

Aperflux 851

High Medium Pressure Gas Regulator



TECHNICAL BROCHURE

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www.f Fiorentini.com

Who we are

We are a global organization specialized 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 offer that goes across the whole natural gas chain.

We are in constant evolution 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 grade of professionalism.



Pietro Fiorentini advantages



Localised technical support

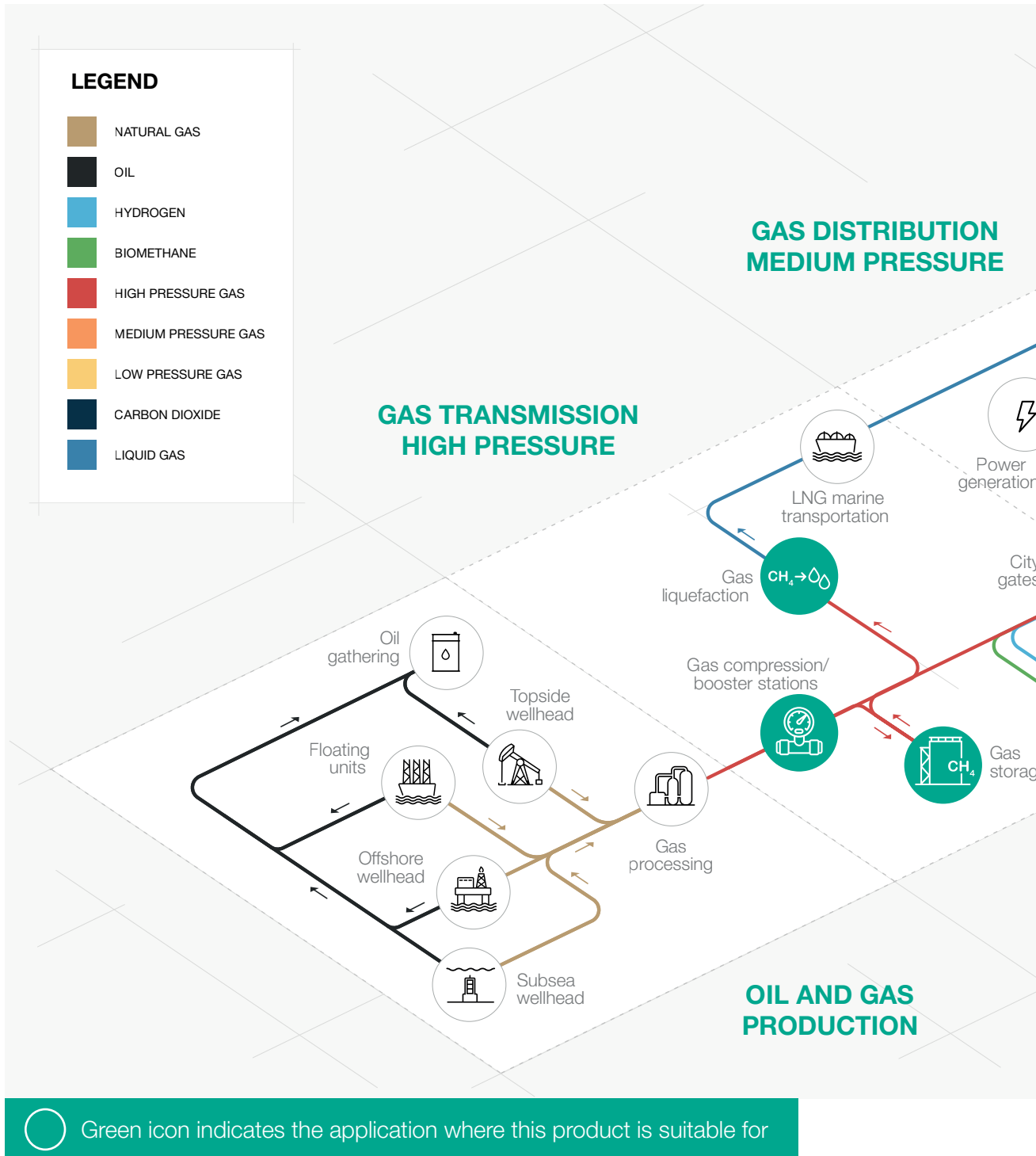


Experience since 1940



We operate in over 100 countries

Area of Application



