

Satron VOF

Turbidity and solids sensor
for Food and Biopharma

SATRON
instruments

The SATRON VOF sensor 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 sensor uses absorption principle and communicates via 4...20mA and digitally using the HART® protocol.



TECHNICAL SPECIFICATIONS

Measuring range

0 ... 1 500 NTU

Calibration

The sensor 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/dm³, PPM

Temperature limits

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

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 ¹⁾: 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: Nitrilerubber 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

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

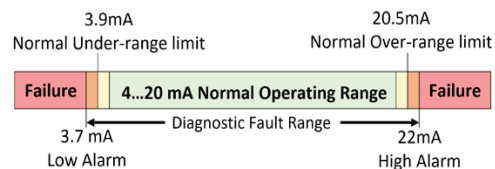
Protection class: IP66, IP67 and IP68

See Selection chart.

Weight

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

Output signal according to NAMUR NE043 Signal Level for the failure information of Digital Transmitters.
Min. load using HART®-communication 250 Ω

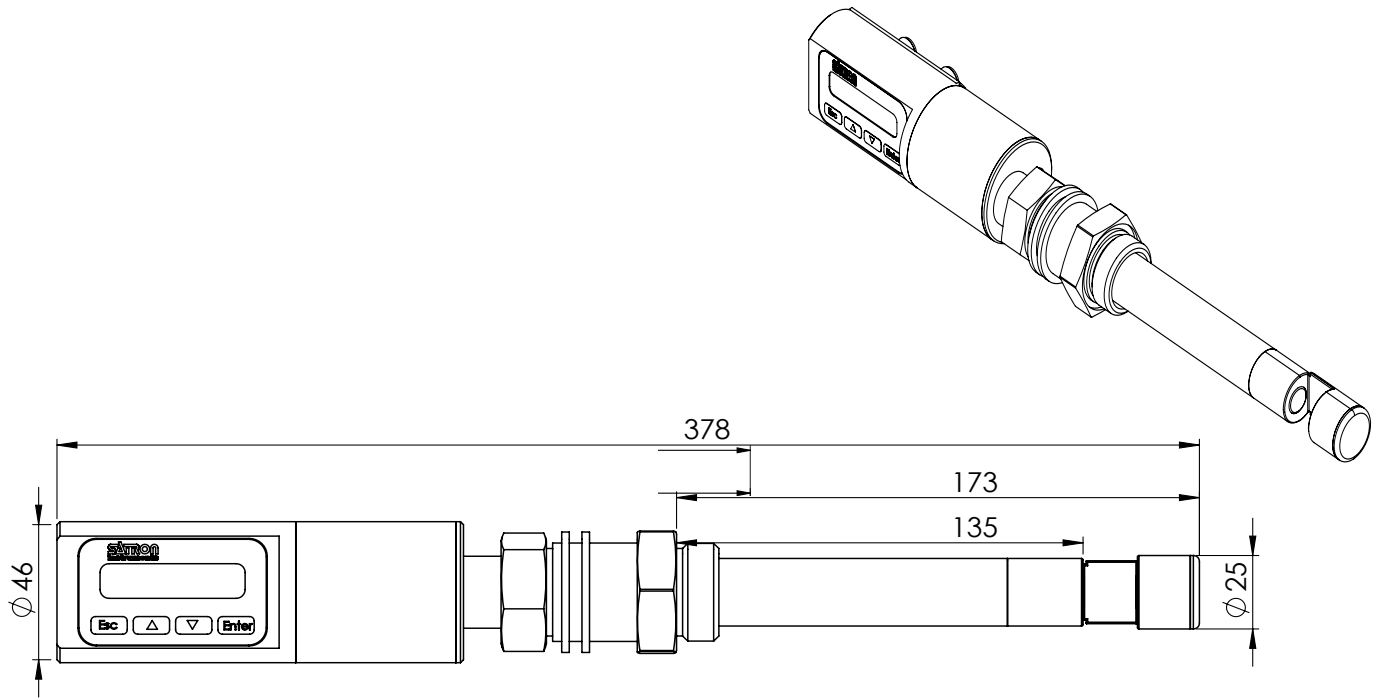


UL 61010-1, 3rd Ed. Rev May 11, 2012
CAN/CSA C22.2 No. 61010-1-12, Ed. 3
EMC directive 2014/30/EC

