

SATRON[®]

PREON™ VDU
Differential Pressure
Transmitter

www.satron.com

#LookCloser

SATRON VDU differential pressure transmitter belongs to V-series transmitters. SATRON VDU differential pressure transmitter is used from 0–4 kPa to 0–3 MPa ranges (static pressure + measuring range). It is a 2-wire transmitter with HART® standard communication. In pressure measuring applications SATRON VDU diff. pressure transmitters are used for measuring the pressure of clean, sedimenting, crystallizing and sticking materials. The transmitter's sensor is piezoresistive. The rangeability is 25:1.



TECHNICAL SPECIFICATIONS

Measuring range and span

See Selection Chart.

Zero and Span adjustment

Zero elevation: Calibrated span is freely selectable on the specified range. This can be made by using the local display option, HART® communicator or Si-Tool.

Damping

Time constant is continuously adjustable 0,01 to 60 s.

Temperature limits

Ambient: -30 to +80 °C

Process: -30 to +125 °C

0 to +200 °C (temp. code H)

Shipping and storage: -40 to +80 °C.

Operating temperature of display: 0 to +50 °C (does not affect operation of the transmitter)

Pressure limits

Min. and max. process pressure: See the appended tables.

Volumetric displacement:

< 0.5 mm³ /max. span (in both sensors)

Output 2-wire (2W), 4–20 mA, user selectable for linear, square root, inverted signal or the transfer function (16 points) specified by the user

Supply voltage and permissible load

See the load capacity diagram;

4–20 mA output: 12 – 35 VDC .

Humidity limits

0–100 % RH; freezing of condensed water not allowed in reference pressure channels.

PERFORMANCE SPECIFICATIONS

Tested in accordance with IEC 60770: Reference conditions, specified span, no range elevation, horizontal mounting; AISI316L diaphragm, silicone oil fill.

Accuracy

±0.2 % of calibrated span (span 1:1–7.5:1 /max.range).

On the measuring ranges 7.5:1–25:1:

$$\pm[0.02+0.024 \times \left(\frac{\text{max. span}}{\text{calibrated span}} \right)] \% \text{ of calibrated span}$$

Special accuracy types **BA** and **DA** :

(Temperature effect on +20 to +70 °C)

±0,15 % of calibrated span, only process connections **BA** and **DA** / temperature effect code S, for spans 1:1–7,5:1).

On the measuring ranges 7,5:1–25:1:

$$\pm[0.01+0.007 \times \left(\frac{\text{max. span}}{\text{calibrated span}} \right)] \% \text{ of calibrated span}$$

(incl. nonlinearity, hysteresis and repeatability)

Long-term stability

±0.2 % / max. span / year

Temperature effect

– on –20 to +80 °C range

Zero and span error:

±0.3 % of max. span.

Temperature effect

– on 0 °C to +200 °C range

(process temperature code H)

±2 % of max. span, VDU6

±4 % of max. span, VDU4, VDU5

Temperature effect

– on +20 °C to +70 °C,

process connections **BA** and **DA**

Zero and span error:

±0.15 % of max. span, code **S**

Mounting position effect

Zero error < 0.32 kPa, which can be calibrated out.

Vibration effect (IEC 68–2–6: FC):

±0.1 % of measuring range/

2g/10 to 2000 Hz

4g/10 to 100 Hz

Power supply

< ±0.01 % of calibrated span / volt.

Insulation test voltage

500 V rms 50 Hz

CONSTRUCTION AND CALIBRATION Materials

Diaphragm¹⁾: AISI316L (EN 1.4435),

Duplex (EN 1.4462), Hastelloy® C276 (EN

2.4819), CoNi-alloy, Titanium Gr2 (EN 3.7035), Nickel or Tantalum.

Coupling¹⁾: AISI316L (EN 1.4404),

Duplex (EN 1.4462), Hastelloy®C276 (EN

2.4819) or Titanium (EN 3.7035)

Other sensing element materials:

AISI316, AISI303.