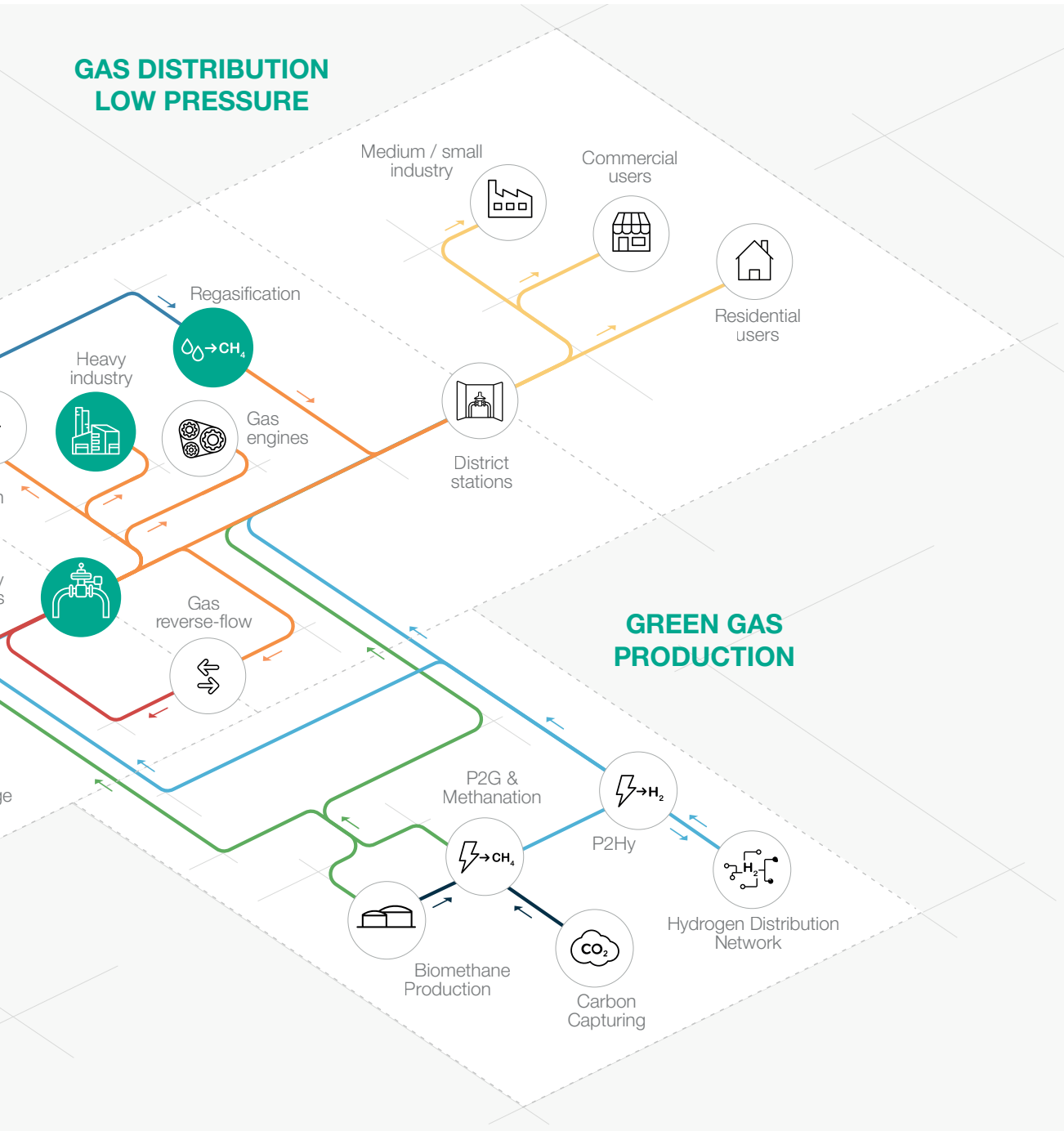


Figure 1 Area of Application Map



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**.

The Aperflux 851 is **Hydrogen Ready** for NG-H2 blending.

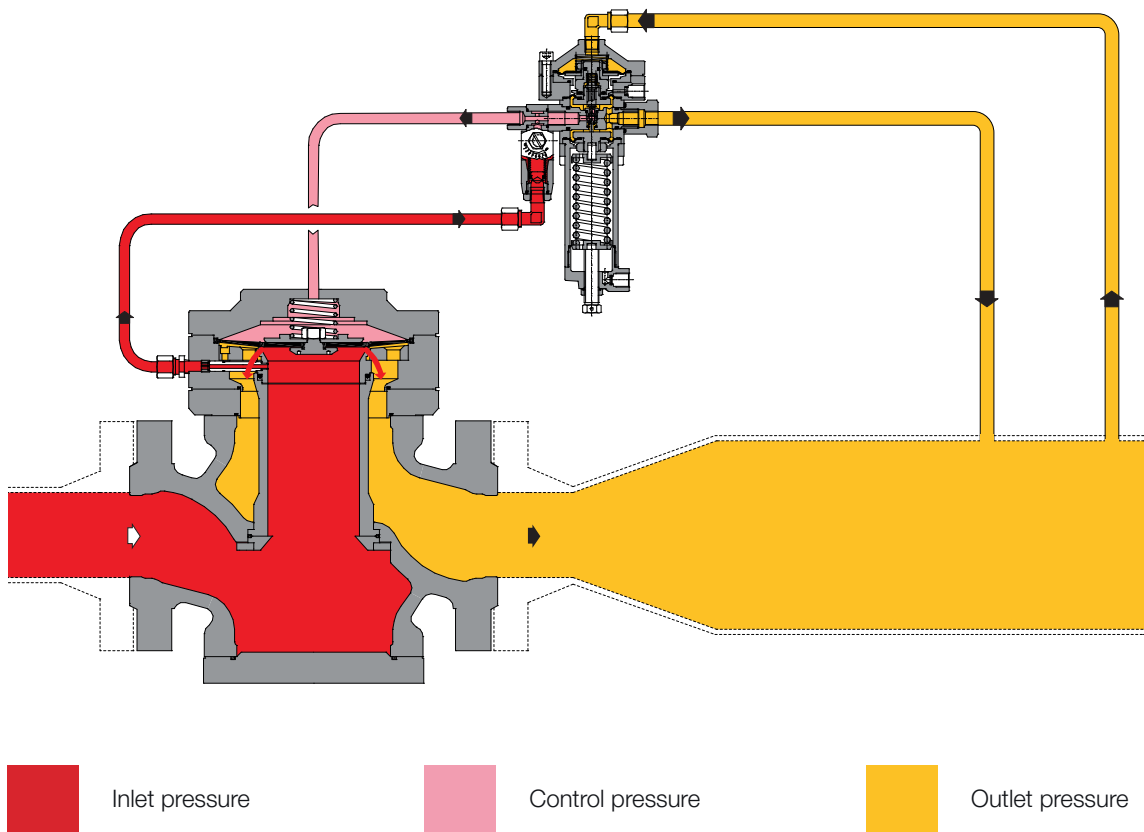


Figure 2 Aperflux 851

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.

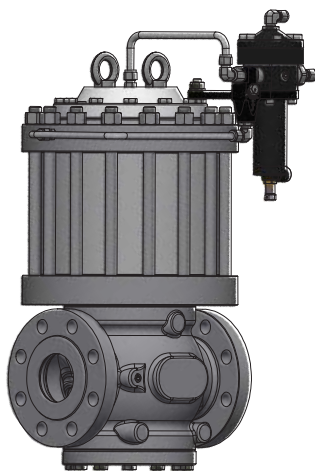


Figure 3 Aperflux 851 with DB/851 silencer

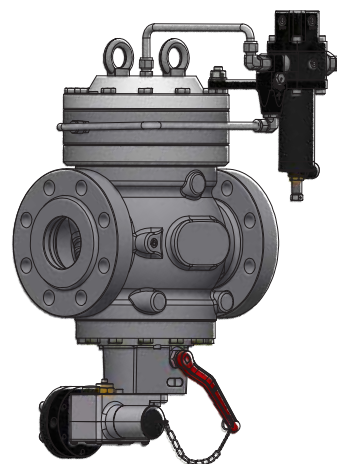


Figure 4 Aperflux 851 with SB/82 slam shut valve



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 20% Hydrogen blending compatible. Higher blending available on request

