

Reval 182

Medium Low Pressure Gas Regulator



TECHNICAL BROCHURE

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to make changes without prior notice.

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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

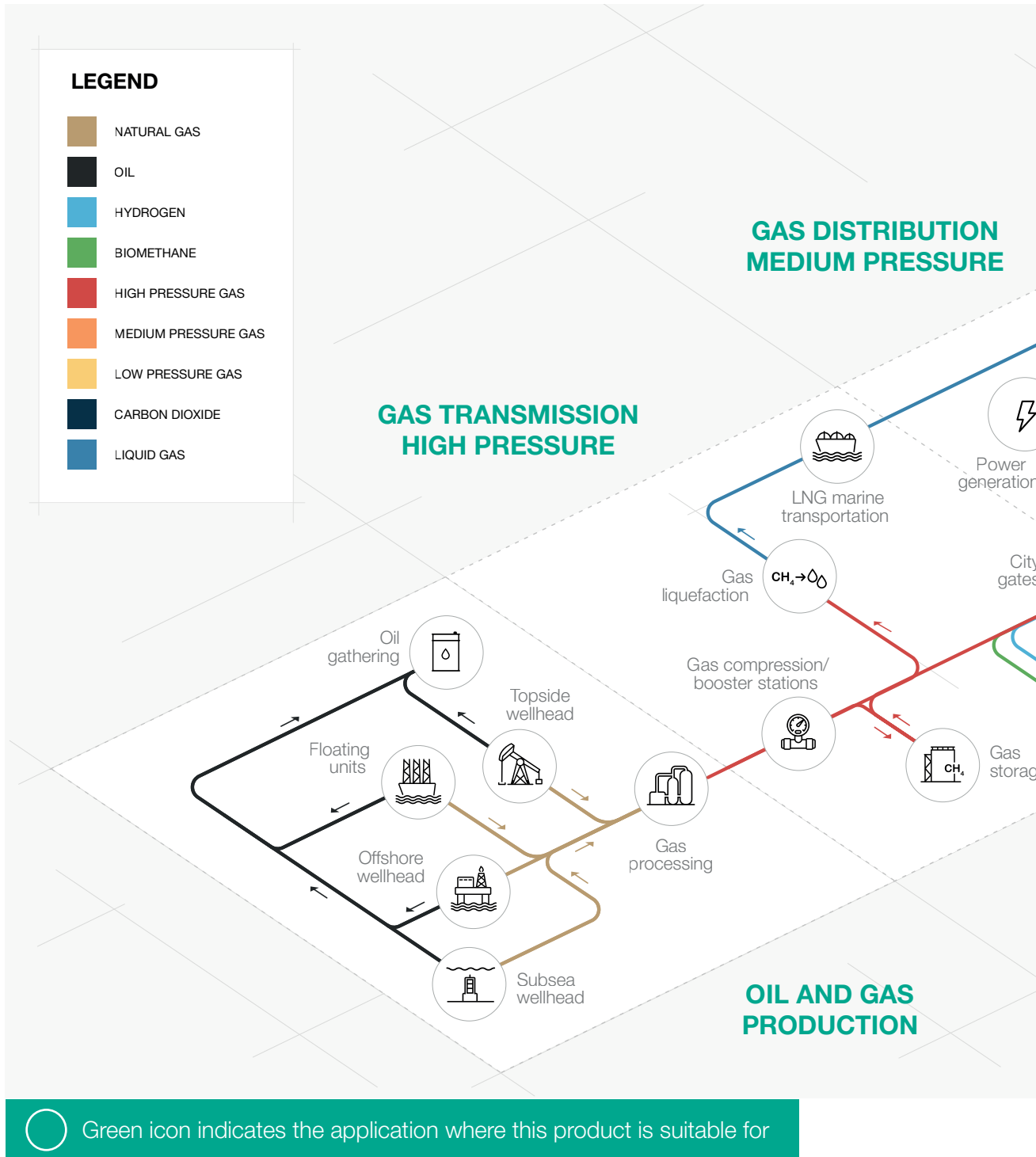


Experience since 1940



We operate in over 100 countries

Area of Application



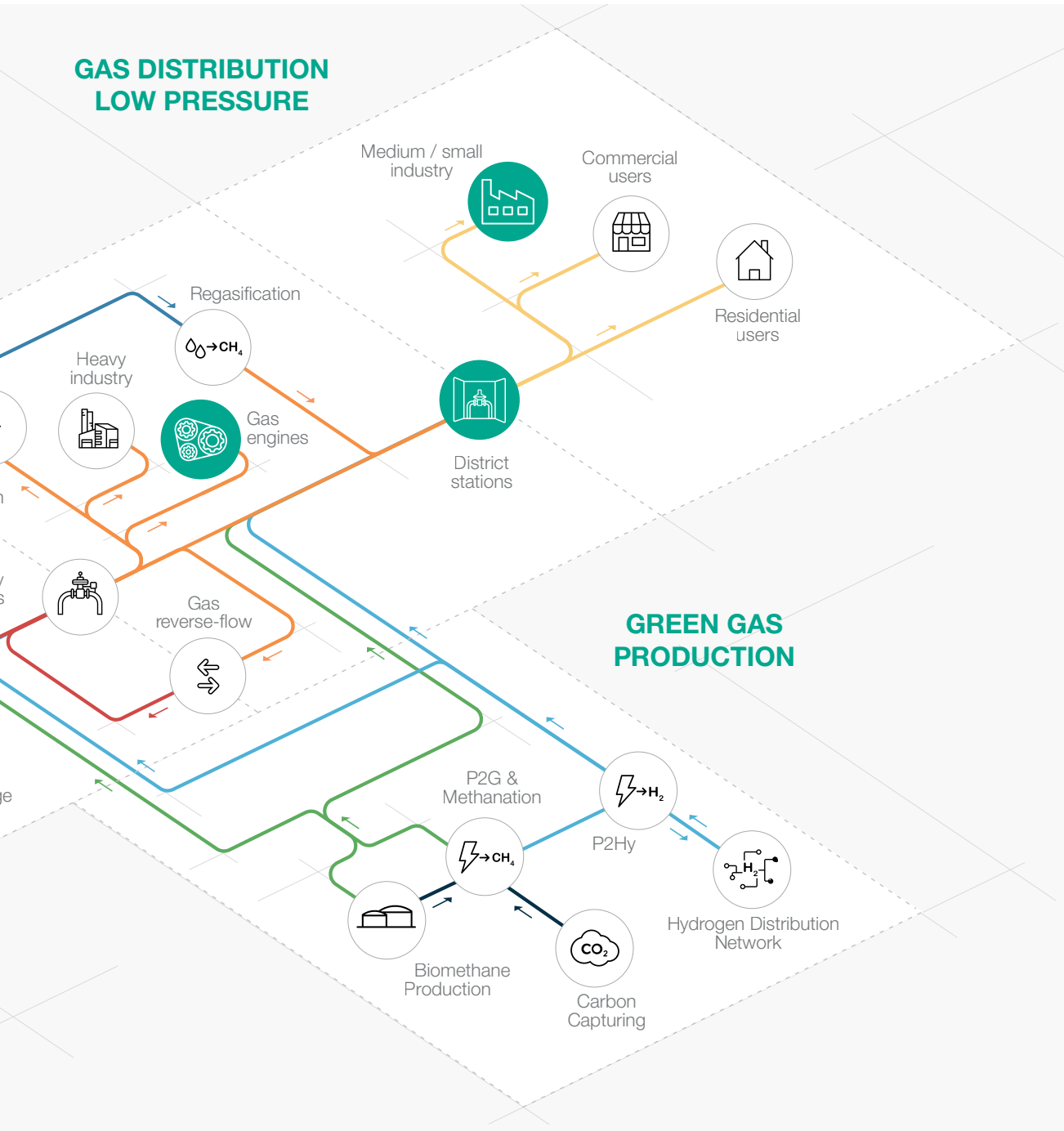


Figure 1 Area of Application Map



Introduction

Reval 182 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 medium and low pressure natural gas distribution networks.

According to the European Standard EN 334, it is classified as Fail Close (pilot series 200/A) or Fail Open (pilot series 210/A) according to the installed pilot (except for the PM/182 monitor).

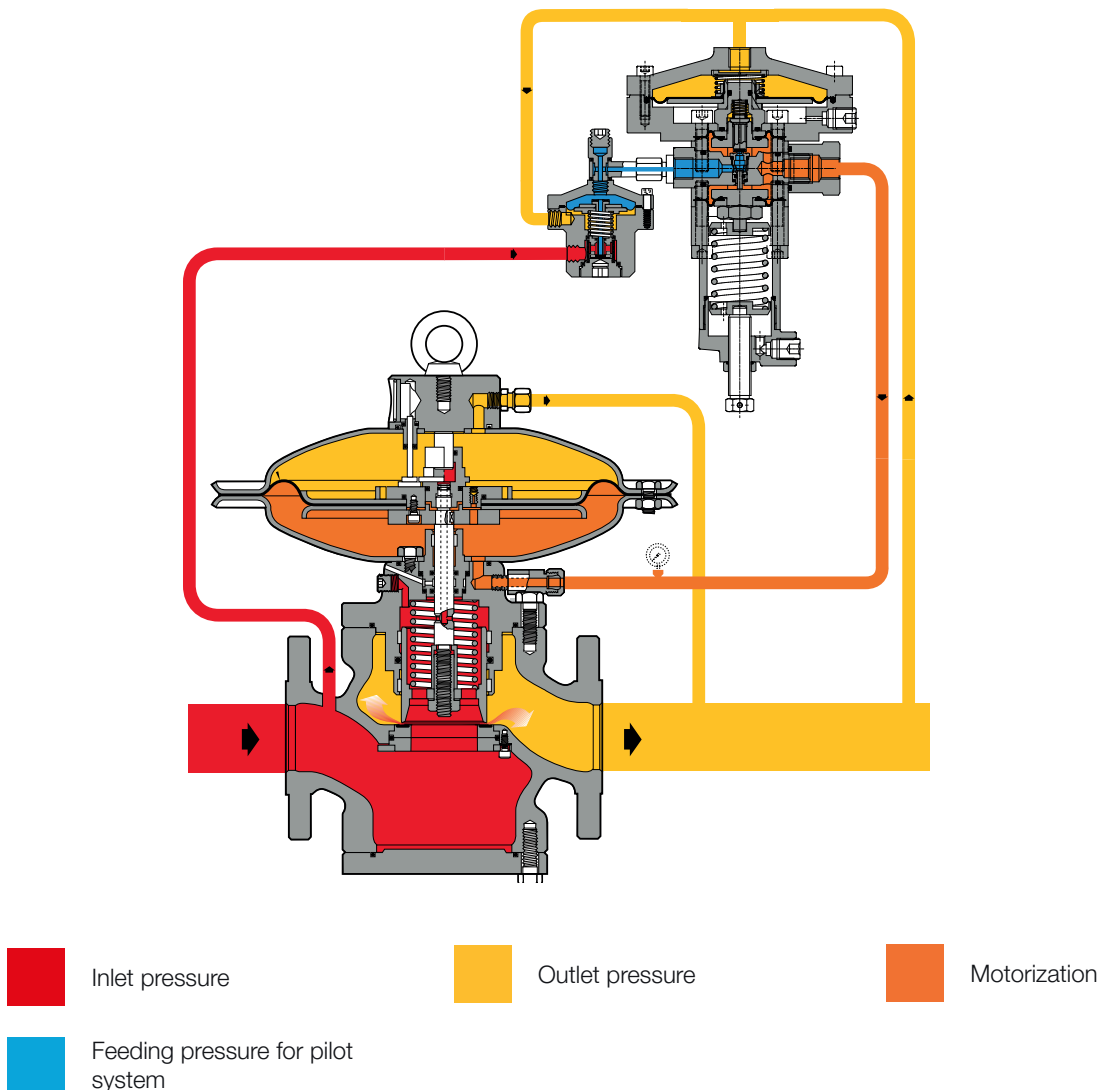


Figure 2 Reval 182

Features and Calibration ranges

Reval 182 is a **pilot-operated** device for medium pressure and low pressure with a unique **dynamic balancing system** which ensures an **outstanding turn down ratio** combined with an extremely **accurate outlet pressure control**.