Fill fluid

Silicone oil, food industry oil or inert fluid

Enclosure class IP66

Electronics housing:

AISI303/316

Seals: FPM

Nameplates: PE

Calibration

For customer-specified range with 1s. damping. (If range is not specified, transmitter is calibrated for maximum range.)

Process connections

See Selection Chart

Process couplings: See Selection Chart and installation instructions or technical specification: Couplings for Transmitters **G150**.

Electrical connections

M20x1.5, 1/2–NPT ; screw terminals for 0.5 to 2.5 mm²

wires and with

PLUG connector, connector type DIN

43650 model AF; Pg9 gland for

cable; wire gross-section 0.5 to 1.5 mm².

¹⁾ Parts in contact with process medium

Product Certifications

**Electro Magnetic Compatibility
EMC Directive 2014/30/EU**

**European Pressure Equipment
Directive (PED) 2014/68/EU**

All pressure transmitters :

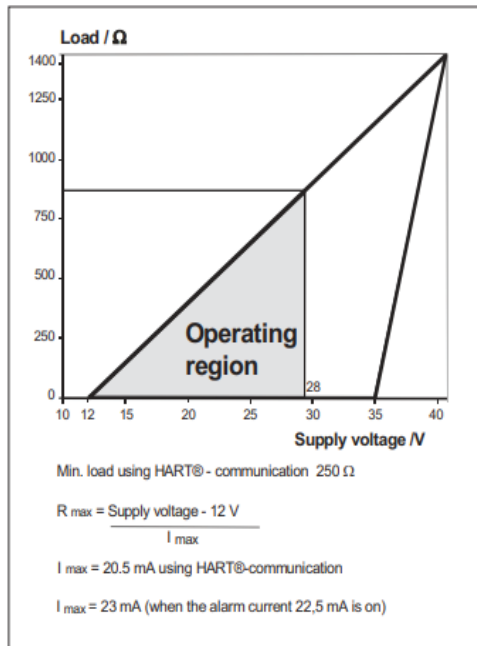
– Sound Engineering Practice

Min. process pressure

T _{proc} °C	Minimum pressure for different fill fluids (kPa, abs)	
	DC200 100 cSt	Inert oil
20	5	8
40	8	10
80	16	28
120	21	53

