



 **Reflux 819**  
Pressure regulator

# REFLUX 819

## Classification and Area of Application

**REFLUX 819** is a downstream pressure regulator, pilot controlled, for medium and high pressure applications.

It is particularly suitable for use within the framework of installations for the distribution of natural gas, as well as for supply networks for civil and industrial use.

The accuracy of the regulated pressure, the high rangeability ratio, together with the fast adaptation to changes in the operating conditions, even in the presence of abrupt changes in the flow rate, make the regulator **REFLUX 819** particularly suitable for use in gas supply installations of electric power generation stations (Turbogas).

The **Reflux 819** regulator, is classified according to the European standard **EN 334**, as a regulator which reacts in closure (**Fail to Close**).

It is truly a **TOP ENTRY** design, which confers to the regulator management advantages, for example the ability to perform full maintenance without uninstalling it from the connection pipe.

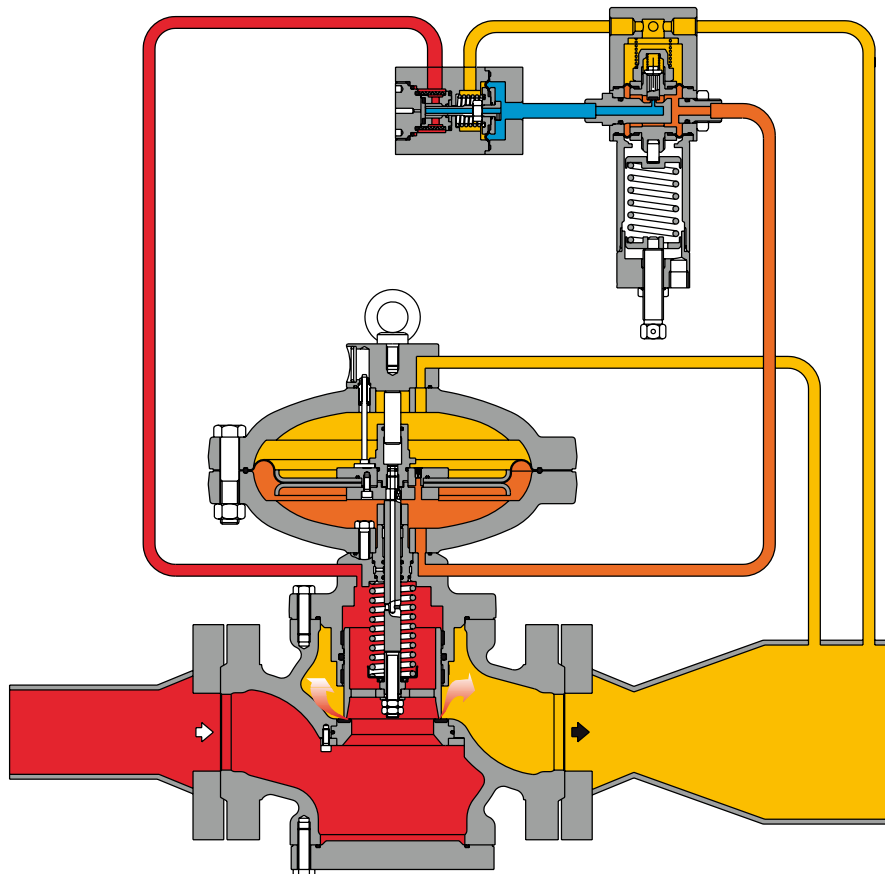


Fig.1

REFLUX 819 - Basic Version

## FEATURES

### Functional features:\*

■ <b>Maximum inlet pressure:</b>	Up to 102 bar
■ <b>Range of downstream pressure:</b>	from 0,3 bar to 74 bar depending on installed pilot (see Pilot section).
■ <b>Minimum working differential pressure:</b>	0,5 bar
■ <b>Minimum ambient temperature:</b>	Execution up to -40°C,
■ <b>Maximum ambient temperature:</b>	+60°C
■ <b>Inlet gas temperature:</b>	Up to -20°C + 60°C,
■ <b>Accuracy class AC:</b>	Up to 1
■ <b>Lock-up pressure class SG:</b>	Up to 2,5

### Design features:

■ <b>Nominal dimensions DN:</b>	25 (1"); 50 (2"); 80 (3"); 100 (4"); 150 (6"); 200 (8"); 250 (10"); 300 (12").
■ <b>Flanged connections:</b>	Class 150-300-600 RF or RTJ, according to ANSI B16.5 and PN 16/40 according to UNI 2282 or DIN 2263, (ISO 7005).

### Materials:\*\*

■ <b>Body:</b>	Cast steel ASTM A 352 LCC for classes ANSI 600 and 300; Cast steel ASTM A 216 WCB for classes Ansi 150 and PN 16/40.
■ <b>Head covers:</b>	ASTM A 350 LF2 forged steel
■ <b>Stem:</b>	AISI 416 stainless steel
■ <b>Plug:</b>	ASTM A 350 LF2 Nickel coated on sealing surface
■ <b>Seat:</b>	Nitril Rubber Vulcanized on a metal support
■ <b>Diaphragm:</b>	Rubberized canvas (performed by hot-pressing process.).
■ <b>Sealing ring:</b>	Nitril rubber
■ <b>Connection fittings:</b>	In zinc-plated carbon steel according to DIN 2353; Stainless steel on request.

REMARK: \* Different functional features available on request.  
\*\* The materials indicated above refer to the standard models.  
Different materials can be provided according to specific needs.

## Cg, KG and K1 coefficient

Nominal diameter								
Millimeters	25	50	80	100	150	200	250	300
Inches	1"	2"	3"	4"	6"	8"	10"	12"
<b>Cg flow coefficient</b>	575	2220	4937	8000	16607	25933	36525	55000
<b>KG flow coefficient</b>	605	2335	5194	8416	17471	27282	38425	57860
<b>K1 body shape factor</b>	106,78	106,78	106,78	106,78	106,78	106,78	106,78	106,78
								Tab.1

For sizing formulas refer to [www.fiorentini.com/sizing](http://www.fiorentini.com/sizing)

## Pilots System

The operation of the regulator **REFLUX 819** is assured by a piloting system consisting, as basic option, of two separate devices: the **Preregulator** and the **Pilot**.

### Preregulator

**The following models are available:**

**R14/A:** With self-adjusted calibration, providing a self-incremental feeding pressure to the pilot depending on the desired regulation pressure. It is equipped with a built-in filter and it is fed by the upstream gas.

**R42/A – R44/A – R45/A:** equipped with built-in filter on the gas inlet connection (upstream gas), with manually adjustable calibration.

