

Plastic tube flowmeters

Series PS



Variable area flowmeter for liquids and gases

- Low cost, excellent readability and light weight
- Simple installation (flanged, threaded or socket ends for solvent or fusion welding connections)
- Wide range of operating temperatures with several combinations of tube and fittings materials
- Scaled directly in l/h, m³/h, %,... Special scales for liquids and gases on request
- Flow rate:
 - Water: 4 l/h ... 50 m³/h
 - Air: 200 NI/h ... 1500 Nm³/h
- Accuracy:
 - Models PS: 4% (q_G=50%)
 - Models PSM / PTM03: 6% (q_G=50%)
- Connections:
 - ISO 1452-3 or ASME B16.5 flanges: DN15 ... DN80 / ½" ... 3"
 - BSP or NPT threaded connections ½" ... 3"
 - Solvent weld socket PVC connections
 - Stainless steel & PP connections for welding
- Materials:
 - Measuring tube: Polysulfone and NAS®
 - Fittings: PVC, EN 1.4404 (AISI 316L), PP, steel
 - Float: EN 1.4404 (AISI 316L), aluminium, PVC, PVDF, PTFE,...
 - Gaskets: NBR, VITON®, EPDM
- Local indication
- Options:
 - 1 or 2 limit switches
 - Electronic transmitter with 4-20 mA analog output (18 points max.). Ex version and HART, PROFIBUS, FIELDBUS, MODBUS RTU protocols available on request



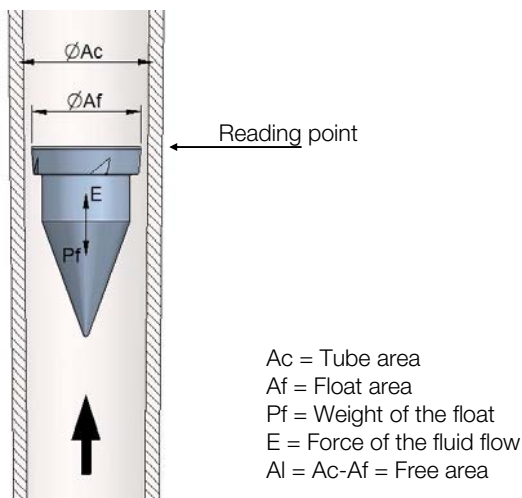
Working principle

The series PS flowmeters work according to the variable area principle, obtained by a float that moves along a tapered tube made of technical plastic materials.

The force of the flow pushes the float to a certain height inside the tapered tube, to an equilibrium point:

- E = force of the fluid flow
 - Pf = weight of the float
 - A1 = free area of flow
- (A1 = Ac, tube area - Af, float area)

Each height or position of the float corresponds to a value of flow rate.



Applications

- Water & waste water treatment
- Chemical & petrochemical industry
- Paper industry
- Pharmaceutical, cosmetics & synthesis
- Refrigeration & air conditioning
- Refining
- Osmosis
- Gas processes

Models

- PS/PSM Polysulfone tube (PSU)
- PTM03 NAS® tube (styrene methyl methacrylate copolymer)

According to connections materials, see next page

Technical data

- Accuracy, acc. to VDI/VDE 3513 sheet 2 ($q_0=50\%$):
 - PS: 4%
 - PSM / PTM03: 6%
- Scales calibrated in l/h, m³/h, %
Special scales for liquids and gases on request
- Scale range: 10:1

• Scale length:

- PS: 160 ± 5 mm
- PSM / PTM03: 100 ± 5 mm

• Fluid temperature:

- Models PS/PSM, connections:
 - PVC: 0°C ... +60°C
 - PP: -20°C ... +80°C
 - EN 1.4404 (AISI 316L) / Steel:
 - NBR gaskets: -20°C ... +100°C
 - VITON® gaskets: -20°C ... +110°C
- Model PTM03, connections PVC: 0°C ... +40°C

• Working pressure: depending on size, up to 15 bar

• Connections:

- PS31: BSP thread / socket ends for solvent welding
1/2" ... 3" / DN15 ... DN80
- PS32: ISO 1452-3 or ASME B16.5 (mod. BR) flange
DN15 ... DN80 / 1/2" ... 3"
- PSM21: BSP thread / socket ends for solvent welding
1/2" ... 3/4" / DN15 ... DN20
- PSM22: ISO 1452-3 or ASME B16.5 (mod. BR) flange
DN15 ... DN20 / 1/2" ... 3/4"
- PTM03: BSP thread / socket ends for solvent welding
1/2" ... 3/4" / DN15 ... DN20

