



# 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 ball 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

- ▶ 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

Characteristics



x|act i  
Precision Pressure Transmitter

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Pressure ranges											
Nominal pressure gauge / absolute <sup>1</sup> [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	
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).											
<sup>1</sup> Nominal pressure absolute from 1 bar											
Supply											
Standard	2-wire: 4 ... 20 mA / V <sub>s</sub> = 10 ... 30 V <sub>DC</sub>					Ex-protection: V <sub>s</sub> = 10 ... 28 V <sub>DC</sub>					
Option	2-wire: 4 ... 20 mA with HART <sup>®</sup> communication (option HART <sup>®</sup> communication is delivered in Ex-version as standard)										
In preparation	3-wire: 0 ... 10 V / V <sub>s</sub> = 15 ... 36 V <sub>DC</sub>										
Current consumption	signal output current: max. 25 mA										
Performance											
Accuracy <sup>2</sup>	turn-down ≤ 1:5 IEC 60770 <sup>3</sup> : ≤ ± 0.1 % FSO BFSL: ≤ ± 0.05 % FSO turn-down > 1:5 ≤ ± [0.1 + 0.015 x (nominal range / adjusted range)] % FSO										
Permissible load	R <sub>max</sub> = [(V <sub>s</sub> - V <sub>s min</sub> ) / 0.02] Ω load during HART <sup>®</sup> communication: R <sub>min</sub> = 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 <sup>4</sup>										
<sup>2</sup> for nominal pressure ranges ≤ 0.35 bar the accuracy is calculated as follows: ≤ ± [0.1 + 0.02 x (nominal range / adjusted range)] % FSO <sup>3</sup> accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability) <sup>4</sup> 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 <sup>5</sup>	≤ ± (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 <sup>6</sup>	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							
<sup>5</sup> an optional cooling element can influence thermal effects for offset and span depending on installation position and filling conditions <sup>6</sup> 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 ball housing	standard: M12x1 4-pin (V <sub>s+</sub> = 1, V <sub>s-</sub> = 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 <sup>2</sup> ) 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 <sup>2</sup> ) option: M12x1 4-pin (V <sub>s+</sub> = 1, V <sub>s-</sub> = 3, ground = plug housing) on request: cable outlet (cable with air tube; cable colours according to DIN 47100)										

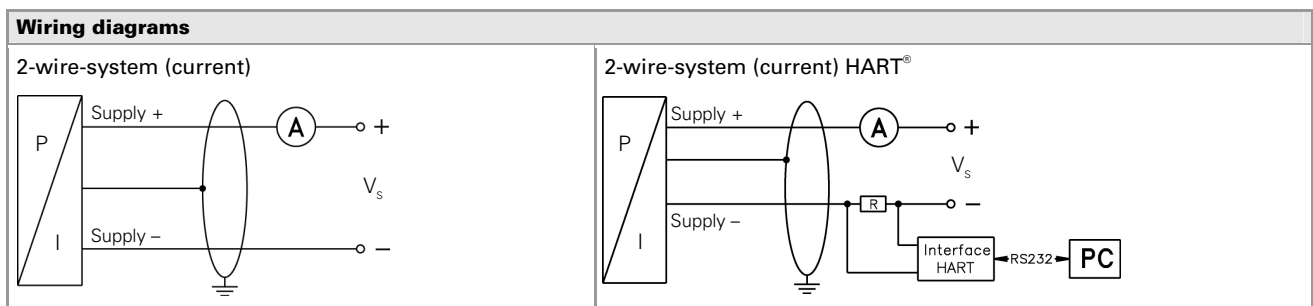


# x|act i

## Precision Pressure Transmitter

## Technical Data

Materials / Filling fluids	
Pressure port	standard pressure port: stainless steel 1.4571 (316Ti) process connections: 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 <sup>®</sup> ; Tantal <sup>7</sup> ; 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
	<sup>7</sup> possible for nominal pressure ranges from 1 bar Hastelloy <sup>®</sup> is a trademark of Haynes International Inc.
Miscellaneous	
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	
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



