Staflux 185

Pressure
Regulators

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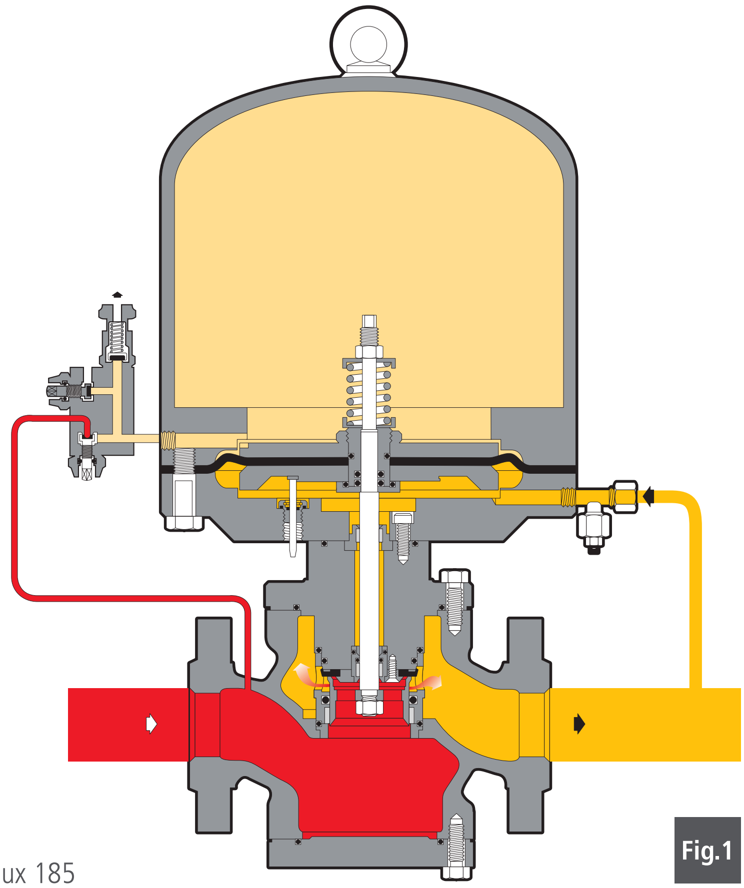
Staflux 185

> Pressure regulators

Introduction

Staflux 185 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.



Staflux 185

Fig.1

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Main Features

The modular design of **Staflux 185** pressure regulators allows application of slam shut valve on the same body without any modification of face to face dimension of standard version. Additionally it is possible to add at any time the slam shut valve without removing the body from the line.
The **Staflux 185** regulator is a truly "top entry design" which allows an easy maintenance of parts as well as retrofitting of device 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. **Staflux 185** is, for this reason, a direct acting pressure regulator ideal for all the applications where fast response time is a must.

Staflux 185

Staflux 185 + SB/82

Designed With Your Needs In Mind

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

Main Features

-Design pressure: up to 102 bar (1479 psi)
-Design temperature: -20 °C to + 60 °C (-4 to + 140 °F)
-Ambient temperature: -20 °C to + 60°C (-4 to + 140 °F)
-Range of inlet pressure bpu: 2 to 85 bar (29 to 841 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" -2" -3"
-Flanging: class ANSI 300-600 RF or RTJ according to ANSI B16.5

Materials

Body	Cast steel ASTM A352 LCC
Head covers	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 Stm³/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)

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

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 K_G values, and hence the regulator size, may be calculated using:

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

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

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	50	80
Size (inches)	1"	2"	3"
Cg coefficient	439	1861	3764
K_G coefficient	462	1768	3960
K1 coefficient	106,78	106,78	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.

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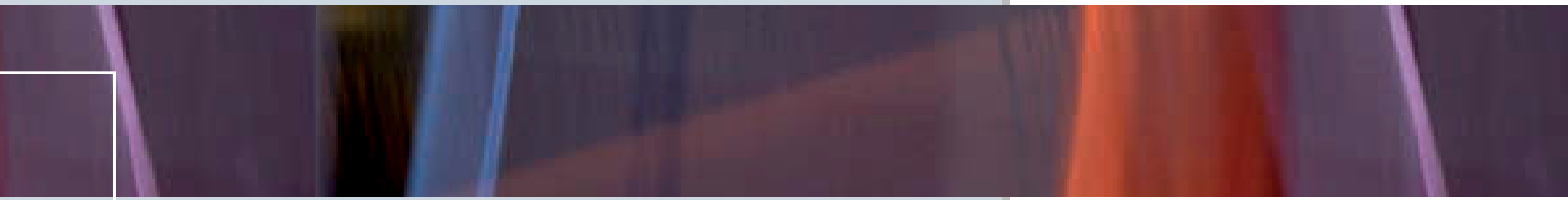

Slam shut

This device immediately stops gas flow (SAV) whenever a failure causes downstream pressure to rise reaching the set point of the slam-shut itself.
The slam-shut device can also be closed manually.

