

Dival 160 AP

High Medium Pressure Gas Regulator



TECHNICAL BROCHURE

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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



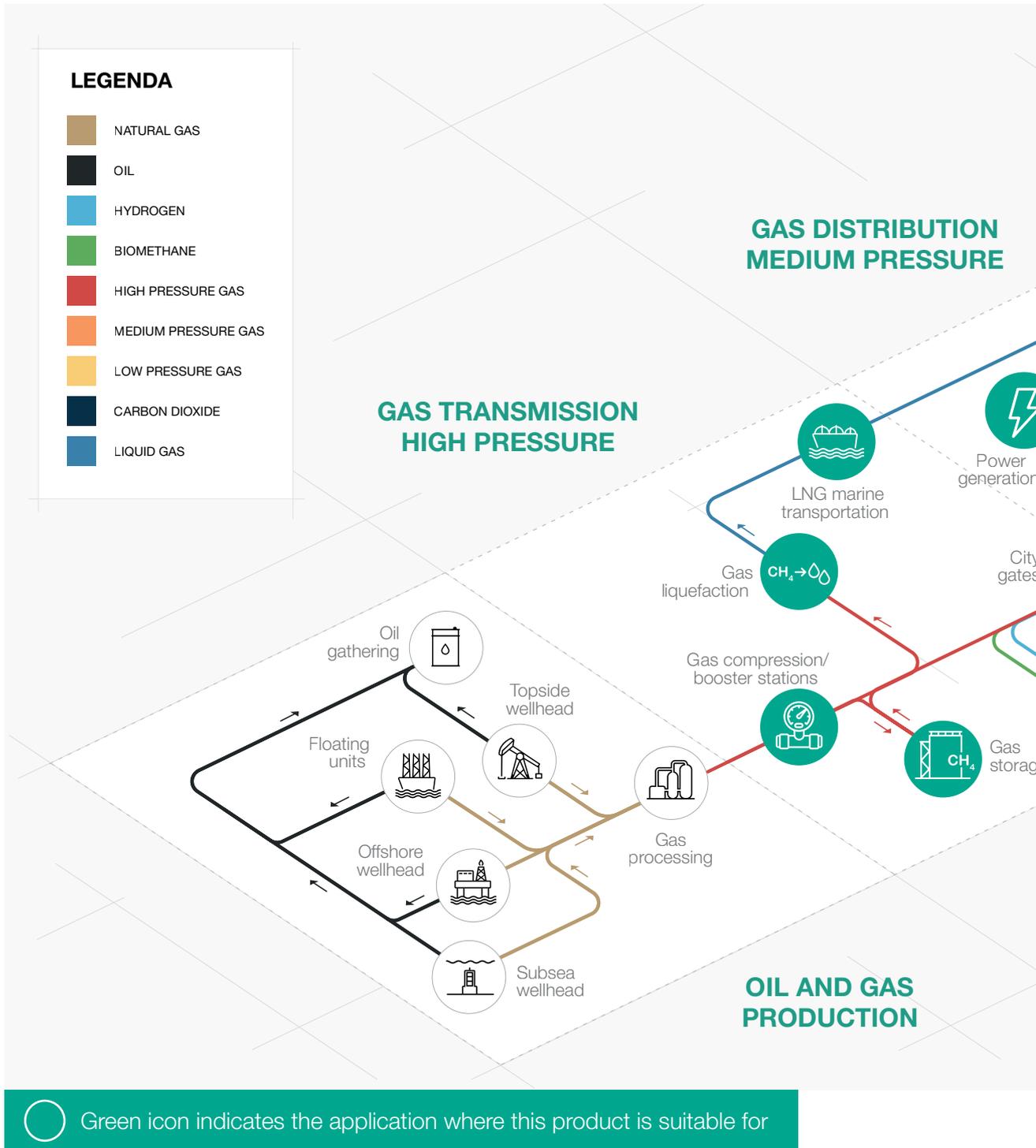
Experience since 1940