Features

| Features | Values |
|---|---|
| Design pressure* (PS ¹ / DP ²) | up to 10.2 MPa up to 102 barg |
| Ambient temperature* (TS ¹) | from -20 °C to +60 °C from -4 °F to +140 °F |
| Inlet gas temperature* | from -20 °C to +60 °C from -4 °F to +140 °F |
| Inlet pressure (MAOP / p _{umax} ¹) | from 0.13 to 8.5 MPa from 1.3 to 85 barg |
| Range of downstream pressure (Wd ¹) | from 0.08 to 7.4 MPa from 0.8 to 74 barg |
| Available accessories | DB/851 Silencer, SB/82 Slam-shut, HB/97 Slam shut, PM/819 Monitor, opening indicator |
| Minimum operating differential pressure (Δp _{min} ¹) | 0.05 MPa - recommended 0.2 MPa 0.5 barg - recommended 2 barg |
| Accuracy class (AC ¹) | up to 2.5 (depending on working conditions) |
| Lock-up pressure class (SG ¹) | up to 10 (depending on working conditions) |
| Nominal size (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 ISO 7005 |

⁽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 | Nitril rubber |
| Compression fittings | Zinc-plated carbon steel |

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 types

| Type | Model | Operation | Range Wh | | Spring Table web link |
|------------|-------|-----------|-------------|-----------|-------------------------|
| | | | MPa | barg | |
| Main pilot | 302/A | Manual | 0.08 - 0.95 | 0.8 - 9.5 | TT 653 |
| Main pilot | 304/A | Manual | 0.7 - 4.3 | 7 - 43 | TT 653 |
| Main pilot | 305/A | Manual | 2 - 6 | 20 - 60 | TT 653 |
| Main pilot | 307/A | Manual | 4.1 - 7.4 | 41 - 74 | TT 1146 |

Table 3 Settings Table

| 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 (0.2 barg) at the minimum opening flow of the regulator and about 0.1 MPa (1 barg) at the maximum opening flow of the regulator.

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.

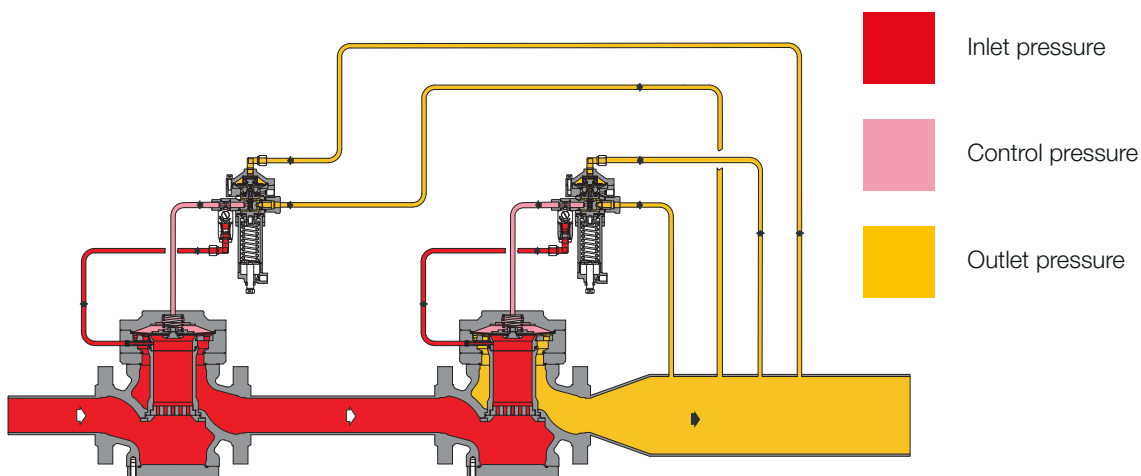


Figure 5 Aperflux 851 with In-line monitor setup



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

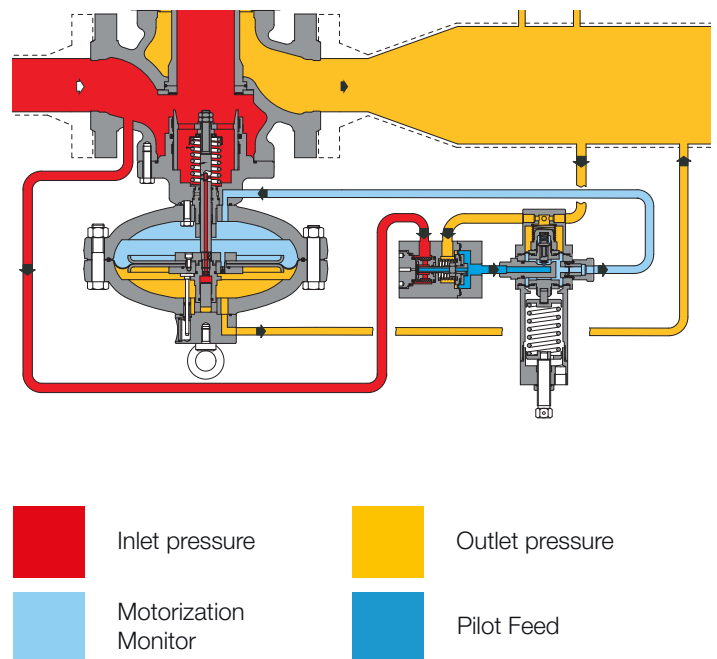


Figure 6 Aperflux 851 with PM/819

| Type | Model | Operation | Range Wh | | Spring Table web link |
|------------|-------|-----------|------------|----------|-------------------------|
| | | | MPa | barg | |
| Main pilot | 204/A | Manual | 0.03 - 4.3 | 0.3 - 43 | TT 433 |
| Main pilot | 205/A | Manual | 2 - 6 | 20 - 60 | TT 799 |
| Main pilot | 207/A | Manual | 4.1 - 7.4 | 41 - 74 | TT 1146 |

Table 5 Setting 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 6 Pilot adjustment table

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

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

Table 7 Accelerator adjustment table

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





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.

