

Aperflux 851

High - Medium Pressure Gas Regulator



TECHNICAL BROCHURE

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Who we are

We are a global organization that specializes in designing and manufacturing technologically advanced solutions for natural gas treatment, transmission and distribution systems.

We are the ideal partner for operators in the Oil & Gas sector, with a business solutions that span the whole natural gas chain.

We are constantly evolving to meet our customers' highest expectations in terms of quality and reliability.

Our aim is to be a step ahead of the competition, with customized technologies and an after-sale service program undertaken with the highest level of professionalism.



Pietro Fiorentini advantages



Localized technical support



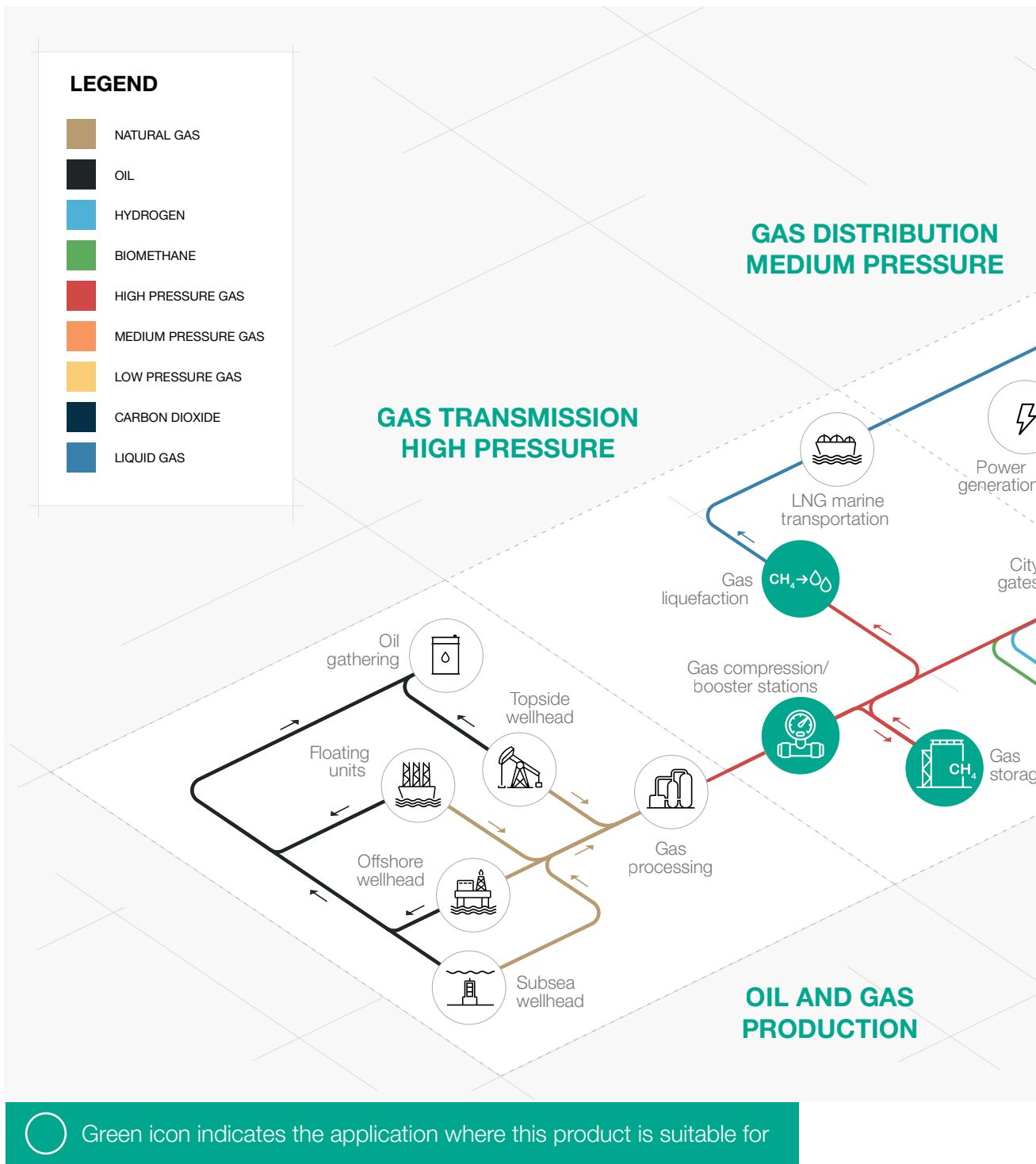
Experience since 1940



Operating in over 100 countries



Area of Application



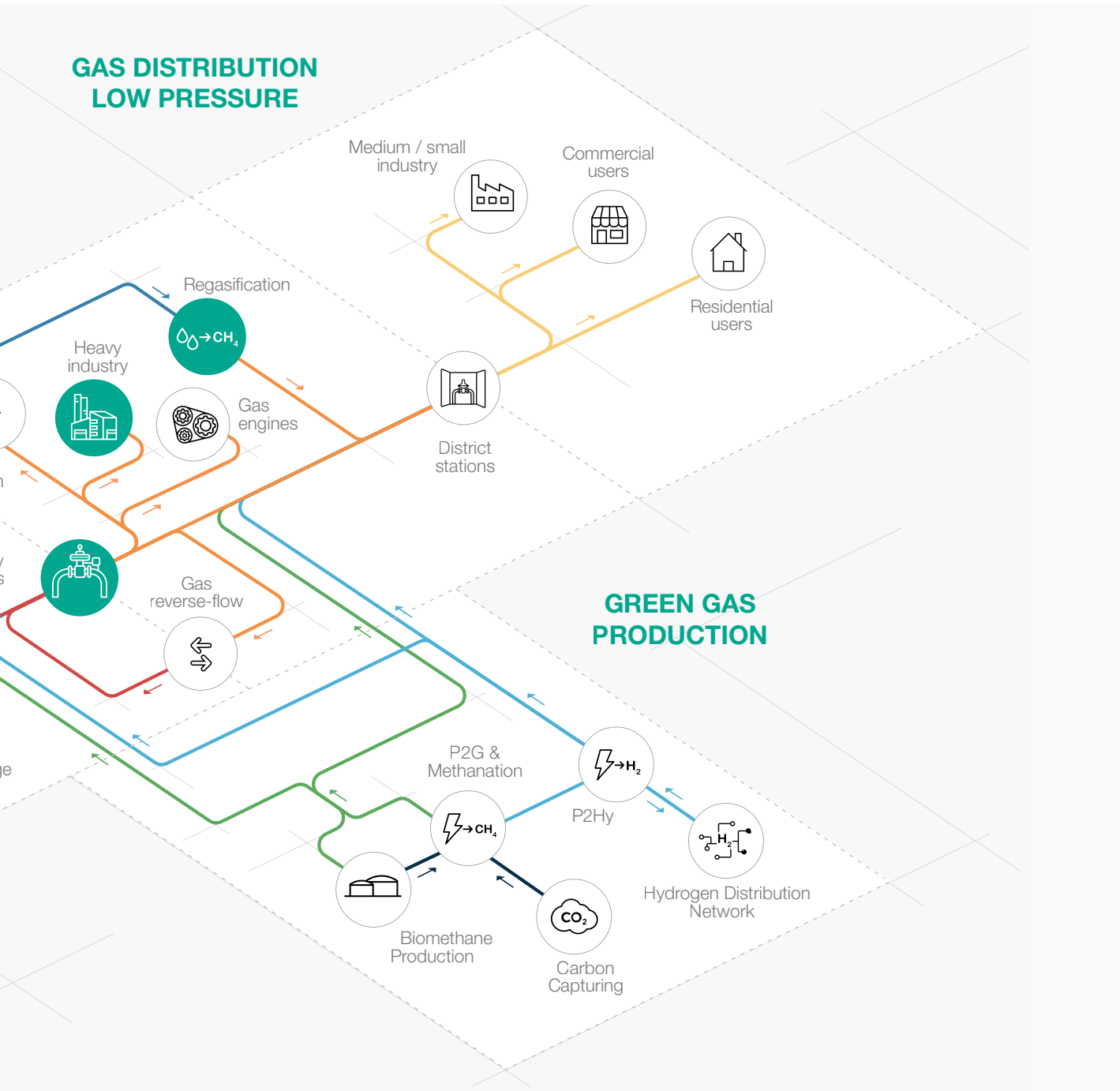


Figure 1 Area of application map



Introduction

Aperflux 851 is one of the **pilot-operated gas pressure regulators** designed and manufactured by Pietro Fiorentini.

This device is suitable for use with previously filtered non-corrosive gases, and it is mainly used for high-pressure transmission systems and for medium pressure natural gas distribution networks.

According to the European Standard EN 334, it is classified as **Fail Open**.

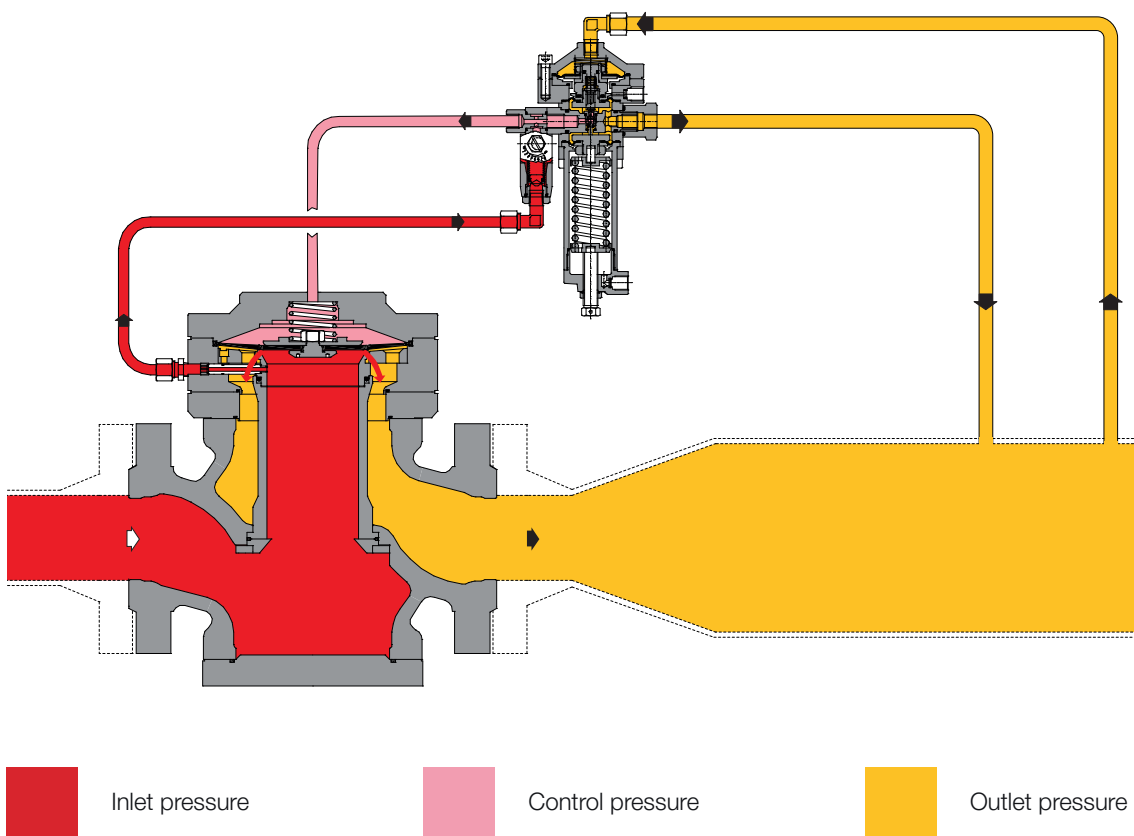


Figure 2 Aperflux 851

Features and Calibration ranges

Aperflux 851 is a **pilot-operated** device for high pressure and medium pressure with a unique **dynamic balancing system** which ensures an **outstanding turn down ratio** combined with an extremely **accurate outlet pressure control**.

