

# PSA21

## Front-flush Electronic Pressure Sensor with LED-Display

- for polluted and viscous media
- measuring ranges from -1 to 600 bar
- analogue output 4...20 mA (current loop, HART®)
- with display and additional switching points
- MIN/MAX memory
- universe useable as pressure switch, pressure sensor, and/or pressure indication
- easy programming of switching points and analogue output with keys without pressurisation
- display 330° rotatable and 180° mirror-inverted



### Description:

The piezoresistive measuring cells used in the PSA21 guarantee high-quality pressure measurement combined with high precision and a long life time.

Due to the front-flush diaphragm, these measuring devices can also be used with soiled and highly viscous media.

The integrated LED display is used for continuous pressure indication and allows a simple adjustment of the pressure sensor together with the programming keys. Due to the rotatable display and the rotatable pressure connection, there are almost no restrictions for mounting. The programming of the device without display is done by the factory or via HART® communication.

### Typical applications:

The pressure sensor is suitable for almost all liquid and gaseous media and is used in vacuum technology, gas technology (stock monitoring, leakage detection), filter monitoring (pollution detection) as well as for various measurement tasks in hydraulics and pneumatics, in process engineering and in building technology.

Pump control (leakage monitoring) and filter monitoring are a frequent application due to the dirt-insensitive front-flush membrane.



## Materials:

<b>Housing:</b>	PBT GF30, Display-Top: Polycarbonate
<b>Measuring cell:</b>	stainless steel CrNi
<b>Process connect.:</b>	stainless steel CrNi
<b>Transmission fluid:</b>	synthetic oil (intern), no transmission fluid at range >25 bar
<b>Seal</b>	NBR (included) FKM/FPM (from -20 °C) EPDM (up to 200 bar) on request

## Technical data:

<b>Process connection:</b>	G ½ front-flush (0...2,5 bar to 0...600 bar), G 1 front-flush (-1...0 bar to 0...1,6 bar)
<b>Media temperature:</b>	media: -30...100 °C, compensated range: 0...80 °C
<b>Ambient temp.:</b>	-20...+80 °C
<b>Storage temp.:</b>	-20...+85 °C
<b>Shock resistance:</b>	1000 g according IEC 60068-2-27 (mechanical shock)
<b>Vibration resistance:</b>	20 g according IEC 60068-2-6 (vibration under resonance)
<b>Accuracy</b>	
<b>Sensor:</b>	+/- 0,5 % of span (at reference conditions)
<b>Amplifier:</b>	0,3 % of range
<b>Display :</b>	+/- 0,2 % of range, +/- 1 digit
<b>Adjustment:</b>	vertical position, pressure connection down
<b>Non-linearity:</b>	<0,2% of span (BFSL per IEC 61298-2)
<b>Non-repeatability:</b>	<0,1% of span (per IEC 61298-2)
<b>1-year stability:</b>	<0,2% of span (at reference conditions)
<b>Temperature coefficient:</b>	
<b>TC zero:</b>	<0,2% of span / 10 K <0,4% span / 10 K for ranges <250 mbar
<b>TC span:</b>	<0,2% span / 10 K
<b>Reference conditions:</b>	15...25 °C / 860...1060 mbar / 45...75% rH / 24 VDC
<b>Response time:</b>	<10 ms
<b>Resolution:</b>	16 Bit
<b>Measuring rate:</b>	10 measurements / s
<b>Filter setting:</b>	0...99 s
<b>Settings:</b>	via software (HART® communication) or via keys (optional)
<b>Mounting position:</b>	any
<b>Weight:</b>	ca. 240 g
<b>Protection class:</b>	IP65 (electronic)

## Electrical data:

<b>Power supply:</b>	12...40 VDC
<b>Electr. connection:</b>	different, see ordering code
<b>Reverse polarity protection:</b>	present
<b>Analogue output:</b>	4...20 mA current loop HART® (2-wire)
<b>Voltage range:</b>	3,8...20,5 mA
<b>Signal on error:</b>	3,6 mA (sensor short circuit, underflow) 21 mA (sensor break, sensor open circuit, overflow)
<b>Load:</b>	$R=(U_B-12\text{ V}) / 21\text{ mA}$