Other connections available on request

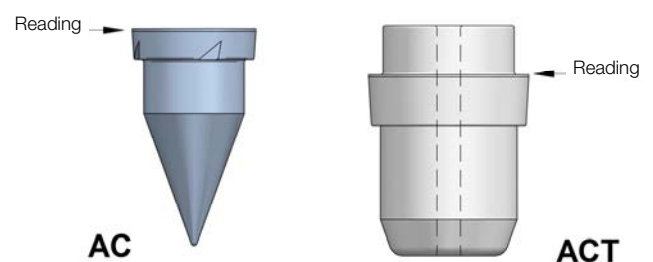
Operation

- Vertical with upwards flow

Limit switches and transmitters

- PT-AMR1 ... 2: 1 ... 2 adjustable reed switches
- PT-TMUR: for models PS. Resistive sensor with remote 4-20 mA transmitter (16...18 points), 24 VDC 2-wire system. Ex intrinsically safe version and HART, FIELDBUS and PROFIBUS protocols on request.
- PTM-TMUR: only for models PSM. Resistive sensor with remote 4-20 mA transmitter (11 points), 24 VDC 2-wire system. Ex intrinsically safe version and HART, FIELDBUS and PROFIBUS protocols on request.

Float types



Models acc. to connections materials

PS ... PSM / PVC ... PP
PTM03 / PVC

BSP thread 1/2" ... 3"
Socket ends for welding DN15 ... DN80



PS ... PSM / Fully Steel ... Fully SS
Fittings and nuts in steel or EN 1.4404 (AISI 316L)

BSP/NPT thread 1/2" ... 3"



PS ... PSM / Fully SS
Fittings and nuts in EN 1.4404 (AISI 316L)

Socket ends for welding DN15 ... DN80



PS ... PSM / PVC ... PP

ISO 1452-3 flange DN15 ... DN80

Other flange standards available on request with models BR flanged



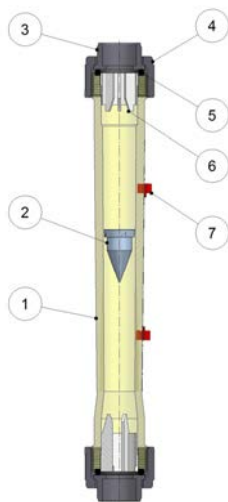
PS ... PSM / Steel ... SS
Fittings in steel or EN 1.4404 (AISI 316L) and nuts in PVC

BSP/NPT thread 1/2" ... 3"

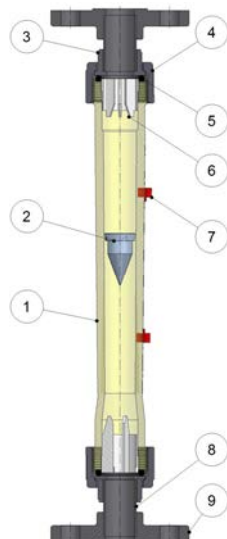


Materials

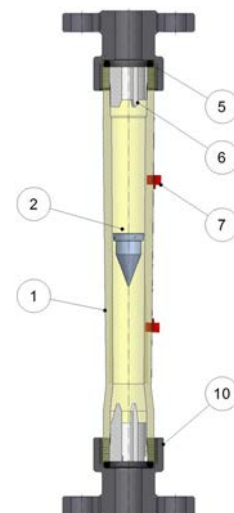
PS31 / PSM21 / PTM03



PS32 / PSM22



PS32-BR



N°	Description	Materials	
		PS31/32, PSM21/22, PS32-BR	PTM03
1	Flow tube	POLYSULFONE	NAS®
2	Float	EN 1.4404 (AISI 316L), PTFE, PTFE+Pb, PVDF, PVDF+Pb, Aluminium, PVC, PVC+Pb	
3	Fitting	PVC, EN 1.4404 (AISI 316L), Steel, PP	PVC
4	Nut	PVC, EN 1.4404 (AISI 316L), Steel, PP	PVC
5	Gasket	NBR, VITON®, EPDM	
6	Float stop	PVDF	PVDF
7	Flow indicator	PVC	PVC
8	Tube union	PVC, PP	---
9	Flange	PVC, PP	---
10	Flange group	PVC, PP	---

In all cases, painted steel

Dimensions

PS31

Rp"	DN	E	A	L (Rp")	L (E)
1/2"	-	-	52	356	-
3/4"	20	25	52	350	346
1"	25	32	74	366	366
1 1/2"	40	50	80	373	376
2"	50	63	100	387	390
2 1/2"	65	75	138	420	420
3"	80	90	138	418	420

