Zertifiziertes QM-System
DIN EN ISO 9001
Zertifikat-Nr. 01017

Pressure Transmitter

measuring • monitoring • analysing

PAS

- Span: -1 ... 1.5 bar up to 0...600 bar
- t_{max}: +120 °C
- Process connection: ¼ NPT, ½ NPT, various diaphragm seals on request
- Material: 316L stainless steel, HAST-C, Tantalum
- Output: 4 ... 20 mA
- Sensor input: gauge- and absolute pressure
- Self-diagnostic function: sensor, memory A/D converter, power etc.
- Digital communication with HART® protocol
- ATEX-approval

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Description

The Kobold Pressure Transmitter model PAS is a micro processor-based high performance transmitter, which has a flexible pressure calibration and a flexible output signal. It has an automatic compensation of ambient temperature and process variables. A communication with the instrument and a configuration of various parameters is possible via the HART® protocol. All data of sensor is to be input, modified and stored in an EEPROM.

Features

Superior performance

- High reference accuracy:
  ±0.075 % of calibrated span
  (option: ±0.04 % of calibrated span)
- Long-term stability
- High rangeability (100 : 1)

Flexibility

- Data configuration with HART® configurator
- Measuring of gauge and absolute pressure

Reliability

- Continuous self-diagnostic function
- Automatic ambient temperature compensation
- EEPROM write protection
- Fail-mode process function

Transmitter Description

Electronics module

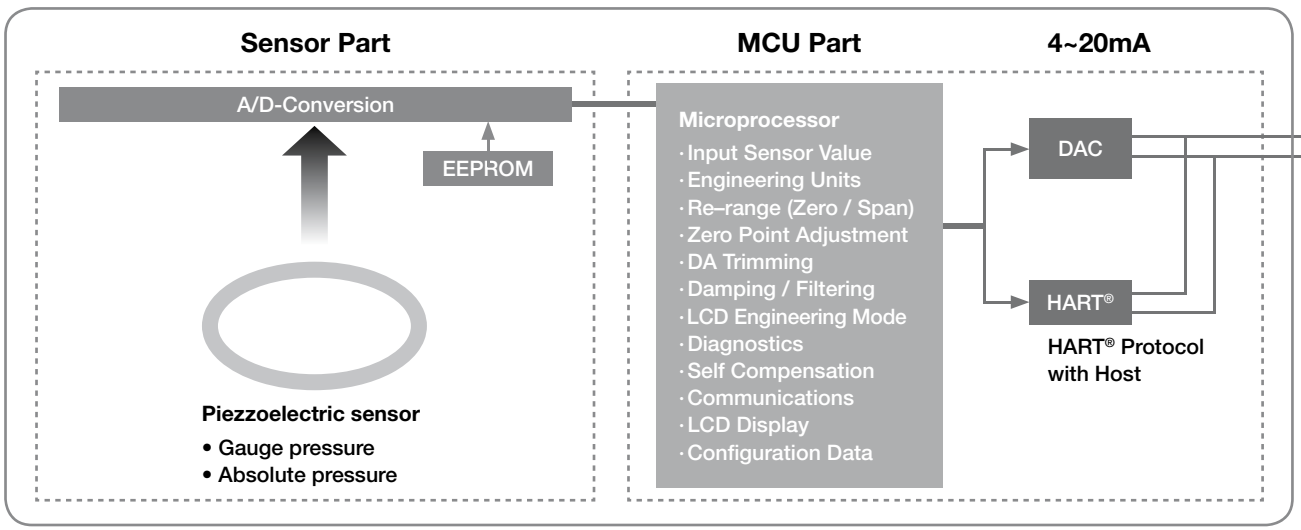
The Electronics module consists of a circuit board sealed in an enclosure. There are a MCU module, an analogue module, a LCD module and a terminal module in a transmitter.

The MCU module acquires the digital value from the analogue module and applies correction coefficients selected from EEPROM. The output section of the MCU module converts the digital signal to a 4…20 mA output. The MCU module communicates with the HART®-based configurator or control systems such as DCS (Distrubuted Control System). The Power section of MCU module has a DC-to-DC power conversion circuit and an input/output isola tion circuit. The LCD module plugs into the MCU module and displays the digital output in a user-configured unit.