## Display (optional):

<b>Display:</b>	7 segment, 8,5 mm, red, 4 digits, representation mirror-inverted 180° possible
<b>Head of display:</b>	rotatable approx. 330°
<b>Memory:</b>	minimum / maximum values
<b>Indication:</b>	measuring value / unit of measurement / control menu
<b>Decimal point:</b>	Automatically or manually, dependent on measuring range / unit
<b>Representation:</b>	Xxxx / xxx.x / xx.xx / x.xxx
<b>Resolution:</b>	-9999...9999 Digit
<b>Accuracy:</b>	+/- 0,2 % of range, +/- 1 digit
<b>Temperature drift:</b>	100 ppm/K

## Limit contacts (optional):

<b>Electronically:</b>	1 or 2 NPN or PNP
<b>Max. switching capacity:</b>	200 mA (optional 1000 mA), 30 VDC
<b>Indication:</b>	1 LED red for each limit value LED lights up: transistor conductive LED dark: transistor locked
<b>Voltage across:</b>	<1 V
<b>Settings:</b>	with 3 keys (TouchM-Technology)
<b>Setting range:</b>	switch point and hysteresis: any value within measuring range
<b>Switching delay:</b>	0,0...999,9 s
<b>Failsafe-function:</b>	adjustable
<b>Galvanical insulation:</b>	switching outputs are separated from measuring amplifier

## Measuring ranges:

Order-code	Measuring range [bar]	Pressure	Overload limit [bar]
15	-0,6...0	relative	4
14	-0,4...0	relative	2
13	-0,25...0	relative	2
12	-0,16...0	relative	1,5
11	-0,1...0	relative	1
16	-1...0	relative	5
42	-1...+0,6	relative	10
43	-1...+1,5	relative	10
44	-1...+3	relative	17
45	-1...+5	relative	35
46	-1...+9	relative	35
49	-1...+15	relative	80
50	-1...+24	relative	50
63	0...0,1	relativ	1
64	0...0,16	relativ	1,5
65	0...0,25	abs./rel.	2
66	0...0,4	abs./rel.	2
67	0...0,6	abs./rel.	4
69	0...1	abs./rel.	5
70	0...1,6	abs./rel.	10
72	0...2,5	abs./rel.	10
73	0...4	abs./rel.	17
74	0...6	abs./rel.	35
75	0...10	abs./rel.	35
76	0...16	abs./rel.	80
78	0...25	relative	50
79	0...40	relative	80
80	0...60	relative	120
81	0...100	relative	200
82	0...160	relative	320
84	0...250	relative	500
86	0...400	relative	800
87	0...600	relative	1200

## HART®-Communication:

The HART-Tool is a graphical user interface with menu-driven program for configuration. It can be used for putting into operation, configuration, analysis of signals, data backup and documentation of the device.

**Operating systems:** Windows2000, Windows XP, Windows 7, Windows 8.1

**Connection:** HART® Interface  
PC-USB interface  
hand-held HART®-Communicator

**Settings:** Adjustment of output current  
Limits of measuring range  
2-point calibration  
Simulation of output current  
Linear output signal  
Filter function  
HART® address

with option switching contacts:  
limit value 1 and 2  
hysteresis value 1 and 2  
delay times 1 and 2

### Please note:

When using communication via a HART modem, a communication resistance of 250 Ω has to be taken into account.

## Ordering code:

Ordering code: **PSA21. A. R. 1. 63. 1. A. W. 0**

**Front-flush electronic pressure sensor**

### Version:

A = with indication and keys

### Kind of pressure:

R = relative pressure  
A = absolute pressure

### Process connection:

1 = G 1/2 front-flush (0...2,5 bar to 0...600 bar)  
2 = G 1 front-flush (-1...0 bar to 0...1,6 bar)

### Measuring range:

15...87, see table „Measuring ranges“

### Electrical connection:

1 = M12x1, 4-pole (max. 1 limit switch)  
2 = M12x1, 5-pole (for 2 limit switches)  
4 = valve connection, 4-pole (max. 1 limit switch)  
9 = special (please specify)