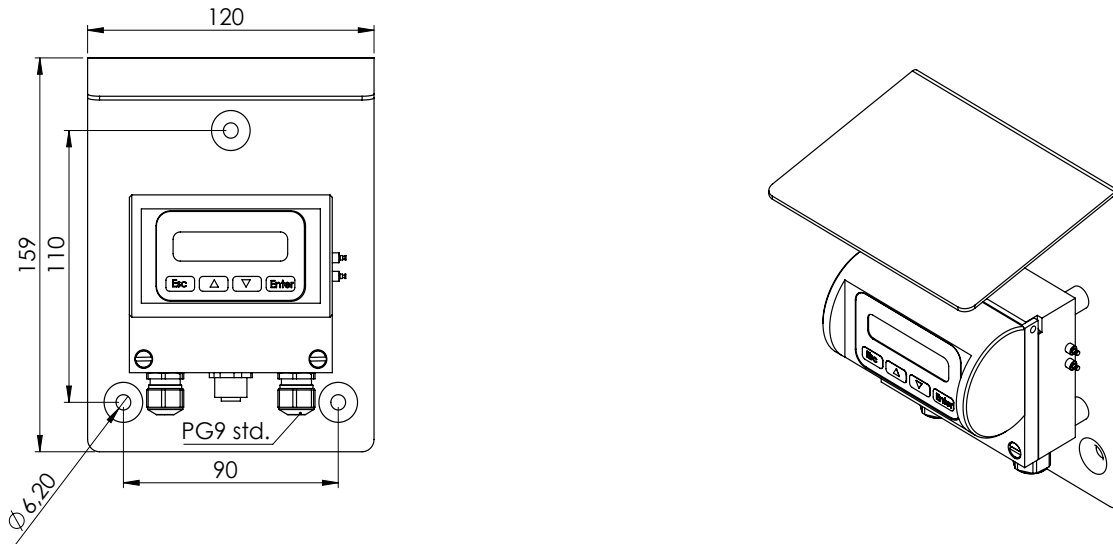
- EN 61326-1:2013

¹⁾ Parts in contact with process medium compliant to FDA

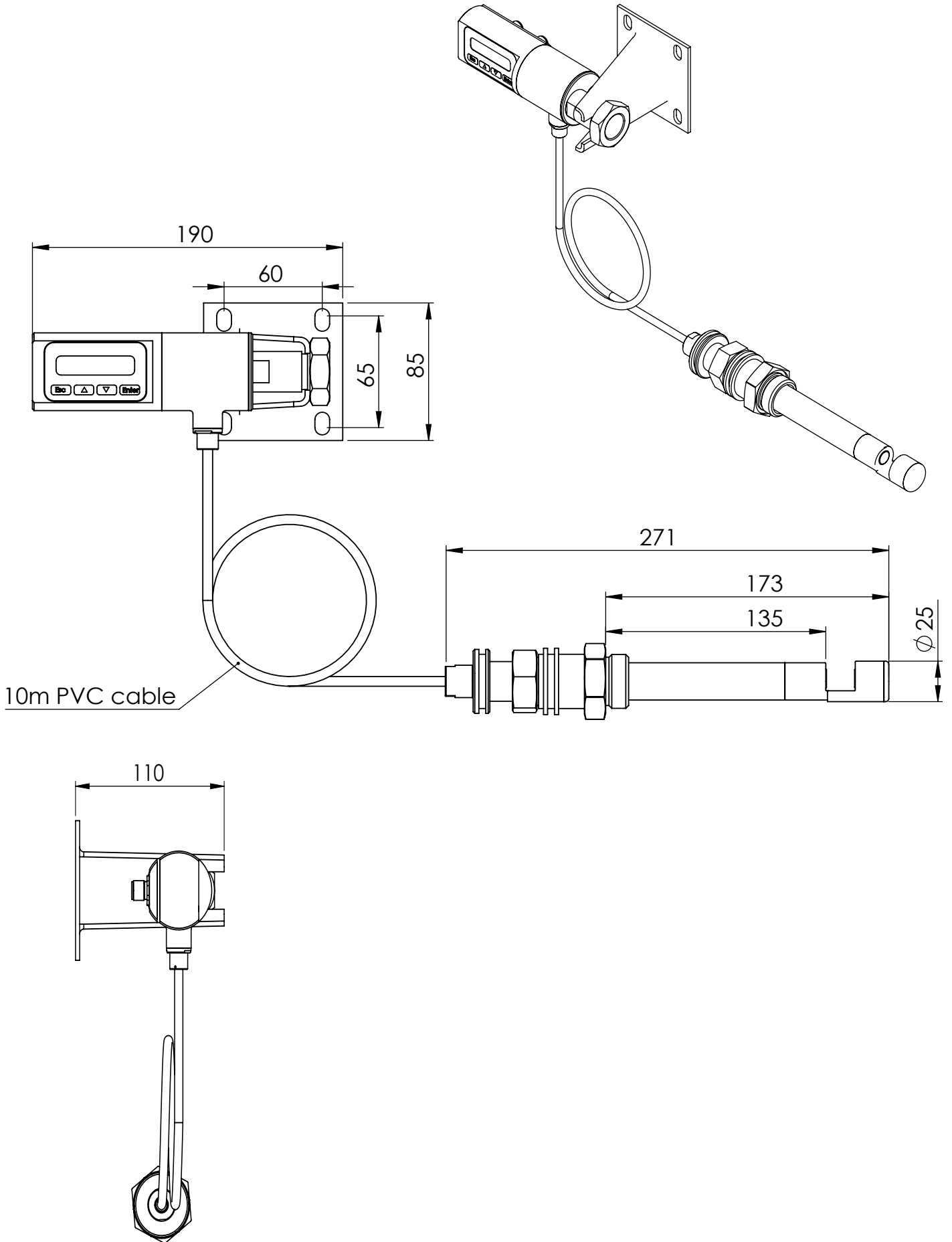
Dimensions and Housing types VOF (mm)