We operate in over 100 countries



Area of Application



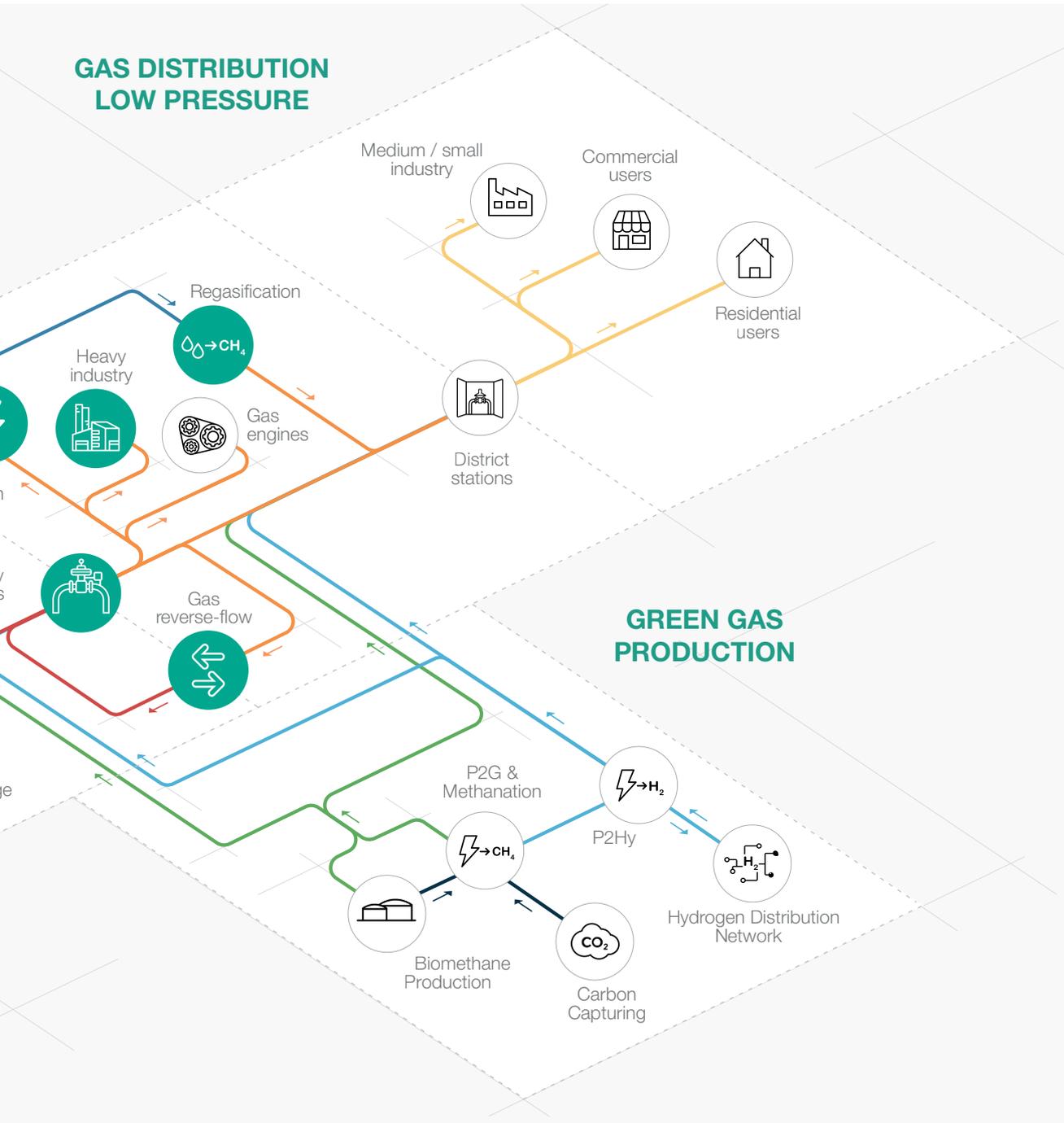


Figure 1 Area of Application Map



Introduction

Dival 160 AP is one of the **direct-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**.