Sensor inputs

The pressure transmitter model PAS is available as a piezo resistive pressure transmitter which measures gauge pressure as well as absolute pressure. The sensor module converts the resistance into a digital value. The MCU module calculates the process pressure based on this digital value.

Functional Block Diagram



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The sensor modules include the following features:

- 0.075 % accuracy
- The software of the transmitter compensates thermal effects, improving performance.
- Precise Input Compensation during operation is achieved with temperature and pressure correction coefficients that are characterized over the range of the transmitter and stored in the sensor module EEPROM memory.
- EEPROM stores sensor information and correction coefficients separately from MCU module, allowing for easy repair, reconfiguration and replacement.

Basic Setups

Following settings can be easily configured from any host that support the HART® protocol:

- Operational parameters
- 4 … 20mA points (zero/span)
- Engineering units
- Damping time: 0.25…60 sec.
- Tag: 8 alphanumeric characters
- Descriptor: 16 characters
- Message: 32 characters
- Date: day/month/year

Calibration and trimming

- Lower/Upper range (zero/span)
- Sensor zero trimming
- Zero point adjustment
- DAC output trimming
- Transfer function
- Self-compensation

Self-diagnosis and others

- CPU & Analogue Module Fault Detection
- Communication Error
- Fail-mode handling
- LCD indication
- Temperature measurement of sensor module

Process Connection via Diaphragm Seals

For the connection of the pressure transmitter model PAS to all different process connections diverse diaphragm seal versions are necessary. They can be connected to the pressure transmitter by direct mounting or via a capillary tube. Depending on the application different combinations of diaphragm seals, capillary tubes and fill fluids are possible. To clarify those possibilities, the special connections via diaphragm seals are always to be requested separately to the pressure transmitter.

Technical Details

Measuring principle:	piezo-resistive sensor
Measuring span:	-1…1.5 bar up to 0…600 bar (depending on instrument version), zero and span values can be set anywhere within the range limits span must be greater than or equal to the minimum span
Accuracy:	0.075 % of calibrated span (better accuracy on request)
Process temperature:	-30 °C…+120 °C
Ambient temperature:	-40 °C…+80 °C
Storage temperature:	-40 °C…+85 °C (without condensing)
Humidity limit:	5 %...98 % RH

Pressure limits (with silicone oil)*

Model G	-1...4 bar (for range 3) -1...40 bar (for range 4) 0...140 bar (for range 5) 0...700 bar (for range 6) 0...800 bar (for range 7)
Model A	0...7 bar (for range 4) 0...40 bar (for range 5) 0...70 bar (for range 6)

Wetted materials

Isolating diaphragms:	1.4404 (316L st. st.), Tantalum, HAST-C
Connection thread:	1.4401 (316 st. st.), HAST-C

Non-wetted materials

Fill Fluid:	silicone oil or inert fill
Electronics housing:	aluminum, flameproof (Ex d) and waterproof (IP 67), 316 L st. st. (option)
Cover O-ring:	Buna-N
Paint:	epoxy-polyester or polyurethane
Mounting bracket:	2-inch pipe, 1.4301 (304 st. st.), painted carbon steel with 1.4301 (304 st. st.), U-bolt
Nameplate:	1.4301 (304 st. st.)
Process connections:	¼…18 NPT female (via adapter) ½…14 NPT female
Mounting position:	upright
Display:	5 Digit LCD
Power supply:	12 … 45 V_{DC} -operation 17.5 … 45 V_{DC} -HART® communications
Maximum load:	250 Ω at 17.5 V_{DC} 550 Ω at 24 V_{DC} max. loop resistance = $\frac{(U - 12\ V_{DC})}{0.022\ A}$
Electrical connection:	½…14 NPT conduit with M4 screw terminals G ½ conduit with M4 screw terminals
Output:	two wire 4…20 mA, user-configurable for linear output, digital process value superimposed on 4…20 mA signal, available to any host that conforms to the HART® protocol
Update time:	0.12 seconds
Turn-On time:	3 seconds
Protection:	IP 67 for standard (code S)
Weight:	1,7 kg (ohne Zusatzoptionen) …2.83 kg (st.st. housing)
Failure mode:	fail high: current ≥ 21.1 mA fail low: current ≤ 3.78 mA
EMC conformity standards:	EMI (emission) - EN 50081-2:1993 EMS (immunity) - EN 50082-2:1995
ATEX Zulassung (Option):	Ⓔx II 2G Exd IIC T6...T4

* valid for stand-alone unit only without assembled diaphragm seals.

