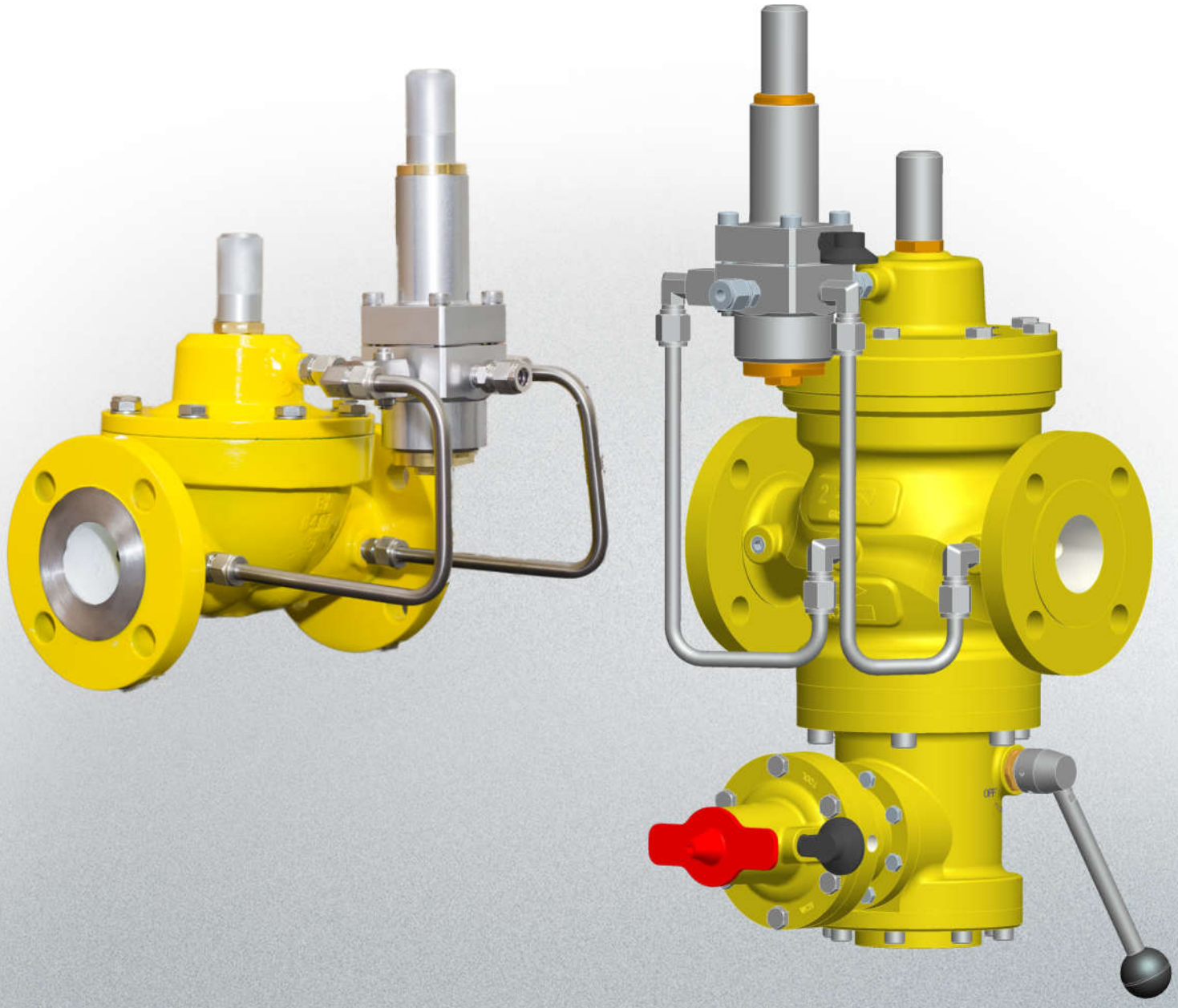
ARGOS

Pressure Regulator



GASCAT

INTRODUCTION

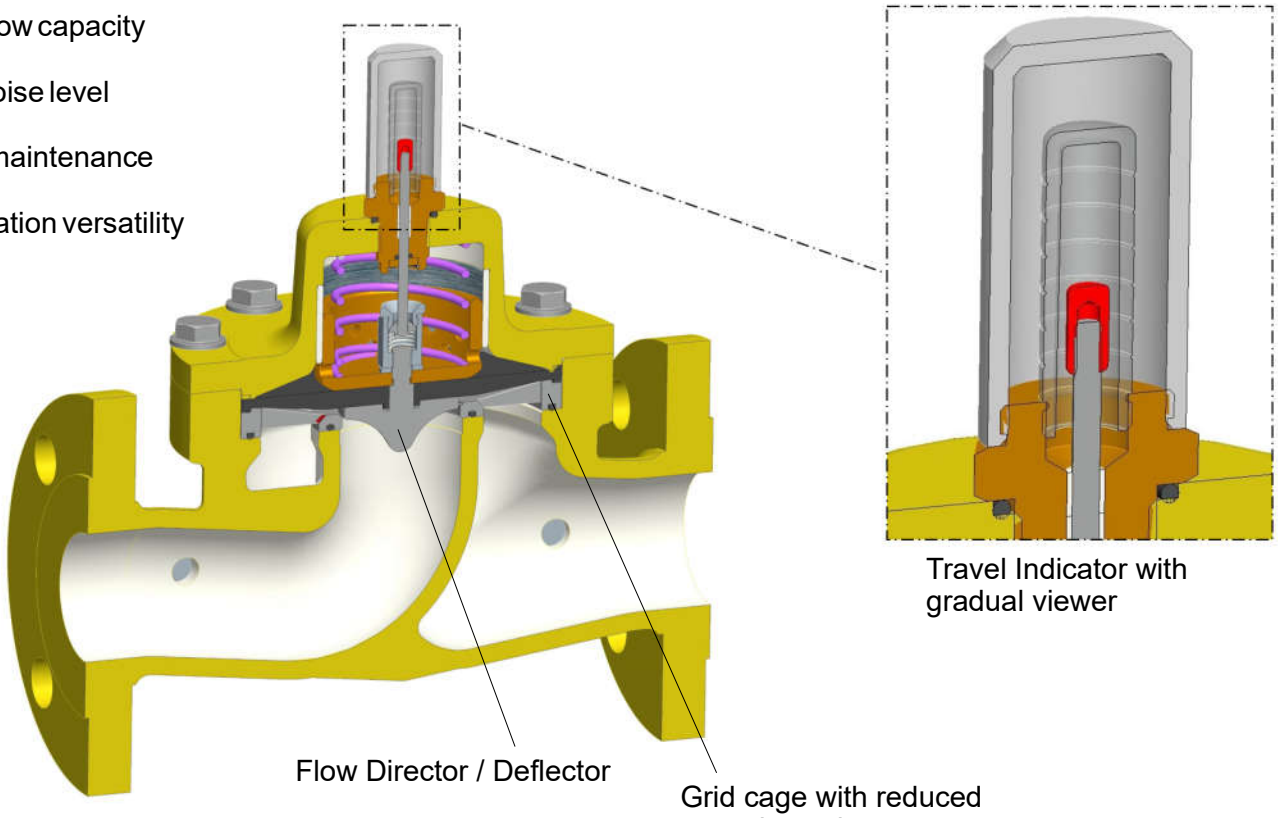
GASCAT's ARGOS is a pilot operated regulador developed for the ''easy to own and operate'' Natural gas Market. This regulator works extremely well at gate stations, as district regulators, and in industrial applications. It can be used as a single working regulator, a worker with a monitor, os as a two stages cut with monitor.

ARGOS has a top entry design allowing maintenance to be performed withpout removing the valve body from the pipe. It is designed with very internal components which minimizes the risk of operator error, while giving you a low cost of ownership.

It is also applicable in the most diverse industrial processes, both as an active regulator and/or monitor in natural gas stations for pressure regulation and applications in process gases such as Ar, Nitrogen and Argon.