### Pilot

**Reflux 819** regulators are equipped with series **200 pilot**.

The available models, according to the pressure to be regulated, are:

- **204/...**Outlet pressure control range from 0,3 to 43 bar (with different setting springs),
- **205/...**Control range from 20 to 60 bar (with different setting springs),
- **207/...**Control range from 41 to 74 bar (with different setting springs).

Pilots can be adjusted manually, in the field, or remotely to change the regulated pressure from far away. In the different cases, in order to identify them properly, they take the following suffixes:

- **.../A** Manual setting in place
- **.../D** Electric/Electronic remote setting control
- **.../CS** Pneumatic remote setting control
- **.../F.I.O.** Smart unit for remote setting, monitoring flow limitation and indirect flow measurement

## MODULARITY AND ACCESSORIES

The project of **REFLUX 819** regulator has been designed with a high degree of modularity that allows to incorporate, within the basic regulator, alternative devices and additional accessories. These can also be added to a basic regulator at a later time, with no need to change the existing assembly piping connections.

### Incorporated Silencer DB/819

The silencer **DB/819** allows absorbing the noise that is generated in the pressure regulator during the lamination process. Its great efficiency is due to the fact that noise absorption takes place at the same point where it is generated, thus preventing its propagation.

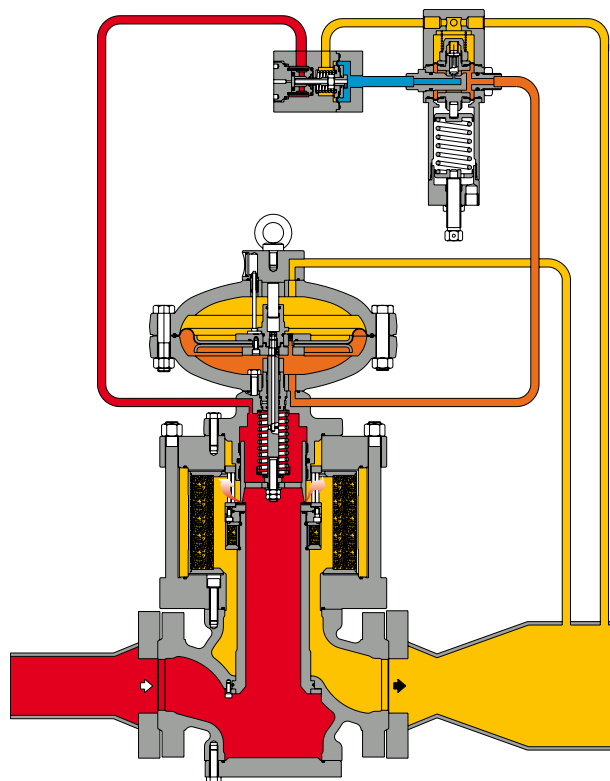


Fig.2

**REFLUX 819** - With incorporated silencer

This mechanical solution allows to still have the possibility of incorporating in the basic regulator, besides the silencer, also the slam-shut valve or the monitor.

With the application of the silencer **DB/819** the Cg and KG valve coefficients are 5% lower than the corresponding basic regulator.

## Slam shut device model SB/82 o HB/97

Slam shuts are **Safety device** whose task is cutting the gas flow if abnormal pressure conditions appear, compared to the one set during calibration of the dedicated pressure switch.

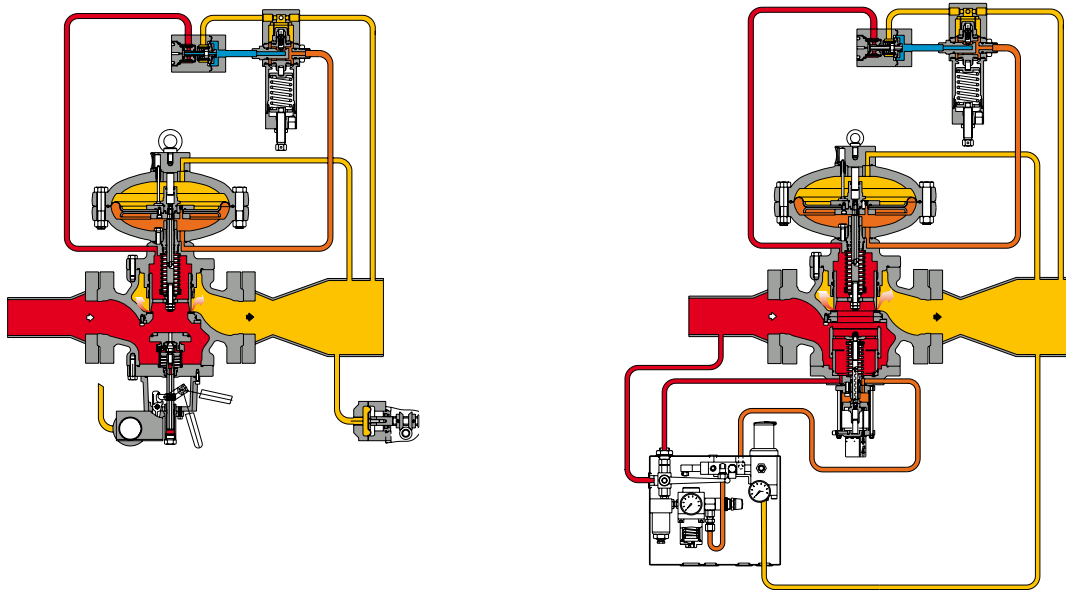


Fig.3

**REFLUX 819** - With slam shuth SB

Fig.4

**REFLUX 819** - With slam shuth HB

The calibration can be varied, according to the operating needs, in the ranges referred to in the table N.2, according to the model of pressure switch applied.

The slam shut device is equipped with a button for local manual control of the block operation.

The reset of the block device, for safety reasons, is exclusively manual and, inside the block device, a bypass device is provided, in order to make the reset operation easier.

The slam-shut device can be equipped with accessories of pneumatic or electromagnetic type allowing control, as well as with sensors (micro-switches) for the remote signaling of its tripping.

## Pressure switch

MOD. SB	MIN.	MAX
<b>102M</b>	0,2 ÷ 2,8	0,2 ÷ 5.5
<b>102MH</b>	2,8 ÷ 5.5	0,2 ÷ 5.5
<b>103M</b>	0,2 ÷ 8	2 ÷ 22
<b>103MH</b>	8 ÷ 19	2 ÷ 22
<b>104M</b>	1,6 ÷ 18	15 ÷ 45
<b>104MH</b>	18 ÷ 41	15 ÷ 45
<b>105M</b>	3 ÷ 44	30 ÷ 90
<b>105MH</b>	44 ÷ 90	30 ÷ 90
MOD. HB		
<b>103</b>	0.4 ÷ 6,8	1,3 ÷ 11
<b>104</b>	1 ÷ 20,6	10 ÷ 31,5
<b>105</b>	2.5 ÷ 50	25 ÷ 76
<b>105/92</b>	45 ÷ 75	58 ÷ 85

Tab.2

Values in Bar(g)

The slam shut valve can be calibrated for pressure increase, **over pressure shut off (OPSO)** and/or for pressure drop, **under pressure shut off (UPSO)**.

