



SATRON®

PREON™ VV Pressure and Level Transmitter

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#LookCloser

SATRON VV pressure and level transmitter belongs to V-transmitter family. The series V transmitters have both analog and smart properties. SATRON VV is used for 0–1.4 kPa...0–0.5 MPa ranges. It is a 2–wire transmitter with HART® standard communication. SATRON VV pressure transmitter is suitable for liquid level measurements in ground, rock and ships' tanks, and in open channels. SATRON VV pressure transmitter can be used in corrosive conditions and to measure contaminating liquids. Possible foam on the surface of the measured liquid does not disturb the measurement. SATRON VV does not require compressed air supply. The transmitter's sensor is piezoresistive. The rangeability is 50:1 for type VV5.



TECHNICAL SPECIFICATIONS

Measuring range and span

See Selection Chart.

Zero and Span adjustment

Zero elevation: Calibrated span is freely selectable on the specified range depending from the desired option. This can be made by using external control shafts (analog option), keyboard (display option) or HART®275/375 communicator.

Damping

Time constant is continuously adjustable 0.01 to 60 s.

Temperature limits

Process: –10 to +125 °C
Ambient: –30 to +80 °C
Shipping and storage: –40 to +80 °C.
Operating temperature of display: 0 to +50°C (does not affect operation of the transmitter)
Equipment cabinet is recommended for extremely demanding conditions.

Pressure limits

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

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 is not allowed in reference pressure channels.

PERFORMANCE SPECIFICATIONS

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

Accuracy

• ±0.05 % of calibrated span (span 1:1–5:1 / max. range).
On the measuring ranges 5:1– 50:1:

$$\pm[0.025 + 0.01 \times \left(\frac{\text{max. span}}{\text{calibrated span}} \right)] \% \text{ Of}$$

(incl. nonlinearity, hysteresis and repeatability)

Long-term stability

±0.1 % of max. span per 12 months

Temperature effect on compensated temperature ranges

Zero and span shift: ±0.15 % of max. span

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/
2 g/10 to 2000 Hz
4 g/10 to 100 Hz

Power supply effect

<±0.01 % of calibrated span per volt.

Insulation test voltage

500 V rms 50 Hz.

CONSTRUCTION AND CALIBRATION

Materials

Diaphragm¹⁾: AISI316L (EN 1.4435), Hastelloy® 276 (EN 2.4819) or Tantalum.
Sensing element 1): AISI316, PTFE/ AISI316 or PVC
Other materials: SIS2343

¹⁾ Parts in contact with process medium

Fill fluid

Silicone oil or inert fluid.

Housing with PLUG connector, code H

Housing: AISI316/303
Seals: FPM

TEST jacks: MS358Sn/PVDF, protected with silicone rubber shield.
PLUG connector: PA6–GF30 jacket, Silicone rubber seal, AISI316 retaining screw.

Housing with junction box/terminal strip, codes M and N

Housing: AISI303/316
Seals: FPM, EPDM
Nameplates: PE

Connection hose between sensing element and housing

Codes L and K :
PTFE hose with AISI316 braiding

Equipment cabinet Rittal AE1380, Steel cabinet with polyester paint.

Enclosure class: IP66.

Calibration

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

Electrical connections

Housing with PLUG connector, H: PLUG connector, connector type DIN 43650 model AF; Pg9 gland for cable; wire cross-section 0.5 to 1.5 mm².

Housing with junction box/terminal strip, M and N: M20x1.5, 1/2–NPT inlet; screw terminals for 0.5 to 2.5 mm² wires

Process connections

DN50PN40, DN80PN40, ANSI2" 150 lbs/300 lbs, ANSI3" 150 lbs/300 lbs; clamp mounting on angle bracket (see INSTALLATION)

Weight (kg):

• VVF 2.2 kg
• VVP 8.7 kg
• VVH 9.2 kg
+ 1 kg/m with PVC protective tube and 3 kg/m with AISI316 protective tube.

PRODUCT CERTIFICATIONS

European Directive Information:
Electro Magnetic Compatibility EMC
Directive 2014/30/EU

ATEX directive 2014/34/EU

Satron Instruments Inc. complies with the ATEX directive.