A balanced pressure regulator it is a pressure regulator where delivery pressure accuracy it is not affected by the fluctuation of the inlet pressure and flow during its operation. Therefore, a balance pressure regulator can have a single orifice for all pressure and flow operating conditions.

This regulator is suitable for use with previously filtered, non corrosive gases and distribution networks as well as high load industrial applications.

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 operated via a pilot unit used to load and unload the bleeding pressure from the top chamber.

The modular design of Reval 182 pressure regulators allows retrofitting of an emergency monitor PM/182, slam shut valve SB/82 or VB/93 and/or silencer DB/182 model on the same body.

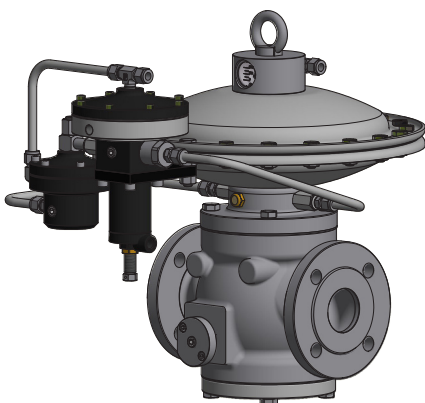


Figure 3 Reval 182

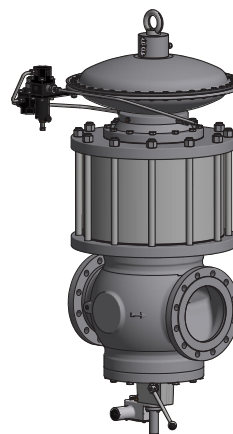












Figure 4 Reval 182 with silencer DB/182 and SB/82



Reval 182 competitive advantages

-  Compact and simple design
-  High accuracy
-  1:500 High turn-down ratio
-  Fail Close plug and seat regulator
-  Built-in pilot filter
-  Top Entry
-  Easy maintenance
-  Built-in accessories
-  Balanced type
-  Biomethane compatible and 20% Hydrogen blending compatible. Higher blending available on request

Features

| Features | Values |
|---|--|
| Design pressure* (PS ¹ / DP ²) | up to 2.5 MPa up to 25 barg |
| Ambient temperature* (TS ¹)** | Standard version from -20 °C to +60 °C from -4 °F to +140 °F Arctic version from -29°C to + 60°C from -20 °F to +140 °F |
| Inlet gas temperature* ,*** | Standard version from -20 °C to +60 °C from -4 °F to +140 °F Arctic version from -20 °C to +60 °C from -4 °F to +140 °F |
| Inlet pressure (MAOP / p _{umax} ¹) | from 0.02 to 2.5 MPa from 0.2 to 25 barg |
| Range of downstream pressure (Wd ¹) | from 0.7 KPa to 1.2 MPa from 7 mbarg to 12 barg |
| Available accessories | DB/182 Silencer, PM/182 Monitor, SB/82 Slam shut, SA Slam shut HB/97 Slam shut, opening indicator |
| Minimum operating differential pressure (Δp _{min} ¹) | 0.01 MPa 0.1 barg |
| Accuracy class (AC ¹) | up to 2.5 up to 1% absolute (depending on working conditions) |
| Lock-up pressure class (SG ¹) | up to 5 |
| Nominal size (DN ^{1,2}) | DN 25 1"; DN 50 2"; DN 65 2" 1/2; DN 80 3"; DN 100 4"; DN 150 6"; DN 200 8"; DN 250 10" |
| Connections | Class 150 RF or RTJ according to ASME B16.5 and PN16, 25 and 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.

(**) NOTE: Stated temperature range is the operating range for which the equipment's mechanical resistance and leakage rate are guaranteed. Some body materials, if multiple choices are available, may not be suitable for all the available versions shown.

(***) NOTE: Stated temperature range is the range for which the equipment's full performance, including accuracy and lock-up are guaranteed. Some body materials, if multiple choices are available, may not be suitable for all the available versions shown.

Table 1 Features

Materials and Approvals

| Part | Material |
|----------------------|---|
| Body | Cast steel ASTM A216 WCB for all sizes Ductile iron GS 400-18 ISO 1083 for Size ≤ 8" |
| Heads | Die stamped carbon steel |
| Stem | AISI 416 Stainless steel |
| Plug | ASTM A 350 LF2 Nickel coated on sealing surfaces |
| Seat | Steel + vulcanized rubber |
| Diaphragm | Rubberized canvas |
| O-rings | Nitrile Rubber |
| Compression fittings | In zinc-plated carbon steel according to DIN 2353 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

Reval 182 regulator is designed according to the European standard EN 334. The regulator reacts in closing (Fail Close) 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*

*Not applicable for regulators with pilot series 210



Pilot ranges and types

| Type | Model | Operation | Range Wh | | Spring Table web link |
|------------|-------|-----------|----------------|--------------|------------------------|
| | | | MPa | barg | |
| Main pilot | 201/A | Manual | 0.0007 - 0.058 | 0.007 - 0.58 | TT 475 |
| Main pilot | 204/A | Manual | 0.02 - 1.2 | 0.2 - 12 | TT 433 |
| Main pilot | 214/A | Manual | 0.03 - 1.2 | 0.3 - 12 | TT 433 |

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 .../MP | Magnetic pilot for remote control setting / flow limitation |

Table 4 Pilot adjustment table

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



| MAOP for regulators without incorporated slam shut | | | | | | | | | | | | | | | | | | | | | | | | |
|--|---------|------|------|---------|------|------|-------------|------|------|---------|------|------|----------|------|------|----------|------|------|----------|------|------|-----------|--|--|
| Size (DN) | 25 1" | | | 50 2" | | | 65 2" 1/2 | | | 80 3" | | | 100 4" | | | 150 6" | | | 200 8" | | | 250 10" | | |
| | mm | MPa | barg | MPa | barg | MPa | barg | MPa | barg | MPa | barg | MPa | barg | MPa | barg | MPa | barg | MPa | barg | MPa | barg | | | |
| S.150 | SBR1 | 1.89 | 18.9 | SBR1 | 1.89 | 18.9 | SBR1 | 1.89 | 18.9 | SBR1 | 1.89 | 18.9 | SBR1 | 1.89 | 18.9 | SBR1 | 1.89 | 18.9 | SBR1 | 1.89 | 18.9 | | | |
| | DBR | 1.7 | 17 | DBR | 1.7 | 17 | DBR | 1.7 | 17 | DBR | 1.7 | 17 | DBR | 1.7 | 17 | DBR | 1.7 | 17 | DBR | 1.7 | 17 | | | |
| | CHR | 1.6 | 16 | CHR | 1.6 | 16 | CHR | 1.6 | 16 | CHR | 1.6 | 16 | CHR | 1.6 | 16 | CHR | 1.6 | 16 | CHR | 1.6 | 16 | | | |
| | SAR | 1.89 | 18.9 | SAR | 1.89 | 18.9 | SAR | 1.89 | 18.9 | SAR | 1.89 | 18.9 | SAR | 1.89 | 18.9 | SAR | 1.89 | 18.9 | SAR | 1.89 | 18.9 | | | |
| | SBR2 | 4 | 40 | SBR2 | 4 | 40 | SBR2 | 4 | 40 | SBR2 | 4 | 40 | SBR2 | 4 | 40 | SBR2 | 4 | 40 | SBR2 | 4 | 40 | | | |

SBR1 = Steel Body Rating
 DBR = Ductile iron Body Rating
 CHR = Control Head Rating
 SAR = slam shut SA Rating
 SBR2 = slam shut SB Rating

Table 5

Accessories

For the pressure regulators:

- Cg limiter
- Limit switches
- Position transmitter
- Silencer
- Slam shut valve
- Monitor

For the pilot circuit:

- 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 monitor is set at a higher pressure than active regulator.

The Cg coefficients of the worker regulator with an in-line monitor is the same, but during worker regulator sizing it shall be considered the differential pressure drop generated by the fully open in-line monitor. As a practice, to incorporate this effect a Cg reduction of 20% of the worker regulator can be applied.

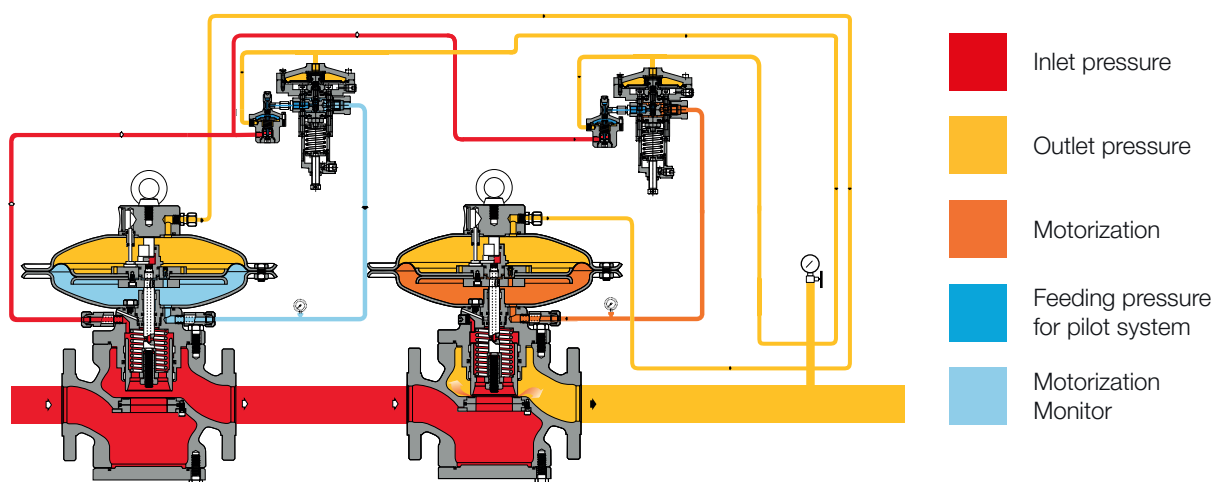


Figure 5 Reval 182 inline monitor



Monitor PM/182

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 fully open position during normal operation of the active regulator and takes over on in the event of its failure.

