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Pressure

PROFIBUS

Characteristics

System	Differential pressure Overload pressure, Vacuum, Absolute pressure, Flow
Metering ranges	±0.3 mbar..+1000 bar
Evaluation	Analog output with unit signals 0/4..20 mA, 0..10 V
Process connection	Male thread G $^{1}/_{4}$ A...G 1 A, Female thread G 1, Push-on nipple Bulkhead fittings
Installation	Screw-in sensors Field housing

Applications

- **Filter and cleanroom technology**
- **Control, measurement and monitoring technology**
- **Medium: air and non-aggressive gases. Also fluids**
- **- Uses**

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Function and benefits

Pressure transducers

Function

Pressure transducers were designed to cover the majority of applications in the area of industrial pressure measurement technology. The field devices are approved for use only with dry non-aggressive gases. The screw-in sensors can also be used for fluids. Silicon oil is used as the internal transfer liquid for the screw-in sensors. Vegetable oil is used for the foodstuffs model.

Benefits

- Compact construction for field housing
- Generous metering ranges
- Condensate-resistant models
- Foodstuffs model

Pressure switch

Function

In the membrane and piston models, the pressure is transferred to a micro switch. The simple mechanical system allows the switching point to be adjusted by means of an adjustment screw.

Benefits

- These robust devices require no voltage supply, and are suitable for air, oil, and water.
- Models are available with normally open (n.o) and normally closed (n.c.) contacts constructed from brass, steel, and stainless steel.

Device overview

Field housing

Device		Metering ranges	Medium temperature	Output	Page
GMUD		0..10 bar rel., ±..10,00 mbar	-20..+70 °C	4..20 mA 0..10 V DC	9
LPC60		±0..±25 mbar rel., ±..0.25..16 mbar (Differential pressure)	-18..+70 °C	4..20 mA 2-wire	11

Screw-in switch

Device		Metering range	Medium temperature	Materials	Switching	Page
PM1		0,2..320 bar	-20..+80°C (Viton 0..+100°C)	Steel, zinc coated Stainless steel	Normally closed or normally open Max. 48VAC/DC	12
PH1		0,2..320 bar	-20..+80°C (Viton 0..100°C)	Steel, zinc coated Stainless steel	Normally closed or normally open Max. 250 VAC	14
PAS		200..900 mbar abs.	-5..+60 °C	Steel / stainless steel	Normally closed or normally open 48 V AC, 0.5 A	16
PAK		0.2..300 bar	-5..+80 °C (-25..+140 °C)	Aluminum	Transformer 250 V AC, 3 A	18

Screw-in sensors

Device		Metering range	Medium temperature	Material	Supply voltage	Dis-play	Output signal		Page
EPS2		1000 bar	-20..+80 °C (-20..+125 °C)	stainless steel	10..30V DC	-	4..20 mA		**20**
EPS		0..400 bar	-20..+80 °C (-20..+100 °C)	stainless steel	10..30V DC	-	4..20 mA		**22**
FLEX-P		0..400 bar	-20..+80 °C (-20..+100 °C)	stainless steel	10..30V DC	LED	PNP / NPN	4..20 mA or 0..10 V	**24**
							and		
OMNI-P		0..400 bar	-20..+80 °C (-20..+100 °C)	stainless steel	10..30V DC	digital	2 x PNP / NPN	0/4..20 mA or 0..10 V	**28**
							and		
RF1-P		0..400 bar	-20..+80 °C (-20..+100 °C)	stainless steel	Lithium battery 3,6 V	-	Radio frequency		**31**
S10, S11 **IS10, IS11**		0..1000 bar	-20..+100 °C	stainless steel	10..30V DC	-	0/4..20 mA		**35**
SA-11 EHEDG 3A approval		0..250 bar	-20..+150 °C	stainless steel	10..30V DC	-	0..10 V		**33**
EPS1		0..400 bar	-20..+80 °C (-20..+120 °C)	ceramics	10..30V DC	-	4..20 mA		**36**
FLEX-P1		0..400 bar	-20..+80 °C (-20..+120 °C)	ceramics	10..30V DC	LED	PNP / NPN	4..20 mA or 0..10 V	**38**
							and		
OMNI-P1		0..400 bar	-20..+80 °C (-20..+120 °C)	ceramics	10..30V DC	digital	2 x PNP / NPN	0/4..20 mA or 0..10 V	**42**
							and		
RF1-P1		0..400 bar	-20..+80 °C (-20..+120 °C)	ceramics	Lithium battery 3,6 V	-	Radio frequency		**45**
EDP1		1..400 bar (Differential pressure)	20..+70 °C	ceramics	10..30V DC	-	4..20 mA		**47**
FLEX-DP1		1..400 bar (Differential pressure)	-20..+70 °C	ceramics	10..30V DC	LED	PNP / NPN	4..20 mA or 0..10 V	**49**
							and		
OMNI-DP1		1..400 bar (Differential pressure)	-20..+70 °C	ceramics	10..30V DC	digital	2 x PNP / NPN	0/4..20 mA or 0..10 V	**53**
							and		
OMNI-DP2		5..1000 bar	-25..+85 °C	stainless steel	18..30 V DC	LCD	0/4..20 mA		**56**

ECI-1	If desired or required, all parameters can be set or modified using the ECI-1 device configurator (with USB interface).		**59**
Accessories	● Type ZV / ZE (Filter) ● OMNI-TA (Panel meter)	● KB... (Round plug Connector 4/5-pin)	**60**

Errors and technical modifications reserved.

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Pressure transducer incl. pressure sensor GMUD MP-S / -F

- **For absolute, over-/underpressure and pressure difference**
- **Piezoresistive pressure sensor with integrated temperature compensation**
- **For controlling, measuring and monitoring**

Characteristic

The GMUD MP is suited for controlling, measuring and monitoring tasks e.g. in climate and ventilation technology or environmental and medical technology.

The pressure transducer with integrated pressure sensor can be used for non-aggressive, non-oxidizing and non-reducing gases. The GMUD must not be used for applications in water.

Depending on design type the GMUD MP measures:
- absolute pressure (abs.)
- relative pressure (rel. neg. connector open), e.g. 0..+10.00 mbar
- difference pressure (rel.), e.g. -10.00..+10.00 mbar

Specifications

Sensor element : Piezoresistive pressure sensor with integrated temperature compensation

Relative fine pressure range:	**Measuring range**	**Overload**	**Burst pressure**
MP-F-MR0	0.000..1.000 mbar rel.	150 mbar	200 mbar
MP-F-MR1	0.00..10.00 mbar rel.	150 mbar	200 mbar
MP-F-MR2	0.00..20.00 mbar rel.	150 mbar	200 mbar
	Optimized customer-specific range available via option - MBF (e.g. -15 … +15 mbar)		
Relative pressure range:	**Measuring range**	**Overload**	**Burst pressure**
MP-S-MR0	0.0..100.0 mbar rel.	1000 mbar	1500 mbar
MP-S-MR1	0.0..500.0 mbar rel.	1000 mbar	1500 mbar
MP-S-MR2	0..1000 mbar rel.	2000 mbar	3000 mbar
MP-S-MR3	0..2000 mbar rel.	4000 mbar	6000 mbar
MP-S-MR4	0..5000 mbar rel.	7000 mbar	7000 mbar
Absolute pressure range:	**Measuring range**	**Overload**	**Burst pressure**
MP-S-MA0	0..1100 mbar abs.	2000 mbar	3000 mbar
MP-S-MA1	0..2000 mbar abs.	4000 mbar	6000 mbar
	Optimized customer-specific range available via option - MBS (e.g. -350 ... +350 mbar)		

Accuracy typ. : **GMUD MP-S:**
±0.15 % FS (lin.), ±0.6 % FS (hysteresis and temperature 0..70 °C)
GMUD MP-F:
±0.35 % FS (lin.), ±0.6 % FS (hysteresis and temperature 0..70 °C)

Output signal : 4..20 mA / 0..10 V (adjustable via menu)

Auxiliary supply : only in output mode 0..10 V (18..30 V DC / 24 V AC)

Permissible burden : (4..20 mA): Ra[Ω] = (Uv [V] - 12 [V]) / 0.02 A

Permissible load : (0..10 V): >= 3000 Ω

Working temperature : -20..+70 °C

Storage temperature : -40..+70 °C

Display / handling : 4-digit 7-segment-display and 3-button-operation

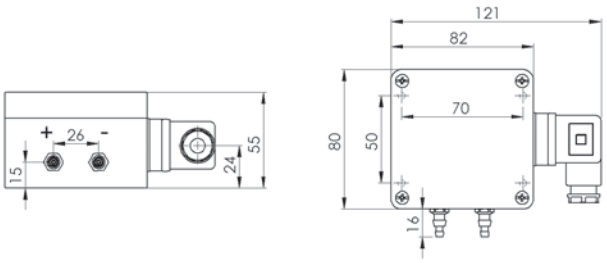
Pressure connection : Universal pressure connector for 6 x 1 mm or 8 x 1 mm plastic hose (4 or 6 mm hose inner diameter)

Mounting position : Arbitrary (low sensitivity to mounting position at small measuring ranges)

Housing : ABS (IP65): With fixing holes for wall mounting (after removing the cover)

Electric connection : Angle plug according to EN 175301-803/A (IP65) max. wire cross section: 1.5 mm², wire diameter: 4.5..7 mm

Dimensions



Product key

GMUD-MP - 1. - 2.

1.	**Pressure type and measuring range**	
	F-MR0	0..1 mbar rel.
	F-MR1	0..10 mbar rel.
	F-MR2	0..20 mbar rel.
	F-MBF	Any fine pressure range (< 25 mbar)
	S-MR0	0..100 mbar rel.
	S-MR1	0..500 mbar rel.
	S-MR2	0..1000 mbar rel.
	S-MR3	0..2000 mbar rel.
	S-MR4	0..5000 mbar rel.
	S-MA0	0..1100 mbar abs.
	S-MA1	0..2000 mbar abs.
	S-MBS	Any pressure range (> 35 mbar)
2.	**Options**	
	00	without option
	LACK	board varnished on both sides
	OUT	switching output
	WE	factory setting, not for MBF and MBS

Order example:
± 700 mbar rel. with switching output:
GMUD MP-S / MBS: -700..+700 mbar, OUT
0..100 mbar rel. with varnishing and switching output:
GMUD MP-S - MR0 / LACK, OUT

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Pressure Converter LPC60

- **For dry and non aggressive gases**
- **Measuring ranges from 0.25..25 mbar**
- **Uni- and bidirectional devices**
- **Output 4..20 mA, 2-wire technology**

Characteristics

The Pressure Converter LPC60 can be used for measuring low pressure, differential pressure in filter- and clean room technology. The device is be designed for dry and non aggressive gases in the range from 0.25..25 mbar designed.

Technical data

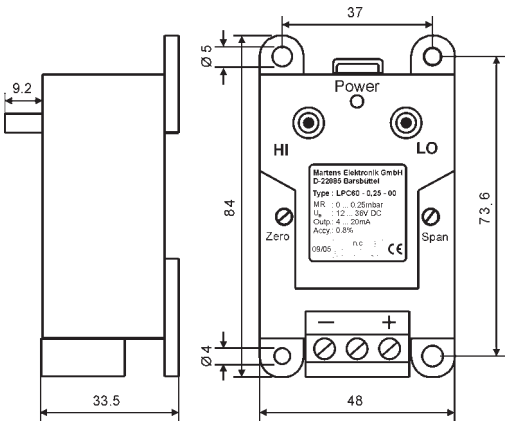
Power supply
Loop voltage : 12..36 V DC
Operating temperature : -18..+70°C
(0..55 °C compensated range)

Input
Process connection : pressure tube 1/4“ (4.7mm)
Measuring range
- unidirectional : 0.25..25 mbar
- bidirectional : ±0.25..16 mbar
Overload : max. 1 bar
for vertical mounting calibrated

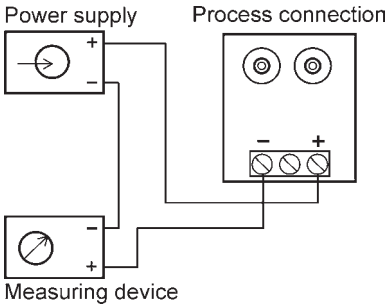
Output
Current : 4..20 mA, 2-wire connection
Span and zero point : ± 5 % adjustable
Accuracy : 0.8 %, optional 0.4 %

Case
Mounting : DIN rail TS35 or screws M4
Electrical connection : slide-in terminal

Dimensions



Connection diagram



Ordering code

LPC60 - 1. - 2.

1.	**Measuring range** [mbar] (please state in clear text)	
	unidirectional	
	0..0.25/ 0.6/ 1/ 1.6/ 2.5/ 4/ 6/ 10/ 25	
	bidirectional	
	±0.25/ 0.6/ 1.6/ 2.5/ 4/ 6/ 10/ 16	
2.	**Options**	
	00	without option
	01	accuracy 0.4 %

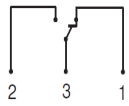
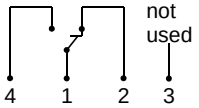
Pressure Switch PM1

- **Adjustable switch point**
- **Change over contact**
- **Flat plug 6.3×0.8 with rubber protection cap or**
- **Circular plug M12×1**

Characteristics

Mechanical pressure controller in which a membrane or piston is pre-tensioned by a spring. The adjustment screws permits the setting of the switch point.

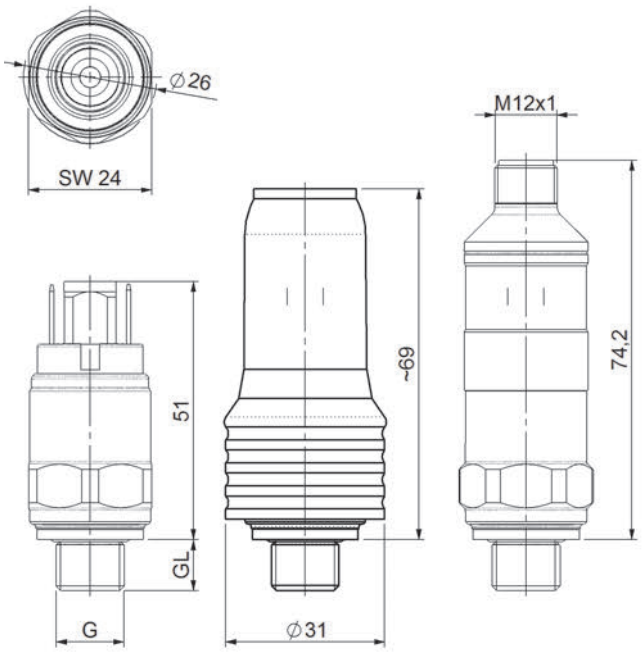
Technische Daten

Switch	Mechanical switch	
Process connection	Male thread R 1/8, G1/8, G1/4, 1/4NPT, 1/8NPT, M10×1	
Switching range	0,2..320 bar	for details see table "Ranges"
Pressure resistance	PS 60bar/ 350 bar	
Tolerance	± 2% at RT relative to full scale value	
Hysteresis	See diagram „Hysteresis“	
Media temperature	-20..+80°C (Viton 0..+100°C)	
Ambient temperature	-20..+80°C	
Media	Water, oils, gases	
Wiring	Flat plug 6,3×0,8 Change over Nr. 0.466  Circular plug M12×1, 4-pin Change over Nr. 0.463 	
Switching voltage	Max. 48VAC/DC	
Switching current	Max. 2 A (1 A inductive)	
Ingress protection	Flat plug: IP 00 with rubber protection cap: IP 54 Circular plug M12×1: IP67 (with mating plug)	
Electrical connection	Flat plug 6,3×0,8 or Circular plug M12×1, 4-pin	
Materials medium-contact	Diaphragm type NBR or EPDM or Viton. Piston type: PTFE with NBR or EPDM or Viton steel, zinc coated or stainless steel (1.4305)	
Non-medium-contact materials	PA 6.6, NBR, Rubber	
Weight	0,10 kg	
Installation location	installation location as desired	

Ranges

Switching Range bar (rel.)	Type	**Pressure resistance PS** bar	**Functional principle**
- 0,85 ..1	001	60	Diaphragm
0,2 .. 2	002		
0,5 .. 8	008		
1 .. 16	016		
10 .. 30	030	350	Piston
10 .. 80	080		
10 .. 120	120		
10 .. 160	160		
20 .. 200	200		
20 .. 250	250		
30 .. 320	320		

Dimensions



Handling and operation

Notes

- If the medium is dirty, install a filter.
- It must be ensured that the values given for voltage, current, and power are not exceeded.
- Check resistance to aggressive media, no DI water.
- Flat plug version 6,3×0,8 supplied with rubber cap.

Torques and thread lengths of the fluid connections

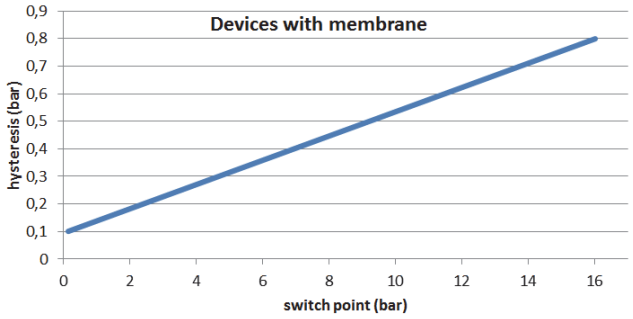
R 1/4, G 1/4, 1/4NPT	20-25 Nm	12 mm
R 1/8, G 1/8,1/8NPT, M10×1	15-20 Nm	10 mm

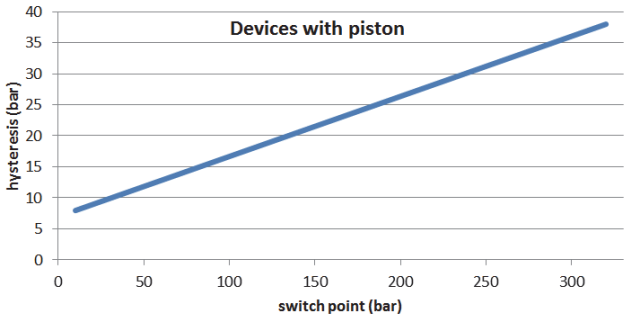
Adjustment

- Set the desired switching value using a hex wrench (size 2). Turn to right increases the value.
- M12x1: The adjustment is done in the factory.

Hysteresis

The diagram shows the hysteresis in relation to the switch point (idealized representation).





Ordering code

	1.	2.	3.	4.	5.	6.
PM1-				**0**	**B**	

1.	**Switching range**	
	001	- 0,85 ..1 bar
	002	0,2 .. 2 bar
	008	0,5 .. 8 bar
	016	1 .. 16 bar
	030	10 .. 30 bar
	080	10 .. 80 bar
	120	10 .. 120 bar
	160	10 .. 160 bar
	200	20 .. 200 bar
	250	20 .. 250 bar
	320	30 .. 320 bar
2.	**Connection material**	
	S	Steel, zinc coated
	K	Stainless steel
3.	**Connection size**	
	004A	G 1/8A
	004H	R 1/8A
	008A	G 1/4A
	009H	NPT1/8
	011A	M10×1 (no stainless steel)
	012H	NPT1/4
4.	**Rotatable**	
	0	Fixed
5.	**Electrical connection**	
	U	Flat plug 6.3×0,8
	S	Circular plug M12×1*
6.	**Sealing / diaphragm**	
	N	NBR
	E	EPDM
	V	Viton

*only with adjustment ex factory

Options

- Factory setting of the switch point on falling or rising pressure.

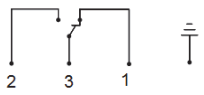
Pressure Switch PH1

- **Adjustable switch point**
- **Adjustable hysteresis**
- **Change over contact**
- **Plug DIN 43650-A**
- **Lateral cable exit**

Characteristics

Mechanical pressure controller in which a membrane or piston is pre tensioned by a spring. Two adjustment screws permits the setting of the switch point and the hysteresis.