Staflux 185 pressure regulator offers the possibility of installing an incorporated slum shut valve **SB/82** (fig. 2) on the monitor or on the main regulator, either from the factory or retrofit in the field.
The Cg and K_G coefficients of a regulator plus incorporated slam-shut system are equivalent to about 95% of those for standard versions.
The incorporated slam shut can also be retrofitted to **Staflux 185** regulators without modifying the pressure regulator assembly.
The main characteristics of this device are:
- overpressure and underpressure pressure shut off;
- manual push-button control;
- option for pneumatic or electromagnetic remote control;
- manual re-setting with internal by-pass activated by the lever mechanism;
- compact dimensions;
- easy maintenance;
- possibility of installing remote signal devices (contact switches or proximity switches).

Staflux 185 + SB/185

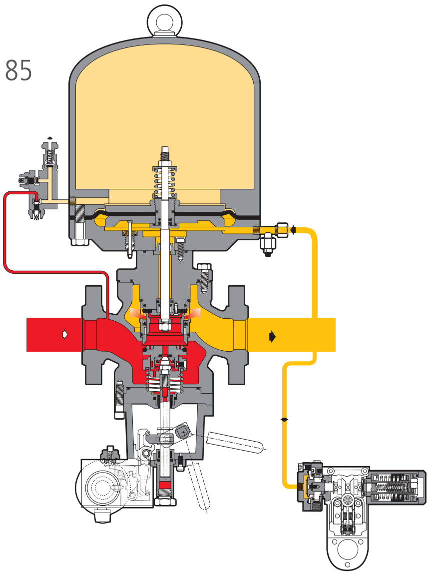

Fig.2

Table 3: Pressure switches

Type	102	103	104	105	106	107	108	109
Overpressure range (OPSO).	0,2 to 5	2 to 22	15 to 44	30 to 88	0,2 to 5	2 to 22	15 to 44	30 to 88
Underpressure range (UPSO).	0,04 to 0,7	0,2 to 4	1,65 to 8	3,2 to16	0,1 to 5	1 to 22	7 to 44	14 to 88

Press. in bar

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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 only difference is that monitor is set at a higher pressure than the main regulator. The Cg and KG coefficients of the regulator plus in-line monitor system are about 20% lower than those of the regulator alone (fig. 3).

Installation

Whenever **Staflux 185** 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.

Possible installation schemes

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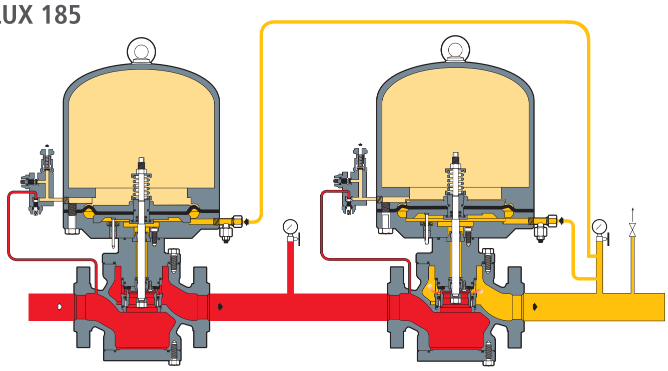