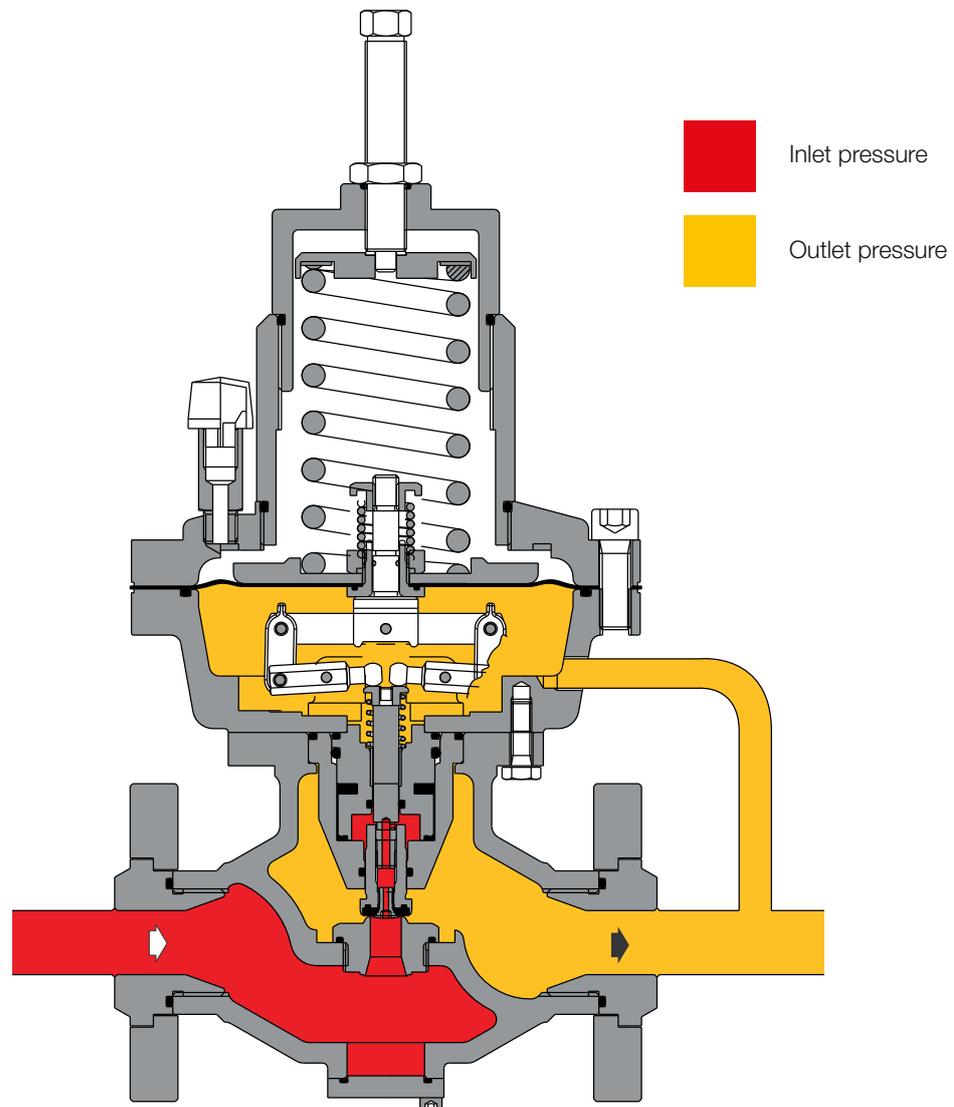


Figure 2 Dival 160 AP

Features and Calibration ranges

Dival 160 AP is a direct action device for high pressure, controlled by a diaphragm and contrasting regulated counter pressure action.

Dival 160 AP 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 also suitable for using with previously filtered, non corrosive gases. 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 three way / two valve unit, loading and unloading the pressure in the top chamber.

A small capacity relief valve prevents set pressures at values beyond limits and, at the same time, protects the pressurised chamber from overpressure subsequent to high ambient temperatures.

Pressure in the top chamber creates the counter action similar to the one of a spring in more conventional regulators.