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Order Details (Example: **PAS- G EE 3 S 2 N S 0 0**)

Model	Version	Material	Messbereiche		
		diaphragm / other	code	measuring range	measuring span
			X[2]	special	special
			for PAS-G		
PAS- Pressure Transmitter	**G** = Gauge Pressure Transmitter **A** = Absolute Pressure Transmitter	**EE** = 316L st. st./316 st. steel **HE**[1] = HAST-C/316 st. steel **TE**[1] = Tantalum/316 st. steel **HH**[1] = HAST-C/HAST-C	**3**	-1...+1.5 bar	15 mbar…1.5 bar
			4	-1...+15 bar	150 mbar…15 bar
			5	0...50 bar	500 mbar…50 bar
			6	0...250 bar	2,5 bar…250 bar
			7	0...600 bar	6 bar…600 bar
			for PAS-A		
			4	0...2.5 bar	25 mbar…2.5 bar
			5	0...15 bar	150 mbar…15 bar
			6	0...25 bar	250 mbar…25 bar

Order Details continued:

Filling liquid	Process connection	Electrical connection	Approvals for hazardous applications	Manifold valve	Options
S = silicone **I** = inert filling liquid **X** = special filling liquid	**2** = ¼…18 NPT female (adapter) **4** = **½**…14 NPT female (standard) **X**[2] = special	**N** = ½…14 NPT epoxy-polyester painted aluminium **G** = G ½ mit epoxy-polyester painted aluminium **X**[2] = special	**S** = standard (waterproof IP 67) **F** = ATEX, flameproof, Ex d **E*** = ATEX, intrinsically safe, Ex i * option E in preparation	**0** = without **2** = manifold 2-ways (st. steel)	**0** = without **E** = oil free finish **M**[3] = housing in stainless steel **N**[4] = mounting of PAS onto diaphragm seal **Y**[2] = special

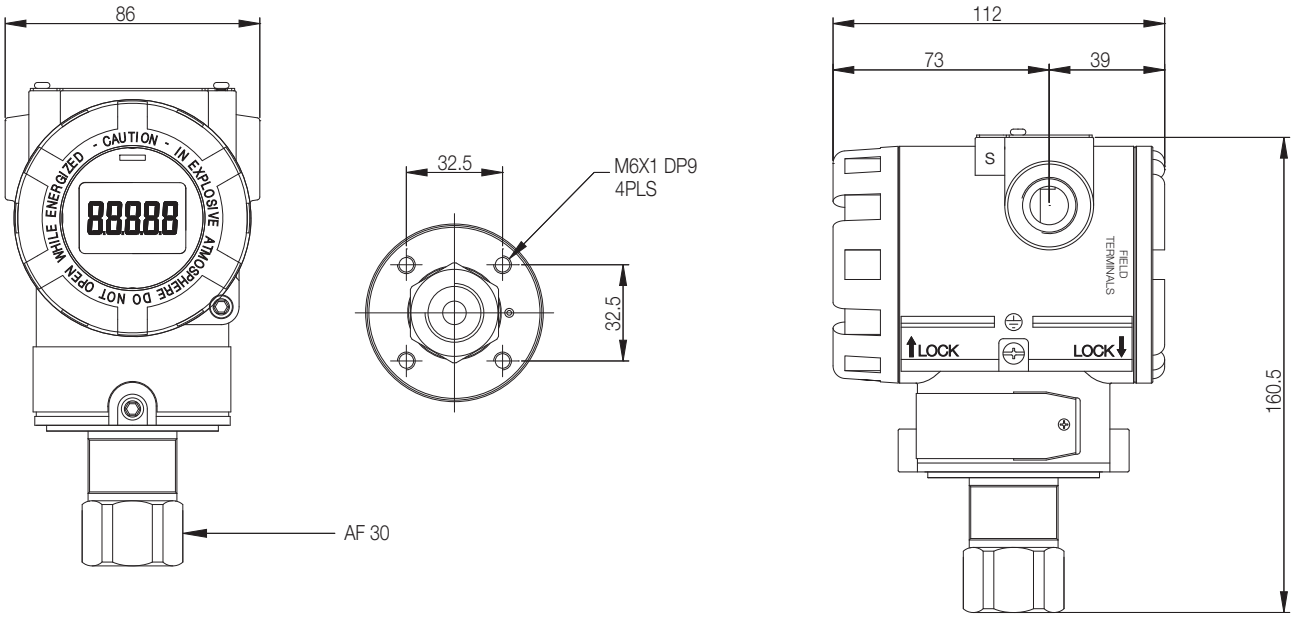
[1] on request
[2] Order code X and Y must be specified in writing
[3] Stainless steel housing in preparation
[4] Diaphragm seal model and application data to be specified in clear text. Application Index on page 17-18 to be filled out.
For summary of diaphragm seal models and possible ranges, see page 9 onwards. For dimensional details see DRM data sheet.