GENERAL FEATURES

- High rangeability
- High flow capacity
- Low noise level
- Easy maintenance
- Application versatility



FLOW DIRECTOR

The Flow Director is part of the diaphragm assembly and has been specially designed by GASCAT's engineers to reduce the gas particles kinetic energy. It also redirects any foreign objects that may have entered the gas steam, keeping them from impacting the diaphragm.

TRAVEL INDICATOR

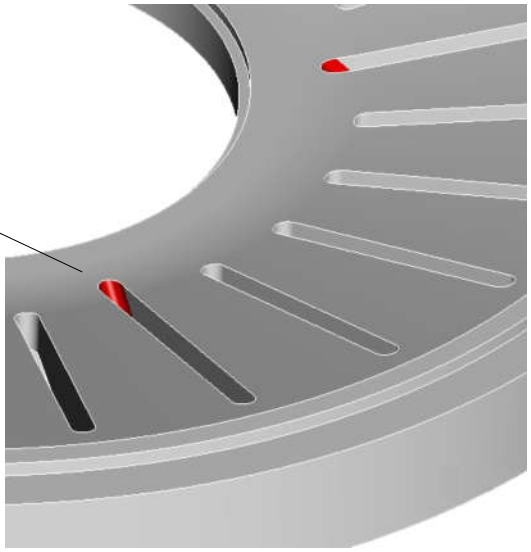
The optional travel indicator responds to the precise movement of the diaphragm and plug assembly and shows the actual valve position. The travel indicator makes in-service inspection and troubleshooting easy. Also, it can be used for remote alarming and monitoring stem position when combined with position monitor. (GASCAT should be consulted to available options).

