



Instructions manual

Series PS

Variable area flowmeter



The art of measuring

PREFACE

Thank you for choosing a product from Tecfluid S.A.

This instruction manual allows the installation, configuration, programming and maintenance. It is recommended to read it before using the equipment.

WARNINGS

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- Tecfluid S.A. reserve the right to make changes as deemed necessary at any time and without notice, in order to improve the quality and safety, with no obligation to update this manual.
- Make sure this manual goes to the end user.
- Keep this manual in a place where you can find it when you need it.
- In case of loss, ask for a new manual or download it directly from our website www.tecfluid.com Downloads section.
- Any deviation from the procedures described in this instruction manual, may cause user safety risks, damage of the unit or cause errors in the equipment performance.
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SERIES PS

1 INTRODUCTION

The series PS are flowmeters for liquids and gases.

They are very compact and low cost instruments.

They have local flow rate indication with scales calibrated in l/h, l/min, %, etc.

They can fit switches that allow to detect a specific flow rate and provide an alarm signal to a remote device. They can also fit too a resistive sensor with a 4-20 mA transmitter proportional to flow rate.

2 WORKING PRINCIPLE

Based on variable area principle.

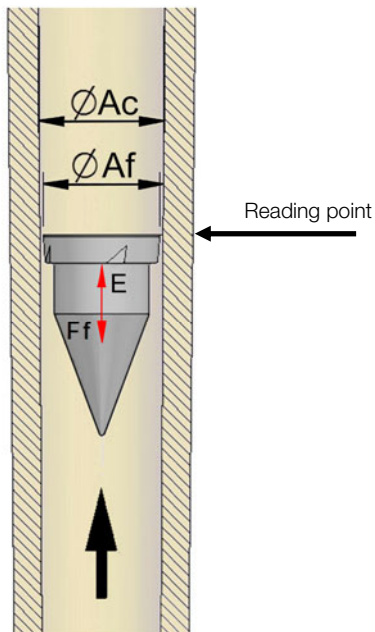
The flowmeter consists of a technical plastic tapered tube and a float inside it. The force of the flow pushes the float to an equilibrium point. The area obtained between the float and the tube is proportional to the flow rate.

The equilibrium point depends on:

- E = Force of the fluid flow
- F_f = Weight of the float
- A_l = Free area of flow

where:

$$(A_l = A_c, \text{ tube area} - A_f, \text{ float area})$$



3 MODELS

Depending on the connection and the tube material:

- PS31 BSP thread or 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 or 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 or socket ends for solvent welding 1/2" ... 3/4" / DN15 ... DN20

The tube of the PS / PSM models is made of Polysulfone (PSU), while in the PTM03 model, it is made of NAS® (Styrene Methyl Methacrylate copolymer).

4 RECEPTION

The series PS flowmeters are supplied conveniently packaged for their protection during transportation and storage, together with their instructions manual for installation and operation.

Before installing the flowmeter, remove all the blocking elements.

Turning the instrument carefully upside down, check that the float moves freely.

5 INSTALLATION



Flowmeters must be installed in a completely vertical position and with upwards flow direction.

It is important that the position is completely vertical given that deviations of about 5° can produce errors of about 10% of the readings.

The fluid inlet must always be at the bottom of the flowmeter (minimum scale value).

The fluid outlet must always be at the top of the flowmeter (maximum scale value).

Do not forget to fit the sealing components between the union pieces and the pipe.

5.1 Valves

In cases where the operating fluid is a liquid, the valve should be mounted at the inlet (bottom) of the meter (see point 6.2).

If the fluid to be measured is a gas, the valve position will depend on the calibrating pressure of the instrument (see point 6.1).



Valves should always be opened slowly to avoid water hammers.

5.2 Filters

The installation of a filter before the instrument is recommendable, this will avoid possible obstructions and breakdowns in the measuring system.

The mesh of the filter should be maximum 200 microns.

5.3 Straight pipe sections

In order to have stable readings, it is necessary to install the instrument in a straight pipe section. This section should have the same inner diameter as the flowmeter. The required minimum distances upstream and downstream of the sensor are 5 x DN upstream and 3 x DN downstream.

These distances must be free of elements that can disturb the flow profile, such as elbows, diameter changes, valves, etc.

6 OPERATION

Once the meter is installed, the regulating valve should be opened slowly. The fluid flow will move the float.



Any variations of working conditions with respect to those when calibrated can induce reading errors.

6.1 Gas flow measurement

The working pressure and temperature are of maximum importance for correct gas measurement as they directly affect the scale readings.

For example, if a meter is calibrated at 2 bar gauge and the working pressure is 1 bar gauge there will be an error of about 22%.