The two intervention modes can be tuned independently, using the dedicated calibration springs: a spring for the intervention of maximum pressure and a second spring for the intervention of minimum pressure.

The choice between the two models - SB/82 and HB/97 - depends on the size of the regulator and on the maximum instantaneous flow rate to be provided.

In general, up to a diameter of DN 80 (3") included, the valve model SB/82 only is mounted; while, for greater sizes, it is necessary to assess whether it is suitable to mount the model HB/97 instead of model SB/82.

For in-depth assessments, please contact our technical and sales department.

The slam shut device incorporated in the regulators causes a reduction of the coefficients Cg and Kg equal to about 7% of the value of the basic regulator.

## Monitor incorporated PM/819

The **MONITOR REGULATOR** is a safety accessory whose task is that of performing the functions of the service regulator in case of failure of the main regulator.

This is a regulator that is normally in fully open position during normal operation of the operating regulator.

It is generally installed following the gas flow direction, upstream of another pressure regulator that acts as OPERATING regulator

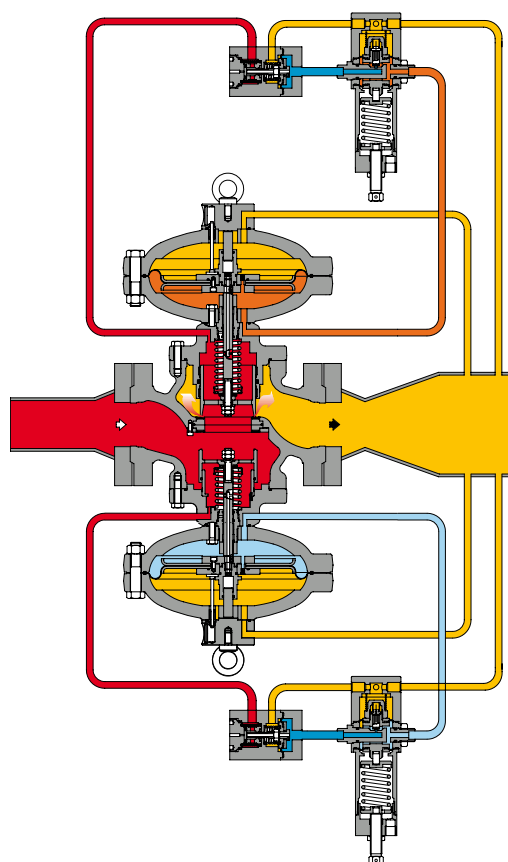


Fig.5

**REFLUX 819** - With monitor incorporated

In this specific case, the Monitor **PM/819** is mounted on the same body of the operating regulator but it is provided with its own sealing seat, piloting system and an independent motorization.

The functional characteristics of the **Monitor PM/819** are the same of the basic regulator **REFLUX 819**

The assembly **REFLUX 819** with **Monitor PM/819** is characterized by equivalent coefficients  $C_g$  and  $K_G$  reduced by **7%** compared to those of the basic regulator.

This solution allows creating reduction lines featuring very small overall dimensions and lower pressure drops compared to the traditional solution of the two regulators installed in line.



## In-line Monitor

In this solution, the Monitor regulator and Operating one are installed in series.

Fig. 6 represents the traditional solution where the monitor is usually installed upstream and the operating regulator is installed downstream (following the gas flow direction).

The Monitor regulator is set at a value that is slightly higher than the calibration set-point of the Operating regulator.

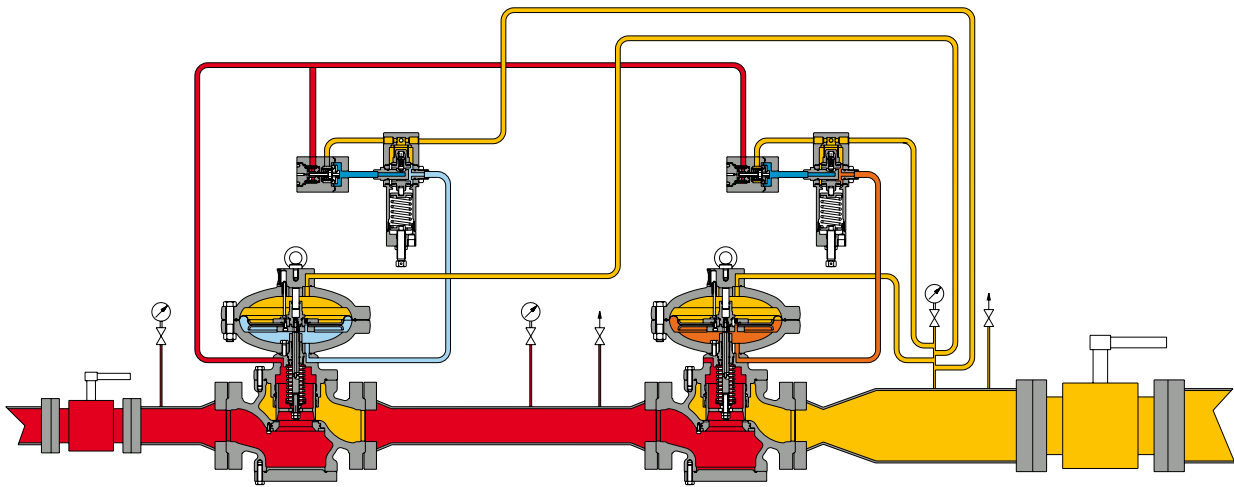


Fig.6

**REFLUX 819** - Solution with in-line monitor

## Optional

### For the pressure regulators:

- Stroke limiters
- Devices for flow rate limitation
- Limit switches
- Position transmitters
- Steel fittings, single or dual sealing

### For the pilot circuit

- M/A Accelerators
- R14/A/S Preregulator for the high pressure circuit ( $P > 12$  bar)
- Heating cable for preheating pilot circuit
- Electrical Heater
- Supplementary Filter CF 14
- Dehydrating Filter CF 14/D
- Fluid Control 896, Pilots for modulation of pressure adjustment
- .../F.I.O. SMART unit for remote adjustment

## Sizing of pressure Regulator

In general, the choice of a regulator is made based on the calculation of the flow rate determined by the use of formulas and on the flow rate coefficients (Cg or KG) as indicated by the EN 334 standard.