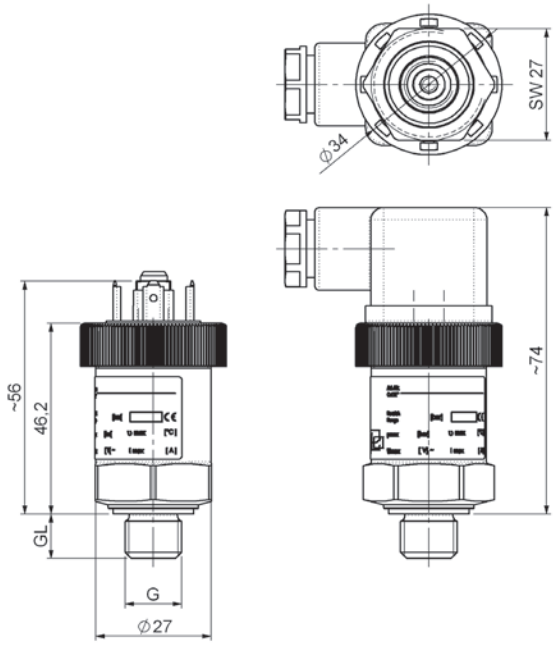
Technische Daten

Switch	Mechanical switch	
Process connection	Male thread R1/4, G1/8, G1/4, 1/4NPT, 1/8NPT, M10x1	
Switching range	0,2..320 bar	for details see table "Ranges"
Pressure resistance	PS 60bar/ 350 bar	
Tolerance	± 2% at RT relative to full scale value	
Hysteresis	Adjustable, see diagram „Hysteresis“	
Media temperature	-20..+80°C (Viton 0..100°C)	
Ambient temperature	-20..+80°C	
Media	water, oils, gases	
Wiring	Change over No. 0.467 	
Switching voltage	Max. 250 VAC	
Switching current	Max. 4 A (2 A inductive)	
Protection class	1 – PE connection	
Ingress protection	IP 65	
Electrical connection	Plug DIN 43650-A/ ISO 4400 with screw clamp in the plug	
Materials medium-contact	Diaphragm type NBR or EPDM or Viton. Piston type: PTFE with NBR or EPDM or Viton steel, zinc coated or stainless steel (1.4305)	
Non-medium-contact materials	PA 6.6, NBR	
Weight	0,15kg	
Installation location	installation location as desired	

Ranges

Switching Range bar (rel.)	Type	**Pressure resistance PS** bar	**Functional principle**
- 0,85 ..1	001	60	Diaphragm
0,2 .. 2	002		
0,5 .. 8	008		
1 .. 16	016		
10 .. 30	030	350	Piston
10 .. 80	080		
10 .. 120	120		
10 .. 160	160		
20 .. 200	200		
20 .. 250	250		
30 .. 320	320		

Dimensions



Handling and operation

Notes

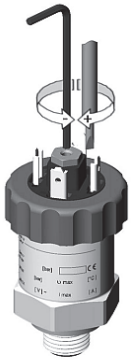
- If the medium is dirty, install a filter
- It must be ensured that the values given for voltage, current, and power are not exceeded.
- Check resistance to aggressive media, no DI water.
- Supplied with mating plug.

Torques and thread lengths of the fluid connections

R 1/4, G 1/4, 1/4NPT	20-25 Nm	12 mm
G 1/8,1/8NPT, M10×1	15-20 Nm	10 mm

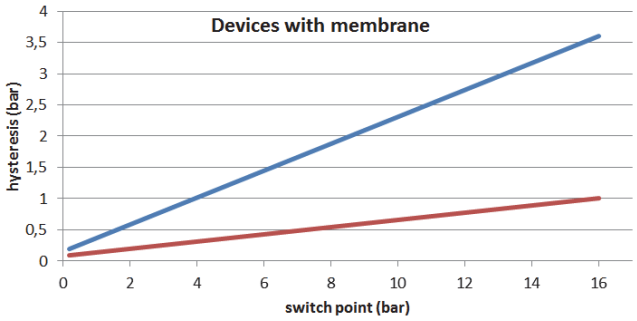
Adjustment

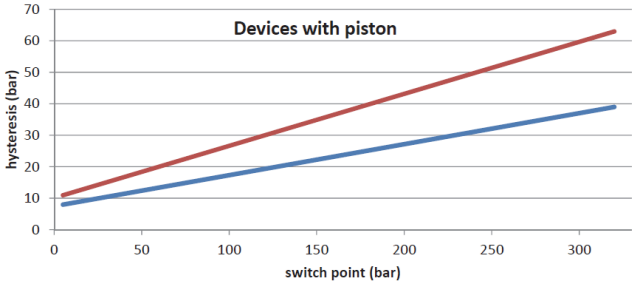
- Loosen the plug and set the desired switching value using a hex wrench(size 2, screw centered). Then adjust the hysteresis using a longitudinal slot screwdriver 2,5x0,4 (screw laterally). Turn to right increases the value. Then attach the plug back onto the device and tighten the screw.



Hysteresis

The diagram indicates possible adjustments of the hysteresis in relation to the switch point (idealized representation). Thus, for example for the piston type at a switch point 130 bar, it can be set a hysteresis between 20 bar and 32 bar.





Ordering code

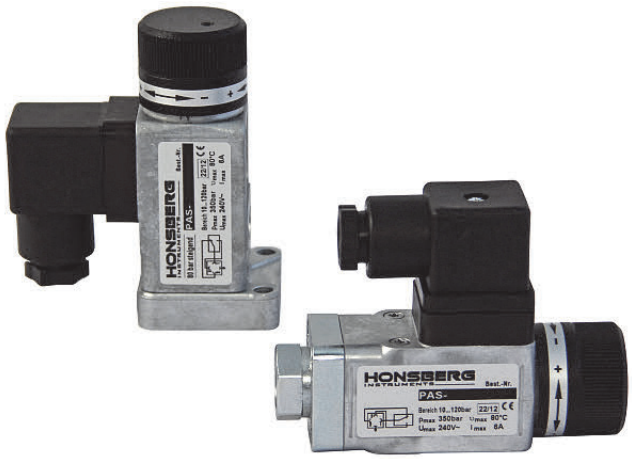
PH1 - | 1. | 2. | 3. | 4. | 5. | 6. |
|---|---|---|---|---|---|
| | | | 0 | B | |

1.	**Switching range**	
	001	- 0,85 ..1 bar
	002	0,2 .. 2 bar
	008	0,5 .. 8 bar
	016	1 .. 16 bar
	030	10 .. 30 bar
	080	10 .. 80 bar
	120	10 .. 120 bar
	160	10 .. 160 bar
	200	20 .. 200 bar
	250	20 .. 250 bar
	320	30 .. 320 bar
2.	**Connection material**	
	K	Stainless steel
	S	Steel, zinc coated
3.	**Connection size**	
	004A	G 1/8A
	008H	R 1/4
	008A	G 1/4A
	009H	NPT1/8 no stainless steel
	011A	M10x1 no stainless steel
	012H	NPT1/4
4.	**Rotatable**	
	0	Fixed
5.	**Electrical connection**	
	B	Plug DIN 43650-A
6.	**Sealing / diaphragm**	
	N	NBR
	E	EPDM
	V	Viton

Options

- Factory setting of the switch point and hysteresis on falling or rising pressure.

Pressure switch PAS

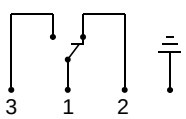


- **Repeatability**
- **Adjustable switch point**
- **Change over contact**
- **Plug DIN 43650-A / ISO 4400 or Circular plug M12×1**

Characteristics

Mechanical pressure switch in which a piston is pre-tensioned by a spring. An adjustment knob permits the setting of the switch point. The setting can be fixed with hexagon socket screw.

Technical Data

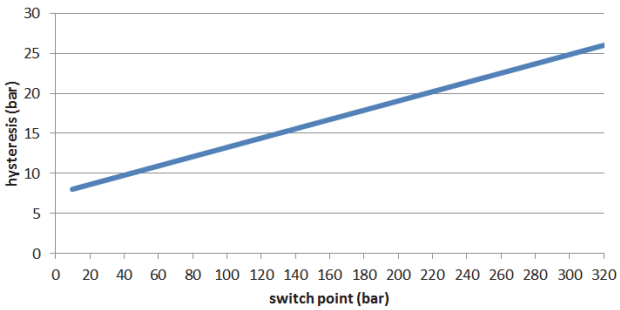
Switch	Mechanical switch	
Process connection	Male thread	G$^1/_4$A fixed
		G$^1/_4$A flexible
		M10×1 flexible
	Female thread	G$^1/_4$ fixed
	Flange	DIN ISO 163873
Switching range	10..320 bar see table “Ranges”	
Hysteresis	see graph “Hysteresis”	
Tolerance	±2 % at RT relative to the full scale value	
Pressure resistance	PS 350 bar	
Media temperature	-20..+80 °C (Viton 0..100°C)	
Ambient temperature	-20..+80 °C	
Media	self-lubricating fluid such as hydraulic oil, lubricating oil, light fuel oil and neutral fluids such as water and some gases.	
Switching frequency	maximum 100 cycles/min.	
Wiring	Plug DIN 43650-A / ISO 4400 Changeover No. 0.342	
Switching voltage switching current (maximum values)	Resistive load 4 A at 24 V DC, 6 A at 250V AC Inductive load 1 A at 24 V DC, 2 A at 250 V AC	
Protection class	1 – PE – connection	

Ingress protection	IP 65
Electr. connection	Plug DIN 43650-A / ISO 4400
Materials	Housing: Zinc die casting, Adjustment knob: aluminium (powder coated)
Material Sealing	Static: NBR or EPDM or Viton Dynamic: PTFE
Weight	0,325 kg
Installation location	Any mounting position, hydraulic connection to bottom is not advisable.

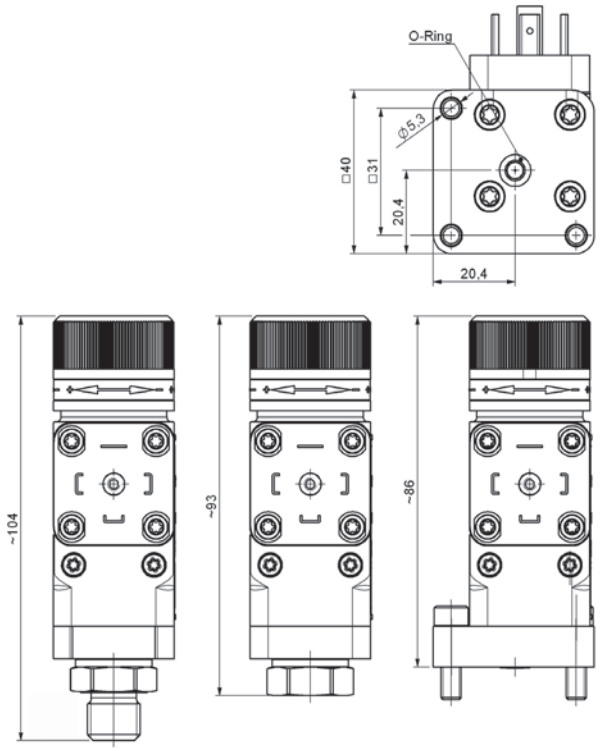
Ranges

Switching range bar (rel.)	Type
10 - 30	PAS-030Z...
10 - 80	PAS-080Z...
10 - 120	PAS-120Z...
10 - 160	PAS-160Z...
20 - 200	PAS-200Z...
20 - 250	PAS-250Z...
30 - 320	PAS-320Z...

Hysteresis



Dimensions



Male thread
Fixed

Female thread
Fixed

Flange
DIN ISO 16873

Handling and operation

Notes

- If the medium is dirty, install a filter.
- It must be ensured that the values given for voltage, current, and power are not exceeded.
- Check resistance to aggressive media, no DI water.

Torques and thread lengths of the fluid connection:
G1/4A, G1/4, R1/4, NPT1/4: 20-25 Nm,11 mm
M10×1: 15-20 Nm, 10 mm
Flange: 6-8 Nm, 3 washer M5

Adjustment

- Turning the adjusting knob to the left for a larger value, turning to the right for a smaller value. After setting the knob can be fixed with a hexagon socket screw by using the supplied key.

Odering code

	1.	2.	3.	4.	5.	6.
PAS -		**Z**				

1.	**Switching range**						
	030	10 - 30 bar					
	080	10 - 80 bar					
	120	10 - 120 bar					
	160	10 - 160 bar					
	200	20 - 200 bar					
	250	20 - 250 bar					
	320	30 - 320 bar					
2.	**Connection material**						
	Z	Zinc die casting					
3.	**Connection size**						
	008A	Male thread	$G^1/_4A$				
	011A		M10×1				
	008G	Female thread	$G^1/_4$				
	031F	Flange	DIN ISO 163873				
4.	**Rotatable (connection pressure site)**						
	0	Fixed		●	●		●
	1	Rotatable				●	●
5.	**Electrical connection**						
	B	For plug DIN 43650-A / ISO 4400					
6.	**Sealing**						
	N	Dynamic	NBR				
	E		EPDM				
	V		Viton				

Options

- Factory setting of the switch point on falling or rising pressure.

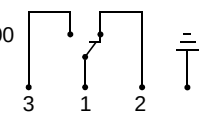
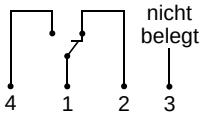
Pressure Switch PAK

- **Repeability**
- **Adjustable switch point**
- **Change over contact**
- **Plug DIN 43650-A / ISO 4400 or Circular plug M12×1**

Characteristics

Mechanical pressure switch in which a membrane is pre-tensioned by a spring. An adjustment knob permits the setting of the switch point. The setting can be fixed with hexagon socket screw.

Technical Data

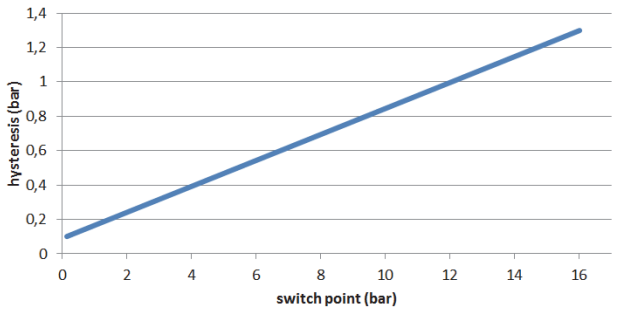
Switch	Mechanical switch
Process connection	Female thread $G^1/_4$
Switching range	-0,85..+16 bar see table “Ranges”
Hysteresis	See graph “Hysteresis”
Tolerance	±2 % at RT relative to the full scale value
Pressure resistance	PS 60 bar
Media temperature	-10..+80 °C (Viton 0..100°C)
Ambient temperature	-10..+80 °C
Media	Water, oil, gases
Switching frequency	maximum 100 cycles/min.
Wiring	Plug DIN 43650-A / ISO 4400 Change over No. 0.342 
	Circular plug M12×1, 4-pole Change over No. 0.463 

Switching voltage switching current (maximum values)	Plug DIN 43650-A / ISO 4400 Resistive load 3 A at 24 V DC, 6 A at 250V AC Inductive load 1 A at 24 V DC, 1 A at 250 V AC Circuit plug M12×1 Resistive load 4 A at 48 V AC, 3 A at 24 V DC Inductive load 1 A at 48 V AC, 1 A at 24 V DC
Protection class	Plug DIN 43650-A / ISO 44001 1 - PE connection Circuit plug M12×1 2 - safety insulation
Ingress protection	IP 65
Electrical connection	Plug DIN 43650-A/ISO 4400 or Circular plug M12×1
Materials	Housing: Zinc die casting, Adjustment knob: aluminium (powder coated)
Material Sealing /membrane	NBR or EPDM or Viton
Weight	0,29 kg
Installation location	Any mounting position, hydraulic connection to bottom is not advisable.

Ranges

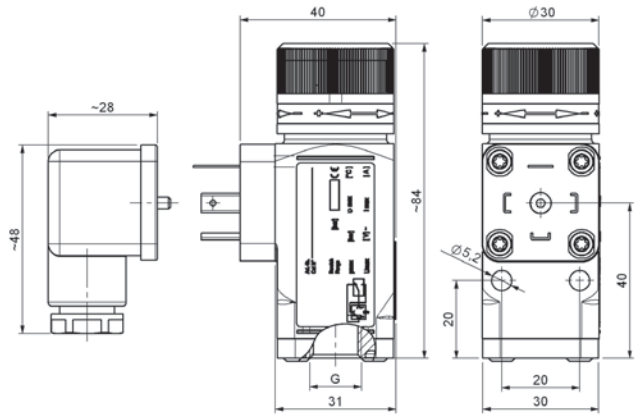
Switching range bar (rel.)	Type
-0,85..+ 1,00	PAK-001Z...
+0,20..+ 2,00	PAK-002Z...
+0,50..+ 8,00	PAK-008Z...
+1,00..+16,00	PAK-016Z...

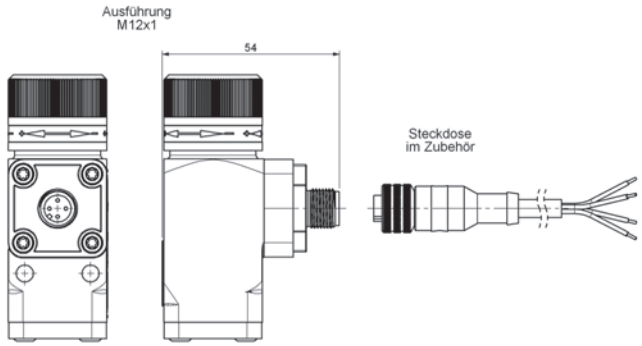
Hysteresis



Dimensions

DIN 43650-A/ISO 4400





Handling and operation

Notes

- If the medium is dirty, install a filter.
- It must be ensured that the values given for voltage, current, and power are not exceeded.
- Check resistance to aggressive media, no DI water.

Torques and thread lengths of the fluid connection:
Thread length 11 mm, tightening torque 20 Nm -25
.

Adjustment

- Turning the adjusting knob to the left for a larger value, turning to the right for a smaller value. After setting the knob can be fixed with a hexagon socket screw by using the supplied key.

Ordering code

	1.	2.	3.	4.	5.	6.
PAK -		**Z**	**008G**	**0**		

1.	**Switching range**		
	001	-0.85..+ 1.00 bar	
	002	+0.20..+ 2.00 bar	
	008	+0.50..+ 8.00 bar	
	016	+1.00..+16.00 bar	
2.	**Connection material**		
	Z	Zinc die casting	
3.	**Connection size**		
	008G	Female thread $G^1/_4$	
4.	**Rotatable**		
	0	Fixed	
5.	**Electrical connection**		
	B	Plug DIN 43650-A / ISO 4400	
	S	Circular plug M12x1, 4-pole	
6.	**Sealing /membrane**		
	N	NBR	
	E	EPDM	
	V	Viton	

Options

- Factory setting of the switch point on falling or rising pressure.

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Pressure Transmitter EPS2

- **Measuring cell made of stainless steel, hermetically welded**
- **Analog signal 4..20 mA (two-wire)**
- **Very rapid reaction time thanks to analog signal path with mixed signal ASIC**
- **Ranges from 0.6..2000 bar relative pressure**
- **Robust full metal housing**
- **Class: 0.5 % standard**
- **Working temperature -40 °C to +100 °C**
- **Poly-Si on SiO_2 (thin film resistors)**
- **M12x1 plug system (or others on request)**

Characteristics

The pressure transducer measures pressures in liquids and gases. It has the following applications:

- Hydraulics
- Testing technology
- Pneumatics
- Industrial robots
- Mobile systems
- Process control
- Air-conditioning + heating
- Water technology
- Vehicle technology

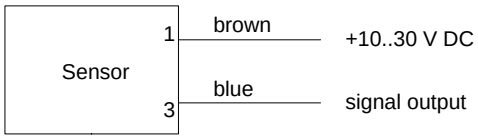
The stainless steel membrane is fitted with a polysilicon thin film cell, completely vacuum-tight, extremely burst resistant, and it can be used in all applications which are compatible with stainless steel. The analog measuring path, which is conditioned by means of an ASIC, permits the most rapid response times, with the need for only a few components. The sensors are calibrated digitally, and the components have very good long term stability and a small total error.