Aperflux 851 is a balanced pressure regulator. This means that the controlled outlet pressure is not affected by variations in the inlet pressure and flow during its operation. Therefore a balanced regulator can have a single-size orifice for all pressure and flow conditions.

This regulator is suitable for use with previously filtered, non corrosive gases, in natural gas transmission and distribution networks as well as high load industrial application.

It is a **truly top entry design** which allows an **easy maintenance** of parts directly in the field **without removing the body from the pipework**.

Set point adjustment of the regulator is achieved via a pilot, loading and unloading the pressure in the Aperflux upper diaphragm chamber.

The modular design of Aperflux pressure regulators allows for the factory (or retro-site fitting) of an emergency monitor regulator PM/819 or a slamshut valve SB/82 or HB/97 (depending on size). Additionally an integral silencer DB851 can be installed. All without removing the body from the pipeline.

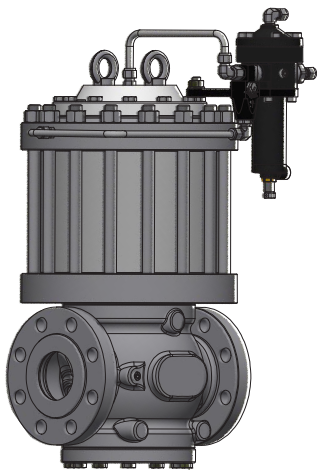


Figure 3 Aperflux 851 with DB/851 silencer

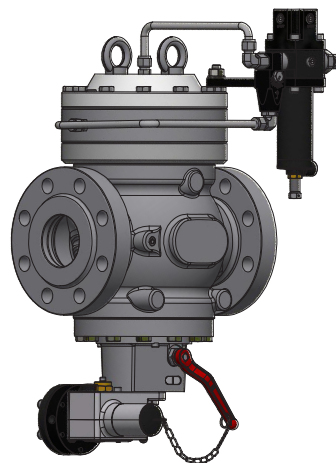


Figure 4 Aperflux 851 with SB/82 slam shut valve



Aperflux 851 competitive advantages



Balanced type



Top Entry



Operates with low differential pressure



Easy maintenance



High accuracy



Low noise



High turn-down ratio



Built-in accessories



Built-in pilot filter



Biomethane compatible and available with specific versions for full Hydrogen or blending

Features

Features	Values
Design pressure* (PS ¹ / DP ²)	up to 10.2 MPa up to 1479 psig
Operating ambient temperature* (TS ¹)	from -20 °C to +60 °C from -4 °F to +140 °F
Permissible gas temperature*	from -20 °C to +60 °C from -4 °F to +140 °F
Inlet pressure range bpu (MAOP / p _{umax} ¹)	from 0.13 to 8.5 MPa from 18.7 to 1232 psig
Range of downstream pressure (Wd ¹)	from 0.08 to 7.4 MPa from 11.6 to 1073 psig
Available accessories	DB/851 Silencer, SB/82 Slam shut, HB/97 Slam shut, PM/819 Monitor, open-status indicator
Minimum differential pressure (Δp _{min} ¹)	0.05 MPa - recommended 0.2 MPa 7.25 psig - recommended 290 psig
Accuracy class (AC ¹)	up to 2.5 (depending on working conditions)
Shut-off overpressure (SG ¹)	up to 10 (depending on working conditions)
Nominal dimensions (DN ^{1,2})	DN 25 1"; DN 50 2"; DN 80 3"; DN 100 4"; DN 150 6"; DN 200 8"; DN 250 10"
Connections*	Class 150/300/600 RF / RTJ according to ASME B 16.5 or PN 16/25/40 according to EN 1092-1

(¹) according to EN334 standard

(²) according to ISO 23555-1 standard

(*) NOTE: Different functional features and/or extended temperature ranges may be available on request. Stated inlet gas temperature range is the maximum for which the equipment's full performance, including accuracy is guaranteed. Product may have a different pressure or temperature ranges according to the version and/or installed accessories.

Table 1 Features

Materials and Approvals

Part	Material
Body	Cast steel ASTM A352 LCC for classes 300 and 600 ASTM A216 WCB for classes 150 and PN16
Cover	Rolled or forged carbon steel
Seat	Stainless steel for DN ≤ 3" Carbon Steel with seal edge in stainless steel for size ≥ 4"
Diaphragm	Vulcanized rubber
Sealing ring	Nitrile rubber
Compression fittings	According to DIN 2353 in zinc-plated carbon steel. Stainless steel on request

NOTE: The materials indicated above refer to the standard models. Different materials can be provided according to specific needs.

Table 2 Materials

Construction Standards and Approvals

Aperflux 851 regulator is designed according to European standard EN 334. The regulator reacts in opening (Fail Open) according to EN 334.

The product is certified according to European Directive 2014/68/EU (PED). Leakage class: bubble tight, better than VIII according to ANSI/FCI 70-3.



EN 334



PED-CE

Pilot ranges and type

Type	Model	Operation	Range Wh		Spring Table web link
			MPa	psig	
Main pilot	302/A	Manual	0.08 - 0.95	11.6 - 138	TT 653
Main pilot	304/A	Manual	0.7 - 4.3	101 - 623	TT 653
Main pilot	305/A	Manual	2 - 6	290 - 870	TT 653
Main pilot	307/A	Manual	4.1 - 7.4	595 - 1073	TT 1146

Table 3 Settings table

Types of pilot adjustment	
Pilot type .../A	Manual setting
Pilot type .../D	Electric remote control setting
Pilot type .../CS	Pneumatic remote control setting
Pilot type .../FIO	Smart unit for remote setting, monitoring, flow limitation

Table 4 Pilot adjustment table

General link to the calibration tables: [PRESS HERE](#) or use the QR code:



The pilot system comes complete with an adjustable AR100 restrictor. The flow rate of the pilot system is controlled by the bleed rate through the AR100 restrictor which influences the response time of the regulator.

Pressure drop through the adjustable AR100 restrictor shall be about 0.02 MPa (2.9 psig) at the minimum opening flow of the regulator and about 0.1 MPa (14.5 psig) at the maximum opening flow of the regulator.

PILOT 302/A							
Spring part number	Spring color	d	Lo	De	Spring range (psig)		
					Min.	Max.	
US2701800	Yellow	4.5	100	35	11.6	16.0	
US2702080	Orange	5	100	35	16.0	31.9	
US2702290	Red	5.5	100	35	31.9	50.8	
US2702460	Green	6	100	35	50.8	81.2	
US2702660	Black	6.5	100	35	81.2	105.9	
US 2702820	Blue	7	100	35	105.9	137.8	

d = Wire Diameter (mm) **Lo** = Spring Length (mm) **De** = External Diameter (mm)

Table 5 TT 653 - PILOT 302/A setting springs

PILOT 304/A							
Spring part number	Spring color	d	Lo	De	Spring range (psig)		
					Min.	Max.	
US2702460	Green	6	100	35	101.5	188.6	
US2702660	Black	6.5	100	35	188.6	246.6	
US2702820	Blue	7	100	35	246.6	464.1	
US2703045	Brown	7.5	100	35	464.1	623.6	

d = Wire Diameter (mm) **Lo** = Spring Length (mm) **De** = External Diameter (mm)

Table 6 TT 653 - PILOT 304/A setting springs

PILOT 305/A							
Spring part number	Spring color	d	Lo	De	Spring range (psig)		
					Min.	Max.	
US2702820	Blue	7	100	35	290.1	478.6	
US2703045	Brown	7.5	100	35	478.6	609.1	
US2703224	Grey	8	100	35	609.1	870.2	

d = Wire Diameter (mm) **Lo** = Spring Length (mm) **De** = External Diameter (mm)

Table 7 TT 653 - PILOT 305/A setting springs

PILOT 307/A							
Spring part number	Spring color	d	Lo	De	Spring range (psig)		
					Min.	Max.	
US2703224	Grey	8	100	35	594.6	1073.2	

d = Wire Diameter (mm) **Lo** = Spring Length (mm) **De** = External Diameter (mm)

Table 8 TT 1146 - PILOT 307/A setting springs

Accessories

For the pressure regulators:

- Cg limiter
- Visual opening indicator
- Silencer
- Slam shut valve
- Monitor

For the pilot circuit:

- Heating cable for preheating pilot circuit
- Electrical heater PPH200
- Supplementary filter CF14 or CF14/D

In-line Monitor

The in-line monitor is generally installed upstream of the active regulator.

Although the function of the monitor regulator is different, the two regulators are virtually identical from the point of view of their mechanical components.

The only difference is that the monitor is set at a higher pressure than the active regulator.

The Cg coefficient of the active regulator is the same, however during the sizing process, the differential pressure drop generated by the fully open in-line monitor shall be considered. As a general practise to incorporate this effect, a 20% reduction of the active regulator's Cg value can be applied.

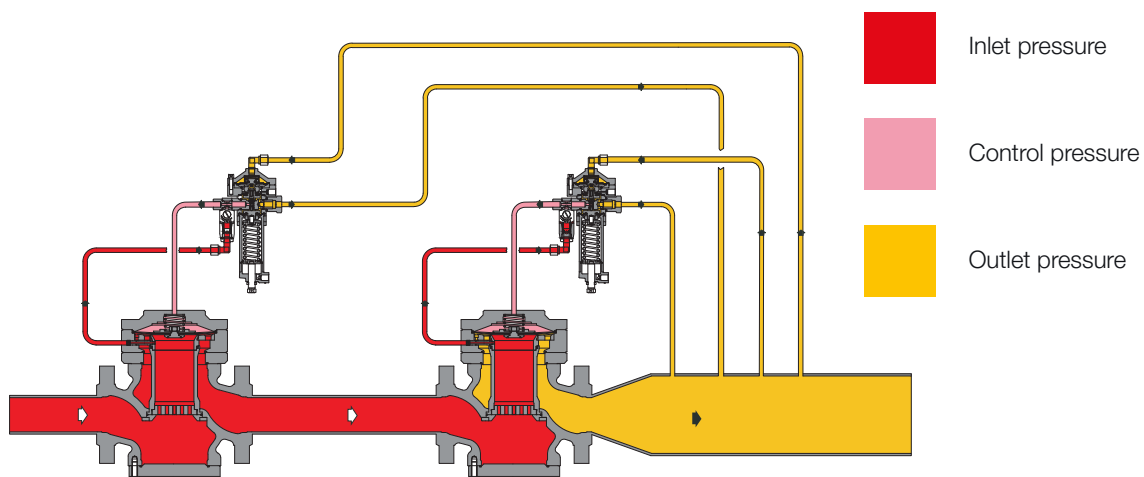


Figure 5 Aperflux 851 with In-line monitor setup

PM/819 monitor

This emergency regulator (monitor) is directly integrated onto the body of the main regulator. Both pressure regulators, therefore, use the same valve body, although they have independent actuators, pilots and valve seats.