For the sizing of the involved regulators, kindly refer to our website: [www.fiorentini.com/sizing](http://www.fiorentini.com/sizing).

For different gases and for natural gas with a different density than 0.61 shall be applied the correction coefficients resulting from the following formula:

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

S = relative density to air  
t = gas temperature [°C]

Correction factors FC		
Type of gas	Relative density (S)	Fc factor
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

Tab.3

The chart shows the correction factors FC valid for above mentioned gas at 15 °C and to the declared relative density.

Flow rate conversion			
Stm <sup>3</sup> /h	x	0,94795	= Nm <sup>3</sup> /h

Tab.4

### CAUTION:

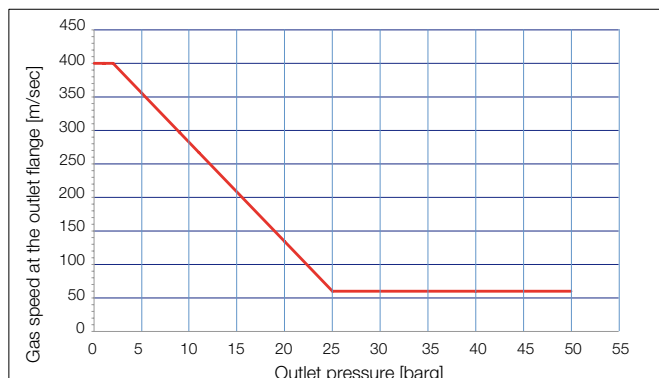
In order to get optimal performance, to avoid premature erosion phenomena and to limit noise emissions, it is recommended to check that gas speed at the outlet flange does not exceed the values of the graph below.

The gas speed at the outlet flange may be calculated by means of the following formula:

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

### where:

- V** = gas speed in m/sec
- Q** = gas flow rate in Stm<sup>3</sup>/h
- DN** = nominal size of regulator in mm
- Pd** = outlet pressure in barg.



## TYPICAL CONNECTION DIAGRAMS

The following examples are provided as a recommendation to get the best performance from the regulator **REFLUX 819**.

### IN-LINE INSTALLATION

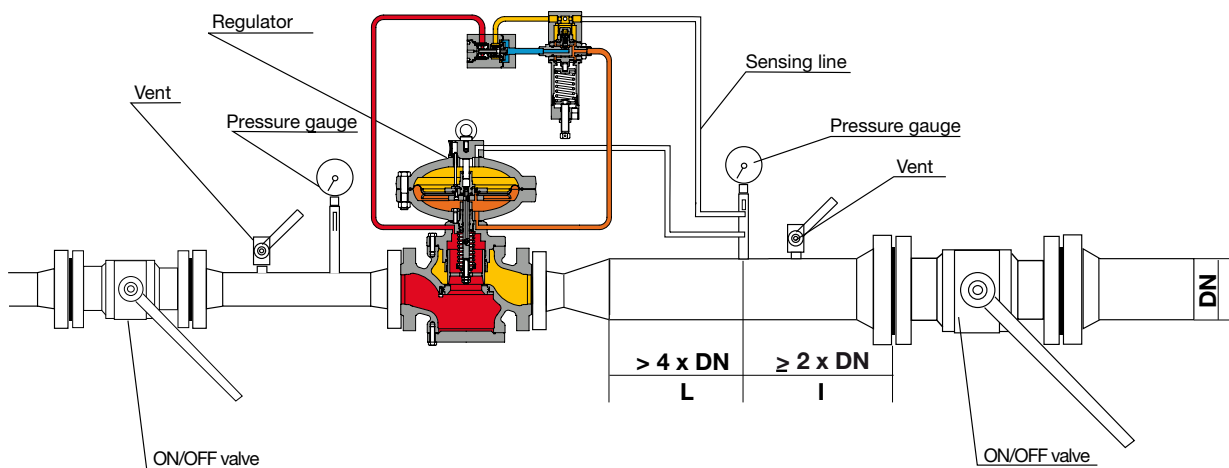
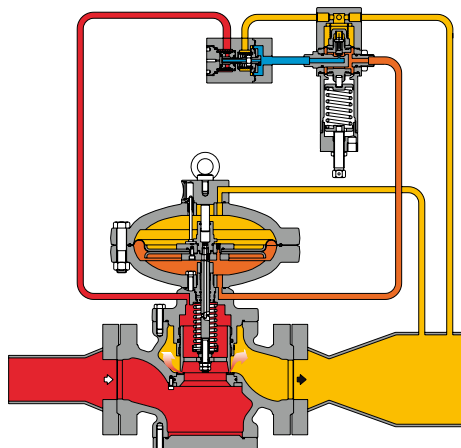