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

All pressure transmitters
• Sound Engineering Practice

Hazardous Locations Certifications

European Certifications
ATEX Intrinsic Safety

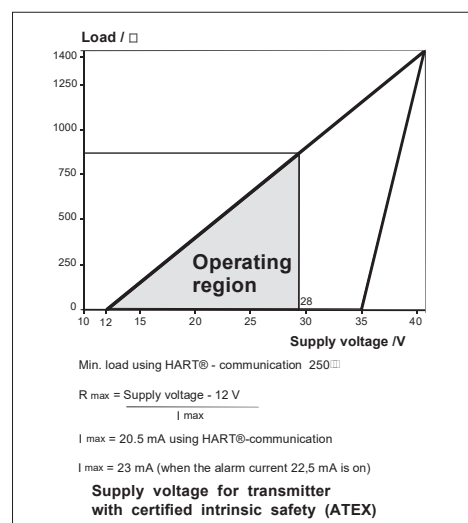
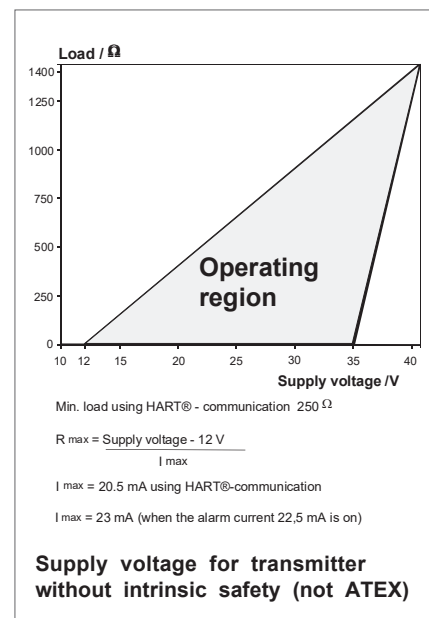
Certification No. : DNV-2007-OSL-ATEX- 1346X

Ex II 1 GD T135°C EEx ia II C T4 -20°C ≤ Tamb ≤ 50°C
Ex II 2 GD T135°C EEx ia II C T4 -20°C ≤ Tamb ≤ 50°C

Input Parameters :

Ui = 28 V
Ii = 93 mA
Pi = 0.651 W
Ci = 5 nF
Li = 0.2 mH

Special Conditions for Safe Use (X): The enclosure with plastic window and the plastic DIN43650 connector must not be installed in potentially explosive atmosphere requiring category 1 apparatus. The non-conducting surface of the sensor element may be charged by the flow of non-conducting media, so there may be electrostatic hazard with IIC-gases. These units should be marked 2 GD. The equipment shall be installed and connected according to the manufacturers instructions



Pressure limits

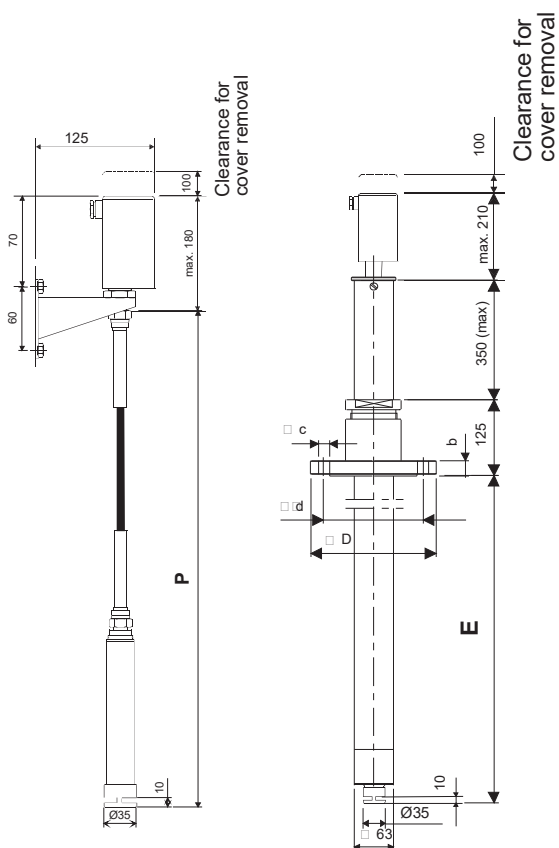
Maximum process pressure, MPa

Transmitter type	Max. overload pressure	Pressure class
VV...3	0.2	PN40
VV...4	0.3	PN40
VV...5	1.5	PN40

