Staflux 187

Pressure Regulators

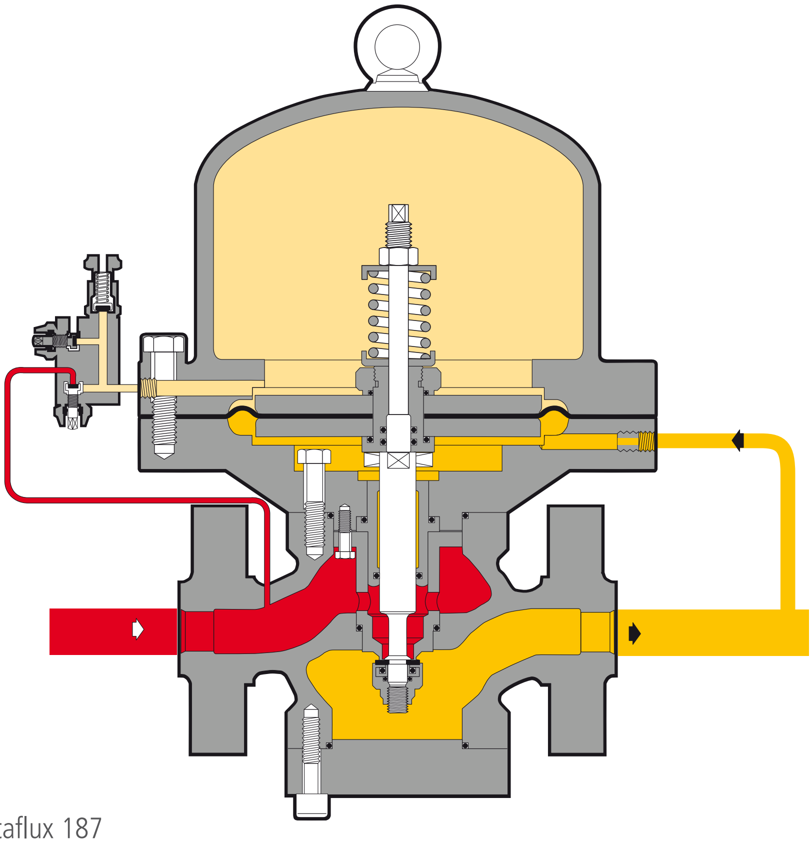
Pietro Fiorentini®

Staflux 187

> Pressure regulators

Introduction

Staflux187 pressure regulators are direct action devices for high pressure, controlled by a diaphragm and contrasting regulated counter pressure action.
These regulators are suitable for use with previously filtered, non corrosive gases.



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Main Features

Staflux 187 is a direct acting regulator ideal for all the applications where fast response time is a must and whenever it is necessary to operate very high differential pressure.

The **Staflux 187** regulator is a truly "top entry design" which allows an easy maintenance of parts directly on the field.

Set point adjustment of the regulator is operated via a three way – two valve unit used to load and unload the pressure on the top chamber.

A small capacity relief valve prevents to set pressure 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 is creating the counter action similar to the one of a spring in more conventional regulators.

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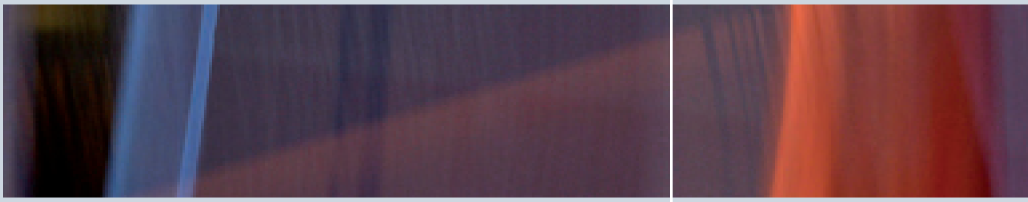
Designed With Your Needs In Mind

- Compact & Simple Design
- Easy Maintenance
- Top Entry
- High Turn Down Ratio
- High Δp Handling
- Rudged Construction
- Easy to operate



Main Features

-Design pressure: up to 250 bar (3626 psi)
-Design temperature: -20 °C to + 60 °C (-4 to + 140 °F)
-Ambient temperature: -15 °C to + 60 °C (5 to + 140 °F)
-Range of inlet pressure bpu: 2 to 250 bar bar (29 to 3626 psi)
-Range of outlet pressure Wh: 1 to 75 bar (14,5 to 1087 psig)
-Accuracy class AC: up to 5
-Closing pressure class SG: up to 10
-Available size DN: 1”
-Flanging: class ANSI 1500 RF according to ANSI B16.5

Materials

Body	ASTM A352 LCC cast steel
Head covers	ASTM A350 LF2 carbon steel
Stem	AISI 416 stainless steel
Diaphgram	Rubberized canvas.
Valve seat	Stainless steel
Seals	Nitril rubber
Compression fittings	According to DIN 2353 in zinc-plated carbon steel

The characteristics listed above are referred to standard products. Special characteristics and materials for specific applications may be supplied upon request.

