SATRON VT pressure transmitter

SATRON VT pressure transmitter belongs to the series V-transmitters which will have both analog and smart properties. SATRON VT is used for 0-26,5 kPa...0-100 MPa ranges. The transmitter communicates in a 2-wire system. In pressure measuring applications SATRON VT-transmitters are used for measuring the pressure of clean gases, steam and non-crystallizing liquids.The transmitter's sensor is piezoresistive. The rangeability is 25:1. 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 extern control shafts (analog option), keyboard (display option), HART®275 communicator.
Damping
Time constant is continuously adjustable 0,01 to 60 s.

Temperature limits
Ambient: -30 to +80 °C
Process: -30 to +120 °C, DIN 16288
-20 to +200 °C, DIN 3852-X
Shipping and storage: -40 to +80 °C.

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

Volumetric displacement
< 0.5 mm^3 /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 not allowed in reference pressure channels.

PERFORMANCE SPECIFICATIONS
Tested in accordance with IEC770: Reference conditions, specified span, no range elevation, horizontal mounting; AISI316L diaphragm, silicone oil fill.

Accuracy
±0.1 % of calibrated span
(span 1:1-7.5:1 /max.range).
On the measuring ranges 7.5:1-25:1:

$$\pm[0.01+0.012 \times \left(\frac{\text{max.span}}{\text{calibrated span}}\right)]\%$$ of calibrated span

(incl. nonlinearity, hysteresis and repeatability)

Long-term stability
±0.1 %/max. span/12 months

[1] Parts in contact with process medium

Temperature effect on compensated temperature ranges -20...+80 °C
Zero and span shift:
±0.15 % of max. span

0 to +200 °C, (process connection, code **3**, DIN3852-X-G½A, Flush Mounted)
±1 % of max. span, VT6 - VT7
±2 % of max. span, VT5

Mounting position effect
(**VT5, VT6** and **VT7**)
Zero error < 0.15 kPa, which can be calibrated out.
VT8: mounting position has no effect

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

EMC-test standards
GENERIC EMISSION STANDARD:
EN 50081 - 2: 1993
Normative reference:
EN 55022:1987/class A
GENERIC IMMUNITY STANDARD:
EN 50082 - 2: 1995
Normative references:
EN 61000-4-2, -4, -5, -8, -11
ENV 50140, ENV 50204, ENV 50141

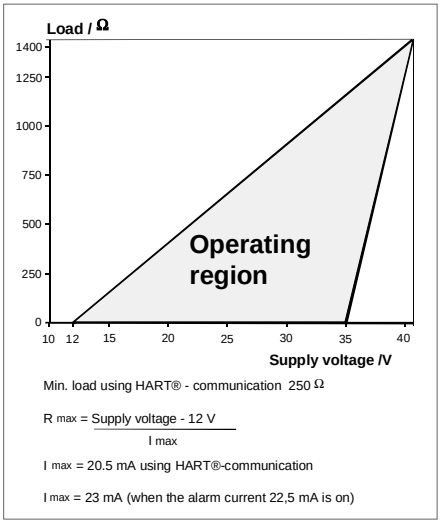
Insulation test voltage
500 V rms 50 Hz

CONSTRUCTION AND CALIBRATION
Materials
Diaphragm [1]: AISI316L, Duplex (Wnr. 1.4462), Hast. C22/C276 or Titanium (VT8).
Other sensing element materials: AISI316, SIS 2343.

Filling fluid: Silicone oil or inert oil (VT5, VT6 and VT7)

Enclosure class IP66

Housing with PLUG connector, housing type codes **H** and **T**
Housing: AISI316, 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
Connection hose between sensing element and housing :
Codes **L** and **K** :
PTFE hose with AISI316 braiding.



Min. load using HART® - communication 250 Ω

$R_{max} = \frac{\text{Supply voltage - 12 V}}{I_{max}}$

I_{max} = 20.5 mA using HART®-communication

I_{max} = 23 mA (when the alarm current 22,5 mA is on)

Pressure limits

Maximum process pressure, MPa

Trans-mitter type	Max. overload pressure	Pressure class
VT5	1,5	PN40
VT6	7,5	PN100
VT7	40,0	PN250
VT8	100,0	PN1000

Minimum process pressure
(VT8: no min. pressure limitations)

$T_{proc.}$ °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

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SATRON VT pressure transmitter