Minimum process pressure

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

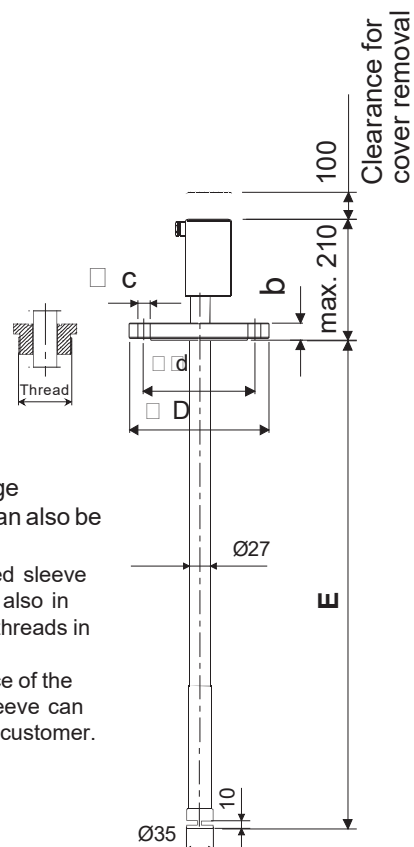
Dimensional drawings (drawings in mm)



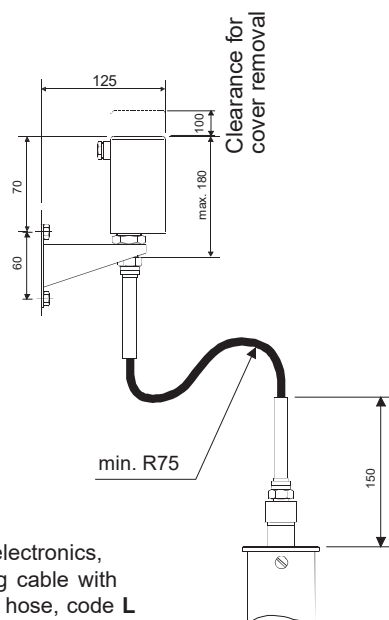
Type VVF

Type VVP

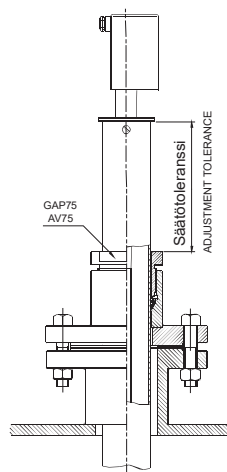
Instead of the flange threaded sleeve can also be used.
Flange and threaded sleeve is possible to have also in VVF type. See the threads in selection chart.
In VVF type the place of the flange/ threaded sleeve can be changed by the customer.



Type VVH



Remote electronics, connecting cable with protection hose, code L (for transmitter types VVP and VVH)