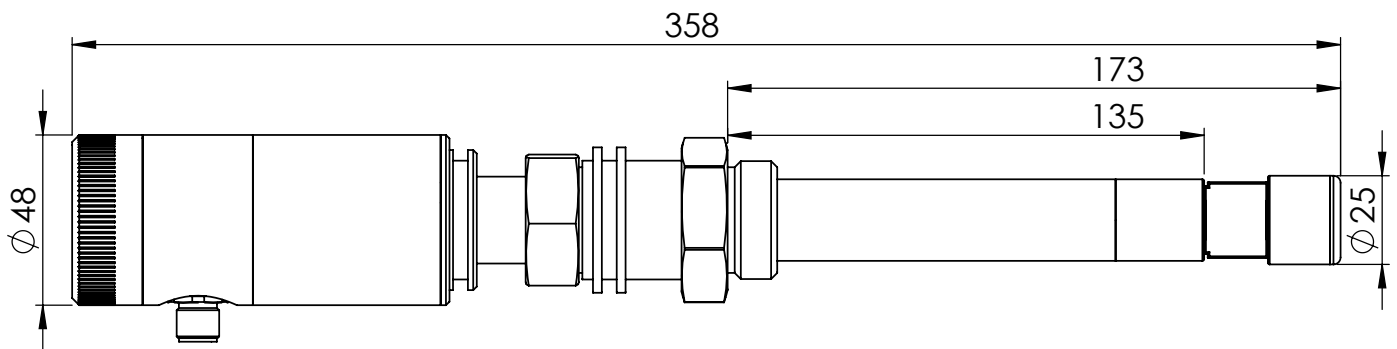
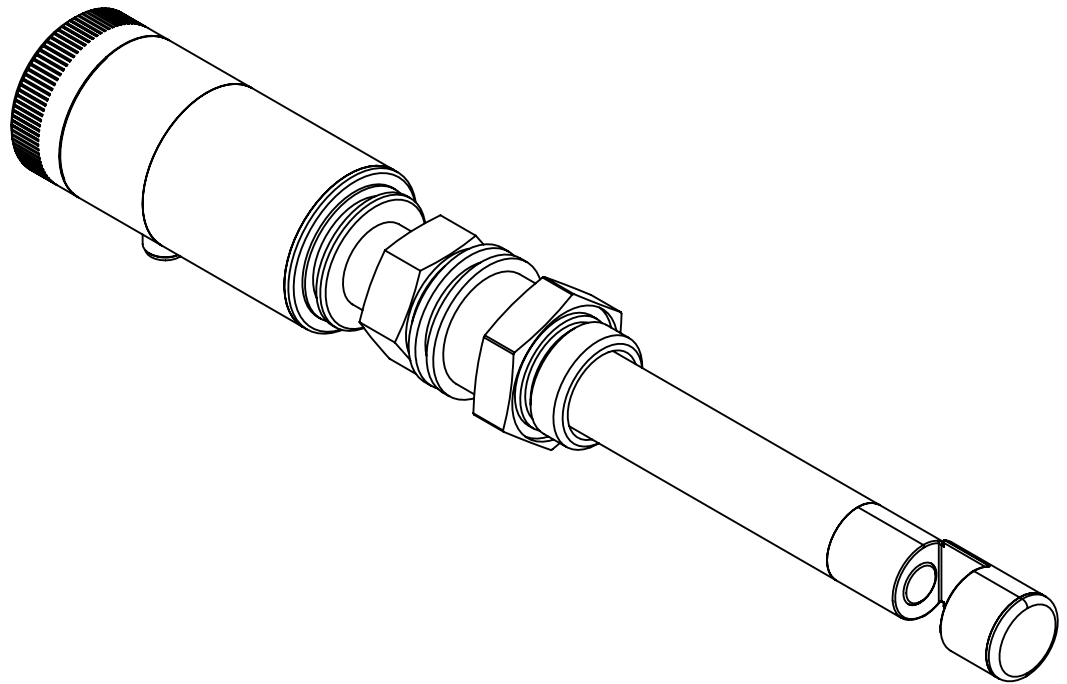
VOF B1 with display and pushbuttons (N housing)