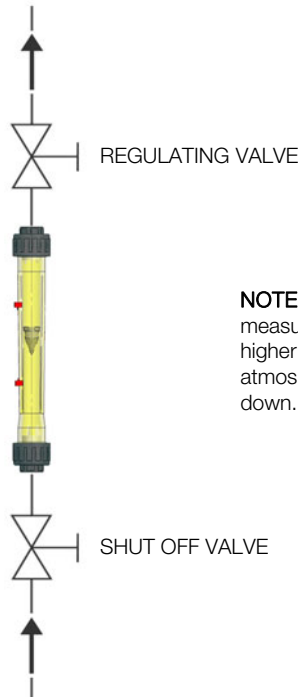
In the same way, if working temperature does not match calibrating temperature, errors will be induced in the flow rate readings.

In applications of gas flow measurement where the calibrating pressure of the instrument corresponds to the inlet pressure, being higher than the atmospheric pressure, the regulating valve must be installed downstream of the flowmeter. Thus, it is ensured that the instrument works at calibrating pressure and a back pressure that keeps the float in equilibrium is obtained.

The flow should be adjusted by means of the regulating valve, while keeping the shut off valve fully open.

If the regulation is done using the shut off valve, in open circuits or at low gas flow in the meter, the gas will expand which will sharply diminish its density, providing very serious reading errors.

If the flow is regulated by the shut off valve, the float usually experiences an oscillating movement which produces a shut off action until sufficient pressure is gained to overcome its weight. The sudden fall of pressure, when the gas escapes, will make it fall. This cycle is repeated generating an oscillating measurement (resonance).



NOTE: Scheme valid for gas flow measurement applications with a pressure higher than atmospheric. For gases at atmospheric pressure, turn valves upside down.

In applications where the gas outlet is at atmospheric pressure, install the regulating valve upstream of the flowmeter if the flowmeter was calibrated at atmospheric pressure. The shut off valve is then installed downstream of the flowmeter and it should be fully open.

The valve opening procedure should be as following:

- With the regulating valve closed, fully open the shut off valve.
- Gradually open the regulating valve until the desired flow rate.

And for closing:

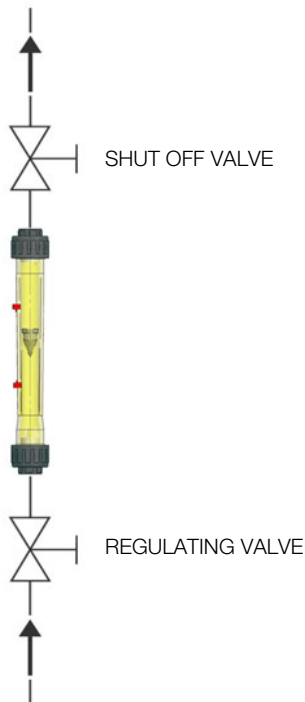
- Close the regulating valve gradually until zero flow rate.
- Fully close the shut off valve to isolate the flowmeter.

Operating in a different way may involve water hammers that can damage the flowmeter or generate instabilities.

6.2 Liquid flow measurement

When measuring liquids the regulating valve should be installed as shown in the following figure.

Being the shut off valve partially open, open the regulating valve slowly until the needle of the indicator housing shows a low flow rate. Then also open the shut off valve slowly in order to get rid of the air and then progressively to fully open.



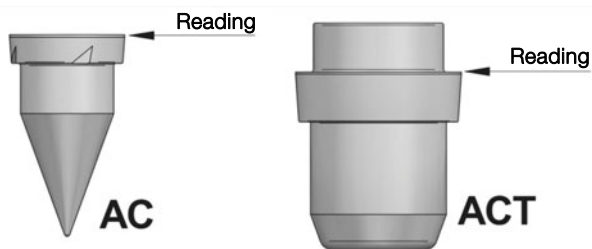
The required flow rate is then regulated by using the regulating valve.

Close the valves during work stops at the end of the working day in order to avoid sudden surges when started up. If the float hits the stops sharply this could cause damage to the meter.

7 FLOW READING

The float determines the flow rate on the scale.

Depending on the type of float, the reading should be taken at the height given in the following figure.



8 AMR LIMIT SWITCH

8.1 Introduction

The AMR limit switch can be used to generate an alarm or an operation when the flow rate that the instrument is measuring reaches a preset value. It is a bi-stable SPST limit switch.

It consists of a potential free reed sensor that is actuated by the magnetic field of the float.

The limit switch can be supplied as a normally open switch when the float is below the switching point (PT-AMR NO), or as a normally closed in the same conditions (PT-AMR NC).

