SATRON®

PREON™ VDtL
Differential Pressure Transmitter

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SATRON VDtL Differential Pressure Transmitter

SATRON VDtL differential pressure transmitter belongs to V transmitter family. The series V transmitters have both analog and smart properties SATRON VDtL is used for 1.4 kPa...3 MPa ranges. It is a 2-wire transmitter with HART® standard communication. In pressure measuring applications SATRON VDtL transmitters are used for liquid level, pipeline pressure and density measurements. SATRON VDtL transmitter is equipped with an SOS (Silicon On Sapphire) sensing element Therangeability 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 depending from the desired option. This can be made by using the local display option, Si-Tool or HART® communicator.

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

Temperature limits
Process temperature:
range 3: +10 to +80 °C
ranges 4, 5 and 6: -30 to +120 °C
Ambient temperature: -30 to +80 °C
Shipping and storage: -30 to +80 °C.
Operating temperature of display:
0 to +50°C (does not affect operation of the transmitter)

Pressure limits
Withstands 40 bar static pressure and unequal pressure load without damage to the transmitter. Pressure class: see Process Connections. See the following table for minimum pressure limits.

Minimum process pressure:

T_{proc} °C	Min. pressure for different fill fluids (kPa, abs.)	
	DC200 10 cSt	Inert oil
20	5.0	8.0
60	12.0	18.5
80	16.0	28.0
120	21.0	53.0

Volume of negative-side process chamber: 2.5 cm³
Process chamber's volumetric displacement for maximum span:
< 0.1 cm³

Output 2-wire (**2**W), 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
±0.05 % of calibrated span
(span 1:1-5:1 /max.range).
On the measuring ranges 5:1-25:1:

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

Special accurate diaphragm **AISI304**:
±1.5 % of calibrated span.
(For spans 1:1 - 25:1)

(incl. nonlinearity, hysteresis and repeatability)

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

Temperature effect on compensated temperature ranges
Ambient: Zero and span shift: ±0.5 % of max. span.
Process: Zero error: ±0.5 % of max.span (ranges 4,5 and 6),
±1 mbar per 10 K or min. ±0.5 % of max. span (range 3)

Static pressure effect on Zero
±0.5 % of max.span per 4 MPa

Mounting position effect
Deviati on from horizontal position causes a zero shift that can be calibrated out.

Power supply effect
< ±0.01 % of calibrated span / volt.

Insulation test voltage
500 V rms 50 Hz

CONSTRUCTION AND CALIBRATION
Materials
Diaphragms 1): AISI316L (EN 1.4435), AISI304 (EN 1.4301), Duplex (EN 1.4462), Hastelloy® C276 (EN 2.4819), Nickel, Titanium Gr2 (EN 3.7035) or Tantalum.
Flanges 1) and vent valves 1): AISI316, Duplex or Hastelloy® C276.
O-ring on sensing element: PTFE.
Other sensing element materials: AISI316, SIS 2343, SIS 2324.
Mounting bolts and nuts for sensor flanges: AISI316 (PN420: m.8.8.Zne)

Fill fluid
Silicone oil (DC200, 10 cSt) or inert fluid or food industry oil (Neobee M-20).

Housing with PLUG connector, H
Housing: AISI316
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, M and N
Housing: AISI303/316
Seals: FPM, EPDM
Nameplates: PE

Connection cable between sensing element and housing
Codes **L** and **K** :
PTFE hose with AISI316 braiding.

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

Enclosure class: IP66.

Process connections
See Selection Table.

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**:
Inlet M20x1.5, 1/2-NPT; screw terminals for 0.5 to 2.5 mm2 wires.

Satron Instruments Inc., Muuraintie 3, FI-33960 Pirkkala,Finland
Tel. +358 207 464 800, sales@satron.com, www.satron.com

SATRON VDtL Differential Pressure Transmitter

PRODUCT CERTIFICATIONS

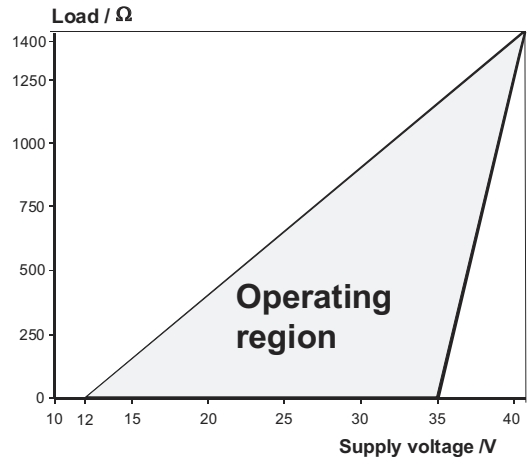
European Directive Information:
Electro Magnetic Compatibility EMC Directive 2014/30/EU

European Pressure Equipment Directive (PED) 2014/68/EU
All pressure transmitters
• Sound Engineering Practice
Transmitters with nominal pressure higher than 200 bar fulfill the requirements of the Conformity Assessment procedure Module A of the directive.