The monitor is normally in the fully open position during normal operation of the active regulator and takes over in the event of its failure.





The operational characteristics of the PM/819 monitor are the same as for the Reflux 819 regulator (refer to that specific technical brochure).

The Cg coefficients of regulators having an incorporated monitor is 5% lower than those for standard version.

This solution allows the construction of pressure reduction lines with compact dimensions.

Another great advantage offered by the incorporated monitor regulator is that **it can be installed at any time**, even on an existing regulator, **without major changes to the pipework**.

The main characteristics of this device are:

-  Compact dimensions
-  Completely independent
-  "Fail to close" action
-  Built-in pilot filter
-  Visual opening indicator
-  Easy maintenance
-  Limit switch option
-  Accelerator option

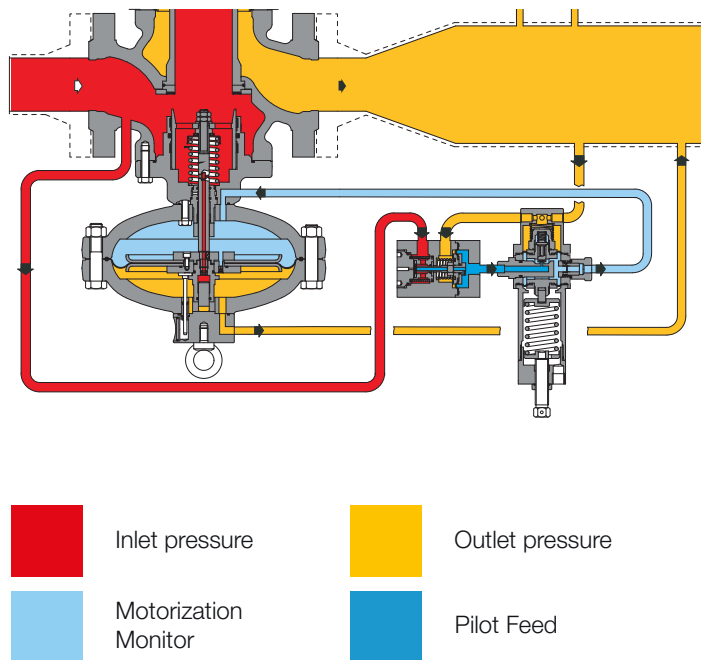


Figure 6 Aperflux 851 with PM/819



Type	Model	Operation	Range Wh		Spring Table web link
			MPa	psig	
Main pilot	204/A	Manual	0.03 - 4.3	4.35 - 623	TT 433
Main pilot	205/A	Manual	2 - 6	290 - 870	TT 799
Main pilot	207/A	Manual	4.1 - 7.4	595 - 1073	TT 1146

Table 9 Settings table

Types of pilot adjustment	
Pilot type .../A	Manual setting
Pilot type .../D	Electric remote setting control
Pilot type .../CS	Pneumatic remote setting control
Pilot type .../FIO	Smart unit for remote setting, monitoring, flow limitation

Table 10 Pilot adjustment table

The monitor regulator can be equipped with an additional pilot called “accelerating valve” to enable a quick response time during the monitor take over. According to PED the accelerating valve is required on the monitor when acting as a safety accessory.

Type	Model	Operation	Range Wh		Spring Table web link
			MPa	barg	
Accelerating valve	M/A	Manual	0.03 - 2	0.3 - 20	TT 354
Accelerating valve	M/A1	Manual	2 - 6.3	20 - 63	TT 892
Accelerating valve	M/A2	Manual	4 - 7.5	40 - 75	TT 892

Table 11 Accelerating valve adjustment table

General link to the calibration tables: [PRESS HERE](#) or use the QR code:



PILOT 204/A							
Spring part number	Spring color	d	Lo	De	Spring range (psig)		
					Min.	Max.	
US2701260	White	3.5	60	35	4.3	14.5	
US2701530	Yellow	4	60	35	14.5	29.0	
US2702070	Orange	5	60	35	29.0	87.0	
US2702450	Red	6	60	35	87.0	174.0	
US2702815	Green	7	60	35	174.0	262.0	
US2703220	Black	8	60	35	262.0	406.1	
US2703420	Blue	8.5	60	35	406.1	623.6	

d = Wire Diameter (mm) **Lo** = Spring Length (mm) **De** = External Diameter (mm)

Table 12 TT 433 - PILOT 204/A setting springs

PILOT 205/A							
Spring part number	Spring color	d	Lo	De	Spring range (psig)		
					Min.	Max.	
US2702820	Blue	7	100	35	290.0	435.1	
US2703045	Brown	7.5	100	35	435.1	638.2	
US2703224	Grey	8	100	35	638.2	870.2	

d = Wire Diameter (mm) **Lo** = Spring Length (mm) **De** = External Diameter (mm)

Table 14 TT 799 - PILOT 205/A setting springs

PILOT 207/A							
Spring part number	Spring color	d	Lo	De	Spring range (psig)		
					Min.	Max.	
US2703224	Grey	8	100	35	594.6	1073.2	

d = Wire Diameter (mm) **Lo** = Spring Length (mm) **De** = External Diameter (mm)

Table 15 TT 1146 - PILOT 207/A setting springs

M/A ACCELERATING VALVE							
Spring part number	Spring color	d	Lo	De	Spring range (psig)		
					Min.	Max.	
US2701260	White	3.5	60	35	4.3	14.5	
US2701530	Yellow	4	60	35	14.5	29.0	
US2702070	Orange	5	60	35	29.0	87.0	
US2702450	Red	6	60	35	87.0	174.0	
US2702815	Green	7	60	35	174.0	262.0	
US2703220	Black	8	60	35	262.0	406.1	
US2703420	Blue	8.5	60	35	406.1	623.6	

d = Wire Diameter (mm) **Lo** = Spring Length (mm) **De** = External Diameter (mm)

Table 13 TT 354 - M/A ACCELERATING VALVE setting springs



M/A ACCELERATING VALVE

Spring part number	Spring color	d	Lo	De	Spring range (psig)	
					Min.	Max.
US2701260	White	3.5	60	35	4.3	14.5
US2701530	Yellow	4	60	35	14.5	30.4
US2702070	Orange	5	60	35	30.4	79.8
US2702450	Red	6	60	35	79.8	159.5
US2702815	Green	7	60	35	159.5	290.1

d = Wire Diameter (mm) **Lo** = Spring Length (mm) **De** = External Diameter (mm)

Table 16 TT 354 - M/A ACCELERATING VALVE setting springs

M/A1 ACCELERATING VALVE

Spring part number	Spring color	d	Lo	De	Spring range (psig)	
					Min.	Max.
US2702820	Blue	7	100	35	290.1	478.6
US2703045	Brown	7.5	100	35	478.6	623.6
US2703224	Grey	8	100	35	623.6	913.7

d = Wire Diameter (mm) **Lo** = Spring Length (mm) **De** = External Diameter (mm)

Table 17 TT 892 - M/A1 ACCELERATING VALVE setting springs

M/A2 ACCELERATING VALVE

Spring part number	Spring color	d	Lo	De	Spring range (psig)	
					Min.	Max.
US2703224	Grey	8	100	35	580.1	1087.7

d = Wire Diameter (mm) **Lo** = Spring Length (mm) **De** = External Diameter (mm)

Table 18 TT 892 - M/A2 ACCELERATING VALVE setting springs

DB/851 silencer

Whenever certain noise limit is desired, an additional silencer allows to considerably reduce the noise level (dBA).

Aperflux 851 pressure regulator can be supplied with an **incorporated silencer** in either the standard version or version with incorporated slam shut or monitor regulator.

The high efficiency noise absorption takes place at the point where the noise is generated, thus preventing its propagation.

With the built-in silencer, the C_g valve coefficient is 5% lower than the corresponding version without.

Given the modular arrangement of the regulator, the silencer may be retrofitted to both standard Aperflux 851 version as well as those with incorporated slam shut or monitor, **without the need to modify the main piping.**

Pressure reduction and control operate in the same manner as the standard version.

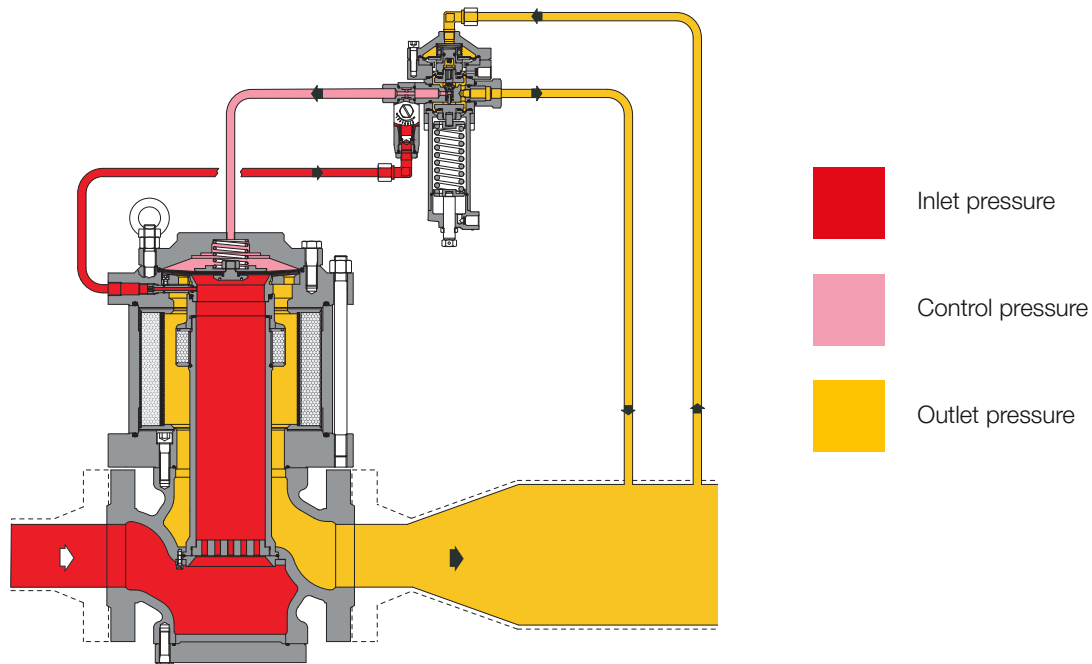


Figure 7 Aperflux 851 with Silencer DB/851

High - Medium Pressure Gas Regulator



The chart below represents the silencer effectiveness based on some common reference conditions for 2", 4" and 6". For actual calculations at specific desired conditions please refer to the online sizing tool or contact your closest Pietro Fiorentini representative.