Technical data

Sensor	thin film pressure measurement bridge on stainless steel membrane			
Process connection	male thread G $^1/_4$ A			
Pressure type	relative pressure			
Metering ranges in bar	**Range**	**Permitted overload pressure**	**Burst pressure**	
● = preferred types	0.. 0.6	1.2	2.4	
	0.. 1.0	2.0	3.0	●
	0.. 2.0	4.0	6.0	●
	0.. 2.5	5.0	7.5	
	0.. 4.0	8.0	12.0	
	0.. 6.0	12.0	18.0	●
	0.. 10.0	20.0	30.0	●
	0.. 16.0	32.0	48.0	
	0.. 25.0	50.0	75.0	●
	0.. 40.0	80.0	120.0	●
	0.. 60.0	120.0	180.0	
	0.. 100.0	200.0	300.0	●
	0.. 160.0	320.0	480.0	
	0.. 250.0	500.0	750.0	●
	0.. 400.0	600.0	800.0	●
	0.. 600.0	900.0	1200.0	●
	0..1000.0	1200.0	1500.0	●
	0..1600.0	1920.0	2400.0	
	0..2000.0	2400.0	3000.0	
Measurement accuracy	accuracy class 0.5 total error (Non-linearity + hysteresis + temperature effect + repeatability): -40..+20 °C ±3 % typically ±2 % -20..+85 °C ±1 % typically ±0.7 % 85..100 °C ±2.5 % typically ±1.5 %			
Response time	(10..90 %) < 1 ms			
Pressure resistance	corresponds to metering range			
Media temperature	-40..+125 °C			
Ambient temperature	-40..+105 °C			
Storage temperature	-40..+125 °C			
Media	fluids and gases			
Materials medium-contact	1.4301			
Materials, non-medium-contact	Housing stainless steel Seal FKM			
Supply voltage	12..32 V DC			
Analog output	4..20 mA two-wire			
Load	max. (battery voltage -12 V) / 20 mA			
Electrical connection	for round plug connector M12x1, 4-pole			
Reversal polarity protected	yes			
Ingress protection	IP 65 / 67			
Weight	approx. 0.2 kg			
Conformity	CE			

EMC	interference radiation DIN EN 55011: < 30 dB µV/m Interference immunity DIN EN 61000-4-3: 25 V/m
Shock test	1 m onto steel plate (as per IEC68-2-32) Vibration 20 g (as per IEC 68-2-6 and 68-2-36)

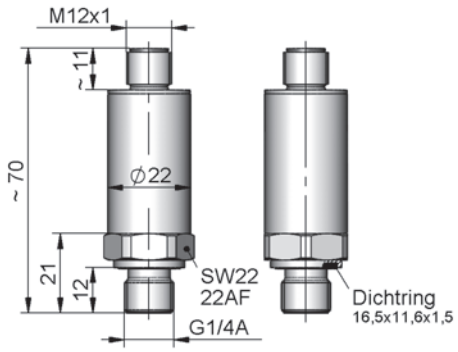
Wiring



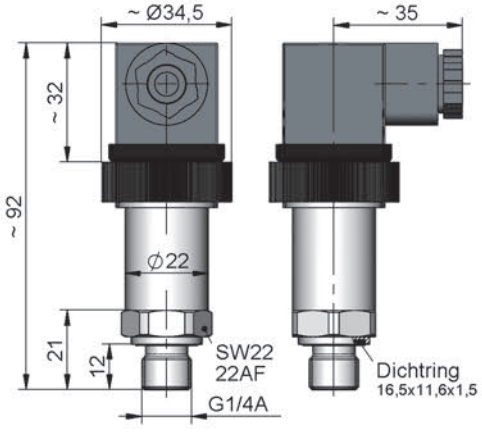
Before the electrical installation, it must be ensured that the supply voltage corresponds with the data sheet.

Dimensions

EPS2-....S



EPS2-....B



Handling and operation

Installation

The pressure transducers are screwed into a nozzle or a T-piece in the pipework. The seal is made by means of the integrated ED sealing ring. The installation of the pressure transducer should result in no significant reduction of the cross-section of the pipework. When tightening the pressure transducer, use only the hexagonal spanner (SW22) specifically provided. Avoid installation locations with high pressure surges (see permitted overload pressure).

Ordering code

	1.	2.	3.	4.	5.
EPS2 -		**R**	**K**	**008**	

❍ = Option

1.	**Metering range**		
	00006	❍	0.. 0.6 bar
	00010		0.. 1.0 bar
	00020		0.. 2.0 bar
	00025	❍	0.. 2.5 bar
	00040	❍	0.. 4.0 bar
	00060		0.. 6.0 bar
	00100		0.. 10.0 bar
	00160	❍	0.. 16.0 bar
	00250		0.. 25.0 bar
	00400		0.. 40.0 bar
	00600	❍	0.. 60.0 bar
	01000		0.. 100.0 bar
	01600		0.. 160.0 bar
	02500		0.. 250.0 bar
	04000		0.. 400.0 bar
	06000		0.. 600.0 bar
	10000		0..1000.0 bar
	16000	❍	0..1600.0 bar
	20000	❍	0..2000.0 bar
2.	**Pressure type**		
	R		relative pressure
3.	**Connection material**		
	K		stainless steel 1.4571
4.	**Connection size**		
	008		male thread G ¼ A
5.	**Electronic connection**		
	S		for round plug connector M12x1, 4-pole
	B	❍	plug DIN 43650-A / ISO 4400

Options

- Special measuring ranges

Accessories

- Cable/round plug connector (KB...)
  see additional information “Accessories”

Pressure Transmitter EPS

- **4..20 mA two-wire pressure transducer**
- **Flush-front stainless steel membrane to protect against contamination**
- **Infinitely adjustably rotatable cable outlet for clean alignment**

Characteristics

The EPS pressure transducer measures static and dynamic pressures in fluids and gases. The sensor consists of a sputtered piezo-resistive measuring bridge made from polysilicon, on a mono-silicon membrane. Here, the flush stainless steel membrane transfers the pressure present via an oil filling to the silicon membrane.

The downstream, integrated electronics convert the bridge signal into a pressure-proportional 4..20 mA signal. The sensor is supplied with < 4 mA, so it was possible to implement a two-wire connection. At the same time, this process connection allows monitoring for wire breaks.

Technical data

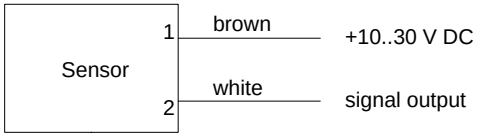
Sensor	thin film pressure measurement bridge on silicon membrane
Process connection	male thread G $^1/_2$ A
Metering ranges	(relative pressure, pressure difference from environment) in bar

Range	Overload pressure
0.. 1.0	4
0.. 2.5	10
0.. 6.0	24
0.. 10.0	40
0.. 25.0	100
0.. 60.0	240
0..100.0	400
0..250.0	600
0..400.0	600

other metering ranges, absolute pressure measurement (not less than 10 mbar abs.) available on request

Measurement accuracy	±1 % of full scale value from 60 °C plus 0.02 %/K
Repeatability	±0.5 % of full scale value
Pressure resistance	corresponds to metering range
Media temperature	-20..+70 °C (with gooseneck option max. 100 °C)
Ambient temperature	-20..+70 °C
Storage temperature	-20..+80 °C
Media	fluids and gases
Materials medium-contact	pressure sensor 1.4301
Materials, non-medium-contact	CW614N, PP, NBR
Supply voltage	10..30 V DC ±10 %
Analog output	4..20 mA two-wire
Load	max. 800 Ohm at 24 V (100 Ohm at 10 V / 1.1 kOhm at 30 V, linear at operating voltage)
Electrical connection	for round plug connector M12x1, 4-pole or DIN 43650-A plug
Reversal polarity protected	yes
Ingress protection	IP 67 round plug connector IP 65 plug DIN 43650-A / ISO 4400
Weight	approx. 0.3 kg
Conformity	CE

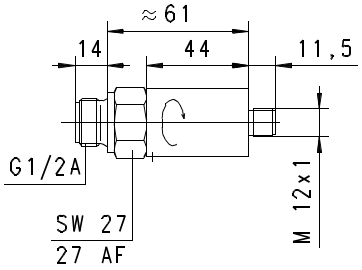
Wiring

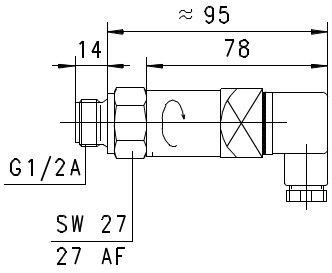


Before the electrical installation, it must be ensured that the supply voltage complies with the data sheet.

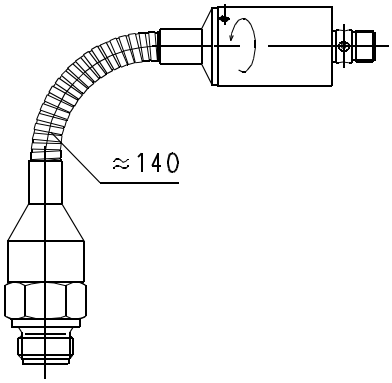
It is recommended to use shielded wiring.

Dimensions





"Gooseneck" option for higher temperatures



Handling and operation

Installation

The protective plastic cap is to be removed from the pressure membrane. Attention! The pressure membrane is very sensitive; a deformed membrane has a negative effect on the accuracy or causes damage to the sensor.

The pressure sensors are screwed into a nozzle or a T-piece in the pipework, using a suitable sealing material (e.g. Klingerit). The installation of the pressure sensor should result in no significant reduction of the cross-section of the pipework. When tightening the pressure sensor, use only the hexagonal spanner (SW27) specifically provided.

Avoid installation locations with high pressure surges (see overload limits).

In the high temperature model with flexible gooseneck, the pressure transducer can be operated up to a media temperature of 100 °C.

Ordering code

	1.	2.	3.	4.	5.	6.
EPS -			**K**	**015**		

❍ = Option

1.	**Metering range**		
	001		0.. 1.0 bar
	002		0.. 2.5 bar
	006		0.. 6.0 bar
	010		0.. 10.0 bar
	025		0.. 25.0 bar
	060		0.. 60.0 bar
	100		0.. 100.0 bar
	250		0.. 250.0 bar
	400		0.. 400.0 bar
2.	**Pressure type**		
	R		relative pressure
	A		absolute pressure
3.	**Connection material**		
	K		stainless steel 1.4571
4.	**Connection size**		
	015		male thread G $^1/_2$ A
5.	**Electronic connection**		
	S		for round plug connector M12x1, 4-pole
	B	❍	plug DIN 43650-A / ISO 4400
6.	**Option**		
	H	❍	model with gooseneck

Accessories

- Cable/round plug connector (KB...)
  see additional information “Accessories”
- converter / counter OMNI-TA

Pressure Transmitter / Switch FLEX-P

- **Flush-front stainless steel membrane**
- **Switching output and/or analog output (4..20 mA / 0..10 V)**
- **Ingress protection IP 67**
- **Infinitely adjustably rotatable cable outlet for clean alignment**
- **Robust stainless steel housing**

Characteristics

The pressure transducers in this range measure pressures in liquids and gases. They output the measured value as an analog signal, or indicate that an adjustable limit value has been exceeded or fallen short of, by means of an electronic switch. Combinations of analog output and limit switches are also available. Alternatively, the switching output can be implemented as a frequency output.

The robust all metal housing makes the sensor suitable for universal industrial use.

A sensor with a flush-front stainless steel membrane is used as the transformer. The stainless steel membrane transmits the applied pressure via an oil filling to a mono-silicon membrane with a sputtered piezo-resistant measuring bridge made from polysilicon. Because the membrane fits flush, there is a minimal risk of contamination.

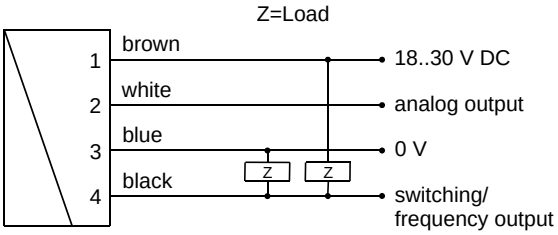
For models with a limit switch, the desired limit value is set by using a magnet to activate a magnetic switch when the applied pressure is at the limit value.

Technical data

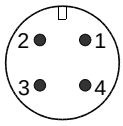
Sensor	thin film pressure measurement bridge on silicon membrane
Process connection	male thread G $^1/_2$ A
Metering ranges	(relative pressure, differential pressure compared with environment) in bar Range / Overload pressure 0.. 1.0 / 4 0.. 2.5 / 10 0.. 6.0 / 24 0.. 10.0 / 40 0.. 25.0 / 100 0.. 60.0 / 240 0..100.0 / 400 0..250.0 / 600 0..400.0 / 600 other metering ranges, absolute pressure measurement (not less than 10 mbar abs.) available on request
Measurement accuracy	±1 % from full scale value, from 60 °C plus 0.02 %/K
Repeatability	±0.5 % of full scale value
Pressure resistance	corresponds to metering range
Dynamics	measuring cycle 50 ms
Media temperature	-20..+70 °C (as high temperature model with gooseneck, max. 120 °C)
Ambient temperature	-20..+70 °C
Storage temperature	-20..+80 °C
Media	fluids and gases
Materials medium-contact	stainless steel 1.4301
Materials electronic housing	stainless steel 1.4305
Supply voltage	18.30 V DC
Power consumption	< 1 W
Analog output	4..20 mA or 0..10 V DC
Switching output	transistor output "push-pull" (resistant to short circuits and polarity reversal) I_{out} = 100 mA max.
Hysteresis	2 % F.S., for Min-switch, position of the hysteresis above the limit value, and for Max-switch, below the limit value
Display	yellow LED (On = Normal / Off = Alarm / Rapid flashing = Programming)
Electrical connection	for round plug connector M12x1, 4-pole
Reversal polarity protected	yes
Ingress protection	IP 67
Weight	approx. 0.3 kg
Conformity	CE

Wiring

Before the electrical installation, it must be ensured that the supply voltage corresponds with the data sheet.

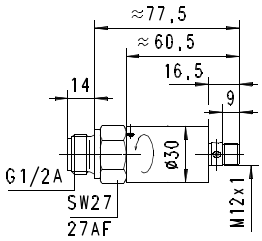


Connection example: PNP NPN

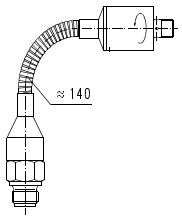


It is recommended to use shielded wiring.

Dimensions



"Gooseneck" option for higher temperatures



Handling and operation

Installation

The protective plastic cap is to be removed from the pressure membrane. Attention! The pressure membrane is very sensitive; a deformed membrane has a negative effect on the accuracy or causes damage to the sensor.
The pressure sensors are screwed into a nozzle or a T-piece in the pipework, using a suitable sealing material (e.g. Klingerit). The installation of the pressure sensor should result in no significant reduction of the cross-section of the pipework. When tightening the pressure sensor, use only the hexagonal spanner (SW27) specifically provided. Avoid installation locations with high pressure surges (see overload limits).

Avoid installation locations with high pressure surges (see overload limits).

In the high temperature model with flexible gooseneck, the pressure transducer can be operated up to a media temperature of 100 °C.

Programming

The electronics contain a magnetic contact, with the aid of which different parameters can be programmed. Programming takes place when a magnet clip is applied for a period between 0.5 and 2 seconds to the marking located on the label. If the contact time is longer or shorter than this, no programming takes place (protection against external magnetic fields).

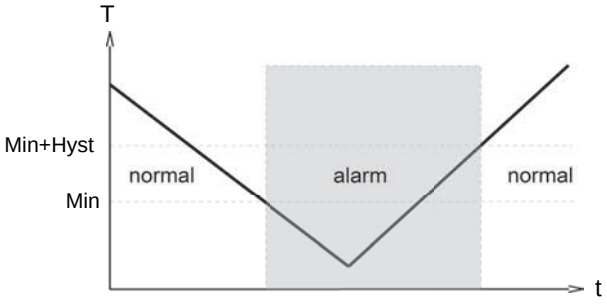
After the programming ("teaching"), the clip can either be left on the device, or removed to protect data.
The device has a yellow LED which flashes during the programming pulse. During operation, the LED serves as a status display for the switching output.
In order to avoid the need to transit to an undesired operating status during "teaching", the device can be provided ex-works with a "teach-offset". The "teach-offset" value is added to the currently measured value before saving (or is subtracted if a negative value is entered).

Example: The switching value is to be set to 70 % of the metering range, because at this flow rate a critical process status is to be notified. However, only 50% can be achieved without danger. In this case, the device would be ordered with a "teach-offset" of +20 %. At 50 % in the process, a switching value of 70 % would then be stored during "teaching".

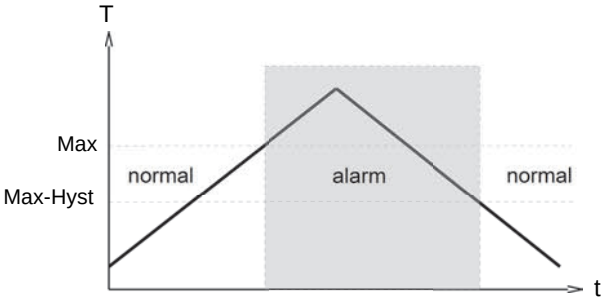
Normally, programming is used to set the limit switch. However, if desired, other parameters such as the end value of the analog or frequency output may also be set.

The limit switch can be used to monitor minimal or maximal.

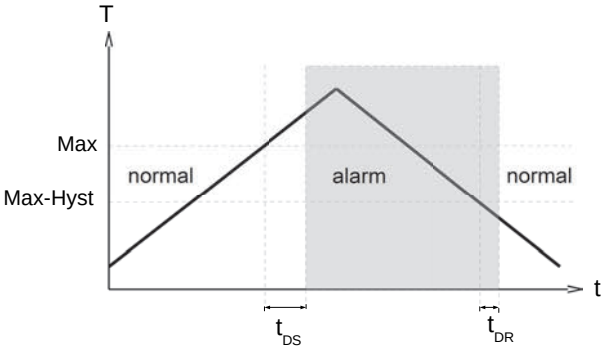
With a minimum-switch, falling below the limit value causes a switchover to the alarm state. Return to the normal state occurs when the limit value plus the set hysteresis is again exceeded.



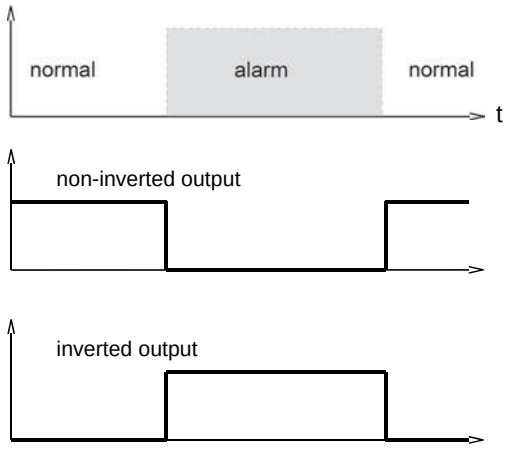
With a maximum-switch, exceeding the limit value causes a switchover to the alarm state. Return to the normal state occurs when the measured value once more falls below the limit value minus the set hysteresis.



A switchover delay time (t_{DS}) can be applied to the switchover to the alarm state. Equally, one switch-back delay time (t_{DR}) of several can be applied to switching back to the normal state.



In the normal state the integrated LED is on, in the alarm state it is off, and this corresponds to its status when there is no supply voltage.
In the non-inverted (standard) model, while in the normal state the switching output is at the level of the supply voltage; in the alarm state it is at 0 V, so that a wire break would also display as an alarm state at the signal receiver. Optionally, an inverted switching output can also be provided, i.e. in the normal state the output is at 0 V, and in the alarm state it is at the level of the supply voltage.



A Power-On delay function (ordered as a separate option) makes it possible to maintain the switching output in the normal state for a defined period after application of the supply voltage.

Combinations with FLEX

FLEX-converter / counter can be combined with very different types of pickup systems for flow rate, level, temperature, and pressure. This has created a family of sensors with which different types of applications can be supported.

Ordering code

	1.	2.	3.	4.	5.	6.	7.	8.	9.
FLEX-P			**K**	**015**	**H**				

❍ = Option

1.	**Metering range**	
	001	0.. 1.0 bar
	002	0.. 2.5 bar
	006	0.. 6.0 bar
	010	0.. 10.0 bar
	025	0.. 25.0 bar
	060	0.. 60.0 bar
	100	0.. 100.0 bar
	250	0.. 250.0 bar
	400	0.. 400.0 bar
2.	**Pressure type**	
	R	relative pressure
	A	absolute pressure
3.	**Connection material**	
	K	stainless steel
4.	**Mechanical connection**	
	015	male thread G $^1/_2$
5.	**Mechanical connection**	
	H	male thread
6.	**Analog output**	
	I	current output 4..20 mA
	U	voltage output 0..10 V
	K	no analog output
7.	**Switching output**	
	T	push-pull (compatible with PNP and NPN)
	K	no switching output
	M ❍	NPN (open collector)
8.	**Function set to switching output**	
	L	minimum-switch
	H ❍	maximum-switch
	R	frequency output
	K	no switching output
9.	**Switching output level**	
	O	standard
	I	inverted

Options

Special range for analog output: ___ bar
(not greater than the sensor's working range)

Special range for frequency output: ___ bar
(not greater than the sensor's working range)

End frequency (max. 2000 Hz) ____ Hz

Switch-on delay (from Alarm to OK) ___ s

Switch-off-delay (from OK to Alarm) ___ s

Power-on delay (0..99 s) ___ s
(time after power on, during which the outputs are not actuated)

Switching output fixed ___ bar

Special hysteresis (standard = 2 % EW) ___ %

Gooseneck (at temperatures over 70 °C) ☐

Accessories

- Cable/round plug connector (KB...)
  see additional information “Accessories”
- Converter / counter OMNI-TA
- Device configurator ECI-1

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Pressure Transmitter / Switch OMNI-P

- **Analog output, two switching outputs**
- **Clear, easily legible, illuminated LCD display**
- **Modifiable units in the display**
- **Designed for industrial use**

Characteristics

The OMNI-P pressure transmitter / switch is intended for the measurement of static and dynamic pressures in liquids and gases. It consists of a pressure cell as a sensor, and an integrated transformer.