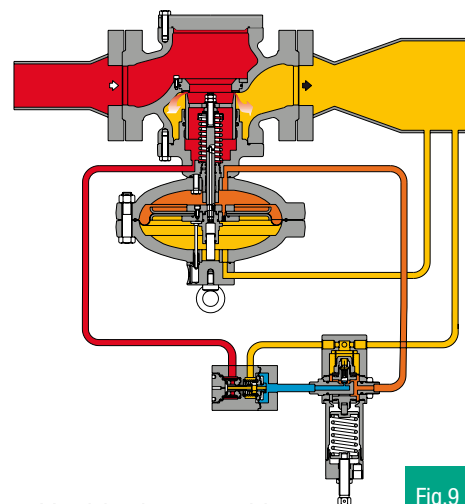
Fig.7

## RECOMMENDED INSTALLATIONS





Standard position



Fig.8





Upside down position

Fig.9

 Inlet pressure  
 Outlet pressure

 Motorization  
 Motorization Monitor

 Control Feed  
 Pilot Feed

## RECOMMENDED INSTALLATIONS

### Regulator Reflux 819 with incorporated Monitor PM/819

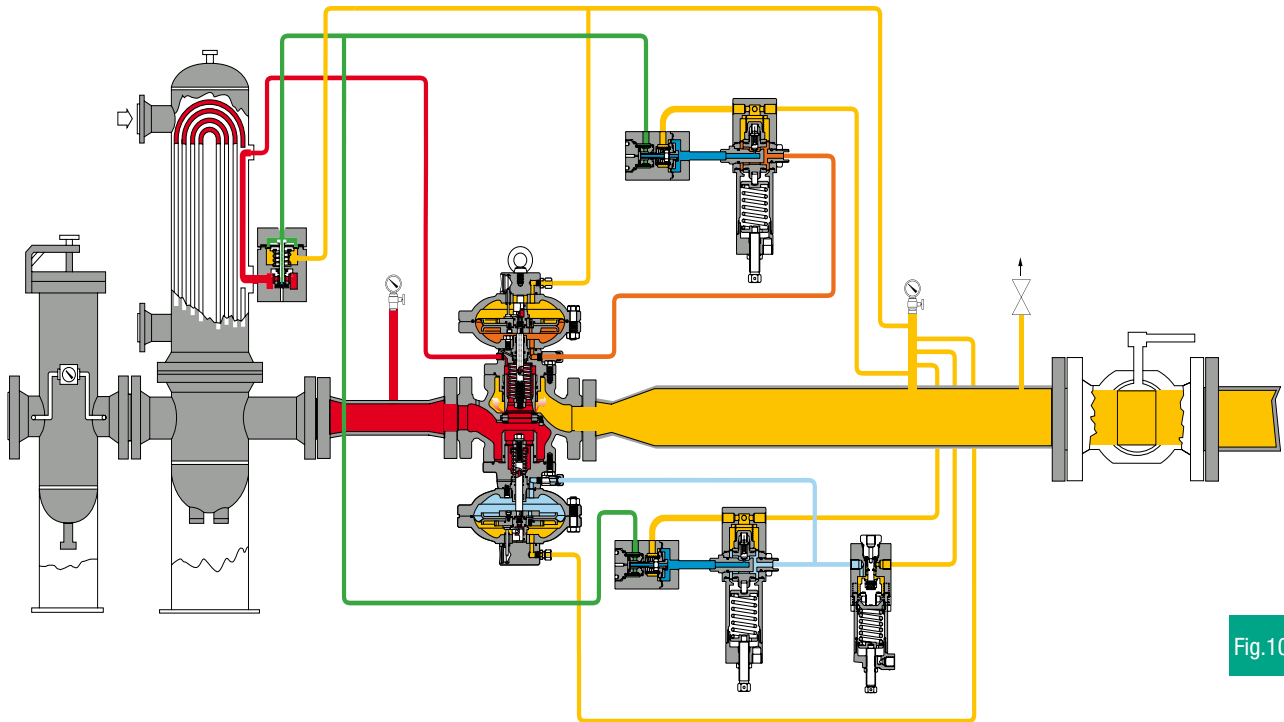


Fig.10

### Slam Shut SBC 782 and Reflux 819 pressure regulator with incorporated slam shut device SB82

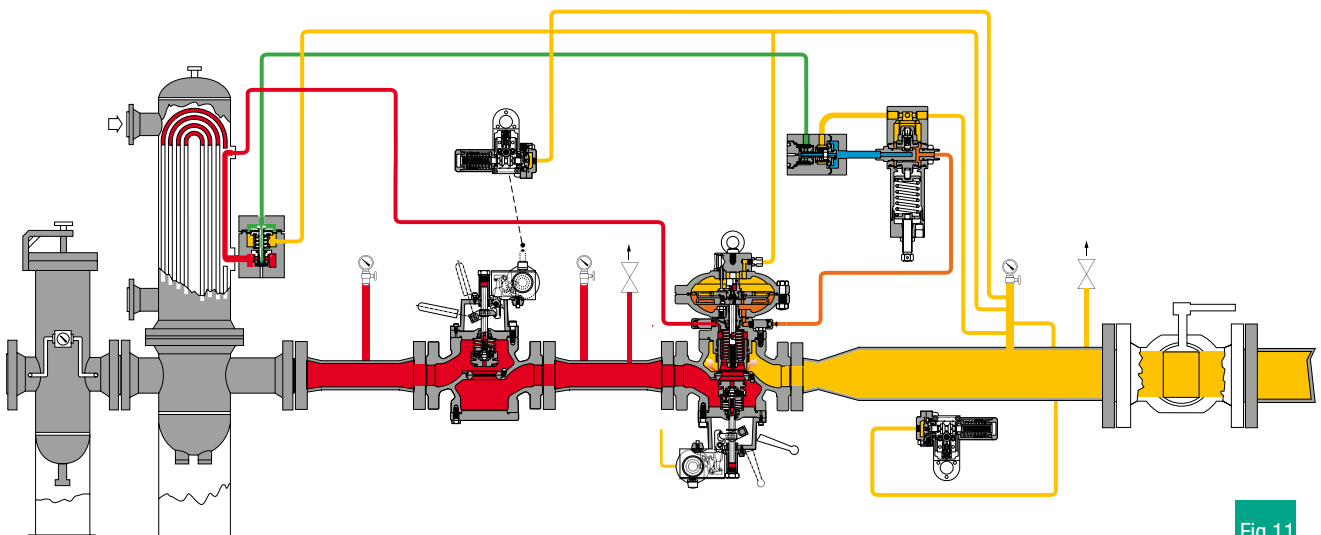


Fig.11

**Monitor Reflex 819 with incorporated slum shut HB/97 and operating pressure regulator Reflex 819**

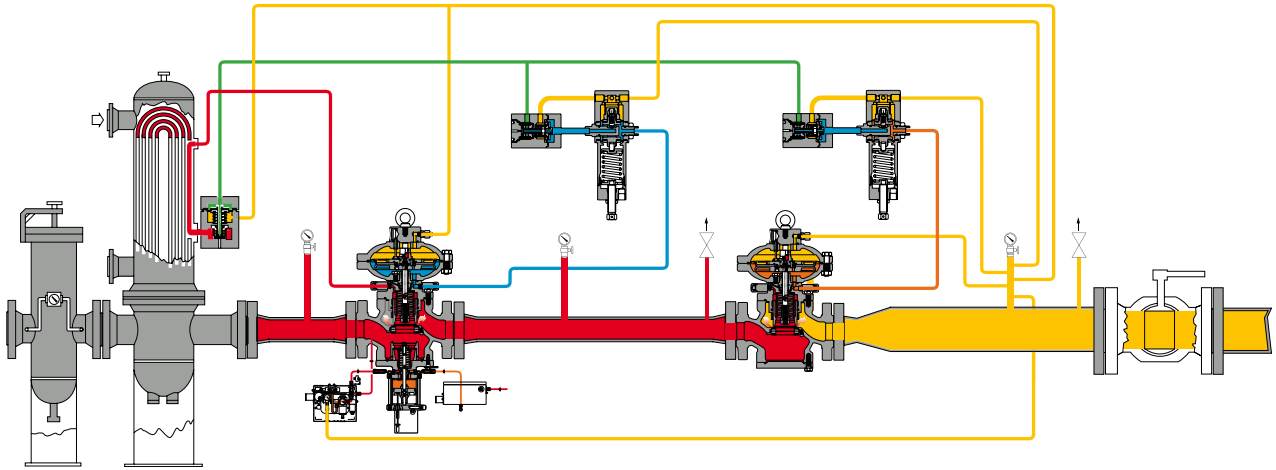


Fig.12

**Pressure regulator operating monitor Reflex 819 and operating pressure regulator Reflex 819**

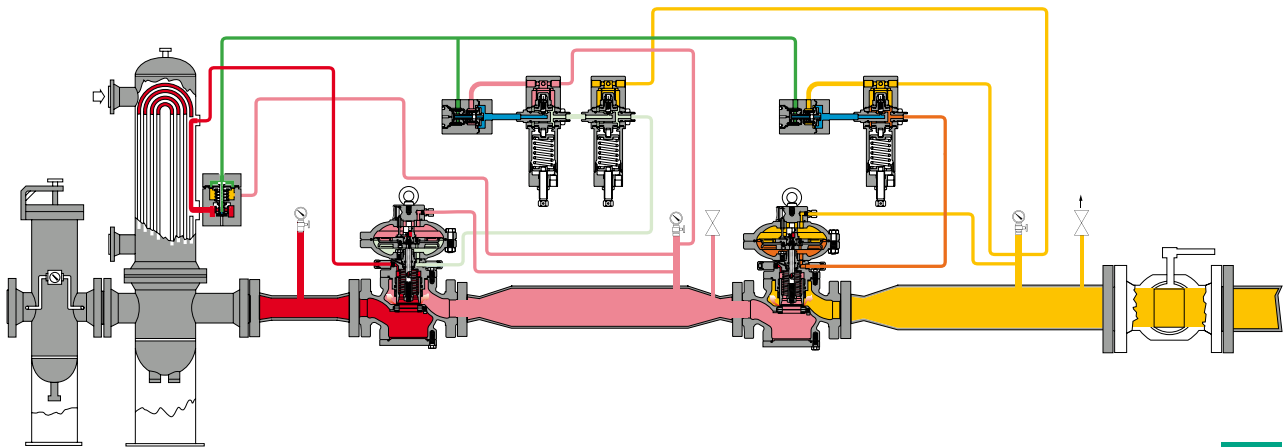


Fig.13

## REFLUX 819

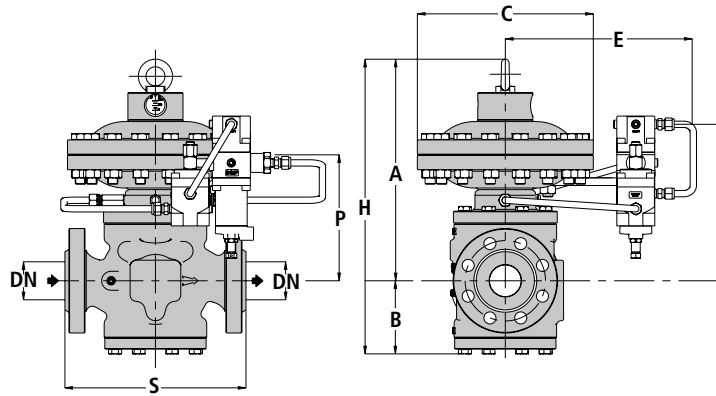


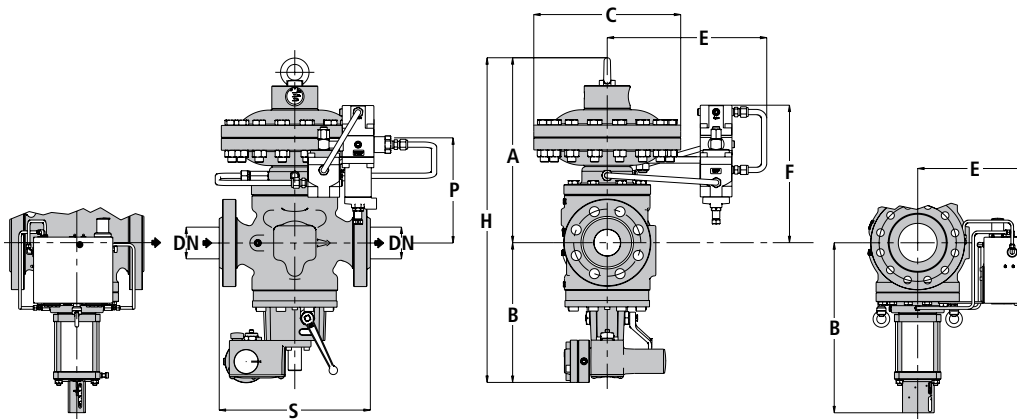
Fig.14

Dimensions								
Millimeters	25	50	80	100	150	200	250	300
Inches	1"	2"	3"	4"	6"	8"	10"	12"
<b>S - Ansi 150/PN 16</b>	184	254	298	352	451	543	673	737
<b>S - Ansi 300</b>	197	267	317	368	473	568	708	775
<b>S - Ansi 600</b>	210	286	336	394	508	609	752	819
<b>A</b>	320	350	430	490	650	750	800	950
<b>B</b>	100	130	150	190	225	265	340	372
