

# SATRON VB Pressure Transmitter

**BPLV770**  
M2, revision 2  
15.2.2013

**SATRON VB pressure transmitter** belongs to the series V transmitters.

SATRON VB is user-friendly, through the ball valve mounted transmitter which is used for 0-4 kPa ... 0-3 MPa ranges. The transmitter communicates in a 2-wire system.

In pressure measuring applications SATRON VB transmitter is used for measuring the pressure of gases, steams and sedimenting, crystallizing and sticking liquids. The transmitter's sensor is piezoresistive. The rangeability of the model VB6 is 100:1. The transmitter communicates digitally using the HART® protocol.

## 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 a HART@275/375 communicator.

### Damping

- Time constant is continuously adjustable from 0.01 to 60 s.

### Response time

Maximum 100 ms

### Temperature limits

Ambient: -30 to +80 °C

Process: -30 to +125 °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 mm<sup>3</sup>/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: 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, horizontal mounting; O-ring seals, 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 - 100:1:

$\pm[0.025+0.010 \times (\frac{\text{max.span}}{\text{calibrated span}})]\%$

of calibrated span  
(incl. nonlinearity, hysteresis and repeatability)

### Long-term stability

±0.1 % / max. span / 12 months

### Temperature effect on compensated temperature ranges -20...+80 °C:

Zero and span error, types VB5 and VB6: ±0.15 % of max.span.

Zero and span error, type VB4:  
±0.25 % of max.span

### Mounting position effect (VB4 ... VB6)

Zero error < 0.15 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 effect

< ±0.01 % of calibrated span per volt

### European Directive Information

European Pressure Equipment Directive (PED) (97/23/EY)

- Sound Engineering Practice  
Electro Magnetic Compatibility  
(EMC directive 2004/108/EC)

-All pressure transmitters

### Insulation test voltage

500 V rms 50 Hz

## CONSTRUCTION

**Wetted materials:** AISI316L (EN 1.4404 and EN 1.4435)

**Other materials:** AISI316L, AISI303

### Housing with PLUG connector, housing type code H

Housing: AISI303/316

Seals: Viton® and NBR

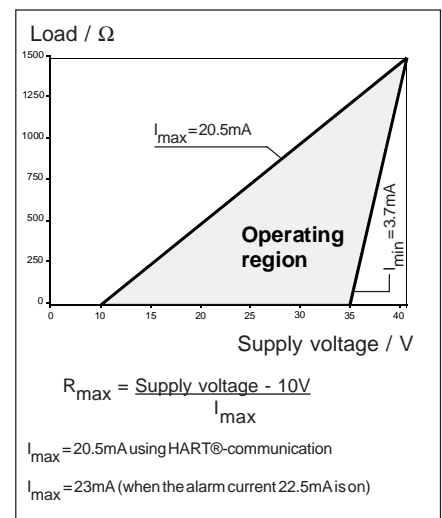
TEST jacks: MS358Sn/PVDF, protected with silicone rubber shield.  
PLUG connector: PA6-GF30 jacket, Silicone rubber seal, AISI316 retaining screw.

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

Housing: AISI303/316; Seals: Nitrile and Viton®; Nameplates: Polyester

**Filling fluid:** Silicone oil or inert oil

**Enclosure class** IP66



## Pressure limits

Maximum process pressure, MPa

Transmitter type	Max. overload. pressure, MPa	Pressure class
VB4	0.3	PN40
VB5	1.5	PN40
VB6	7.5	PN100

Minimum process pressure

T <sub>proc.</sub> °C	Minimum pressure for different fill fluid (kPa, abs.)	
	DC200 100 cSt	Inert oil
20	5	8
40	8	10
80	16	28
120	21	53

## Calibration

Transmitter is calibrated for maximum range with 1 sec. damping  
Calibration for customer-specified range and item positioning must be mentioned in the order.

## Electrical connections

Housing with PLUG connector, code **H**  
PLUG connector, connector type DIN 43650 model AF; Pg9 gland for cable; wire cross section 0,5...1,5 mm<sup>2</sup>.  
Housing with junction box/terminal strip, code **M**  
M16x1.5 inlet; screw terminals for 0,5...2,5 mm<sup>2</sup> wires

## Product Certifications

### European Directive Information

#### Electro Magnetic Compatibility (EMC directive 2004/108/EC)

All pressure transmitters

#### Atex Directive (94/9/EC)

Satron Instruments Inc. complies with the ATEX Directive.