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Choosing the pressure regulator

Sizing of regulators is usually made on the basis of Cg valve and K_G sizing coefficients (table 1). Flow rates at fully open position and various operating conditions are related by the following formulae where:

Q = flow rate in Stm^3/h
Pu = inlet pressure in bar (abs)
Pd = outlet pressure in bar (abs).

A > When the Cg and K_G values of the regulator are known, as well as Pu and Pd, the flow rate can be calculated as follows:

A-1 in sub critical conditions: (Pu<2xPd)

$$Q = K_G \times \sqrt{Pd \times (Pu - Pd)} \qquad Q = 0.526 \times Cg \times Pu \times \text{sen}\left(K1 \times \sqrt{\frac{Pu - Pd}{Pu}}\right)$$

A-2 in critical conditions: (Pu≥2xPd)

$$Q = \frac{K_G}{2} \times Pu \qquad Q = 0.526 \times Cg \times Pu$$

B > Vice versa, when the values of Pu, Pd and Q are known,the Cg or KG values, and hence the regulator size, may be calculated using:

B-1 in sub-critical conditions: (Pu<2xPd)

$$K_G = \frac{Q}{\sqrt{Pd \times (Pu - Pd)}} \qquad Cg = \frac{Q}{0.526 \times Pu \times \text{sen} \times \left(K1 \times \sqrt{\frac{Pu - Pd}{Pu}}\right)}$$

B-2 in critical conditions (Pu≥2xPd)

$$K_G = \frac{2 \times Q}{Pu} \qquad Cg = \frac{Q}{0{,}526 \times Cg \times Pu}$$

NOTE: The sin val is understood to be DEG.

Table 1: Cg, K_G and K1 coefficient

Nominal diameter (mm)	25
Size (inches)	1"
Cg coefficient	130
K_G coefficient	136
K1 coefficient	106,78

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The formulae are applicable to natural gas having a relative density of 0.61 w.r.t. air and a regulator inlet temperature of 15 °C. For gases having a different relative density S and temperature t in °C, the value of the flow rate, calculated as above, must be multiplied by a correction factor, as follows:

$$Fc = \sqrt{\frac{175.8}{S \times (273.16 + t)}}$$

Table 2 lists the correction factors Fc for a number of gases at 15 °C.

Table 2: Correction factors FC

Type of gas	Relative density	Fc Factor
Air	1.0	0.78
Propane	1.53	0.63
Butane	2.0	0.55
Nitrogen	0.97	0.79
Oxygen	1.14	0.73
Carbon dioxide	1.52	0.63

Caution:

in order to get optimal performance, to avoid premature erosion phenomena and limit noise emissions, it is recommended to check that the gas speed at the outlet flange does not exceed 150 m/sec.
The gas speed at the outlet flange may be calculated by means of the following formula:

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

where:

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

Monitor

The monitor is an emergency regulator which comes into operation if the main regulator allows downstream pressure to increase up to monitor set pressure.
The Cg and K_G coefficients of the regulator plus in-line monitor system are about 20% lower than those of the regulator alone. (fig. 2).