The operational characteristics of the PM/182 monitor are the same as for the Reval 182 regulator.

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

This solution allows the construction of reduction pressure 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.**

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

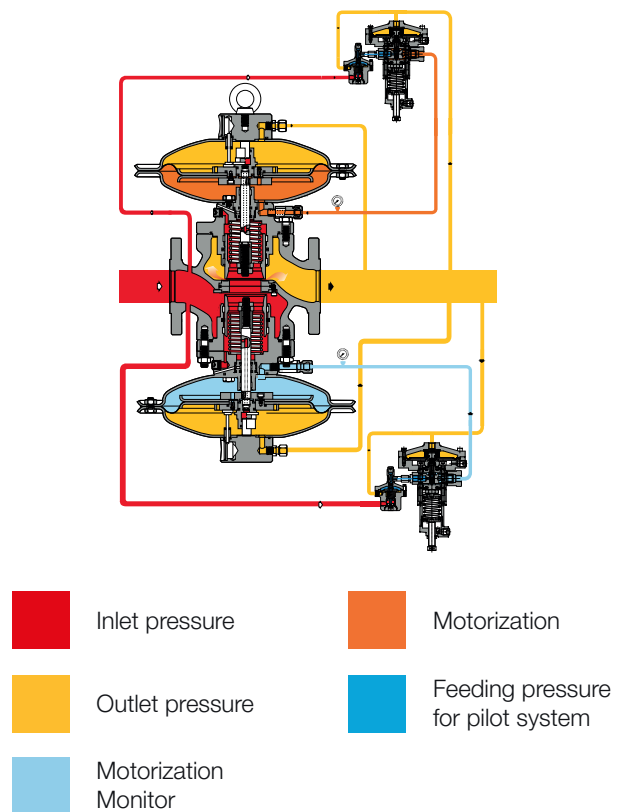


Figure 6 Reval 182 with PM/182

| Type | Model | Operation | Range Wh | | Spring Table web link |
|------------|-------|-----------|----------------|--------------|------------------------|
| | | | MPa | barg | |
| Main pilot | 201/A | Manual | 0.0007 - 0.058 | 0.007 - 0.58 | TT 475 |
| Main pilot | 204/A | Manual | 0.02 - 1.2 | 0.2 - 12 | TT 433 |

Table 6 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 .../MP | Magnetic pilot for remote control setting / flow limitation |

Table 7 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 | |
| Accelerator | V/25 BP | Manual | 0.0015 – 0.02 | 0.015 – 0.2 | TT 00601 |
| Accelerator | V/25 MP | Manual | 0.02 – 0.06 | 0.2 – 0.6 | TT 00601 |
| Accelerator | M/A | Manual | 0.03 - 2 | 0.3 - 20 | TT 354 |

Table 8 Accelerator adjustment table

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





Silencer DB/182

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

The Reval 182 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 rely to the fact that noise absorption takes place at the same 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 Reval 182 version as well as those with incorporated slam shut or monitor, **without the need to modify the main piping.**

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

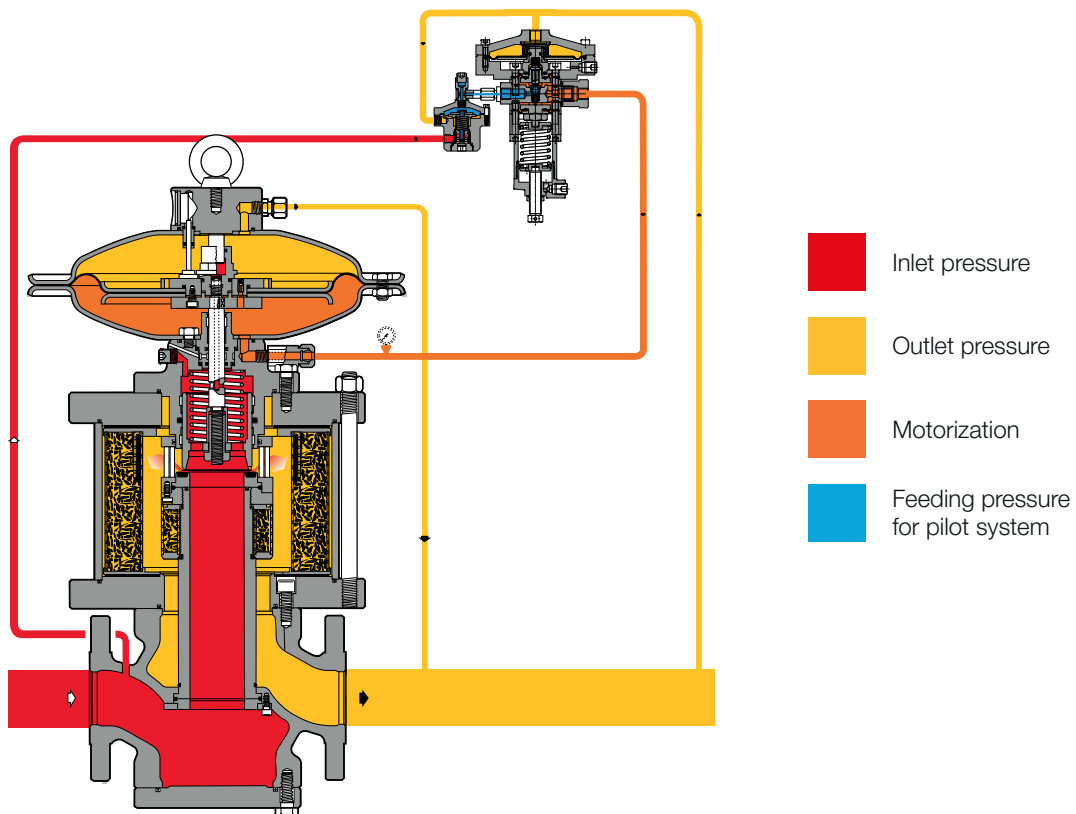


Figure 7 Reval 182 with silencer DB/182

The chart below represents the silencer effectiveness based on some common reference conditions for 2", 3" and 4". For actual calculations at specific desired conditions please refer to the online sizing tool or contact your closest Pietro Fiorentini representative.

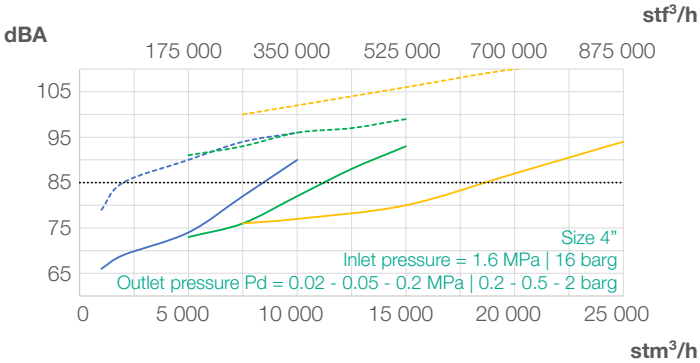
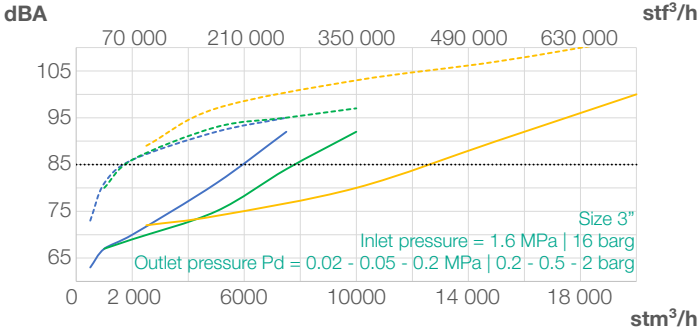
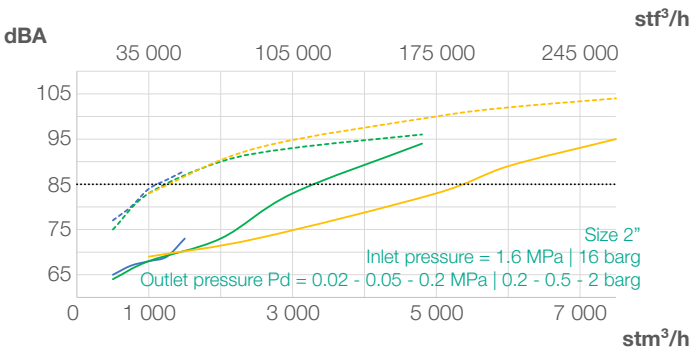
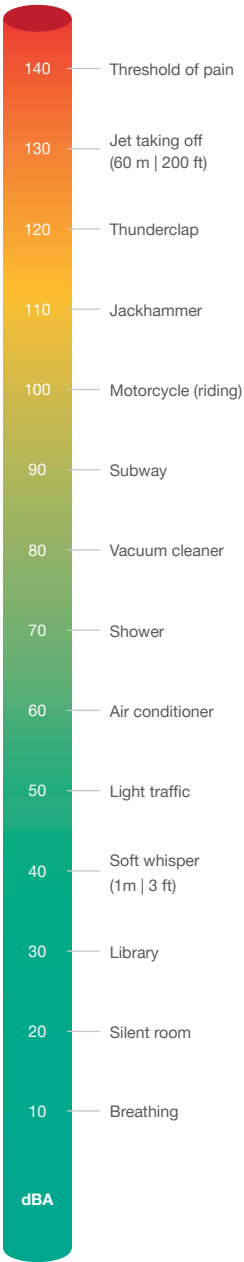
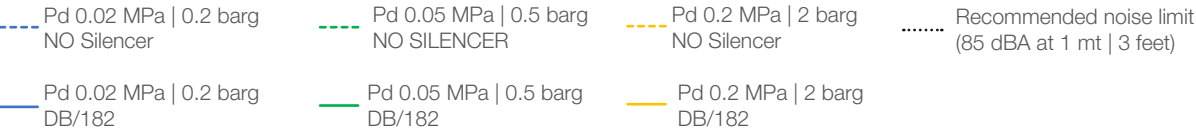


Chart 1 Reval 182's silencer efficiency charts











Slam Shut SA, SB/82 or HB/97

The Reval 182 pressure regulator offers the possibility of installing an **incorporated slam shut valve** SB/82, HB/97 or SA, 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" only. SA is available up to 4".