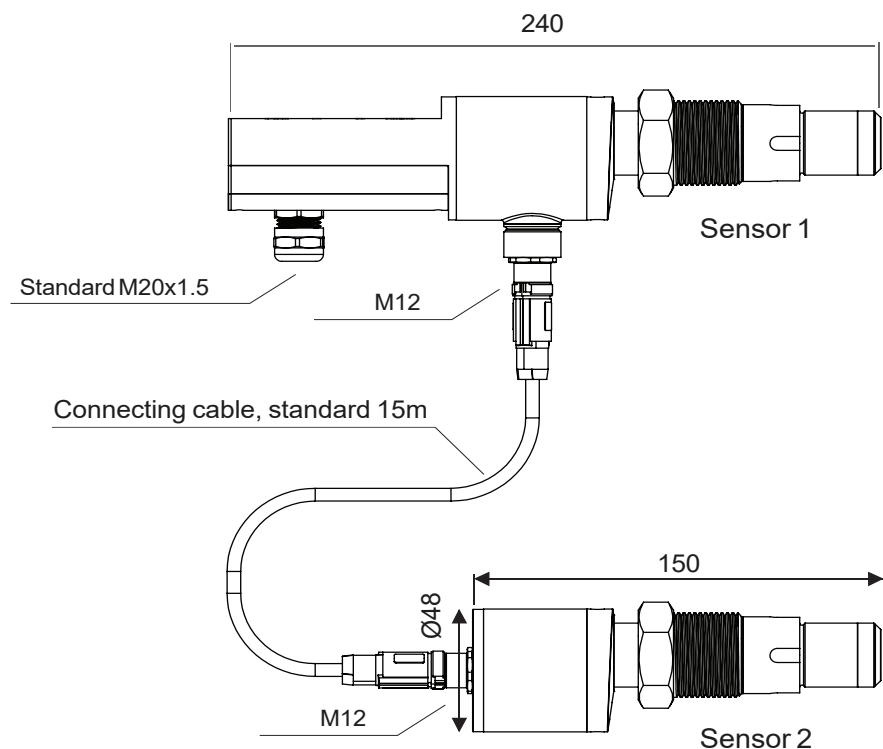
Pressure limits

Transmitter type	Max. overload pressure, MPa	Max. operating range (=static pressure + meas. range), kPa	Pressure class
VDU4	0.3	100	PN40
VDU4/5	0.3	250	PN40
VDU5	1.5	500	PN40
VDU5/6	1.5	1000	PN40
VDU6	7.5	3000	PN100

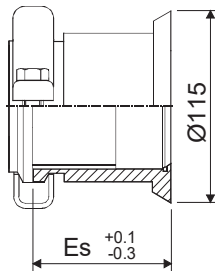
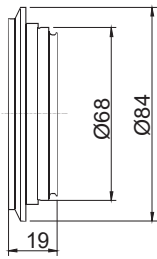
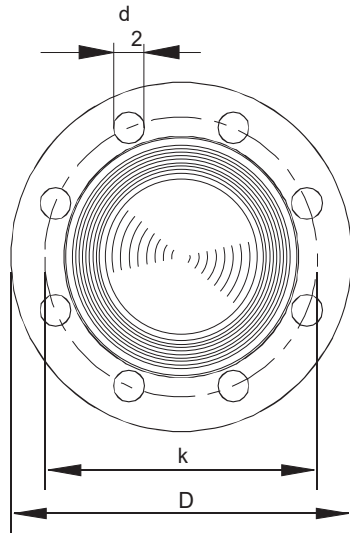


Weight		Weight / kg			
Mounting Type		Extension code			
		0	2	4	6
Flange	DN50	8.8	10	10.5	11
	DN80	13.5	15.8	16	16.8
SA (Sandvik)		-	8.2	10.6	12.8
Tx (Tri-Clamp)		2.4	-	-	-
PA (PMC 1")		1.8	-	-	-
BA, VA, WA		1.8	-	-	-
UA, VB, WB		2.6	-	-	-
G1...G4		2.5	-	-	-

Dimensions (mm)

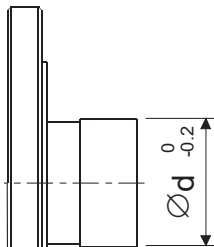


Dimensional drawings (dimensions in mm)



Process connection **UA**,
- Tuchenhagen DN50/40
(Varivent®)

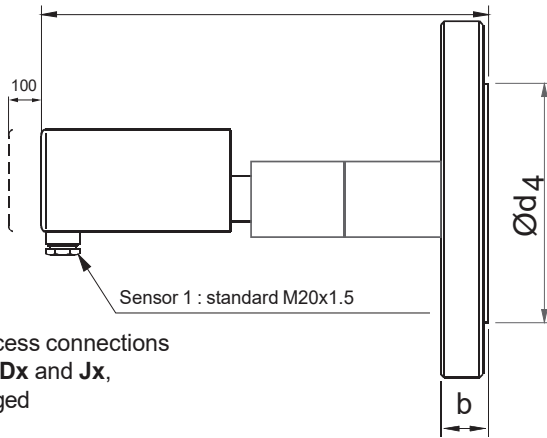
Process connection **SA**,
- Sandvik-clamp



