

The SATRON VOF analyzer allows savings to be obtained in process industries such as:

- Impurities monitoring of clean water
- Detection of yeast after the membrane in breweries
- Integrity monitoring of filters
- Evaporator impurities monitoring

The transmitter uses absorption principle and communicates via 4...20mA and digitally using HART® protocol.



## TECHNICAL SPECIFICATIONS

### Measuring range

0...1 500 NTU

### Calibration

The transmitter is factory calibrated at 4mA = water, 20mA = full absorption. freely adjustable with pushbuttons or Hart® modem.

### Damping

Time constant adjustable 0.01 to 60 s.

### Repeatability

0.1% from maximum span.

### Response time

0.1s (with less than 0.1s damping)

### Accuracy

0...50 NTU	0.2%
0...1 500 NTU	1%

### Unit selection

%, NTU, FNU, FTU, mg/L, g/dm<sup>3</sup>, PPM

### Temperature limits

Ambient: -30 to +80 °C  
Display operating range: 0 to +50 °C  
(Does not affect operation of the transmitter)

Process N type: 0 to +100 °C  
(120 °C for 10min)

Process H type: 0 to +140 °C  
(160 °C for 30 min)

Shipping and storage: -40 to +80 °C

**Output** 3-wire (3W), 4-20 mA NAMUR NE43

### Supply voltage

Nominal 24 VDC, (21,6 - 27,6V) 200mA

**Humidity limits** 0-100 % RH

### Pressure class:

- PN40
- Test pressure -1 to 30 bar (-14.5 to 435 PSI)

### EMC directive 2014/30/EC

- EN 61326-1:2013

### CONSTRUCTION

#### Materials:

Sensing element <sup>1)</sup>: AISI316L, Duplex (EN. 1.4462), Hast. C276/C22, or Titanium Gr2.  
Surface quality: Polished Ra <0,8µm  
Lens: Sapphire

#### Housing with display code N:

Housing: AISI303/316, Seals: Nitrile-rubber and Viton®, Nameplates: Polyester

#### Housing without display code H:

Housing: AISI303/316, Seals: Viton® and NBR.  
Nameplates: Polyester

#### Connection hose between sensing element and housing code L:

PVC signal cable or hose protected with PTFE/AISI316 braiding  
Nameplates: Polyester

### Electrical connections

Housing without display code H:  
1x M12 plug connector

Housing with display, code N:  
2x M12 plug connector

### I/O-connections

Current output1 Turbidity active  
Range (Namur NE 043) 3.5...23 mA  
Maximum load 600 Ω  
Factory setting 4...20 mA

#### Switch outputs (up to 3 available)

solid state relay, grounding contact  
Maximum voltage 35 V  
Maximum current 50 mA  
Maximum leakage current 10 µA

#### Switch inputs (up to 3 available)

NC (no connection)	OFF
0...2 V	ON
Minimum values for switch in use	
Voltage	16 V
Current	4 mA
Leakage current	1 mA

#### Current output2

Internal power supply  
Current output 2 has same ground as binary IO  
Maximum load 400 Ω  
Range 3.5...23 mA  
Factory setting 4...20 mA  
External power supply  
Current output 2 is galvanically isolated

Maximum supply voltage 35 VDC  
Range 3.5...23 mA  
Factory setting 4...20 mA  
Maximum isolation voltage 100 VDC

### Process connections of the sensor

- G1A ball valve insertion. Extension 19cm diameter ø 24mm

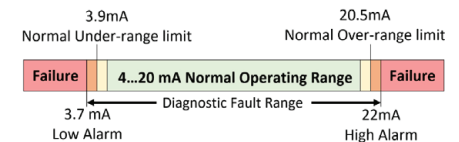
**Protection class:** IP66. IP67 and IP68  
See Selection chart.

### Weight

Housing without (H):	1.2 kg
Housing with Display (N):	1.3 kg
Remote Housing (L):	2.5 kg

Min. load using HART®-communication 250 Ω

Output signal according to NAMUR NE043 Signal Level for the failure information of Digital Transmitters.