A sensor with a flush-front stainless steel membrane is used as the transformer. The stainless steel membrane transmits the applied pressure via an oil filling to a mono-silicon membrane with a sputtered piezo-resistant measuring bridge made from polysilicon. Because the membrane fits flush, there is a minimal risk of contamination.

The pressure present is shown in the display and output as an analog signal (0/4..20 mA or 0/2..10 V). In addition, if set limit values are fallen short of or exceeded, this can be signalled by means of two switching outputs and a red LED.

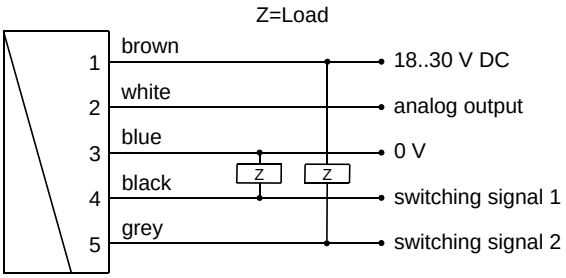
Because the complete upper part of the housing can be turned, it is possible to simply and infinitely adjust the display and the cable outlet.

By turning the programming ring to right or left, it is simple to modify the parameters (e.g. switching point, hysteresis...). To protect from unintended programming, it can be removed, turned through 180 °, and replaced, or completely removed, thus acting as a key.

Technical data

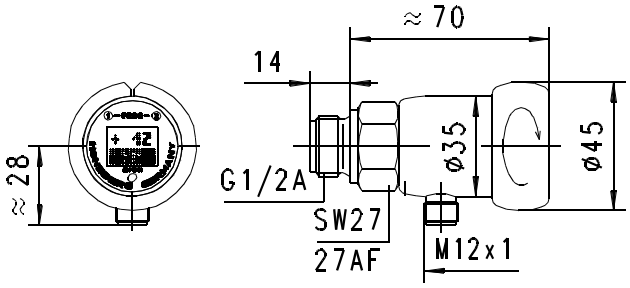
Sensor	thin film pressure measurement bridge on silicon membrane	
Process connection	male thread G $^1/_2$ A	
Metering ranges	(relative pressure, pressure difference from environment) in bar	
	Range	Overload pressure
	0.. 1.0	4
	0.. 2.5	10
	0.. 6.0	24
	0.. 10.0	40
	0.. 25.0	100
	0.. 60.0	240
	0..100.0	400
	0..250.0	600
	0..400.0	600
	other metering ranges, Absolute pressure measurement (not less than 10 mbar abs.) available on request	
Measurement accuracy	1 % of the full scale value, from 60 °C 0.02 %/°C	
Repeatability	±0.5 % of full scale value	
Dynamics	measurement cycle 32 ms, display cycle 0.5 sec.	
Working temperature	-20..+70 °C (with gooseneck max. 120 °C)	
Storage temperature	-20..+80 °C	
Materials medium-contact	stainless steel 1.4301	
Materials non-medium-contact	Housing	Stainless steel 1.4305 Mineral glass, hardened
	Programming ring	POM
	Magnet	Samarium-Cobalt
Supply voltage	18..30 V DC	
Power consumption	< 1 W	
Analog output	0/4..20 mA or 0/2..10 V	
Switching output	2 x transistor output "push-pull" (resistant to short circuits and polarity reversal) I_{out} = 100 mA max.	
Hysteresis	adjustable, for Min-switch, position of the hysteresis above the limit value, and for Max-switch, below the limit value	
Display	backlit graphical LCD-Display (transreflective), extended temperature range -20..+70 °C, 32 x 16 pixels, background illumination, displays value and unit, flashing LED signal lamp with simultaneous message on the display.	
Electrical connection	for round plug connector M12x1, 5-pole	
Ingress protection	IP 67	
Weight	approx. 0.2 kg	
Conformity	CE	

Wiring



Before the electrical installation, it must be ensured that the supply voltage corresponds to the data sheet.
It is recommended to use shielded wiring.
The push-pull outputs can be set as a PNP or an NPN output, as desired.

Dimensions



Gooseneck option

A gooseneck (optional) between the electronics head and the primary sensor provides freedom in the orientation of the sensor. This option simultaneously provides thermal decoupling between the two units

Handling and operation

Installation

The protective plastic cap is to be removed from the pressure membrane. The pressure membrane is very sensitive; a deformed membrane has a negative effect on the accuracy or causes damage to the sensor.

The pressure sensors are screwed into a nozzle or a T-piece in the pipework, using a suitable sealing material (e.g. Klingerit). The installation of the pressure sensor should result in no significant reduction of the cross-section of the pipework. When tightening the pressure sensor, use only the hexagonal spanner (SW27) specifically provided. Avoid installation locations with high pressure surges (see overload limits).

In the high temperature model with flexible gooseneck, the pressure transducer can be operated up to a media temperature of 120 °C. For this model, it should also be ensured that the head with plug is not exposed to temperatures greater than 70 °C.

Programming

The annular gap of the programming ring can be turned to positions 1 and 2. The following actions are possible:

Set to 1 = continue (STEP)
Set to 2 = modify (EDIT)

Neutral position between 1 and 2

The ring can be removed to act as a key, or turned through 180 ° and replaced to create a programming protector.
Operation is by dialog with the display messages, which makes its use very simple.
Starting from the normal display (currently measured value with unit), if 1 (STEP) is repeatedly selected, then the display shows the following information in this order:

Display of the parameters, using position 1

- Switching value S1 (switching point 1 in the selected unit)
- Switching characteristic of S1
- (MIN = monitoring of minimum value, hysteresis greater than switching value,
- MAX = monitoring of maximum value, hysteresis less than switching value)
- Hysteresis 1 (hysteresis value of S1 in the set unit)
- Switching value S2
- Switching characteristic of S2
- Hysteresis 2
- Code:
  After entering the code 111, further parameters can be defined:
- Filter (settling time of the display and output)
- Units: e.g. l/min or m³/h
- Output: 0..20 mA or 4..20 mA
- 0/4 mA (flow rate corresponding to 0/4 mA)
- 20 mA (flow rate corresponding to 20 mA)

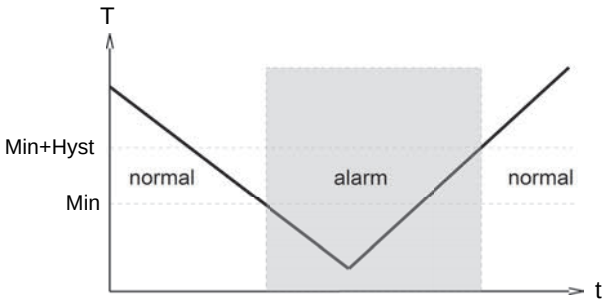
Edit, using position 2

If the currently visible parameter is to be modified:

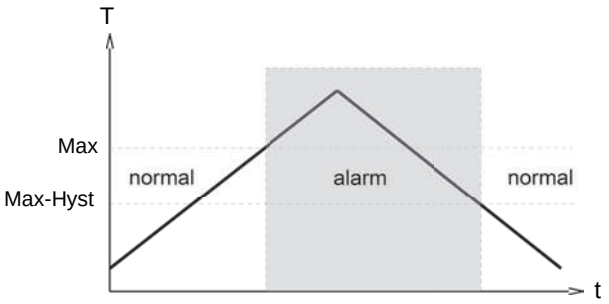
- Turn the annular gap to position 2, so that a flashing cursor appears which displays the position which can be modified.
- By repeatedly turning to position 2, values are increased; by turning to position 1, the next digit is reached.
- Leave the parameter by turning to position 1 (until the cursor leaves the row); this accepts the modification.
- If there is no action within 30 seconds, the device returns to the normal display range without accepting the modification.

The limit switches S1 and S2 can be used to monitor minima or maxima.

With a minimum-switch, falling below the limit value causes a switchover to the alarm state. Return to the normal state occurs when the limit value plus the set hysteresis is once more exceeded.



With a maximum-switch, exceeding the limit value causes a switchover to the alarm state. Return to the normal state occurs when the measured value once more falls below the limit value minus the set hysteresis.



The change to the alarm state is indicated by the integrated red LED and a cleartext in the display.
While in the normal state the switching outputs are at the level of the supply voltage; in the alarm state they are at 0 V, so that a wire break would also display as an alarm state at the signal receiver.
Overload of the switching output is detected, indicated on the display ("Check S 1 / S 2"), and the switching output is switched off.

Simulation mode
To simplify commissioning, the sensor supports a simulation mode for the analog output. It is possible to create a programmable value in the range 0..26 mA at the output (without modifying the process variable). This allows the wiring run between the sensor and the downstream electronics to be tested during commissioning. This is mode is accessed by means of code 311.

Overload display
Overload of the switching output is detected, indicated on the display, and the switching output is set to high impedance.

Default setting
After setting the configuration parameters, they can be reset to factory values at any time, by means of code 989.

Starting from the normal display (currently measured value with unit), if 1 (STEP) is selected repeatedly, then the display shows the following information:

Display of the parameters, using position 1

- Switching values S1 and S2: Switching values in the selected unit.
- Hysteresis direction of S1 and S2:
  Max = Hysteresis less than S1 or S2
- Max = Hysteresis greater than S 1 or S 2
- Hystereses Hyst 1 and Hyst 2:
- Hysteresis values of the switching values in the set unit
- After entering code 111, further parameters can be defined (this should take place only if necessary)
- Filter: Selectable filter constant in seconds (affects display and output)
- Unit: e.g. bar or psi ...
- Output: 0..20 mA or 4..20 mA
- 0/4 mA: Displayed value for 0/4 mA
- 20 mA: Displayed value for 20 mA

Edit, using position 2

- If the **visible** parameter is to be modified:
- Turn the annular gap to position 2, so that a flashing cursor appears which displays the position which can be modified. By repeatedly turning to position 2, values are increased; by turning to position 1, the next digit is reached. In this way, every digit can be modified. If there is no action within 5 seconds, the device returns to the normal display range without accepting the modification.

Saving the changes using position 1

After leaving the last value, turn once to position 1; this accepts the modification.

Ordering code

	1.	2.	3.	4.	5.	6.	7.
OMNI-P			**K**	**015**		**S**	

❍ = Option

1.	**Metering range**		
	001		0.. 1.0 bar
	002		0.. 2.5 bar
	006		0.. 6.0 bar
	010		0.. 10.0 bar
	025		0.. 25.0 bar
	060		0.. 60.0 bar
	100		0.. 100.0 bar
	250		0.. 250.0 bar
	400		0.. 400.0 bar
2.	**Pressure type**		
	R		relative pressure
	A		absolute pressure
3.	**Connection material**		
	K		stainless steel
4.	**Mechanical connection**		
	015		male thread G $^1/_2$ A
5.	**Analog output**		
	I		Current output 0/4..20 mA
	U	❍	Voltage output 0/2..10 V
6.	**Electrical connection**		
	S		for round plug connector M12x1, 5-pole
7.	**Optional**		
	H	❍	model with gooseneck
	O	❍	Tropic-model oil-filled version for heavy use or outdoor use

Accessories

- Cable/round plug connector (KB...)
  see additional information “Accessories”
- Device configurator ECI-1

Radio Pressure Transmitter RF1-P

- **Pressure sensor with integrated radio interface for the HONSBERG RF1 system**
- **Flush stainless steel membrane or ceramic cell (Al_2O_3)**
- **Energy-saving battery operation**
- **Ingress protection IP 67**
- **Robust stainless steel housing**
- **Operation without registration or fees (ISM band 868 MHz)**

Characteristics

The RF1-P pressure transmitter measures pressures in fluids and gases. The measured value is polled using a radio connection. If set limit values are exceeded, this can be actively notified by the sensor. To operate one or more sensors, at least one send/receive station (access point RF1-ETH or RF1-USB) is required.

A sensor with a flush-front stainless steel membrane is used as the transformer. The stainless steel membrane transmits the applied pressure via an oil filling to a mono-silicon membrane with a sputtered piezo-resistant measuring bridge made from polysilicon. Because the membrane fits flush, there is a minimal risk of contamination. The robust full metal construction makes the sensors suitable for universal industrial use.

Technical data

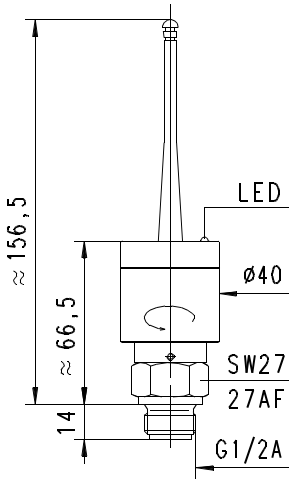
Sensor	thin film pressure measurement bridge on silicon membrane
Process connection	male thread G $^1/_2$ A
Metering ranges	(relative pressure, differential pressure compared with environment) in bar

Range	Overload pressure
0.. 1.0	4
0.. 2.5	10
0.. 6.0	24
0.. 10.0	40
0.. 25.0	100
0.. 60.0	240
0..100.0	400
0..250.0	600
0..400.0	600

other metering ranges,
absolute pressure measurement
(not less than 10 mbar abs.)
available on request

Measurement accuracy	±1 % of full scale value from 60 °C plus 0.02 %/K
Repeatability	±0.5 % of full scale value
Pressure resistance	corresponds to metering range
Media temperature	-20..+70 °C (with gooseneck option max. 100 °C)
Ambient temperature	-20..+70 °C
Storage temperature	-20..+80 °C
Media	fluids and gases
Materials medium-contact	1.4301
Materials, non-medium-contact	CW614N, PP, NBR
Voltage supply	lithium battery 1/2 AA 3.6 V (e.g. Tadiran SL-750/S)
Battery life	depends on parameter settings, generally > 1 year
Radio frequency	868.9 MHz; < 10 mW (ISM band, no registration or fees)
Vibration resistance	max. 20 g
Ingress protection	IP 67
Conformity	CE (FTEG and directive 1999 / 5 / EC)

Dimensions



Handling and Operation

Installation

The protective plastic cap is to be removed from the pressure membrane. Attention! The pressure membrane is very sensitive; a deformed membrane has a negative effect on the accuracy or causes damage to the sensor.

The pressure sensors are screwed into a nozzle or a T-piece in the pipework, using a suitable sealing material (e.g. Klingerit). The installation of the pressure sensor should result in no significant reduction of the cross-section of the pipework. When tightening the pressure sensor, use only the hexagonal spanner (SW27) specifically provided.

Avoid installation locations with high pressure surges (see overload limits).

In the high temperature model with flexible gooseneck, the pressure transducer can be operated up to a media temperature of 100 °C.

Changing battery

The sensor's battery can be changed by the user himself. For this, unscrew the lid of the housing. Take care when removing the lid: Do not tear off the wiring! Remove the battery from the battery holder, and replace it with a suitable battery (3.6 V type C, e.g. Tadiran Lithium SL-750/S).

Programming

All parameters, e.g. the setting of limit values, are programmed via the radio interface. The RF1-Control software is available for this purpose. Alternatively, software modules provided by HONSBERG can be integrated into the customer's own applications; these allow the use of the whole range of functionality.

Ordering code

	1.	2.	3.	4.	5.	6.
RF1-P -			**K**	**015**		

❍ = Option

1.	**Metering range**		
	001		0.. 1.0 bar
	002		0.. 2.5 bar
	006		0.. 6.0 bar
	010		0.. 10.0 bar
	025		0.. 25.0 bar
	060		0.. 60.0 bar
	100		0.. 100.0 bar
	250	❍	0.. 250.0 bar
	400	❍	0.. 400.0 bar
2.	**Pressure type**		
	R		relative pressure
	A		absolute pressure
3.	**Connection material**		
	K		stainless steel
4.	**Connection size**		
	015		male thread G $^1/_2$ A
5.	**Voltage Supply**		
	S		external for round plug connector M12x1, 4-pole
	B		internal battery
6.	**Option**		
	H	❍	model with gooseneck

Accessories

- Ethernet Access Point RF1-ETH
- USB Access Point RF1-USB
- Software RF1 Control
- Battery pack with round plug connector RF1-BAT

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www.ghm-messtechnik.de ● info@martens-elektronik.de

Pressure Transmitter Series SA-11

SA-11-0

SA-11-1

- **Measuring range from 0.25..25 bar**
- **Output signal 0..20 mA, 4..20 mA, 0..10 V DC**
- **Certified for EHEDG, 3A and FDA**
- **Max. process temperature -20..150 °C**

Characteristics

The SA-11 pressure transmitter has been specially designed to meet the requirements of the food, beverage, pharmaceutical and biotechnology industries. With its resistance to chemical cleaning liquids and high temperatures, this transmitter is particularly suited for CIP/SIP cleaning processes. The flush diaphragm is directly welded to the process connection, thus ensuring a gap-free connection and eliminating the need for additional sealing gaskets. The SA-11 pressure transmitter meets the high requirements of sterile engineering processes and is certified in accordance with the 3-A Sanitary Standards and the EHEDG.

Technical data

Power supply

Supply voltage	: 10/(14)..30 V DC
Process temperature	: -20..+150 °C
Ambient temperature	: -20..+80 °C
CE-conformity	: 97/23 EG, 2004/108/EG, EN 61326 emission (group 1 and class B) and immunity
Certification	: EHEDG, A3, FDA conform

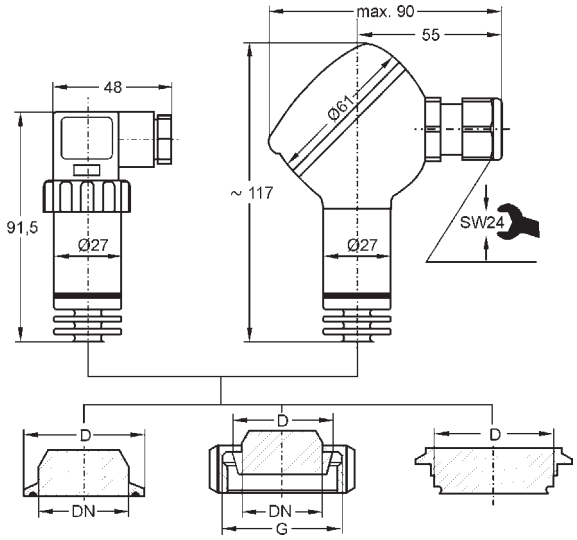
Output

Current	: 0..20 mA, 3-wire; 4..20 mA, 2-wire
Max. burden R_A	: 2-wire, $R_A \leq (U+ -10\ V) \div 0.02\ A\ [\Omega]$ 3-wire, $R_A \leq (U+ -3\ V) \div 0.02\ A\ [\Omega]$
Voltage	: 0..10 V DC, 3-wire
Max. burden R_A	: >10 kΩ
Accuracy	: 0.5 %

Material

Process connection	: stainless-steel 1.4435
Surface roughness	: Ra <0.4 µm
Case	: stainless-steel 1.4571
System fill fluid	: synthetic oil, FDA approved
Membrane	: gap free connection, free of dead spaces
Electrical connection	: field case (IP68) or L-connector acc. to EN 175301-803/A (IP65)

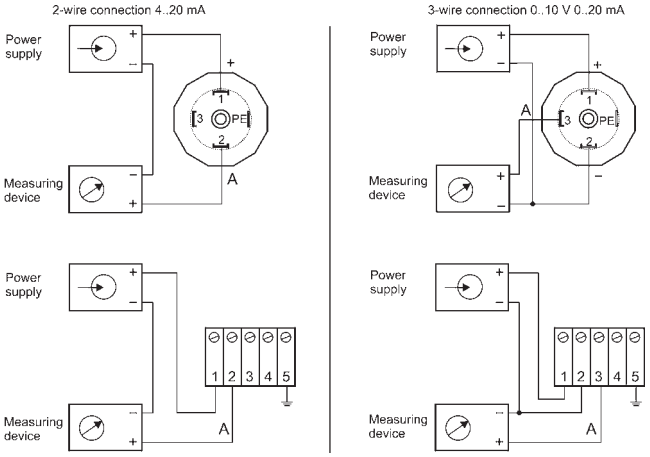
Dimensions



Clamp DIN11851 VARIVENT®

Process connection		DN [mm/inch]	D [mm]	G
Tri-Clamp		1 ½“ 2“	50 64	
Clamp	DIN32676	DN32 DN40 DN50	50 50 64	
Female union nut	DIN11851	DN25 DN40 DN50	44 56 68,5	Rd52x1/6 Rd65x1/6 Rd78x1/6
VARIVENT®	Form F Form N	DN25/32 DN50/DN50	50 68	

Connection diagram



Continue next page

Ordering code

	1.		2.		3.		4.		5.
SA-11	-		-		-		-		

1.	**Electrical connection**	
	0	L-connector EN175301-803/A, IP65
	1	field case, IP68
2.	**Output**	
	0	0..10 V 3-wire
	1	0..20 mA 3-wire
	2	4..20 mA 2-wire
3.	**Process connection**	
	TC15	Tri-Clamp 1 ½"
	TC20	Tri-Clamp 2"
	NM25	female union nut DN25
	NM40	female union nut DN40
	NM50	female union nut DN50
	CL25	Clamp DN25
	CL32	Clamp DN32
	CL40	Clamp DN40
	CL50	Clamp DN50
	WV25	VARIVENT® Form F
	WV40	VARIVENT® Form N
4.	**Options**	
	00	without option
5.	**Measuring range [bar]**	
	0.25/ 0.4/ 0.6/ 1/ 2.5/ 4/ 6/ 10/ 16/ 25 -1..0/ -1..1/ -1..2/ -1..4/ -1..10	

GHM Messtechnik GmbH – Location Martens
Kiebitzhörn 18 ● 22885 Barsbüttel ● Germany
Fon +49-40-670 73-0 ● Fax -288
www.ghm-messtechnik.de ● info@martens-elektronik.de

Pressure Transmitter Series S and IS

- **Measuring ranges from -1..1000 bar**
- **Output signal 0..20 mA, 4..20 mA, 0..10 V DC**
- **Devices for Ex areas available**

Characteristics

This series of pressure transmitters has been carefully designed to cover the majority of industrial applications with instruments readily available from stock. Compact design and robust construction make these instruments suitable for all applications in machine construction, process control, laboratory or quality and materials testing equipment.