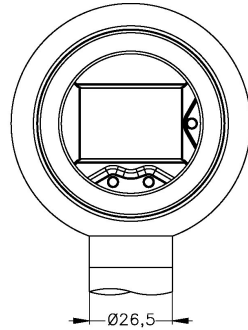
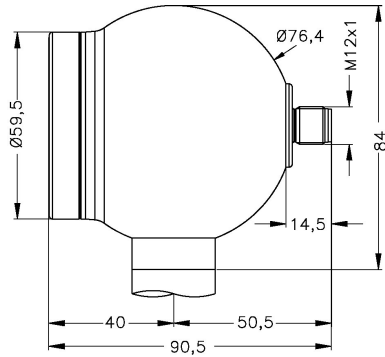
Pin configuration				
		stainless steel ball housing / field housing	stainless steel field housing	aluminium die cast case
Electrical connection		M12x1 (4-pin)	terminal clamps	terminal clamps
2-wire-system	Supply +	1	1	2
	Supply -	3	2	4
	Test <sup>8</sup>	-	-	3
	Ground	plug housing	6	1
<sup>8</sup> by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

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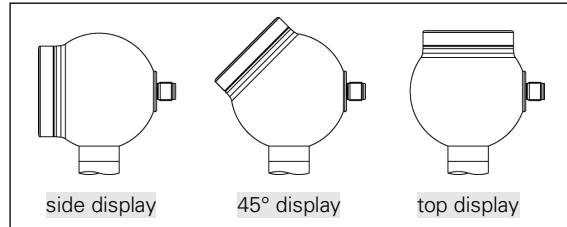
## Precision Pressure Transmitter

## Housing

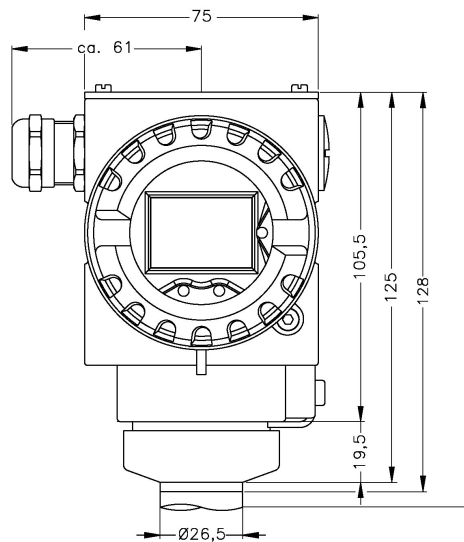
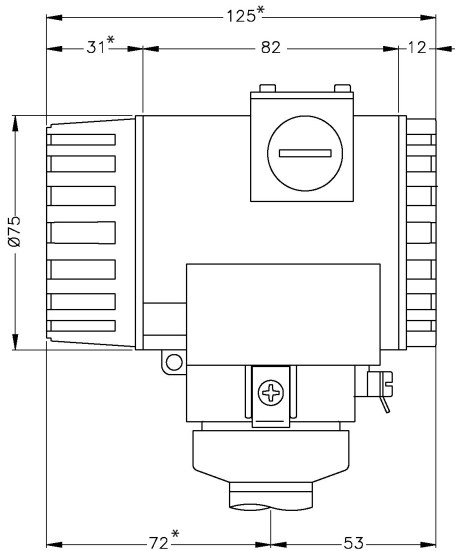
### Stainless steel ball housing