#### European Pressure Equipment Directive (PED) (97/23/EC)

All Pressure Transmitters :  
- Sound Engineering Practice


#### Hazardous Locations Certifications

#### European Certifications

ATEX Intrinsic Safety

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

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

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

Input Parameters :

$U_i = 28 \text{ V}$

$I_i = 93 \text{ mA}$

$P_i = 0.651 \text{ W}$

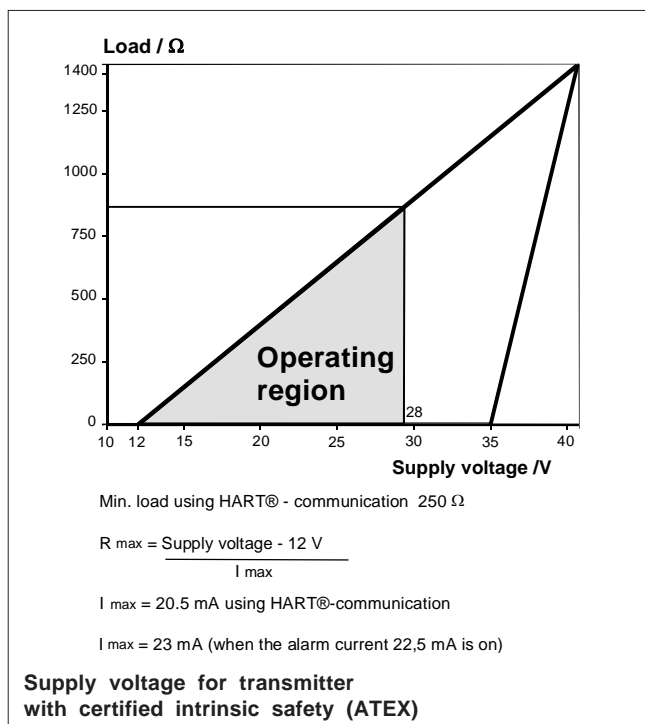
$C_i = 5 \text{ nF}$

$L_i = 0.2 \text{ mH}$

#### 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.



#### Weight

Transmitter  
- with housing type **H**: 0.9 kg  
- with housing type **M**: 1.4 kg  
- with housing type **N**: 1.5 kg



Keyboard :

**Esc** = Press **Esc** to move back towards the top of the main menu.  
**▲** = Use the UP arrow key to move up on the current menu level or to increase the selected parameter value.  
**▼** = Use the DOWN arrow key to move down on the current menu level or to decrease the selected parameter value.  
**Enter** = Press **Enter** to move to a lower level in a menu or to accept a command or parameter value.

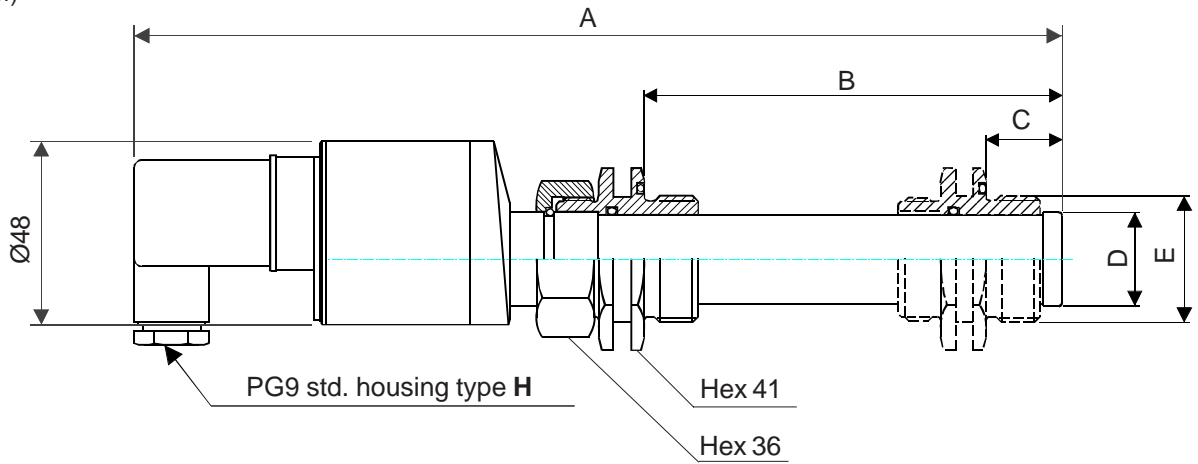
**Housing with display, code N**

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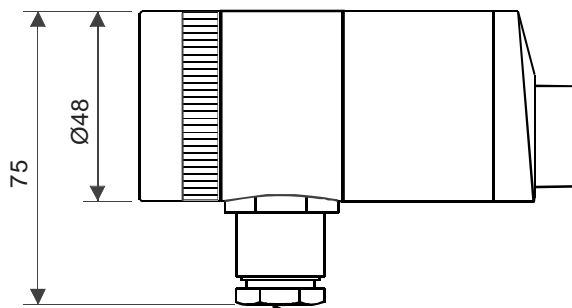
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Dimensions  
(mm)