PS32 ... PS32-BR

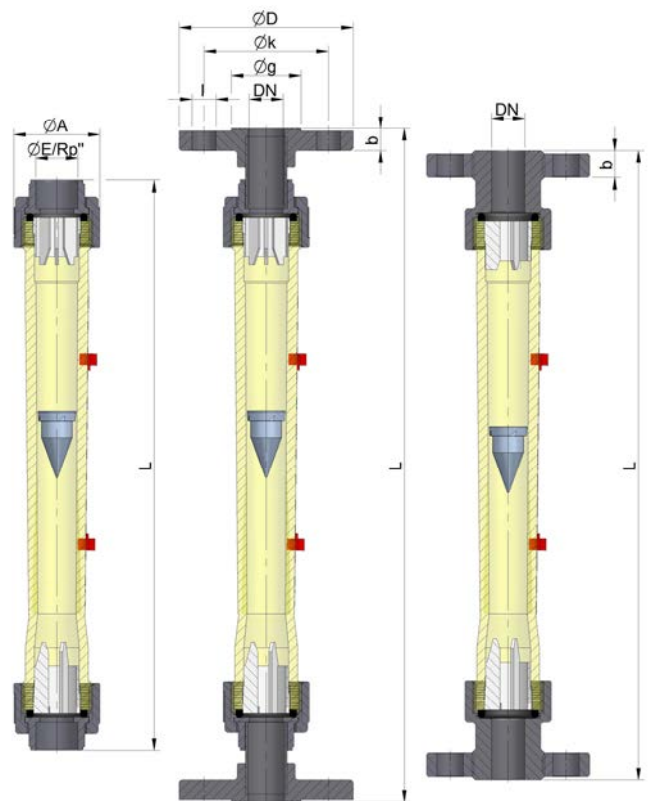
DN	D	k	g	l x n°	b	L (PS32)	L (PS32-BR)
20	105	75	58	14x4	13	408	379
25	115	85	68	14x4	15	422	392
40	150	110	88	18x4	17	456	400
50	165	125	102	18x4	19	483	418
65	185	145	122	18x4	21	515	425
80	200	160	138	18x8	22	542	422

PSM21 / PTM03

Rp"	DN	E	A	L (Rp")	L (E)
1/2"	15	20	43	229	236
1/2"	-	-	53	242	-
3/4"	20	25	53	238	230

PSM22

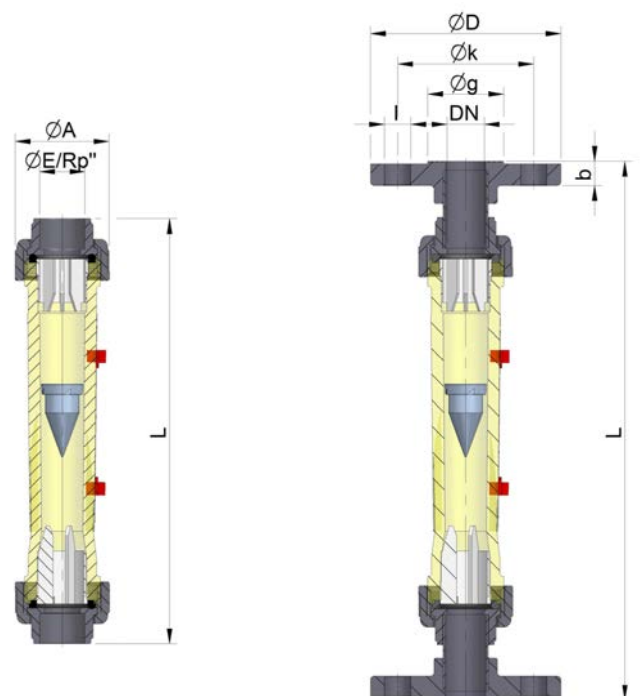
DN	D	k	g	l x n°	b	L
15	95	65	45	14x4	12	290
20	105	75	58	14x4	13	294



PS31

PS32

PS32-BR



PSM21
PTM03

PSM22

All dimensions in mm ($\pm 1,5$ mm)

Dimensions indicated for PVC fittings. For other materials there might be deviations.