VOF with remote electronics housing with display (L housing)



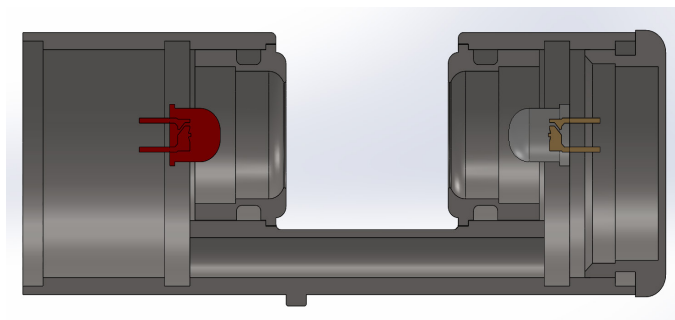
VOF B1 with remote electronics NR housing



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

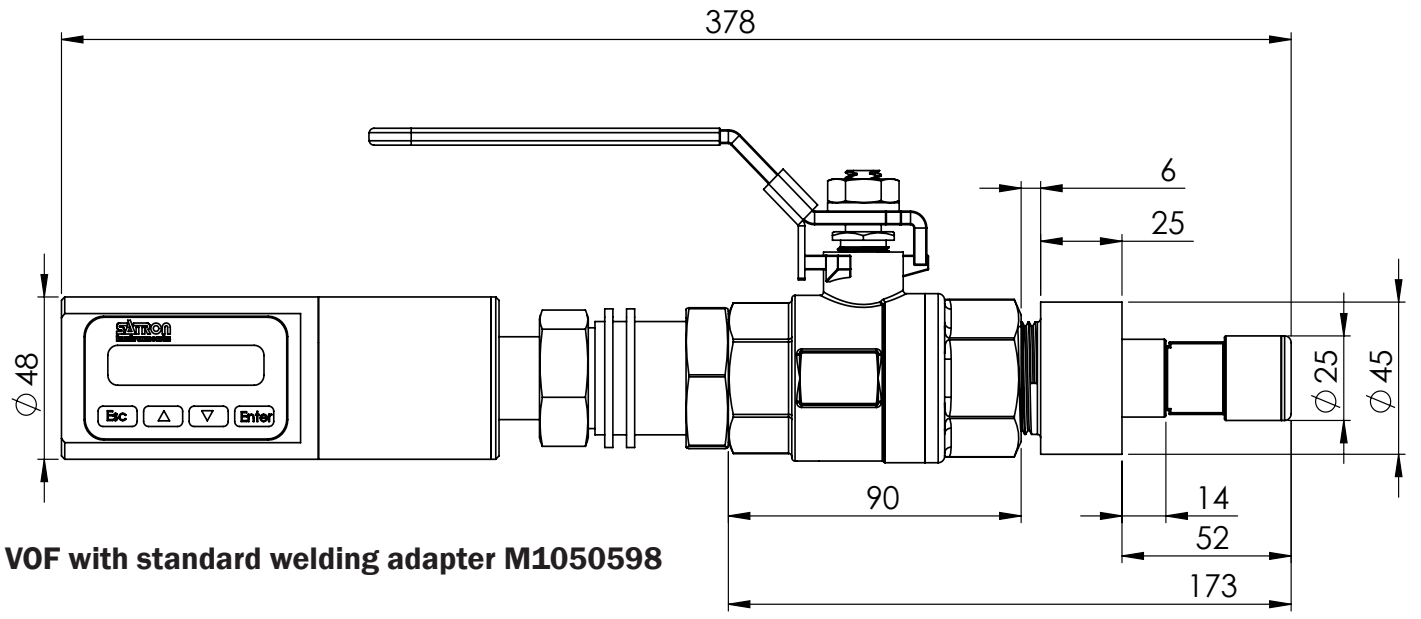
VOF measurement principle:

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.

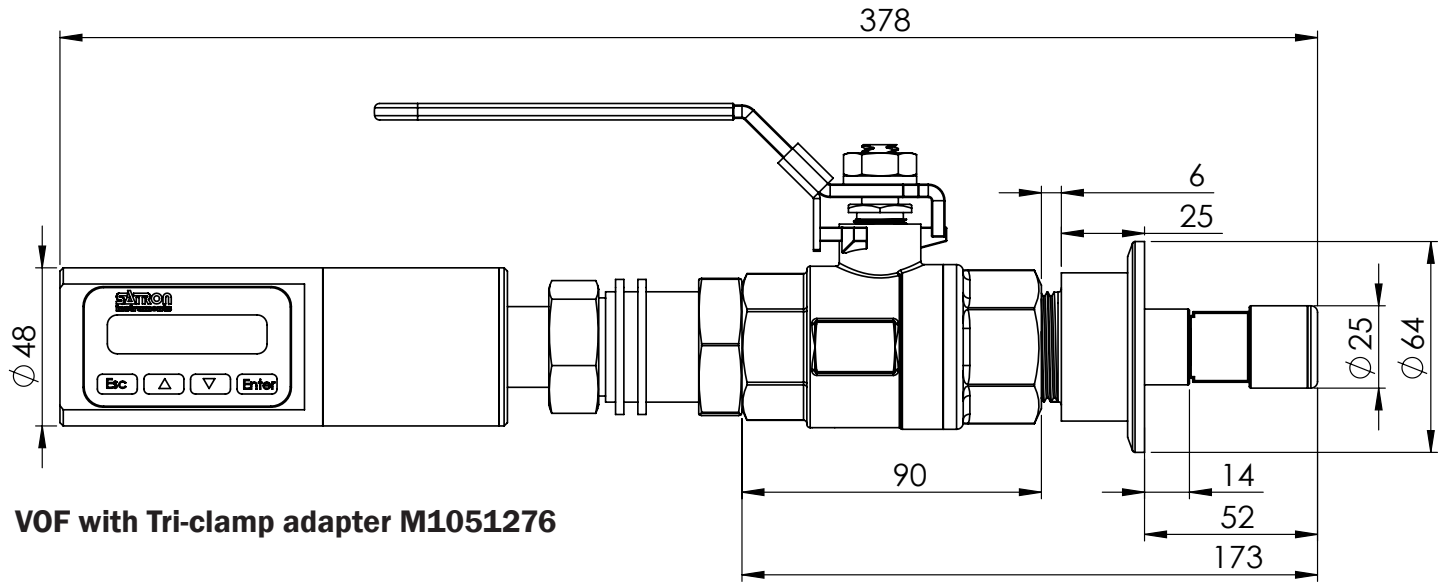


Process connection details

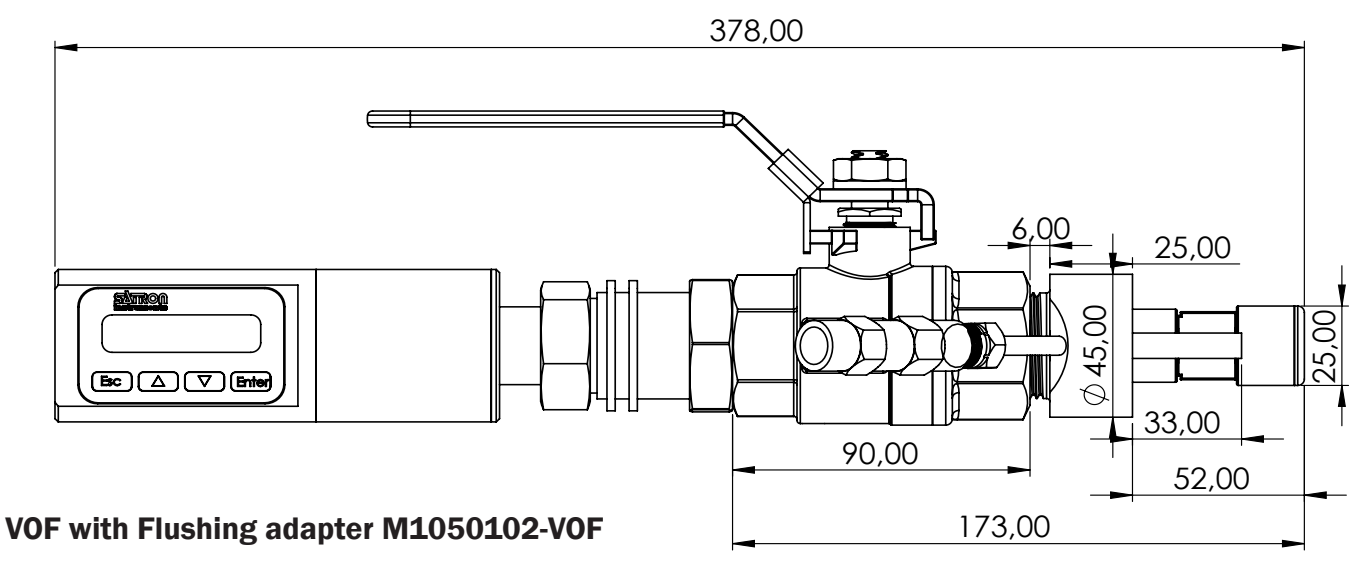
The Satron VOF comes with a G1" retractable process connection type B1.
Different process couplings allow for welding, flanged or clamped connection.