Order Details Mounting brackets

Description	Order number
Angle type bracket for PAD/PAS vertical pipe mounting for PAS vertical pipe mounting for PAD incl. U-Clamp for 2“ pipe mounting bracket and 2 x mounting nuts/ washers incl. 4 x mounting screws for PAS incl. 4 x mounting screws for PAD	**ZUB-PAD/PAS-K**
Flat type bracket for PAD/PAS horizontal pipe mounting for PAS vertical pipe mounting for PAD incl. U-Clamp for 2“ pipe mounting bracket and mounting nuts/ washers incl. 4 x mounting bolts and washers for PAS incl. 4 x mounting bolts for PAD	**ZUB-PAD/PAS-L**

Dimensions

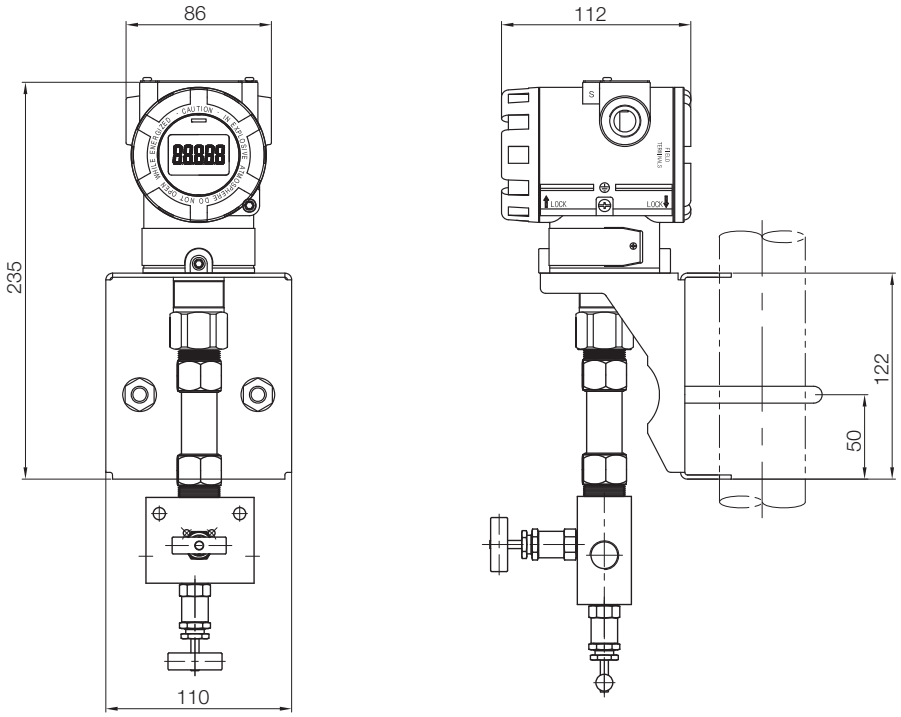
Standard model



PAS with 2-way manifold valve and angle type bracket (vertical mounted)

Technical Specifications (of 2-way manifold valve)