Process connections
Ax, Dx and Jx,
- flange with extension

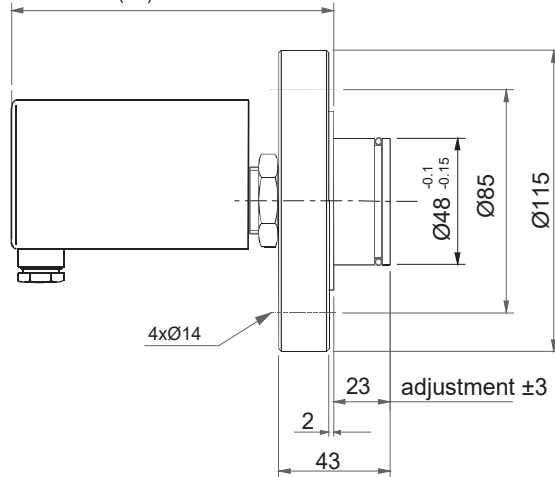
Code	E +0.4 -0.4	Es +0.3 -0.2
0	0	-
1	23	-
2	51	54,5
4	102	105
6	152	156

Sensor 1 (P1) 275
Sensor 2 (P2) 190



Process connections
Ax, Dx and Jx,
flanged

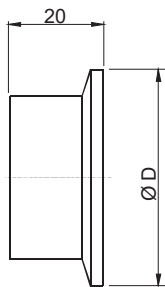
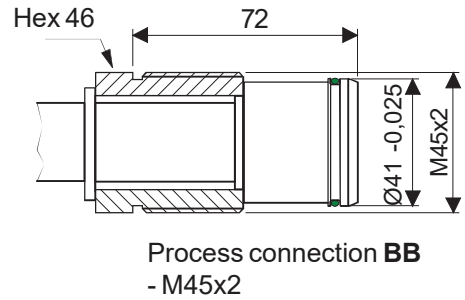
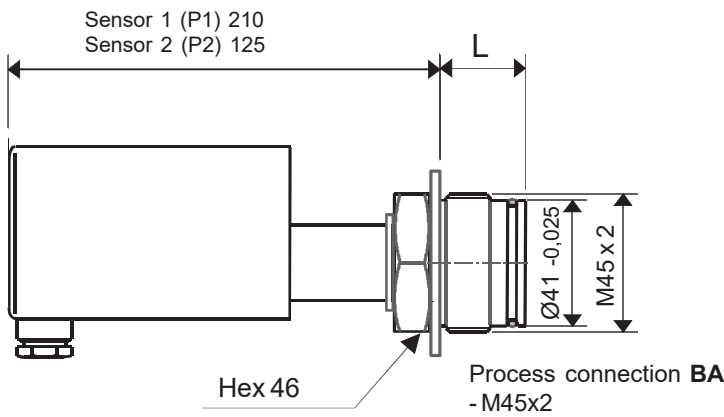
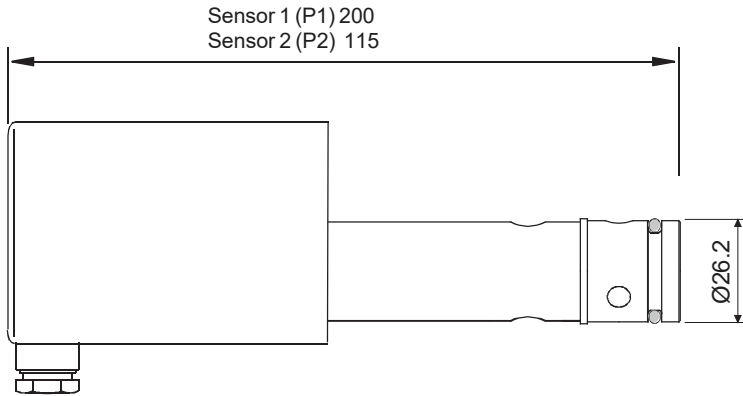
Sensor 1 (P1) 225
Sensor 2 (P2) 145



Process connection **DA**, DN25 PN40 flange with
extension, process temperature max. +125°C