GRELHA

The Grids cage applied on ARGOS regulators is trated in hard anodization, resulting in hard surface allowing a bigger longevity of the product. This process protects the cage againts corrosion, oxidation and wear by erosion.

The design of our new cage has 10% of its orifices longer than the others and has greater degree of inclination. This results in a very wide rangeability. These longer orifices allow the regulator to flow a very amall amount of gas when the diaphragm begins to open.

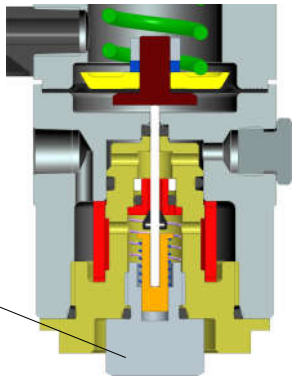
Specially designed longer orifices allow larger flow rangeability and increase the diaphragm life time



PILOTS

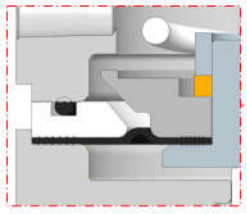
The pilots G30F and G32F model have a simple construction, with few internal parts reducing the amount of maintenance time and associated cost.

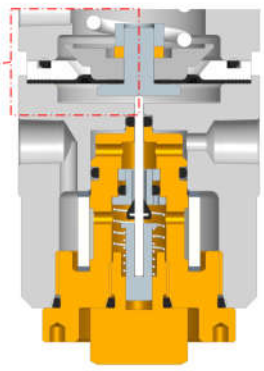
To protect the plug and seat assembly, they all have an internal 10 micron filter element.