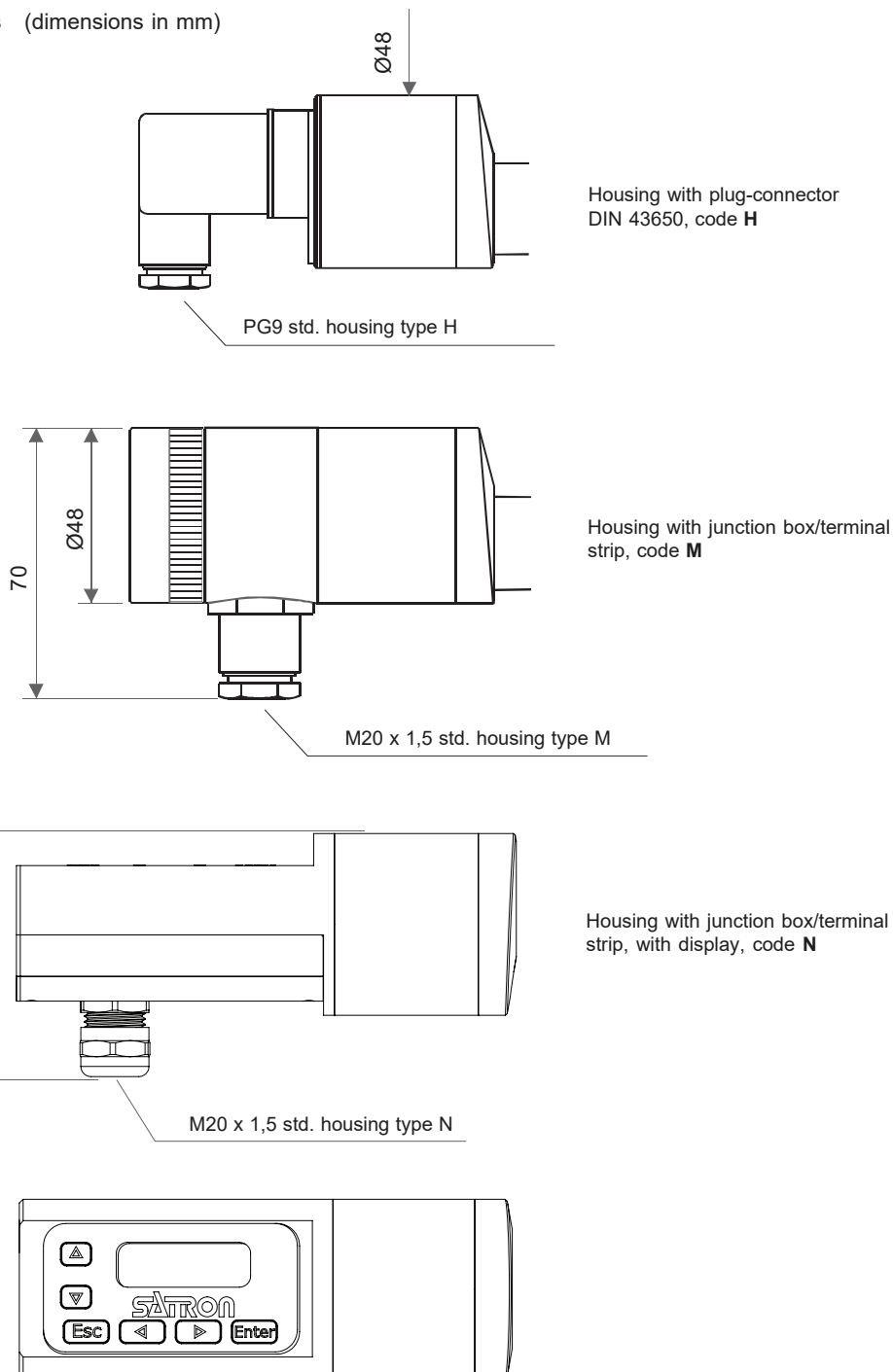


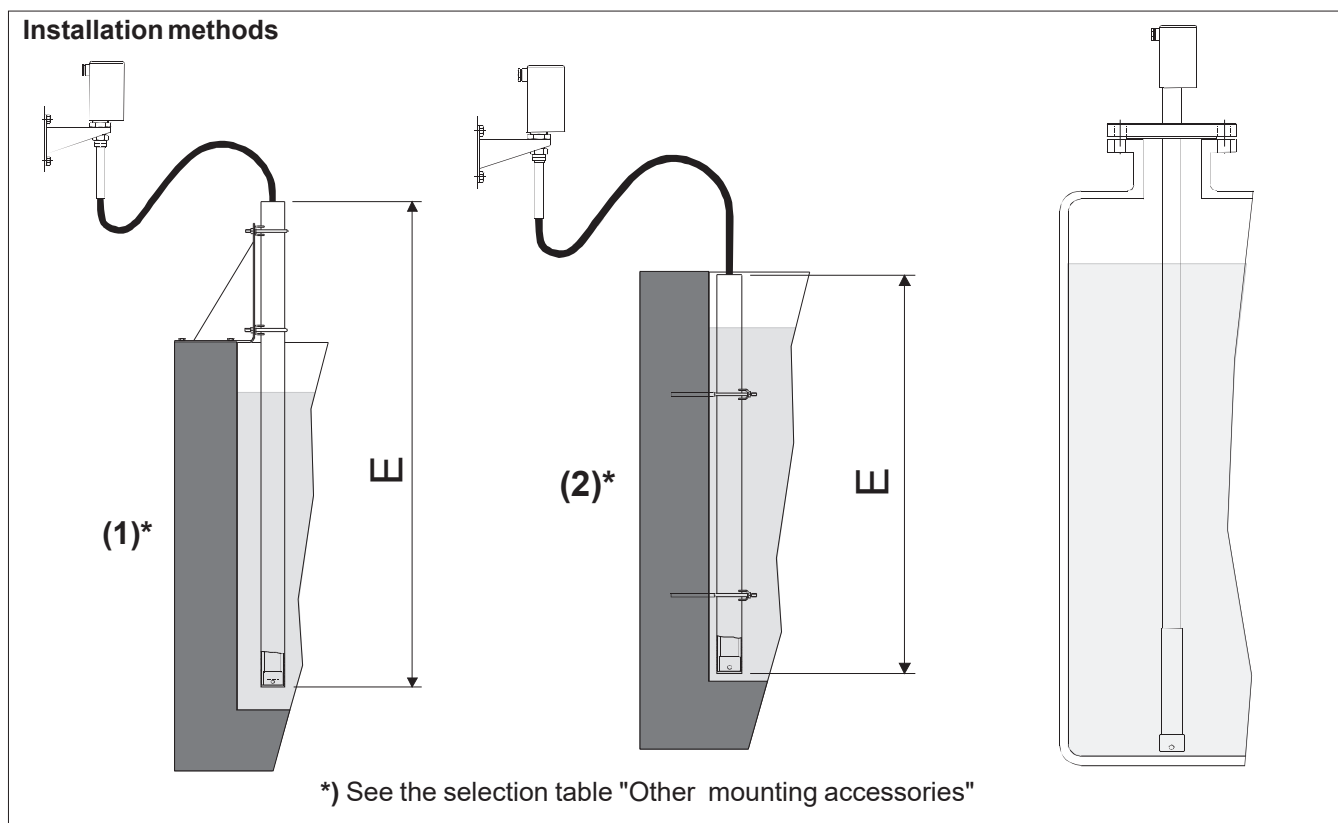
Flange mounting with adjustment facility, type VVP