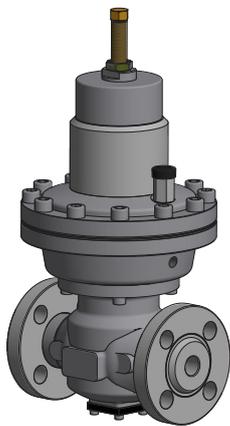


Figure 3 Dival 160 AP

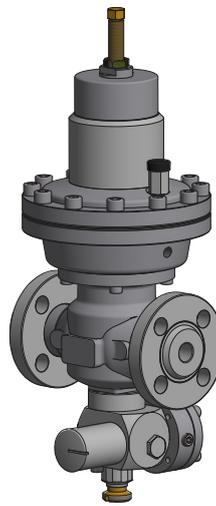


Figure 4 Dival 160 AP with SB/87



Dival 160 AP competitive advantages



Compact and simple design



Top Entry



Operates with high differential pressure



Easy maintenance



Balanced type



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

Features

Features	Values
Design pressure*	up to 8.5 MPa up to 85 barg
Ambient temperature*	from -20 °C to +60 °C from -4 °F to +140 °F
Inlet gas temperature range*	from -20 °C to +60 °C from -4 °F to +140 °F
Inlet pressure range bpu (MAOP)	from 0.14 to 8.5 MPa from 1.4 to 85 barg
Range of downstream pressure Wd	from 0.085 to 0.45 MPa from 0.85 to 4.5 barg
Available Accessories	SB/87 Slam shut
Minimum differential pressure	0.1 MPa 1 barg
Accuracy class AC	up to 5 (depending on working conditions)
Lock-up pressure class SG	up to 10 (depending on working conditions)
Nominal dimensions DN	DN 25 / 1";
Connections*	Class 300 and 600 RF or RTJ according to ASME B16.5

(*) REMARK: Different functional features and/or extended temperature ranges available on request. Stated temperature ranges are the maximum for which the equipment's full performance, including accuracy, are fulfilled. Standard product may have a narrower range.

Table 1 Features

Materials and Approvals

Part	Material
Body	ASTM A 216 WCB cast steel
Cover	ASTM A 105
Seat	AISI 303
Diaphragm	Vulcanized rubber
Sealing ring	Nitrile rubber
Compression fittings	Zinc-plated carbon steel

REMARK: 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

Dival 160 AP 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



Springs ranges and control heads

Type	Model	Operation	Range Wh		Spring Table web link
			MPa	barg	
Delivery pressure	-	Manual	0.085 - 0.45	0.85 - 4.5	TT_151Z

Table 3 Settings table

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



Accessories

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 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.

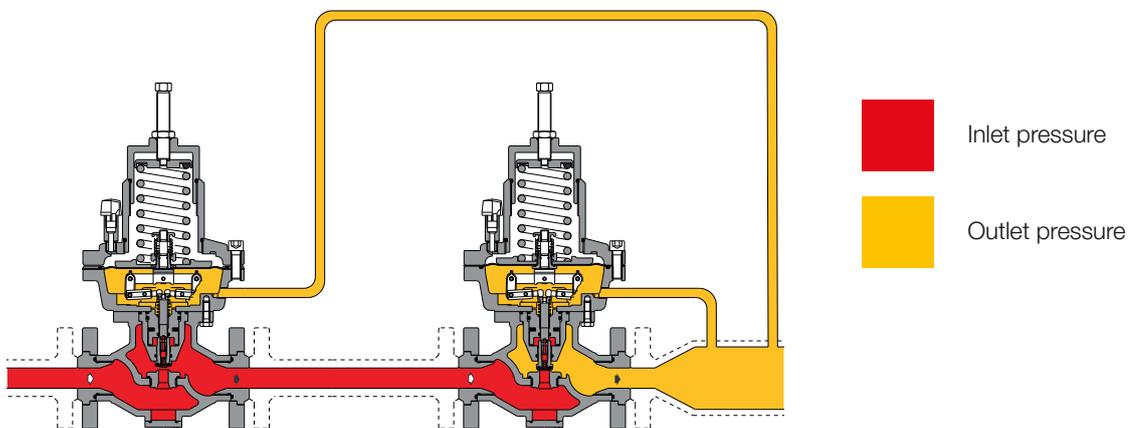


Figure 5 Dival 160 AP with In-line monitor setup

SB/87 slam shut

Dival 160 AP pressure regulator offers the possibility of installing an **SB/87 incorporated slam shut valve** and this can be done either during the manufacturing process or be retrofitted in the field.