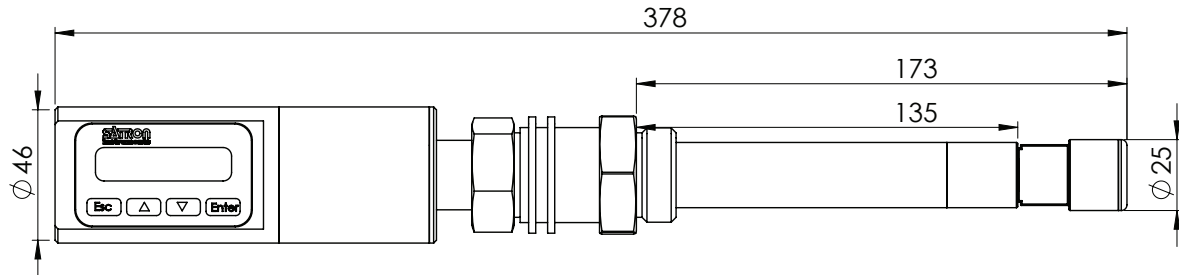
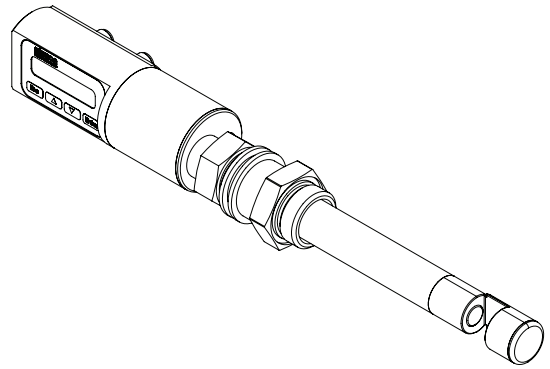


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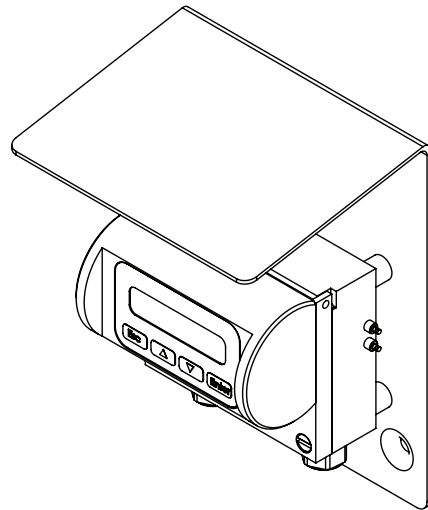
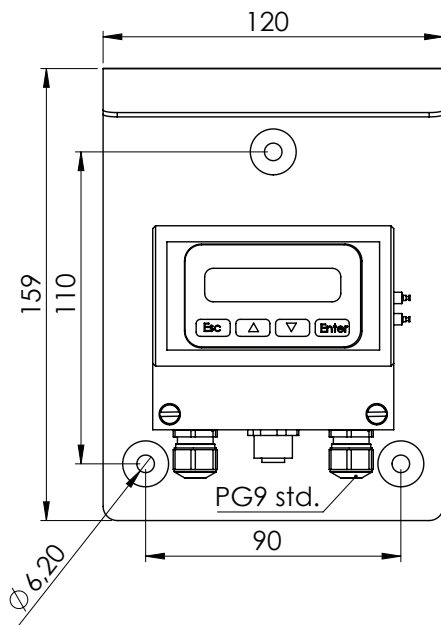
<sup>1)</sup> Parts in contact with process medium compliant to FDA