8.2 Operation

When the float passes through the point where the limit switch is positioned, it changes the state of the reed sensor, and therefore the output state. This is maintained until the float passes in the opposite direction by the point where the switch is, returning again to the previous state.

8.3 Switching point adjustment

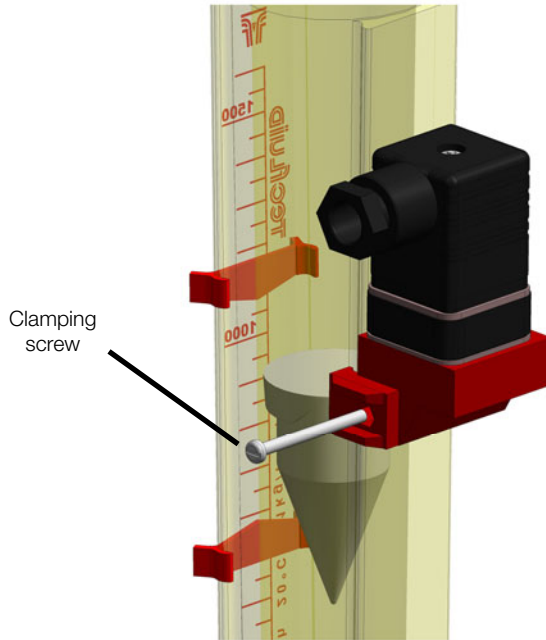
To hold the limit switch to the flowmeter, the AMR limit switch has a DIN 315 type screw.

Loosen the screw and clamp the limit switch on the guide opposed to the reading scale.

The position of the reading point of the float with reference to the switching point can vary from one type of float to another. If it is the first time that the switching point is adjusted, with the float in a stable position, slide the limit switch along the guide until the reed switch changes its state.

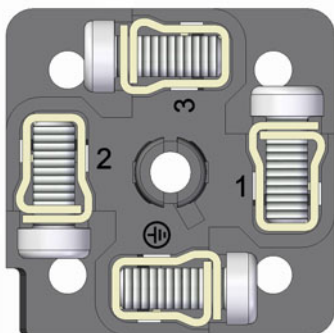
Mark the position of the reading point of the float on the limit switch and then situate this mark at the required switching level on the scale.

Tighten the clamping screw.



8.4 Electrical connection

For the electrical installation it is recommended to use multiple conductor cables, and not single cables, in order to guarantee the cable gland will stay watertight. The connector has a PG9 cable gland for cables with outside diameters between 4.5 mm and 7 mm. The numeration of the terminals is the following:



In the female connector:

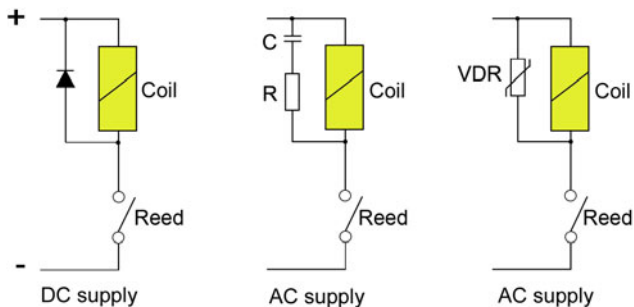
- Terminal 1: Reed contact
- Terminal 2: Reed contact
- Terminal 3: Not connected
- Earth terminal: Not connected

Make sure that the contact rating indicated on the label at the product and in page 16 of this manual is not exceeded. If high loads are to be switched, use an auxiliary relay.

When using inductive loads, such as relays or solenoid valve coils, surge arresters should be installed to protect the reed contacts.

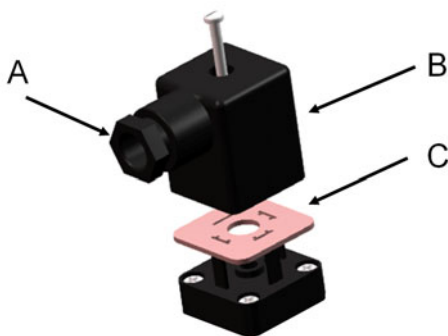
With a DC supply, a diode should be connected as shown.

For an AC supply, a RC circuit can be used as shown, although a varistor (VDR) is better and is easier to select the right value. The VDR should have a breakdown voltage greater than 1.5 times the rms voltage. The standard varistor ratings specify the rms working voltage for the varistor, for example a S05K25 varistor will be for 25 V_{rms} working and will have a breakdown voltage of 39 V at 1 mA.



The electrical installation should provide a fuse or circuit breaker to protect the reed switch from overloads.

When installing the connector, make sure that the cable gland (A) closes over the cable and that the connector (B) with the rubber seal (C) is well screwed down to maintain the IP65 rating.