STAFLUX 187 + STAFLUX 187

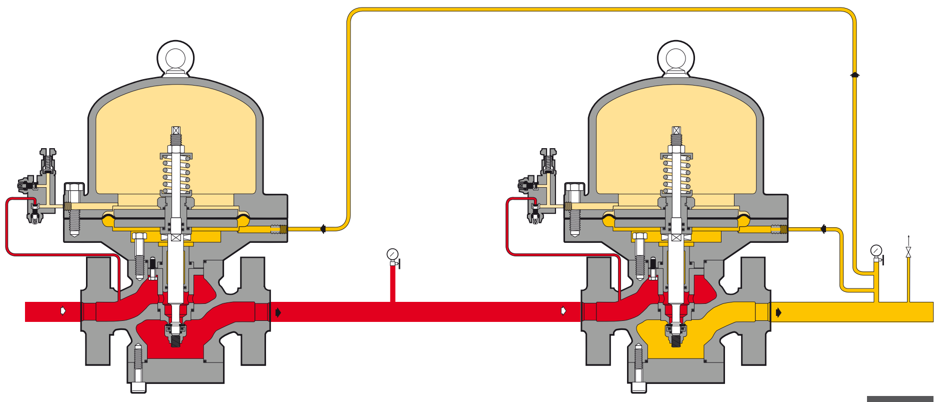

Fig.2

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SBC/187 + STAFLUX 187

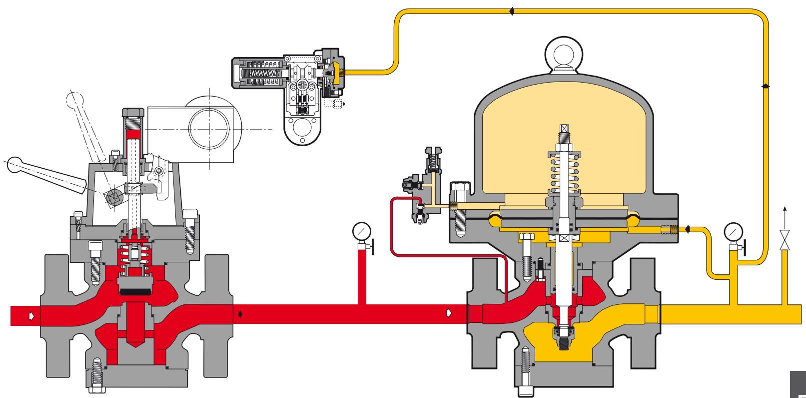

Fig.3

- Inlet pressure
- Outlet pressure
- Motorization regulator

Installation

Whenever **Staflux 187** pressure regulator is being installed, it is essential to follow a few basic rules in order to ensure the achievement equipment's operational and performance characteristics.
These rules may be summarised as follows:

a) filtering: the gas arriving from the main pipeline must be adequately filtered; it is also advisable to make sure that the pipe upstream of the regulator is perfectly clean and void of residual impurities;

b) pre-heating: whenever the pressure drop at the regulator is considerable, the gas must be pre-heated enough to avoid the formation of ice during decompression (for reference natural gas the temperature drop is about 0,4°C to 0,5°C for every bar of pressure reduction);

c) Outlet pipe size must also be sized correctly so the velocity is not to high. High velocity will result in improper pressure control.

d) impulse take-off: for correct operation, the impulse take-off must be located in the right position. Between the regulator and the downstream take-off there must be a straight length of, pipe ≥ 4 times the diameter of the outlet pipe and downstream the take-off, there must be a further length of pipe ≥ 2 times the same diameter.

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Possible installation

Plant with Staflux 187

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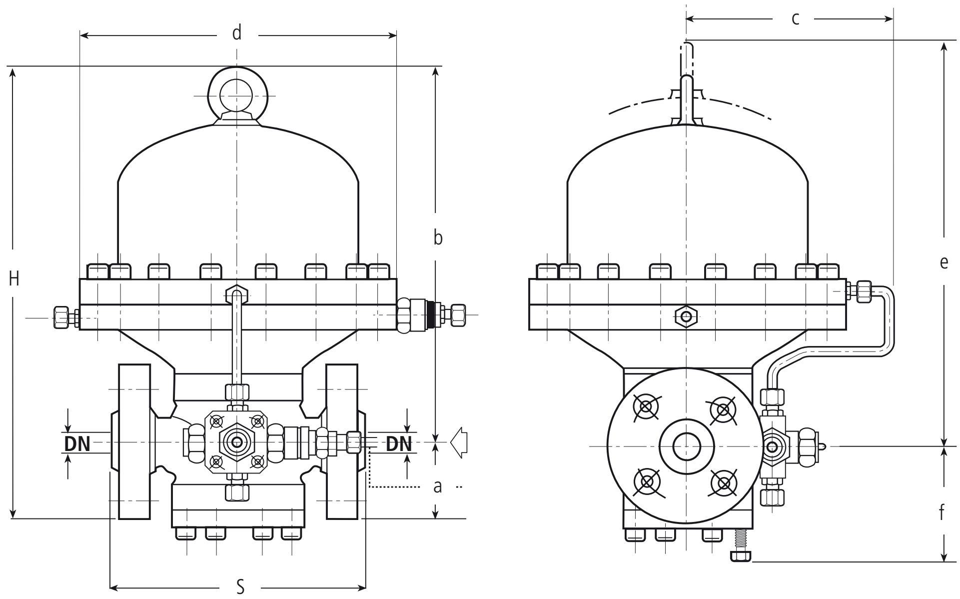

Overal dimensions in mm

Size (mm)	25
Inches	1"
S - Ansi 1500	235
a	105
b	350
c	200
d	280
e	455
f	135
h	455
Tubing Connections	⌀e10 x ⌀i 8

Weights in Kgf

ANSI 1500	53

Face to face dimensions S according to IEC 534-3 and EN 334

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