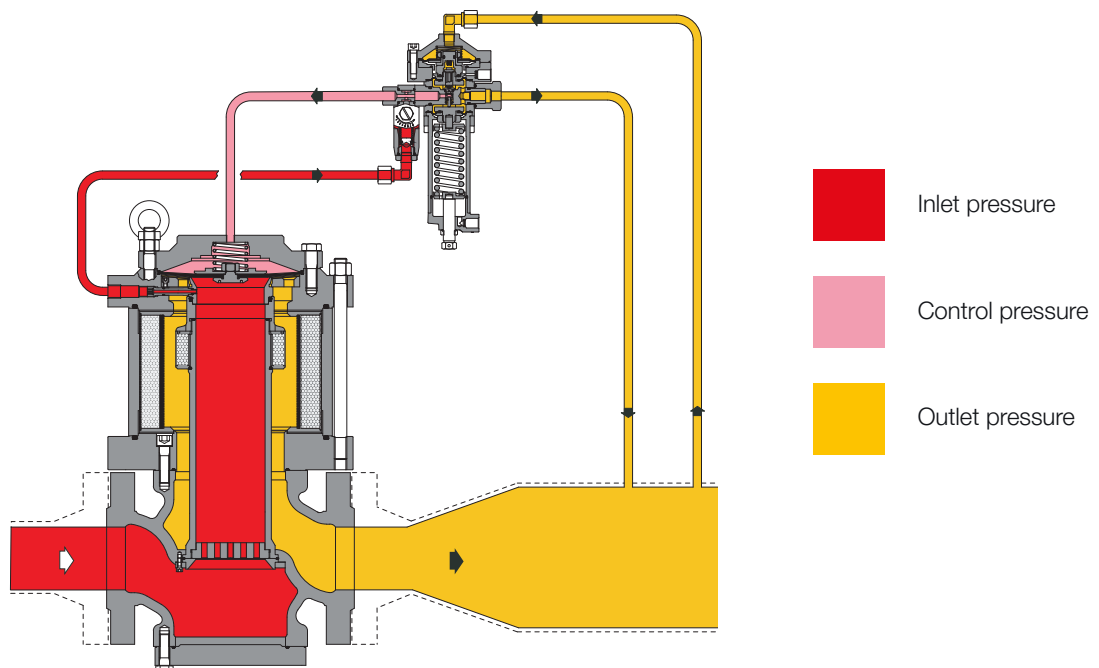


Figure 7 Aperflux 851 with Silencer DB/851

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)

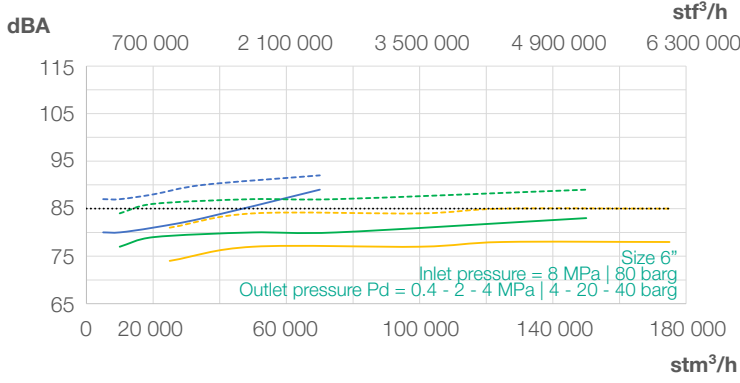
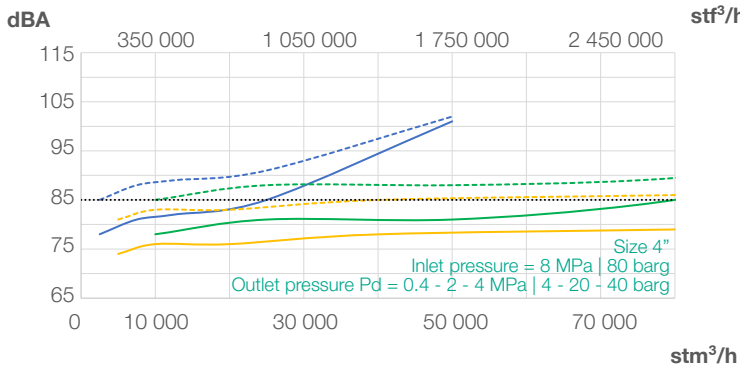
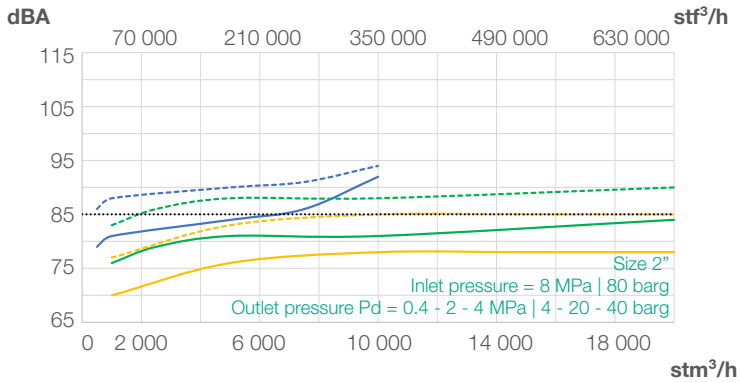
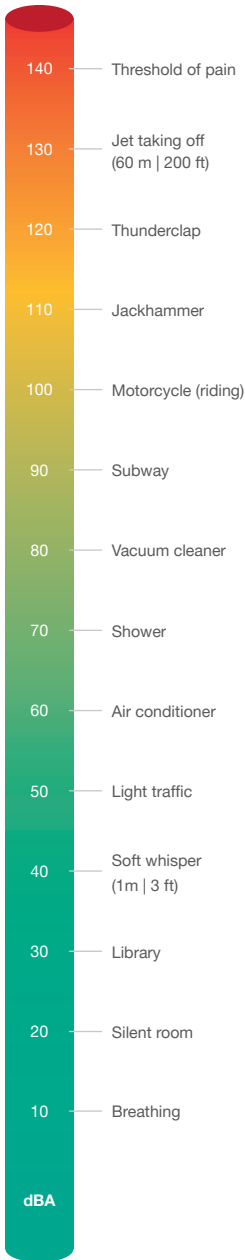


Chart 1 Aperflux 851's silencer efficiency charts



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:

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

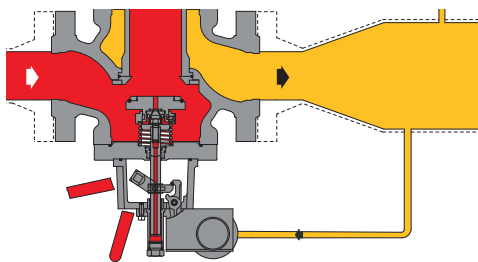


Figure 8 Aperflux 851 with SB/82

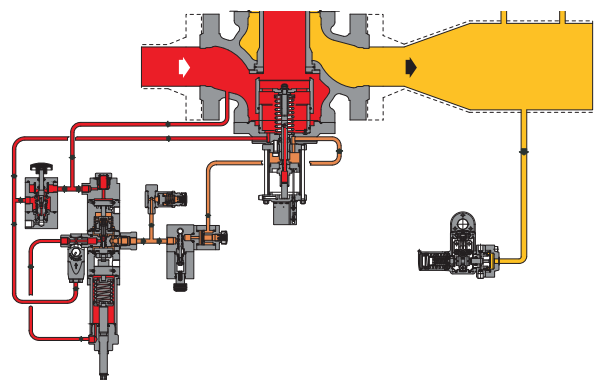
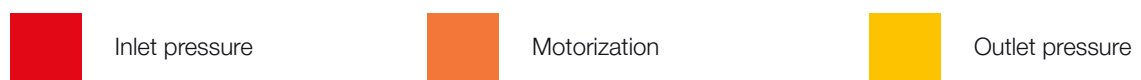