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 |  | Easy maintenance |
|  UPSO | Under Pressure Shut-Off |  | Remote tripping option |
|  | Internal by-pass |  | Limit switch option |
|  | Compact dimensions | | |

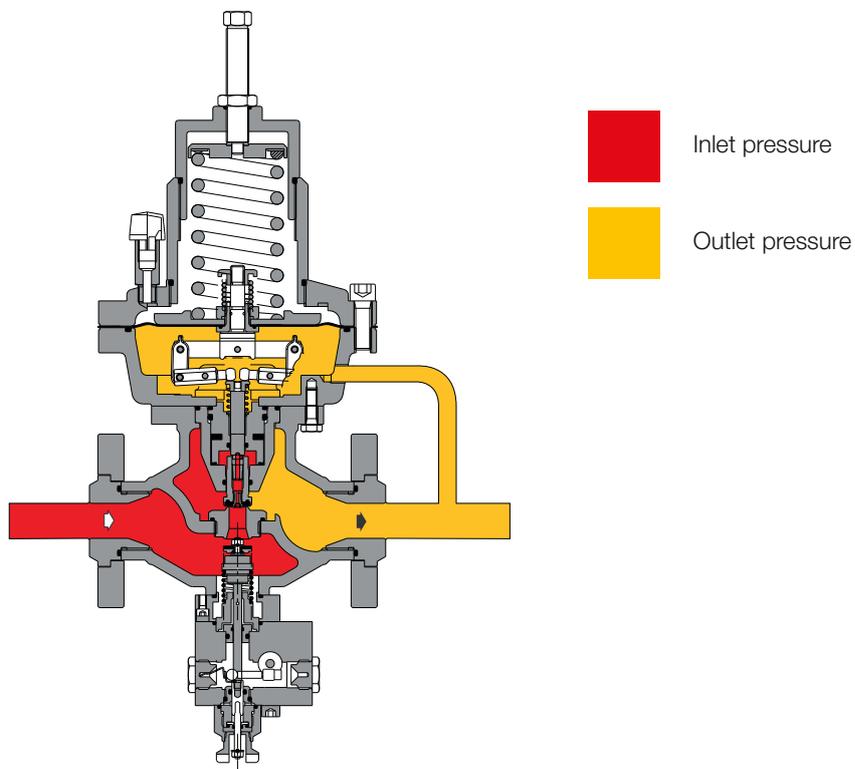


Figure 6 Dival 160 AP with SB/87



Pressure switch types and range					
SSV Type	Model	Operation	Range Wh		Spring Table web link
			MPa	barg	
SB/87	102	OPSO	0.015 - 0.15	0.15 - 1.5	TT 872
		UPSO	0.007 - 0.1	0.07 - 1	
SB/87	103	OPSO	0.01 - 0.68	1 - 6.8	TT 872
		UPSO	0.04 - 0.5	0.4 - 5	