- Pd 0.4 MPa | 4 barg NO Silencer
- Pd 0.4 MPa | 4 barg DB/851
- Pd 2 MPa | 20 barg NO SILENCER
- Pd 2 MPa | 20 barg DB/851
- Pd 4 MPa | 40 barg NO Silencer
- Pd 4 MPa | 40 barg DB/851
- Recommended noise limit (85 dBA at 1 mt | 3 feet)

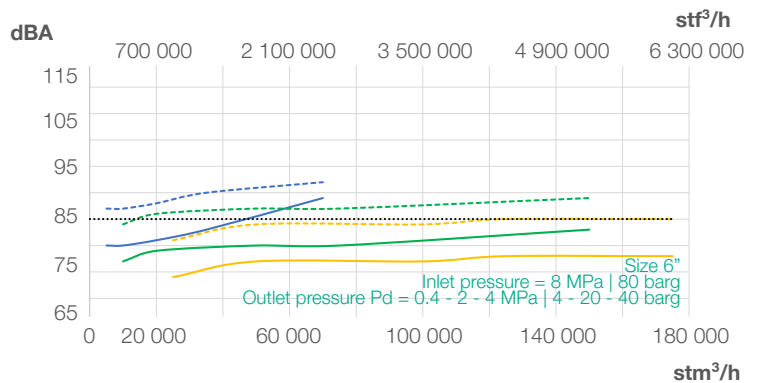
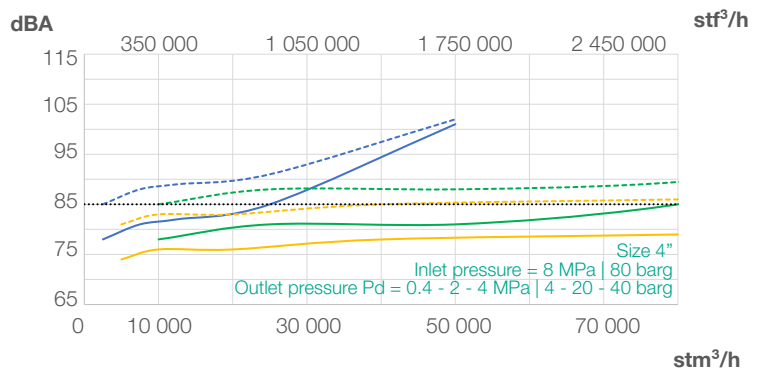
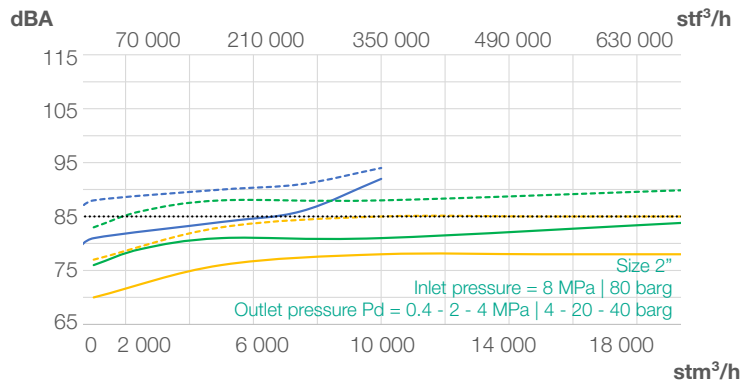
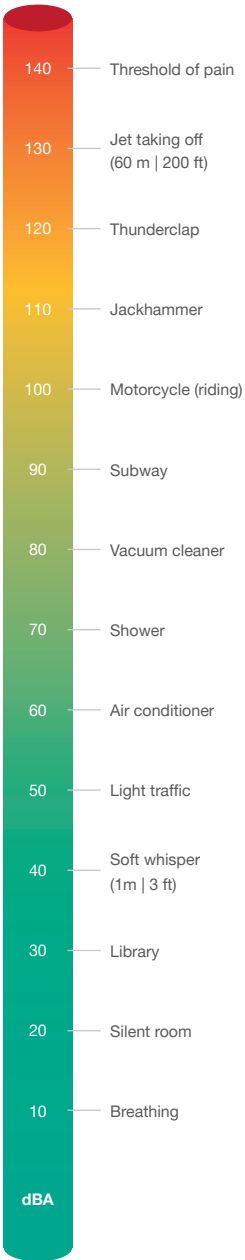


Chart 1 Aperflux 851's silencer efficiency charts

SB/82 or HB/97 slam shut valve









Aperflux 851 pressure regulator offers the possibility of installing an **SB/82 or HB/97 incorporated slam shut valve**, depending on the regulator size, and this can be done either during the manufacturing process or be retrofitted in the field.

SB/82 is available for all sizes, while HB/97 is available from 4" to 10" only.

Retrofitting can be done without modifying the pressure regulator assembly.

With the built-in slam shut, the Cg valve coefficients is 5% lower than the corresponding version without.

The main characteristics of this device are:

-  OPSO Over Pressure Shut-Off
-  UPSO Under Pressure Shut-Off
-  Internal by-pass
-  Push button for tripping test
-  Compact dimensions
-  Easy maintenance
-  Remote tripping option
-  Limit switch option

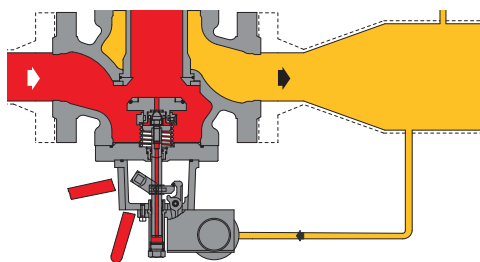


Figure 8 Aperflux 851 with SB/82

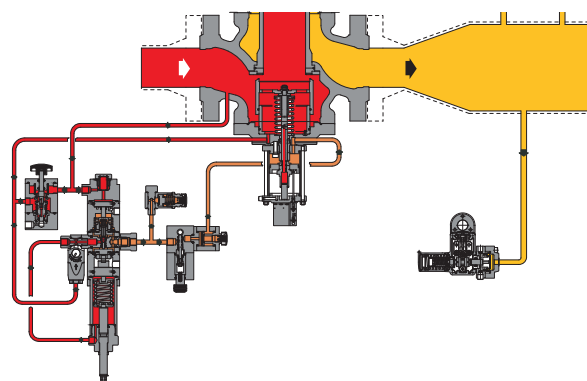
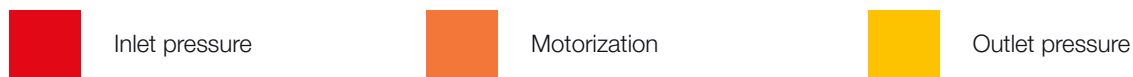


Figure 9 Aperflux 851 with HB/97





Pressure switch types and ranges					
SSV Type	Model	Operation	Range Wh		Spring Table web link
			MPa	psig	
SB/82	102M	OPSO	0.02 - 0.55	2.9 - 79.8	TT 1331
		UPSO	0.02 - 0.28	2.9 - 40.6	
SB/82	102MH	OPSO	0.02 - 0.55	2.9 - 79.8	TT 1331
		UPSO	0.28 - 0.55	40.6 - 79.8	
SB/82	103M	OPSO	0.2 - 2.2	29.0 - 319.1	TT 1331
		UPSO	0.02 - 0.8	2.9 - 116.0	
SB/82	103MH	OPSO	0.2 - 2.2	29.0 - 319.1	TT 1331
		UPSO	0.8 - 1.9	116.0 - 275.6	
SB/82	104M	OPSO	1.5 - 4.5	217.6 - 652.7	TT 1331
		UPSO	0.16 - 1.8	23.2 - 216.1	
SB/82	104MH	OPSO	1.5 - 4.5	217.6 - 652.7	TT 1331
		UPSO	1.8 - 4.1	216.1 - 594.7	
SB/82	105M	OPSO	3 - 9	435.1 - 1305	TT 1331
		UPSO	0.3 - 4.4	43.5 - 638.2	
SB/82	105MH	OPSO	3 - 9	435.1 - 1305	TT 1331
		UPSO	4.4 - 9	638.2 - 1305	
HB/97	103	OPSO	0.13 - 1.1	18.9 - 159.5	TT 984
		UPSO	0.04 - 0.68	5.8 - 98.6	
HB/97	104	OPSO	1 - 3.15	145.0 - 456.9	TT 984
		UPSO	0.1 - 2.06	14.5 - 298.8	
HB/97	105	OPSO	2.5 - 7.6	362.6 - 1102	TT 985
		UPSO	0.25 - 5	362.6 - 725.2	
HB/97	105/92	OPSO	5.8 - 8.5	841.2 - 1232	TT 985
		UPSO	4.5 - 7.5	652.7 - 1087	

Table 19 Settings table

General link to the calibration tables: [PRESS HERE](#) or use the QR code:



Mod. 102M/102MH - Max pressure

Spring part number	Spring color	d	Lo	De	Spring range (psig)	
					Min.	Max.
US2701260	White	3.5	60	35	2.90	11.6
US2701530	Yellow	4	60	35	11.6	23.2
US2701790	Yellow/black	4.5	60	35	23.2	37.7
US2702280	White/red	5.5	60	35	37.7	79.8

d = Wire Diameter (mm) **Lo** = Spring Length (mm) **De** = External Diameter (mm)

Table 20 TT 1331 - Mod. 102M/102MH - Max pressure setting springs

Mod. 102M - Min pressure

Spring part number	Spring color	d	Lo	De	Spring range (psig)	
					Min.	Max.
US2700513	Red	2	40	15	0.7	2.9
US2700713	Green	2.3	40	15	2.9	5.8
US2700750	Black	2.5	40	15	5.8	11.6
US2700985	Brown	3	40	15	11.6	40.6

d = Wire Diameter (mm) **Lo** = Spring Length (mm) **De** = External Diameter (mm)

Table 21 TT 1331 - Mod. 102M - Min pressure setting springs

Mod. 102MH - Min pressure

Spring part number	Spring color	d	Lo	De	Spring range (psig)	
					Min.	Max.
US2700985	Brown	3	40	15	40.6	60.9
US2700980	Blue	3	35	15		
US2700985	Brown	3	40	15	60.9	79.8
US2700985	Brown	3	40	15		

d = Wire Diameter (mm) **Lo** = Spring Length (mm) **De** = External Diameter (mm)

Table 22 TT 1331 - Mod. 102MH - Min pressure setting springs

Mod. 103M/103MH - Max pressure

Spring part number	Spring color	d	Lo	De	Spring range (psig)	
					Min.	Max.
US2701530	Yellow	4	60	35	29.0	58.0
US2701790	Yellow/black	4.5	60	35	58.0	108.8
US2702280	White/red	5.5	60	35	108.8	217.5
US2702450	Red	6	60	35	217.5	319.1

d = Wire Diameter (mm) **Lo** = Spring Length (mm) **De** = External Diameter (mm)