Calibration

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

Electrical connections

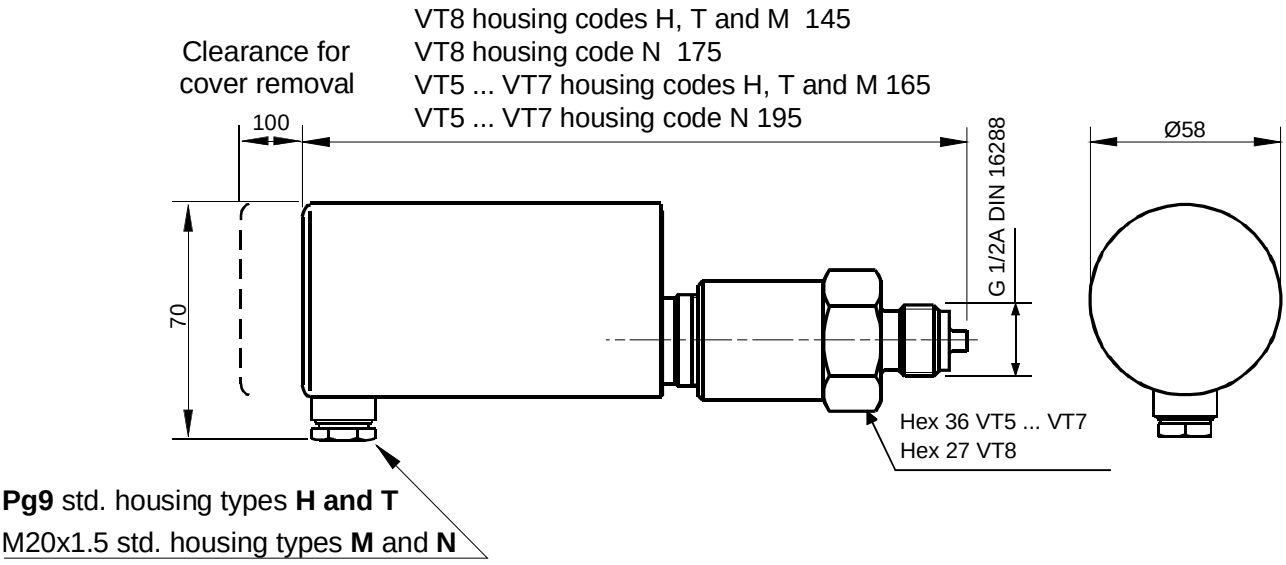
Housing with PLUG connector, **H** and **T:**
PLUG connector, connector type DIN 43650 model AF; Pg9 gland for cable; wire gross-section 0.5 to 1.5 mm^2.

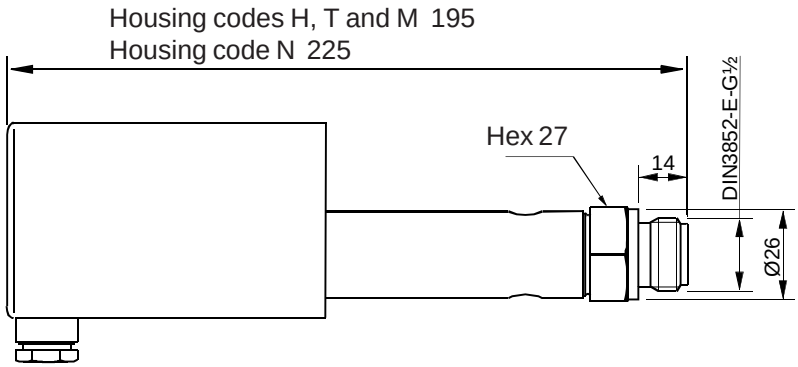
Housing with junction box/terminal strip, **M** and **N:**
M20x1.5, 1/2-NPT inlet; screw terminals for 0.5 to 2.5 mm^2 wires

Weight

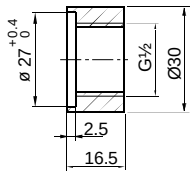
Transmitter
- with housing types **H** and **T** : 0,7 kg
- with housing type **M** : 1.2 kg
- with housing type **N** : 1.3 kg

Dimensions (in mm)

