x|act i

Precision Pressure Transmitter for Process Industry

- piezoresistive stainless steel sensor
  - diaphragm inside mounted or
  - flush welded
- nominal pressure ranges from 0 ... 350 mbar up to 0 ... 600 bar

Description

The **x**|act i is an intelligent pressure transmitter - precise and long term stable – for process industry. Possibility for configuration is given:

- either in situ via integrated display and operating module
- or by remote access via HART® interface

Among others offset, span and damping are configurable.

Applications

- **Stainless steel globe housing**
  for applications with high requirements on hygiene in **food industry and pharmacy**
  standard with display and operating module
- **Aluminium die cast case**
  in two chamber version for **process industry**
- **Stainless steel field housing**
  for extremely rough conditions in **chemical and heavy industry**
  both optional with display and operating module

Characteristics

- electrical versions:
  4...20 mA / 2-wire with **integrated display and operating module** optional as Ex-version
  4...20 mA / 2-wire with **HART®-communication** Ex-version optional with display and operating module
- turn-down 1:10
- accuracy according to IEC 60770: 0.1 % FSO
- thermal error 0.1 % FSO / 10 K
- **Ex-protection, zone 0**
- several process connections:
  with inch and NPT threads inside mounted diaphragm
  with Clamp, dairy pipe, Varivent®, flange etc. flush welded diaphragm

CE Ex HART

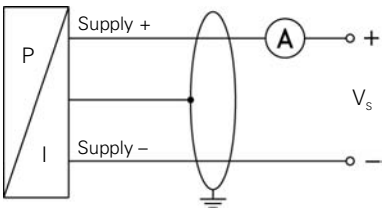
x|act i Precision Pressure Transmitter

Pressure ranges										
Nominal pressure gauge / absolute [1] [bar]	0.35	1	2	7	17	35	70	170	350	600
Permissible overpressure [bar]	1	3	6	20	60	100	140	340	600	1000
	[1] *Nominal pressure absolute from 1 bar*									
Vacuum ranges										
Nominal pressure gauge [bar]	-0.17 ... 0.17		-0.35 ... 0.35		-1 ... 1		-1 ... 2		-1 ... 7	
Permissible overpressure [bar]	0.5		1		3		6		20	
	On customer request we adjust the devices by software on the required pressure ranges (within the turn-down-possibility; gauge starting at 0.1 bar, abs. starting at 0.35 bar.									
Supply										
Standard	2-wire: 4 ... 20 mA / V_S = 10 ... 30 V_{DC}						Ex-protection: V_S = 10 ... 28 V_{DC}			
Option	2-wire: 4 ... 20 mA with HART® communication (option HART® communication is delivered in Ex-version as standard)									
In preparation	3-wire: 0 ... 10 V / V_S = 15 ... 36 V_{DC}									
Current consumption	signal output current: max. 25 mA									
Performance										
Accuracy [2]	turn-down ≤ 1:5 IEC 60770 [3]: ≤ ± 0.1 % FSO BFSL: ≤ ± 0.05 % FSO turn-down > 1:5 ≤ ± [0.1 + 0.015 x (nominal range / adjusted range)] % FSO									
Permissible load	R_{max} = [(V_S – $V_{S\,min}$) / 0.02] Ω load during HART® communication: R_{min} = 250 Ω									
Influence effects	supply: 0.05 % FSO / 10 V permissible load: 0.05 % FSO / kΩ									
Long term stability	≤ ± (0.1 x nominal range / adjusted range) % FSO / year									
Response time	200 ms – without consideration of electronic damping							measuring rate 5/sec		
Adjustability	electronic damping: 0 ... 100 sec; offset: 0 ... 90 % FSO; turn-down of span: max. 1:10 [4]									
	[2] *for nominal pressure ranges ≤ 0.35 bar the accuracy is calculated as follows: ≤ ± [0.1 + 0.02 x (nominal range / adjusted range)] % FSO* [3] *accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability)* [4] *span minimal 0.1 bar (gauge) or 0.35 bar (absolute); turn-down with 35 bar maximal 1:2*									
Thermal errors / Permissible temperatures										
Thermal error [5]	≤ ± (0.1 x nominal range / adjusted range) % FSO / 10 K in compensated range standard: -20 ... 80 °C optional for device with display: -40 ... 60 °C									
Permissible temperatures [6]	without display: medium: -40 ... 125 °C environment: -40 ... 80 °C storage: -40 ... 80 °C									
	with display: medium: -40 ... 125 °C environment: -20 ... 70 °C storage: -30 ... 80 °C									
	[5] *an optional cooling element can influence thermal effects for offset and span depending on installation position and filling conditions* [6] *for vacuum ranges and absolute pressure the max. medium temperature is 70 °C with optional cooling element its maximum permissible temperature is valid max. temperature of the medium for nominal pressure gauge > 0 bar: 150 °C for 30 minutes with a max. environmental temperature of 50 °C*									
Electrical protection										
Short-circuit protection	permanent									
Reverse polarity protection	no damage, but also no function									
Electromagnetic compatibility	emission and immunity according to EN 61326									
Mechanical stability										
Vibration	5 g RMS (20 ... 2000 Hz)									
Shock	100 g / 11 msec									
Electrical connections										
Stainless steel globe housing	standard: M12x1 4-pin (V_S+ = 1, V_S- = 3, ground = plug housing) on request: cable outlet (cable with air tube; cable colours according to DIN 47100)									
Aluminium die cast case	standard: terminal clamps in clamping chamber with cable gland M16x1.5 (IP 67, Ø = 5 ... 10 mm; clamp section: 2.5 mm²) on request: terminal clamps in clamping chamber with cable gland M20x1.5									
Stainless steel field housing	standard: terminal clamps in clamping chamber with cable gland M16x1.5 (IP 67, Ø-range 4 ... 11 mm; clamp section: 1.5 mm²) option: M12x1 4-pin (V_S+ = 1, V_S- = 3, ground = plug housing) on request: cable outlet (cable with air tube; cable colours according to DIN 47100)									