Table 23 TT 1331 - Mod. 103M/103MH - Max pressure setting springs

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Mod. 103M - Min pressure

Spring part number	Spring color	d	Lo	De	Spring range (psig)	
					Min.	Max.
US2700464	Orange	1.7	40	15	2.9	7.3
US2700513	Red	2	40	15	7.3	11.6
US2700713	Green	2.3	40	15	11.6	24.7
US2700750	Black	2.5	40	15	24.7	58.0
US2700985	Brown	3	40	15	58.0	116.0

d = Wire Diameter (mm) **Lo** = Spring Length (mm) **De** = External Diameter (mm)

Table 24 TT 1331 - Mod. 103M - Min pressure setting springs

Mod. 103MH - Min pressure

Spring part number	Spring color	d	Lo	De	Spring range (psig)	
					Min.	Max.
US2700985	Brown	3	40	15	116.0	188.5
US2700980	Blue	3	35	15		
US2700985	Brown	3	40	15	188.5	275.6
US2700985	Brown	3	40	15		

d = Wire Diameter (mm) **Lo** = Spring Length (mm) **De** = External Diameter (mm)

Table 27 TT 1331 - Mod. 103MH - Min pressure setting springs

Mod. 104M/104MH - Max pressure

Spring part number	Spring color	d	Lo	De	Spring range (psig)	
					Min.	Max.
US2702280	White/Red	5.5	60	35	217.6	435.1
US2702450	Red	6	60	35	435.1	652.6

d = Wire Diameter (mm) **Lo** = Spring Length (mm) **De** = External Diameter (mm)

Table 25 TT 1331 - Mod. 104M/104MH - Max pressure setting springs

Mod. 104M - Min pressure

Spring part number	Spring color	d	Lo	De	Spring range (psig)	
					Min.	Max.
US2700713	Green	2.3	40	15	23.2	43.5
US2700750	Black	2.5	40	15	43.5	116.0
US2700985	Brown	3	40	15	116.0	261.1

d = Wire Diameter (mm) **Lo** = Spring Length (mm) **De** = External Diameter (mm)

Table 26 TT 1331 - Mod. 104M - Min pressure setting springs

Mod. 104MH - Min pressure

Spring part number	Spring color	d	Lo	De	Spring range (psig)	
					Min.	Max.
US2700985	Brown	3	40	15	261.1	435.1
US2700980	Blue	3	35	15		
US2700985	Brown	3	40	15	435.1	594.6
US2700985	Brown	3	40	15		

d = Wire Diameter (mm) **Lo** = Spring Length (mm) **De** = External Diameter (mm)

Table 31 TT 1331 - Mod. 104MH - Min pressure setting springs

Mod. 105M/105MH - Max pressure

Spring part number	Spring color	d	Lo	De	Spring range (psig)	
					Min.	Max.
US2702280	White/Red	5.5	60	35	435.1	942.7
US2702450	Red	6	60	35	942.7	1305.3

d = Wire Diameter (mm) **Lo** = Spring Length (mm) **De** = External Diameter (mm)

Table 28 TT 1331 - Mod. 105M/105MH - Max pressure setting springs

Mod. 105M - Min pressure

Spring part number	Spring color	d	Lo	De	Spring range (psig)	
					Min.	Max.
US2700713	Green	2.3	40	15	43.5	101.5
US2700750	Black	2.5	40	15	101.5	232.1
US2700985	Brown	3	40	15	232.1	638.1

d = Wire Diameter (mm) **Lo** = Spring Length (mm) **De** = External Diameter (mm)

Table 29 TT 1331 - Mod. 105M - Min pressure setting springs

Mod. 105MH - Min pressure

Spring part number	Spring color	d	Lo	De	Spring range (psig)	
					Min.	Max.
US2700985	Brown	3	40	15	638.1	870.2
US2700980	Blue	3	35	15		
US2700985	Brown	3	40	15	870.2	1305.3
US2700985	Brown	3	40	15		

d = Wire Diameter (mm) **Lo** = Spring Length (mm) **De** = External Diameter (mm)

Table 30 TT 1331 - Mod. 105MH - Min pressure setting springs



Weights and Dimensions

Aperflux 851

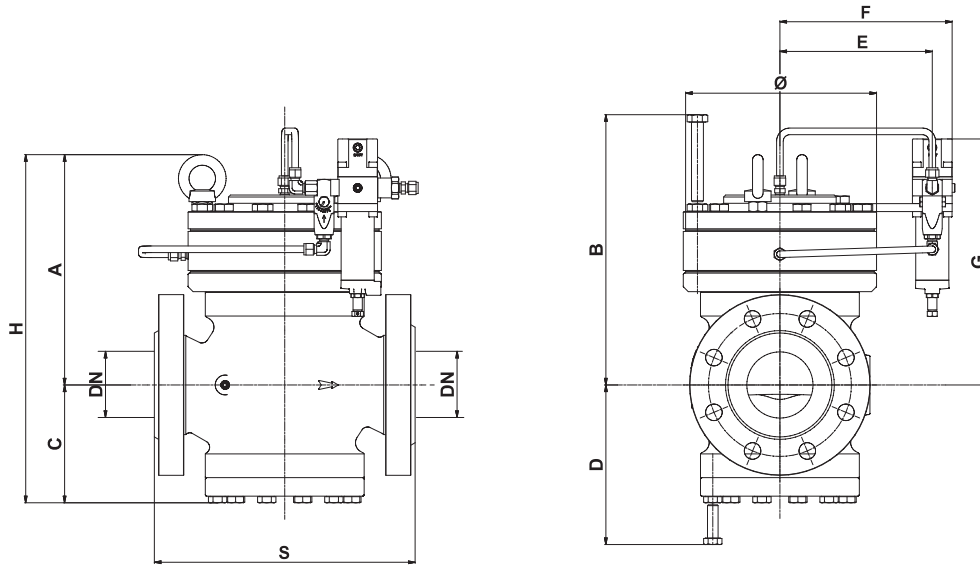


Figure 10 Aperflux 851 dimensions

Weights and Dimensions (for other connections please contact your closest Pietro Fiorentini representative)

Size (DN) - [mm] Size (DN) - inches	25		50		80		100		150		200		250	
	[mm]	inches	[mm]	inches	[mm]	inches	[mm]	inches	[mm]	inches	[mm]	inches	[mm]	inches
S - ANSI 150/PN16	184	7.2"	254	10"	298	11.7"	352	13.9"	451	17.8"	543	21.4"	673	26.5"
S - ANSI 300	197	7.8"	267	10.5"	317	12.5"	368	14.5"	473	18.6"	568	22.4"	708	27.9"
S - ANSI 600	210	8.3"	286	11.3"	336	13.2"	394	15.5"	508	20.0"	609	24.0"	752	29.6"
Ø	125	4.9"	160	6.3"	245	9.6"	290	11.4"	385	15.2"	490	19.3"	615	24.2"
A	200	7.9"	230	9.1"	300	11.8"	340	13.4"	420	16.5"	455	17.9"	580	22.8"
B	230	9.1"	260	10.2"	340	13.4"	380	15.0"	470	18.5"	510	20.1"	520	20.5"
C	100	3.9"	130	5.1"	150	5.9"	190	7.5"	240	9.4"	265	10.4"	340	13.4"
D	130	5.1"	160	6.3"	200	7.9"	250	9.8"	300	11.8"	320	12.6"	440	17.3"
E	140	5.5"	145	5.7"	190	7.5"	210	8.3"	260	10.2"	315	12.4"	370	14.6"
F	160	6.3"	175	6.9"	220	8.7"	240	9.4"	290	11.4"	345	13.6"	415	16.3"
G	260	10.2"	280	11.0"	350	13.8"	380	15.0"	450	17.7"	490	19.3"	380	15.0"
H	300	11.8"	360	14.2"	450	17.7"	530	20.9"	660	26.0"	720	28.3"	920	36.2"
Tubing Connections	Øe 10 x Øi 8 (on request imperial sizing)													
Weight	Kg	lbs	Kg	lbs	Kg	lbs	Kg	lbs	Kg	lbs	Kg	lbs	Kg	lbs
ANSI 150/PN16	20	44	35	77	76	168	115	254	235	518	335	739	700	1543
ANSI 300	21	46	36	79	82	181	128	282	257	567	395	871	750	1653
ANSI 600	22	49	38	84	85	187	138	304	290	639	435	959	850	1874