Figure 9 Aperflux 851 with HB/97



| Pressure switch types and ranges | | | | | |
|----------------------------------|--------|-----------|-------------|-----------|--------------------------|
| SSV Type | Model | Operation | Range Wh | | Spring Table web link |
| | | | KPa | mbarg | |
| SB/82 | 101M | OPSO | 2 - 100 | 20 - 1000 | TT 1331 |
| | | UPSO | 1 - 26 | 10 - 260 | |
| SSV Type | Model | Operation | Range Wh | | Spring Table web link |
| | | | MPa | barg | |
| SB/82 | 102M | OPSO | 0.02 - 0.55 | 0.2 - 5.5 | TT 1331 |
| | | UPSO | 0.02 - 0.28 | 0.2 - 2.8 | |
| SB/82 | 102MH | OPSO | 0.02 - 0.55 | 0.2 - 5.5 | TT 1331 |
| | | UPSO | 0.28 - 0.55 | 2.8 - 5.5 | |
| SB/82 | 103M | OPSO | 0.2 - 2.2 | 2 - 22 | TT 1331 |
| | | UPSO | 0.02 - 0.8 | 0.2 - 8 | |
| SB/82 | 103MH | OPSO | 0.2 - 2.2 | 2 - 22 | TT 1331 |
| | | UPSO | 0.8 - 1.9 | 8 - 19 | |
| SB/82 | 104M | OPSO | 1.5 - 4.5 | 15 - 45 | TT 1331 |
| | | UPSO | 0.16 - 1.8 | 1.6 - 18 | |
| SB/82 | 104MH | OPSO | 1.5 - 4.5 | 15 - 45 | TT 1331 |
| | | UPSO | 1.8 - 4.1 | 18 - 41 | |
| SB/82 | 105M | OPSO | 3 - 9 | 30 - 90 | TT 1331 |
| | | UPSO | 0.3 - 4.4 | 3 - 44 | |
| SB/82 | 105MH | OPSO | 3 - 9 | 30 - 90 | TT 1331 |
| | | UPSO | 4.4 - 9 | 44 - 90 | |
| HB/97 | 103 | OPSO | 0.13 - 1.1 | 1.3 - 11 | TT 984 |
| | | UPSO | 0.04 - 0.68 | 0.4 - 6.8 | |
| HB/97 | 104 | OPSO | 1 - 3.15 | 10 - 31.5 | TT 984 |
| | | UPSO | 0.1 - 2.06 | 1 - 20.6 | |
| HB/97 | 105 | OPSO | 2.5 - 7.6 | 25 - 76 | TT 985 |
| | | UPSO | 0.25 - 5 | 2.5 - 50 | |
| HB/97 | 105/92 | OPSO | 5.8 - 8.5 | 58 - 85 | TT 985 |
| | | UPSO | 4.5 - 7.5 | 45 - 75 | |

Table 8 Setting table



Weights and Dimensions

Aperflux 851

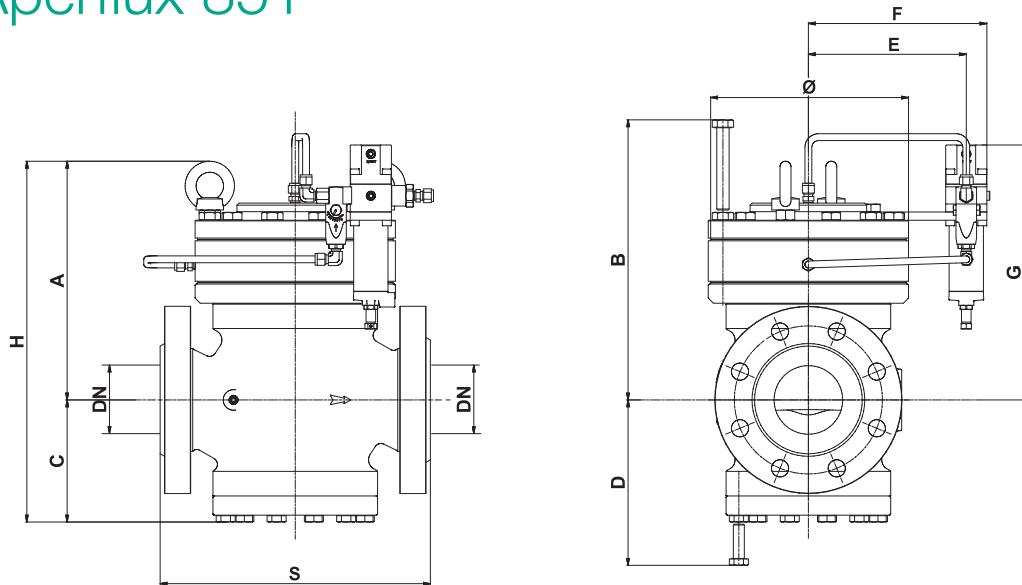


Figure 10 Aperflux 851 dimensions

| Weights and Dimensions (for other connections please contact your closest Pietro Fiorentini representative) | | | | | | | | | | | | | | |
|---|---|--------|------|--------|------|--------|------|--------|------|--------|------|--------|------|--------|
| Size (DN) - [mm] | 25 | | 50 | | 80 | | 100 | | 150 | | 200 | | 250 | |
| | 1" | | 2" | | 3" | | 4" | | 6" | | 8" | | 10" | |
| Size (DN) - inches | [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" |
| 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 | 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 9 Weights and dimensions