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

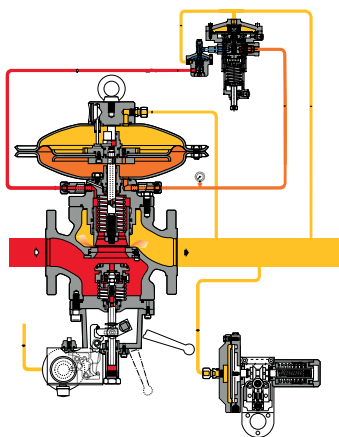


Figure 8 Reval 182 with SB/82

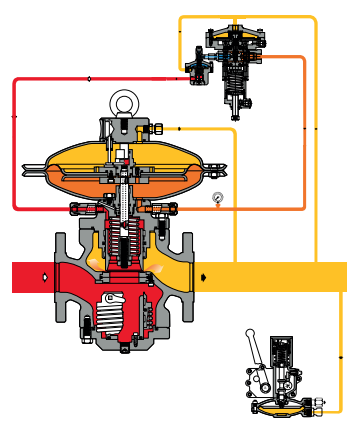
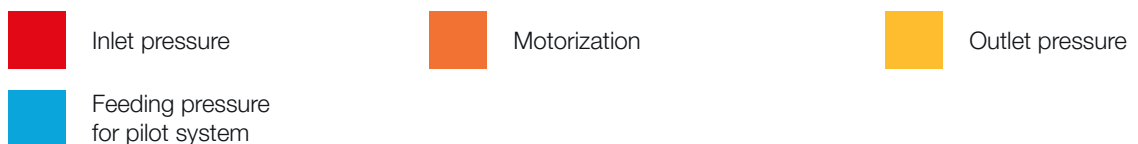


Figure 9 Reval 182 with SA



| Pressure switch types and ranges | | | | | |
|----------------------------------|-------|-----------|-------------|------------|-------------------------|
| SSV Type | Model | Operation | Range Wh | | Spring Table web link |
| | | | KPa | mbarg | |
| SA | 91 | OPSO | 2.5 - 110 | 25 - 1100 | TT 1381 |
| | | UPSO | 1 - 90 | 10 - 900 | |
| SA | 92 | OPSO | 70 - 500 | 700 - 5000 | TT 1381 |
| | | UPSO | 25 - 301 | 250 - 3010 | |
| SSV Type | Model | Operation | Range Wh | | Spring Table web link |
| | | | MPa | barg | |
| SA | 93 | OPSO | 0.3 - 1.33 | 3 - 13.3 | TT 1381 |
| | | UPSO | 0.08 - 0.77 | 0.8 - 7.7 | |
| 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 | |
| HB/97 | 102M | OPSO | 0.02 - 0.55 | 0.2 - 5.5 | TT 1331 |
| | | UPSO | 0.02 - 0.28 | 0.2 - 2.8 | |
| HB/97 | 102MH | OPSO | 0.02 - 0.55 | 0.2 - 5.5 | TT 1331 |
| | | UPSO | 0.28 - 0.55 | 2.8 - 5.5 | |
| HB/97 | 103M | OPSO | 0.2 - 2.2 | 2 - 22 | TT 1331 |
| | | UPSO | 0.02 - 0.8 | 0.2 - 8 | |
| HB/97 | 103MH | OPSO | 0.2 - 2.2 | 2 - 22 | TT 1331 |
| | | UPSO | 0.8 - 1.9 | 8 - 19 | |

Table 9 Settings table



Pilot series 210 fail to open (optional)

The pilot series 210/A is a mechanical device which enables the working principle and the setpoint modifications of pilot operated gas pressure regulators. The pilot is optimized to enhance the accuracy and minimize the lock-up.

This model specifically allow to have a **fail-to-open regulator in case of pilot's failure**.

The pilot series 210/A is not certified for PED-CE applications.