FLANGE SIZE	Flange dimens.			Holes			Extens. Ød -0.2
	b	D	Ød ₄	pcs	d ₂	k	
ISO DN25 PN40	18	115	68	4	14	85	48
ISO DN50 PN40	20	165	102	4	18	125	51
ISO DN80 PN40	24	200	138	8	18	160	73
ISO DN100 PN40	24	235	162	8	22	190	73
ANSI 1" 150 lbs	15	108	51	4	16	79.4	-
ANSI 1" 300 lbs	18	124	51	4	20	88.9	-
ANSI 2" 150 lbs	23	152	92	4	20	120.6	51
ANSI 2" 300 lbs	25	165	92	8	20	127	51
ANSI 3" 150 lbs	26	191	127	4	20	152.4	73
ANSI 3" 300 lbs	31	210	127	8	23	168.3	73
ANSI 4" 150 lbs	26	229	157	8	20	190.5	73
ANSI 4" 300 lbs	34	254	157	8	23	200	73
JIS 10K-50	16	155	96	4	19	120	51
JIS 40K-50	26	165	105	8	19	130	51
JIS 10K-80	18	185	126	8	19	150	73
JIS 40K-80	32	210	140	8	23	170	73
JIS 10K-100	18	210	151	8	19	175	73
JIS 40K-100	36	250	165	8	25	205	73

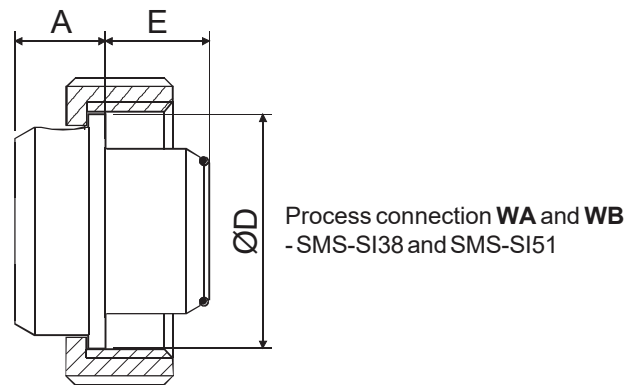
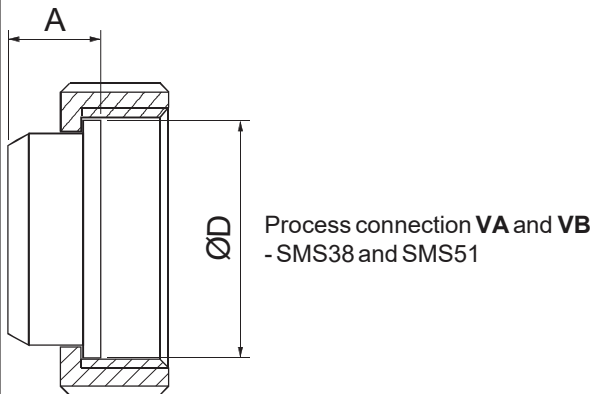
Dimensional drawings (dimensions in mm)



Process connections **TA , TB and TC**
- Tri-clamp DN38 ... 63,5

DN	ØD
38	50.5
51	64
63.5	77.5

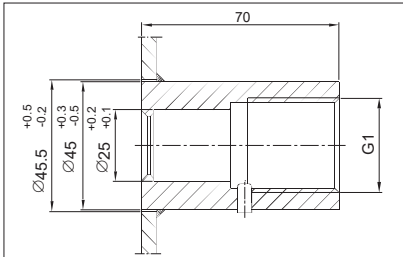
BA - extension code	L
0	28,5
2	51
3	72
4	102



Size	Dimensions		Thread
	ØD	A	
38	54	21	Rd 60 x 1/6
51	64	23	Rd 70 x 1/6

Size	Dimensions			Thread
	ØD	A	E	
SI38	54	21	24	Rd 60 x 1/6
SI51	64	23	27	Rd 70 x 1/6

