



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

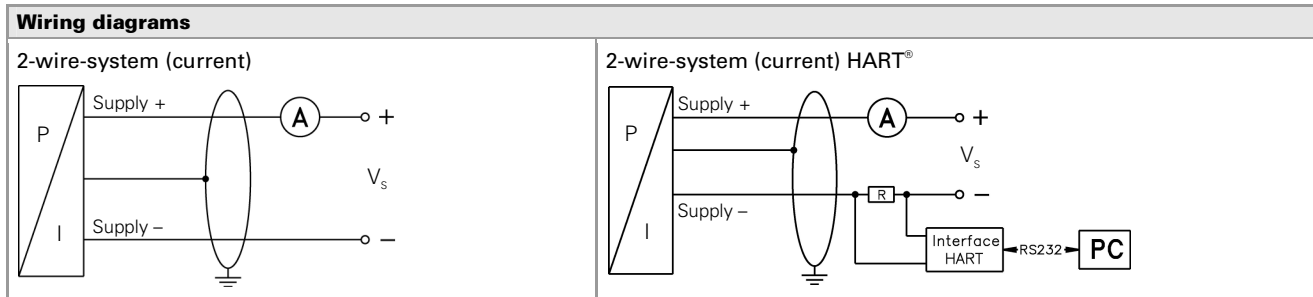
- ▶ electrical versions:
 - 4...20 mA / 2-wire with **integrated display and operating module**
optional as Ex-version
 - 4...20 mA / 2-wire with **HART®-communication**
Ex-version
optional with display and operating module
- ▶ turn-down 1:10
- ▶ accuracy according to IEC 60770: 0.1 % FSO
- ▶ thermal 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

x|act i
Precision Pressure Transmitter



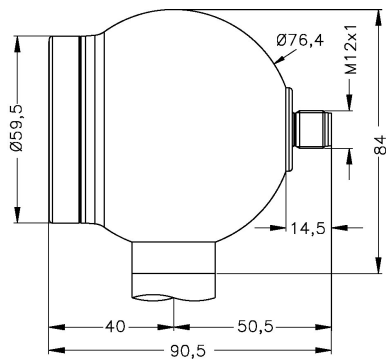
Pressure ranges										
Nominal pressure gauge / absolute ¹ [bar]	0.35	1	2	7	17	35	70	170	350	600
Permissible overpressure [bar]	1	3	6	20	60	100	140	340	600	1000
¹ Nominal pressure absolute from 1 bar										
Vacuum ranges										
Nominal pressure gauge [bar]	-0.17 ... 0.17		-0.35 ... 0.35		-1 ... 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 _{Smin}) / 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 mm ²) 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 mm ²) 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 [?] ; 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
	[?] 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-segment bargraph; accuracy $0.1\% \pm 1$ 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	$> 100 \times 10^6$ 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 μ H/m

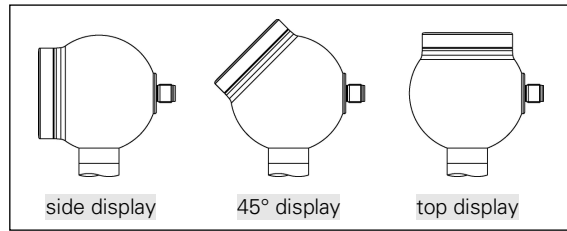


Pin configuration		stainless steel globe housing / field housing	stainless steel field housing	aluminium die cast case
Electrical connection		M12x1 (4-pin)	terminal clamps	terminal clamps
2-wire-system	Supply +	1	1	2
	Supply -	3	2	4
	Test ⁸	-	-	3
	Ground	plug housing	6	1
		⁸ by connecting a ampere meter between the terminals Supply + and Test, the output signal can be measured without disconnecting the power supply		