Aperflux 851+ SB/82 or HB/97

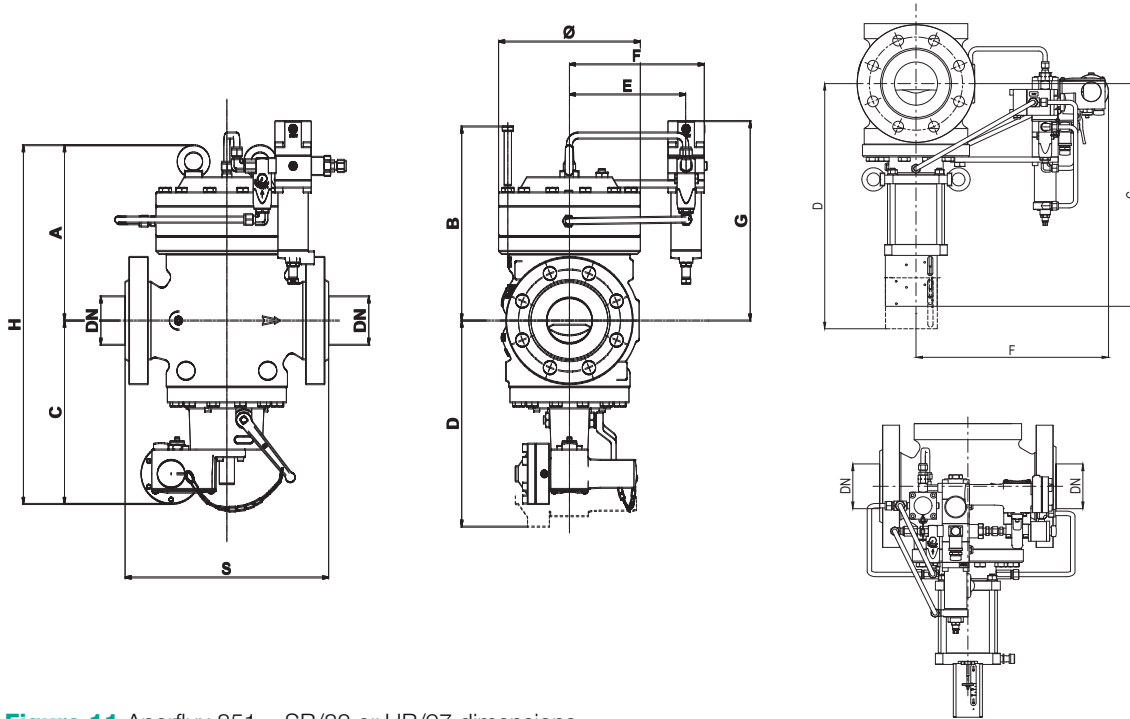


Figure 11 Aperflux 851 + SB/82 or HB/97 dimensions

| Weights and Dimensions (for other connections please contact your closest Pietro Fiorentini representative) | | | | | | | | | | | | | | |
|---|---|--------|------|--------|------|--------|------|--------|------|--------|------|--------|------|--------|
| Size (DN) - [mm] | 25 | | 50 | | 80 | | 100 | | 150 | | 200 | | 250 | |
| | 1" | | 2" | | 3" | | 4" | | 6" | | 8" | | 10" | |
| Size (DN) - inches | [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" |
| 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 | 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 10 Weights and dimensions

Aperflux 851 + PM/819

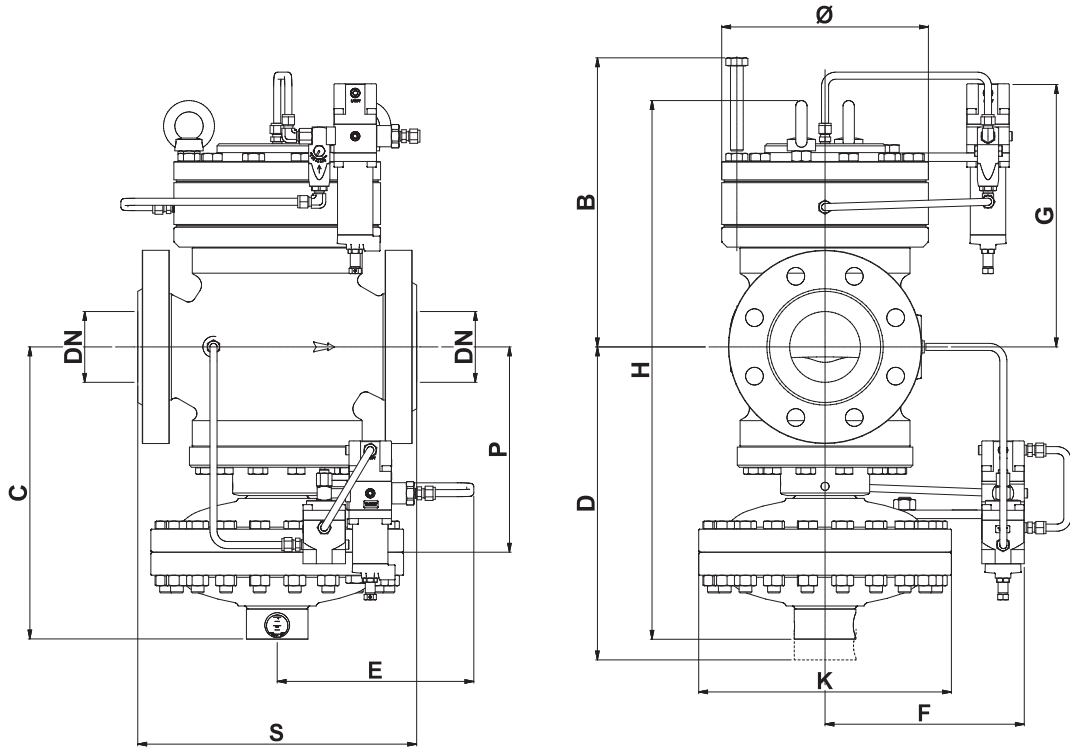


Figure 12 Aperflux 851 + PM/819 dimensions

| 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 11 Weights and dimensions