# SATRON VOF Turbidity and solids content sensor

## Dimensions and Housing types VOF (mm)

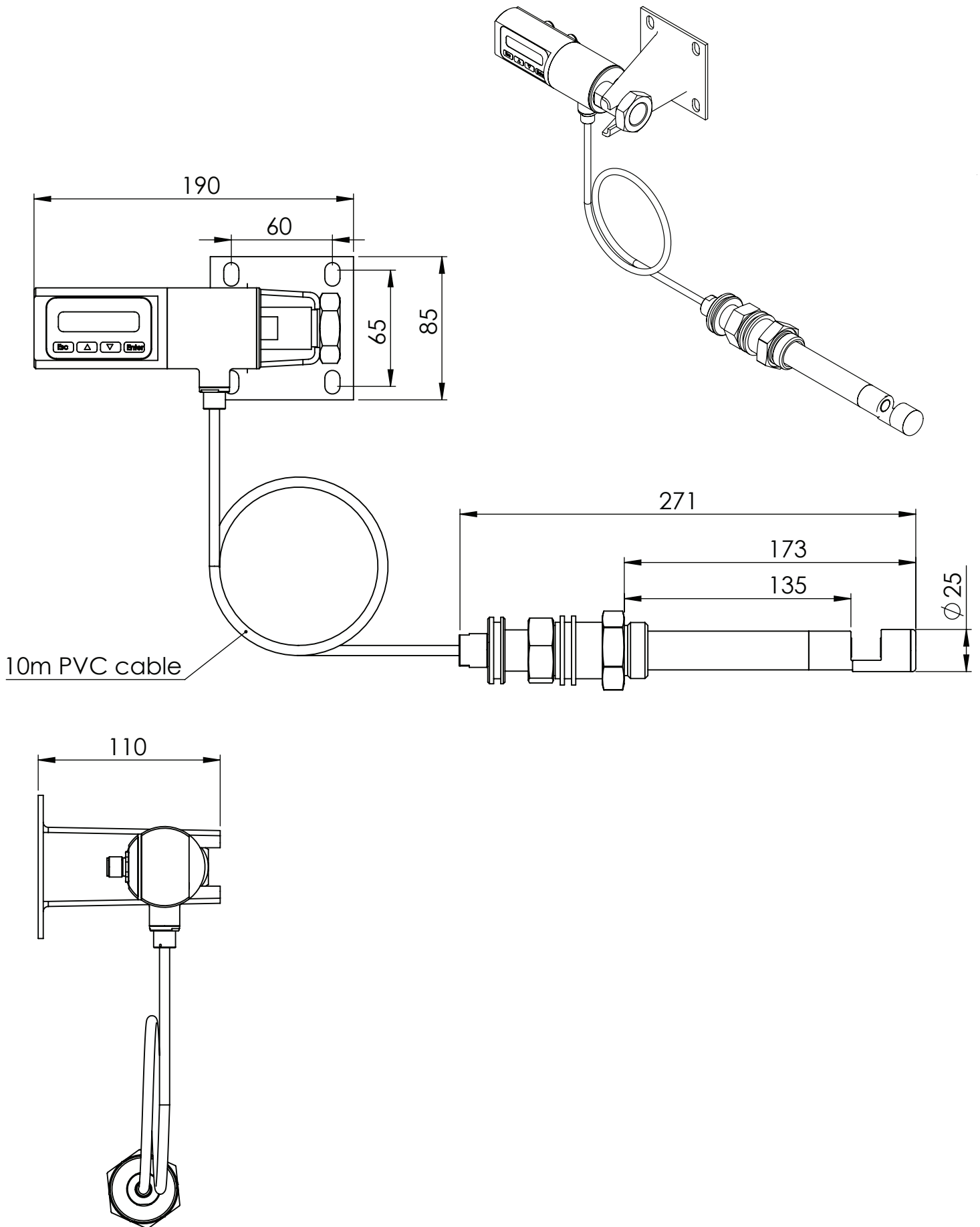


VOF B1 with display and pushbuttons (N housing)