Technical data

Power supply

Supply voltage	: 10/(14)..30 V DC (U+)
Process temperature	
S10, S11	: -30..+100 °C
IS10, IS11	: -20..+80 °C -40..+125 °C Optional
Ambient temperature	: -20..+80 °C
CE-conformity	: 97/23 EG, 2004/108/EG, EN 61326 emission (group 1 and class B) and immunity
Approval for	: ATEX Ex ia I/II C T6 FM,CSA

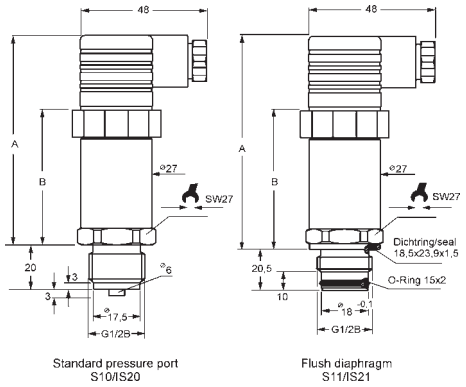
Output

Current	: 0..20 mA, 3-wire; 4..20 mA, 2-wire
Max. burden R_A	: 2-wire, $R_A \leq (U+ -10V) \div 0.02A$ 3-wire, $R_A \leq (U+ -3V) \div 0.02A$
Voltage	: 0..10 V DC 3-wire
Max. burden R_A	: >10 kΩ
Accuracy	: 0.5 %, optional 0.25 %

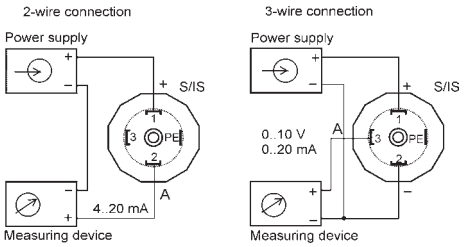
Material

Process connection	: stainless steel
Case	: stainless steel
System liquid	: synthetic oil, FDA approved
Membrane	: flush diaphragm model (I)SX1 standard pressure port model (I)SX0
Electrical connection	: L-connector acc. to EN 175301-803/A
Protection class	: IP65

Dimensions



Connection diagram



Ordering code

1. 2. - 3. - 4. - 5.

1.	**Device type**	
	S1	standard device (non Ex)
	IS2	device for Ex-areas*
2.	**Model**	
	0	standard pressure port, G ½ B, -1..0/0..1000 bar
	1	flush diaphragm, G1B, 0..0.1/ 1.6 bar
		flush diaphragm, G ½ B, 0..2.5/ 600 bar
3.	**Output**	
	0	0..10 V, 3-wire (14..30 V DC)
	1	0..20 mA, 3-wire (10..30 V DC)
	2	4..20 mA, 2-wire (10..30 V DC)
4.	**Options**	
	00	without option
	01	custom measuring range S10/S11
	02	accuracy 0.25 %
	03	absolute pressure measurement
	04	custom measuring range IS20/IS21
	05	process temperature -40..+125 °C
5.	**Measuring ranges** [bar]	
	-1/ 0.1/ 0.16/ 0.25/ 0.4/ 0.6/ 1/ 1.6/ 2.5/ 4/ 6/ 10/ 16/ 25/ 40/ 60/ 100/ 160/ 250/ 400/ 600/ 1000	
	*Device type IS only with output 4..20 mA	

Pressure Transmitter EPS1

- **4..20 mA two-wire pressure transducer**
- **Ceramic cell made from Al_2O_3**
- **Pressure cell protected from mechanical damage**
- **Infinitely adjustably rotatable cable outlet for clean alignment**

Characteristics

The EPS1 pressure transformer measures static and dynamic pressures in fluids and gases. The robust 100% metal construction makes it suitable for universal industrial use.

The pressure transformer consists of a measuring cell (four extension measurement cells using thick film technology applied to a ceramic substrate) and the converter / counter. This converts the bridge signal into a pressure-proportional 4..20 mA signal. The pressure cell is connected to the medium via a drilling with 8 mm diameter, and this construction protects it securely from mechanical damage.

Technical data

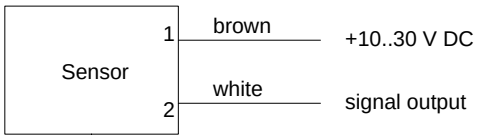
Sensor	ceramic cell with measuring bridge using thick film technology
Process connection	male thread G $^1/_2$ A or G $^1/_4$ A
Metering ranges	(relative pressure, pressure difference from environment) in bar

Range	Burst pressure
0.. 1	4
0.. 2	4
0.. 5	10
0.. 10	20
0.. 20	40
0.. 50	100
0..100	175

* available only on request for gases

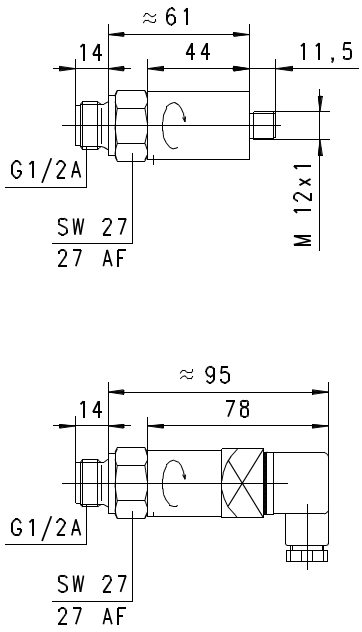
Measurement accuracy	±1 % of final value; plus 0.05 %/K at < 0 °C and > 60 °C
Repeatability	±0.5 % of full scale value
Pressure resistance	corresponds to metering range
Media temperature	-20..+80 °C (with gooseneck option max. 120 °C)
Ambient temperature	-20..+70 °C
Storage temperature	-20..+80 °C
Media	fluids and gases
Material medium-contact	probe 1.4571, Al_2O_3, FKM
Materials non-medium-contact	CW614N, PP, NBR
Supply voltage	10..30 V DC ±10 %
Analog output	4..20 mA two-wire
Load	max. 800 Ohm at 24 V (100 Ohm at 10 V/1.1 kOhm at 30 V, linear at operating voltage)
Electrical connection	for round plug connector M12x1, 4-pole or plug DIN 43650-A / ISO 4400
Reversal polarity protected	yes
Ingress protection	IP 67 round plug connector IP 65 plug DIN 43650-A / ISO 4400
Weight	approx. 0.3 kg
Conformity	CE

Wiring

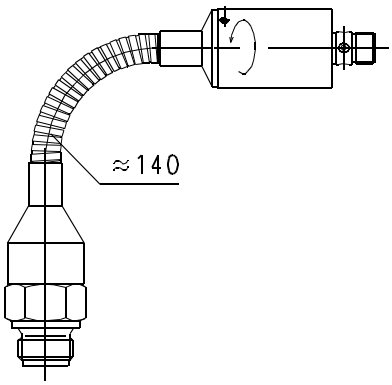


Before the electrical installation, it must be ensured that the supply voltage corresponds with the data sheet.

Dimensions



"Gooseneck" option for higher temperatures



Handling and operation

Installation

The pressure transformers are screwed into a nozzle or a T-piece in the pipework, using a suitable sealing material (e.g. Klingerit). The installation of the pressure sensor should result in no significant reduction of the cross-section of the pipework. When tightening the pressure sensor, use only the hexagonal spanner (SW27) specifically provided.

Avoid installation locations with high pressure surges (see overload limits).

In the high temperature model with flexible gooseneck, the pressure transformer can be operated up to a media temperature of 120 °C.

Ordering code

	1.	2.	3.	4.	5.	6.	7.
EPS1 -		**R**	**K**		**H**		

❍ = Option

1.	**Metering range**		
	001		0.. 1 bar
	002		0.. 2 bar
	005		0.. 5 bar
	010		0.. 10 bar
	020		0.. 20 bar
	050		0.. 50 bar
	100		0..100 bar
2.	**Pressure type**		
	R		relative pressure
3.	**Connection material**		
	K		stainless steel 1.4571
4.	**Mechanical connection**		
	008		G $^1/_4$
	015		G $^1/_2$
5.	**Mechanical connection**		
	H		male thread
6.	**Electronic connection**		
	S		for round plug connector M12x1, 4-pole
	B	❍	plug DIN 43650-A / ISO 4400
7.	**Option**		
	H	❍	model with gooseneck

Accessories

- Cable/round plug connector (KB...)
  see additional information “Accessories”
- converter / counter OMNI-TA

Pressure Transmitter / Switch FLEX-P1

- **Ceramic cell made from Al_2O_3**
- **Switching output and/or analog output (4..20 mA / 0..10 V)**
- **Ingress protection IP 67**
- **Infinitely adjustably rotatable cable outlet for clean alignment**
- **Robust stainless steel housing**

Characteristics

The pressure transducers in this range measure pressures in liquids and gases. They output the measured value as an analog signal, or indicate that an adjustable limit value has been exceeded or fallen short of, by means of an electronic switch. Combinations of analog output and limit switches are also available. Alternatively, the switching output can be implemented as a frequency output.

The robust 100% metal construction makes it suitable for universal industrial use.

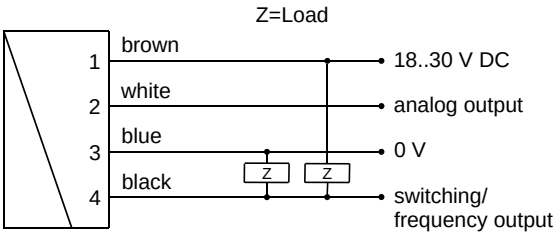
The sensor is an economical ceramic thick film cell which protects from damage because of its non-flush construction, and is built extremely robustly.

For models with a limit switch, the desired limit value is set by using a magnet to activate a magnetic switch when the applied pressure is at the limit value.

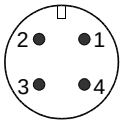
Technical data

Sensor	ceramic cell with measuring bridge using thick film technology
Process connection	male thread G $^1/_4$ A, G $^1/_2$ A (optionally with female thread)
Metering ranges	(relative pressure, differential pressure compared with environment) in bar Range — Burst pressure 0.. 1 — 4 0.. 2 — 4 0.. 5 — 10 0.. 10 — 20 0.. 20 — 40 0.. 50 — 100 0..100 — 175 * available only on request for gases
Measurement accuracy	±1 % of full scale value, plus 0.05 %/K at < 0 °C and > 60 °C
Repeatability	±0.5 % of full scale value
Pressure resistance	corresponds to metering range
Dynamics	measuring cycle 50 ms
Media temperature	-20..+70 °C (as high temperature model with gooseneck, max. 120 °C)
Ambient temperature	-20..+70 °C
Storage temperature	-20..+80 °C
Media	fluids and gases
Materials medium-contact	stainless steel 1.4571 ceramic Al_2O_3, FKM
Materials non-medium-contact	stainless steel 1.4305 (housing) PA6.6 (plug), gold-plated contacts
Supply voltage	18..30 V DC
Power consumption	< 1 W
Analog output	4..20 mA or 0..10 V DC
Switching output	transistor output "push-pull" (resistant to short circuits and polarity reversal) I_{out} = 100 mA max.
Hysteresis	2 % F.S., for Min-switch, position of the hysteresis above the limit value, and for Max-switch, below the limit value
Display	yellow LED (On = Normal / Off = Alarm / Rapid flashing = Programming)
Electrical connection	for round plug connector M12x1, 4-pole
Reversal polarity protected	yes
Ingress protection	IP 67
Weight	approx. 0.3 kg
Conformity	CE

Wiring



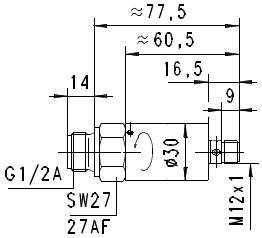
Connection example: PNP NPN



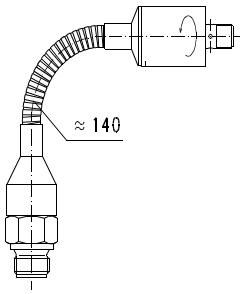
Before the electrical installation, it must be ensured that the supply voltage corresponds with the data sheet.

It is recommended to use shielded wiring.

Dimensions



"Gooseneck" option for higher temperatures



Handling and operation

Installation

The pressure sensors are screwed into a nozzle or a T-piece in the pipework, using a suitable sealing material (e.g. Klingerit). The installation of the pressure sensor should result in no significant reduction of the cross-section of the pipework. When tightening the pressure sensor, use only the hexagonal spanner (SW27) specifically provided. Avoid installation locations with high pressure surges (see burst pressure).

Avoid installation locations with high pressure surges (see overload limits).

In the high temperature model with flexible gooseneck, the pressure transducer can be operated up to a media temperature of 120 °C.

Programming

The electronics contain a magnetic contact, with the aid of which different parameters can be programmed. Programming takes place when a magnet clip is applied for a period between 0.5 and 2 seconds to the marking located on the label. If the contact time is longer or shorter than this, no programming takes place (protection against external magnetic fields).

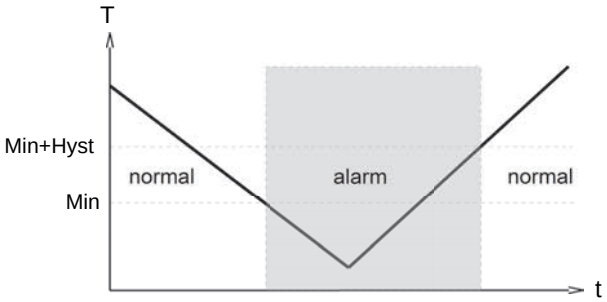
After the programming ("teaching"), the clip can either be left on the device, or removed to protect data.
The device has a yellow LED which flashes during the programming pulse. During operation, the LED serves as a status display for the switching output.
In order to avoid the need to transit to an undesired operating status during "teaching", the device can be provided ex-works with a "teach-offset". The "teach-offset" value is added to the currently measured value before saving (or is subtracted if a negative value is entered).

Example: The switching value is to be set to 70 % of the metering range, because at this flow rate a critical process status is to be notified. However, only 50% can be achieved without danger. In this case, the device would be ordered with a "teach-offset" of +20 %. At 50 % in the process, a switching value of 70 % would then be stored during "teaching".

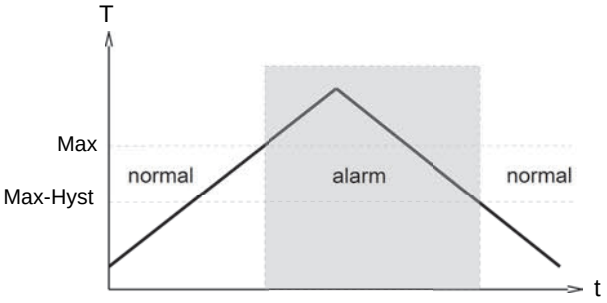
Normally, programming is used to set the limit switch. However, if desired, other parameters such as the end value of the analog or frequency output may also be set.

The limit switch can be used to monitor minimal or maximal.

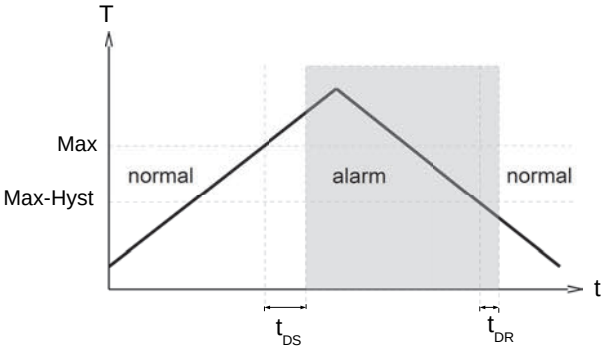
With a minimum-switch, falling below the limit value causes a switchover to the alarm state. Return to the normal state occurs when the limit value plus the set hysteresis is again exceeded.



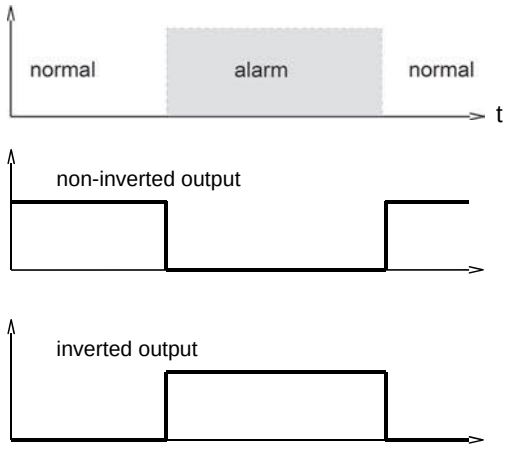
With a maximum-switch, exceeding the limit value causes a switchover to the alarm state. Return to the normal state occurs when the measured value once more falls below the limit value minus the set hysteresis.



A switchover delay time (t_{DS}) can be applied to the switchover to the alarm state. Equally, one switch-back delay time (t_{DR}) of several can be applied to switching back to the normal state.



In the normal state the integrated LED is on, in the alarm state it is off, and this corresponds to its status when there is no supply voltage.
In the non-inverted (standard) model, while in the normal state the switching output is at the level of the supply voltage; in the alarm state it is at 0 V, so that a wire break would also display as an alarm state at the signal receiver. Optionally, an inverted switching output can also be provided, i.e. in the normal state the output is at 0 V, and in the alarm state it is at the level of the supply voltage.



A Power-On delay function (ordered as a separate option) makes it possible to maintain the switching output in the normal state for a defined period after application of the supply voltage.

Combinations with FLEX

FLEX-converter / counter can be combined with very different types of pickup systems for flow rate, level, temperature, and pressure. This has created a family of sensors with which different types of applications can be supported.