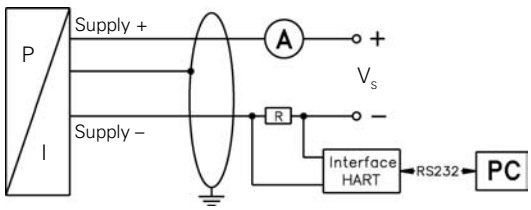
Materials / Filling fluids	
Pressure port	standard pressure ports and flange-version: stainless steel 1.4571 (316Ti) process connections (without flange): stainless steel 1.4435 (316L)
Housing	stainless steel 1.4301 (304) / aluminium die cast, powder-coated
Viewing glass	laminated safety glass
Seals (media wetted)	clamp, dairy pipe, Varivent®, flange: none inch thread with $P_N \leq 35$ bar: FKM / EPDM inch thread with $P_N > 35$ bar: NBR option: welded version for pressure ports according to EN 837 with pressure ranges P_N between 1 bar and 170 bar others on request; delivery of process seals on request
Diaphragm	standard: stainless steel 1.4435 (316L) options for process connections: Hastelloy®; Tantal [7]; others on request
Media wetted parts	pressure port, seals, diaphragm
Filling fluids	standard: silicon oil options for process connections: food compatible oil (with FDA approval); Halocarbon; others on request
	[7] possible for nominal pressure ranges from 1 bar *Hastelloy® is a trademark of Haynes International Inc.*
Miscellaneous	
Display	LC display, visible range 32.5 x 22.5 mm; 5-digit 7-segment main display, digit size 8 mm, range of indication ±9999; 8-digit 14-segment additional display, digit size 5 mm; 52-segement bargraph; accuracy 0.1% ± 1 Digit
Ingress protection	IP 67
Installation position	any (standard calibration in a vertical position with the pressure port connection down; differing installation position have to be specified in the order)
Weight	min. 400 g (depending on housing and mechanical connection)
Operational life	> 100 x 10^6 cycles
Explosion protection (optionally for 4 ... 20 mA / 2-wire)	
Approval AX12-**x**|act i	stainless steel ball and field housing: zone 0: II 1 G EEx ia IIC T4 aluminium die cast case: zone 0: II 1 G EEx ia IIB T4
Safety technical maximum values	V_i = 28 V, I_i = 93 mA, P_i = 660 mW
Permissible temperatures for environment	in zone 0: -20 ... 60 °C with p_{atm} 0.8 bar up to 1.1 bar in zone 1: -20 ... 70 °C
Connecting cables (by factory)	cable capacitance: signal line/shield also signal line/signal line: 150 pF/m cable inductance: signal line/shield also signal line/signal line: 1.0 µH/m