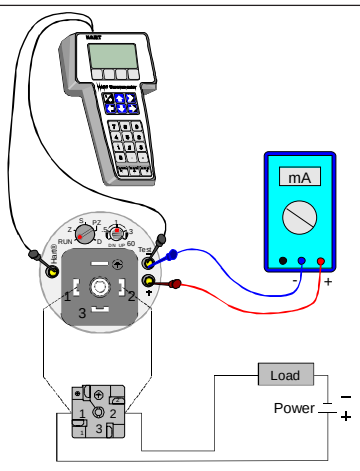




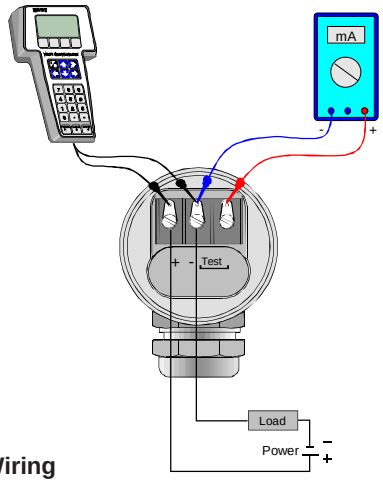
VT5, **VT6** and **VT7** Threaded DIN3852-E-G½A Flush-Mounted Diaphragm



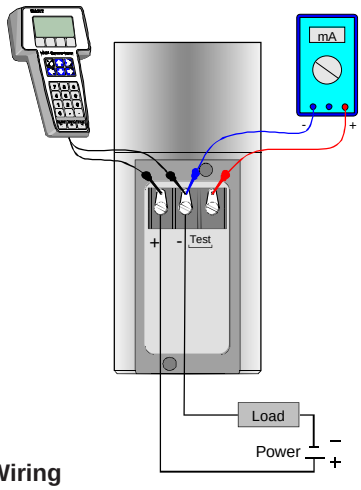
Process coupling DIN 3852-X-G½



Wiring
Housing with PLUG-connector, codes **H** and **T**



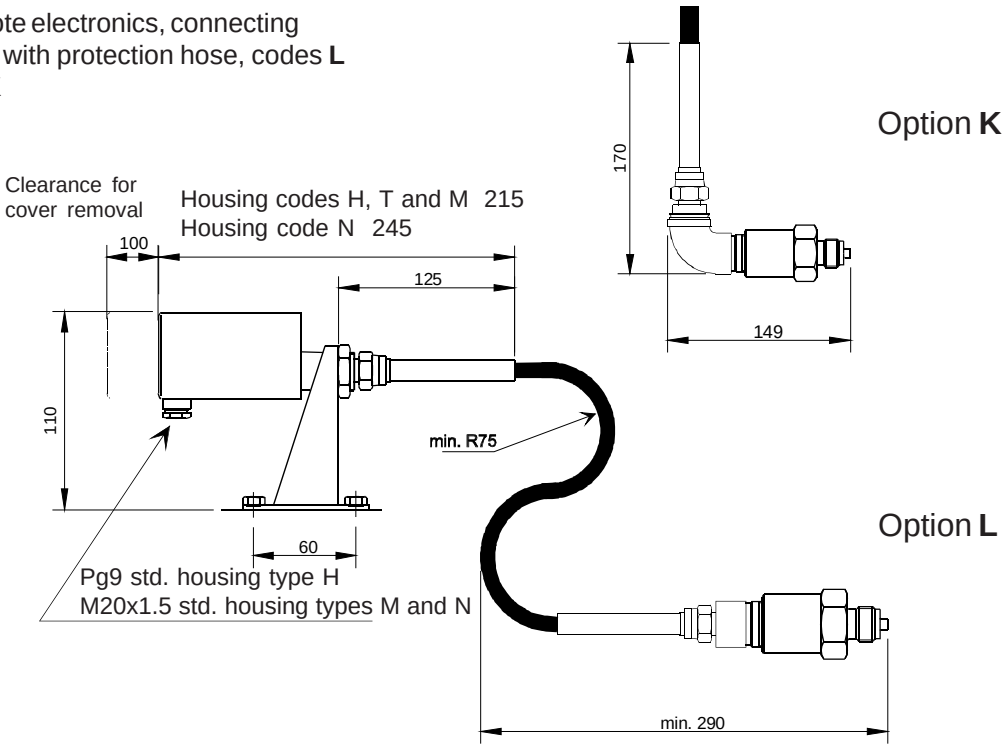
Wiring
Housing with terminal strip, code **M**