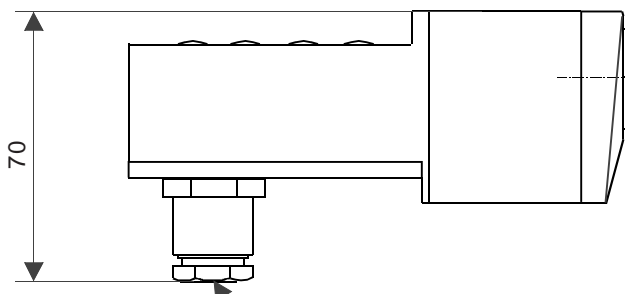


Process connection code	Dim. A	Dim. B	Dim. C	Dim. D	Thread E
1	228	109	20	Ø24.5	G1A



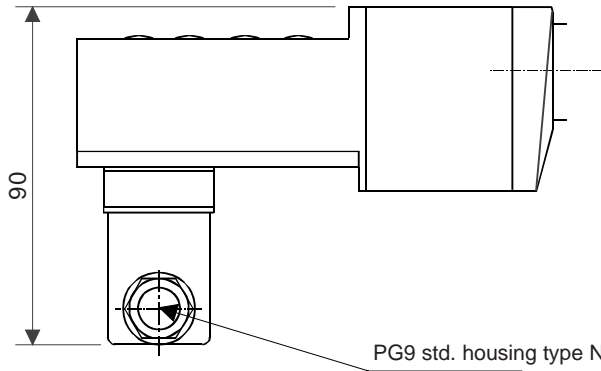
Housing with junction box/terminal strip, code M