Wiring diagrams

2-wire-system (current)



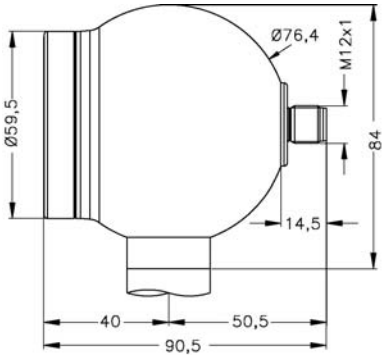
2-wire-system (current) HART®

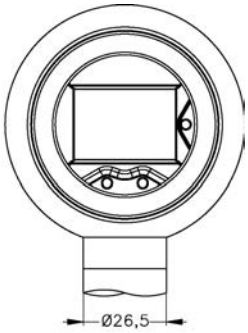


Pin configuration

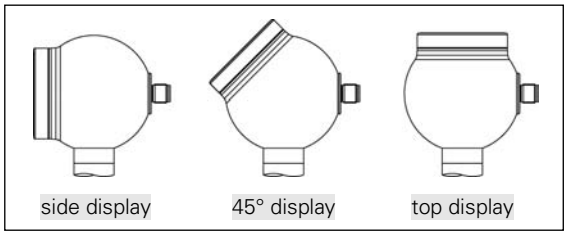
		stainless steel globe housing / field housing		stainless steel field housing	aluminium die cast case
Electrical connection		M12x1 (4-pin)	cable colour (DIN 47100)	terminal clamps	terminal clamps
2-wire-system	Supply + Supply – Test [8]	1 3 -	white brown -	1 2 -	2 4 3
	Ground	plug housing	yellow / green (shield)	6	1
		[8] by connecting a ampere meter between the terminals Supply + and Test, the output signal can be measured without disconnecting the power supply			