Table 4 Setting table

Weights and Dimensions

Dival 160 AP

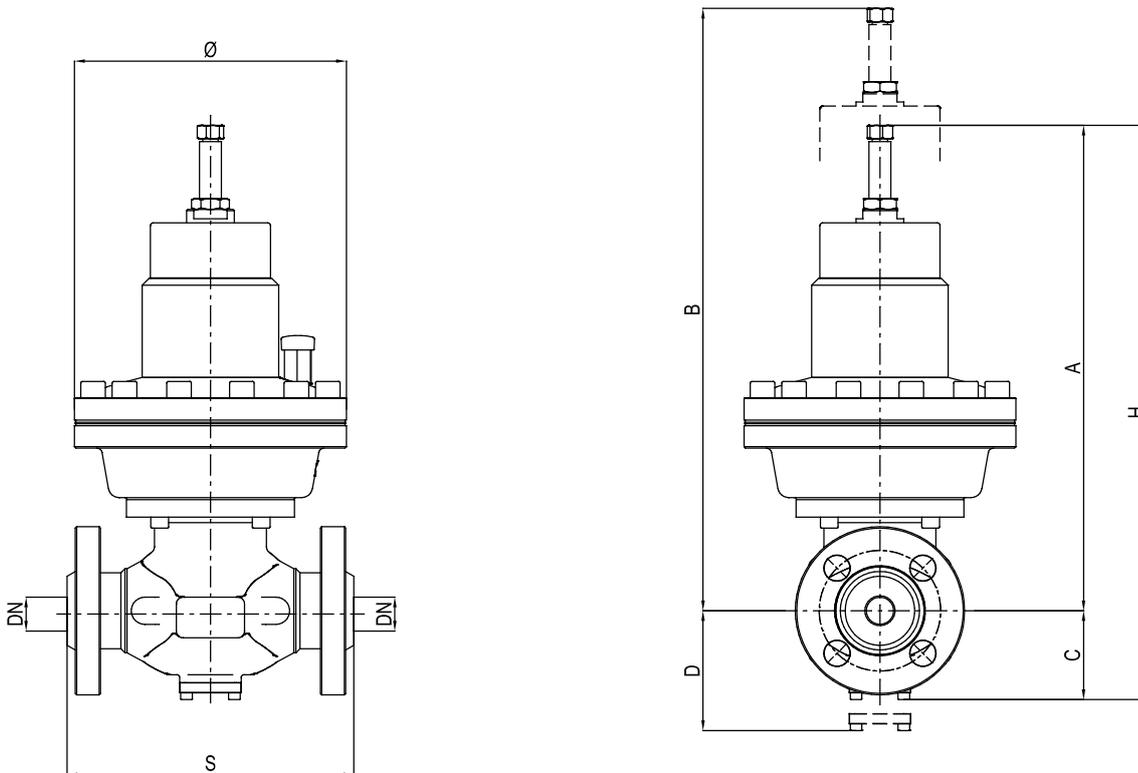


Figure 7 Dival 160 AP dimensions

Weights and Dimensions (for other connections please contact your closest Pietro Fiorentini representative)	
	[mm] inches
Size (DN)	25 1"
S - ANSI 150	183 7.20"
S - ANSI 300	197 7.76"
S - ANSI 600	210 8.27"
Ø	199 7.83"
A	360 14.17"
C	65 2.56"
D	85 3.35"
H	425 16.73"
Tubing connections	Øe 10 x Øi 8 (on request imperial sizing)
Weight	Kg lbs
	22 48

