



SATRON®

PREON™ VVFe Pressure and Level Transmitter

www.satron.com

#LookCloser

SATRON VVFe pressure and level transmitter belongs to V-transmitter family. SATRON VVFe is used for 0 – 4 kPa...0–500 kPa ranges. It is a 2-wire transmitter with HART® standard communication. SATRON VVFe pressure transmitter is suitable for liquid level measurements in ground, rock and ships' tanks, drill well and in open channels. SATRON VVFe pressure transmitter can be used to measure contaminating liquids. Possible foam on the surface of the measured liquid does not disturb the measurement. SATRON VVFe does not require compressed air supply. The transmitter's sensor is piezoresistive.



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.

Response time

Maximum 100 ms
Temperature limits
Process: -10 to +80 °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).

Pressure limits

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

Volumetric displacement

< 0.5 mm³ /max. span

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: 10–35 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

• ±0.1 % of calibrated span (span 1:1–7.5:1 /max.range).
On the measuring ranges 7.5:1– 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 -20...+80 °C

Zero and span shift, type VVFe 5: ±0.15 % of max. span

Zero and span shift, type VVFe 4: ±0.25 % of max. span

Mounting position effect

Zero error <0.15 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

Wetted materials

Metal parts: AISI316L (EN 1.4404)
Jacket of cable: PUR
Other materials: AISI303/316

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

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

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

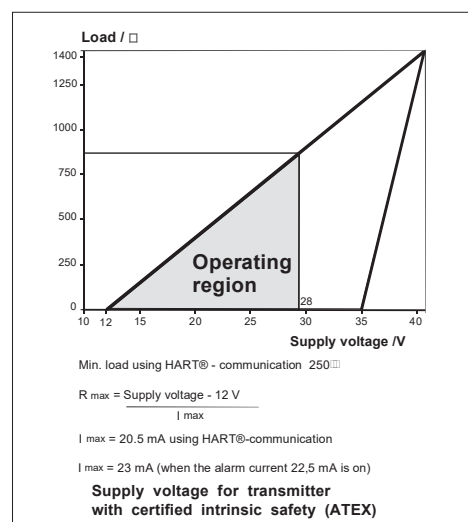
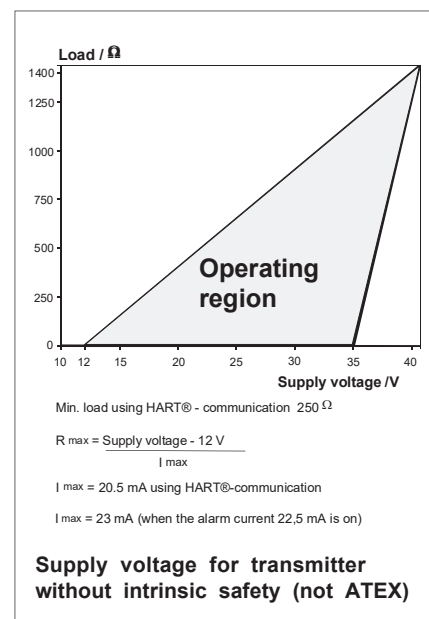
Certification No. : DNV-2007-OSL-ATEX- 1346X

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

Input Parameters :

U_i = 28 V
I_i = 93 mA
P_i = 0.651 W
C_i = 5 nF
L_i = 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