### Output signal:

#### (limit switches only at version A):

A = 4...20 mA, without limit switches  
B = 4...20 mA and 1 x PNP, 30 V, 200 mA  
C = 4...20 mA and 2 x PNP, 30 V, 200 mA (standard)  
D = 4...20 mA and 1 x NPN, 30 V, 200 mA  
E = 4...20 mA and 2 x NPN, 30 V, 200 mA  
F = 4...20 mA and 1 x PNP, 30 V, 1000 mA  
G = 4...20 mA and 2 x PNP, 30 V, 1000 mA  
H = 4...20 mA and 1 x NPN, 30 V, 1000 mA  
I = 4...20 mA and 2 x NPN, 30 V, 1000 mA

### Configuration output signal:

0 = without  
K = customised (please specify)

### Options:

0 = without  
1 = please specify in writing

## Accessories:

PVC-cable **SM12** with M12 plug, 4-or 5 pole  
HART®-tool: modem with HART®-cable, USB-cable, software

## Programmable Features (via keys):

**Measur. amplifier:** measuring range start (LRV)  
measuring range end (URV)  
adjustment, simulation of output current, filter function, linear output signal, HART®-address

**Display (optional):** range of indication, time of indication, decimal point, units  
stabilisation of zero point, locking of programming, calibration points, TAG number

**Limit value contacts: (optional)** limit value 1 and 2  
limit value 1 and 2  
delay times 1 and 2



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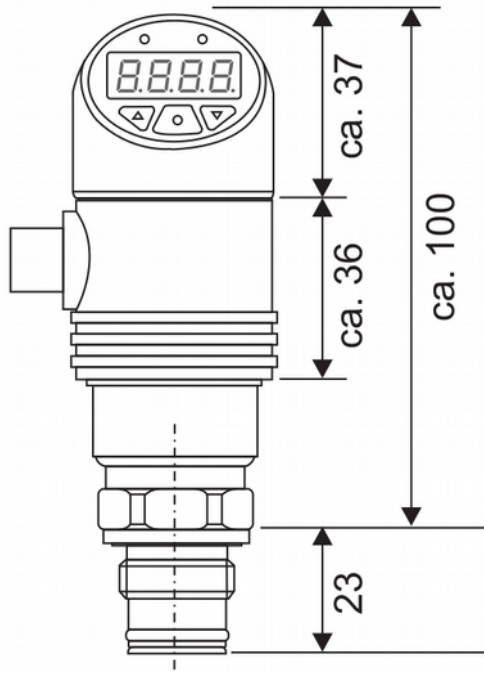
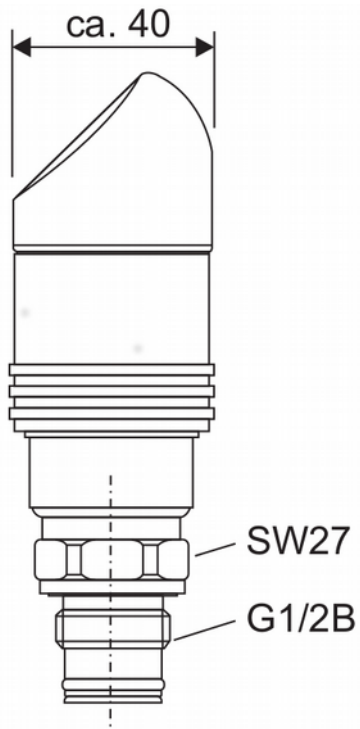
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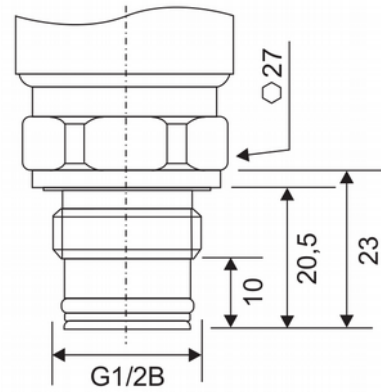
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## Dimensions:



## Pressure Connection:

Process connection G 1/2 front-flush  
0...2,5 bar to 0...600 bar



Process connection G 1 front-flush  
-1...0 bar to 0...1,6 bar