<b>C</b>	278	278	360	360	510	510	610	718
<b>E</b>	310	310	320	320	420	420	470	500
<b>F</b>	260	290	350	380	410	460	560	645
<b>H</b>	420	480	580	680	875	1015	1240	1300
<b>P</b>	170	200	260	290	320	370	500	630
								Tab.5

**Pneumatic fittings;** 10x8mm

Dimensions S according to EN 334 and IEC 534-3

Weight in Kg								
<b>Ansi 150/PN 16</b>	44	61	105	146	308	408	900	1335
<b>Ansi 300</b>	45	62	109	156	345	470	950	1410
<b>Ansi 600</b>	46	64	112	165	360	495	1000	1490
								Tab.6

**REFLUX 819 + SB/82 or HB/97**

**Fig.15**
**Dimensions**

Millimeters	25	50	80	100		150		200		250		300	
Inches	1"	2"	3"	4"		6"		8"		10"		12"	
<b>S - Ansi 150/PN 16</b>	184	254	298	352		451		543		673			737*
<b>S - Ansi 300</b>	197	267	317	368		473		568		708			775*
<b>S - Ansi 600</b>	210	286	336	394		508		609		752			819*
<b>A</b>	320	350	430	490		650		750		800			928*
<b>B</b>	215	240	270	300	518*	375	645*	450	687*	530	796*		940*
<b>C</b>	278	278	360	360		510		510		610			717,5*
<b>E</b>	310	310	320	320	358*	420	410*	420	445*	470	510*		530*
<b>F</b>	260	290	350	380		410		460		560			644*
<b>H</b>	535	590	700	790		1025		1200		1330			1860*
<b>P</b>	170	200	260	290		320		370		500			630*

Tab.7

**Pneumatic fittings:** 10x8mm

\* Weights &amp; dimensions with HB/97.