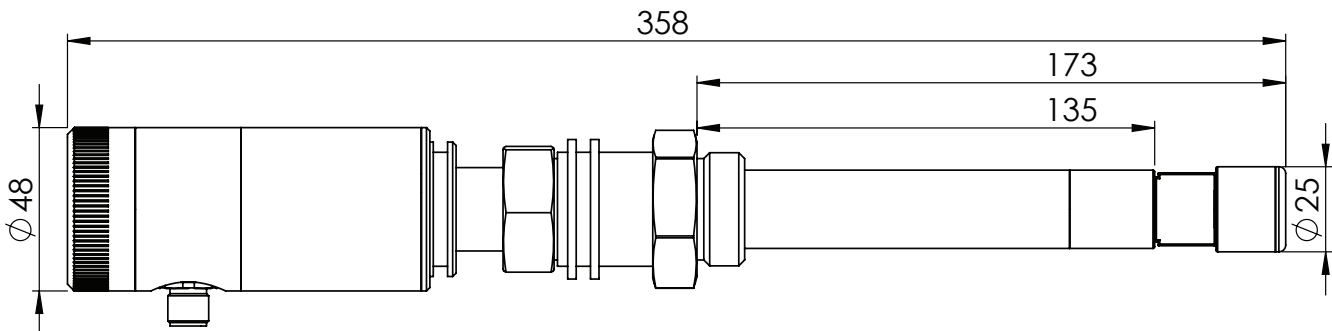
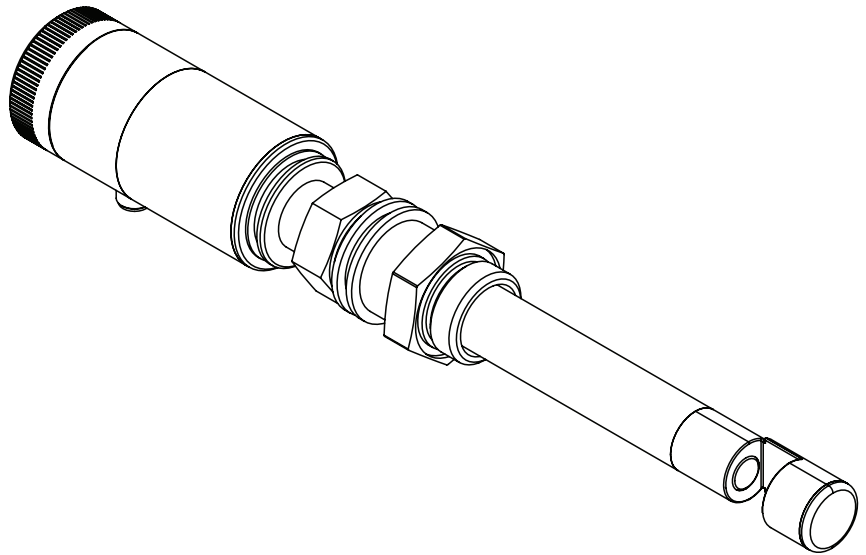
VOF with remote electronics housing with display (L housing)

# SATRON VO Turbidity and solids content sensor



VOF B1 with remote electronics NR housing)

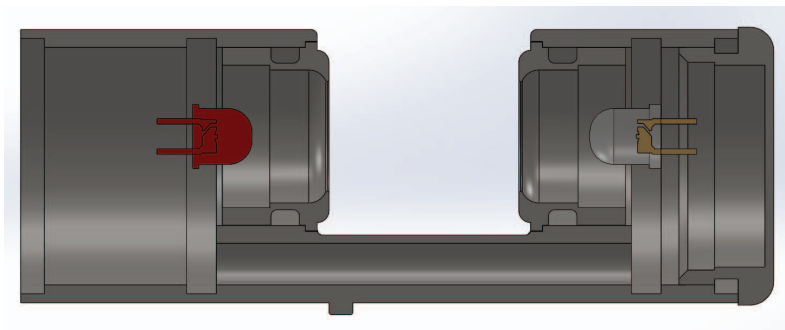
# SATRON VO Turbidity and solids content sensor



**VOF B1 with no display or remote display (H or L housing)**

## VOF measurement principle:

Turbidity measurement according absorption with selectable wavelength LED lightsources (see selection chart). The LED (shown as red) sends light through the process and is received by the photodetector (shown as grey). Depending on the turbidity the amount of light received by the photodetector will change. The lifetime of the high quality optical LED and photodetectors used in our process instruments is generally considered to be in excess of 20 years.