Table 32 Weights and dimensions

Aperflux 851+ SB/82 or HB/97

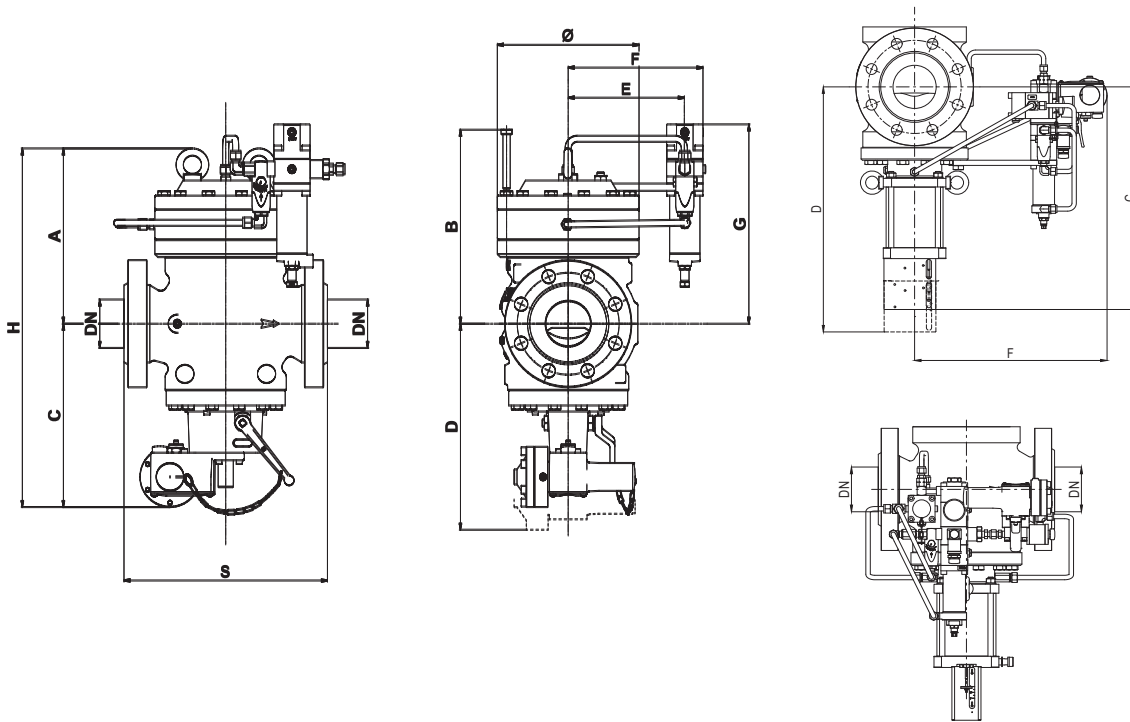


Figure 11 Aperflux 851 + SB/82 or HB/97 dimensions

Weights and Dimensions (for other connections please contact your closest Pietro Fiorentini representative)														
Size (DN) - [mm]	25		50		80		100		150		200		250	
Size (DN) - inches	1"		2"		3"		4"		6"		8"		10"	
	[mm]	inches	[mm]	inches	[mm]	inches	[mm]	inches	[mm]	inches	[mm]	inches	[mm]	inches
S - ANSI 150/PN16	184	7.2"	254	10"	298	11.7"	352	13.9"	451	17.8"	543	21.4"	673	26.5"
S - ANSI 300	197	7.8"	267	10.5"	317	12.5"	368	14.5"	473	18.6"	568	22.4"	708	27.9"
S - ANSI 600	210	8.3"	286	11.3"	336	13.2"	394	15.5"	508	20.0"	609	24.0"	752	29.6"
Ø	125	4.9"	160	6.3"	245	9.6"	290	11.4"	385	15.2"	490	19.3"	615	24.2"
A	200	7.9"	230	9.1"	300	11.8"	340	13.4"	420	16.5"	455	17.9"	580	22.8"
B	230	9.1"	260	10.2"	340	13.4"	380	15.0"	470	18.5"	510	20.1"	520	20.5"
C with SB/82	215	8.5"	240	9.4"	270	10.6"	300	11.8"	375	14.8"	450	17.7"	680	26.8"
C with HB/97	-	-	-	-	-	-	518	20.4"	645	25.4"	687	27.0"	796	31.3"
D with SB/82	320	12.6"	370	14.6"	420	16.5"	480	18.9"	600	23.6"	665	26.2"	900	35.4"
D with HB/97	-	-	-	-	-	-	650	25.6"	835	32.9"	900	35.4"	1060	41.7"
E	140	5.5"	145	5.7"	190	7.5"	210	8.3"	260	10.2"	315	12.4"	370	14.6"
F with HB/97	-	-	-	-	-	-	358	14.1"	410	16.1"	445	17.5"	510	20.1"
F	160	6.3"	175	6.9"	220	8.7"	240	9.4"	290	11.4"	345	13.6"	415	16.3"
G	260	10.2"	280	11.0"	350	13.8"	380	15.0"	450	17.7"	490	19.3"	380	15.0"
H	415	16.3"	470	18.5"	570	22.4"	640	25.2"	795	31.3"	905	35.6"	1260	49.6"
Tube Connections	Øe 10 x Øi 8 (on request imperial sizing)													
Weight	Kg	lbs	Kg	lbs	Kg	lbs	Kg	lbs	Kg	lbs	Kg	lbs	Kg	lbs
ANSI 150/PN16	27	60	44	97	86	190	130	287	260	573	400	882	750	1653
ANSI 300	27	60	46	101	92	203	145	320	290	639	470	1036	800	1764
ANSI 600	30	66	48	106	96	212	155	342	320	705	510	1124	900	1984

Table 33 Weights and dimensions

Aperflux 851 + PM/819

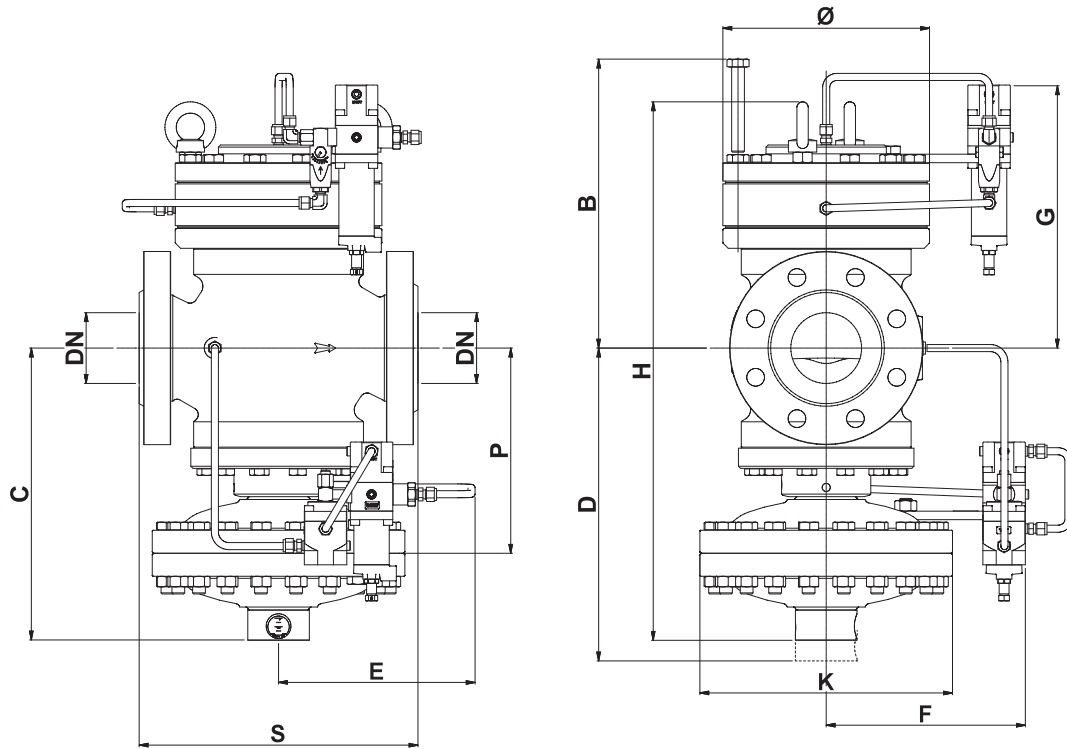


Figure 12 Aperflux 851 + PM/819 dimensions

Weights and Dimensions (for other connections please contact your closest Pietro Fiorentini representative)														
Size (DN) - [mm]	25		50		80		100		150		200		250	
Size (DN) - inches	1"		2"		3"		4"		6"		8"		10"	
	[mm]	inches	[mm]	inches	[mm]	inches	[mm]	inches	[mm]	inches	[mm]	inches	[mm]	inches
S - ANSI 150/PN16	184	7.2"	254	10"	298	11.7"	352	13.9"	451	17.8"	543	21.4"	673	26.5"
S - ANSI 300	197	7.8"	267	10.5"	317	12.5"	368	14.5"	473	18.6"	568	22.4"	708	27.9"
S - ANSI 600	210	8.3"	286	11.3"	336	13.2"	394	15.5"	508	20.0"	609	24.0"	752	29.6"
Ø	125	4.9"	160	6.3"	245	9.6"	290	11.4"	385	15.2"	490	19.3"	615	24.2"
B	230	9.1"	260	10.2"	340	13.4"	380	15.0"	470	18.5"	510	20.1"	520	20.5"
C	320	12.6"	350	13.8"	430	16.9"	490	19.3"	650	25.6"	750	29.5"	680	26.8"
D	410	16.1"	430	16.9"	530	20.9"	600	23.6"	735	28.9"	850	33.5"	900	35.4"
E	370	14.6"	370	14.6"	410	16.1"	410	16.1"	485	19.1"	485	19.1"	370	14.6"
F	270	10.6"	270	10.6"	310	12.2"	310	12.2"	385	15.2"	385	15.2"	415	16.3"
G	260	10.2"	280	11.0"	350	13.8"	380	15.0"	450	17.7"	490	19.3"	380	15.0"
H	520	20.5"	580	22.8"	730	28.7"	830	32.7"	1070	42.1"	1205	47.4"	1380	54.3"
K	278	10.9"	278	10.9"	360	14.2"	360	14.2"	510	20.1"	510	20.1"	610	24.0"
P	170	6.7"	200	7.9"	260	10.2"	290	11.4"	320	12.6"	370	14.6"	500	19.7"
Tubing Connections	Øe 10 x Øi 8 (on request imperial sizing)													
Weight	Kg	lbs	Kg	lbs	Kg	lbs	Kg	lbs	Kg	lbs	Kg	lbs	Kg	lbs
ANSI 150/PN16	33	73	68	150	135	298	160	353	370	816	525	1157	1100	2425
ANSI 300	34	75	70	154	138	304	165	364	390	860	585	1290	1150	2535
ANSI 600	35	77	72	159	148	326	190	419	420	926	625	1378	1250	2756

