60068-2-27

Materials	
Pressure port	stainless steel 1.4404 (316L)
Housing	stainless steel 1.4404 (316L)
Display housing	PA 6.6, Polycarbonate
Seal (media wetted)	FKM
Sensor	stainless steel 1.4404 (316L), silicon, Epoxy or RTV, glass
Media wetted parts	pressure port, seal, sensor

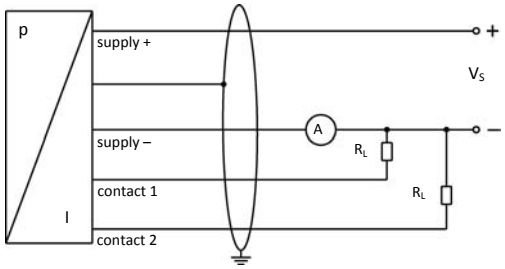
Explosion protection (for 2-wire current signal)	
Approval AX11-DS 210	TÜV 02 ATEX 1841 zone (0) 1: II (1) 2 G Ex ia IIC T4
Safety technical maximum values	U_i = 28 V, I_i = 93 mA, P_i = 660 mW, C ≈ 0 nF, L_i ≈ 0 µH
Max. switching current [4]	70 mA (max. permissible inductivity: 4.7 mH)
Permissible temperatures for environment	-20 ... 70 °C
Connecting cables (by factory)	cable capacitance: signal line/shield also signal line/signal line: 160 pF/m cable inductance: signal line/shield also signal line/signal line: 1 µH/m

[4] the real switching current in the application depends on the power supply unit

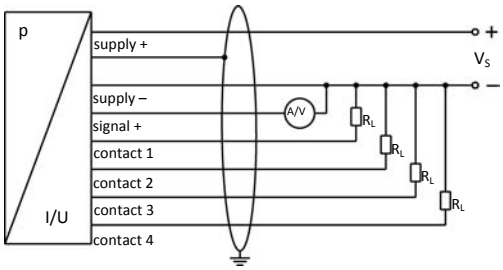
Miscellaneous	
Display	4-digit, red 7-segment-LED display, digit height 7 mm, range of indication -1999 ... +9999; accuracy 0.1 % ± 1 digit; digital damping 0.3 … 30 sec (programmable); measured value update 0.0 … 10 sec (programmable)
Current consumption (without contacts)	2-wire signal output current: max. 25 mA 3-wire signal output current: approx. 45 mA + signal current 3-wire signal output voltage: approx. 45 mA
Ingress protection	IP 65
Installation position	any
Weight	approx. 180 g
Operational life	> 100 x 10^6 cycles
CE-conformity	EMC Directive: 2004/108/EC

Wiring diagrams

2-wire-system (current)



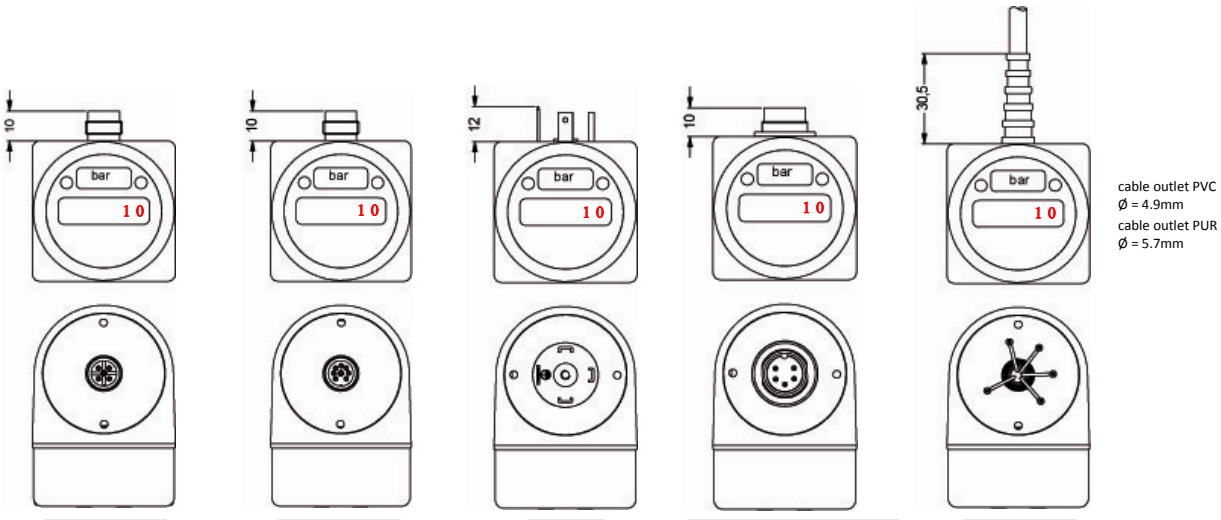
3-wire-system (current / voltage)



Pin configuration

Electrical connection	M12x1 plastic (5-pin)	M12x1 metal (5-pin)	M12x1 plastic (8-pin)	ISO 4400	Binder series 723 (5-pin)	cable colours (DIN 47100)
Supply +	1	1	1	1	3	wh (white)
Supply –	3	3	3	2	4	bn (brown)
Signal + (only 3-wire)	2	2	2	3	5	gn (green)
Contact 1	4	4	4	3	2	gr (grey)
Contact 2	5	5	5	-	1	pn (pink)
Contact 3	-	-	6	-	-	-
Contact 4	-	-	7	-	-	-
Shield	via pressure port	plug housing/ pressure port	via pressure port	ground contact	plug housing/ pressure port	gn/ye (green/yellow)