Dimensions S according to EN 334 and IEC 534-3.

**Weight in Kg**

<b>Ansi 150/PN 16</b>	53	71	115	160		320		460		950			1615*
<b>Ansi 300</b>	55	73	122	171	179*	365	406*	525	558*	1000	1079*		1690*
<b>Ansi 600</b>	56	75	125	180	191*	380	432*	550	584*	1050	1099*		1770*

Tab.8

## REFLUX 819 + PM/819

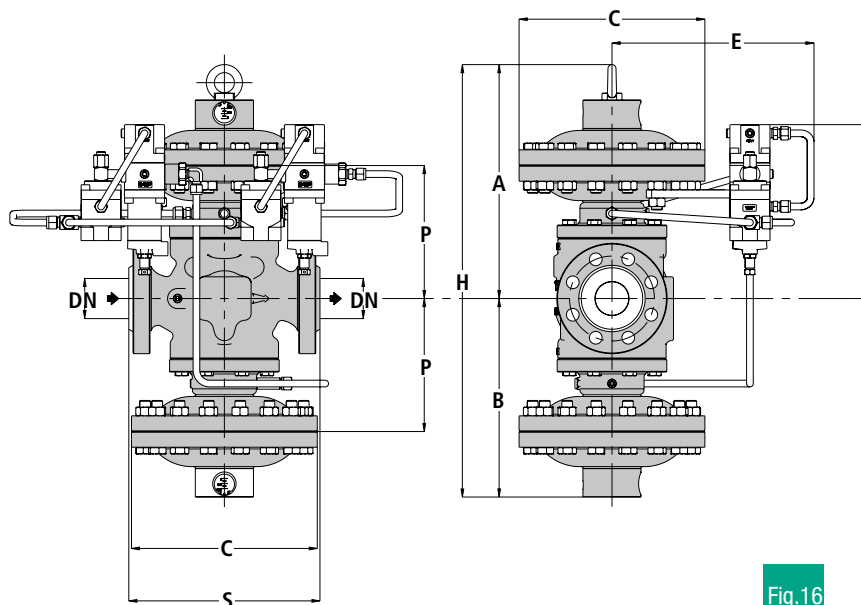


Fig.16

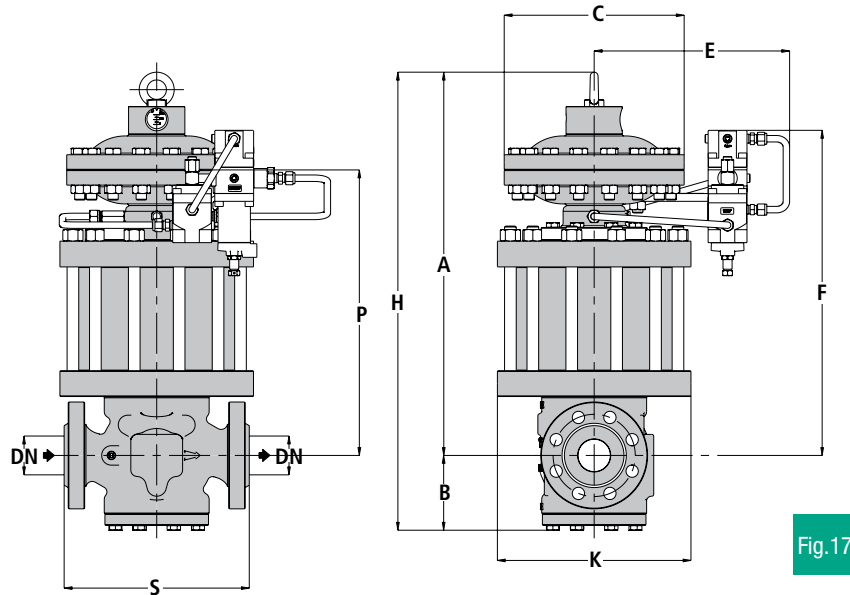
Dimensions							
Millimeters	25	50	80	100	150	200	250
Inches	1"	2"	3"	4"	6"	8"	10"
<b>S - Ansi 150/PN 16</b>	184	254	298	352	451	543	673
<b>S - Ansi 300</b>	197	267	317	368	473	568	708
<b>S - Ansi 600</b>	210	286	336	394	508	609	752
<b>A</b>	320	350	430	490	650	750	800
<b>B</b>	320	350	430	490	650	750	800
<b>C</b>	278	278	360	360	510	510	610
<b>E</b>	310	310	320	320	420	420	470
<b>F</b>	260	290	350	380	410	460	560
<b>H</b>	640	700	860	980	1300	1500	1600
<b>P</b>	170	200	260	290	320	370	500
							Tab.9

**Pneumatic fittings:** 10x8mm

Dimensions S according to EN 334 and IEC 534-3

Weight in Kg							
<b>Ansi 150/PN 16</b>	84	105	180	245	517	670	1400
<b>Ansi 300</b>	85	106	184	255	554	731	1450
<b>Ansi 600</b>	86	108	187	264	569	756	1500
							Tab.10



**REFLUX 819 + DB/819**

**Fig.17**
**Dimensions**

Millimeters	25	50	80	100	150	200	250	300
Inches	1"	2"	3"	4"	6"	8"	10"	12"
<b>S - Ansi 150/PN 16</b>	184	254	298	352	451	543	673	737
<b>S - Ansi 300</b>	197	267	317	368	473	568	708	775
<b>S - Ansi 600</b>	210	286	336	394	508	609	752	819
<b>A</b>	520	575	700	800	935	1085	1300	1505
<b>B</b>	100	130	150	190	225	265	340	372
<b>C</b>	278	278	360	360	510	510	610	718
<b>E</b>	310	310	320	320	420	420	470	500
<b>F</b>	425	495	615	670	795	895	1100	1220
<b>H</b>	620	705	850	990	1160	1350	1640	1877
<b>P</b>	370	400	505	585	690	770	1000	1205
<b>K</b>	220	300	330	390	480	595	695	745