Stainless steel globe housing

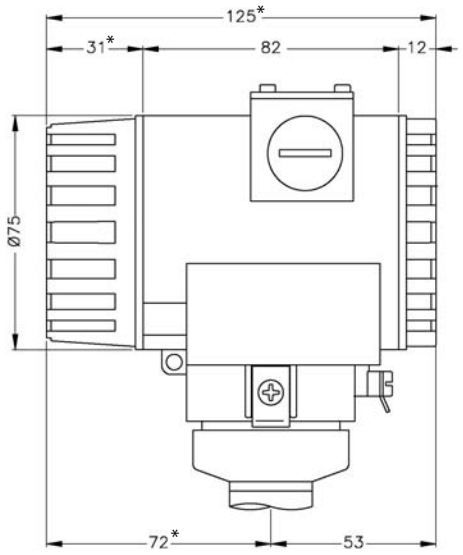


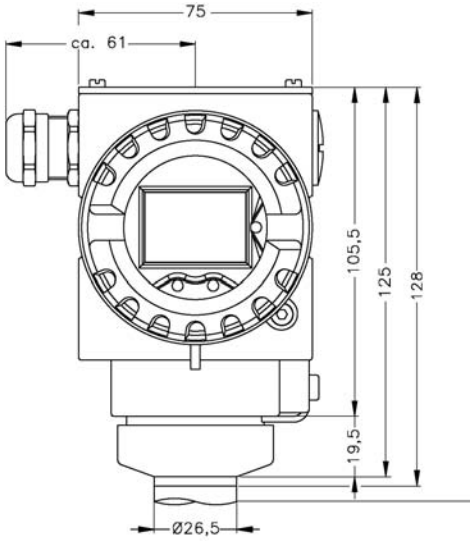


Designs



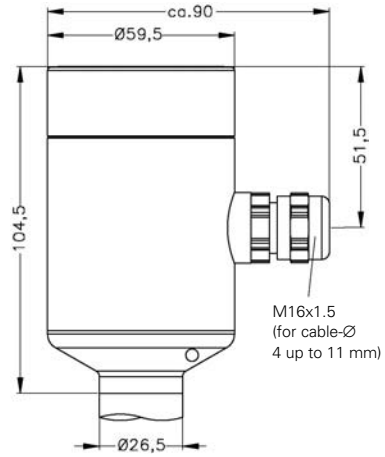
Aluminium die cast case



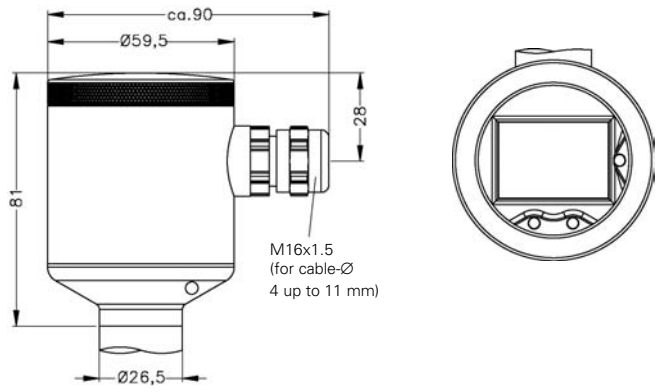


* without display and operating module marked dimensions decrease by 19 mm

Stainless steel field housing

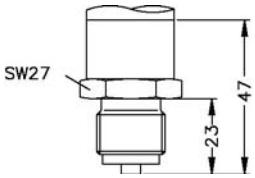


with display and operating module

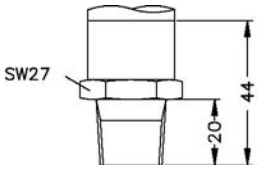


without display and operating module

Standard pressure ports



G1/2“ EN 837
M20x1,5

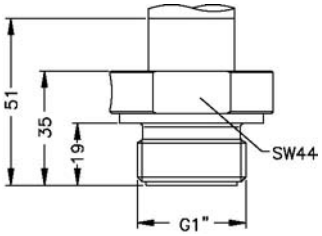


1/2“ NPT

⇨ with pressure ranges > 40 bar the length increases by 6 mm

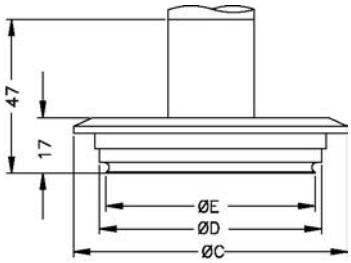
Process connections (up to 35 bar)

Inch thread (DIN 3852)



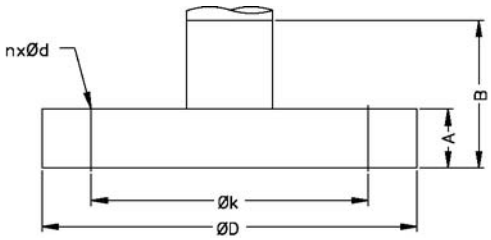
G1“ flush

Varivent®



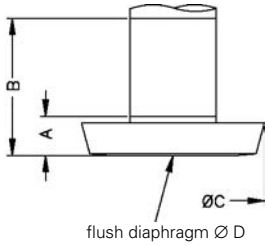
dimensions in mm	
size	DN 40/50
C	84
D	68
E	64