G30F

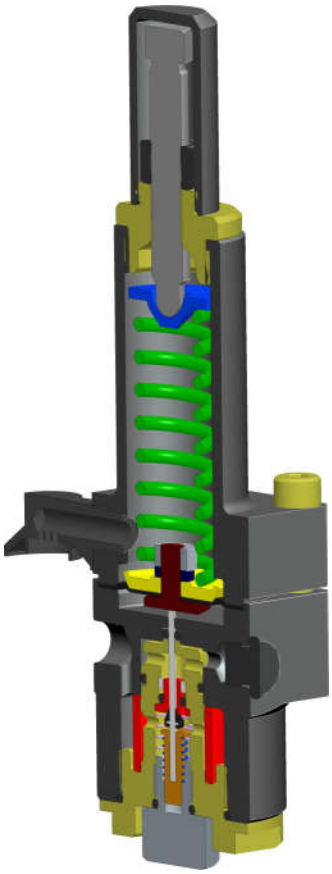
Easy acess to the shutter





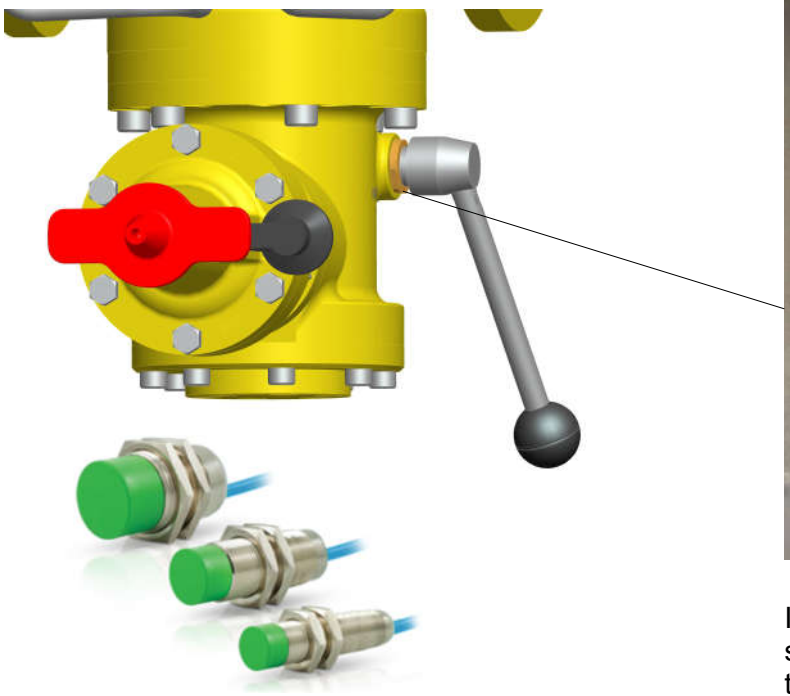
G32F

Reduced area



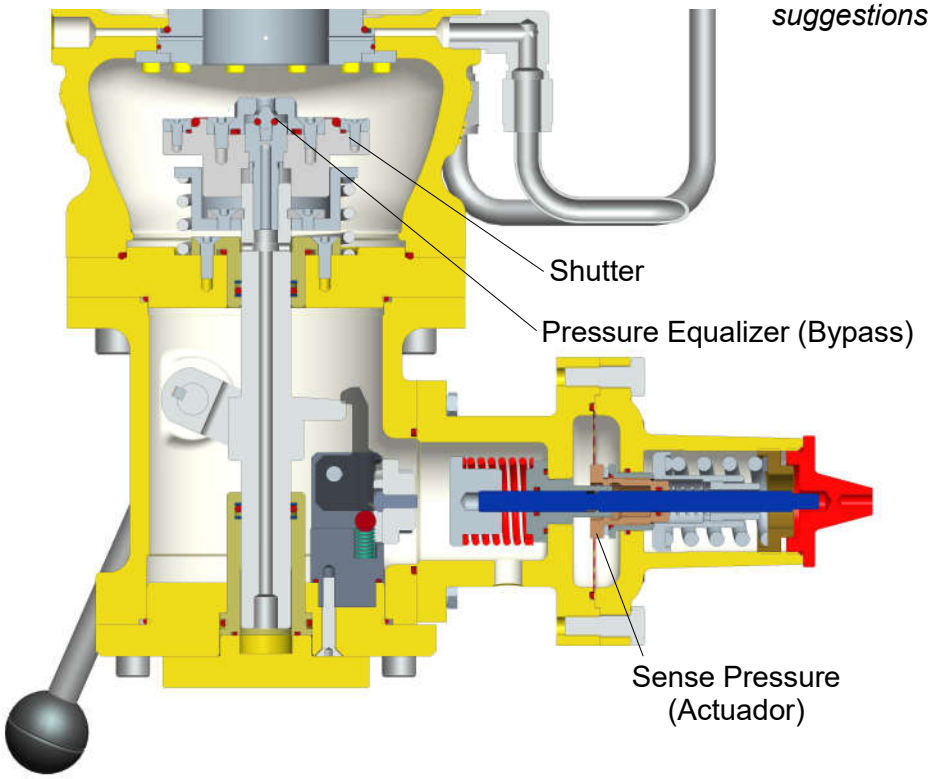
SLAM SHUT-OFF VALVE INCORPORATED

The built-in device SSV ARGOS has the function of interrupting the gas flow in order to protect the gas supply line and the upstream equipment from an unwanted increase in the working pressure. It has the fail close function, that is, it shutts the gas flow in the event of a rupture of the valve sensor element (diaphragm), or also in case of interruption of the gas supply or even with a high decrease or interruption of the sensing line. With this function (set at the factory) the shut-off valve meets the requirements of EN14382.



It is also possible to use it in a remote sensing system if combined with a limit switch sensor type.

(GASCAT should be consulted for suggestions on sensor models)