Ordering code

	1.	2.	3.	4.	5.	6.	7.	8.	9.
FLEX-P1		**R**	**K**		**H**				

❍ = Option

1.	**Metering range**		
	001	0.. 1 bar	
	002	0.. 2 bar	
	005	0.. 5 bar	
	010	0.. 10 bar	
	020	0.. 20 bar	
	050	0.. 50 bar	
	100	0..100 bar	
2.	**Pressure type**		
	R	relative pressure	
3.	**Connection material**		
	K	stainless steel	
4.	**Mechanical connection**		
	015	G $^1/_2$	
	008	❍	G $^1/_4$
5.	**Mechanical connection**		
	H	male thread	
6.	**Analog output**		
	I	current output 4..20 mA	
	U	voltage output 0..10 V	
	K	no analog output	
7.	**Switching output**		
	T	push-pull (compatible with PNP and NPN)	
	K	no switching output	
	M	❍	NPN (open collector)
8.	**Function set to switching output**		
	L	minimum-switch	
	H	❍	maximum-switch
	R	frequency output	
	K	no switching output	
9.	**Switching output level**		
	O	standard	
	I	inverted	

Options

Special range for analog output: ___ bar
(not greater than the sensor's working range)

Special range for frequency output: ___ bar
(not greater than the sensor's working range)

End frequency (max. 2000 Hz) ____ Hz

Switch-on delay (from Alarm to OK) ___ s

Switch-off-delay (from OK to Alarm) ___ s

Power-on delay (0..99 S) ___ s
(time after power on, during which the outputs are not actuated)

Switching output fixed ___ bar

Special hysteresis (standard = 2 % EW) ___ %

Gooseneck (at temperatures over 70 °C) ☐

Accessories

- Cable/round plug connector (KB...) see additional information “Accessories”
- Converter / counter OMNI-TA
- Device configurator ECI-1

Pressure Transmitter / Switch OMNI-P1

- **Analog output, two switching outputs**
- **Clear, easily legible, illuminated LCD display**
- **Modifiable units in the display**
- **Designed for industrial use**

Characteristics

The OMNI-P1 pressure transmitter / switch is intended for the measurement of static and dynamic pressures in liquids and gases. It consists of a pressure cell as a sensor, and an integrated transformer.

The sensor is an economical ceramic cell with a temperature compensated measuring bridge using thick film technology. It is protected from damage because of its non-flush construction, and is built extremely robustly.

The pressure present is shown in the display and output as an analog signal (0/4..20 mA or 0/2..10 V). In addition, if set limit values are fallen short of or exceeded, this can be signalled by means of two switching outputs and a red LED.

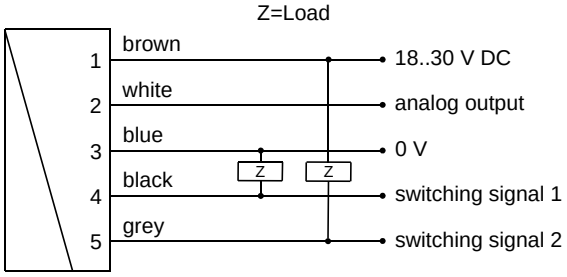
Because the complete upper part of the housing can be turned, it is possible to simply and infinitely adjust the display and the cable outlet.

By turning the programming ring to right or left, it is simple to modify the parameters (e.g. switching point, hysteresis...). To protect from unintended programming, it can be removed, turned through 180 °, and replaced, or completely removed, thus acting as a key.

Technical data

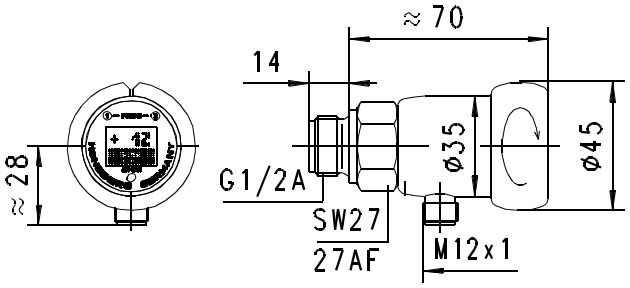
Sensor	ceramic cell with measuring bridge using thick film technology
Process connection	male thread G $^1/_4$ A, G $^1/_2$ A (optionally with female thread)
Metering ranges	(relative pressure, pressure difference from environment) in bar Range / Burst pressure 0.. 1 / 4 0.. 2 / 6 0.. 5 / 15 0.. 10 / 40 0.. 20 / 60 0.. 50 / 150 0..100 / 280 0..200* / 400 0..400* / 1050 * available only on request for gases
Measurement accuracy	±1 % of full scale value; 0.05 %/°C at < 0° and > 60 °C
Repeatability	±0.1 % of full scale value
Dynamics	measurement cycle 32 ms, display cycle 0.5 sec.
Working temperature	-20..+70 °C (with gooseneck max. 120 °C)
Storage temperature	-20..+80 °C
Supply voltage	18..30 V DC
Power consumption	< 1 W
Analog output	0/4..20 mA, 0/2..10 V via a 500 Ohm resistance after 0 V (impedance of the receiver > 100 kOhm)
Switching output	transistor output "push-pull" (resistant to short circuits and polarity reversal) I_{out} = 100 mA max.
Hysteresis	adjustable, for Min-switch, position of the hysteresis above the limit value, and for Max-switch, below the limit value
Display	backlit graphical LCD-Display (transreflective), extended temperature range -20..+70 °C, 32 x 16 pixels, background illumination, displays value and unit, flashing LED signal lamp with simultaneous message on the display.
Electrical connection	for round plug connector M12x1, 5-pole
Ingress protection	IP 67
Materials medium-contact	stainless steel 1.4571, ceramic Al_2O_3, FKM
Materials, non-medium-contact	stainless steel 1.4305 (housing), hardened mineral glass, POM (programming ring), Samarium-Cobalt (magnet)

Wiring



Before the electrical installation, it must be ensured that the supply voltage corresponds to the data sheet.
It is recommended to use shielded wiring.
The push-pull outputs can be set as a PNP or an NPN output, as desired.

Dimensions



Gooseneck option

A gooseneck (optional) between the electronics head and the primary sensor provides freedom in the orientation of the sensor. This option simultaneously provides thermal decoupling between the two units

Handling and operation

Installation

The pressure sensors are screwed into a nozzle or a T-piece in the pipework, using a suitable sealing material (e.g. Klingerit). The installation of the pressure sensor should result in no significant reduction of the cross-section of the pipework. When tightening the pressure sensor, use only the hexagonal spanner (SW27) specifically provided. Avoid installation locations with high pressure surges (see burst pressure).

In the high temperature model with flexible gooseneck, the pressure transducer can be operated up to a media temperature of 120 °C. For this model, it should also be ensured that the head with plug is not exposed to temperatures greater than 70 °C.

Programming

The annular gap of the programming ring can be turned to positions 1 and 2. The following actions are possible:

Set to 1 = continue (STEP)
Set to 2 = modify (EDIT)

Neutral position between 1 and 2

The ring can be removed to act as a key, or turned through 180 ° and replaced to create a programming protector.
Operation is by dialog with the display messages, which makes its use very simple.
Starting from the normal display (currently measured value with unit), if 1 (STEP) is repeatedly selected, then the display shows the following information in this order:

Display of the parameters, using position 1

- Switching value S1 (switching point 1 in the selected unit)
- Switching characteristic of S1
- (MIN = monitoring of minimum value, hysteresis greater than switching value,
- MAX = monitoring of maximum value, hysteresis less than switching value)
- Hysteresis 1 (hysteresis value of S1 in the set unit)
- Switching value S2
- Switching characteristic of S2
- Hysteresis 2
- Code:
  After entering the code 111, further parameters can be defined:
- Filter (settling time of the display and output)
- Units: e.g. l/min or m^3/h
- Output: 0..20 mA or 4..20 mA
- 0/4 mA (flow rate corresponding to 0/4 mA)
- 20 mA (flow rate corresponding to 20 mA)

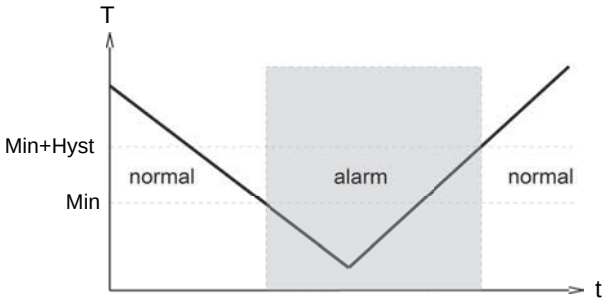
Edit, using position 2

If the currently visible parameter is to be modified:

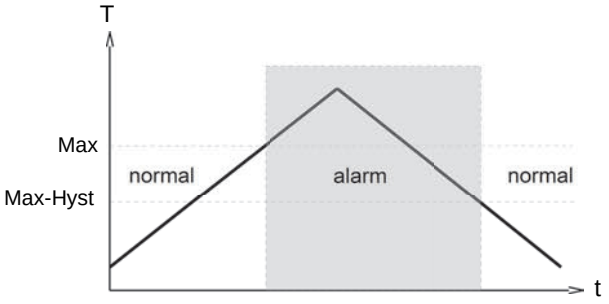
- Turn the annular gap to position 2, so that a flashing cursor appears which displays the position which can be modified.
- By repeatedly turning to position 2, values are increased; by turning to position 1, the next digit is reached.
- Leave the parameter by turning to position 1 (until the cursor leaves the row); this accepts the modification
- If there is no action within 30 seconds, the device returns to the normal display range without accepting the modification.

The limit switches S1 and S2 can be used to monitor minimal or maximal.

With a minimum-switch, falling below the limit value causes a switchover to the alarm state. Return to the normal state occurs when the limit value plus the set hysteresis is once more exceeded.



With a maximum-switch, exceeding the limit value causes a switchover to the alarm state. Return to the normal state occurs when the measured value once more falls below the limit value minus the set hysteresis.



The change to the alarm state is indicated by the integrated red LED and a cleartext in the display.
While in the normal state the switching outputs are at the level of the supply voltage; in the alarm state they are at 0 V, so that a wire break would also display as an alarm state at the signal receiver.Overload of the switching output is detected, indicated on the display ("Check S1 / S2"), and the switching output is switched off.

Simulation mode
To simplify commissioning, the sensor supports a simulation mode for the analog output. It is possible to create a programmable value in the range 0..26 mA at the output (without modifying the process variable). This allows the wiring run between the sensor and the downstream electronics to be tested during commissioning. This is mode is accessed by means of code 311.

Overload display
Overload of the switching output is detected, indicated on the display, and the switching output is set to high impedance.

Default setting
After setting the configuration parameters, they can be reset to factory values at any time, by means of code 989.

Starting from the normal display (currently measured value with unit), if 1 (STEP) is selected repeatedly, then the display shows the following information:

Display of the parameters, using position 1

- Switching values S1 and S2: Switching values in the selected unit.
- Hysteresis direction of S1 and S2:
  Max = Hysteresis less than S1 or S2
- Max = Hysteresis greater than S1 or S2
- Hystereses Hyst 1 and Hyst 2:
- Hysteresis values of the switching values in the set unit
- After entering code 111, further parameters can be defined (this should take place only if necessary)
- Filter: Selectable filter constant in seconds (affects display and output)
- Unit: e.g. bar or psi ...
- Output: 0..20 mA or 4..20 mA
- 0/4 mA: Displayed value for 0/4 mA
- 20 mA: Displayed value for 20 mA

Edit, using position 2

- If the **visible** parameter is to be modified:
- Turn the annular gap to position 2, so that a flashing cursor appears which displays the position which can be modified. By repeatedly turning to position 2, values are increased; by turning to position 1, the next digit is reached. In this way, every digit can be modified. If there is no action within 5 seconds, the device returns to the normal display range without accepting the modification.

Saving the changes using position 1

After leaving the last value, turn once to position 1; this accepts the modification.

Ordering code

	1.	2.	3.	4.	5.	6.	7.	8.
OMNI-P1			**K**		**H**		**S**	

❍ = Option

1.	**Metering range**		
	001		0.. 1 bar
	002		0.. 2 bar
	005		0.. 5 bar
	010		0.. 10 bar
	020		0.. 20 bar
	050		0.. 50 bar
	100		0..100 bar
	200		0..200 bar
	400		0..400 bar
2.	**Pressure type**		
	R		relative pressure
	A		absolute pressure available on request
3.	**Connection material**		
	K		stainless steel
4.	**Mechanical connection**		
	015		G 1/2
	018	❍	G 1/4
5.	**Mechanical connection**		
	H		male thread
6.	**Analog output**		
	I		Current output 0/4..20 mA
	U	❍	Voltage output 0/2..10 V
7.	**Electrical connection**		
	S		for round plug connector M12x1, 5-pole
8.	**Optional**		
	H	❍	model with gooseneck
	O	❍	Tropic-model oil-filled version for heavy use or outdoor use

Accessories

- Cable/round plug connector (KB...)
  see additional information “Accessories”
- Device configurator ECI-1

Radio Pressure Transmitter RF1-P1

- **Pressure sensor with integrated radio interface for the HONSBERG RF1 system**
- **Flush stainless steel membrane or ceramic cell (Al_2O_3)**
- **Energy-saving battery operation**
- **Ingress protection IP 67**
- **Robust stainless steel housing**
- **Operation without registration or fees (ISM band 868 MHz)**

Characteristics

The RF1-P pressure transmitter measures pressures in fluids and gases. The measured value is polled using a radio connection. If set limit values are exceeded, this can be actively notified by the sensor. To operate one or more sensors, at least one send/receive station (access point RF1-ETH or RF1-USB) is required.

The sensor is an economical ceramic cell with a temperature compensated measuring bridge using thick film technology. It is protected from damage because of its non-flush construction, and is built extremely robustly.

In the high temperature model with flexible gooseneck, the pressure transducer can be operated up to a media temperature of 120 °C. For this model, it should also be ensured that the head with plug is not exposed to temperatures greater than 70 °C.

Technical data

Sensor	ceramic cell with measuring bridge using thick film technology
Process connection	male thread G $^1/_2$ A or G $^1/_4$ A
Metering ranges	(relative pressure, differential pressure compared with environment) in bar

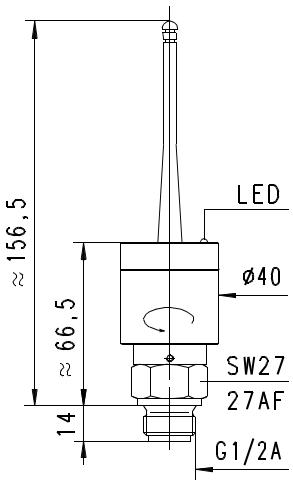
Range	Burst pressure
0.. 1	4
0.. 2	6
0.. 5	15
0.. 10	40
0.. 20	60
0.. 50	150
0..100	280
0..200*	400
0..400*	1050

* available only on request for gases

Measurement accuracy	±1 % of full scale value, plus 0.05 %/K at < 0 °C and > 60 °C
Repeatability	±0.5 % of full scale value
Pressure resistance	corresponds to metering range

Media temperature	-20..+80 °C (with gooseneck option max. 120 °C)
Ambient temperature	-20..+70 °C
Storage temperature	-20..+80 °C
Media	fluids and gases
Material medium-contact	probe 1.4571, Al_2O_3, FKM
Materials non-medium-contact	CW614N, PP, NBR
Supply voltage	lithium battery 1/2 AA 3.6 V (e.g. Tadiran SL750/S)
Battery life	depending on parameter settings, usually > 1 year
Radio frequency	868.9 MHz; < 10 mW (ISM band, no registration or fees)
Vibration resistance	max. 20 g
Ingress protection	IP 67
Conformity	CE (FTEG and directive 1999 / 5 / EC)

Dimensions



Handling and Operation

Installation

The pressure sensors are screwed into a nozzle or a T-piece in the pipework, using a suitable sealing material (e.g. Klingerit). The installation of the pressure sensor should result in no significant reduction of the cross-section of the pipework. When tightening the pressure sensor, use only the hexagonal spanner (SW27) specifically provided. Avoid installation locations with high pressure surges (see burst pressure).

Avoid installation locations with high pressure surges (see overload limits).

In the high temperature model with flexible gooseneck, the pressure transducer can be operated up to a media temperature of 120 °C.

Changing battery

The sensor's battery can be changed by the user himself. For this, unscrew the lid of the housing. Take care when removing the lid: Do not tear off the wiring! Remove the battery from the battery holder, and replace it with a suitable battery (3.6 V type C, e.g. Tadiran Lithium SL-750/S).

Programming

All parameters, e.g. the setting of limit values, are programmed via the radio interface. The RF1-Control software is available for this purpose. Alternatively, software modules provided by HONSBERG can be integrated into the customer's own applications; these allow the use of the whole range of functionality.

Ordering code

	1.	2.	3.	4.	5.	6.
RF1-P1			**K**			

❍ = Option

1.	**Metering range**		
	001		0.. 1 bar
	002		0.. 2 bar
	005		0.. 5 bar
	010		0.. 10 bar
	020		0.. 20 bar
	050		0.. 50 bar
	100		0..100 bar
	200		0..200 bar
	400		0..400 bar
2.	**Pressure type**		
	R		relative pressure
	A		absolute pressure available on request
3.	**Connection material**		
	K		stainless steel
4.	**Connection size**		
	008		male thread G $^1/_4$ A
	015		male thread G $^1/_2$ A
5.	**Voltage Supply**		
	S		external for round plug connector M12x1, 4-pole
	B		internal battery
6.	**Option**		
	H	❍	model with gooseneck

Accessories

- Ethernet Access Point RF1-ETH
- USB Access Point RF1-USB
- Software RF1 Control
- Battery pack with round plug connector RF1-BAT

Differential Pressure Transmitter EDP1

- **4..20 mA two-wire differential pressure transducer**
- **Ideally suited to wet/wet applications**
- **Can also be used at high differential pressures**
- **High chemical resistance thanks to top-quality materials**
- **Compact design**

Characteristics

The differential pressure transmitter EDP1 is intended for the measurement of differential pressures in liquids and gases. It consists of a differential pressure sensor cell as a sensor, and of an integrated transformer.

The differential pressure measuring cell has two separate ceramic pressure sensors with a measuring bridge applied by thick film technology. The bridge signal of each sensor is temperature-compensated. The integrated microcontroller measures the signals from the two sensors, and calculates the pressure difference. This is output as a 4..20 mA signal (two-wire).

The ceramic sensors are available in various pressure ranges. This limits the maximum pressure applied to each connection. The differential pressure, which should correspond to an output signal of 20 mA, can be freely selected within this range, but should not be less than 10 % of the metering range of the single cells, so that a sufficient resolution and accuracy are ensured.

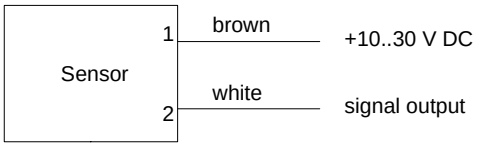
The microcontroller also permits customer-specific characteristic curves and output signals, e.g. measurement of positive and negative pressure differences (available on request).

The medium comes into contact exclusively with top-quality materials such as AL_2O_3 -ceramic, stainless steel, FKM seals.

Technical data

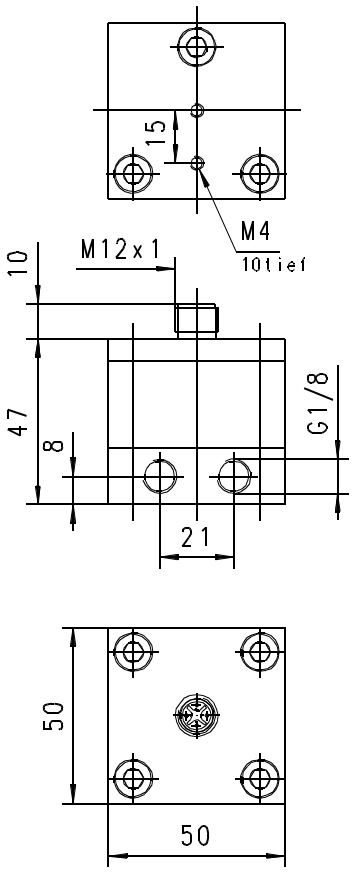
Sensor	ceramic cell with measuring bridge in thick film technology	
Process connection	2 x female thread G $^1/_8$	
Metering ranges of the single cells	(pressure relative to environment of the single cell) in bar Range: 0.. 1 / 0.. 2 / 0.. 5 / 0.. 10 / 0.. 20 / 0.. 50 / 0..100 Burst pressure: 4 / 6 / 15 / 40 / 60 / 150 / 280	
Differential pressure range	when ordering please state: minimum: 10 % of the metering range of the single cells maximum: Metering range of the single cells	
Measurement accuracy	±1 % of full scale value; plus. 0.05 %/K at < 0 °C and > 60 °C	
Repeatability	±0.5 % of full scale value	
Pressure resistance	corresponds to metering range	
Dynamics	measuring cycle 50 ms	
Media temperature	-20..+70 °C	
Ambient temperature	-20..+70 °C	
Storage temperature	-20..+80 °C	
Media	fluids and gases	
Materials medium-contact	Connection Ceramic cell Seal	1.4571 Al_2O_3 FKM
Materials, non-medium-contact	Housing Plug Contacts	Al anodised 1.4305 PA6.6 gold-plated
Supply voltage	10..30 V DC	
Analog output	4..20 mA two-wire	
Load	max. 800 Ohm at 24 V (100 Ohm at 10 V, 1,1 kOhm at 30 V, linear at operating voltage)	
Electrical connection	for round plug connector M12x1, 4-pole	
Reversal polarity protected	yes	
Protection class	IP 67	
Weight	approx. 0.5 kg	
Conformity	CE	

Wiring



Before the electrical installation, it must be ensured that the supply voltage complies with the data sheet.
It is recommended to use shielded wiring.