Flange [9] (DIN 2501)



dimensions in mm			
size	DN25/PN40	DN50/PN40	DN80/PN16
D	115	165	200
k	85	125	160
A	18	20	20
B	48	50	50
n	4	4	8
d	14	18	18

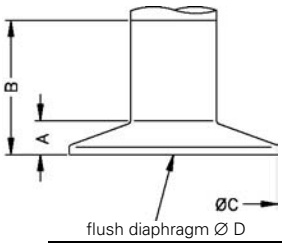
Dairy pipe [10] (DIN 11851)



flush diaphragm Ø D

dimensions in mm			
size	DN 25	DN 40	DN 50
A	14	23	23.5
B	44	23	23.5
C	44	56	68.5
D	24	32	45

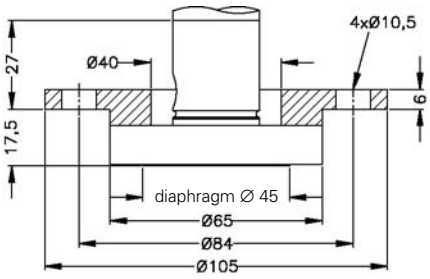
Clamp (ISO 2852)



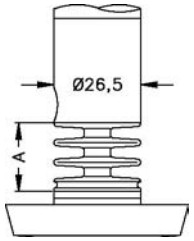
flush diaphragm Ø D

dimensions in mm			
size	1“	1 1/2“	2“
A	11	11	22
B	41	41	22
C	50.5	50.5	64
D	24	32	45

DRD [10]



Cooling element



dimensions in mm		
size	150° C	300° C
A	22	34

⇨ further process connections on request

[9] *DN80/PN16 possible for nominal pressure ranges up to 16 bar*
[10] *cup nut resp. mounting flange is included in the delivery (already pre-assembled)*

Operation

Configuration of the precision pressure transmitter **x**|act i is possible in situ via push buttons on the display module or by remote access via HART® interface.

Display and operating module

The indication of the measured value as well as the configuration of the individual parameters occurs through a menu via the LC display. The individual functions can be set with the help of three miniature push buttons located under the cap. Besides in the display a bargraph is shown, which indicates the current pressure input in per cent to the specified pressure range.

Among others following parameters could be configured:

- initial value
- terminal value
- damping
- pressure unit
- configuration of display
- password protection
- maximum pressure display
- minimum pressure display
- HART®-ID

HART® communication

Via HART®-protocol the possibility of setting initial and terminal value is given. In addition simple configuration of the parameters and transmitting of process measured values is offered. By HART®-communication, which can run via PC, notebook, HART®-communicator or process leading systems, measured values and parameters become transparent and are available on every step of the signal circuit.

Configuration software

For the simple and time-saving configuration of the **x**|act i BD SENSORS offers a special configuration software. The software also uses the HART® interface and is compatible with all Windows® systems (Windows 98 and higher).

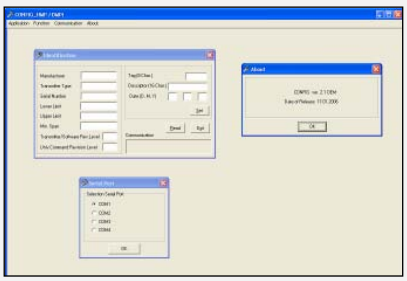
Displays

measured values

measured values pressure / temperature

maximum pressure display

configuration of damping



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Windows® is a registered trade mark of Microsoft Corporation