9 TMUR RESISTIVE SENSOR

9.1 Introduction

The TMUR resistive sensor is based on the variation of resistance as a function of the height of the float. This signal, once processed by a microcontroller, is converted to a two-wire current signal of 4-20 mA proportional to the flow rate.

9.2 Operation

For each flow, the float height activates a certain reed sensor incorporated in a set of resistances, giving a resistive value that becomes a current proportional to the flow rate.

9.3 Models

Depending on the need of each application, the following transmitters can be supplied:

- TR3420. 4-20 mA transmitter
- TR2420H. 4-20 mA transmitter + HART. Ex zone 2
- TR2420P. 4-20 mA transmitter + Profibus PA / Foundation Fieldbus. Ex zone 2
- TR2420Ex. 4-20 mA transmitter. Ex ia IIC T6
- TR2420Hex. 4-20 mA transmitter + HART. Ex ia IIC T6
- TR2420FPEX. 4-20 mA transmitter + Profibus PA / Foundation Fieldbus. Ex ia IIC T6

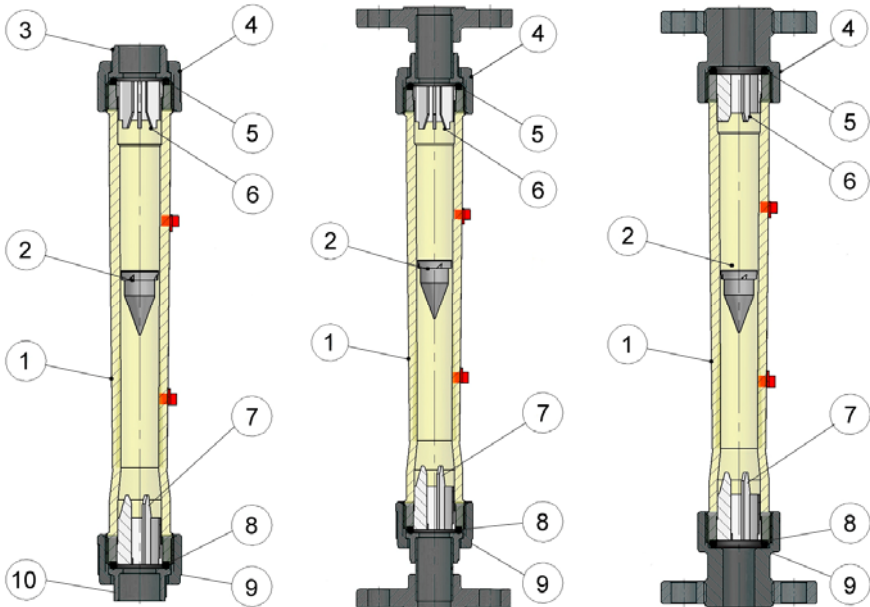
Information related to these transmitters can be found in the transmitter specific manual of each transmitter.

10 MAINTENANCE

10.1 Series PS

To perform the maintenance, it is necessary to disassemble some parts of the flowmeter. Check the drawings below for reference.

10.1.1 Non guided float model



Unscrew the upper nut (4). If the connection is threaded or welded, separate the fitting (3).

Remove the gasket (5).

Remove the upper stop (6).

Carefully slide the float (2) until it is removed from of the measuring tube (1).

Unscrew the lower nut (9). If the connection is threaded or welded, separate the fitting (10).

Remove the gasket (8).

Remove the lower stop (7).



To remove adhered chemical dirt to the float (2) or metering tube (1), clean the parts with water whenever possible and soft brushes, never use metallic tools.



Never use ethyl alcohol o detergents composed of alcohol to clean the tube. There are a wide variety of chemical agents or solvents that could damage the flowmeter tube, therefore, it is recommendable to contact our technical-sales department for any questions.

To reassemble the instrument, check if the gaskets (5) and (8) are in good condition. If not, replace them.



NOTE: The upper stop (6) is different from the lower one (7) and should not be exchanged.

Place the lower stop (7).

Fit the gasket (8) (see note at the end).

Screw the lower nut (9), placing the fitting (10) in case of threaded or welded connection.

Carefully introduce the float (2)

Place the upper stop (6).

Fit the gasket (5) (see note at the end).

Finally, screw the upper nut (4), placing the fitting (3) in case of threaded or welded connection.

Before re-installing the flowmeter in the line verify that the float moves freely along the plastic tube.



NOTE: Make sure that the flat part of the o-ring gasket rests on the groove of the measuring tube, leaving the rounded side in view, to seal on the flat face of the stub. In case the gasket is misplaced or pinched, there will be leaks in the meter.