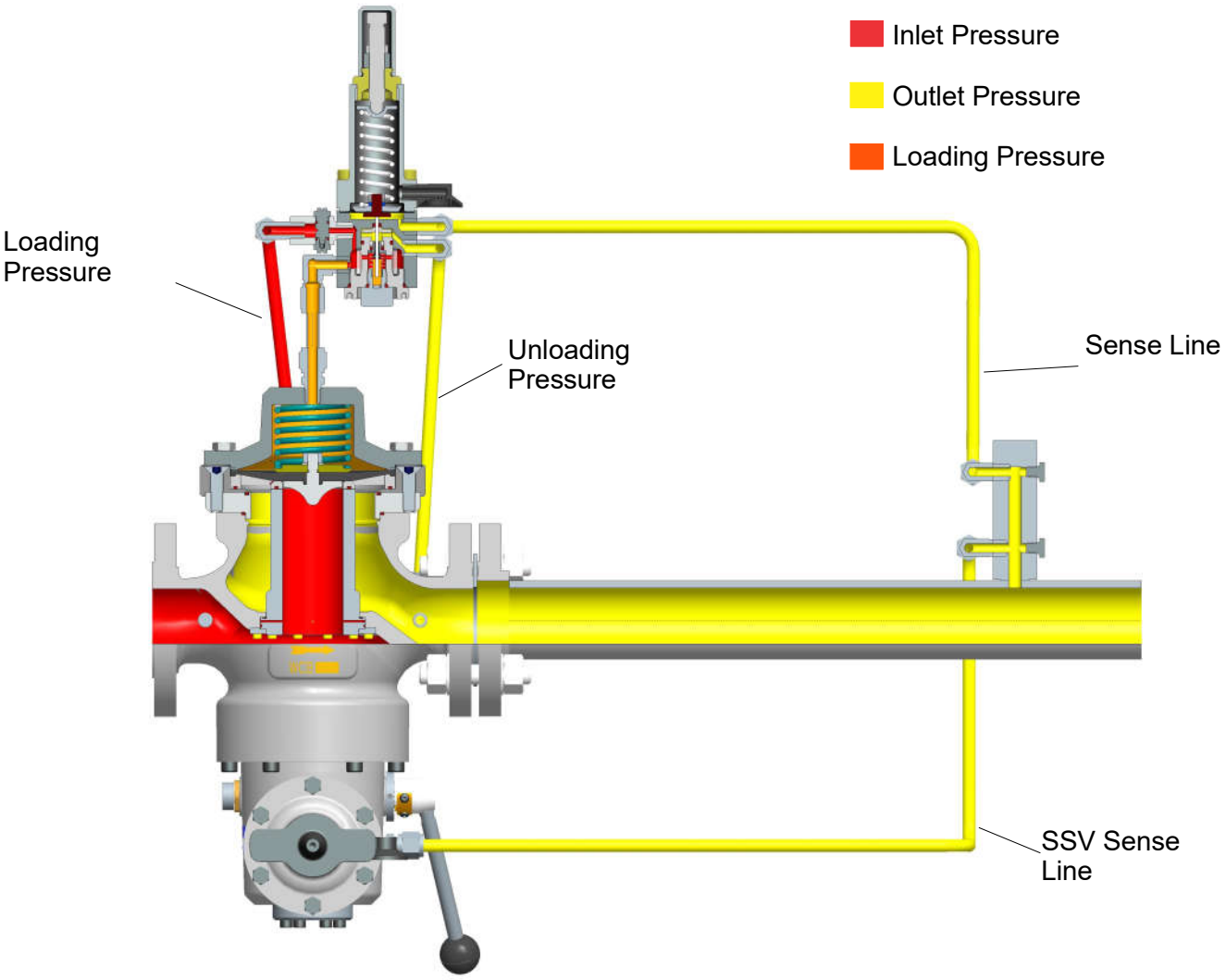


PRESSURE REGULATOR WORKING PRINCIPLE

The ARGOS pressure regulator operates by a changing the pressure in the valves upper chamber, the diaphragm chamber. This pressure is controled by one of the pilots in the GASCAT family of products

At no flow, the outlet pressure is greater then the pilot set point, closing the pilot and allowing full inlet pressure to build in the diaphragm chamber. This pressure in conjuntion with the main spring supplies enough force to overtake the pressure under the diaphragm, keeping the regulator closed.

When flow starts, the downstream pressure decrease and the pilot starts to open the valve by reducing the pressure in the diaphragm chamber. Once enough pressure is removed from the chamber, the pressure under the diaphragm will be higher, allowing it to lift the diaphragm and start flowing.