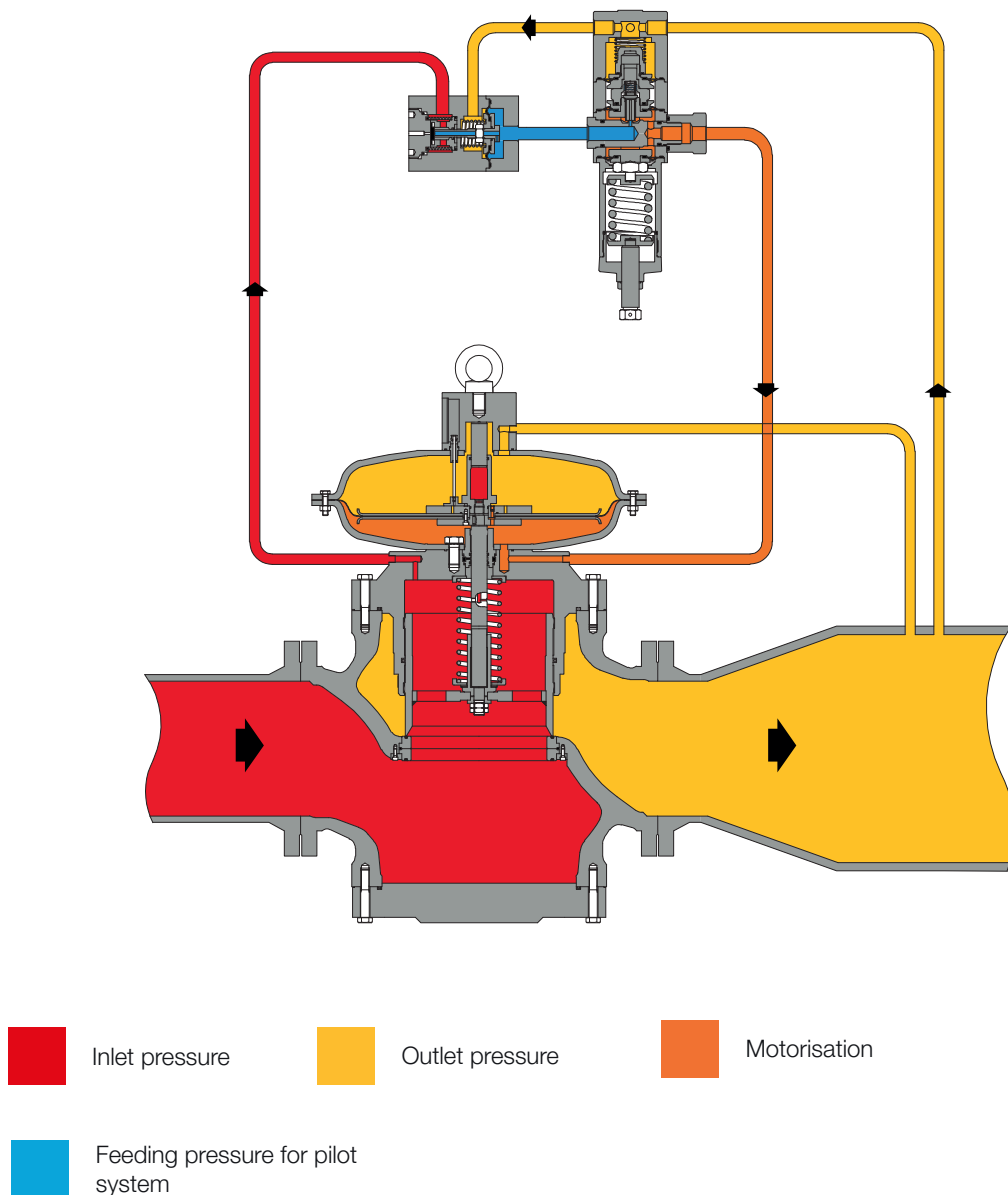


Figure 10 Reval 182 with fail to open pilot series 210

Gas flow

Standard version with frontal SSV

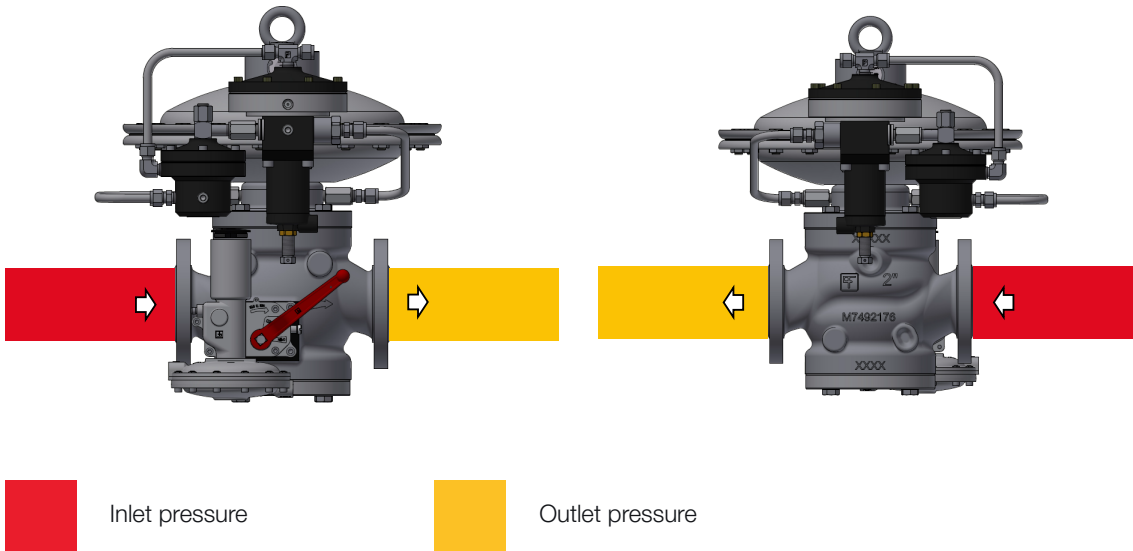


Figure 11 Reval 182 standard version gas flow

Upside down version

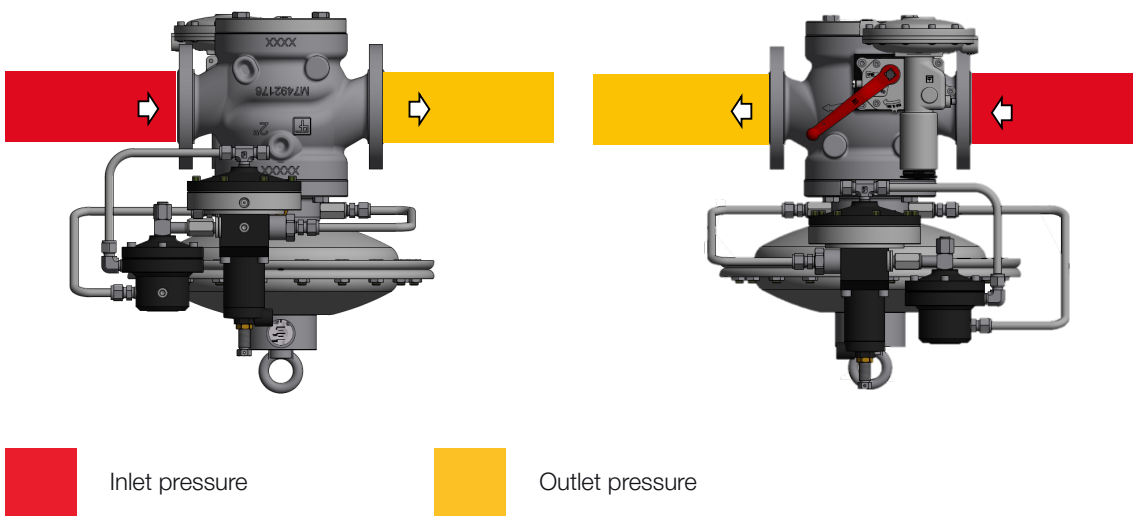


Figure 12 Reval 182 standard version gas flow upside down



Right to left gas flow version with frontal SSV

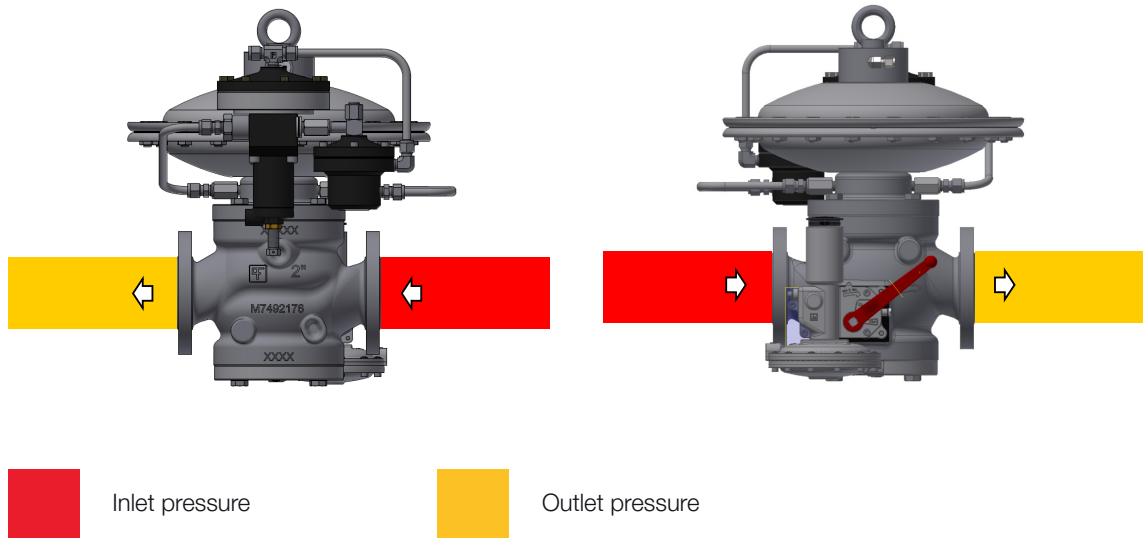


Figure 13 Reval 182 version right to left gas flow

Right to left gas flow version upside down

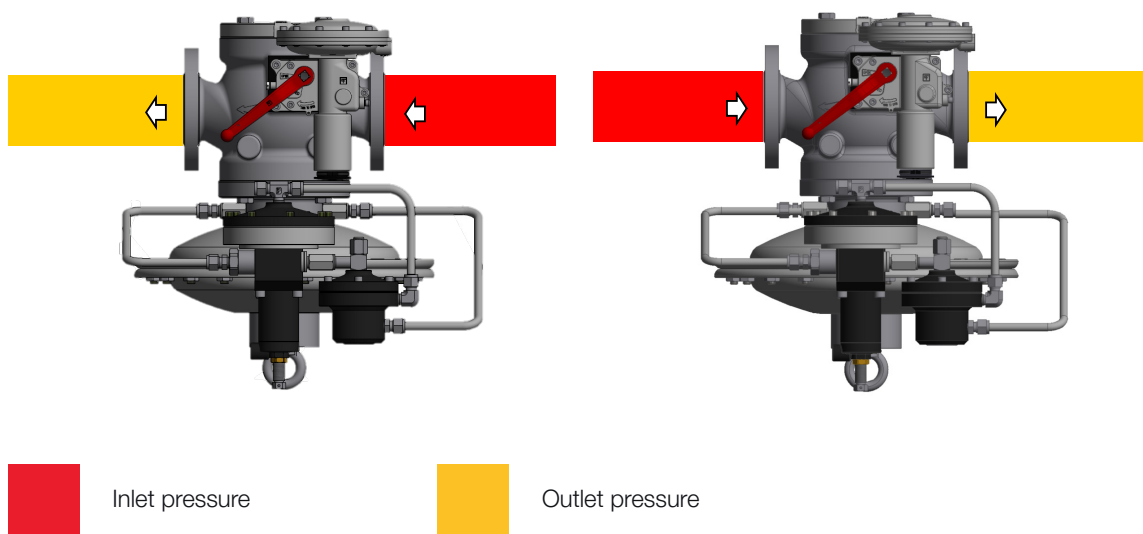


Figure 14 Upside down Reval 182 version right to left gas flow

Weights and Dimensions

Reval 182

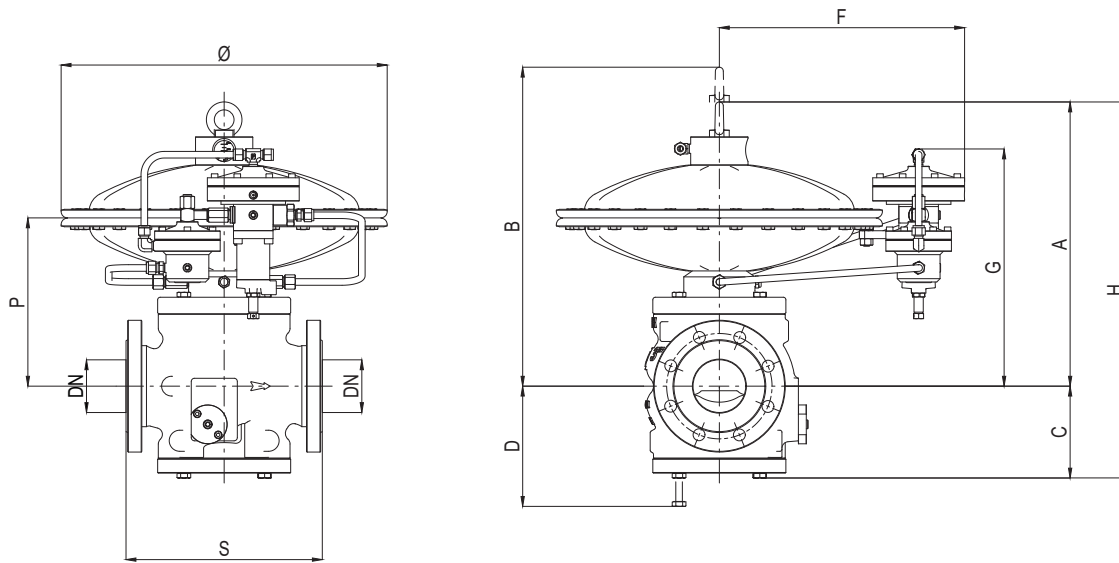


Figure 15 Reval 182 dimensions

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

| | [mm] inches | [mm] inches | [mm] inches | [mm] inches | [mm] inches | [mm] inches | [mm] inches | [mm] inches |
|--------------------|---|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| Size (DN) | 25 1" | 50 2" | 65 2" 1/2 | 80 3" | 100 4" | 150 6" | 200 8" | 250 10" |
| S - ANSI 150/PN 16 | 183 7.25" | 254 10" | 276 10.88" | 298 11.75" | 352 13.88" | 451 17.75" | 546 21.38" | 673 26.5" |
| Ø | 375 14.76" | 375 14.76" | 495 19.49" | 495 19.49" | 495 19.49" | 630 24.80" | 630 24.80" | 630 24.80" |
| A | 320 12.60" | 350 13.78" | 430 16.93" | 430 16.93" | 470 18.50" | 550 21.65" | 650 25.60" | 770 30.32" |
| B | 410 16.14" | 430 16.93" | 530 20.87" | 530 20.87" | 600 23.62" | 735 28.94" | 850 33.46" | 760 29.92" |
| C | 100 3.94" | 130 5.12" | 140 5.51" | 150 5.90" | 190 7.48" | 220 8.66" | 260 10.24" | 310 12.20" |
| D | 130 5.12" | 160 6.30" | 180 7.08" | 200 7.87" | 250 9.84" | 270 10.63" | 315 12.40" | 398 15.67" |
| F | 350 13.78" | 350 13.78" | 410 16.14" | 410 16.14" | 410 16.14" | 475 18.70" | 475 18.70" | 470 18.50" |
| G | 250 9.84" | 285 11.22" | 330 12.99" | 340 13.36" | 370 14.57" | 400 15.75" | 450 17.72" | 550 21.65" |
| H | 430 16.93" | 480 18.90" | 570 22.40" | 580 22.83" | 660 25.98" | 770 30.31" | 910 35.83" | 1070 42.13" |
| P | 170 6.70" | 205 8.07" | 250 9.84" | 260 10.24" | 290 11.42" | 320 12.60" | 370 14.57" | 470 18.50" |
| 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 | Kg lbs |
|----------------|----------|----------|----------|----------|-----------|-----------|-----------|------------|
| ANSI 150/PN 16 | 33 73 | 50 110 | 58 128 | 70 154 | 110 242 | 195 430 | 300 661 | 580 1279 |