Fig.3

STAFLUX 185 + STAFLUX 185 + SB/185

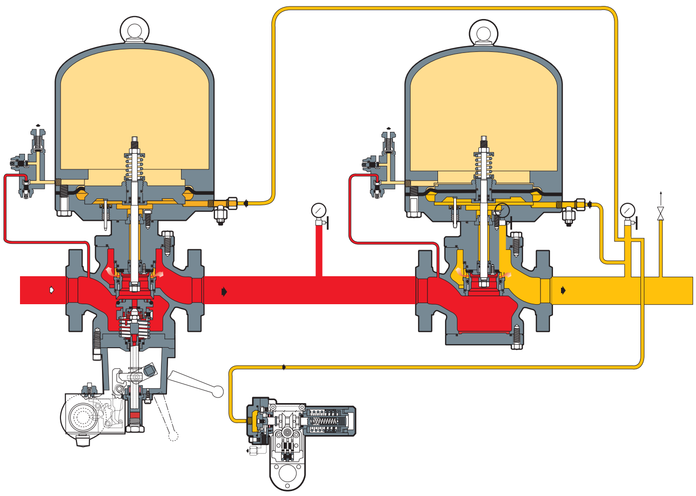

Fig.4

SBC 782 STAFLUX 185 + SB/185

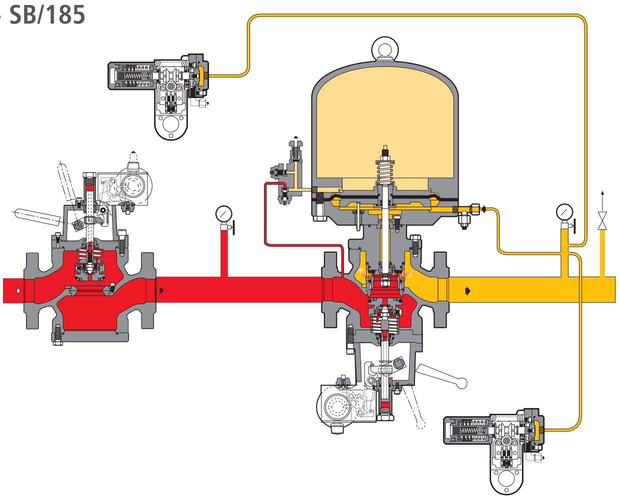

Fig.5

- Inlet pressure
- Outlet pressure
- Motorization regulator

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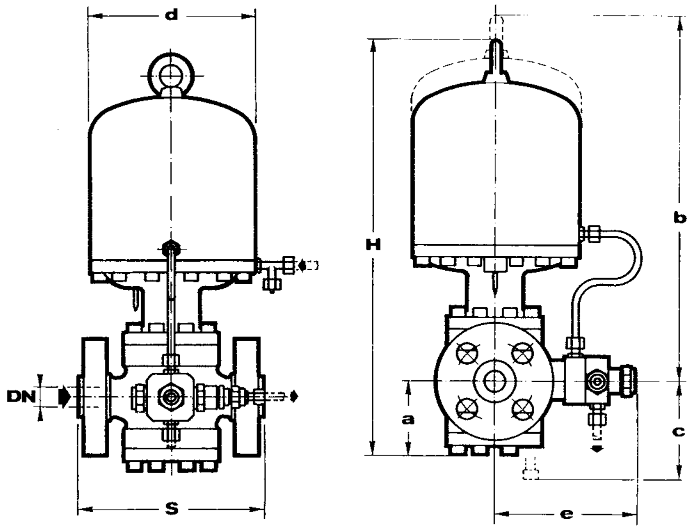

Overal dimensions in mm

Size (mm)	25	50	80
Inches	1"	2"	3"
S - Ansi 300	197	267	317
S - Ansi 600	210	286	336
a	95	125	145
b	610	650	670
c	110	160	190
d	280	324	324
e	170	190	220
h	610	675	710
Tubing Connections		⌀e10 x ⌀i 8	

Weights in Kgf

ANSI 300	65	98	115
ANSI 600	67	101	120

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

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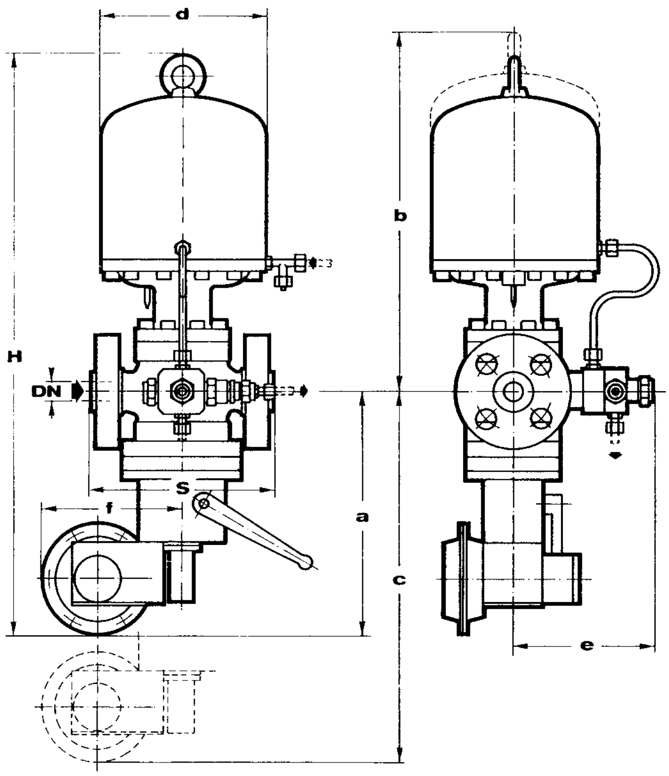

Overal dimensions in mm

Size (mm)	25	50	80
Inches	1"	2"	3"
S - Ansi 300	197	267	317
S - Ansi 600	210	286	336
a	215	240	270
b	610	650	670
c	325	355	400
d	280	324	324
e	170	190	220
f	130	130	130
h	730	790	840
Tubing Connections		⌀e10 x ⌀i 8	

Weights in Kgf

ANSI 300	75	111	137
ANSI 600	77	114	142

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

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