Process couplings, G1 thread



Standard coupling

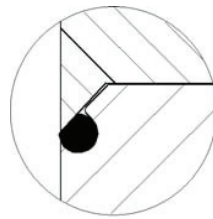
Material: AISI316 L, Titanium or Hastelloy C

Special couplings, e.g.:

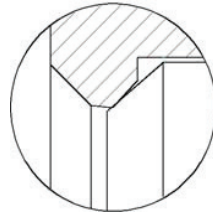
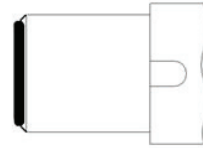
- G1 hygienic coupling, M548101
- G1/2A/G1 coupling, M546190
- G1/2A/G1 coupling with venting, M860280
- G1/2A/ G1 couplings with bracket:
 - G1/2A male, M546195
 - G1/2 female, M550393

Transmitter's process sealing G1 thread

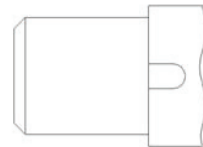
Three different options are available for the transmitter's process sealing:



AISI316L, AISI317L or Duplex diaphragm, o-ring **FPM** (Viton) (code **G5**)
EHEDG - certified

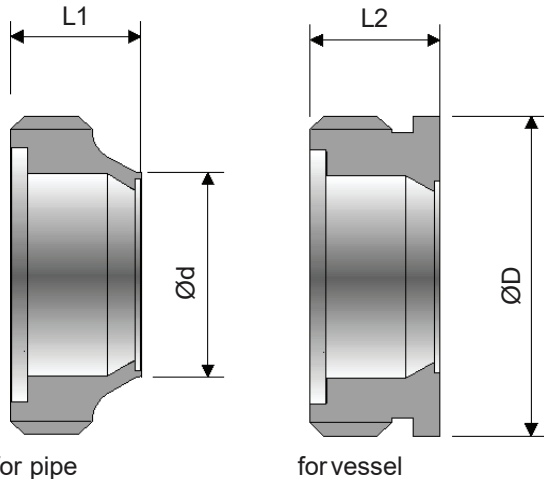


AISI316L, AISI317L or Duplex diaphragm, o-ring **EPDM** (code **G6**)
EHEDG - certified



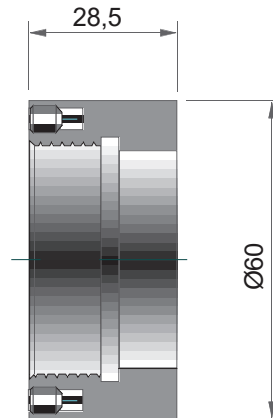
AISI316L, CoNi-, Duplex, Hastelloy C276 or Tantalum diaphragm, metal/metal taper sealing (diaphragm on sealing face) (code **G4**)

SMS-SI couplings :



Size	Dimensions				Thread
	L1	Ød	L2	ØD	
38	27	38,5	24	60	Rd 60 x 1/6
51	30	51	25	70	Rd 70 x 1/6

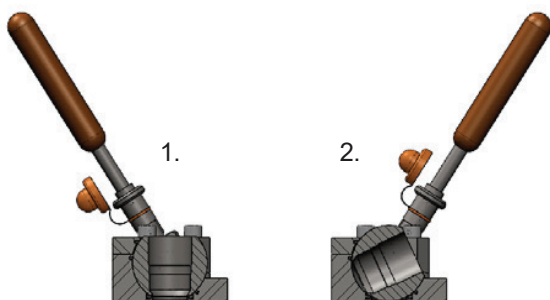
Coupling M45x2 with adjust, for process connection BA, order code M1050459



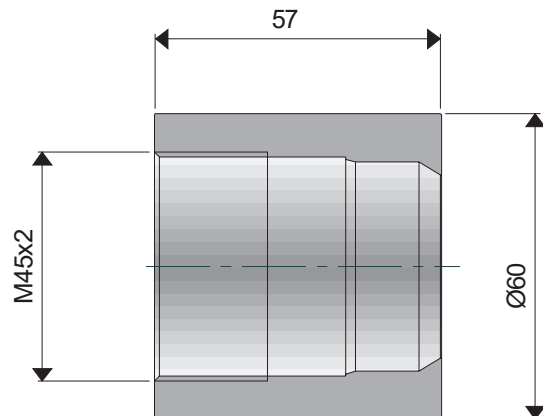
Passive BA working position:

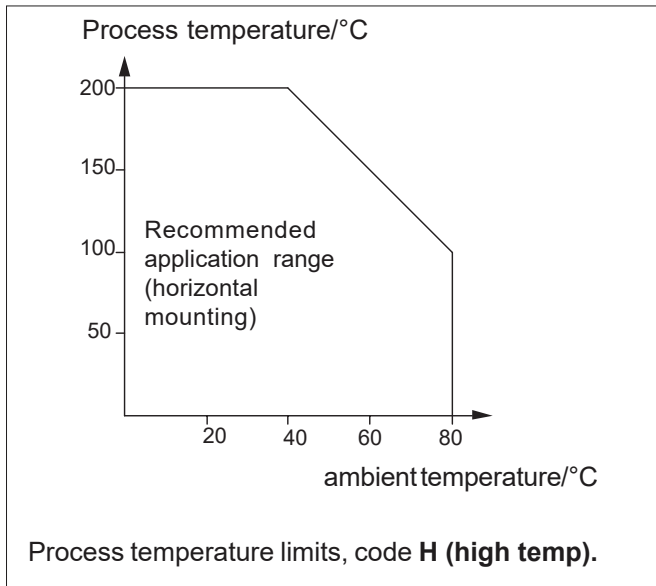
For process connections **BA3** and **BB**

1. Transmitter in measuring
2. Transmitter can be checked, changed, calibrated or the transmitter diaphragm can be flushed



Coupling BB M45x2, for process connection BB, order code M1050474 (Welding assistant, code M1050473)





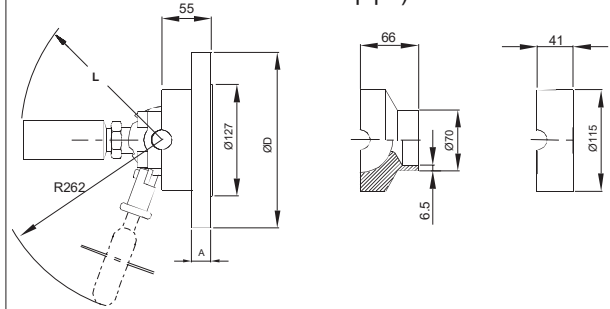
PASVE® mounting & service valve

All PASVE types are also available with pneumatic actuator, flushing and limit switches.

For process connections **G4, G5, G6**.

PASVE GF (NF)
(Flange type)

GP (NP)
(Welded on pipe)



Selection Chart

Adjustability	Span, min.	Span, max.	Measuring range
VDU4	4kPa (40 mbar)	100 kPa (1000 mbar)	-100...+100 kPa (-1000...1000 mbar)
VDU4/5	4kPa (40 mbar)	250 kPa (2500 mbar)	-100...+250 kPa (-1000...2500 mbar)
VDU5	26.5 kPa (265 mbar)	500 kPa (5000 mbar)	-100...+500 kPa (-1000...5000 mbar)
VDU5/6	26.5 kPa (265 mbar)	1 MPa (10 bar)	-0.1...+1 MPa (-1... 10 bar)
VDU6	0.145 MPa (1.45 bar)	3 MPa (30 bar)	-0.1...+3 MPa (-1...30 bar)