Table 10 Weights and dimensions

Reval 182 + SB/82 or HB/97

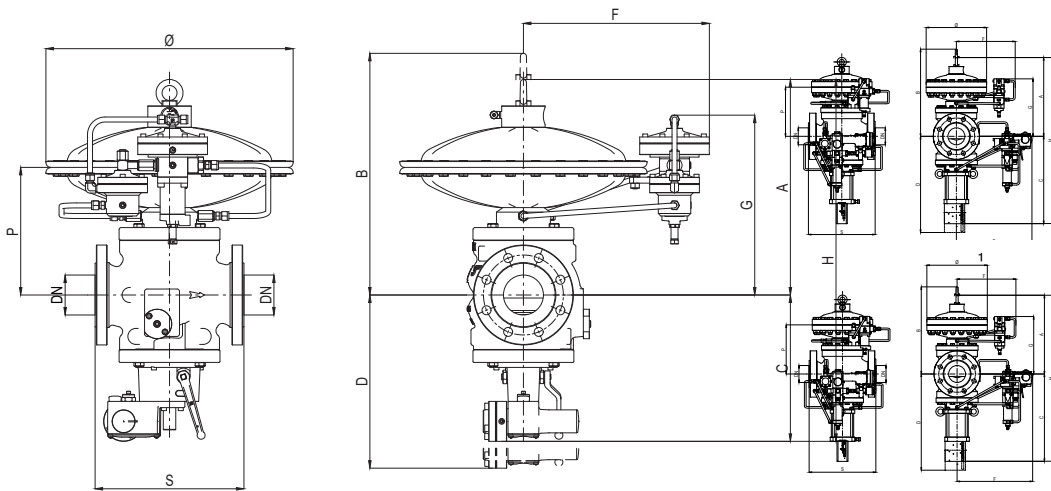


Figure 16 Reval 182 + SB/82 or HB/97 dimensions

| Weights and Dimensions (for other connections please contact your closest Pietro Fiorentini representative) | | | | | | | | |
|---|---|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| | [mm] inches | [mm] inches | [mm] inches | [mm] inches | [mm] inches | [mm] inches | [mm] inches | [mm] inches |
| Size (DN) | 25 1" | 50 2" | 65 2" 1/2 | 80 3" | 100 4" | 150 6" | 200 8" | 250 10" |
| S - ANSI 150/PN16 | 183 7.25" | 254 10" | 276 10.88" | 298 11.75" | 352 13.88" | 451 17.75" | 543 21.38" | 673 26.5" |
| Ø | 375 14.76" | 375 14.76" | 495 19.49" | 495 19.49" | 495 19.49" | 630 24.80" | 630 24.80" | 630 24.80" |
| A | 320 12.60" | 350 13.78" | 430 16.93" | 430 16.93" | 470 18.50" | 550 21.65" | 650 25.60" | 770 30.32" |
| B | 410 16.14" | 430 16.93" | 530 20.87" | 530 20.87" | 600 23.62" | 735 28.94" | 850 33.46" | 760 29.92" |
| C with SB/82 | 300 11.8" | 300 11.8" | 315 12.4" | 335 13.19" | 360 14.17" | 430 16.93" | 475 18.70" | 550 21.65" |
| C with HB/97 | - | - | - | - | 518 20.39" | 645 25.39" | 687 27.05" | 796 31.34" |
| D with SB/82 | 390 15.3" | 390 15.35" | 425 16.73" | 445 17.52" | 500 19.68" | 615 24.21" | 695 37.36" | 800 31.50" |
| D with HB/97 | - | - | - | - | 650 25.59" | 835 32.87" | 900 35.43" | 1060 41.7" |
| F | 350 13.78" | 350 13.78" | 410 16.14" | 410 16.14" | 410 16.14" | 475 18.70" | 475 18.70" | 470 18.50" |
| F1 | - | - | - | - | 358 14.09" | 410 16.14" | 445 17.52" | 510 20.08" |
| G | 250 9.84" | 285 11.22" | 330 12.99" | 340 13.36" | 370 14.57" | 400 15.75" | 450 17.72" | 550 21.65" |
| H with SB/82 | 620 24.41" | 650 25.59" | 745 29.33" | 765 30.12" | 830 32.68" | 980 38.58" | 1125 44.29" | 1320 51.9" |
| H with HB/97 | - | - | - | - | 988 38.90" | 1195 47.05" | 1337 52.64" | 1566 61.65" |
| P | 170 6.70" | 205 8.07" | 250 9.84" | 260 10.24" | 290 11.42" | 320 12.60" | 370 14.57" | 470 18.50" |
| 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 | Kg lbs |
|---------------------------|----------|----------|----------|----------|-----------|-----------|-----------|------------|
| ANSI 150/PN 16 with SB/82 | 45 99 | 56 | 70 154 | 88 194 | 132 291 | 246 542 | 354 780 | 680 1500 |
| ANSI 150/PN 16 with HB/97 | - | - | - | - | 122 269 | 236 520 | 308 679 | 624 1376 |

Table 11 Weights and dimensions

Reval 182 + SA

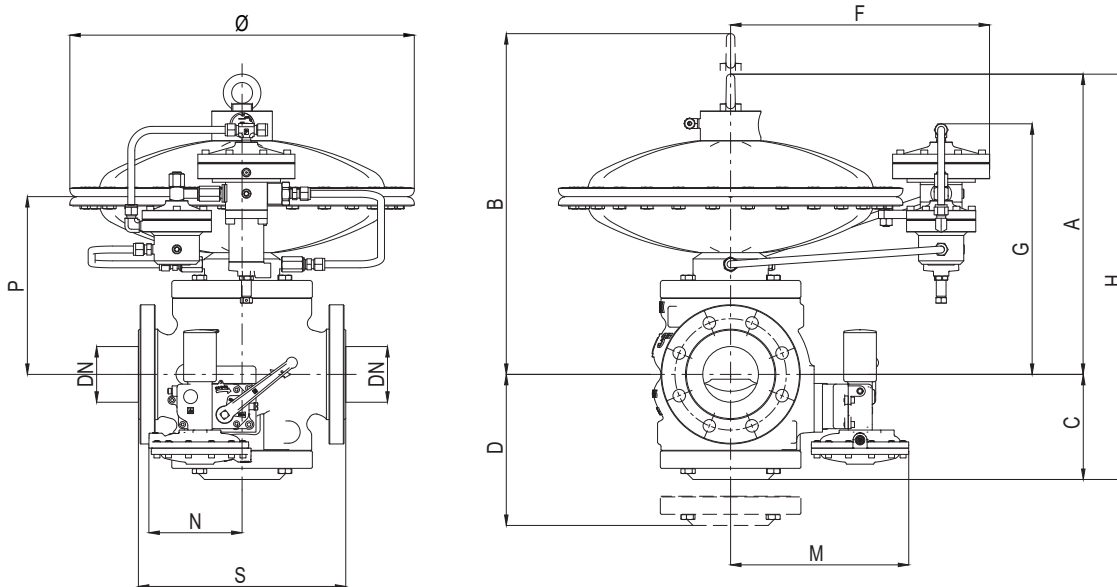


Figure 17 Reval 182 + SA dimensions

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

| | [mm] inches | [mm] inches | [mm] inches | [mm] inches | [mm] inches |
|--------------------|---|---------------|---------------|---------------|---------------|
| Size (DN) | 25 1" | 50 2" | 65 2" 1/2 | 80 3" | 100 4" |
| S - ANSI 150/PN16 | 183 7.25" | 254 10" | 276 10.88" | 298 11.75" | 352 13.88" |
| Ø | 375 14.76" | 375 14.76" | 495 19.49" | 495 19.49" | 495 19.49" |
| A | 320 12.60" | 350 13.78" | 430 16.93" | 430 16.93" | 470 18.50" |
| B | 410 16.14" | 430 16.93" | 530 20.87" | 530 20.87" | 600 23.62" |
| C | 145 5.71" | 161 6.34" | 178 7.01" | 185 7.28" | 205 8.07" |
| D | 212 8.35" | 255 10.04" | 292 11.50" | 322 12.68" | 330 12.99" |
| F | 350 13.78" | 350 13.78" | 410 16.14" | 410 16.14" | 410 16.14" |
| G | 250 9.84" | 285 11.22" | 330 12.99" | 340 13.36" | 370 14.57" |
| H | 465 18.31" | 511 20.12" | 608 23.94" | 615 24.21" | 874 34.41" |
| P | 170 6.70" | 205 8.07" | 250 9.84" | 260 10.24" | 290 11.42" |
| L | 98 3.86" | 146 5.75" | 146 5.75" | 146 5.75" | 146 5.75" |
| M | 194 7.64" | 219 8.62" | 232 9.13" | 246 9.68" | 263 10.35" |
| N | 125 4.92" | 125 4.92" | 125 4.92" | 125 4.92" | 130 5.12" |
| Tubing Connections | Øe 10 x Øi 8 (on request imperial sizing) | | | | |

| Weight | Kg lbs | Kg lbs | Kg lbs | Kg lbs | Kg lbs |
|----------------|----------|----------|----------|----------|-----------|
| ANSI 150/PN 16 | 35 77 | 52 115 | 60 132 | 72 159 | 113 249 |

Table 12 Weights and dimensions

Reval 182 + PM/182

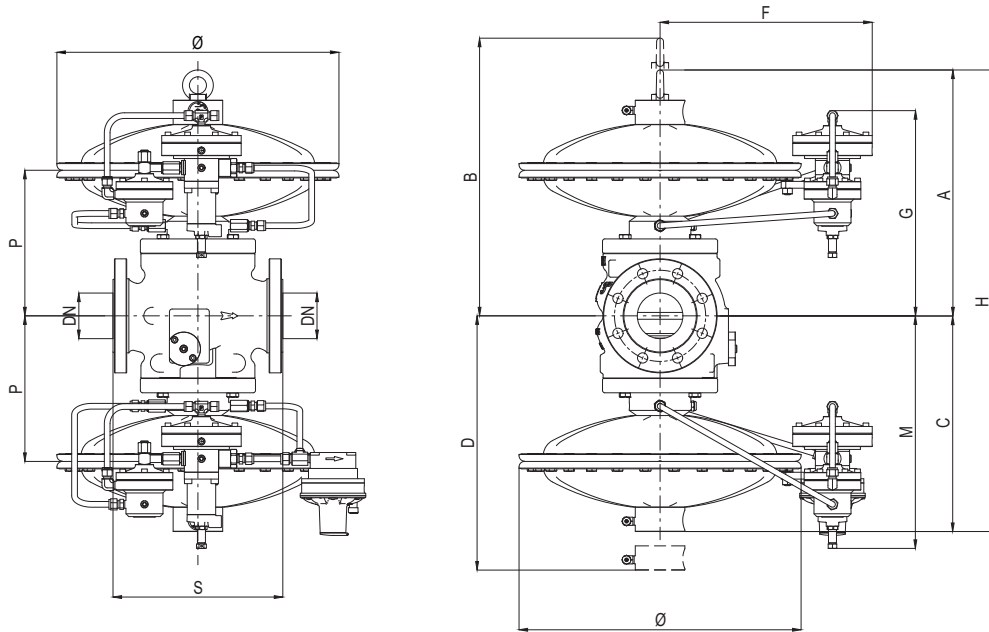


Figure 18 Reval 182 + PM/182 dimensions

| Weights and Dimensions (for other connections please contact your closest Pietro Fiorentini representative) | | | | | | | |
|---|---|---------------|---------------|---------------|---------------|---------------|---------------|
| | [mm] inches | [mm] inches | [mm] inches | [mm] inches | [mm] inches | [mm] inches | [mm] inches |
| Size (DN) | 25 1" | 50 2" | 65 2" 1/2 | 80 3" | 100 4" | 150 6" | 200 8" |
| S - ANSI 150/PN 16 | 183 7.25" | 254 10" | 276 10.88" | 298 11.75" | 352 13.88" | 451 17.75" | 543 21.38" |
| Ø | 375 14.76" | 375 14.76" | 495 19.49" | 495 19.49" | 495 19.49" | 630 24.80" | 630 24.80" |
| A | 320 12.60" | 350 13.78" | 430 16.93" | 430 16.93" | 470 18.50" | 550 21.65" | 650 25.60" |
| B | 410 16.14" | 430 16.93" | 530 20.87" | 530 20.87" | 600 23.62" | 735 28.94" | 850 33.46" |
| C | 260 10.24" | 290 11.42" | 370 14.57" | 380 14.96" | 410 16.14" | 490 19.29" | 590 23.23" |
| D | 410 16.14" | 430 16.93" | 530 20.87" | 530 20.87" | 600 23.62" | 735 28.94" | 850 33.46" |
| F | 350 13.78" | 350 13.78" | 410 16.14" | 410 16.14" | 410 16.14" | 475 18.70" | 475 18.70" |
| G | 250 9.84" | 285 11.22" | 330 12.99" | 340 13.36" | 370 14.57" | 400 15.75" | 450 17.72" |
| H | 640 25.20" | 700 27.56" | 860 33.86" | 860 33.86" | 940 37.01" | 110 4.33" | 1300 51.18" |
| P | 170 6.70" | 205 8.07" | 250 9.84" | 260 10.24" | 290 11.42" | 320 12.60" | 370 14.57" |
| M | 260 10.24" | 295 11.61" | 340 13.39" | 350 13.78" | 380 14.96" | 410 16.14" | 460 18.11" |
| 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/PN 16 | 54 119 | 75 165 | 85 187 | 100 220 | 150 330 | 255 562 | 395 871 |