#### Designs

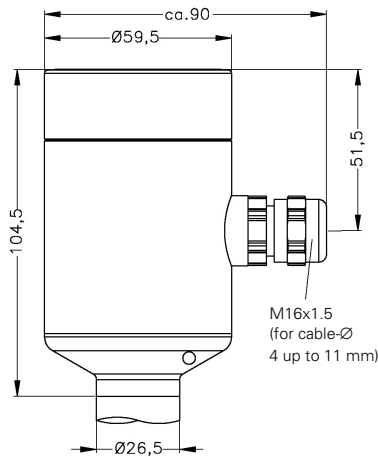


### Aluminium die cast case

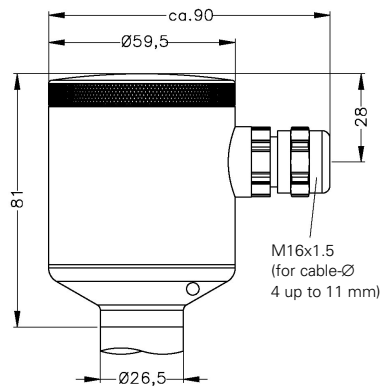


\* without display and operating module marked dimensions decrease by 19 mm

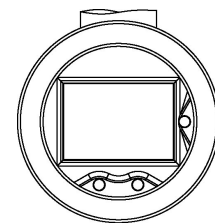
### Stainless steel field housing



with display and operating module



without display and operating module



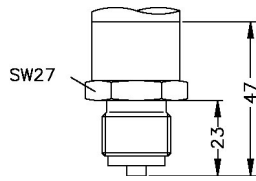


x|act i

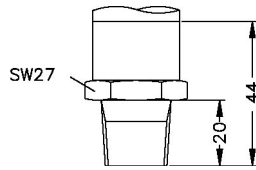
Precision Pressure Transmitter

Mechanical connections

**Standard pressure ports**



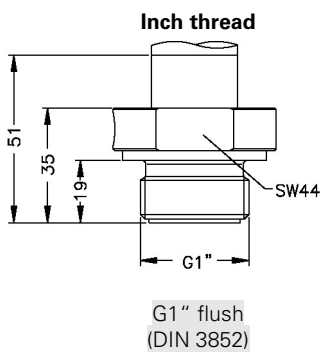
G1/2" EN 837  
M20x1,5



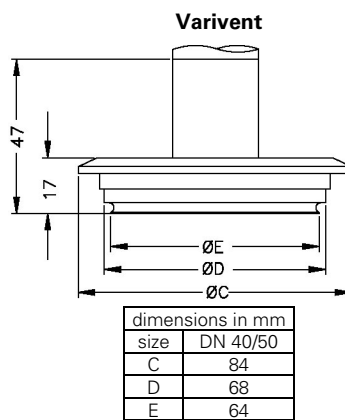
1/2" NPT

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

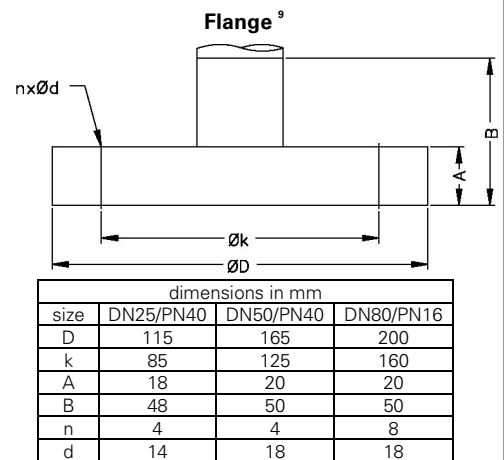
**Process connections (up to 35 bar)**



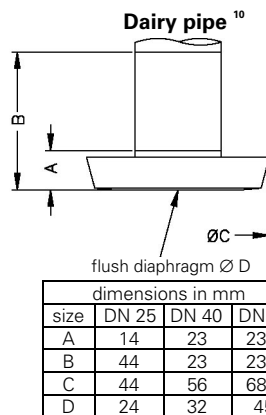
G1" flush  
(DIN 3852)



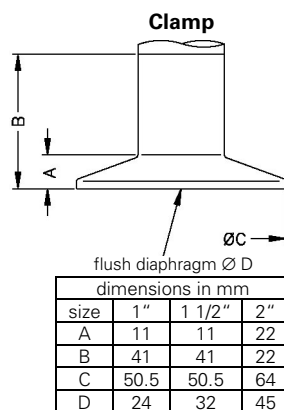
dimensions in mm	
size	DN 40/50
C	84
D	68
E	64



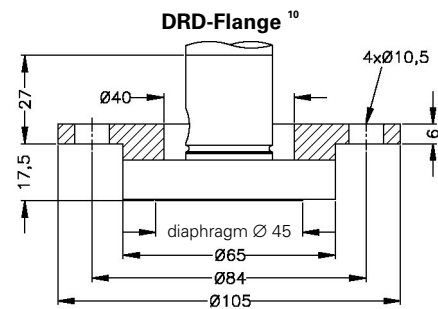
dimensions in mm			
size	DN25/PN40	DN50/PN40	DN80/PN16
D	115	165	200
k	85	125	160
A	18	20	20
B	48	50	50
n	4	4	8
d	14	18	18



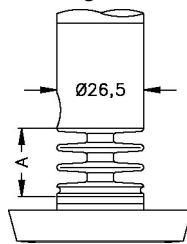
dimensions in mm			
size	DN 25	DN 40	DN 50
A	14	23	23.5
B	44	23	23.5
C	44	56	68.5
D	24	32	45