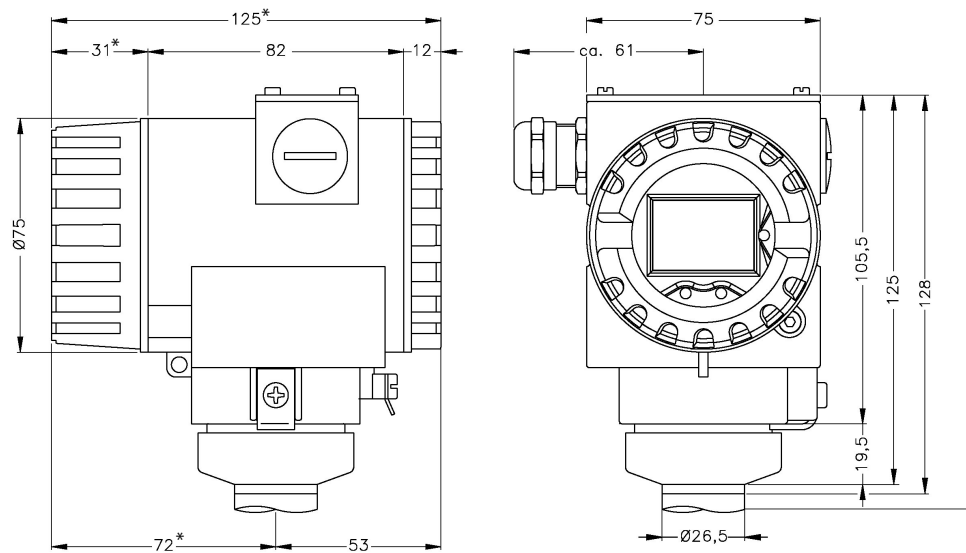
Stainless steel globe housing



Designs

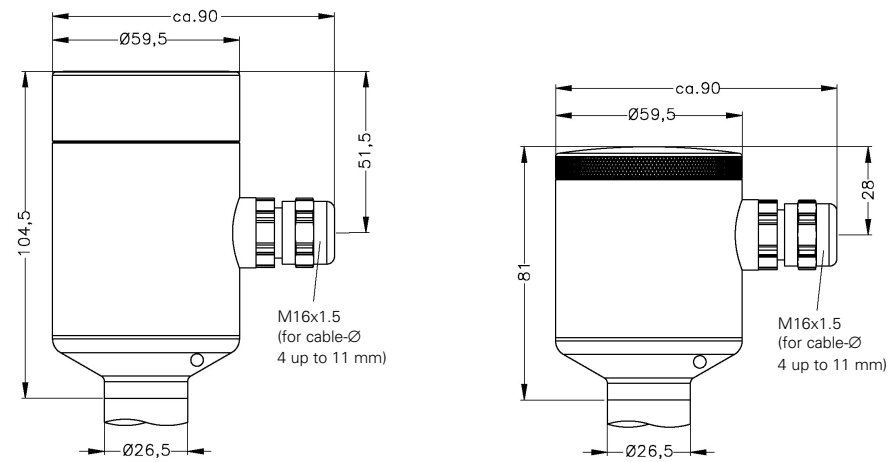


Aluminium die cast case



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

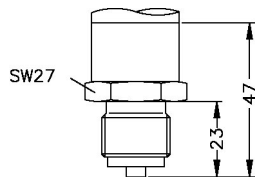
Stainless steel field housing



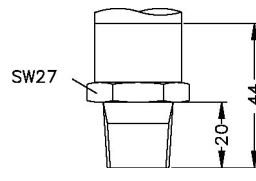
with display and operating module

without display and operating module

Standard pressure ports



G1/2" EN 837
M20x1,5

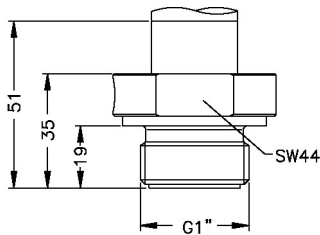


1/2" NPT

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

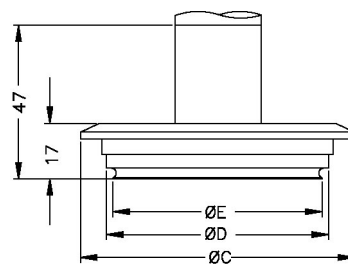
Process connections (up to 35 bar)

Inch thread (DIN 3852)



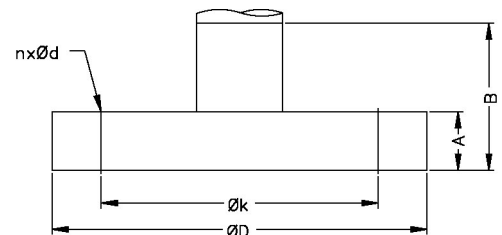
G1" flush

Varivent®



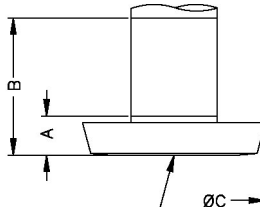
dimensions in mm	
size	DN 40/50
C	84
D	68
E	64

Flange⁹ (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

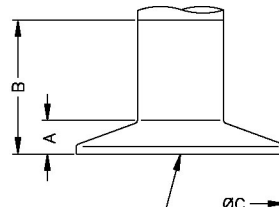
Dairy pipe¹⁰ (DIN 11851)



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

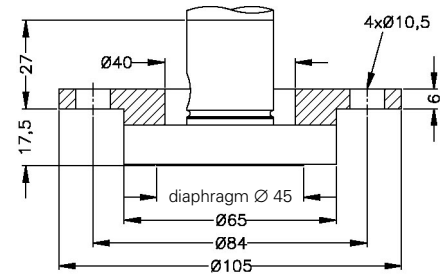
Clamp (ISO 2852)



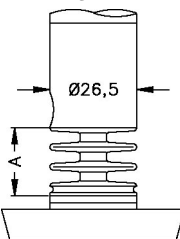
flush diaphragm Ø D

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

DRD¹⁰



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.

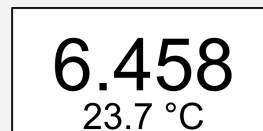
Configuration software

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

Displays



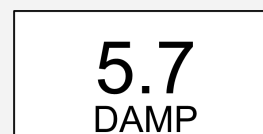
measured values



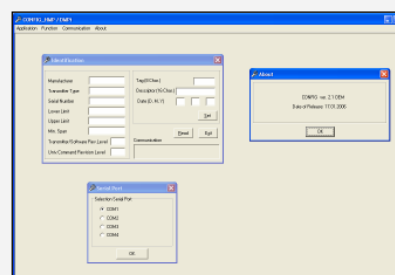
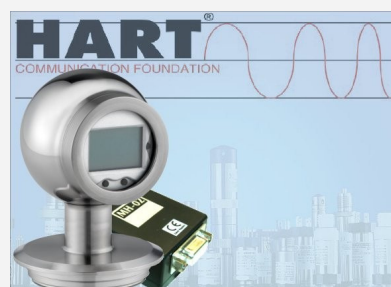
measured values pressure / temperature



maximum pressure display



configuration of damping



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