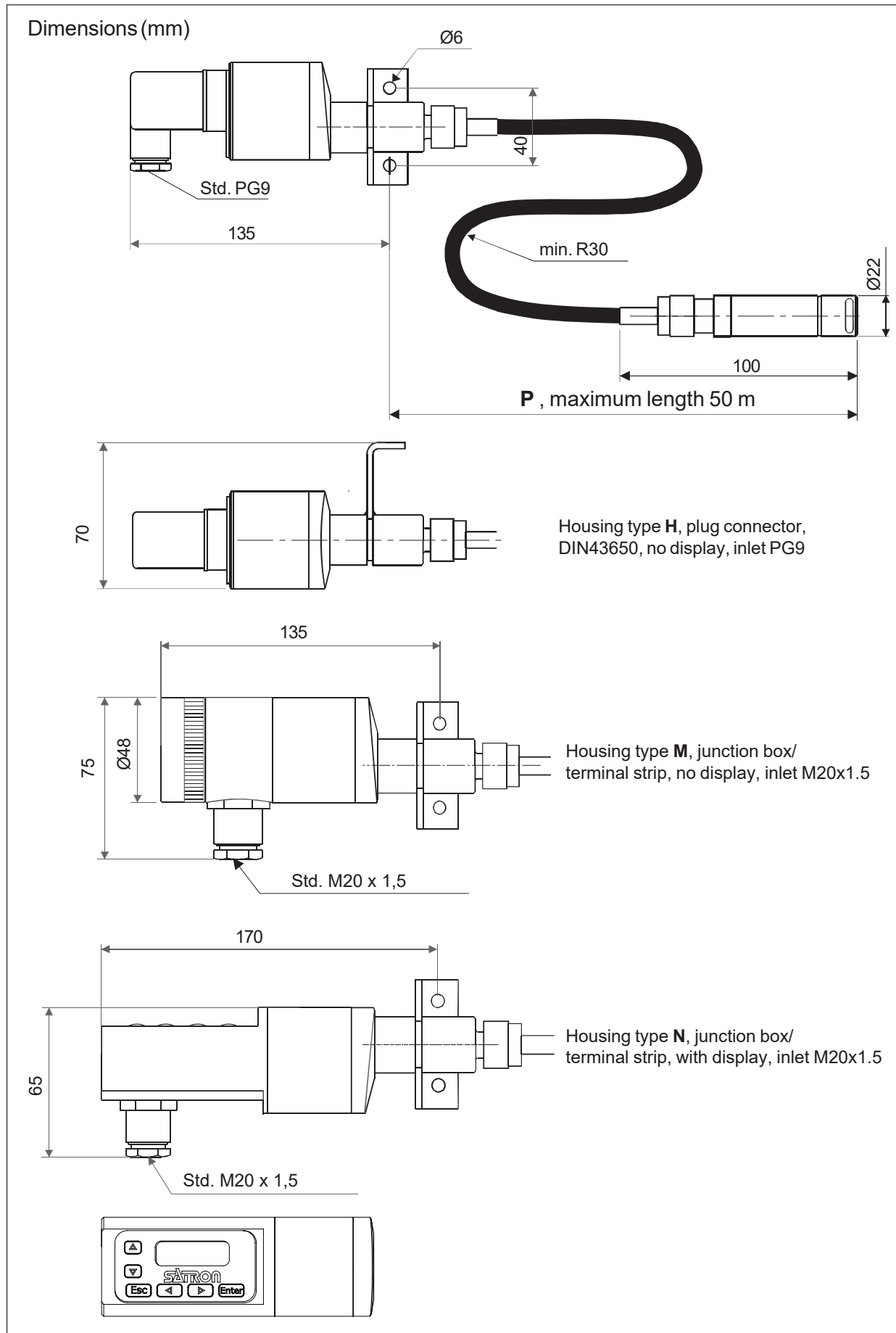
Pressure limits

Maximum process pressure, MPa

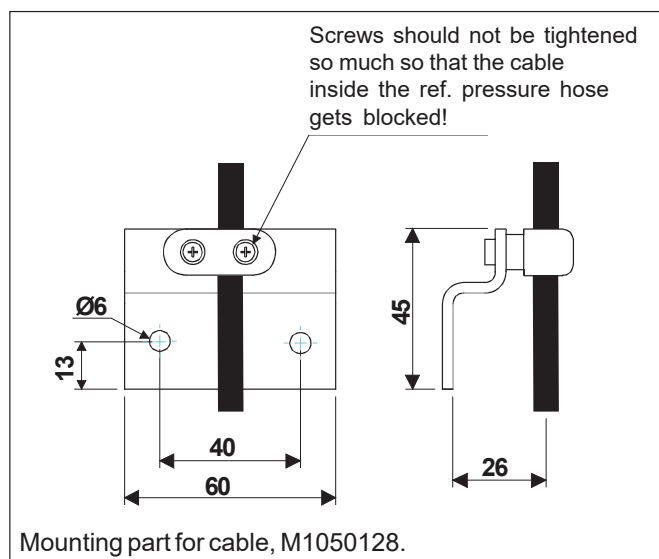
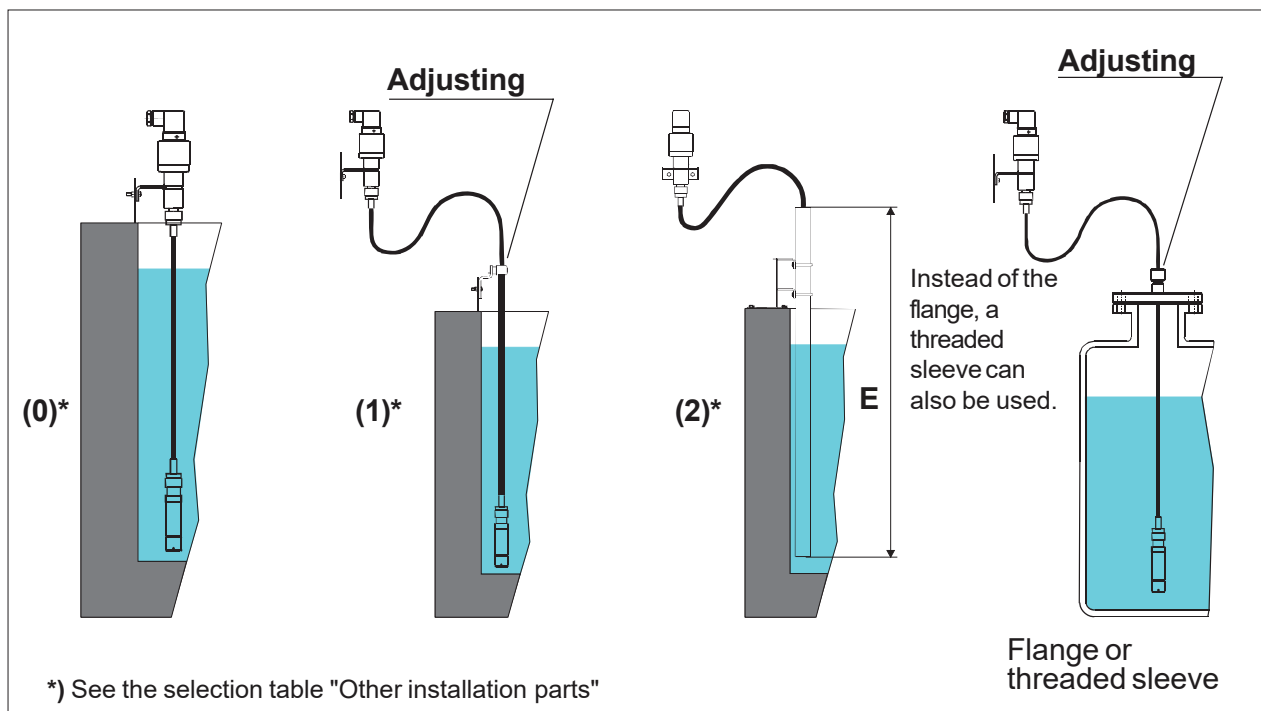
Transmitter type	Max. overload pressure	Pressure class
VVFe4	0.3	PN40
VVFe5	1.5	PN40