**Tab.11**
**Pneumatic fittings:** 10x8mm

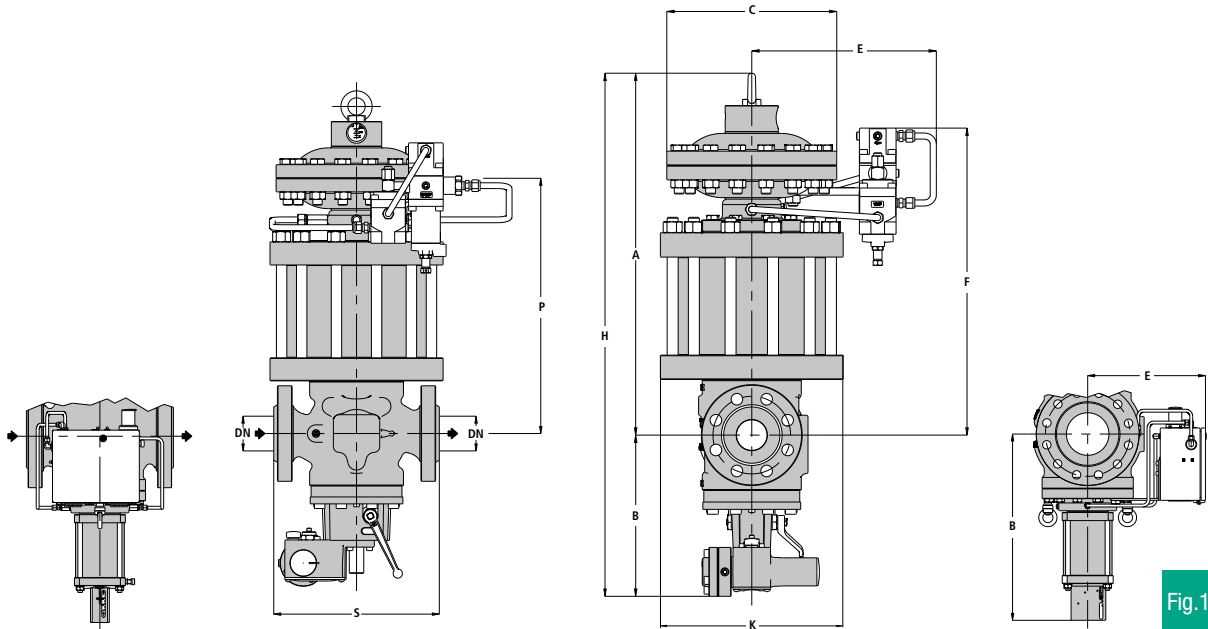
Dimensions S according to EN 334 and IEC 534-3

**Weight in Kg**

<b>Ansi 150/PN 16</b>	70	126	195	260	565	835	1280	2035
<b>Ansi 300</b>	72	128	204	289	608	925	1380	1230
<b>Ansi 600</b>	73	130	207	298	640	950	1430	2310

**Tab.12**

**REFLUX 819 + DB/819+SB/82 or HB/97**



**Fig.18**

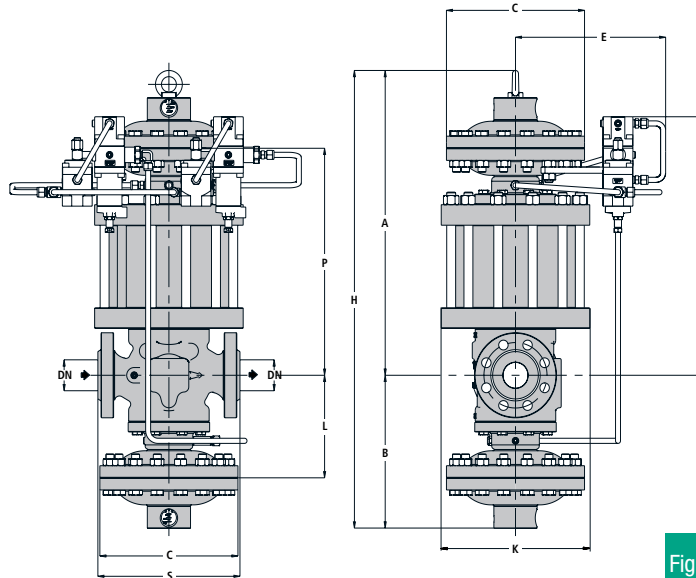
Dimensions												
Millimeters	25	50	80	100	150	200	250	300				
Inches	1"	2"	3"	4"	6"	8"	10"	12"				
<b>S - Ansi 150/PN 16</b>	184	254	298	352	451	543	673				737*	
<b>S - Ansi 300</b>	197	267	317	368	473	568	708				775*	
<b>S - Ansi 600</b>	210	286	336	394	508	609	752				819*	
<b>A</b>	520	575	700	800	935	1085	1300				1505*	
<b>B</b>	215	240	270	300	518*	375	645*	450	687*	530	796*	940*
<b>C</b>	278	278	360	360	510	510	610				718*	
<b>E</b>	310	310	320	320	358*	420	410*	420	445*	470	510*	530*
<b>F</b>	425	495	615	670	795	865	1100				1220*	
<b>H</b>	735	815	970	1100	1310	1535	1830				2445*	
<b>P</b>	370	400	505	575	690	770	1000				1205*	
<b>K</b>	220	300	330	390	480	595	695				745*	
											Tab.13	

**Pneumatic fittings:** 10x8mm

\* Weights & dimensions with HB/97.

Dimensions S according to EN 334 and IEC 534-3.

Weight in Kg												
<b>Ansi 150/PN 16</b>	79	136	205	274	577	887	1330					2315*
<b>Ansi 300</b>	82	139	217	304	318*	628	661*	980	1006*	1430	1761*	2503*
<b>Ansi 600</b>	83	141	220	313	330*	660	687*	1500	1022*	1480	1781*	2590*
											Tab.14	

**REFLUX 819 + DB/819 + PM/819**

**Fig.19**
**Dimensions**

Millimeters	25	50	80	100	150	200	250
Inches	1"	2"	3"	4"	6"	8"	10"
<b>S - Ansi 150/PN 16</b>	184	254	298	352	451	543	673
<b>S - Ansi 300</b>	197	267	317	368	473	568	708
<b>S - Ansi 600</b>	210	286	336	394	508	609	752
<b>A</b>	520	575	700	800	935	1085	1300
<b>B</b>	320	350	430	490	650	750	800
<b>C</b>	278	278	360	360	510	510	610
<b>E</b>	310	310	320	320	420	420	470
<b>F</b>	425	495	615	670	795	895	1100
<b>H</b>	840	925	1130	1290	1585	1835	2100
<b>P</b>	370	400	505	575	690	770	1000
<b>K</b>	220	300	330	390	480	595	695
							Tab.15

**Pneumatic fittings:** 10x8mm

Dimensions S according to EN 334 and IEC 534-3.

**Weight in Kg**

<b>Ansi 150/PN 16</b>	110	170	270	359	774	1097	1780
<b>Ansi 300</b>	112	172	267	388	783	1185	1880
<b>Ansi 600</b>	113	174	270	397	815	1210	1930
							Tab.16

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