Weight (kg):
See the table; add 0,6 kg for transmitter with screwed cap housing and 0,7 kg for housing with display.

Type	Extension code			
	0	**2**	**4**	**6**
Ax, Dx, JX*,SA*	9.2	9.6 7.2	10 7.7	10.4 8.1

* process connection code



Min. load using HART® - communication 250 Ω

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

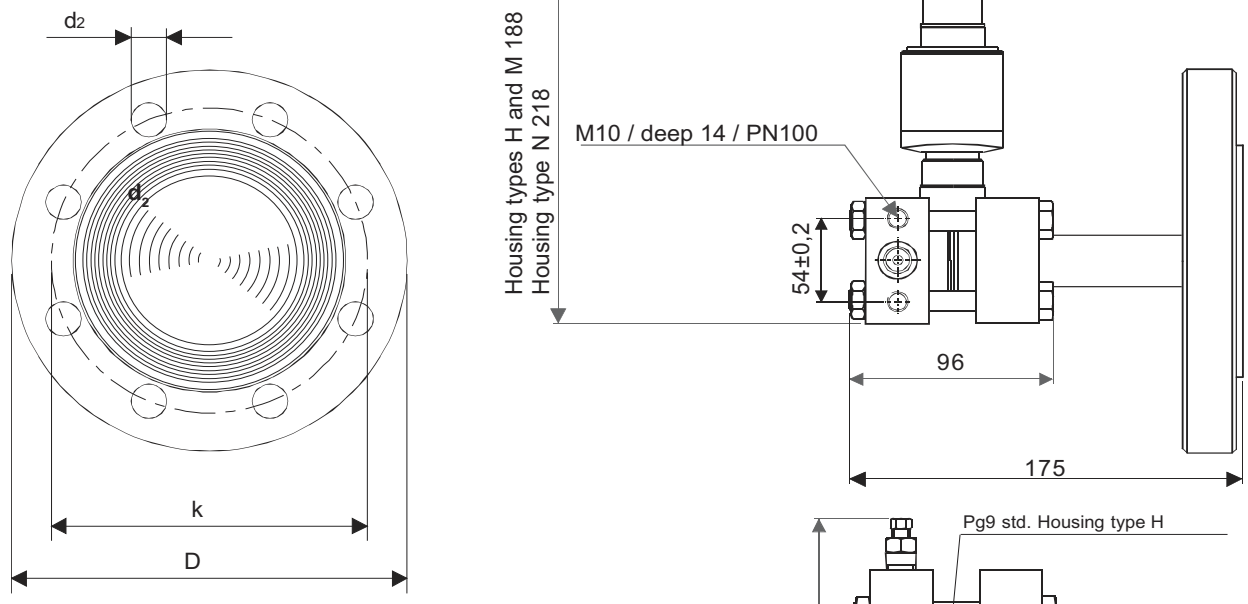
I_{max} = 20.5 mA using HART®-communication

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

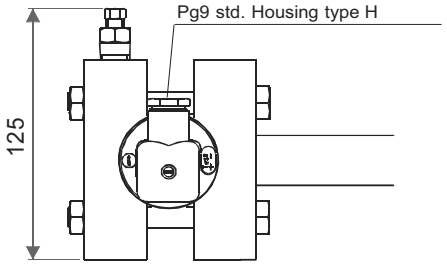
Flange size	Flange dimensions			Holes			Extension
	b	D	Ød$_4$	pcs	d$_2$	k	Ød -0.2
ISO DN50 PN40	20	165	102	4	18	125	51
ISO DN80 PN40	24	200	138	8	18	160	73
ISO DN100 PN40	24	235	162	8	22	190	73
ANSI 2" 150 lbs	23	152	92	4	20	120.6	51
ANSI 2" 300 lbs	25	165	92	8	20	127	51
ANSI 3" 150 lbs	26	191	127	4	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