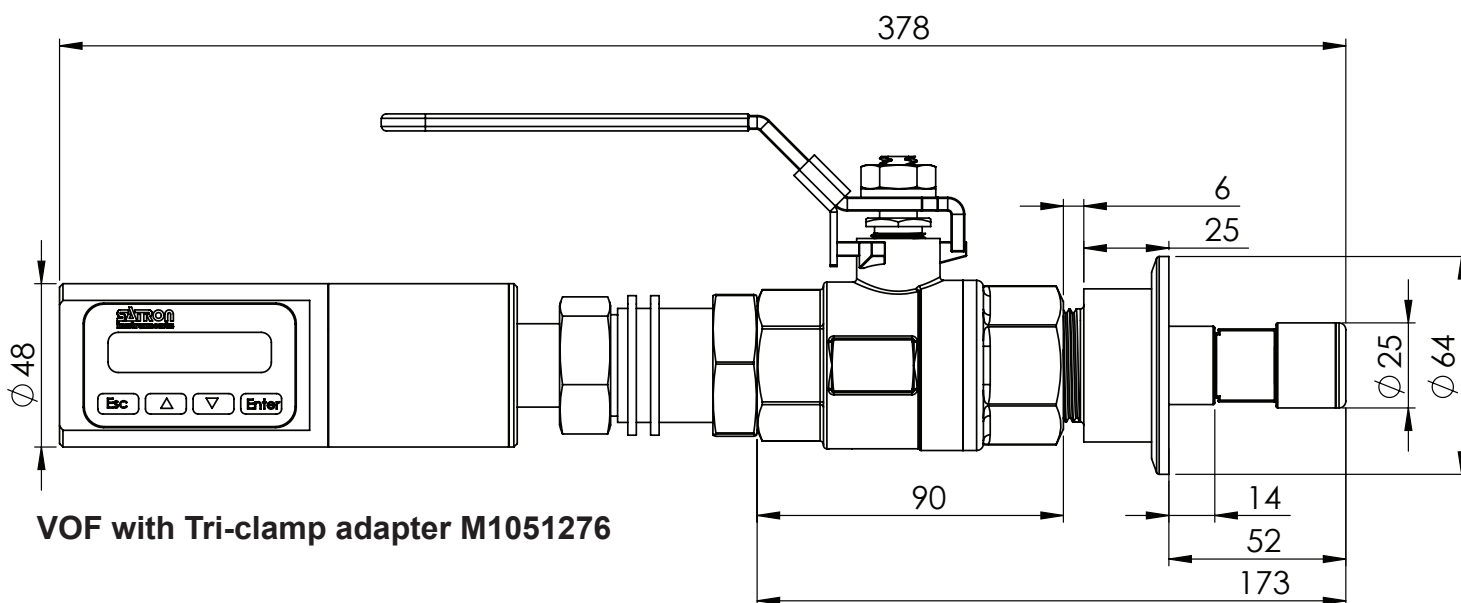
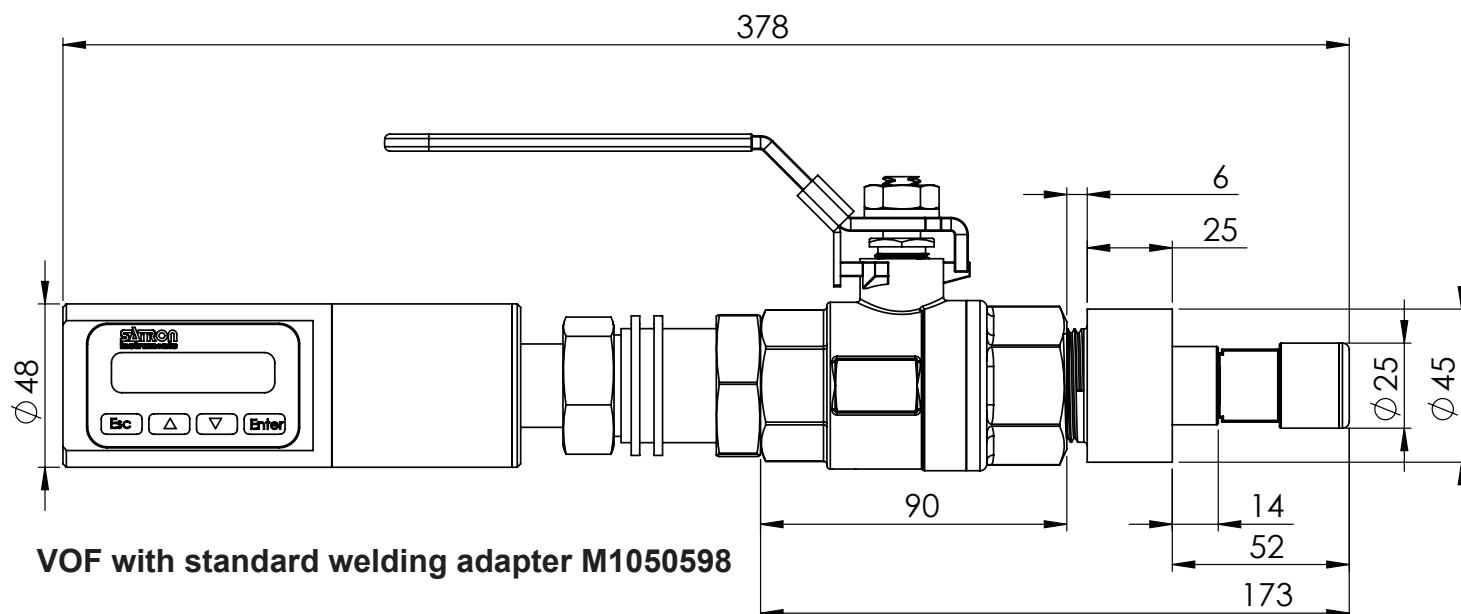