Output	S 4-20mA DC/HART® -protocol		
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Process Connections	AA	ANSI 1" 150 lbs ANSI B16-5	PA	PMC 1" PN40	
G4	G1 thread, metal/taper sealing	AB	ANSI 1" 300 lbs ANSI B16-5	SA	Sandvik DN70 PN64
G5	G1 thread, FPM O-ring sealing ¹⁾	AC	ANSI 2" 150 lbs ANSI B16-5	JA	JIS 10K 50 JIS B 2220
G6	G1 thread, EPDM O-ring sealing ¹⁾	AD	ANSI 2" 300 lbs ANSI B16-5	JB	JIS 40K 50 JIS B 2220
DA	DN25 PN40 ISO 2084-1974	AE	ANSI 3" 150 lbs ANSI B16-5	JC	JIS 10K 80 JIS B 2220
DB	DN50 PN40 ISO 2084-1974	AF	ANSI 3" 300 lbs ANSI B16-5	JD	JIS 40K 80 JIS B 2220
DC	DN80 PN40 ISO 2084-1974	AG	ANSI 4" 150 lbs ANSI B16-5	JE	JIS 10K 100 JIS B 2220
DD	DN100 PN40 ISOw 2084-1974	AH	ANSI 4" 300 lbs ANSI B16-5	JF	JIS 40K 100 JIS B 2220
BA	M45x2 PN160	TA	Tri-clamp DN38 PN40 ISO 2852	VA	SMS 38
BB	M45x2 PN160	TB	Tri-clamp DN51 PN40 ISO 2852	VB	SMS 51
		TC	Tri-clamp DN63.5 PN40 ISO 2852	WA	SMS-SI 38 with extension 24 mm
		UA	Tuchenhagen DN50/40 (Varivent®) PN40	WB	SMS-SI 51 with extension 27 mm

Extension length (mm) (Flanged conn.) (Sandvik conn.)			
0	0	-	(not proc.conn. SA)
1	23	-	(only proc.conn. DA1, DN25 PN40, max. +125 °C)
2	51	54.5	(not proc.conn. BB, VA, VB, WA, WB, Tx, UA, PA, DA, G1, G2, G4)
3	72	-	(only proc.conn. BA)
4	102	105	(not proc.conn. BB, VA, VB, WA, WB, Tx, UA, PA, DA, G1, G2, G4)
6	152	156	(not proc.conn. BB, VA, VB, WA, WB, Tx, UA, PA, DA, G1, G2, G4)

Wetted materials Diaphragm	Code	Material	Code	Material	Extension or other wetted parts	Code	Material	Diaphragm coating (specify only if coated)	Code	Material
	1	Nickel ^{2,4)}	5	Tantalum ⁴⁾		2	AISI316L	9	Gold/Rhodium	
	2	AISI316L	6	Titanium ³⁾		3	Hastelloy® C276	Y	Diamond	
	3	Hastelloy® C276	8	Duplex		8	Duplex			

Fill fluid	S	Silicone oil	G	Inert oil for oxygen use
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Housing type, master	N	Housing with junction box/terminal strip, with display, inlet M20x1,5
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Explosion proof	O	No explosion proof
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Process temperature	N	30 ... +125 °C	H	0 ... +200 °C ⁴⁾
	S	+20 ... +70 °C (only process connections BA and DA)		

Cable between sensors	1	PVC cable with M12 connector both end of cable, 15m
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Example code

VDU5 S G4 0 2 S N O N 1

Optional items - order separately

Special size of electrical inlet, for housing types M or N			
T1410026	1/2NPT	T1410024	Plug DIN 43650
T1410027	Pg13,5	T1410025	M12 4-pin

Documentation

Material certificates
MC1 Raw material certificate without appendixes, in accordance with SFS-EN 10204-2.1 (DIN 50049-2.1) standard
MC2 Raw material certificate for wetted parts, in accordance with SFS-EN 10204-2.2 (DIN 50049-2.2) standard
MC3 Raw material certificate for wetted parts, in accordance with SFS-EN 10204-3.1 B (DIN 50049-3.1 B) standard

- ¹⁾ EHEDG certified
- ²⁾ Only with flange
- ³⁾ Only with flange and G4
- ⁴⁾ Not with G5 and G6

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