Table 13 Weights and dimensions

Reval 182 + DB/182

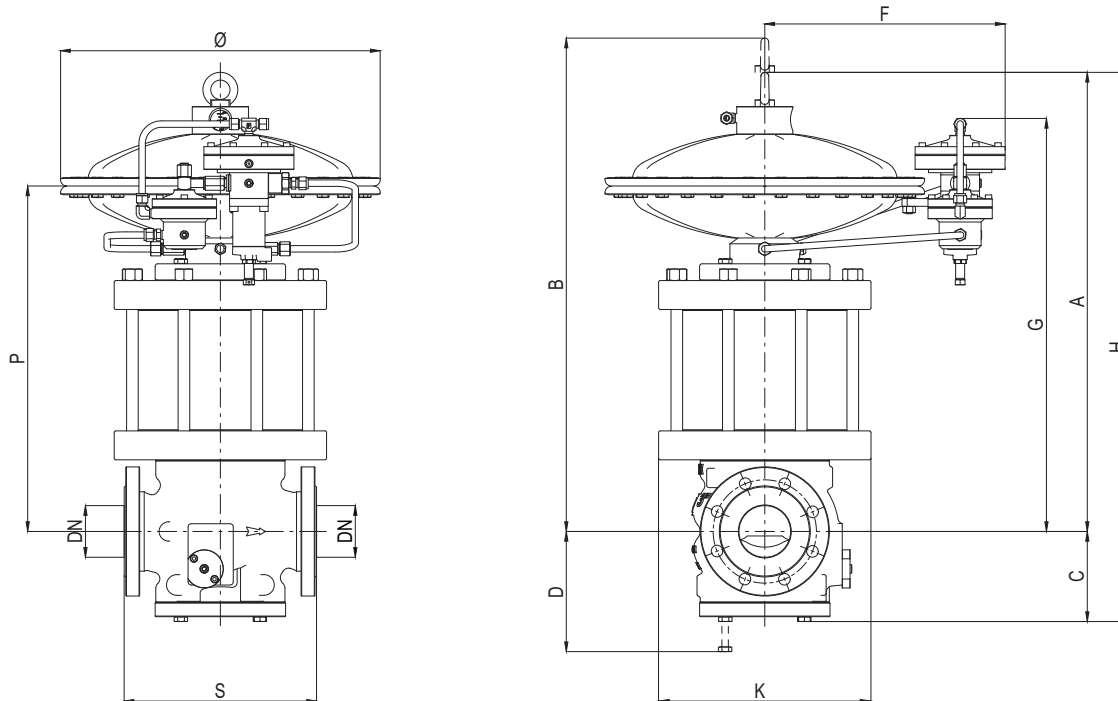


Figure 19 Reval 182 + DB/182 dimensions

| Weights and Dimensions (for other connections please contact your closest Pietro Fiorentini representative) | | | | | | | | |
|---|---|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| | [mm] inches | [mm] inches | [mm] inches | [mm] inches | [mm] inches | [mm] inches | [mm] inches | [mm] inches |
| Size (DN) | 25 1" | 50 2" | 65 2" 1/2 | 80 3" | 100 4" | 150 6" | 200 8" | 250 10" |
| S - ANSI 150/PN 16 | 183 7.25" | 254 10" | 276 10.88" | 298 11.75" | 352 13.88" | 451 17.75" | 543 21.38" | 673 26.5" |
| Ø | 375 14.76" | 375 14.76" | 495 19.49" | 495 19.49" | 495 19.49" | 630 24.80" | 630 24.80" | 630 24.80" |
| A | 520 20.5" | 550 21.7" | 650 25.6" | 675 26.6" | 755 29.7" | 920 36.2" | 1050 41.3" | 1262 50" |
| B | 610 24" | 640 25.2" | 780 30.7" | 785 30.9" | 895 35.2" | 1120 44" | 1250 49.2" | 1450 57" |
| C | 100 3.94" | 130 5.12" | 140 5.51" | 150 5.90" | 190 7.48" | 220 8.66" | 260 10.24" | 310 12.20" |
| D | 130 5.12" | 160 6.30" | 180 7.08" | 200 7.87" | 250 9.84" | 270 10.63" | 315 12.40" | 398 15.67" |
| F | 350 13.78" | 350 13.78" | 410 16.14" | 410 16.14" | 410 16.14" | 475 18.70" | 475 18.70" | 470 18.50" |
| G | 450 17.7" | 480 18.9" | 550 21.6" | 585 23" | 655 25.8" | 770 30.3" | 850 33.5" | 1040 41" |
| H | 820 32.3" | 850 33.5" | 965 38" | 1010 39.8" | 1115 44" | 1350 53" | 1525 60" | 1575 62" |
| P | 215 8.5" | 295 11.6" | 325 12.8" | 325 12.8" | 390 15.4" | 470 18.5" | 600 23.6" | 960 38" |
| K | 370 14.6" | 400 15.7" | 470 18.5" | 505 19.9" | 575 22.6" | 690 27.2" | 770 30.3" | 700 27.6" |
| 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 | Kg lbs |
| ANSI 150/PN 16 | 44 97 | 84 185 | 88 194 | 112 247 | 178 392 | 339 747 | 536 1181 | 900 1984 |

Table 14 Weights and dimensions

Reval 182 + DB/182 + SB/82 or HB/97

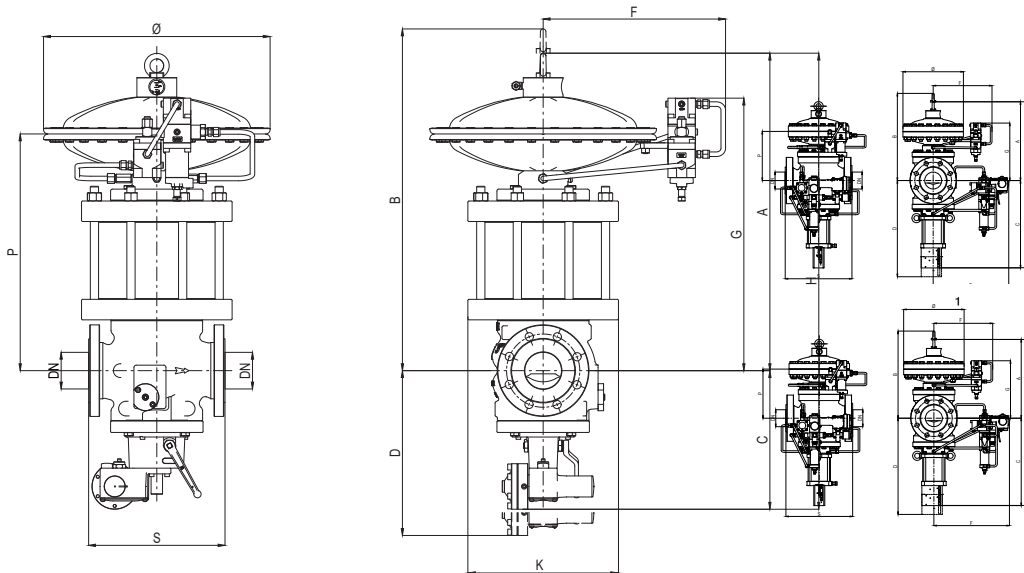


Figure 20 Reval 182 + DB/182 + SB/82 or HB/97 dimensions

| Weights and Dimensions (for other connections please contact your closest Pietro Fiorentini representative) | | | | | | | | |
|---|---|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| | [mm] inches | [mm] inches | [mm] inches | [mm] inches | [mm] inches | [mm] inches | [mm] inches | [mm] inches |
| Size (DN) | 25 1" | 50 2" | 65 2" 1/2 | 80 3" | 100 4" | 150 6" | 200 8" | 250 10" |
| S - ANSI 150/PN16 | 183 7.25" | 254 10" | 276 10.88" | 298 11.75" | 352 13.88" | 451 17.75" | 543 21.38" | 673 26.5" |
| Ø | 375 14.76" | 375 14.76" | 495 19.49" | 495 19.49" | 495 19.49" | 630 24.80" | 630 24.80" | 630 24.80" |
| A with SB/82 | 520 20.5" | 550 21.7" | 650 25.6" | 675 26.6" | 755 29.7" | 920 36.2" | 1050 41.3" | 1262 50" |
| B with SB/82 | 610 24" | 640 25.2" | 780 30.7" | 785 30.9" | 895 35.2" | 1120 44" | 1250 49.2" | 1450 57" |
| C with SB/82 | 300 11.8" | 300 11.8" | 315 12.4" | 335 13.2" | 360 14.2" | 430 16.9" | 475 18.7" | 550 21.6" |
| C with HB/97 | - | - | - | - | 518 20.39" | 645 25.39" | 687 27.05" | 796 31.34" |
| D with SB/82 | 390 15.3" | 390 15.3" | 425 16.7" | 445 17.5" | 500 19.7" | 615 24.2" | 695 27.4" | 800 31.5" |
| D with HB/97 | - | - | - | - | 650 25.59" | 835 32.87" | 900 35.43" | 1060 41.7" |
| F | 350 13.78" | 350 13.78" | 410 16.14" | 410 16.14" | 410 16.14" | 475 18.70" | 475 18.70" | 470 18.50" |
| F1 | - | - | - | - | 358 14.09" | 410 16.14" | 445 17.52" | 510 20.08" |
| G with SB/82 | 250 9.8" | 480 18.9" | 550 21.7" | 585 23.03" | 655 25.8" | 770 30.3" | 850 33.5" | 1040 40.9" |
| H with SB/82 | 820 32.3" | 850 33.5" | 965 38" | 1010 39.8" | 1115 44" | 1350 53" | 1525 60" | 1812 71" |
| H with HB/97 | - | - | - | - | 650 25.59" | 835 32.87" | 900 35.43" | 1060 41.7" |
| P with SB/82 | 370 14.6" | 400 15.7" | 470 18.5" | 505 19.9" | 575 22.6" | 690 27" | 770 30.3" | 700 27.5" |
| 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 | Kg lbs |
| ANSI 150/PN 16 with SB/82 | 56 123 | 90 198 | 100 220 | 130 287 | 200 441 | 390 860 | 590 1301 | 1000 2205 |
| ANSI150/PN 16 with HB/97 | - | - | - | - | 196 432 | 380 838 | 534 1177" | 944 2081 |