Aperflux 851+ DB/851

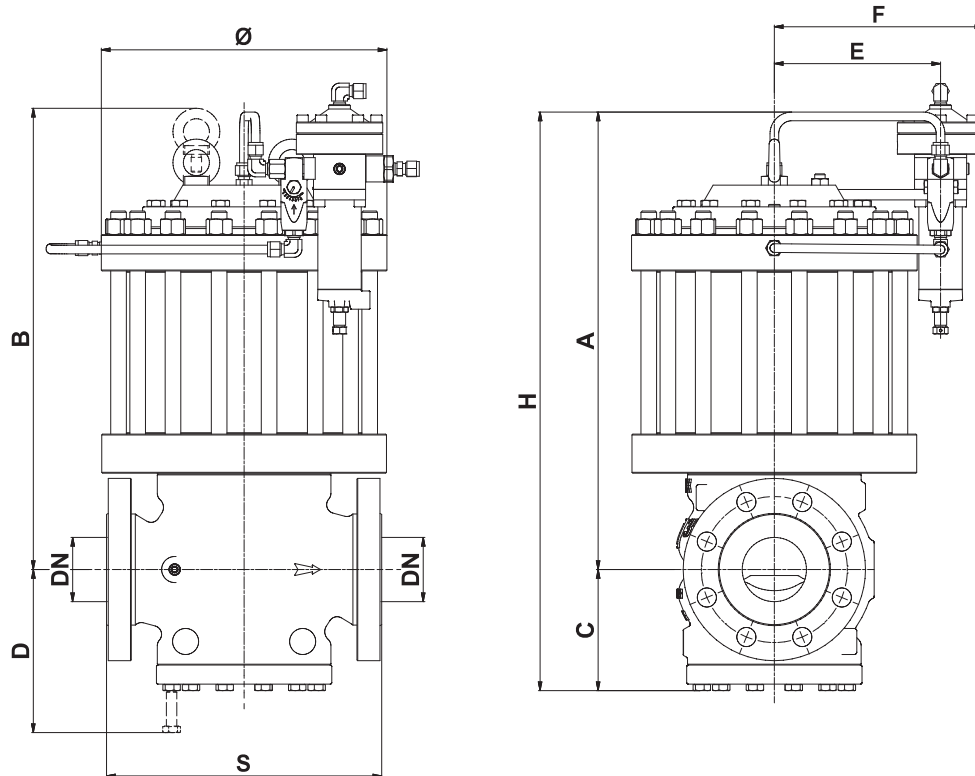


Figure 13 Aperflux 851 + DB/851 dimensions

| Weights and Dimensions (for other connections please contact your closest Pietro Fiorentini representative) | | | | | | | | | | | | | | |
|---|---|--------|------|--------|------|--------|------|--------|------|--------|------|--------|------|--------|
| Size (DN) - [mm] | 25 | | 50 | | 80 | | 100 | | 150 | | 200 | | 250 | |
| | 1" | | 2" | | 3" | | 4" | | 6" | | 8" | | 10" | |
| Size (DN) - inches | [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" |
| Tubeing 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 12 Weights and dimensions

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

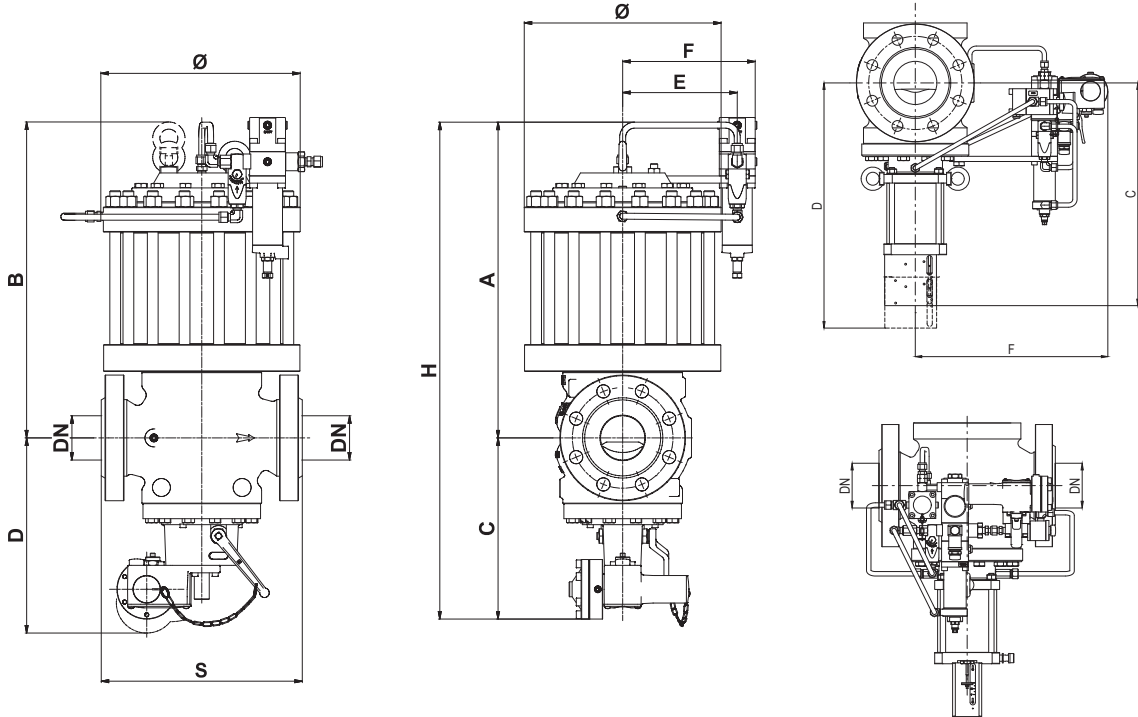


Figure 14 Aperflux 851 + DB/851 + SB/82 or HB/97 dimensions

| Weights and Dimensions (for other connections please contact your closest Pietro Fiorentini representative) | | | | | | | | | | | | | | |
|---|---|--------|------|--------|------|--------|------|--------|------|--------|------|--------|------|--------|
| Size (DN) - [mm] | 25 | | 50 | | 80 | | 100 | | 150 | | 200 | | 250 | |
| | 1" | | 2" | | 3" | | 4" | | 6" | | 8" | | 10" | |
| Size (DN) - inches | [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 13 Weights and dimensions