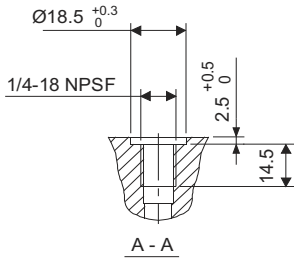
Process connection types Ax, Dx and Jx

Dimensions (in mm)

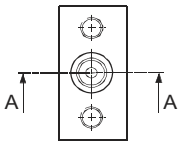


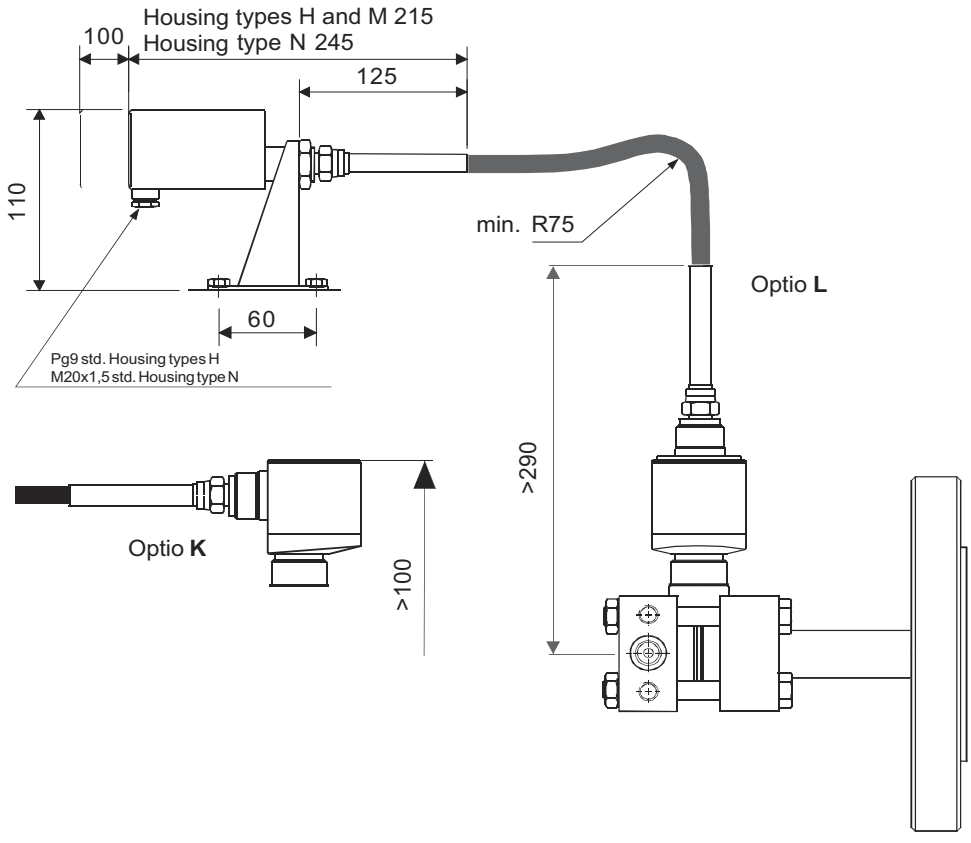
Process connection types **Ax, Dx** and **Jx**



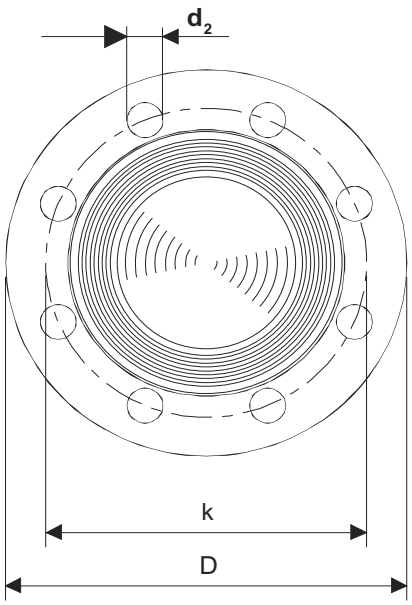


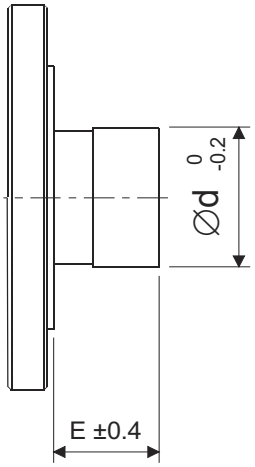
Notice!
The flange dimensions on page 2!