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



**Cooling element**



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

⇒ further process connections on request

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

### 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.

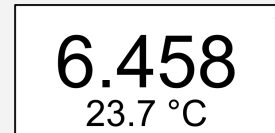
#### Configuration software

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

#### Displays



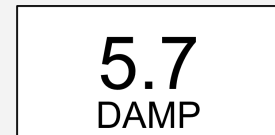
measured values



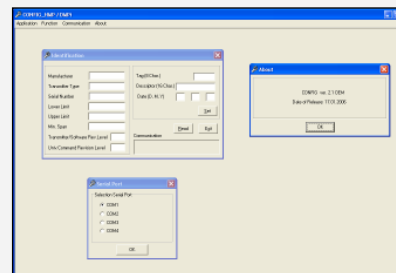
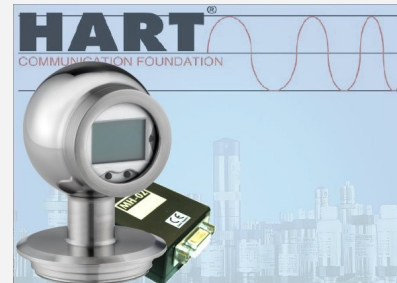
measured values pressure / temperature



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**

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

<b>Pressure</b>																				
	gauge	5	1	A																
	absolute <sup>1</sup>	5	1	B																
<b>Input <sup>Δ</sup></b>																				
	[bar]																			
	0 ... 0,35 <sup>1</sup>	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															
<b>Design and el. Connection</b>																				
<b>Stainless steel ball housing</b>																				
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							
<b>Stainless steel field housing</b>																				
with display	terminal clamp					F	V				A	K	0							
without display	terminal clamp					F	N				A	K	0							
<b>Aluminium die cast case</b>																				
with display	terminal clamp					A	0				A	K	0							
without display	terminal clamp					A	N				A	K	0							
	customer					9	9				9	9	9							
<b>Output</b>																				
	4 ... 20 mA / 2-wire										1									
	Intrinsic safety 4 ... 20 mA / 2-wire										E									
	HART <sup>®</sup> -communication										I									
	Intrinsic safety 4 ... 20 mA / 2-wire																			
	customer										9									
<b>Accuracy</b>																				
	0.1 %										1									
<b>Mechanical connection</b>																				
<b>Standard pressure connections</b>																				
	G1/2" EN 837										2	0	0							
	1/2" NPT										N	0	0							
<b>Process connections (up to 35 bar)</b>																				
	G1" DIN 3852 with flush										Z	3	1							
	welded diaphragm										C	6	1							
	Clamp 1"										C	6	2							
	Clamp 1 1/2"										C	6	3							
	Clamp 2"										C	6	3							
	Dairy pipe DN 25 <sup>2</sup>										M	7	3							
	Dairy pipe DN 40 <sup>2</sup>										M	7	5							
	Dairy pipe DN 50 <sup>2</sup>										M	7	6							
	Varivent DN 40/50										P	4	1							
	Flange (DIN) DN 25 / PN 40										F	2	0							
	Flange (DIN) DN 50 / PN 40										F	2	3							
	Flange (DIN) DN 80 / PN 16 <sup>3</sup>										F	1	4							
	DRD-Flansch Ø 65 mm <sup>2</sup>										D	R	D							
<b>Diaphragm</b>																				
	Stainless steel 1.4435 (316L)																			1
	Hastelloy <sup>®</sup> <sup>4</sup>																			H
	Tantal <sup>4,5</sup>																			T
<b>Seals</b>																				
<b>standard pressure connections</b>																				
up to 40 bar:	FKM												1							
up to 40 bar:	EPDM												3							
over 40 bar:	NBR												5							
EN 837:	without (welded version) <sup>6</sup>												2							
<b>Process connections</b>																				
	without												0							
<b>Filling Fluids</b>																				
	Silicon oil												1							
	food compatible oil <sup>4,7</sup>												2							
	Halocarbon <sup>4</sup>												C							
<b>Special version</b>																				
	standard																			0 0 0
	with cooling element up to 150°C																			1 5 0
	with cooling element up to 300°C																			3 0 0
	special compensation -40 ... +60 °C																			0 2 2

<sup>Δ</sup> if setting range shall be different from nominal range please specify in your order

<sup>1</sup> absolute pressure possible from 1 bar

<sup>2</sup> cup nut resp. mounting flange is included in the delivery (already pre-assembled)

<sup>3</sup> DN80/PN16 possible for nominal pressure ranges up to 16 bar

<sup>4</sup> only possible with process connections

<sup>5</sup> welded version only with pressure ports according to EN 837; not possible with pressure ranges ≤ 0.16 bar and > 25 bar

<sup>6</sup> tantal diaphragm possible with nominal pressure ranges from 1 bar

<sup>7</sup> Name of oil: Mobil DTE FM 32; Category Code: H1; NSF Registration No.: 130662

HART<sup>®</sup> is a registered trade mark of HART Communication Foundation

Hastelloy<sup>®</sup> is a trademark of Haynes International Inc.

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