Dimensions



Ordering code

	1.	2.	3.	4.	5.	6.
EDP1 -		**R**		**K**	**004**	**S**

1.	**Range of the single cell**	
	001	0.. 1 bar
	002	0.. 2 bar
	005	0.. 5 bar
	010	0.. 10 bar
	020	0.. 20 bar
	050	0.. 50 bar
	100	0..100 bar
2.	**Pressure type**	
	R	relative pressure
3.	**Differential pressure range**	
	0001 … 1000	example 0055 = 5.5 bar (min. 10 %, max. 100 % of the range of the single cells)
4.	**Connection material**	
	K	stainless steel 1.4571
5.	**Connection size**	
	004	female thread G $^{1}/_{8}$
6.	**Electronic connection**	
	S	for round plug connector M12x1, 4-pole

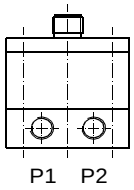
Accessories

- Round plug connector/cable
- converter / counter OMNI-TA
- Device configurator ECI-1

Handling and operation

Installation

Connect the pipework to P1 and P2. When sealing off, ensure that it is carried out cleanly.



The standard version is designed for P1 > P2. However, if the connections are reversed, no damage occurs.

When cleaning the pressure cells from the media side, the bolts of the part with the media connections are to be loosened The electronics remain closed in this case). Cleaning should be carried out very carefully, using a cotton tips.

Differential Pressure Transmitter / Switch FLEX-DP1

Characteristics

The FLEX-DP1 differential pressure transmitter / switch is intended for the measurement of differential pressures in liquids and gases. It consists of a differential pressure cell as a sensor, and an integrated transformer.

The differential pressure measuring cell has two separate ceramic pressure sensors with a measuring bridge applied by thick film technology. The bridge signal of each sensor is temperature-compensated. The integrated microcontroller measures the signals from the two sensors, and calculates the pressure difference. This is output as an analog signal (0/4..20 mA or 0/2..10 V). In addition, if a set limit value is fallen short of or exceeded, this can be signalled by means of a switching output. Alternatively the electronic switch (push-pull) can be used as a frequency output.

The ceramic sensors are available in various pressure ranges. This limits the maximum pressure applied to each connection. The differential pressure, which should correspond to the maximum value of the output signal, can be freely selected within this range, but should not be less than 10 % of the metering range of the single cells, so that sufficient resolution and accuracy are ensured.

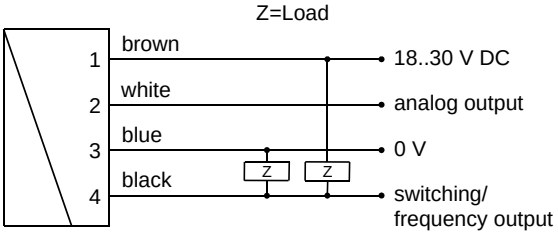
The microcontroller also permits customer-specific characteristic curves and output signals, e.g. measurement of positive and negative pressure differences (available on request).

The medium comes into contact exclusively with top-quality materials such as AL_2O_3 -ceramics, stainless steel, fluorocarbon O-rings.

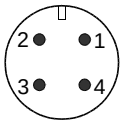
Technical data

Sensor	ceramic cell with measuring bridge using thick film technology
Process connection	2 x female thread G $^1/_8$
Metering ranges of the single cells	(pressure relative to environment of the single cell) in bar Range — Burst pressure 0.. 1 — 4 0.. 2 — 6 0.. 5 — 15 0.. 10 — 40 0.. 20 — 60 0.. 50 — 150 0..100 — 280 others on request
Differential pressure range	which can be set on the device, maximum: Metering range of the single cells
Measurement accuracy	±1 % of full scale value, plus 0.05 %/K at < 0 °C and > 60 °C
Repeatability	±0.5 % of full scale value
Pressure resistance	corresponds to metering range
Dynamics	measuring cycle 50 ms
Media temperature	-20..+70 °C
Ambient temperature	-20..+70 °C
Storage temperature	-20..+80 °C
Media	fluids and gases
Materials medium-contact	Connection 1.4571 Ceramic cell Al_2O_3 Seal FKM
Materials non-medium-contact	al anodised, 1.4305 (housing) PA6.6 (plug), gold-plated contacts
Supply voltage	18..30 V DC
Power consumption	< 1 W
Analog output	4..20 mA or 0..10 V DC
Switching output	transistor output "push-pull" (resistant to short circuits and polarity reversal) I_{out} = 100 mA max.
Hysteresis	2 % F.S., for Min-switch, position of the hysteresis above the limit value, and for Max-switch, below the limit value
Display	LED-signal lamp in the connector output (only for switching output)
Electrical connection	for round plug connector M12x1, 4-pole
Reversal polarity protected	yes
Ingress protection	IP 67
Weight	approx. 0.7 kg
Conformity	CE

Wiring



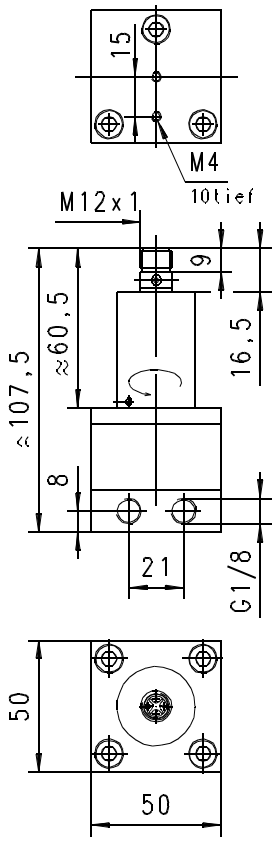
Connection example: PNP NPN



Before the electrical installation, it must be ensured that the supply voltage corresponds with the data sheet.

It is recommended to use shielded wiring.

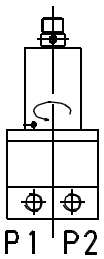
Dimensions



Handling and operation

Installation

Connect the pipework to P1 and P2. When sealing off, ensure that it is carried out cleanly.
The standard version is designed for P1 > P2. However, if the connections are reversed, no damage occurs.



When cleaning the pressure cells from the media side, the bolts of the part with the media connections are to be loosened The electronics remain closed in this case). Cleaning should be carried out very carefully, using a cotton tips.

Programming

The electronics contain a magnetic contact, with the aid of which different parameters can be programmed. Programming takes place when a magnet clip is applied for a period between 0.5 and 2 seconds to the marking located on the label. If the contact time is longer or shorter than this, no programming takes place (protection against external magnetic fields).

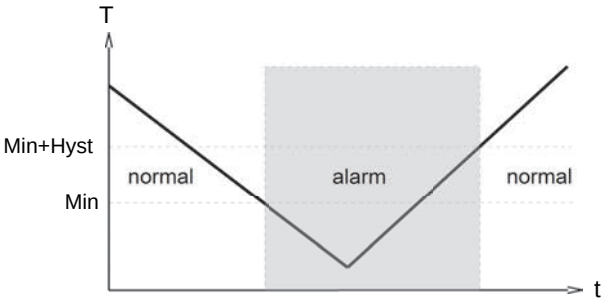
After the programming ("teaching"), the clip can either be left on the device, or removed to protect data.
The device has a yellow LED which flashes during the programming pulse. During operation, the LED serves as a status display for the switching output.
In order to avoid the need to transit to an undesired operating status during "teaching", the device can be provided ex-works with a "teach-offset". The "teach-offset" value is added to the currently measured value before saving (or is subtracted if a negative value is entered).

Example: The switching value is to be set to 70 % of the metering range, because at this flow rate a critical process status is to be notified. However, only 50% can be achieved without danger. In this case, the device would be ordered with a "teach-offset" of +20 %. At 50 % in the process, a switching value of 70 % would then be stored during "teaching".

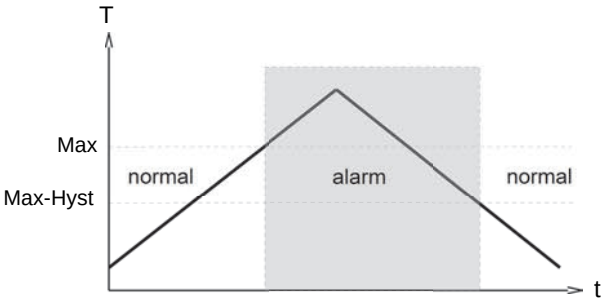
Normally, programming is used to set the limit switch. However, if desired, other parameters such as the end value of the analog or frequency output may also be set.

The limit switch can be used to monitor minimal or maximal.

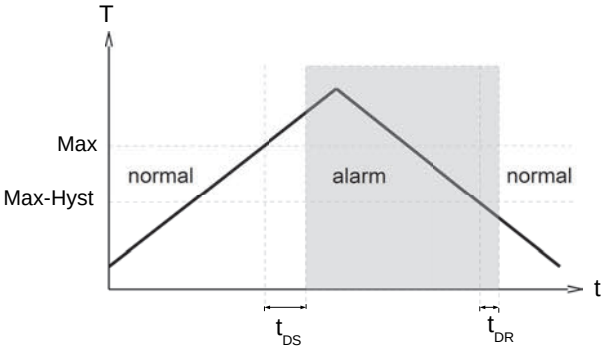
With a minimum-switch, falling below the limit value causes a switchover to the alarm state. Return to the normal state occurs when the limit value plus the set hysteresis is again exceeded.



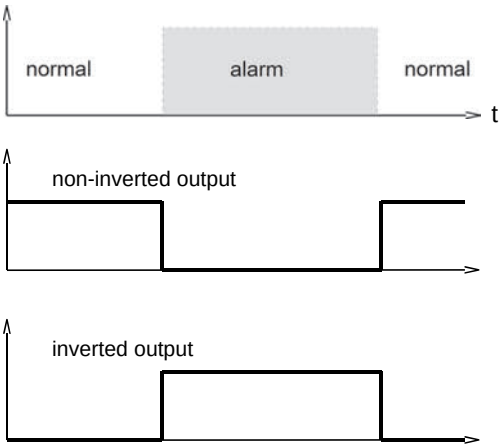
With a maximum-switch, exceeding the limit value causes a switchover to the alarm state. Return to the normal state occurs when the measured value once more falls below the limit value minus the set hysteresis.



A switchover delay time (t_{DS}) can be applied to the switchover to the alarm state. Equally, one switch-back delay time (t_{DR}) of several can be applied to switching back to the normal state.



In the normal state the integrated LED is on, in the alarm state it is off, and this corresponds to its status when there is no supply voltage.
In the non-inverted (standard) model, while in the normal state the switching output is at the level of the supply voltage; in the alarm state it is at 0 V, so that a wire break would also display as an alarm state at the signal receiver. Optionally, an inverted switching output can also be provided, i.e. in the normal state the output is at 0 V, and in the alarm state it is at the level of the supply voltage.



A Power-On delay function (ordered as a separate option) makes it possible to maintain the switching output in the normal state for a defined period after application of the supply voltage.

Combinations with FLEX

FLEX-converter / counter can be combined with very different types of pickup systems for flow rate, level, temperature, and pressure. This has created a family of sensors with which different types of applications can be supported.

Ordering code

	1.	2.	3.	4.	5.	6.	7.	8.	9.
FLEX-DP1		**R**		**K**	**004**				

❍ = Option

1.	**Range of the single cell**	
	001	0.. 1 bar
	002	0.. 2 bar
	005	0.. 5 bar
	010	0.. 10 bar
	020	0.. 20 bar
	050	0.. 50 bar
	100	0..100 bar
2.	**Pressure type**	
	R	relative pressure
3.	**Differential pressure range**	
	0001 … 1000	example 0055 = 5.5 bar (min. 10 %, max. 100 % of the range of the single cells)
4.	**Connection material**	
	K	stainless steel
5.	**Mechanical connection**	
	004	female thread G $^1/_8$
6.	**Analog output**	
	I	current output 4..20 mA
	U	voltage output 0..10 V
	K	no analog output
7.	**Switching output**	
	T	push-pull (compatible with PNP and NPN)
	K	no switching output
	M ❍	NPN (open collector)
8.	**Function set to switching output**	
	L	minimum-switch
	H ❍	maximum-switch
	R	frequency output
	K	no switching output
9.	**Switching output level**	
	O	standard
	I	inverted

Options

For analog output:

Special range for analog output:

Start of metering range (4 mA or 0 V) at ____.____ bar
Standard = 0 bar

End of metering range (20 mA or 10 V) at ____.____ bar
Standard = Maximum

For frequency output:

End frequency (max. 2000 Hz) ____ Hz
Standard = 2000 Hz

Special range for frequency output:

Start of metering range (0 Hz) at ____ bar
Standard = 0 bar

End of metering range (end frequency) at ____ bar
Standard = Maximum

For switching output:

Switching delay period (0.0..99.9 s) ____.____ s
(from Normal to Alarm)

Switch-back delay period (0.0..99.9 s) ____.____ s
(from Alarm to Normal)

Switching output fixed at ____.____ bar

Switching hysteresis ____ %
Standard = 2 % of the metering range

General:

Power-On-Delay period (0..99 s) ____ s

Teach-Offset ____.____ bar

Accessories

- Cable/round plug connector (KB...)
  see additional information “Accessories”
- Converter / counter OMNI-TA
- Device configurator ECI-1

Differential Pressure Transmitter / Switch OMNI-DP1

- **Ideally suited to wet/wet applications**
- **Can also be used at high differential pressures**
- **High chemical resistance thanks to top-quality materials**
- **Rotatable head for adjustment**
- **Units can be programmed at will**
- **Limit values and hysteresis adjustable**
- **Units can be selected**
- **0/4..20 mA output with adjustable range and zero point**
- **Clear, easily legible, illuminated LCD display**
- **Bright signal-LED**

Characteristics

The OMNI-DP1 differential pressure transmitter / switch is intended for the measurement of differential pressures in liquids and gases. It consists of a differential pressure cell as a sensor, and an integrated transformer.

The differential pressure measuring cell has two separate ceramic pressure sensors with a measuring bridge applied by thick film technology. The bridge signal of each sensor is temperature-compensated. The integrated microcontroller measures the signals from the two sensors, and calculates the pressure difference. This is shown in the display and output as an analog signal (0/4..20 mA or 0/2..10 V). In addition, if set limit values are fallen short of or exceeded, this can be signalled by means of two switching outputs and a red LED.

The ceramic sensors are available in various pressure ranges. This limits the maximum pressure to be applied to each connection. The differential pressure which is intended to correspond to the maximum value of the output signal can be freely set within this range on the device, but should not be less than 10 % of the metering range of the single cells, so that sufficient resolution and accuracy are ensured.

The medium comes into contact exclusively with top-quality materials such as AL_2O_3 -ceramics, stainless steel, fluorocarbon O-rings.

By turning the programming ring to right or left, it is simple to modify the parameters (e.g. switching point, hysteresis...). To protect from unintended programming, it can be removed, turned through 180 °, and replaced, or completely removed, thus acting as a key.

Technical data

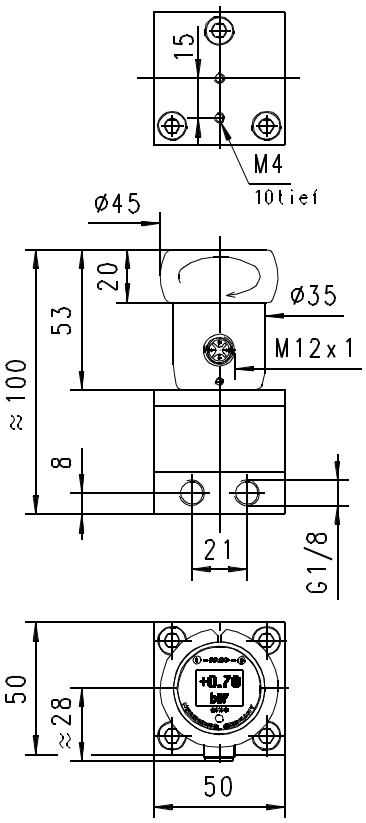
Sensor	ceramic cell with measuring bridge using thick film technology	
Process connection	2 x female thread G $^1/_8$	
Metering ranges of the single cells	(pressure relative to environment of the single cell) in bar	
	Range	Burst pressure
	0.. 1	4
	0.. 2	6
	0.. 5	15
	0.. 10	40
	0.. 20	60
	0.. 50	150
	0..100	280
Differential pressure meas. range	when ordering please state: minimum: 10 % of the nominal pressure maximum: Nominal pressure	
Measurement accuracy	±1 % of full scale value, plus 0.05 %/K at < 0 °C and > 60 °C	
Repeatability	±0.5 % of full scale value	
Pressure	corresponds to metering range	
Dynamics	measuring cycle 31.25 ms	
Media temperature	-20..+70 °C (with gooseneck max. 85 °C)	
Ambient temperature	-20..+70 °C	
Storage temperature	-20..+80 °C	
Media	fluids and gases	
Material medium-contact	1.4571, FKM, ceramic Al_2O_3	
Materials electronic housing	Housing	stainless steel 1.4305
	Glass	mineral glass, hardened
	Magnet	samarium-Cobalt
	Ring	POM
Supply voltage	18..30 V DC	
Power consumption	< 1 W	
Analog output	0/4..20 mA (0/2..10 V available on request)	
Switching points S1 and S2	transistor output "push-pull" (resistant to short circuits and polarity reversal) I_{out} = 100 mA max. per output	
Hysteresis	adjustable, position of the hysteresis depends on minimum or maximum	
Display	backlit graphical LCD-Display (transreflective), extended temperature range -20..+70 °C, 32 x 16 pixels, background illumination, displays value and unit, flashing LED signal lamp with simultaneous message on the display.	

Electrical connection	for round plug connector M12x1, 5-pole
Reversal polarity protected	yes
Ingress protection	IP 67
Weight	approx. 0.7 kg
Conformity	CE

Wiring

Before the electrical installation, it must be ensured that the supply voltage corresponds to the data sheet.
It is recommended to use shielded wiring.
The push-pull outputs can be set as a PNP or an NPN output, as desired.

Dimensions

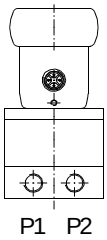


Gooseneck option

A gooseneck (optional) between the electronics head and the primary sensor provides freedom in the orientation and reading direction of the sensor. This option simultaneously provides thermal decoupling between the two units

Handling and operation

The pipework is connected to P1 and P2. When sealing off, ensure that it is carried out cleanly.
P1 > P2 displays positive pressure differences;
P1 < P2 displays negative values.



When cleaning the pressure cells from the media side, the bolts of the part with the media connections can be loosened (the electronics remain closed in this case). Cleaning should be carried out very carefully, using a cotton tips.