Dimensions (mm)





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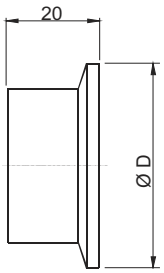
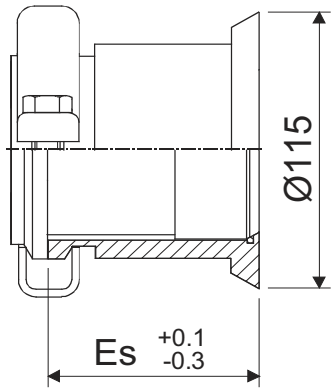


Process connection types **TA** , **TB** and **TC**
- Tri-clamp DN38 ... 63,5

DN	ØD
38	50,5
51	64
63,5	77,5

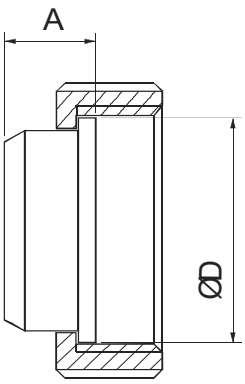
Process connection types Ax, Dx and Jx, with extension

	Extension code			
	0	**2**	**4**	**6**
Dim. E	0	51	102	152



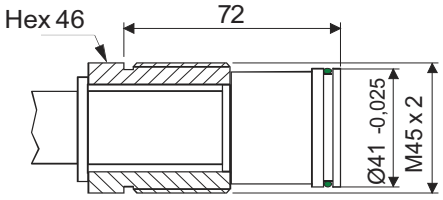
Process connection type SA

	Extension code		
	2	**4**	**6**
Dim. Es	54.5	105	156

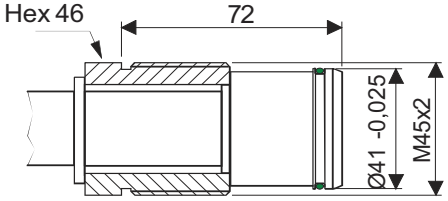


Process connection types **VA** and **VB**
- SMS38 and SMS51

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



Process connection **BA**
- M45x2



Process connection **BB**
- M45x2 with tapered

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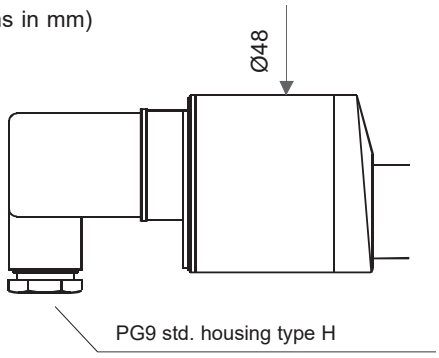
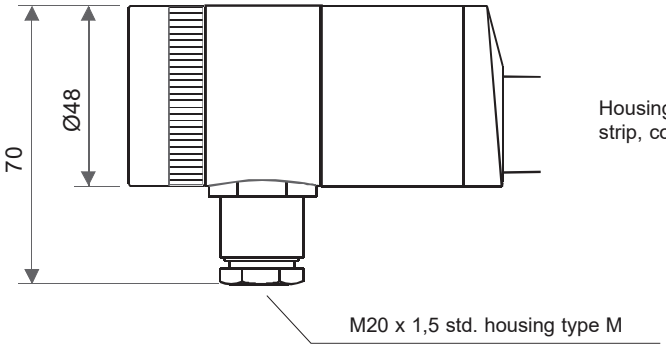
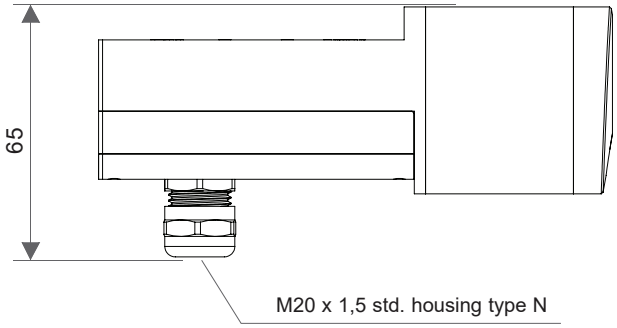
Dimensional drawings (dimensions in mm)