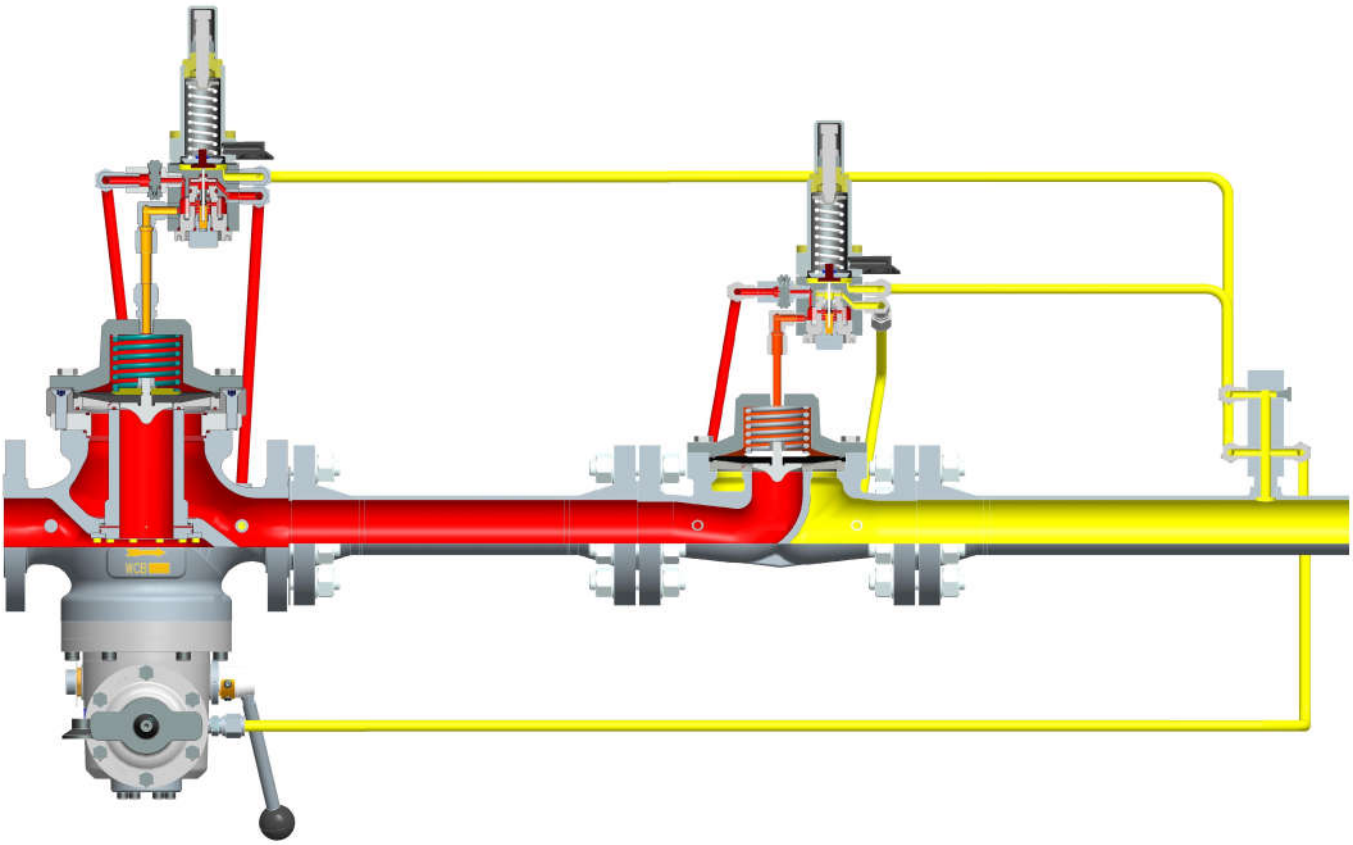


STANDBY MONITOR SYSTEM

In the standby monitor system, the working principle of the regulators are the same as explained on the previous page. The upstream regulator, the monitor stays in the open position because the pressure set point on its pilot is higher than the pilot on the active regulator. Both regulators sense the downstream pressure, and if the active regulator is operating properly, the monitor's pilot will never be satisfied, causing the monitor valve to open fully.

If a failure in the active regulator occurs causing an increase in the downstream pressure, the pilot on the monitor will sense this and start to close the monitor valve as the downstream pressure reaches its set point. the monitor will then become the active regulator until repairs are made.

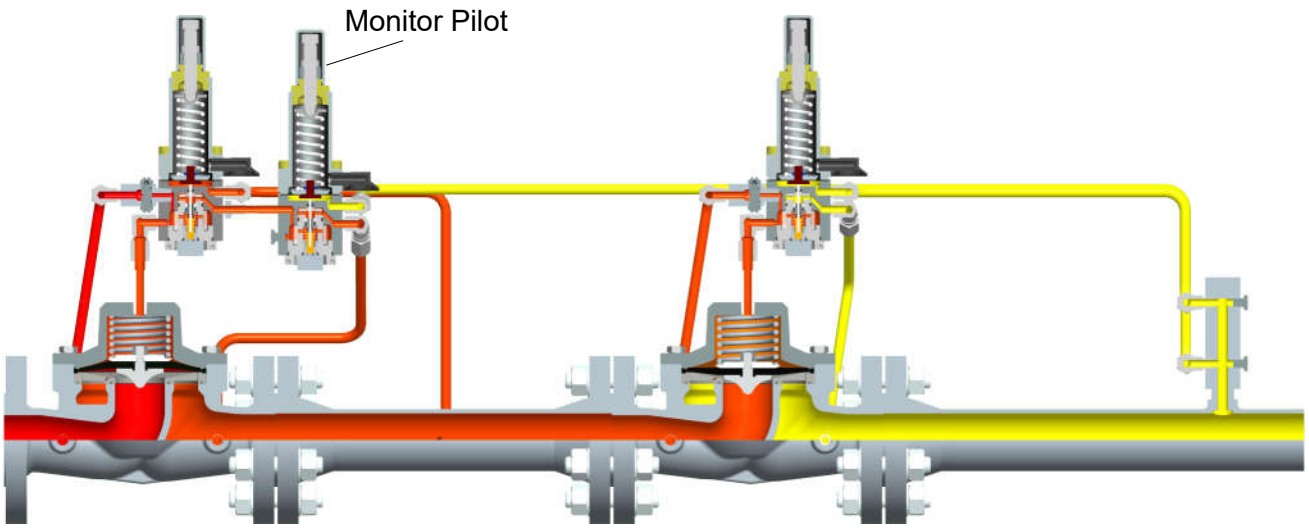
SISTEMA ATIVO / MONITOR



WORKING MONITOR SYSTEM

In the working monitor system both regulators are actively reducing the pressure. A second pilot is added to upstream regulator to act as a monitor for the second pressure cut.

The upstream regulator, or first stage, has a pilot with a set point for the initial pressure cut. The monitor pilot, connected in series with ther first stage pilot, has a set point slightky higher than the second pilot would start closing, causing pressure to build in the first stage diaphragm chamber, closing the first stage valve until the monitor pilot is satisfied.



SISTEMA LIMITADOR DE VAZÃO

Under normal conditions of process flow,, without excess that cause differential pressure over than pre-stablished value, the differential pressure monitor pilot remain opened, since there is a small drop pressure after the orifice plate.