Programming

The annular gap of the programming ring can be turned to positions 1 and 2. The following actions are possible:

Set to 1 = continue (STEP)
Set to 2 = modify (EDIT)

Neutral position between 1 and 2

The ring can be removed to act as a key, or turned through 180 ° and replaced to create a programming protector.
Operation is by dialog with the display messages, which makes its use very simple.
Starting from the normal display (currently measured value with unit), if 1 (STEP) is repeatedly selected, then the display shows the following information in this order:

Display of the parameters, using position 1

- Switching value S1 (switching point 1 in the selected unit)
- Switching characteristic of S1
- (MIN = monitoring of minimum value, hysteresis greater than switching value,
- MAX = monitoring of maximum value, hysteresis less than switching value)
- Hysteresis 1 (hysteresis value of S1 in the set unit)
- Switching value S2
- Switching characteristic of S2
- Hysteresis 2
- Code:
  After entering the code 111, further parameters can be defined:
- Filter (settling time of the display and output)
- Units: e.g. l/min or m³/h
- Output: 0..20 mA or 4..20 mA
- 0/4 mA (flow rate corresponding to 0/4 mA)
- 20 mA (flow rate corresponding to 20 mA)

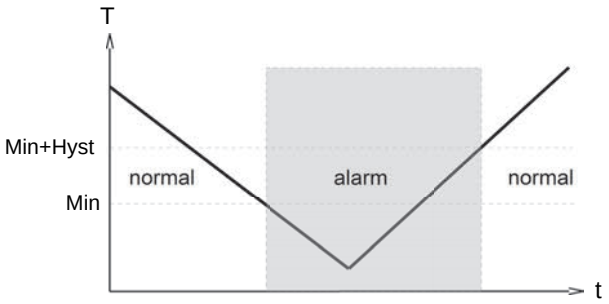
Edit, using position 2

If the currently visible parameter is to be modified:

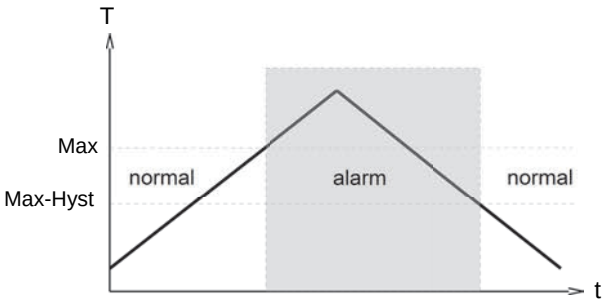
- Turn the annular gap to position 2, so that a flashing cursor appears which displays the position which can be modified.
- By repeatedly turning to position 2, values are increased; by turning to position 1, the next position is reached.
- Leave the parameter by turning to position 1 (until the cursor leaves the row); this accepts the modification.
- If there is no action within 30 seconds, the device returns to the normal display range without accepting the modification.

The limit switches S1 and S2 can be used to monitor minima or maxima.

With a minimum-switch, falling below the limit value causes a switchover to the alarm state. Return to the normal state occurs when the limit value plus the set hysteresis is once more exceeded.



With a maximum-switch, exceeding the limit value causes a switchover to the alarm state. Return to the normal state occurs when the measured value once more falls below the limit value minus the set hysteresis.



The change to the alarm state is indicated by the integrated red LED and a cleartext in the display.
The switching outputs are at the level of the supply voltage in the normal state, and in the alarm state they are at 0 V, and so a wire break would also be displayed as an alarm state at the signal receiver. Over-load of the switching output is detected, indicated on the display ("Check S 1 / S 2"), and the switching output is switched off.

Simulation mode
To simplify commissioning, the sensor supports a simulation mode for the analog output. It is possible to create a programmable value in the range 0..26 mA at the output (without modifying the process variable). This allows the wiring run between the sensor and the downstream electronics to be tested during commissioning. This is mode is accessed by means of code 311.

Overload display
Overload of the switching output is detected, indicated on the display, and the switching output is set to high impedance.

Default setting
After setting the configuration parameters, they can be reset to factory values at any time, by means of code 989.

Starting from the normal display (currently measured value with unit), if 1 (STEP) is pressed repeatedly, then the display shows the following information:

Display of the parameters with position 1
- Switching values S1 and S2: Switching values in the selected unit.
- Hysteresis direction of S1 and S2:
  Max = Hysteresis less than S1 or S2
- Max = Hysteresis greater than S1 or S2
- Hystereses Hyst 1 and Hyst 2:
- Hysteresis values of the switching values in the set unit
- After entering code 111, further parameters can be defined (this should take place only if necessary)
- Filter: Selectable filter constant in seconds (affects display and output)
- Unit: e.g. bar or psi ...
- Output: 0..20 mA or 4..20 mA
- 0/4 mA: Displayed value for 0/4 mA
- 20 mA: Displayed value for 20 mA

Edit, using position 2

- If the **visible** parameter is to be modified:
- Turn the annular gap to position 2, so that a flashing cursor appears which displays the position which can be modified. By repeatedly turning to position 2, values are increased; by turning to position 1, the next digit is reached. In this way, every digit can be modified. If there is no action within 5 seconds, the device returns to the normal display range without accepting the modification.

Saving the changes using position 1

After leaving the last value, turn once to position 1; this accepts the modification.

Ordering code

	1.	2.	3.	4.	5.	6.	7.
OMNI-DP1		**R**		**K**	**004**	**S**	

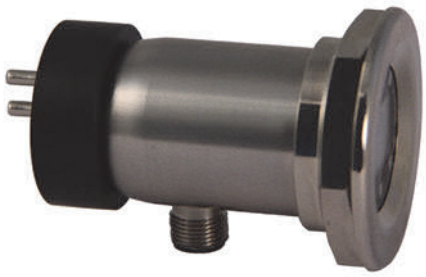
❍ = Option

1.	**Range of the single cell**		
	001		0.. 1 bar
	002		0.. 2 bar
	005		0.. 5 bar
	010		0.. 10 bar
	020		0.. 20 bar
	050		0.. 50 bar
	100		0..100 bar
2.	**Pressure type**		
	R		relative pressure
3.	**Differential pressure range**		
	0001 … 1000		example 0055 = 5.5 bar (min. 10 %, max. 100 % of the range of the single cells)
4.	**Connection material**		
	K		stainless steel
5.	**Mechanical connection**		
	004		female thread G $^{1}/_{8}$
6.	**Electrical connection**		
	S		for round plug connector M12x1, 5-pole
7.	**Optional**		
	H	❍	model with gooseneck

Accessories

- Cable/round plug connector (KB...)
  see additional information “Accessories”
- Device configurator ECI-1

Differential pressure Transmitter / Switch OMNI-DP2



- **Differential pressure measurement for non-aggressive gases**
- **Short reaction time**
- **Analog output, two switching outputs**
- **Clear, easily legible, illuminated LCD display**
- **Designed for industrial use**
- **Small, compact construction**
- **Very simple installation**
- **Control panel assembly (IP65)**

Characteristics

The sensor measures the difference of the pressures at the two pressure ports P1 and P2 by means of piezo-resistive pressure sensor elements on a ceramic substrate.
The sensors are compensated in the entire operating temperature range and offer excellent drift and long+term stability.

The pressure ports are designed as hose connections with a 3 mm outside diameter.

There are various versions available:

Relative differential:
In this case P1 >= P2 must apply.
Metering ranges from 5 mbar to 1000 mbar

Bidirectional differential:
In this case P1 > P2 or P2 > P1 may apply.
Metering ranges from ±5 mbar to 1000 mbar

Absolute pressure measurement with only one pressure port P1:
Metering ranges:
0..1000 mbar
760..1200 mbar (barometric)

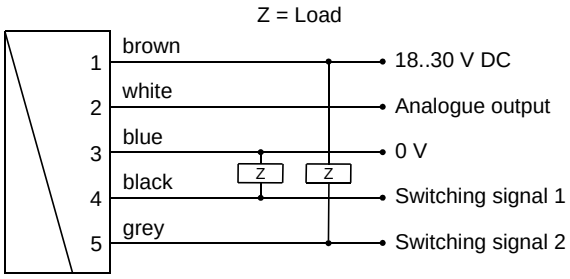
The display of the measured values takes place on a backlit graphical LCD display, including physical unit, which can be transposed on the device.
In addition, there is an analog output (20 mA or 10 V). The output range is programmable on the device.
Two integrated limit switches can be configured as a minimum or maximum switch.

Technical data

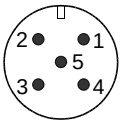
Sensor	Piezo-resistive pressure difference measuring bridge
Process connection	Tube Ø3 mm for hose connection
Medium being measured	Non-aggressive gases
Metering ranges and burst pressures	Relative differential: 0 .. 5 mbar > 0.35 bar 0 .. 10 mbar > 0.35 bar 0 .. 20 mbar > 0.5 bar 0 .. 50 mbar > 1 bar 0 .. 100 mbar > 1 bar 0 .. 200 mbar > 5 bar 0 .. 340 mbar > 5 bar 0 .. 1000 mbar > 5 bar Bidirectional differential: -5 .. +5 mbar > 0.35 bar -10 .. +10 mbar > 0.35 bar -20 .. +20 mbar > 0.5 bar -50 .. +50 mbar > 1 bar -100 .. +100 mbar > 1 bar -200 .. +200 mbar > 5 bar -340 .. +340 mbar > 5 bar -1000 .. +1000 mbar > 5 bar Absolute pressure sensors: 0 .. 1000 mbar > 5 bar 760 .. 1200 mbar > 5 bar Other metering ranges available on request
Measurement uncertainty	At 25 °C: Metering ranges up to 10 mbar: ±1.5% full scale value Metering ranges up to 100 mbar: ±1.0% full scale value other metering ranges : ±0.5% full scale value in the range -25 .. +85 °C: plus 0.5% full scale value on the above values
Long term stability	< 0.5% full scale value / year
Reaction time	32 ms
Medium temperature	-25..+85 °C
Ambient temperature	-20..+70 °C
Storage temperature	-20..+80 °C
Materials medium-contact	stainless steel Piezo-resistive pressure sensor elements on ceramic substrate
Materials, non-medium-contact	Housing: Stainless steel 1.4305 Glass: Mineral glass, hardened Magnet: Samarium Cobalt Ring and rear wall: POM Sensor support: FR4 screws: Steel, galvanised
Supply voltage	18..30 V DC
Power requirement	< 2 W

Analogue output	4 – 20 mA / max. load 500 Ω or 0 – 10 V / min. load 1 kΩ
Switching outputs	Transistor output "push-pull" (resistant to short circuits and polarity reversal) I_{out} = 100 mA max.
Hysteresis	adjustable, position of the hysteresis depends on minimum or maximum
Display	extendible graphic LCD display Temperature range -20..+70 °C, 32 x 16 pixels, background illumination, displays value and unit, flashing LED signal lamp with simultaneous message on the display
Electrical connection	for round plug connector M12x1, 5pole
Ingress protection	IP 65 (Front)
Weight	approx. 0.2 kg
Conformity	CE

Wiring



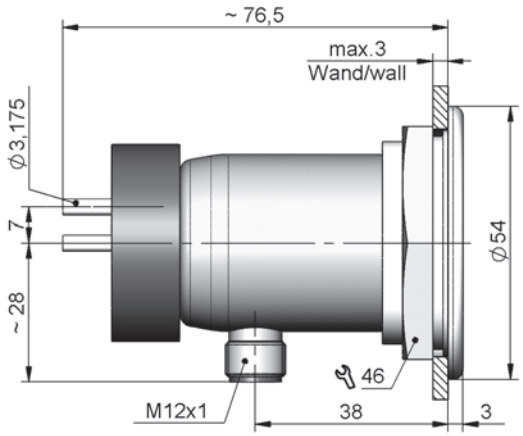
Connection example: PNP NPN



Plug connector M12x1

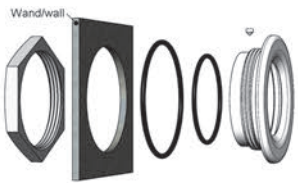
Before the electrical installation, it must be ensured that the supply voltage complies with the data sheet.
The use of shielded cabling is recommended.

Dimensions



Handling and operation

Assembly



Installation kit

Mounted device

The assembly in the control panel takes place using an installation kit (included in the scope of supply). An mounting hole (Ø 45 mm) in the control panel is required. The front ring is fit through the hole from the outside and secured from the inside by a nut (size 46). Then the OMNI device is inserted in the ring from the inside and fixed with a threaded pin mounted on the side. The seal between the front ring and control panel and the seal between the front ring and OMNI device are provided by O-rings.

The connection takes place by means of sliding hoses onto the 3 mm connection of the device.

Programming

Set to 1 = continue (STEP)
Set to 2 = modify (PROG)

Pos. 1 or 2 is selected with the supplied magnets. Operation is by dialogue with the display messages, which makes its use very simple.

The following actions are possible:

Display of the parameters, using position 1

Starting from the normal display (currently measured value with unit), if 1 (STEP) is repeatedly selected, then the display shows the following information in this order:

- Switching value S1 (switching point 1 in the selected unit)
- Switching characteristics of S1
  MIN = Monitoring of minimum value
  MAX = Monitoring of maximum value
- Hysteresis 1 (hysteresis value of S1 in the set unit)
- Switching value S2
- Switching characteristics of S2
- Hysteresis 2
- Code
  After entering the **code 111**, further parameters can be defined:
- Filter (settling time of the display and output)
- Physical unit (Units)
- Output: 0..20 mA or 4..20 mA
- 4/0 mA (measured value corresponding to 4/0 mA)

- 20 mA (measured value corresponding to 20 mA)

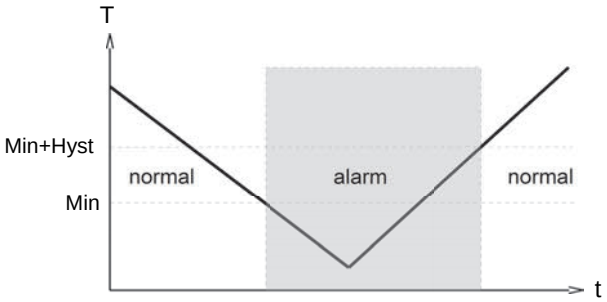
For models with a voltage output, replace 20 mA accordingly with 10 V.

Edit, using position 2

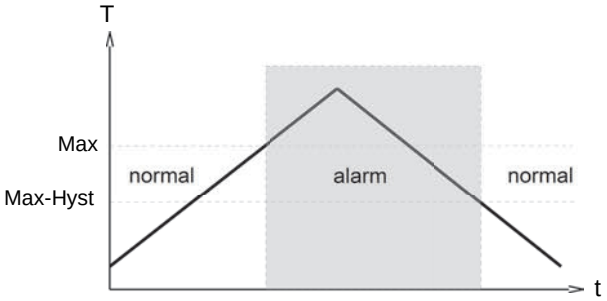
If the currently visible parameter is to be modified:
- Set magnet to Pos. 2 and a blinking cursor appears which shows the modifiable position
- By actuation of Pos. 2 repeatedly, the values are increased; with actuation of Pos. 1, the cursor switches to the next digit
- Leave the parameter by actuating Pos. 1 (until the cursor leaves the line) means adopting the change
- If there is no action within 30 seconds, the device returns to the normal display range without accepting the modification.

The limit switches S1 and S2 can be used for the monitoring of minima or maxima.

With a minimum-switch, falling below the limit value causes a switchover to the alarm state. Return to the normal state occurs when the limit value plus the set hysteresis is once more exceeded. With a maximum-switch, exceeding the limit value causes a



switchover to the alarm state. Return to the normal state occurs when the measured value once more falls below the limit value minus the set hysteresis.



The change to the alarm state is indicated by the integrated red LED and a cleartext in the display.
While in the normal state the switching outputs are at the level of the supply voltage; in the alarm state they are at 0 V, so that a wire break would also display as an alarm state at the signal receiver.

Overload display
Overload of the switching output is detected, indicated on the display ("Check S1 / S2"), and the switching output is

Simulation mode
To simplify commissioning, the sensor provides a simulation mode for the analog output. It is possible to create a programmable value in the range 0..21.0 mA (and/or 10 V) at the output (without modifying the process variable). This allows the wiring run between the sensor and the downstream electronics to be tested during commissioning. This is mode is accessed by means of **code 311**.

Factory settings
After modifying the configuration parameters, it is possible to reset them to the factory settings at any time **using code 989**.

Ordering code

	1.	2.	3.	4.
OMNI-DP2-				**S**

❍ = Option

1.	**Metering range**				
	0005	5 mbar	●	●	
	0010	10 mbar	●	●	
	0020	20 mbar	●	●	
	0050	50 mbar	●	●	
	0100	100 mbar	●	●	
	0200	200 mbar	●	●	
	0340	340 mbar	●	●	
	1000	1000 mbar	●	●	●
	1200	760 – 1200 mbar (barometric)			●
2.	**Sensor type**				
	D	Relative differential			
	B	Bidirectional differential			
	A	Absolute			
3.	**Analogue output**				
	I	Current output 0/4..20 mA			
	U ❍	Voltage output 0/2..10 V (available on request)			
4.	**Electrical connection**				
	S	for round plug connector M12x1, 5pole			

Accessories

- Round plug connector / cable (K / KB...)
- Device configurator ECI-1

Device Configurator ECI-1

- **Can be used on site for:**
  - **parameter modification**
  - **firmware update**
  - **adjustment of inputs and outputs**
- **Can be connected via USB**

Characteristics

The device configurator ECI-1 is an interface which allows the connection of microcontroller-managed HONSBERG sensors to the USB port of a computer.
Together with the Windows software "HONSBERG Device Configurator" it enables

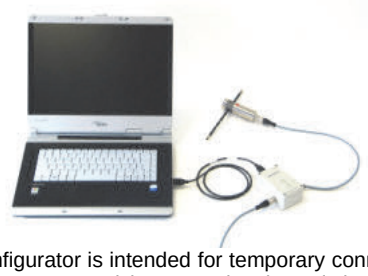
- the modification of all the sensor's configuration settings
- the reading of measured values
- the adjustment of inputs and outputs
- firmware updates

Technical data

Supply voltage	12..30 V DC (depending on the connected sensor) and via USB
Power consumption	< 1 W
Connection	
Sensor	cable bushing M12x1, 5-pole, straight length approx. 50 cm
Lead	device connector M12x1, 5-pole
USB	USB bushing type B
Operating temperature	0..50 °C
Storage temperature	-20..+80 °C
Dimensions of housing	98 mm (L) x 64 mm (W) x 38 mm (H)
Housing material	ABS
Ingress protection	IP 40

Handling and operation

Connection



The device configurator is intended for temporary connection to the application. It is connected between the the existing sensor lead and the sensor. Power supply is via the supply to the sensor and the computer's USB port. When inactive (no communication), the configurator behaves completely neutrally; all signals from the sensor remain available to the application. During communication between computer and sensor, the signal wirings are separated in the configurator, so that in this state the sensor's output signals are not available.

To connect 4-pole leads without a middle hole to the installed 5-pole device connector, adapter K04-05 is included. 4-pole leads with a middle hole can be used without an adapter.

Ordering code

Device configurator (for scope of delivery, see the diagram below)	**ECI-1**

Scope of delivery

1. Device configurator ECI-1
2. USB cable
3. Adapter K04-05
4. Plug KB05G
5. Cable K05PU-02SG
6. Carrying case

Incl. software

Accessories:

Mains connector 24 V DC (with fitted round plug connector, 5-pole, incl. international plug set)		**EPWR24-1**

Replacement parts:

M12x1 adapter 4- / 5-pole	**K04-05**
PUR cable, 5-pole, shielded with round plug connector M12x1	**K05PU-02SG**
Round plug connector M12x1, 5-pole (without cable)	**KB05G**

Accessories

Filter

Type ZV

Type ZE

The HONSBERG filters are offered for the protection of the devices from dirt or as independent components for coarse and fine filtration of liquids.

For more information, see additional product information.

Panel meter OMNI-TA

Primary Sensors
0..10 V
4..20 mA
Frequency

Converter with the same data as the OMNI in situ electronics; but as an external panel-mounting variant with IP 67 housing.

Round plug connector 4 / 5-pin

1	brown
2	white
3	blue
4	black

1	brown
2	white
3	blue
4	black
5	grey

Ordering code

Self-assembly

	1.	2.
KB		

1.	**Number of pins**	
	04	4-pin
	05	5-pin
2.	**Connector output**	
	G	straight
	W	elbow 90 °

Packaged

1.	2.		3.	4.	5.	6.
	PU	-				

1.	**Number of pins**	
	K	4-pin
	K05	5-pin
2.	**Cable material**	
	PU	PUR
3.	**Cable length**	
	02	2 m
	05	5 m
	10	10 m
4.	**Shielding**	
	N	shielding not applied to coupling
	S	shielding applied to coupling
5.	**Connector output**	
	G	straight
	W	elbow 90 °
6.	**Shielding**	
	A	shielded

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Product Overview

„Industrial Sensors and Instrumentation“

Temperature
Flow
Level / Filling Height
Analysis
Humidity
Pressure
Weighing Instruments

„Process Instrumentation “Hygienic Design“

GHM*adapt*
Temperature
Flow
Level / Filling Height
Analysis

“Laboratory Instrumentation“

„Industrial Electronics“

Displays / Controller
Transmitter / Signal conditioning
Isolating converters
Safety and Monitoring Devices
Power Electronics
Calibration and Testing

“Measuring Data Acquisition“

Data Logging and Monitoring
Test Bench Measurement Technology
Renewable Energies