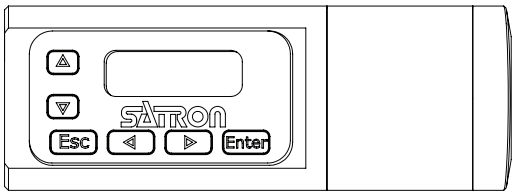
Housing with plug-connector
DIN 43650, code **H**



Housing with junction box/terminal
strip, code **M**



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



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Selection Chart

Adjustability (±)	Span, min.	Span, max.	Measuring rane
VDtL3	1,4 kPa (14 mbar)	35 kPa (350 mbar)	-35...+35 kPa (-350...+350 mbar)
VDtL4	4 kPa (40 mbar)	100 kPa (1000 mbar)	-100...+100 kPa (-1000...+1000 mbar)
VDtL5	26,5 kPa (265 mbar)	500 kPa (5000 mbar)	-500...+500 kPa (-5000...+5000mbar)
VDtL6	145 kPa (1,45 bar)	3 MPa (30 bar)	-3...+3 MPa (-30...+30 bar)

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

Process Connections

DB	DN50 PN40 ISO 2084-1974	**JE**	JIS 10K 100 JIS B 2220	**TA**	Tri-clamp DN38 PN40 ISO 2852
DC	DN80 PN40 ISO 2084-1974	**JF**	JIS 40K 100 JIS B 2220	**TB**	Tri-clamp DN51 PN40 ISO 2852
DD	DN100 PN40 ISO 2084-1974	**AC**	ANSI 2" 150 lbs ANSI B16-5	**TC**	Tri-clamp DN63.5 PN40 ISO 2852
JA	JIS 10K 50 JIS B 2220	**AD**	ANSI 2" 300 lbs ANSI B16-5	**SA**	Sandvik DN70 PN64
JB	JIS 40K 50 JIS B 2220	**AE**	ANSI 3" 150 lbs ANSI B16-5	**VA**	SMS 38
JC	JIS 10K 80 JIS B 2220	**AF**	ANSI 3" 300 lbs ANSI B16-5	**VB**	SMS 51
JD	JIS 40K 80 JIS B 2220	**AG**	ANSI 4" 150 lbs ANSI B16-5	**BA**	M45x2 PN160
		AH	ANSI 4" 300 lbs ANSI B16-5	**BB**	M45x2 PN160 with tapered

Extension length/mm	Process connections DC, AE and AF	Process connection SA
0	0	-
2	51	54.5
4	102	105
6	152	156

Wetted materials

(-)-flange		(+)diaphragm		(-)-diaphragm		Extension		(-)diaphragm coating	
Code	Material	Code	Material	Code	Material	Code	Material	Code	Material
2	AISI316L	**1**	Nickel [1]	**2**	AISI316L/317L	**2**	AISI316L	**9**	Gold/ Rhodium (Do not enter code if diaphragm not coated)
3	Hastelloy®C276	**2**	AISI316L	**3**	Hast.C 276	**3**	Hast.C 276		
		3	Hastelloy®C276	**5**	Tantalum	**8**	Duplex		
		5	Tantalum	**8**	Duplex				
		6	Titanium Gr2 [1]						
		8	Duplex (EN 1.4462)						
		A	AISI304						

Fill fluid **S** Silicone oil **A** Oul for food Industry (Neobee M-20) **G** Inert fluid

(-)-side process connection
D M10, PN100, ranges 3 to 6, IEC 61518
U 7/16-20 UNF, PN100, ranges 3, 4, and 5 only

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 **0** No explosion proof

									Special features		

Example code

VDtL5	S	DC	0	222	S	D	H	0

Special features (specify only if necessary)

Special electronics (specify only if housing connected with hose 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 cable between sensing element and housing
(specify only if housing connected with cable to sensing element)
2 2m cable **3** 3m cable etc. (max. 10m)

Optional items - order separately

Threaded process adapters (only specify for (-) side)

Code	Type
M860298-1	Oval flange G1/2 PN100 M10
M550428-1	Oval flange G1/4 PN100 M10
M550431PN420-1	Oval flange ½ -NPT PN420 M10

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

Mounting parts for remote electronics
M1050025 for pipe Ø51 mm (2") **M1050025-1** for pipe Ø60 mm (2.25")

Documentation

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

[1] **Only with flange**

Satron Instruments Inc., Muuraintie 3, FI-33960 Pirkkala,Finland
Tel. +358 207 464 800, sales@satron.com, www.satron.com