10.1.2 Guided float model (figure in the following page)

Unscrew the upper nut (7). In case of threaded or welded connection, separate the fitting (6).

Remove the gasket (8).

Loosen the nuts and washer (5).

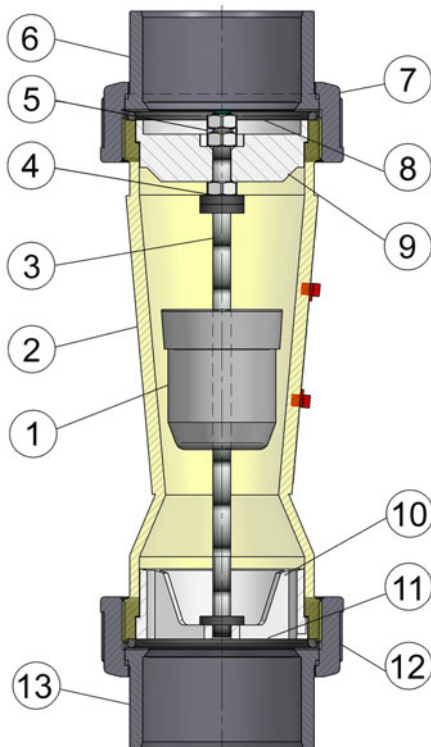
Remove the top stop (9).

Loosen the nut (4) and remove it together with the two damping gaskets.

Carefully slide the float (1) until it is removed.

Unscrew the lower nut (12). In case of threaded or welded connection, separate the fitting (13).

Remove the gasket (11).



Remove the bottom stop (10) together with the guide (3), until it is removed from of the measuring tube (2).



To remove adhered chemical dirt to the float (1) or metering tube (2), clean the parts with water whenever possible and soft brushes, never use metallic tools.



ATTENTION: Never use ethyl alcohol o detergents composed of alcohol to clean the tube. There are a wide variety of chemical agents or solvents that could damage the flowmeter tube, therefore, it is recommendable to contact our technical-sales department for any questions.

To reassemble the instrument, check if the gaskets (8) and (11) are in good condition. If not, replace them.



NOTE: The upper stop (9) is different from the lower one (10) and should not be exchanged.

Place the lower stop (10) together with the guided (3) threaded on it.

Fit the gasket (11) (see note at the end).

Screw the lower nut (12), placing the fitting (13) in case of threaded or welded connection.

Carefully introduce the float (1).

Place the two damping gaskets and the washer (4) through the guide (3).

Place the upper stop (9).

Place the two nuts with washer (5) and tighten the set.

Fit the gasket (8) (see note at the end).

Finally, screw the upper nut (7), placing the fitting (6) in case of threaded or welded connection.

Before re-installing the flowmeter in the line verify that the float moves freely along the plastic tube.



NOTE: Make sure that the flat part of the o-ring gasket rests on the groove of the measuring tube, leaving the rounded side in view, to seal on the flat face of the stub. In case the gasket is misplaced or pinched, there will be leaks in the meter.

10.2 Potential problems with the measuring tube

10.2.1 Jammed float

To remove the float, follow the steps in section 10.1.

To remove adhered chemical dirt to the float and/or the measuring tube, clean the parts with suitable products or solvents and soft brushes, never use metallic tools.

The float may also become clogged by accumulation of metallic particles around it in case the float is magnetic. In this case install a magnetic filter at the inlet of the meter, or just a normal filter depending on the size and nature of the particles.

Follow the steps in section 10.1 to reassemble the flowmeter.

10.2.2 Damaged float

Check that it does not show any impacts or scratches. Also check for any chemical attack. If the float is in bad condition it must be replaced. In this case it is recommendable to re-calibrate the flowmeter at Tecfluid S.A. facilities.

10.3 AMR limit switch maintenance

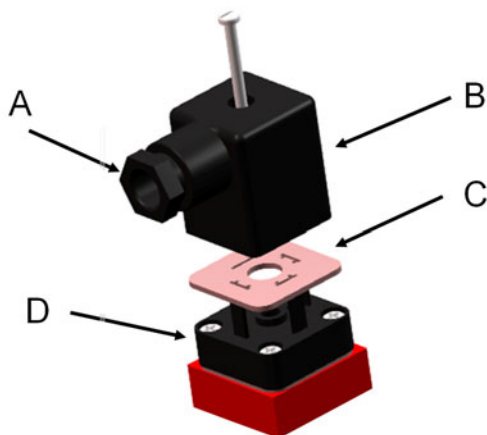
If the limit switch must be changed from a PT-AMR NC to a PT-AMR NO or vice-versa, the procedure is the following:

Remove the female connector (B) by unscrewing the central screw and then the rubber seal (C).