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
120	21	53



Installation methods



SELECTION CHART

Adjustability VVFe 4 VVFe 5	Span, min. 4kPa (40 mbar) 10 kPa (100 mbar)	Span, max. 100 kPa (1000 mbar) 500 kPa (5000 mbar)	Measuring range -100...+100 kPa (-1000...1000 mbar) -100...+500 kPa (-1000...5000 mbar)																				
Output S 4-20mA DC/HART® -protocol																							
<table border="1"> <tr> <td colspan="2">Flange or thread sleeve</td> <td>DB DN50 PN40</td> <td>DC DN80 PN40</td> <td>AC ANSI 2" 150lbs</td> </tr> <tr> <td>O no flange or thread</td> <td>AE ANSI 3" 150 lbs</td> <td>AF ANSI 3" 300lbs</td> <td>GA G1A, male</td> <td></td> </tr> <tr> <td>AD ANSI 2" 300 lbs</td> <td>GC G2A, male</td> <td>NA 1½ - NPT, male</td> <td>NB 2 - NPT, male</td> <td></td> </tr> <tr> <td>GB G1½A, male</td> <td></td> <td></td> <td></td> <td></td> </tr> </table>				Flange or thread sleeve		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 G1A, male		AD ANSI 2" 300 lbs	GC G2A, male	NA 1½ - NPT, male	NB 2 - NPT, male		GB G1½A, male				
Flange or thread sleeve		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 G1A, male																				
AD ANSI 2" 300 lbs	GC G2A, male	NA 1½ - NPT, male	NB 2 - NPT, male																				
GB G1½A, male																							
Wetted material		Flange or thread sleeve	Diaphragm	Extension																			
Code		Material	Code	Material																			
2		AISI316L (EN 1.4404)	2	AISI316L (EN 1.4435)																			
				AISI316 / PUR																			
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 2 GD T135°C																							
Length P of PTFE/AISI316 hose between sensing element and housing																							
P10 1.0 m hose																							
P25 2.5 m hose																							
...																							
P500 50.0 m hose																							
Length E of mounting/protective tube																							
E10 1.0 m hose																							
E15 1.5 m hose																							
...																							
E55 5.5 m hose																							

Example code

VVFe4 S O 2 S H O P20

Optional items – order separately

Other installation parts			
M1050100	Mounting bracket for protective tube E	M1050128	Mounting bracket for cable P
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 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

We reserve the right for technical modifications without prior notice.
HART® is a registered trademark of FieldComm Group, Inc.
Hastelloy® is the registered trademark of Haynes International, Inc.