# SATRON VO Turbidity and solids content sensor

## Process connection details

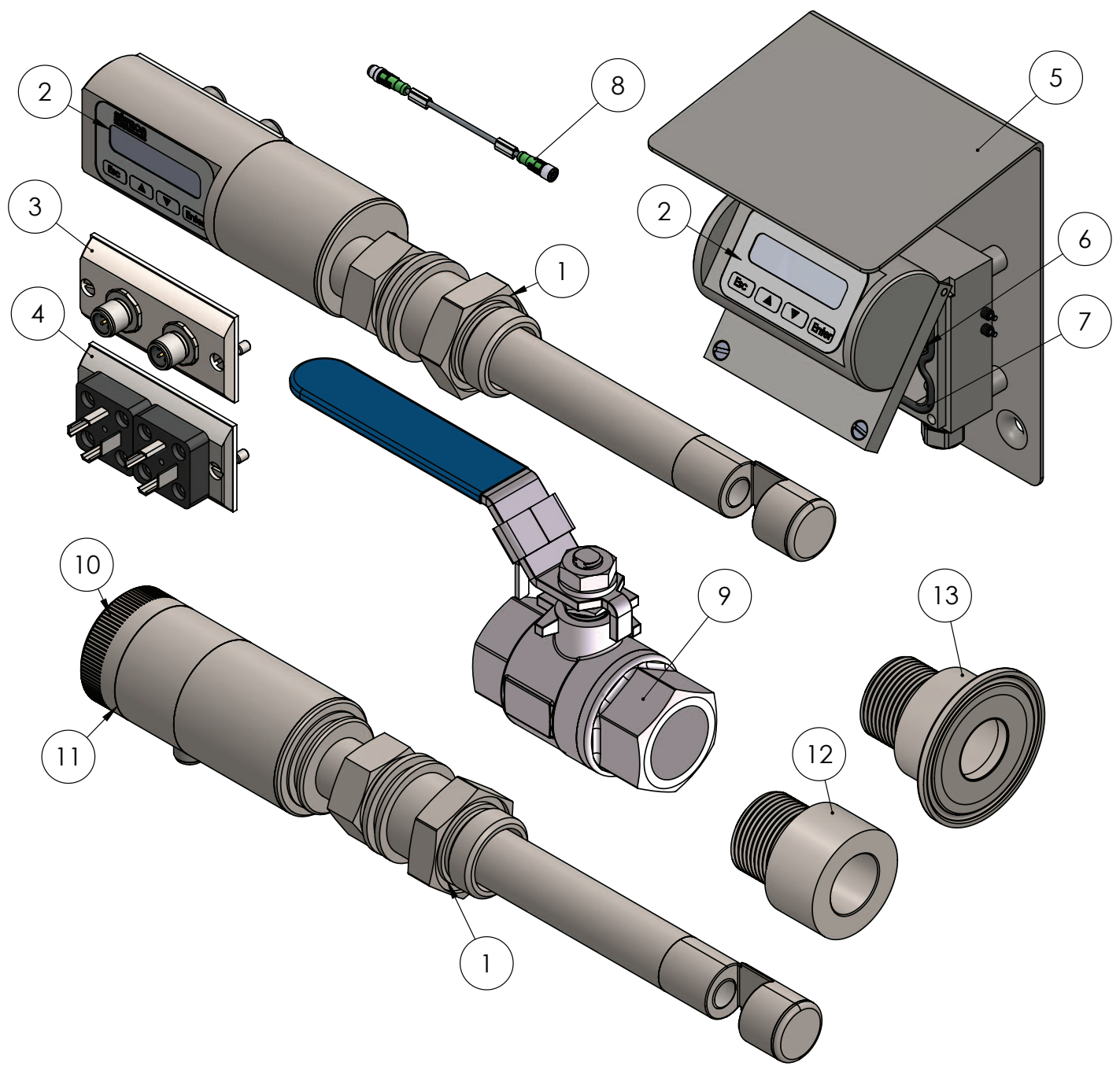
The Satron VOF comes with a G1" retractable process connection type B1.