Unscrew the 4 screws that hold the male connector (D).

Withdraw the connector, rotate it 180° and reassemble it carefully.

Fit the gasket (C) and then the female connector (B). Screw the central screw.



Take care that the seals are properly fitted to maintain the ingress protection.

11 TECHNICAL CHARACTERISTICS

11.1 Series PS

Accuracy:	According to VDI/VDE 3513 sheet 2 ($q_G=50\%$) PS 4% PSM / PTM03 6%
Scales:	In l/h, m ³ /h, %, etc.
Mounting:	Vertical (Upwards flow)
Scale range:	10:1
Fluid density:	No restrictions
Working temperature:	PVC connections: -20°C ... +60°C PP connections: -20°C ... +80°C EN 1.4404 / Steel connections, NBR gaskets: -20°C ... +100°C EN 1.4404 / Steel connections, VITON® gaskets: -20°C ... +110°C
Ambient temperature:	-20°C ... +60°C
Working pressure:	8 ... 15 bar, depending on the tube size (see table on p. 18)
Connections:	PS31: BSP thread or socket ends for solvent welding ½" ... 3" / DN15 ... DN80 PS32: ISO 1452-3 or ASME B16.5 (mod. BR) flange. DN15 ... DN80 / ½" ... 3" PSM21: BSP thread or socket ends for solvent welding ½" ... ¾" / DN15 ... DN20 PSM22: ISO 1452-3 or ASME B16.5 (mod. BR) flange. DN15 ... DN20 / ½" ... ¾" PTM03: BSP thread or socket ends for solvent welding ½" ... ¾" / DN15 ... DN20

11.2 AMR limit switch

DIN 43650 A connector

Technical characteristics of the reed sensor:

Maximum switching power:	12 VA
Maximum switching voltage:	250 VAC
Maximum switching current:	0.5 A
Hysteresis:	±5% of full scale value
Ingress protection:	IP65
Ambient temperature:	-25°C ... +80°C

11.3 TMUR resistive sensor

Temperature of operation:	-20°C ... +80°C
Resolution:	10 mm

Transmitters series TR

See characteristics in the transmitter specific manual

12 SAFETY INSTRUCTIONS

The series PS flowmeters are in conformity with all essential requirements of all EC directives applicable to them:

2014/68/EU Pressure equipment directive (PED)

Limit switches and transmitters:

2014/30/EU Electromagnetic compatibility directive (EMC)

2012/19/EU Waste electric and electronic equipment (WEEE).

2011/65/EU Restriction of the use of certain hazardous substances in electrical and electronic equipment (ROHS).



The declarations UE of conformity can be downloaded from the section “Download” of the Tecfluid S.A. website. www.tecfluid.com

12.1 Pressure equipment directive

Tecfluid S.A. have subjected the series PS of flowmeters to a conformity assessment method for the pressure equipment directive, specifically according to module H (full quality assurance).

Conformity with the directive is reflected by the CE marking in each pressure equipment and by the written declaration of conformity. The CE marking is accompanied by the identification number of the notified body involved at the production control phase.

The marking of the equipment takes into account the fluid type, the group of fluid and the category, for example: G1 CATI

G Gases and vapours

1 Group of liquids 1

CATI Category I

Devices that, due to their size, are not subject to conformity assessment, are considered outside the scope of the directive and therefore they have not the CE mark according to pressure directive. These devices are subject to applicable sound engineering practice (SEP).



This equipment is considered as being a pressure accessory and **NOT** a safety accessory as defined in the 2014/68/EU directive, Article 2, paragraph 4.

12.2 Certificate of conformity TR CU (EAC marking)

Tecfluid S.A. have subjected the series PS of flowmeters to a certification procedure according to the technical regulations of the Customs Union of the Eurasian Economic Union (EEU).



This Certificate is an official document confirming the quality of production with the standards on the territory of the Customs Union, particularly regarding safety requirements and electromagnetic compatibility.

13 ADDITIONAL INSTRUCTIONS FOR ATEX ZONES

Instruments with AMR limit switches can be considered as a simple apparatus according to the IEC 60079-11 standard and therefore they are not marked as ATEX.