Material: 316SS
Connection & Size: ½" NPT (F)
Pressure rating: 6,000 psig at 38°C (≈410 bar)
Temperature range: -54°C ... +232°C



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Example of PAS direct assembled with diaphragm seal
(for dimensional details, see DRM data sheet)

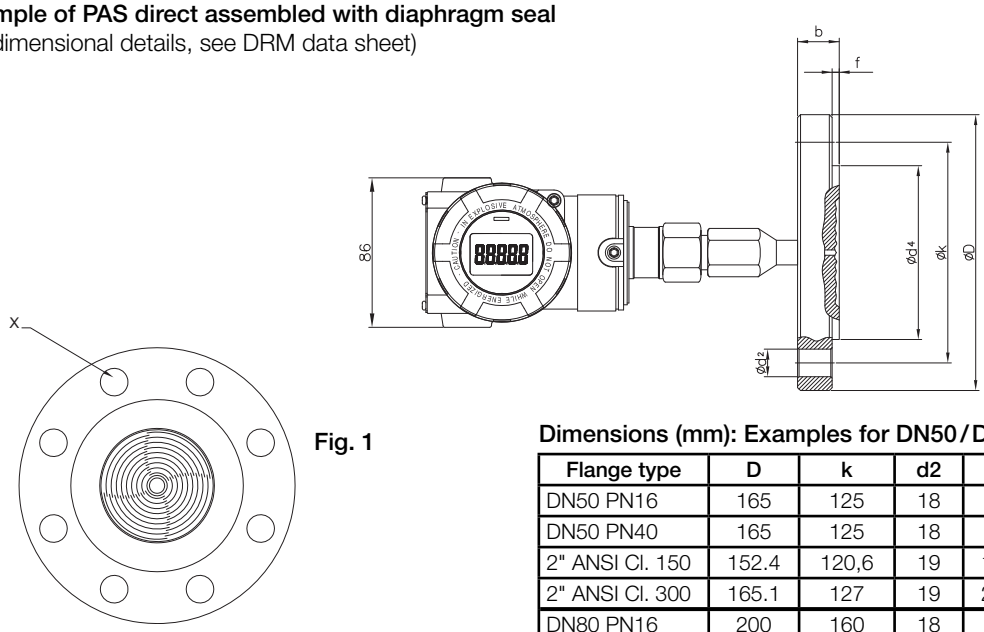


Fig. 1

Dimensions (mm): Examples for DN50 / DN80 / 2" ANSI / 3" ANSI

Flange type	D	k	d2	b	f	d4	X
DN50 PN16	165	125	18	18	2	102	4
DN50 PN40	165	125	18	20	2		4
2" ANSI Cl. 150	152.4	120,6	19	19.1	2	92	4
2" ANSI Cl. 300	165.1	127	19	22.3	2		8
DN80 PN16	200	160	18	20	2	138	8
DN80 PN40	200	160	18	24	2		8
3" ANSI Cl. 150	190.5	152.4	19	23.9	1.6	127	4
3" ANSI Cl. 300	209.5	168.3	22	28.4	1.6		8

Example of PAS remote assembed with diaphragm seal and capillary
(for dimensional details, see DRM data sheet)

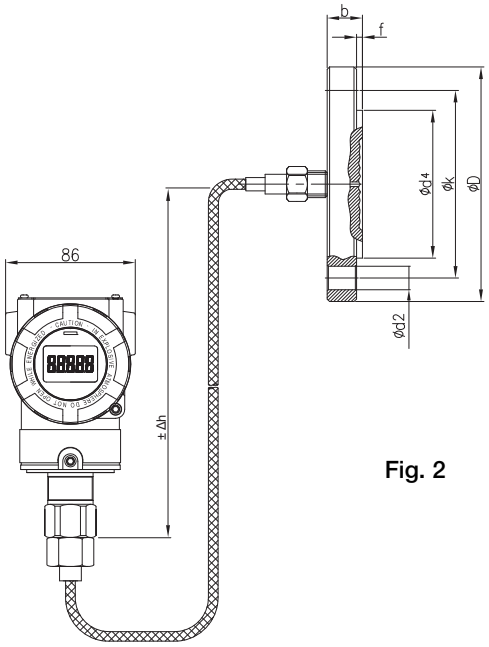
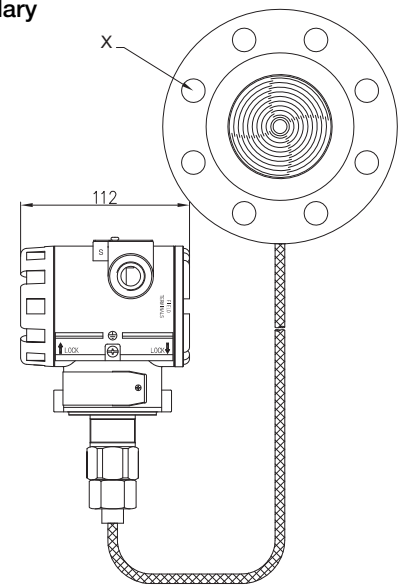