Wiring
Housing with terminal strip, code **N**

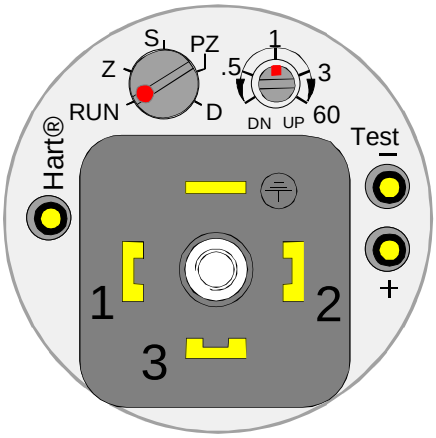
SATRON VT pressure transmitter

Remote electronics, connecting cable with protection hose, codes **L** and **K**

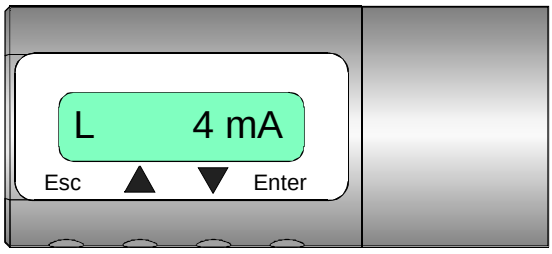


Use of selector switch :

RUN = working position
PZ = Process value zero
D = damping adjustment
S = Span adjustment
Z = Zero adjustment
DN = Down
UP = Up



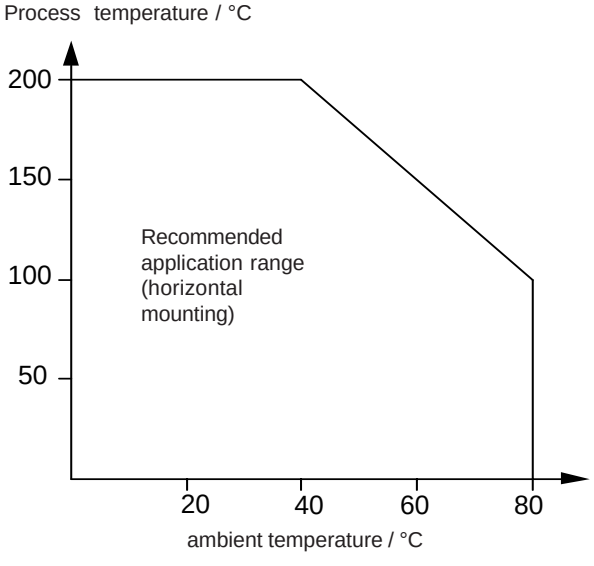
Housing with PLUG-connector, code T



Keyboard :

Esc	=	Press **Esc** 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



Process temperature limits for the transmitter of high temperature

SATRON VT pressure transmitter

BPV710
November 10, 2004

Selection Chart

Adjustability	Span, min	Span, max	Measuring range
VT5	26,5 kPa (265 mbar)	500 kPa (5000 mbar)	-100...+500 kPa (-1000...5000 mbar)
VT6	0,145 MPa (1.45 bar)	3 MPa (30bar)	-0,1...+3 MPa (-1...+30 bar)
VTA6	0,145 MPa (1.45 bar)	3 MPa (30 bar)	0...+3 MPa (0...+30 bar), abs.
VT7	1 MPa (10 bar)	15 MPa (150 bar)	0...+15 MPa (0...+150 bar), abs.
VT8	6,7 MPa (67 bar)	100 MPa (1000 bar)	-0.1...+100 MPa (-1...+1000 bar)

Output
S 4-20mA DC/HART®-protocol

Process connection **1** G 1/2A (male) **2** 1/2-NPT (male) **3** DIN 3852-X-G½A (male), Flush Mounted, not VT8

Wetted material

Body		Diaphragm			
Code	Material	Code	Material	Code	Material
2	AISI316L	**2**	AISI316L (no VT8)	**8**	Duplex (no VT8) (Wnr. 1.4462)
3	Hast. C 276	**3**	Hast. C276 (no VT8)		
		6	Titanium (only VT8)		

Fill fluid (specify for types VT5, VT6 and VT7) **S** Silicone oil **G** Inert oil

Housing type
H Housing with PLUG-connector, DIN43650, no display, inlet PG9
T Housing with PLUG-connector and with manual adjust, 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 **0** No explosion proof classification **1** EEx ia II C T4 (not Atex)

□□□□□□□ / □□ / □□□ / □□□

Process coupling
0 No coupling
1 Threaded coupling G½, DIN 16288
2 Threaded coupling G½, DIN 3852-X-G½ (Flush-Mounted)

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

Special features

Remote electronics (specify only if housing connected with cable to sensing element)
- connecting cable with protection hose
L Hose protected with PTFE/AISI316 braiding, straight
K Hose protected with PTFE/AISI316 braiding, angle of 90°

Length of connection cable between sensing element and housing
2 2 m cable
3 3 m cable
etc. (max. 10 meter)

Mounting parts for remote electronics for Ø 51 mm tube
0 No mounting parts **1** Mounting parts

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

Material certificates
O No material certificate
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

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SATRON instruments