13.1 Non-metallic parts



WARNING: POTENTIAL RISK OF ELECTROSTATIC CHARGE



Since the danger of ignition by electrostatic discharge when rubbing this protection can not be avoided, **the instrument must always be cleaned with a damp cloth.**

14 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)	D _{ext}
	l/h water	Nm ³ /h air 1.013 bar abs 20°C	ΔP (mbar)	Nm ³ /h air 1.013 bar abs 20°C	ΔP (mbar)			
PS312-0160 ⁽¹⁾	16-160 ⁽¹⁾	-	10 ⁽¹⁾	0.6-6 ⁽¹⁾	-	15	½" ¾" (DN20)	25
PS312-0250 ⁽¹⁾	25-250 ⁽¹⁾	-		1-10 ⁽¹⁾				
PS313-0400	40-400	1.2-12	12	0.7-7	5			
PS313-0630	60-630	1.9-19	12	1.1-11	5	10	1" (DN25)	32
PS313-1000	100-1000	3-30		1.8-18				
PS314-1600	160-1600	4.5-45	18	2.5-25	8			
PS314-2500	250-2500	8-75	18	5-45	8	10	1 ½" (DN40)	50
PS315-4000	400-4000	12-120	23	7-70	10			
PS315-6300	500-6300	15-190		10-110				
PS316-6300	500-6300	15-190		10-110		8	2" (DN50)	63
PS316-M010	1000-10000	30-300	30	20-180	12			
PS316-M014	2000-14000	60-430		40-250				
PS317-M016	1600-16000	50-490		30-290		8	2 ½" (DN65) 3" (DN80)	75 90
PS317-M020	2000-20000	60-600		40-360				
PS317-M025	2500-25000	80-770	40	50-460	17			
PS317-M030	3000-30000	90.7-920	40	60-550	17	8	2 ½" (DN65) 3" (DN80)	75 90
PS317-M040	6000-40000	190-1200		110-730				
PS317-M050	10000-50000	280-1500		170-920				

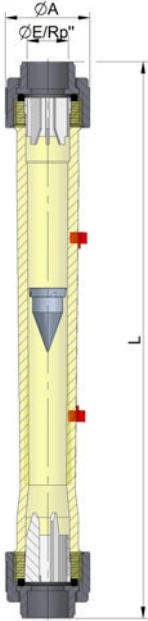
⁽¹⁾ with PTFE float

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)	D _{ext}
	l/h water	Nm ³ /h air 1.013 bar abs 20°C	ΔP (mbar)	Nm ³ /h air 1.013 bar abs 20°C	ΔP (mbar)			
PSM-312-0040 ⁽¹⁾	4-40 ⁽¹⁾	-	3 ⁽¹⁾	0.6-6 ⁽¹⁾	-	15	½" (DN15)	20
PSM-312-0060 ⁽¹⁾	6-60 ⁽¹⁾	-		1-10 ⁽¹⁾				
PSM-312-0100	10-100	0.3-3	10	0.2-1.8	4			
PSM-312-0160	16-160	0.5-5	10	0.3-3	4	15	½" (DN15) ¾" (DN20)	20 25
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			
PSM-313-0630	60-630	1.9-19	12	1.1-11	5	15	½" (DN15) ¾" (DN20)	20 25
PSM-313-1000	100-1000	3-30		1.8-18				

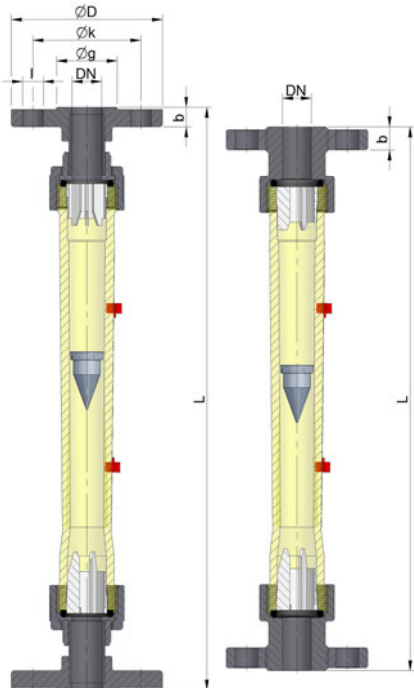
⁽¹⁾ with PTFE float

15 DIMENSIONS



Model PS31

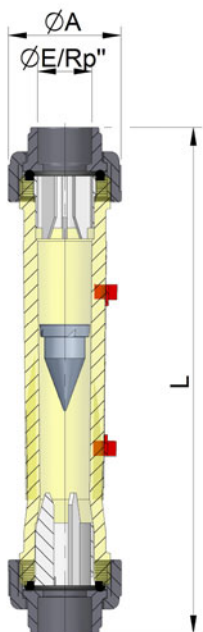
R"	DN	E	A	L (R")	L (DN)
1/2"	-	-	52	356	-
3/4"	20	25	52	350	346
1"	25	32	74	366	366
1 1/2"	40	50	80	373	376
2"	50	63	100	387	390
2 1/2"	65	75	138	420	420
3"	80	90	138	418	420