Ordering Code xlact i

xlact i ☐☐☐-☐☐☐☐-☐☐-☐-☐-☐☐☐-☐☐☐-☐-☐-☐-☐☐☐

Pressure	Code
gauge	5 1 1
absolute [1]	5 1 2

Input ⚠ [bar]	Code
0 ... 0,35 [1]	3 5 0 0
0 ... 1	1 0 0 1
0 ... 2	2 0 0 1
0 ... 7	7 0 0 1
0 ... 17	1 7 0 2
0 ... 35	3 5 0 2
0 ... 70	7 0 0 2
0 ... 170	1 7 0 3
0 ... 350	3 5 0 3
0 ... 600	6 0 0 3
-0,17 ... 0,17	S 1 7 0
-0,35 ... 0,35	S 3 5 0
-1 ... 1	S 1 0 2
-1 ... 2	V 2 0 2
-1 ... 7	V 7 0 2
customer	9 9 9 9

Design and el. Connection		Design code	El. connection code
Stainless steel globe housing			
side display	male plug M12x1 (4-pin)	K H	M 1 0
45° display	male plug M12x1 (4-pin)	K 4	M 1 0
top display	male plug M12x1 (4-pin)	K V	M 1 0
side display	Cable outlet incl. cable [2]	K H	T R 1
45° display	Cable outlet incl. cable [2]	K 4	T R 1
top display	Cable outlet incl. cable [2]	K V	T R 1
Stainless steel field housing			
with display	terminal clamp	F V	A K 0
without display	terminal clamp	F N	A K 0
Aluminium die cast case			
with display	terminal clamp	A 0	A K 0
without display	terminal clamp	A N	A K 0
	customer	9 9	9 9 9

Output	Code
4 ... 20 mA / 2-wire	1
Intrinsic safety 4 ... 20 mA / 2-wire	E
HART®-communication Intrinsic safety 4 ... 20 mA / 2-wire	I
customer	9

Accuracy	Code
0.1 %	1

Mechanical connection	Code
Standard pressure connections	
G1/2" EN 837	2 0 0
1/2" NPT	N 0 0
Process connections (up to 35 bar,	
G1" with flush welded diaphragm (DIN 3852)	Z 3 1
Clamp 1" (ISO 2852)	C 6 1
Clamp 1 1/2" (ISO 2852)	C 6 2
Clamp 2" (ISO 2852)	C 6 3
Dairy pipe DN 25 (DIN 11851) [3]	M 7 3
Dairy pipe DN 40 (DIN 11851) [3]	M 7 5
Dairy pipe DN 50 (DIN 11851) [3]	M 7 6
Varivent® DN 40/50	P 4 1
Flange DN 25 / PN 40 (DIN 2501)	F 2 0
Flange DN 50 / PN 40 (DIN 2501)	F 2 3
Flange DN 80 / PN 16 (DIN 2501) [4]	F 1 4
DRD Ø 65 mm [3]	D R D

Diaphragm	Code
Stainless steel 1.4435 (316L)	1
Hastelloy® [5]	H
Tantal [5, 6]	T

Seals		Code
standard pressure connections		
up to 40 bar:	FKM	1
up to 40 bar:	EPDM	3
over 40 bar:	NBR	5
EN 837:	without (welded version) [7]	2
Process connections		
	without	0

Filling Fluids	Code
Silicon oil	1
food compatible oil [5, 8]	2
Halocarbon [5]	C

Special version	Code
standard	0 0 0
with cooling element up to 150°C	1 5 0
with cooling element up to 300°C	2 0 0
special compensation -40 ... +60 °C	0 2 2

⚠ **if setting range shall be different from nominal range please specify in your order**

[1] absolute pressure possible from 1 bar
[2] standard: 2 m PUR cable with ventilation tube; different cable types and lengths deliverable
[3] cup nut resp. mounting flange is included in the delivery (already pre-assembled)
[4] DN80/PN16 possible for nominal pressure ranges up to 16 bar
[5] only possible with process connections
[6] tantal diaphragm possible with nominal pressure ranges from 1 bar
[7] welded version only with pressure ports according to EN 837; possible with pressure ranges between 1 bar and 170 bar
[8] Name of oil: Mobil DTE FM 32; Category Code: H1; NSF Registration No.: 130662

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This ordering code contains product specification; properties are not guaranteed. Subject to change without notice.