Table 5 Weights and dimensions

Dival 160 AP + SB/87

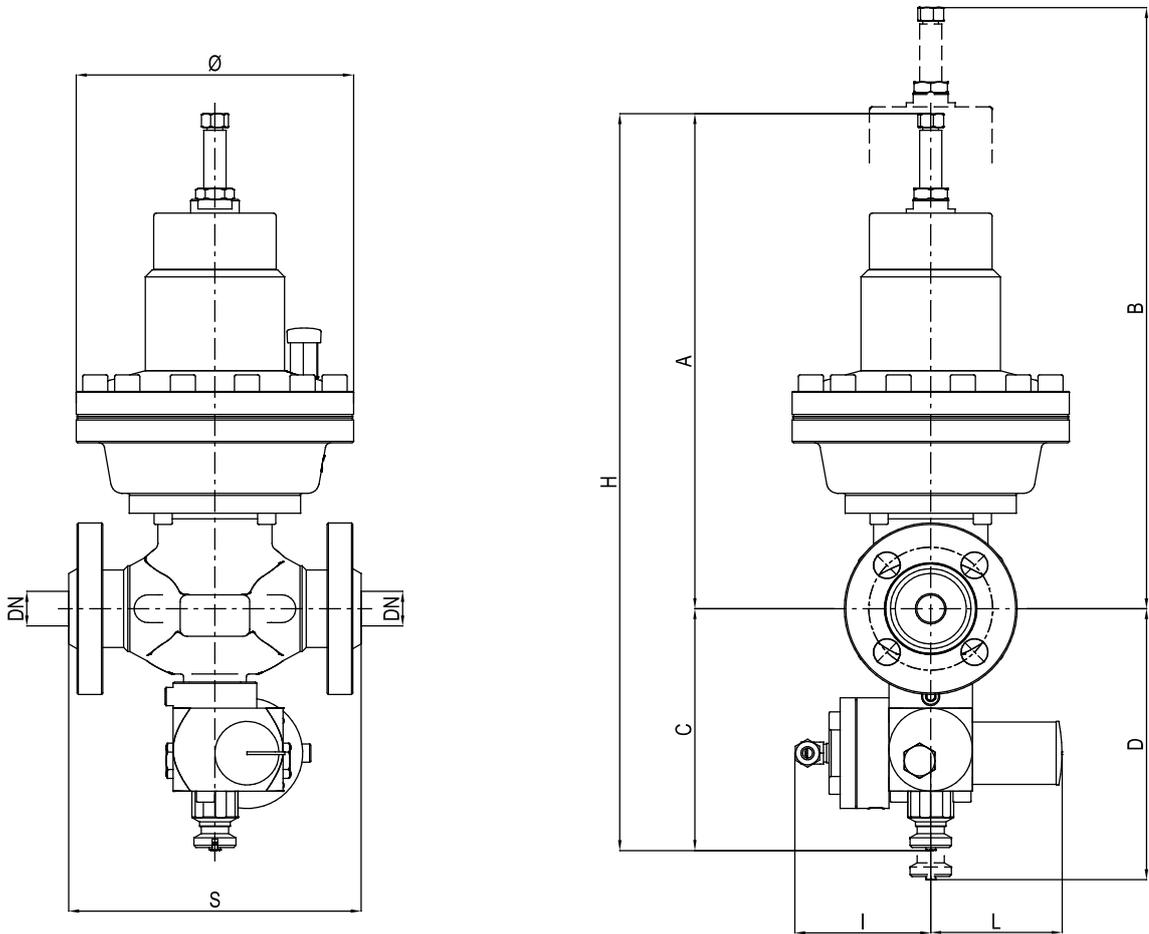


Figure 8 Dival 160 AP + SB/87 dimensions

Weights and Dimensions (for other connections please contact your closest Pietro Fiorentini representative)	
	[mm] inches
Size (DN)	25 1"
S - ANSI 150	183 7.20"
S - ANSI 300	197 7.76"
S - ANSI 600	210 8.27"
Ø	199 7.83"
A	360 14.17"
C	175 6.89"
D	195 7.68"
H	535 21.06"
I	88 3.46"
L	94 3.70"
Tubing connections	Øe 10 x Øi 8 (on request imperial sizing)
Weight	Kg lbs
	25 55

Table 6 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
Inches	1"
Cg	140
K1	147

Table 7 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 8)
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 8 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

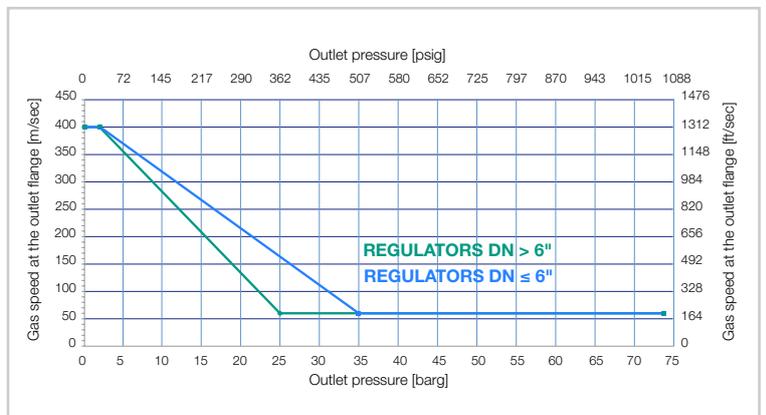
Table 9 Flow rate conversion

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:

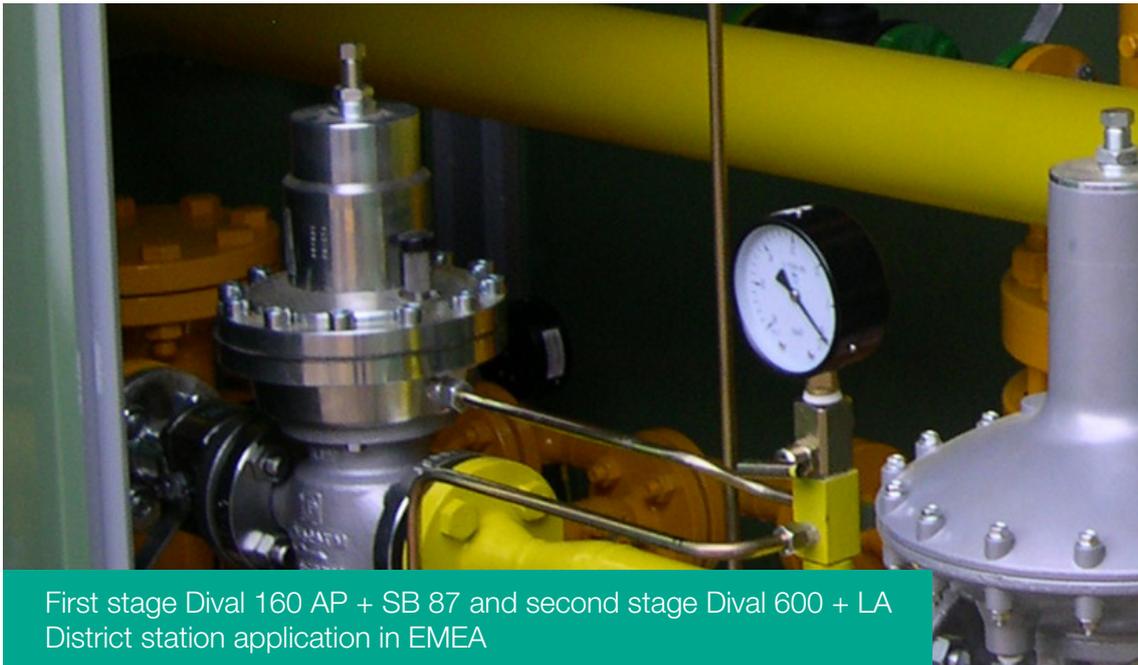
$$V = 345.92 \times \frac{Q}{DN^2} \times \frac{1 - 0.002 \times Pd}{1 + Pd}$$

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



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.



First stage Dival 160 AP + SB 87 and second stage Dival 600 + LA
District station application in EMEA



Customer Centricity

Pietro Fiorentini is one of the main Italian international companies with high focus on product and service quality.

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



Support

One of Pietro Fiorentini's top priorities is to provide support to the client in all phases of project development, during installation, commissioning and operation. Pietro Fiorentini has developed a highly standardized intervention management system, which helps to facilitate the entire process and effectively archive all the interventions carried out, drawing on valuable information to improve the product and service. Many services are available remotely, avoiding long waiting times or expensive interventions.



Training

Pietro Fiorentini offers training services available for both experienced operators and new users. The training is composed of the theoretical and the practical parts, and is designed, selected and prepared according to the level of use and the customer's need.



Customer Relation Management (CRM)

The centrality of customer is one of the main missions and vision of Pietro Fiorentini. For this reason, Pietro Fiorentini has enhanced the customer relation management system. This enables to track every opportunity and request from Customer in one single point and make free the information flow.

Sustainability

Here at Pietro Fiorentini, we believe in a world capable of improvement through technologies 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.

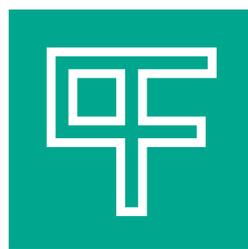


Our commitment to the world of tomorrow

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, with 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 put the why we operate before the what and how we do it.





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