Fig. 2



Dimensions (mm): Examples for DN50 / DN80 / 2" ANSI / 3" ANSI

Flange type	D	k	d2	b	f	d4	X
DN50 PN16	165	125	18	18	2	102	4
DN50 PN40	165	125	18	20	2		4
2" ANSI Cl. 150	152.4	120.6	19	19.1	2	92	4
2" ANSI Cl. 300	165.1	127	19	22.3	2		8
DN80 PN16	200	160	18	20	2	138	8
DN80 PN40	200	160	18	24	2		8
3" ANSI Cl. 150	190.5	152.4	19	23.9	1.6	127	4
3" ANSI Cl. 300	209.5	168.,3	22	28.4	1.6		8

Example of PAS remote assembled with extended diaphragm seal and capillary
(for dimensional details, see DRM data sheet)

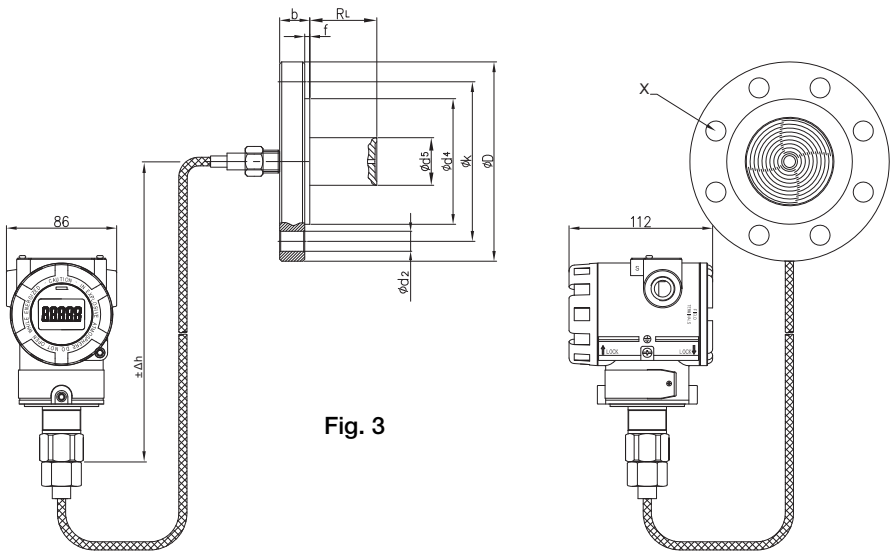


Fig. 3

Dimensions (mm): Examples for DN50 / DN 80 / 2" ANSI / 3" ANSI

Flange type	D	k	d2	b	f	d4	X	d5	RL
DN50 PN16	165	125	18	18	2	102	4	48	50 mm (2")/ 100 mm (4")/ 150 mm (6")/ 200 mm (8")/ (customer specified)
DN50 PN40	165	125	18	20	2		4	48	
2" ANSI Cl. 150	152.4	120.6	19	19.1	2	92	4	48	
2" ANSI Cl. 300	165.1	127	19	22.3	2		8	48	
DN80 PN16	200	160	18	20	2	138	8	76	
DN80 PN40	200	160	18	24	2		8	76	
3" ANSI Cl. 150	190.5	152.4	19	23.9	1.6	127	4	76	
3" ANSI Cl. 300	209.5	168.3	22	28.4	1.6		8	76	

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