Electrical connections (dimensions in mm)

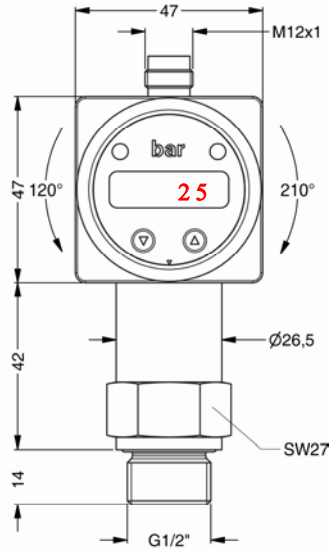


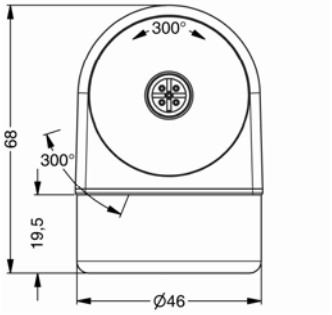
M12x1 (5-pin) | M12x1 (8-pin) | ISO 4400 | Binder series 723 (5-pin) | cable outlet [5]

[5] *different cable types and lengths available; standard: 2 m PVC cable (without ventilation tube)*

Mechanical connections (dimensions in mm)

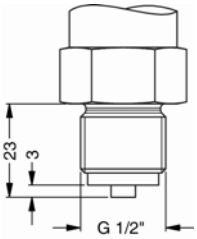
standard



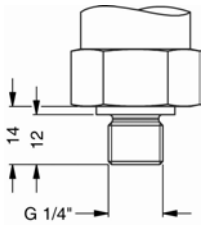


G1/2" DIN 3852

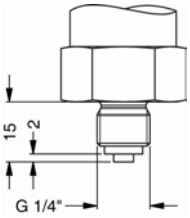
optionally



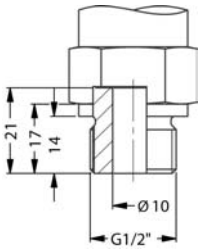
G1/2" EN 837



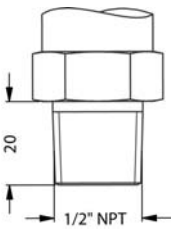
G1/4" DIN 3852



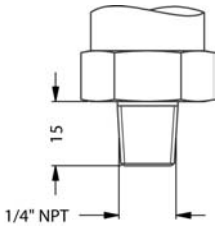
G1/4" EN 837



G1/2" open port



1/2“ NPT



1/4“ NPT

⇨ metric threads and other versions on request

DS 210

DS 210 ☐☐☐-☐☐☐☐-☐-☐-☐-☐☐☐-☐☐☐-☐-☐☐☐

Messgröße		
relativ	7 8 A	
Eingang [mbar]		
10	0 1 0 0	
16	0 1 6 0	
25	0 2 5 0	
40	0 4 0 0	
60	0 6 0 0	
100	1 0 0 0	
160	1 6 0 0	
250	2 5 0 0	
400	4 0 0 0	
600	6 0 0 0	
1000	1 0 0 1	
-1000 … 0	X 1 0 2	
Sondermessbereiche	9 9 9 9	auf Anfrage
Analogausgang		
ohne	0	
4 … 20 mA / 2-Leiter	1	
0 … 10 V / 3-Leiter	3	
4 … 20 mA / 3-Leiter, verstellbar	7	
Ex-Schutz 4 … 20 mA / 2-Leiter [1]	E	
andere	9	auf Anfrage
Schaltausgang		
1 Schaltausgang [1, 2]	1	
2 Schaltausgänge [1, 2]	2	
4 Schaltausgänge [3]	4	
Genauigkeit		
Standard für P_N > 0,1 bar 0,35 %	3	
Standard für $P_N \leq$ 0,1 bar 0,5 %	5	
andere	9	auf Anfrage
Elektrischer Anschluss		
Stecker M12x1 (5-polig) / Kunststoffausführung	N 0 0	
Stecker M12x1 (8-polig) / [3] Kunststoffausführung	M 5 0	
Stecker M12x1 (5-polig) / Metallausführung	N 1 0	
Stecker und Kabeldose ISO 4400 [2]	1 0 0	
Stecker Binder Serie 723 (5-polig)	2 0 0	
Kabelausgang mit PVC-Kabel [4]	T A 0	
andere	9 9 9	auf Anfrage
Mechanischer Anschluss		
G1/2" DIN 3852	1 0 0	
G1/2" EN 837	2 0 0	
G1/4" DIN 3852	3 0 0	
G1/4" EN 837	4 0 0	
G1/2" DIN 3852 offener Anschluss	H 0 0	
1/2" NPT	N 0 0	
1/4" NPT	N 4 0	
andere	9 9 9	auf Anfrage
Dichtung		
FKM	1	
andere	9	auf Anfrage
Sonderausführungen		
Standard	0 0 0	
andere	9 9 9	auf Anfrage

[1] bei Ex-Ausführung ist max. 1 Schaltausgang möglich
[2] mit Stecker ISO 4400 ist bei 2-Leiter Ausführung nur max. 1 Schaltausgang möglich; bei 3-Leiter Ausführung ist kein Schaltausgang möglich
[3] 4 Schaltausgänge und M12x1, 8-polig nur in Kombination miteinander und mit 4 … 20 mA/3-Leiter erhältlich; 0 … 10 V/3-Leiter auf Anfrage
[4] Standard: 2 m PVC-Kabel ohne Belüftungsschlauch (Temperatureinstzbereich: -5 … 70 °C), andere auf Anfrage