Aperflux 851 + DB/851 + PM/819

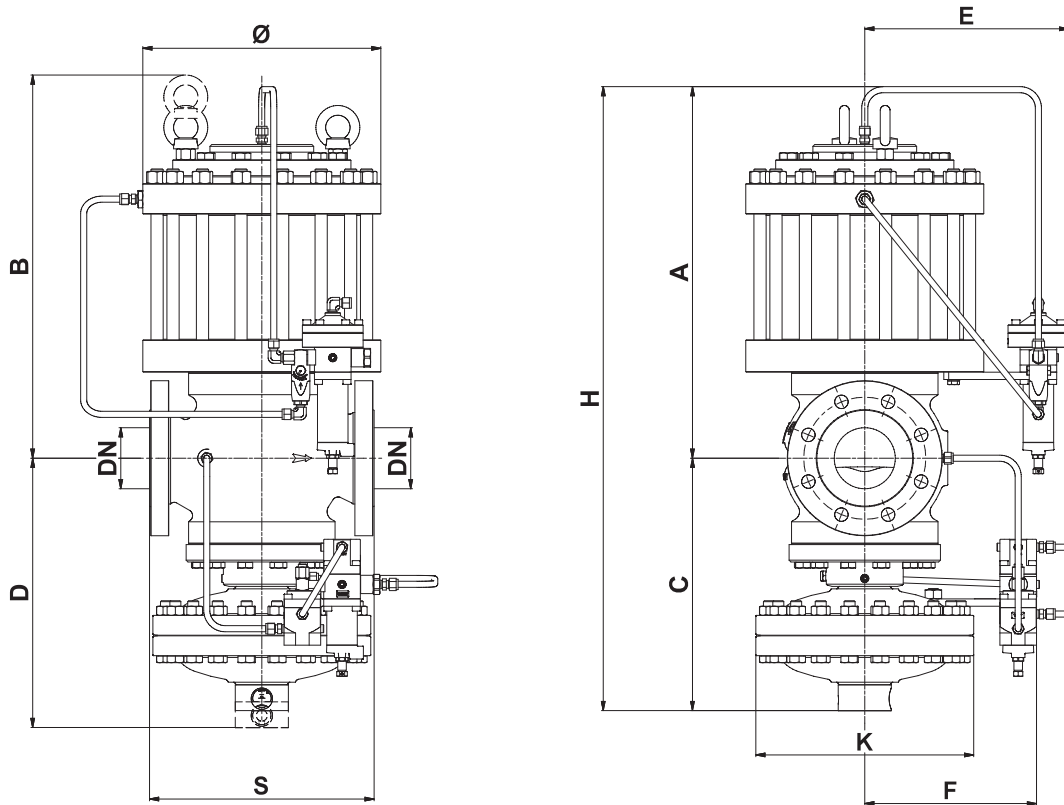


Figure 15 Aperflux 851 + DB/851 + PM/819 dimensions

| 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 14 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 the use of formulae 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 15 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 (refere to table 16)
T = gas temperature (°C)

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 16 Correction factor Fc

Flow rate conversion

$$\text{Stm}^3/\text{h} \times 0.94795 = \text{Nm}^3/\text{h}$$

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

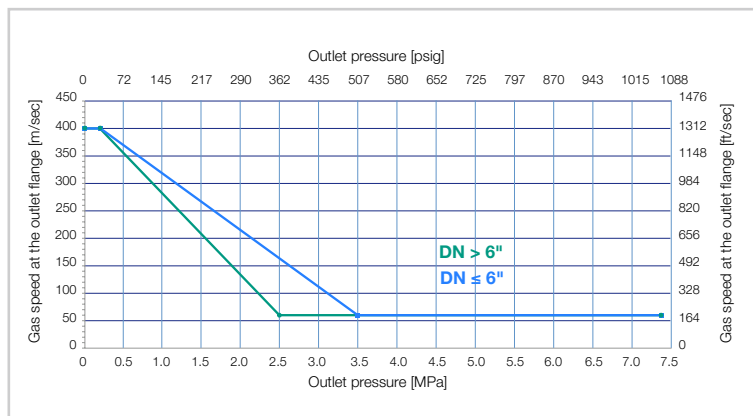
Table 17 Flow rate conversion

CAUTION:

In order to get optimal performance, to avoid premature erosion phenomena and to limit noise emissions, it is recommended to check that the gas speed at the outlet flange does not exceed the values of the graph below. The gas speed at the outlet flange may be calculated by means of the following formula:

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

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





Sizing of regulators is usually made based on valve Cg value (table 15).

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

Q = flow rate in Stm³/h

Pu = inlet pressure in bar (abs)

Pd = outlet pressure in bar (abs).

- **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: (Pu < 2 x Pd)

$$Q = 0.526 \times C_g \times P_u \times \sin \left(K_1 \times \sqrt{\frac{P_u - P_d}{P_u}} \right)$$

- **A-2** in critical conditions: (Pu ≥ 2 x Pd)

$$Q = 0.526 \times C_g \times P_u$$

- **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: (Pu < 2 x Pd)

$$C_g = \frac{Q}{0.526 \times P_u \times \sin \left(K_1 \times \sqrt{\frac{P_u - P_d}{P_u}} \right)}$$

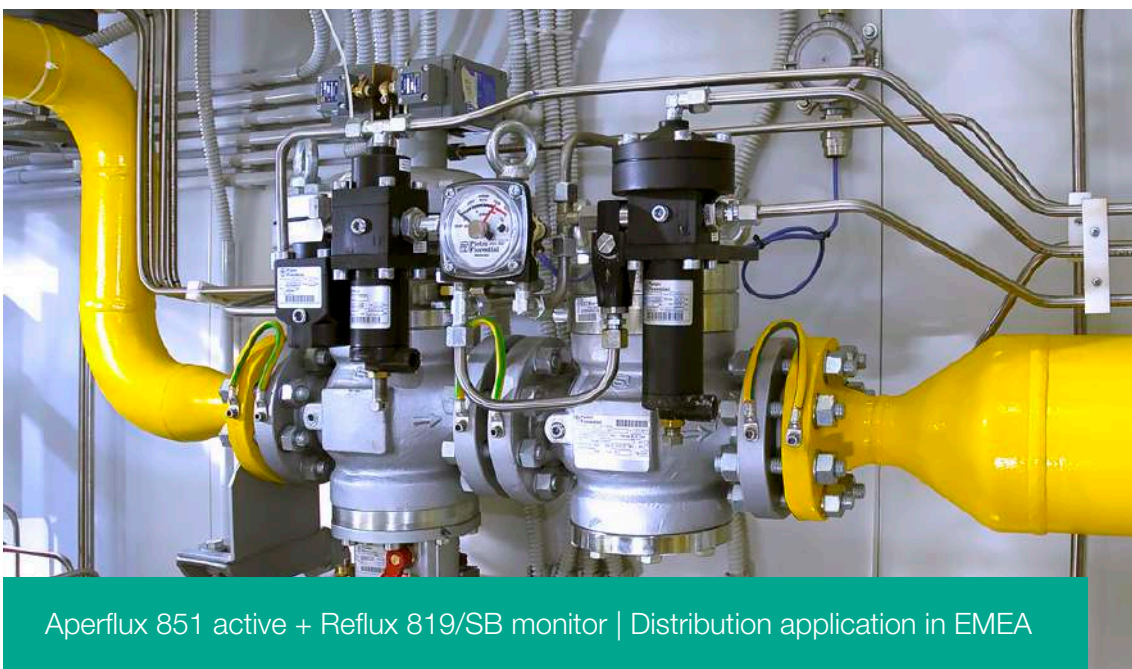
- **B-2** in critical conditions (Pu ≥ 2 x Pd)

$$C_g = \frac{Q}{0.526 \times P_u}$$

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.





Pietro Fiorentini

TB0002ENG



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