M20 x 1,5 std. housing type M

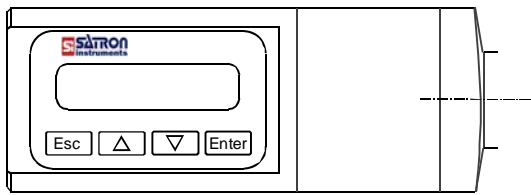


Housing with junction box/terminal strip, with display, code N

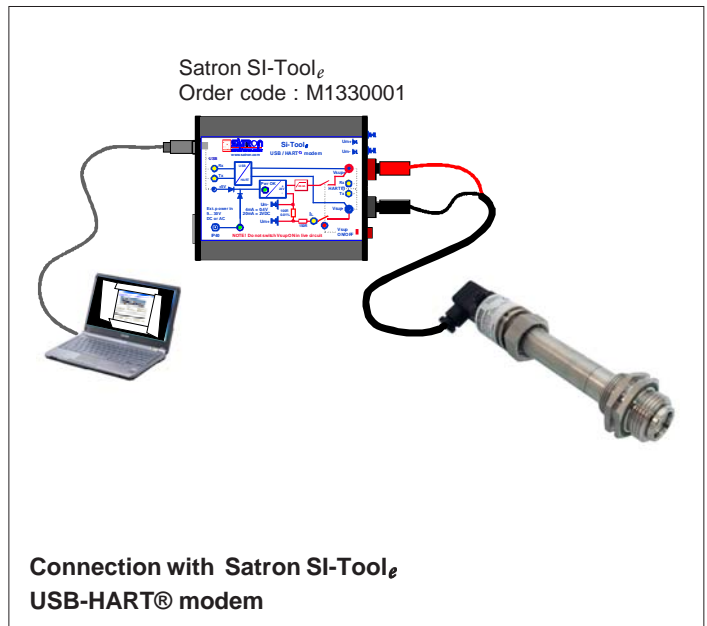
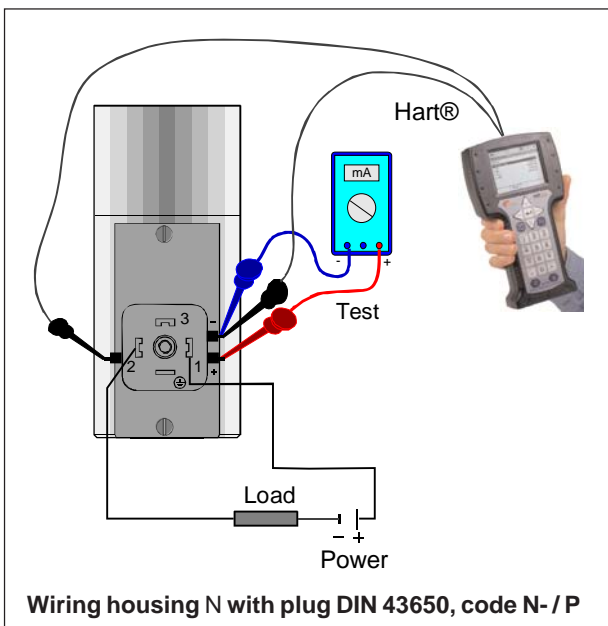
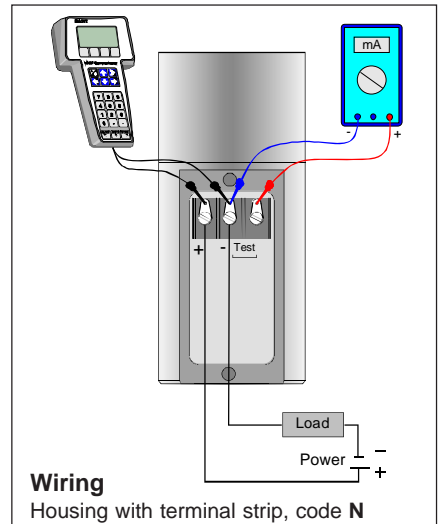
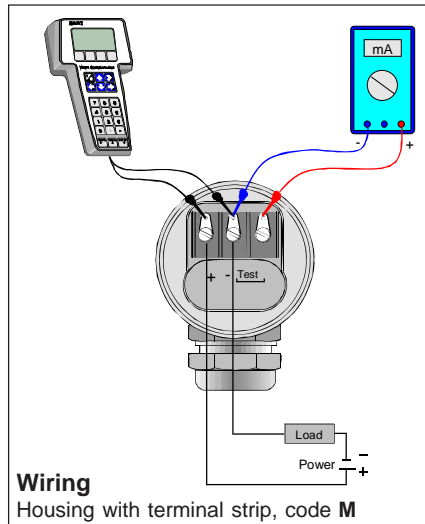
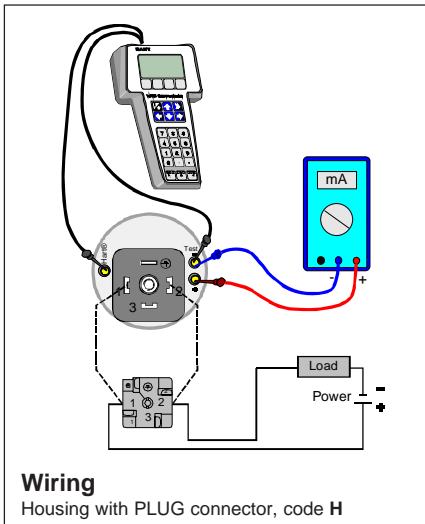
M20 x 1,5 std. housing type N



Housing with junction box/terminal strip, with display and plug-connector DIN 43650, code N--- /-P



PG9 std. housing type N with plug DIN 43650



## Selection Chart

Adjustability	Span, min	Span, max	Measuring range
<b>VB 4</b>	4 kPa (40 mbar)	100 kPa (1000 mbar)	-100...+100 kPa (-1000...1000 mbar)
<b>VB 5</b>	10 kPa (100 mbar)	500 kPa (5000 mbar)	-100...+500 kPa (-1000...5000 mbar)
<b>VB 6</b>	0.03 MPa (0.3 bar)	3 MPa (30bar)	-0.1...+3 MPa (-1...+30 bar)

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**Output**      **S**    4-20mA DC/HART®

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**Process connection**  
**1** Thread G1A, extension diameter Ø24.5 mm, extension length 109 mm

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Wetted materials	Body	Diaphragm
	Code    Material	Code    Material
	<b>2</b> AISI316L (EN 1.4404)	<b>2</b> AISI316L (EN 1.4435)


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**Fill fluid**      **S**    Silicone oil      **G**    Inert oil (\*)


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**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

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**Explosion proof**      **0** No explosion proof classification    **1** Atex Intrinsic Safety,  II 1 GD T135°C (\*\*)

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**Special size of electrical inlet**  
**N** 1/2 NPT      **G** Pg13,5      **P** PLUG connector, DIN43650

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**Documentation**  
**Calibration certificate**    **AE**    English  
**Installation and operating instructions**      **IE**    English      **IF**    Finnish

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**Material certificates**  
**O**    No material certificate  
**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 with appendices, in accordance with SFS-EN 10204-2.2 (DIN 50049-2.2) standard  
**MC3** Raw material certificate for wetted parts with appendices, in accordance with SFS-EN 10204-3.1 B (DIN 50049-3.1 B) standard

(\*) = Oxygen cleaning must be mentioned in the order

(\*\*) = Kotelointi H ja N :  II 2 GD T135°C



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