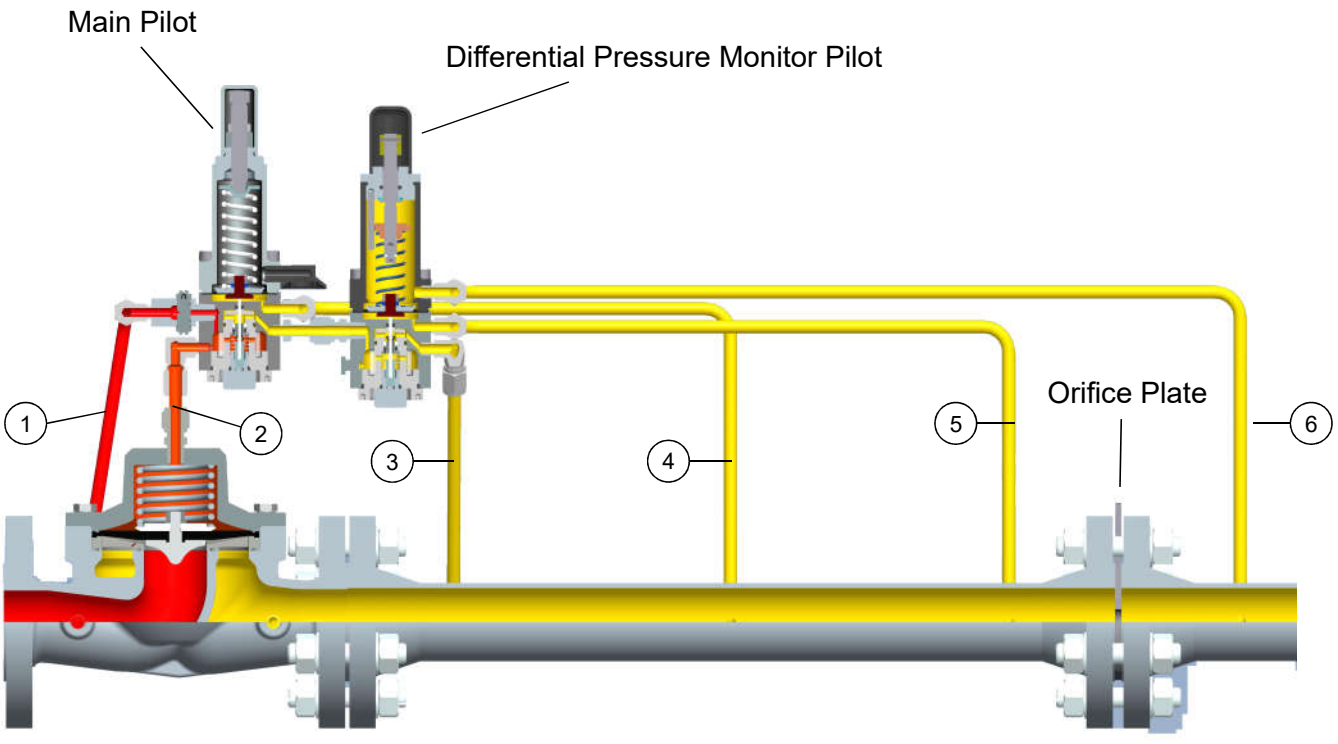
In this condition the main pilot is responsable for pressure regulating. It is sensing line (4) is connected before the orifice plate distant around 5~8 times the pipe size as in normal installations.

When there is gas consumption occurs lightly drop in the outlet pressure. This drop is trasnmitted to the pilot that feeds the diaphragm upper chamber of main valve and also reduce the pressure in this chamber. Then, the inlet pressure becomes superior than this pressure of upper chamber and main spring force and moves the diaphragm of main valve upward opening the main valve.

The pressure under the pilot diaphragm is the same of outlet pressure. In this set of pilots the discharge of outlet pressure is done by monitor pilot. This pilot discharges the pressure through discharging line (3) directly in the regulator body, because the discharging pressure of main pilot is lightly higher than the monitor pilot making it open when there is discharging.

Cesasing the gas consumption occur increase in the outlet pressure. This lightly increase in pressure is transmitted by the sensig line (4) to the lower chamber of main pilot diaphragm. Due of outlet pressure under the diaphragm set added to the obturator spring is over than the pilot regulating spring its set is moved upward. The obturator set is moved against the pilot set closing it.

In this condition, also occur the increase in pressure of diaphragm upper chamber of main valve. This increase added to the main spring force moves the diaphragm against the cage closing the main valve.