Table 15 Weights and dimensions

Reval 182 + DB/182 + SA

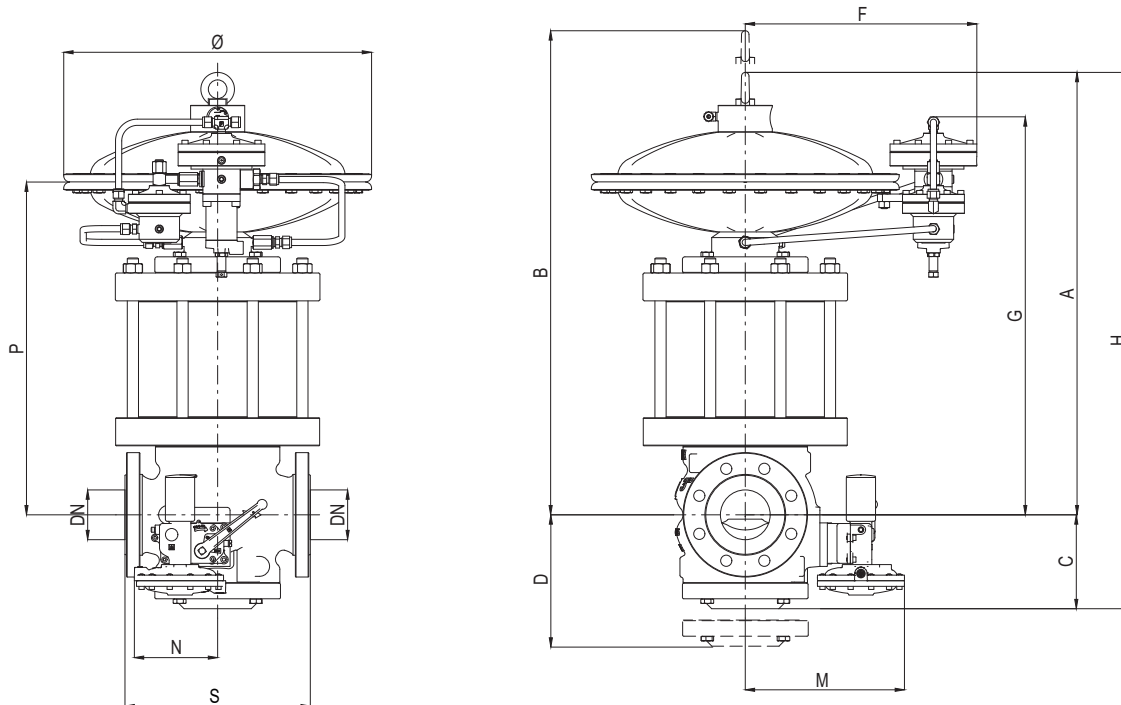


Figure 21 Reval 182 + DB/182 + SA dimensions

| Weights and Dimensions (for other connections please contact your closest Pietro Fiorentini representative) | | | | | |
|---|---|---------------|---------------|---------------|---------------|
| | [mm] inches | [mm] inches | [mm] inches | [mm] inches | [mm] inches |
| Size (DN) | 25 1" | 50 2" | 65 2" 1/2 | 80 3" | 100 4" |
| S - ANSI 150/PN16 | 183 7.25" | 254 10" | 276 10.88" | 298 11.75" | 352 13.88" |
| Ø | 375 14.76" | 375 14.76" | 495 19.49" | 495 19.49" | 495 19.49" |
| A | 520 20.5" | 550 21.7" | 650 25.6" | 675 26.6" | 755 29.7" |
| B | 610 24" | 640 25.2" | 780 30.7" | 785 30.9" | 895 35.2" |
| C | 145 5.71" | 161 6.34" | 178 7.01" | 185 7.28" | 205 8.07" |
| D | 212 8.35" | 255 10.08" | 292 11.50" | 322 12.68" | 330 12.99" |
| F | 350 13.78" | 350 13.78" | 410 16.14" | 410 16.14" | 410 16.14" |
| G | 250 9.84" | 480 18.90" | 550 21.65" | 585 23.03" | 655 25.79" |
| H | 465 18.31" | 511 20.12" | 608 23.94" | 615 24.21" | 874 34.41" |
| P | 370 14.57" | 400 15.75" | 470 18.5" | 505 19.88" | 575 22.64" |
| L | 98 3.86" | 146 5.75" | 146 5.75" | 146 5.75" | 146 5.75" |
| M | 194 7.64" | 219 8.62" | 232 9.13" | 246 9.68" | 263 10.35" |
| N | 125 4.92" | 125 4.92" | 125 4.92" | 130 5.11" | 130 5.11" |
| K | 215 8.5" | 295 11.6" | 325 12.8" | 325 12.8" | 390 15.3" |
| Tubing Connections | Øe 10 x Øi 8 (on request imperial sizing) | | | | |
| Weight | Kg lbs | Kg lbs | Kg lbs | Kg lbs | Kg lbs |
| ANSI 150/PN 16 | 35 77 | 52 115 | 60 132 | 72 159 | 113 249 |

Table 16 Weights and dimensions

Reval 182 + DB/182 + PM/182

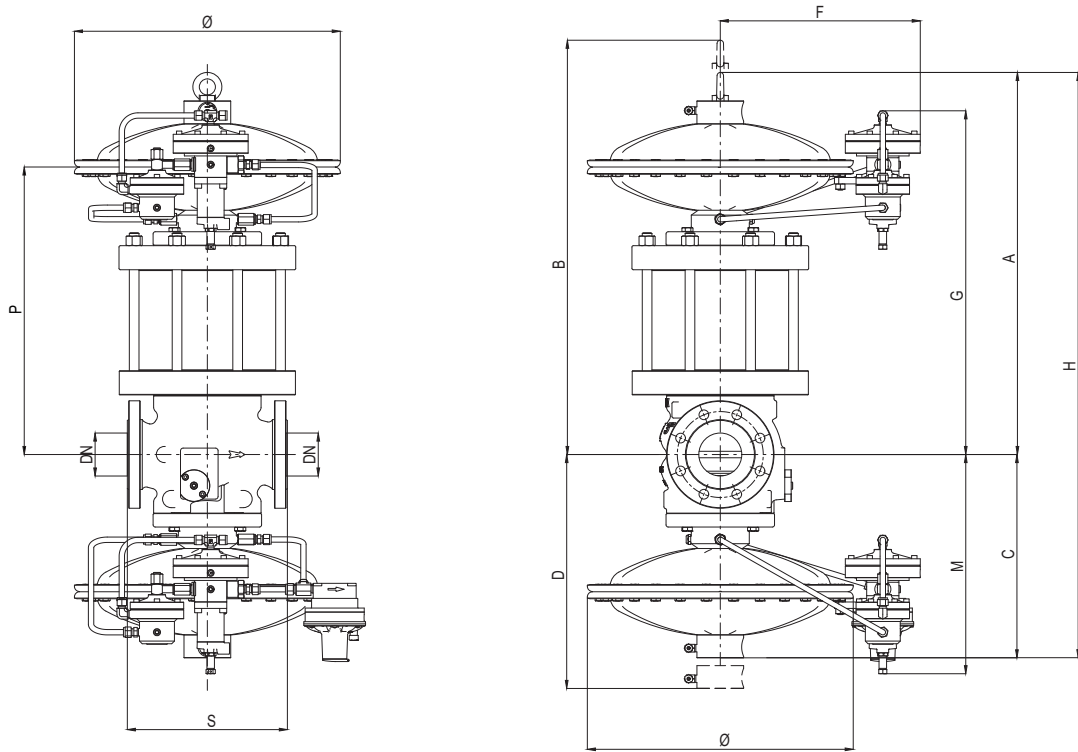


Figure 22 Reval 182 + DB/182 + PM/182 dimensions

| Weights and Dimensions (for other connections please contact your closest Pietro Fiorentini representative) | | | | | | | |
|---|---|---------------|---------------|---------------|---------------|---------------|---------------|
| | [mm] inches | [mm] inches | [mm] inches | [mm] inches | [mm] inches | [mm] inches | [mm] inches |
| Size (DN) | 25 1" | 50 2" | 65 2" 1/2 | 80 3" | 100 4" | 150 6" | 200 8" |
| S - ANSI 150/PN 16 | 183 7.25" | 254 10" | 276 10.88" | 298 11.75" | 352 13.88" | 451 17.75" | 543 21.38" |
| Ø | 375 14.76" | 375 14.76" | 495 19.49" | 495 19.49" | 495 19.49" | 630 24.80" | 630 24.80" |
| A | 520 20.5" | 550 21.7" | 650 25.6" | 675 26.6" | 755 29.7" | 920 36.2" | 1050 41.3" |
| B | 610 24" | 640 25.2" | 780 30.7" | 785 30.9" | 895 35.2" | 1120 44.1" | 1250 49.2" |
| C | 260 10.24" | 290 11.42" | 370 14.57" | 380 14.96" | 410 16.14" | 490 19.29" | 590 23.23" |
| D | 410 16.14" | 430 16.93" | 530 20.87" | 530 20.87" | 600 23.62" | 735 28.94" | 850 33.46" |
| F | 350 13.78" | 350 13.78" | 410 16.14" | 410 16.14" | 410 16.14" | 475 18.70" | 475 18.70" |
| G | 450 17.7" | 480 18.9" | 550 21.7" | 585 23" | 655 25.8" | 770 30.3" | 850 33.5" |
| H | 780 30.7" | 840 33" | 1020 40.1" | 1055 41.5" | 1165 45.8" | 1410 55.5" | 1640 64.6" |
| L | 260 10.2" | 295 11.6" | 340 13.4" | 350 13.8" | 380 15" | 410 16.1" | 460 18.1" |
| P | 370 14.6" | 400 15.7" | 470 18.5" | 505 19.9" | 575 22.6" | 690 27.2" | 770 30.3" |
| K | 215 8.5" | 295 11.6" | 325 12.8" | 325 12.8" | 390 15.3" | 470 18.5" | 600 23.6" |
| 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/PN 16 | 65 143 | 109 240 | 115 254 | 142 313 | 218 480 | 399 880 | 631 1391 |

Table 17 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. Sizing available through Pietro Fiorentini's online sizing programme.

| Flow rate coefficient | | | | | | | | |
|-----------------------|--------|--------|--------|--------|--------|--------|--------|--------|
| Nominal size | 25 | 50 | 65 | 80 | 100 | 150 | 200 | 250 |
| Inches | 1" | 2" | 2" 1/2 | 3" | 4" | 6" | 8" | 10" |
| Cg | 575 | 2220 | 3320 | 4937 | 8000 | 16607 | 25933 | 36525 |
| K1 | 106.78 | 106.78 | 106.78 | 106.78 | 106.78 | 106.78 | 106.78 | 106.78 |

Table 18 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 19)
T = gas temperature (°C)

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

S = relative density (refer to Table 19)
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 19 Correction Factor Fc

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

Nm³/h Reference conditions:

T= 0 °C; P= 1 bar(a) | T= 32 °F; P= 14.5 psi(a)

Stm³/h Reference conditions:

T= 15 °C; P= 1 bar(a) | T= 59 °F; P= 14.5 psi(a)

Table 20 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:

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

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

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

Sizing of regulators is usually made based on valve Cg value (Table 18).

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.



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

TB0015ENG



The data are not binding. We reserve the right
to make changes without prior notice.

reval182_technicalbrochure_ENG_revG

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