Type	P/m		E/m	
	min.	max.	min.	max.
VVF	1.0	20.0	-	-
VVP	-	-	1.0	5.5
VVH	-	-	1.0	5.5

Flange	Code	ØD	Ød	Øc	b
DN50 PN40	DB	165	125	4x18	20
DN80 PN40	DC	200	160	8x18	24
ANSI2"150lb	AC	152	120.6	4x20	23
ANSI2"300lb	AD	165	127	8x20	25
ANSI3"150lb	AE	191	152.4	4x20	26
ANSI3"300lb	AF	210	168.3	8x23	31

Dimensional drawings (dimensions in mm)





Transmitter types								
VVF	Flexible PTFE hose (PTFE/AISI316 braiding)							
VVP	PVC hose/flange							
VVH	AISI316L hose/flange (fixed mounting tube)							
	Adjustability	Span, min.	Span, max.	Measuring range				
	3	1.4 kPa (14 mbar)	35 kPa (350 mbar)	-35...+35 kPa (-350...350 mbar)				
	4	4 kPa (40 mbar)	100 kPa (1000 mbar)	-100...+100 kPa (-1000...1000 mbar)				
	5	10 kPa (100 mbar)	500 kPa (5000 mbar)	-100...+500 kPa (-1000...5000 mbar)				
	Output	S	4-20mA DC/HART® -protocol					
	Flange or thread		DB	DN50 PN40	DC	DN80 PN40	AC	ANSI 2" 150lbs
	O	no flange or thread	AE	ANSI 3" 150 lbs	AF	ANSI 3" 300lbs	GA	G1 ½ A
	AD	ANSI 2" 300 lbs	GC	G1A	NA	1 ½ - NPT	NB	2 - NPT
	GB	G2A						
	Wetted materials		Flange		Diaphragm		Extension	
		Code	Material		Code	Material		
		2	AISI316L		2	AISI316L/317L		(type VVF = PTFE/AISI316)
		3	Hastelloy® 276		3	Hastelloy® 276 ¹)		(type VVP = PVC)
					5	Tantalum ¹)		(type VVH = AISI316)
	Fill fluid	S	Silicone oil		G	Inert fluid for oxygen use		
	Housing type							
	H	Housing with PLUG–connector, DIN43650, no display, inlet PG9						
	M	Housing with junction box/terminal strip, no display, inlet M20x1,5						
	N	Housing with junction box/terminal strip, with display, inlet M20x1,5						
	Explosion proof							
	O	No Explosion proof				1	ATEX Intrinsic safety Ⓔ II 1 GD T135°C ²)	
	Length P of PTFE/AISI316 hose between sensing element and housing (specify for transmitter type VVF)							
					P10	1.0 m hose		
					P25	2.5 m hose		
					...			
					P200	20.0 m hose		
	Length E of mounting/protective tube (specify for transmitter type VVP and VVH also with the type VVF if the protective tube is used)							
					E10	1.0 m hose		
					E15	1.5 m hose		
					...			
					E55	5.5 m hose		
					Special features		/ □ □	

VVF	4	5	0	2	5	N	0	P20
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2	2m cable	3	3m cable	etc. (max length 10 m)
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Mounting parts for remote electronics			
M1050025	For pipe Ø51 mm (2")	M1050025-1	For pipe Ø60 mm (2.25")
Other installation parts			
M1002064	Mounting bracket for protective tube	T1002065	Clamps for protective tube
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

Material certificates	
MC1	Raw material certificate without appendices, 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

CE