Table 34 Weights and dimensions

Aperflux 851+ DB/851

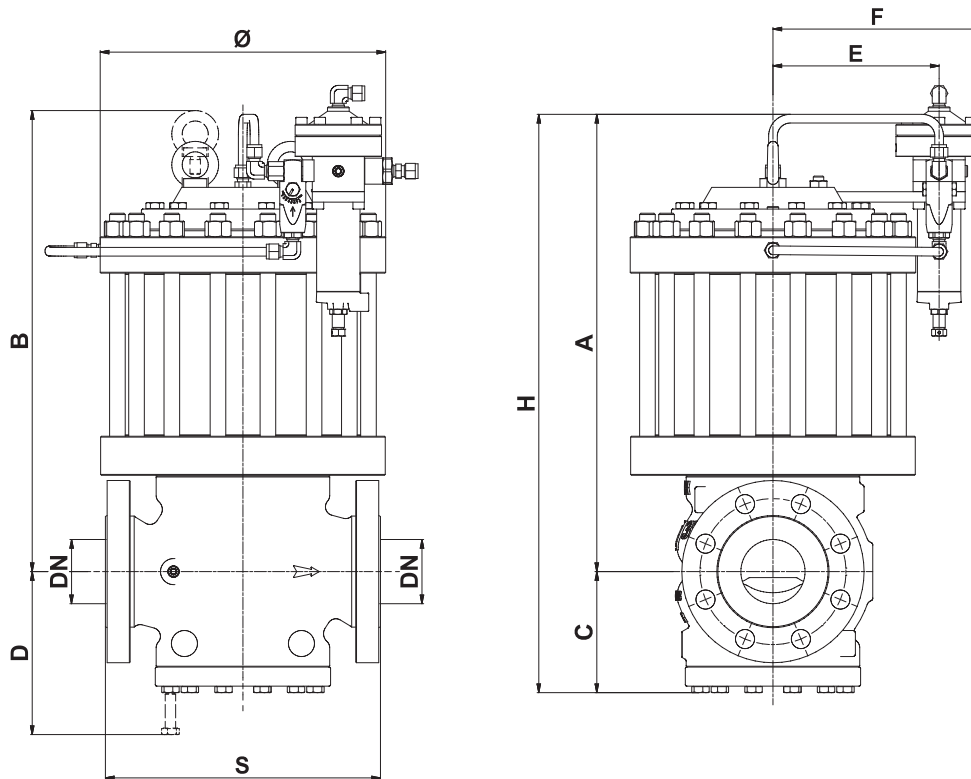


Figure 13 Aperflux 851 + DB/851 dimensions

Weights and Dimensions (for other connections please contact your closest Pietro Fiorentini representative)														
Size (DN) - [mm]	25		50		80		100		150		200		250	
Size (DN) - inches	1"		2"		3"		4"		6"		8"		10"	
	[mm]	inches	[mm]	inches	[mm]	inches	[mm]	inches	[mm]	inches	[mm]	inches	[mm]	inches
S - ANSI 150/PN16	184	7.2"	254	10"	298	11.7"	352	13.9"	451	17.8"	543	21.4"	673	26.5"
S - ANSI 300	197	7.8"	267	10.5"	317	12.5"	368	14.5"	473	18.6"	568	22.4"	708	27.9"
S - ANSI 600	210	8.3"	286	11.3"	336	13.2"	394	15.5"	508	20.0"	609	24.0"	752	29.6"
Ø	220	8.7"	300	11.8"	330	13.0"	390	15.4"	480	18.9"	645	25.4"	740	29.1"
A	355	14.0"	420	16.5"	500	19.7"	570	22.4"	715	28.1"	910	35.8"	1025	40.4"
B	465	18.3"	530	20.9"	625	24.6"	695	27.4"	850	33.5"	1045	41.1"	1085	42.7"
C	100	3.9"	130	5.1"	150	5.9"	190	7.5"	240	9.4"	265	10.4"	340	13.4"
D	130	5.1"	160	6.3"	200	7.9"	250	9.8"	300	11.8"	320	12.6"	440	17.3"
E	162	6.4"	196	7.7"	216	8.5"	241	9.5"	234	9.2"	237	9.3"	262	10.3"
F	192	7.6"	226	8.9"	246	9.7"	271	10.7"	264	10.4"	267	10.5"	292	11.5"
H	455	17.9"	550	21.7"	650	25.6"	760	29.9"	980	38.6"	1175	46.3"	1215	47.8"
Tubing Connections	Øe 10 x Øi 8 (on request imperial sizing)													
Weight	Kg	lbs	Kg	lbs	Kg	lbs	Kg	lbs	Kg	lbs	Kg	lbs	Kg	lbs
ANSI 150/PN16	673	1484	100	220	168	370	240	529	391	862	760	1676	1240	2734
ANSI 300	708	1561	102	225	177	390	268	591	433	955	834	1839	1292	2848
ANSI 600	752	1658	104	229	180	397	278	613	466	1027	874	1927	1392	3069

Table 35 Weights and dimensions

Aperflux 851 + DB/851 + SB/82 or HB/97

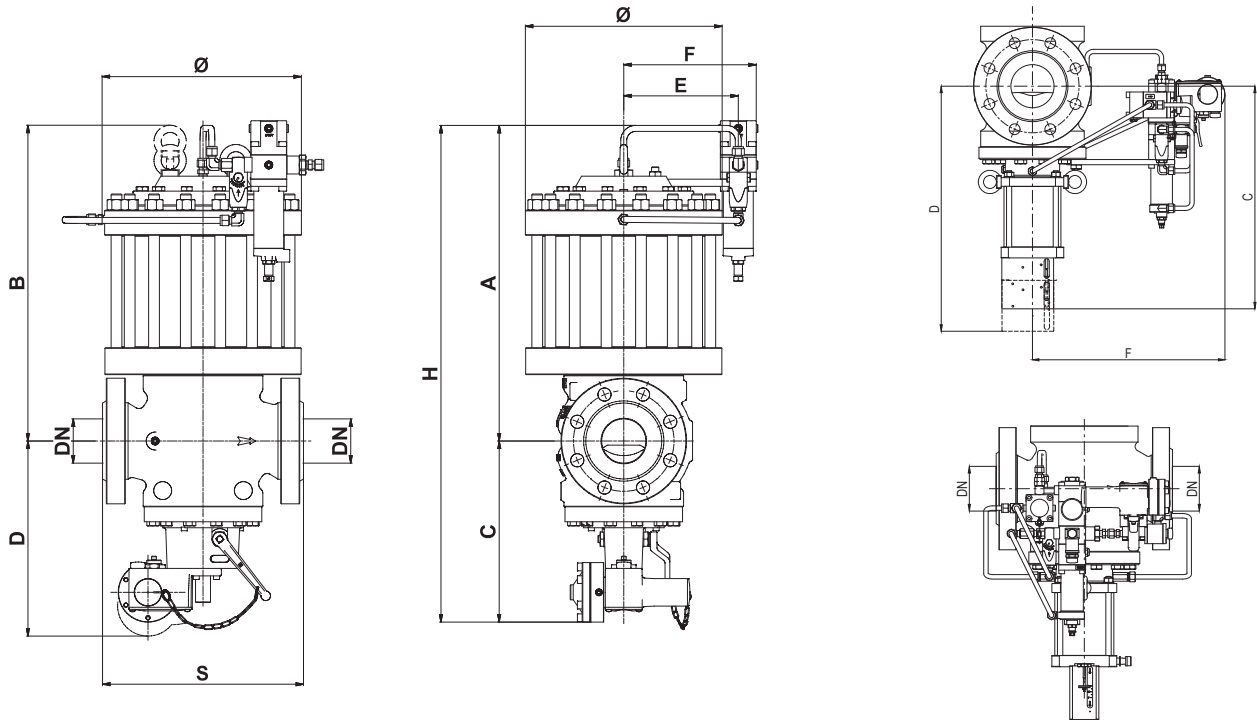


Figure 14 Aperflux 851 + DB/851 + SB/82 or HB/97 dimensions

Weights and Dimensions (for other connections please contact your closest Pietro Fiorentini representative)														
Size (DN) - [mm]	25		50		80		100		150		200		250	
Size (DN) - inches	1"		2"		3"		4"		6"		8"		10"	
	[mm]	inches	[mm]	inches	[mm]	inches	[mm]	inches	[mm]	inches	[mm]	inches	[mm]	inches
S - ANSI 150/PN16	184	7.2"	254	10"	298	11.7"	352	13.9"	451	17.8"	543	21.4"	673	26.5"
S - ANSI 300	197	7.8"	267	10.5"	317	12.5"	368	14.5"	473	18.6"	568	22.4"	708	27.9"
S - ANSI 600	210	8.3"	286	11.3"	336	13.2"	394	15.5"	508	20.0"	609	24.0"	752	29.6"
Ø	220	8.7"	300	11.8"	330	13.0"	390	15.4"	480	18.9"	645	25.4"	740	29.1"
A	335	13.2"	420	16.5"	500	19.7"	570	22.4"	715	28.1"	910	35.8"	1025	40.4"
B	465	18.3"	530	20.9"	625	24.6"	695	27.4"	850	33.5"	1045	41.1"	1085	42.7"
C with SB/82	215	8.5"	240	9.4"	270	10.6"	300	11.8"	375	14.8"	450	17.7"	680	26.8"
C with HB/97	-	-	-	-	-	-	518	20.4"	645	25.4"	687	27.0"	796	31.3"
D with SB/82	320	12.6"	370	14.6"	420	16.5"	480	18.9"	600	23.6"	665	26.2"	900	35.4"
D with HB/97	-	-	-	-	-	-	650	25.6"	935	36.8"	900	35.4"	1060	41.7"
E	192	7.6"	226	8.9"	246	9.7"	271	10.7"	264	10.4"	267	10.5"	292	11.5"
F with HB/97	-	-	-	-	-	-	358	14.1"	410	16.1"	445	17.5"	510	20.1"
F	485	19.1"	550	21.7"	645	25.4"	705	27.8"	880	34.6"	1135	44.7"	1736	68.3"
H	675	26.6"	783	30.8"	912	35.9"	1007	39.6"	1216	47.9"	1517	59.7"	1712	67.4"
Tubing Connections	Øe 10 x Øi 8 (on request imperial sizing)													
Weight	Kg	lbs	Kg	lbs	Kg	lbs	Kg	lbs	Kg	lbs	Kg	lbs	Kg	lbs
ANSI 150/PN16	54	119	109	240	178	392	255	562	416	917	825	1819	1290	2844
ANSI 300	56	123	112	247	187	412	283	624	466	1027	909	2004	1342	2959
ANSI 600	58	128	114	251	191	421	294	648	499	1100	949	2092	1442	3179