Flow ranges

Model N°	Flow scales EN 1.4404 float 7.95 g/cm ³			Flow scales Aluminium float 2.85 g/cm ³		Max. pressure bar	R" (DN)	E
	l/h water	Nm ³ /h air	ΔP mbar	Nm ³ /h air	ΔP mbar			
		1.013 bar abs 20°C						
PS-312-0160 ⁽¹⁾	16-160 ⁽¹⁾	-	10 ⁽¹⁾	0,6-6 ⁽¹⁾	-	15	½" ¾" (DN20)	25
PS-312-0250 ⁽¹⁾	25-250 ⁽¹⁾	-		1-10 ⁽¹⁾	-			
PS-313-0400	40-400	1.2-12	12	0.7-7	5	15	¾" (DN20)	25
PS-313-0630	60-630	1.9-19		1.1-11				
PS-313-1000	100-1000	3-30		1.8-18				
PS-314-1600	160-1600	4.5-45	18	2.5-25	8	10	1" (DN25)	32
PS-314-2500	250-2500	8-75		5-45				
PS-315-4000	400-4000	12-120	23	7-70	10	10	1 ½" (DN40)	50
PS-315-6300	500-6300	15-190		10-110				
PT-316-6300	500-6300	15-190	30	10-110	12	8	2" (DN50)	63
PS-316-M010	1000-10000	30-300		20-180				
PS-316-M014	2000-14000	60-430		40-250				
PS-317-M016	1600-16000	50-490	40	30-290	17	8	2 ½" (DN65) 3" (DN80)	75 90
PS-317-M020	2000-20000	60-600		40-360				
PS-317-M025	2500-25000	80-770		50-460				
PS-317-M030	3000-30000	90-920		60-550				
PS-317-M040	6000-40000	190-1200		110-730				
PS-317-M050	10000-50000	280-1500		170-920				

⁽¹⁾ with PTFE float

For PS series, all plastic loaded floats are in PVDF+Pb, except for tube models PS-316-M014 ... M050, in PVC+Pb

Model N°	Flow scales EN 1.4404 float 7.95 g/cm ³			Flow scales Aluminium float 2.85 g/cm ³		Max. pressure bar	R" (DN)	E
	l/h water	Nm ³ /h air	ΔP mbar	Nm ³ /h air	ΔP mbar			
		1.013 bar abs 20°C						
PSM-312-0040 ⁽¹⁾	4-40 ⁽¹⁾	-	3 ⁽¹⁾	0.2-1.6 ⁽¹⁾	-	15	½" (DN15)	20
PSM-312-0060 ⁽¹⁾	6-60 ⁽¹⁾	-		0.3-2.5 ⁽¹⁾	-			
PSM-312-0100	10-100	0.3-3	10	0.2-1.8	4	15	½" ¾" (DN20)	25
PSM-312-0160	16-160	0.5-5		0.3-3				
PSM-312-0250	25-250	0.8-7.7		0.5-4.5				
PSM-313-0400	40-400	1.2-12	12	0.7-7	5	15	½" ¾" (DN20)	25
PSM-313-0630	60-630	1.9-19		1.1-11				
PSM-313-1000	100-1000	3-30		1.8-18				

⁽¹⁾ with PTFE float

Limit switches

Adjustable limit switch PT-AMR

Bi-stable SPST reed switch, actuated by a magnet inside the float and mounted in a PVC enclosure:

- PT-AMR1 ... 2: 1 ... 2 adjustable reed switches

- Normally opened (NO) switches. Normally closed (NC) reed switches are available on request.
- Operation: the standard contact is normally opened. That means:

- Maximum flow: on increasing flow, the contact closes when the float reaches the height of the alarm sensor. It remains closed while the float is above the sensor. It opens again when the flow rate decreases and the float returns to a position below the sensor.

- Minimum flow: on decreasing flow, the contact closes when the float reaches the height of the alarm sensor. It remains closed while the float is below the sensor. It opens again when the flow increases and the float rises to a position above the sensor.

- Contact rating: 0.5 A / 250 V / 12 VA
- Hysteresis: $\pm 5\%$
- Ambient temperature: $-25^{\circ}\text{C} \dots +80^{\circ}\text{C}$
- DIN 43650-A connector, PG9 cable gland
- Ingress protection: IP65
- Suitable for ATEX hazardous area "Simple Apparatus"