Different process couplings allow for welding, flanged or clamped connection.



# SATRON VO Turbidity and solids content sensor

## Spare-parts VOF



No.	Part name	Order code	Note
1	O-ring EPDM	80036203	.
2	Sticker	T1325215	
3	Plug cover M12	T1325031	
4	Plug cover DIN43650	T1325003-K48	includes 2 M12 female connectors
5	Remote Display Unit RDU	T13250016	includes 2 DIN43650 female connectors
6	FUSE for L-Housing	74212000	
7	Seal for L-Housing display	80017226	
8	L-Housing data cable 10m PVC	70000450	
8	L-Housing data cable 15m PUR	70000440	
9	AISI316L ball valve	82500003	
10	AISI 316 cover	T1300256	contact satron
11	O-ring	80013800	
12	B1 Welding process coupling	M1050598	
13	B1 Triclamp 64mm coupling	M1051276	

# SATRON VO Turbidity and solids content analyzer

## Selection Chart

<b>Adjustability</b> VOF		<b>Span, min</b> 0...50 NTU		<b>Span, max</b> 0...1 500 NTU
<b>Process temperature limits</b>	<b>N</b>	Normal version	0...+100 °C continuous (120 °C for 10 minutes)	
	<b>H(**)</b>	High temperature	0...+140 °C continuous (160 °C for 30 minutes)	
<b>Output</b>	<b>S</b>	4-20mA DC/HART® for 50Hz (Europe)		
	<b>J</b>	4-20mA DC/HART® for 60Hz (USA / Japan)		
<b>Material of wetted parts</b>	<b>Body</b>	<b>Lens</b>	<b>Seal PTFE +</b>	
	<b>2</b>	AISI316L	<b>2</b>	Sapphire
			<b>1</b>	EPDM
			<b>2</b>	FPM (Viton®)
			<b>3</b>	FFPM (Kalrez®)
<b>Housing type</b>	<b>N</b>	Housing with display and pushbuttons		
	<b>H</b>	Housing with, no display, (only one mA output)		
	<b>L</b>	Remote electronics housing with display		
<b>Probe type</b>	<b>0</b>	No remote probe		
	<b>R</b>	Remote electronics		
<b>Connection type</b>	<b>T</b>	M12, IP67		
	<b>V</b>	PG9 (always with L housing), IP66		
<b>Cable Material (R &amp; L housing)</b>	<b>2</b>	AISI316L braided PTFE hose.		
	<b>4</b>	PVC cable (std.)		
<b>Cable length (R &amp; L housing)</b>	<b>0</b>	No L option selected		
	<b>1</b>	5 M.	<b>3</b>	15 M.
	<b>2</b>	10 M. (std.)	<b>4</b>	20 M.
<b>Light source</b>	<b>3</b>	460nm	<b>7</b>	880nm
	<b>9</b>	IR+		
<b>Process connections</b>				
<b>HX</b>	Fixed mounting tube, (specify length)			
<b>B1</b>	G1A ball valve insertion. Extension 19cm diameter ø 25mm			
<b>BX</b>	G1A ball valve insertion. Extension on request			



### Documentation

Calibration certificate **AE** English

Installation and operating instructions **IE** English **IF** Finnish **FR** French

### Material certificates

**0** 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, 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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