VOF with standard welding adapter M1050598

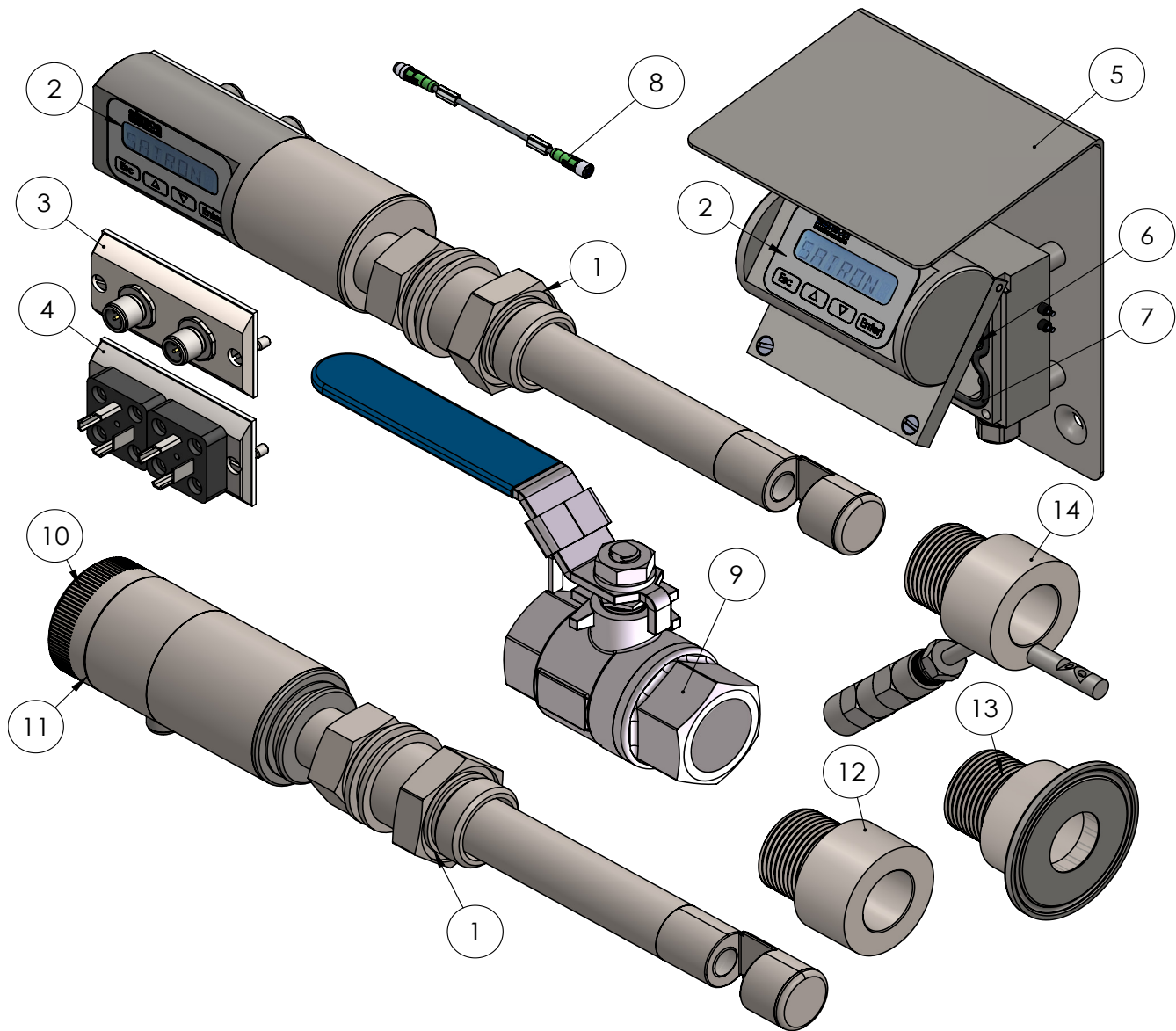


VOF with Tri-clamp adapter M1051276



VOF with Flushing adapter M1050102-VOF

Spare-parts VOF



No.	Part name	Order code	Note
1	O-ring EPDM	80033426	EPDM 34,6x2,62mm
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	70000450	
8	L-Housing data extension 10m	70000600	Extension cable to add 10meter. (male - female M12)
9	AISI316L ball valve	82500003	
10	AISI 316 cover	T1300256	
11	O-ring	80013800	
12	B1 Welding process coupling	M1050598	
13	B1 Triclamp 64mm coupling	M1051276	
14	Flushing coupling for VOF	M1050102-VOF	

Selection Chart

Adjustability VOF	Span, min 0... 50 NTU	Span, max 0... 1 500 NTU		
Process temperature limits	N	Normal version 0...+100 °C continuous (120 °C for 10 minutos)		
	H(**)	High temperature 0...+140 °C continuous (160 °C for 30 minutos)		
Output	S	4-20mA DC/HART® for 50Hz (Europe)		
	J	4-20mA DC/HART® for 60Hz (USA / Japan)		
Material of wetted parts	Body	Lens	Seal PTFE +	
	2	2	1 EPDM	
			2 FPM (Viton®)	
			3 FFPM (Kalrez®)	
Housing type	N	Housing with display and pushbuttons		
	H	Housing without display (only one mA output)		
	L	Remote electronics housing with display		
Probe type	0	No remote probe		
	R	Remote electronics		
Connection type	T	M12, IP67		
	V	PG9 (always with L housing), IP66		
Cable Material (R & L housing)	2	AISI316L braided PTFE hose		
	4	PVC cable (std.)		
Cable length (R & L housing)	0	No L option selected		
	1	3	15 M	
	2	4	10 M (std.) 20 M	
Light source	3	7	9	460nm 880nm IR+
Process connections	HX	Fixed mounting tube (specify length)		
	B1	G1A ball valve insertion. Extension 19cm diameter ø 25mm		
	BX	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



800029 EC 1935/2004

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EMC directive 2014/30/EC
- EN 61326-1:2013
1) Parts in contact with process medium
compliant to FDA

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