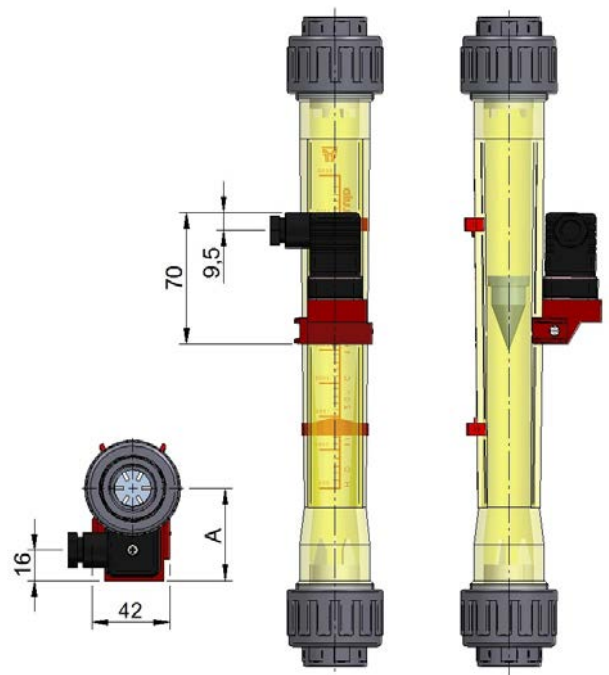
PS31
with 2 reed switches PT-AMR



PSM22
with 1 reed switch PT-AMR

Dimensions series PS + PT-AMR (in mm)

DN	15	20	25	40	50	65	80
R	1/2"	3/4"	1"	1 1/2"	2"	2 1/2"	3"
A	47	52	62	70	70	90	90



Transmitters

Transmitter PT-TMUR 4-20 mA

(18 points, for ½" ... 2")

(16 points, for 2½" ... 3")

Transmitter PTM-TMUR 4-20 mA (11 points)

The TMUR resistive sensor consists of a reed chain which is mounted inside a plastic enclosure IP65 rated. Installation on the rear side of the measuring tube. By means of a transmitter, the resistance signal is converted into current 4-20 mA.



PSM21 + PTM-TMUR



TR3420

Technical data TMUR

- Working temperature: -20°C ... +80°C
- Resolution: 10 mm

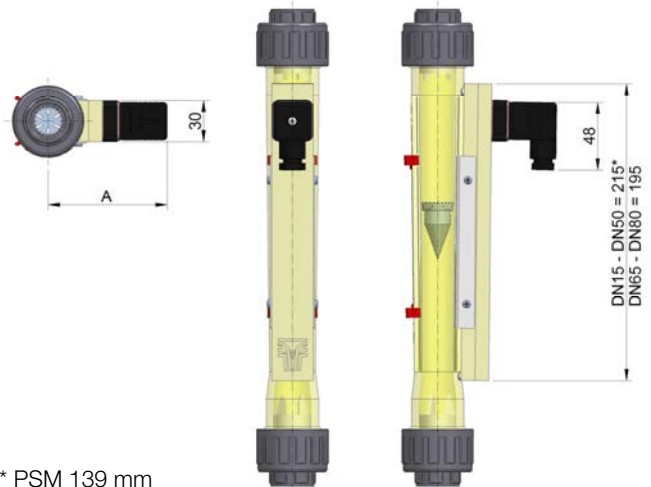


Transmitters TR series

- 2-wire system with 4-20 mA output
- **TR3420** safe area version
 - Power supply: 12 ... 36 VDC
 - Consumption: 0.8 W
 - Configuration by means of USB connection and Winsmeter TR software, available for download at www.tecfluid.com
- **TR2420Ex** ATEX Ex ia IIC T6 certified version
 - Power supply: 8 ... 30 VDC
- **TR2420H** (HART protocol), **TR2420FP** (Fieldbus/Profibus protocol). Also available in combination with their Ex versions

Dimensions series PS + transmitter TMUR (in mm)

DN	15	20	25	40	50	65	80
A	95	105	110	120	130	145	145



* PSM 139 mm

Electronic converter

Model MT03A

- Electronic converter for flow applications
- Resistance and current inputs
- Programmable via USB cable by means of Tecfluid S.A. Winsmeter MT03 software or by means of keyboard and graphic display with intuitive menus
- Panel mounting with dimensions 96 x 96 mm DIN 43700
- Power supply: 100 ... 240 VAC 50 / 60 Hz
18 ... 36 VDC
- Full diagnosis. User selectable password protection
- 5 digits local flow rate indication and 8 digits totalizer and partial totalizer. Possibility of remote reset
- Programmable 4-20 mA analog output
- 2 x relay outputs programmable as flow rate alarms

- Mass flow rate can be measured programming the product density
- Ingress protection: IP50 front, IP30 back (Optional IP65 front with silicone cover)
- Ambient temperature: -20°C ... +60°C
- MODBUS RTU RS485 protocol on request



MT03A

PRESENCE IN MORE THAN 50 COUNTRIES ALL OVER THE WORLD



TECFLUID
The art of measuring

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Quality Management System ISO 9001 certified by



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