Models PS32 / PS32-BR

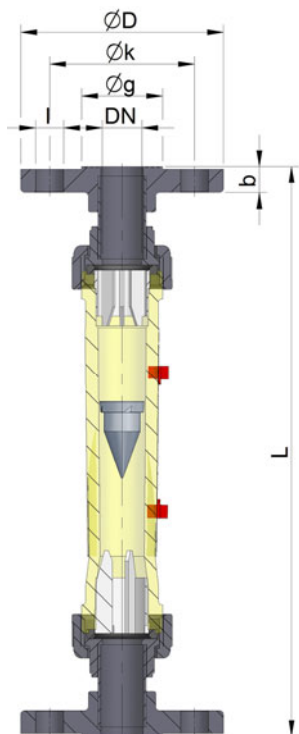
DN	D	k	g	lxn°	B	L	L (BR)
20	105	75	58	14x4	13	408	379
25	115	85	68	14x4	15	424	392
40	150	110	88	18x4	17	456	400
50	165	125	102	18x4	19	476	418
65	185	145	122	18x4	21	522	425
80	200	160	138	18x8	22	548	422

(dimensions in mm)



Model PSM21

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

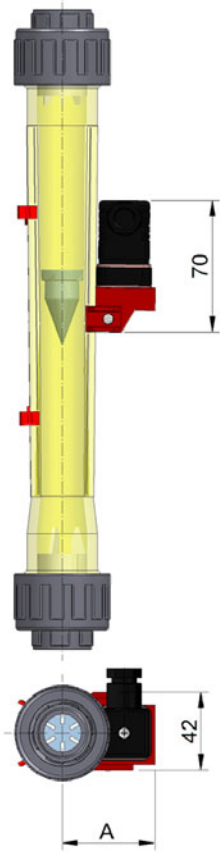


Model PSM22

DN	D	k	g	lxn°	B	L
15	95	65	45	14x4	12	290
20	105	75	58	14x4	13	294

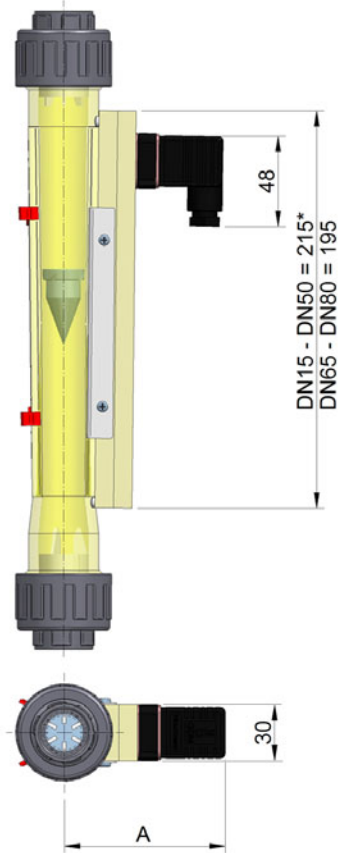
(dimensions in mm)

AMR limit switch



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

TMUR resistive sensor



DN	R	A
15	1/2"	95
20	3/4"	105
25	1"	110
40	1 1/2"	120
50	2"	130
65	2 1/2"	145
80	3"	145

(dimensions in mm)

WARRANTY

Tecfluid S.A. guarantee all the products for a period of 24 months from their sale, against all faulty materials, manufacturing or performance. This warranty does not cover failures which might be imputed to misuse, use in an application different to that specified in the order, the result of service or modification carried out by personnel not authorized by Tecfluid S.A., wrong handling or accident.

This warranty is limited to cover the replacement or repair of the defective parts which have not damaged due to misuse, being excluded all responsibility due to any other damage or the effects of wear caused by the normal use of the devices.

Any consignment of devices for repair must observe a procedure which can be consulted in the website www.tecfluid.com, "After-Sales" section.

All materials sent to our factory must be correctly packaged, clean and completely exempt of any liquid, grease or toxic substances.

The devices sent for repair must enclose the corresponding form, which can be filled in via website from the same "After-Sales" section.

Warranty for repaired or replaced components applies 6 months from repair or replacement date. Anyway, the warranty period will last at least until the initial supply warranty period is over.

TRANSPORTATION

All consignments from the Buyer to the Seller's installations for their credit, repair or replacement must always be done at freight cost paid unless previous agreement.

The Seller will not accept any responsibility for possible damages caused on the devices during transportation.



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Quality Management System ISO 9001 certified by



Pressure Equipment Directive 2014/68/UE certified by



ATEX European Directive 2014/34/EU certified by



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The technical data described in this manual is subject to modification without notification if the technical innovations in the manufacturing processes so require.