Table 36 Weights and dimensions

Aperflux 851 + DB/851 + PM/819

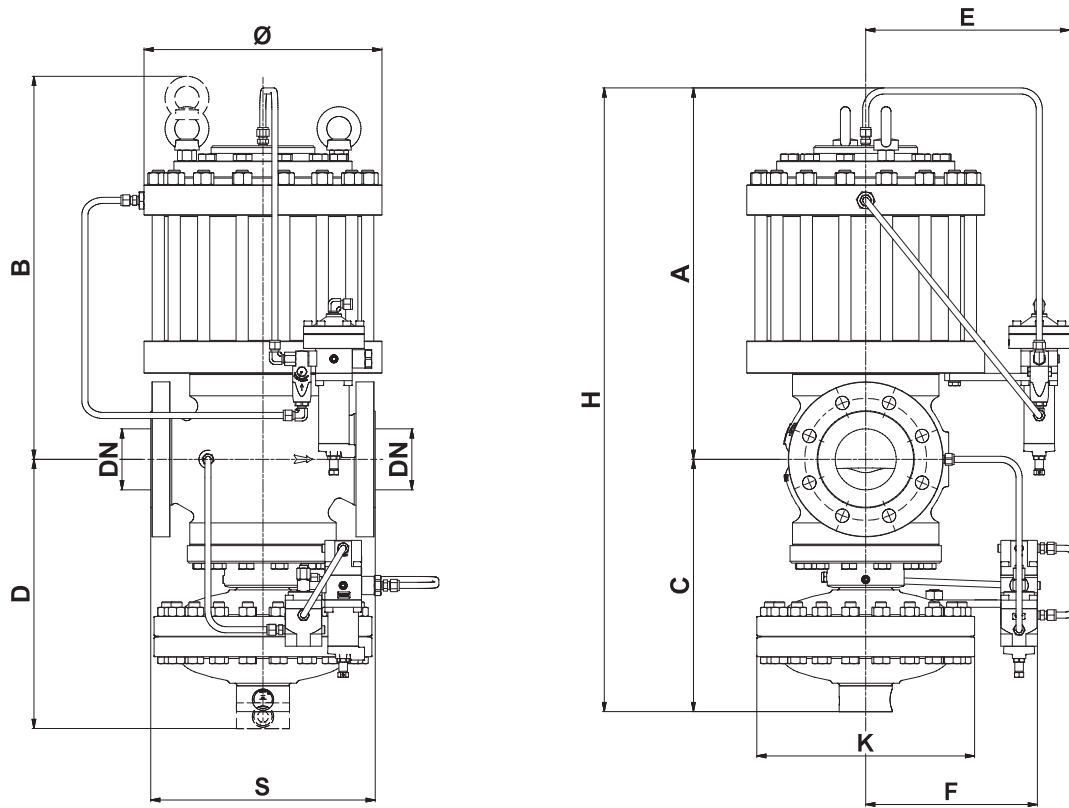


Figure 15 Aperflux 851 + DB/851 + PM/819 dimensions

Weights and Dimensions (for other connections please contact your closest Pietro Fiorentini representative)														
Size (DN) - [mm]	25		50		80		100		150		200		250	
Size (DN) - inches	1"		2"		3"		4"		6"		8"		10"	
	[mm]	inches	[mm]	inches	[mm]	inches	[mm]	inches	[mm]	inches	[mm]	inches	[mm]	inches
S - ANSI 150/PN16	184	7.2"	254	10"	298	11.7"	352	13.9"	451	17.8"	543	21.4"	673	26.5"
S - ANSI 300	197	7.8"	267	10.5"	317	12.5"	368	14.5"	473	18.6"	568	22.4"	708	27.9"
S - ANSI 600	210	8.3"	286	11.3"	336	13.2"	394	15.5"	508	20.0"	609	24.0"	752	29.6"
Ø	220	8.7"	300	11.8"	330	13.0"	390	15.4"	480	18.9"	645	25.4"	740	29.1"
A	355	14.0"	420	16.5"	500	19.7"	570	22.4"	715	28.1"	910	35.8"	1025	40.4"
B	465	18.3"	530	20.9"	625	24.6"	695	27.4"	850	33.5"	1045	41.1"	1085	42.7"
C	320	12.6"	350	13.8"	430	16.9"	490	19.3"	650	25.6"	750	29.5"	800	31.5"
D	410	16.1"	430	16.9"	530	20.9"	600	23.6"	735	28.9"	850	33.5"	900	35.4"
E	192	7.6"	226	8.9"	246	9.7"	271	10.7"	264	10.4"	267	10.5"	292	11.5"
F	270	10.6"	270	10.6"	310	12.2"	310	12.2"	385	15.2"	385	15.2"	415	16.3"
H	685	27.0"	750	29.5"	905	35.6"	995	39.2"	1260	49.6"	1530	60.2"	1545	60.8"
Tubing Connections	Øe 10 x Øi 8 (on request imperial sizing)													
Weight	Kg	lbs	Kg	lbs	Kg	lbs	Kg	lbs	Kg	lbs	Kg	lbs	Kg	lbs
ANSI 150/PN16	60	132	133	293	223	492	295	650	526	1160	950	2094	1640	3616
ANSI 300	62	137	135	298	232	511	325	717	568	1252	1024	2258	1692	3730
ANSI 600	63	139	137	302	235	518	335	739	601	1325	1064	2346	1792	3951

Table 37 Weights and dimensions



Sizing and Cg

In general, the choice of a regulator is made based on the calculation of the flow rate determined by using the flow rate coefficients (Cg) and the form factor (K1) as indicated by the EN 334 standard.

Flow rate coefficient							
Nominal size	25	50	80	100	150	200	250
Inches	1"	2"	3"	4"	6"	8"	10"
Cg	480	1550	3790	5554	11112	17316	24548
K1	113.9	113.9	113.9	113.9	113.9	113.9	113.9

Table 38 Flow rate coefficient

For sizing [PRESS HERE](#) or use the QR code:



Note: In case you do not have the proper credentials to access, feel free to contact your closest Pietro Fiorentini representative.

In general the online sizing considers multiple variables as the regulator is installed in a system, enabling a better and multiperspective approach to the sizing.

For different gases, and for natural gas with a different relative density other than 0.61 (compared to air), the correction coefficients from the following formula shall be applied.

$$F_c = \sqrt{\frac{175.8}{S \times (273.16 + T)}}$$

S = relative density (refer to Table 39)
T = gas temperature (°C)

$$F_c = \sqrt{\frac{316.44}{S \times (459.67 + T)}}$$

S = relative density (refer to Table 39)
T = gas temperature (°F)

Correction Factor Fc		
Gas Type	Relative Density S	Correction Factor Fc
Air	1.00	0.78
Propane	1.53	0.63
Butane	2.00	0.55
Nitrogen	0.97	0.79
Oxygen	1.14	0.73
Carbon Dioxide	1.52	0.63

Note: the table shows the Fc correction factors valid for Gas, calculated at a temperature of 15°C and at the declared relative density.

Table 39 Correction Factor Fc

Flow rate conversion
Stm ³ /h x 0.94795 = Nm ³ /h

Nm³/h reference conditions T= 0 °C; P= 1 barg
 Stm³/h reference conditions T= 15 °C; P= 1 barg

Table 40 Flow rate conversion

CAUTION:

In order to get optimal performance, to avoid premature erosion phenomena and to limit noise emissions, it is recommended to check the gas speed, and its compliance with local practice and regulations. The gas speed at the outlet flange may be calculated by means of the following formula:

$$V = 345.92 \times \frac{Q}{DN^2} \times \frac{1 - 0.002 \times Pd}{1 + Pd}$$

V = gas speed in m/s
 Q = gas flow rate in Stm³/h
 DN = nominal size of regular in mm
 Pd = outlet pressure in barg

$$V = 0.0498 \times \frac{Q}{DN^2} \times \frac{14.504 - 0.002 \times Pd}{14.504 + Pd}$$

V = gas speed in ft/s
 Q = gas flow rate in Scfh
 DN = nominal size of regular in inches
 Pd = outlet pressure in psi



Sizing of regulators is usually made based on valve Cg value (Table 38).

Flow rates at fully open position and various operating conditions are related by the following formulae where:

Q = flow rate in Scf/h

Pu = inlet pressure in psia

Pd = outlet pressure in psia

- **A** > when the Cg value of the regulator is known, as well as Pu and Pd, the flow rate can be calculated as follows:

- **A-1** in sub critical conditions: ($P_u < 2 \times P_d$)

$$Q = 0.216 \times C_g \times P_u \times \sin \left(K_1 \times \sqrt{\frac{P_u - P_d}{P_u}} \right)$$

- **A-2** in critical conditions: ($P_u \geq 2 \times P_d$)

$$Q = 0.216 \times C_g \times P_u$$

- **B** > vice versa, when the values of Pu, Pd and Q are known, the Cg value, and hence the regulator size, may be calculated using:

- **B-1** in sub-critical conditions: ($P_u < 2 \times P_d$)

$$C_g = \frac{Q}{0.216 \times P_u \times \sin \left(K_1 \times \sqrt{\frac{P_u - P_d}{P_u}} \right)}$$

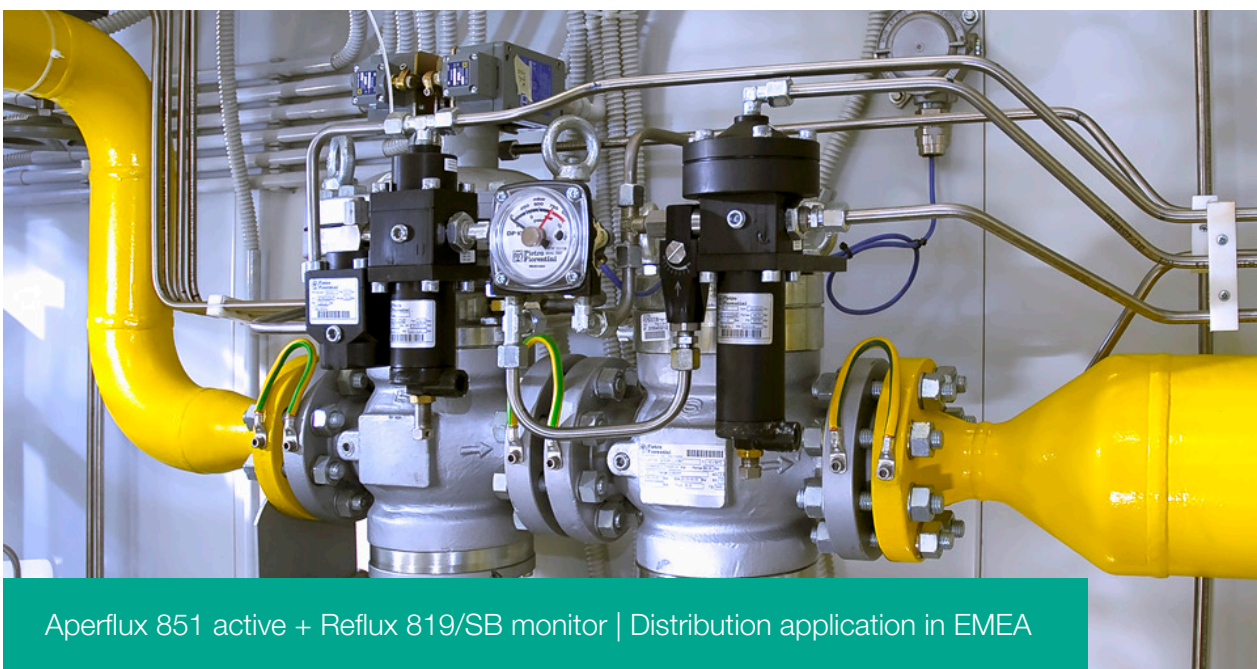
- **B-2** in critical conditions ($P_u \geq 2 \times P_d$)

$$C_g = \frac{Q}{0.216 \times P_u}$$

NOTE: The sin value is understood to be DEG.

Installations

Here below, at glance, are some typical installations by application and geographical location. On demand we are available to supply a more comprehensive experience list and/or references.





Customer Centricity

Customer centricity is a way of running your business — implementing a perfect customer experience at each stage of the pipeline. Pietro Fiorentini is one of the main Italian international company with high focus on product and service quality.

The main strategy is to create a stable, long-term relationship, putting the customer's needs first. Lean management and customer centricity are used to improve and maintain the highest level of customer experience.



Support

Pietro Fiorentini's top priority is to provide support to the client in all phases of project development, during installation, start up and operation. Pietro Fiorentini has developed a highly standardized Intervention-Management-System (IMS), which helps to facilitate the entire process and putting the customer at the forefront of every decision in our process while manufacturing or developing a product to help improve the product and service. With our IMS business model many services are available remotely, avoiding long waiting times, improving service, and avoiding unnecessary expenses.



Training

Pietro Fiorentini offers training services available for both experienced operators and new customers. The training is offered for all levels of our customers which can include one or all of the following: sizing of equipment, application, installation, operation, maintenance and is prepared according to the level of use and the customer's need.



Customer Relation Management (CRM)

The service and care of our customers are one of the main missions and vision of Pietro Fiorentini. For this reason, Pietro Fiorentini has enhanced the customer relation management system. This enables us to track every opportunity and request from our customers into one single information point and allows us to coordinate information allowing us to give the customer improved service.

Sustainability

Here at Pietro Fiorentini, we believe in a world capable of improvement through technology and solutions that can shape a more sustainable future. That is why respect for people, society and the environment form the cornerstones of our strategy.



Our commitment to the world of tomorrow

While in the past we limited ourselves to providing products, systems and services for the Oil & Gas sector, today we want to broaden our horizons and create technologies and solutions for a digital and sustainable world. We have a particular focus on renewable energy projects to help make the most of our planet's resources and create a future in which the younger generations can grow and prosper.

The time has come to understand how and why we operate now.





Pietro Fiorentini

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