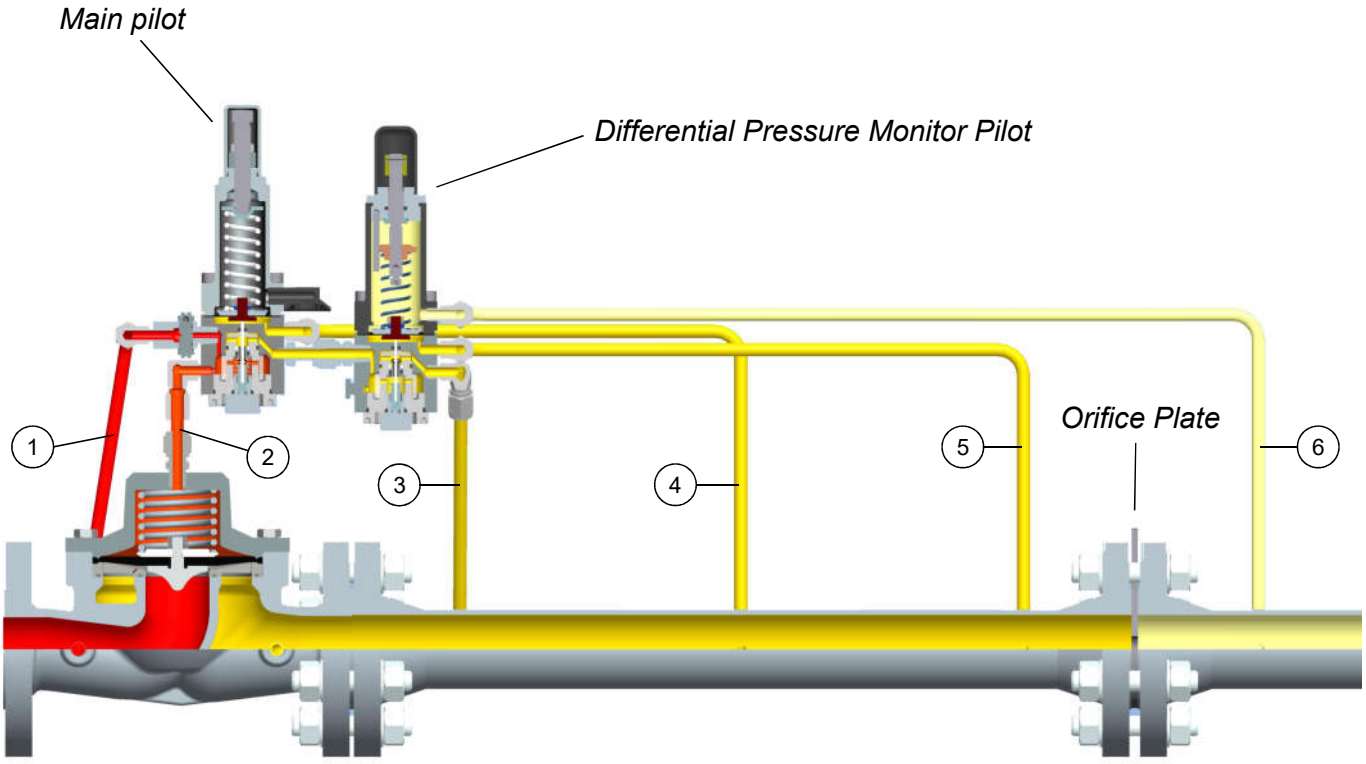
WORK PRINCIPLE WITH INCREASE IN DIFFERENTIAL PRESSURE

Considering that the gas volume consumed increase above the limit pre-agreed between the gas distributor and the user will occur an increase in the differential pressure of orifice plate. The limit of gas volume will be the same that determined differential pressure calculated by the orifice plate manufacturer. Then, achieving such value of differential pressure, it is known that the maximum gas volume of contract was achieved.

In this condition, the pressure in sensing line downstream the orifice plate decreases. This pressure drop is transmitted to the differential pressure monitor pilot that closes the gas passage and the discharging pressure.

As there is no pressure discharging the main pilot responsible for pressure regulating of the pressure regulator also closes increasing the pressure in the diaphragm upper chamber of main valve. The resultant force in this chamber is the force of main spring that moves the diaphragm set downward against the cage closing the main valve and interrupting the gas flow to the process.

Decreasing the gas volume consumed by the user the differential pressure in the orifice plate decreases and then the regulator start opening releasing the gas to the process automatically.



TECHNICAL CHARACTERISTICS

ARGOS REGULATOR	
COMPONENT	**MATERIAL**
BODY	Carbon Steel ASTM A216 Gr. WCB
COVER	
GRID	ALUMINIUM HARD ANODIZED*
ELASTOMERS	BUNA N

G30F/G32F PILOT	
COMPONENT	**MATERIAL**
BODY	ALUMINIUM ANODIZED
COVER	
SEAT	STAINLESS STEEL AISI 316
ELASTOMERS	BUNA N

** Surface hardness approximately 50HRC*
Notes: To other option materials, GASCAT should be consulted.

ND	CONNECTIONS	CLASS
1"	NPT-F (ANSI B.20.1) STD BSP (BS 21 - DIN2999) Optional	-
1", 2", 3", 4" e 6"	Flange ANSI B16.5	150#, 300# e 600#

Note: To other option connections, GASCAT should be consulted.

OPERATION LIMITS	
Maximmum Inlet Pressure	103 bar / 1500 psi
Outlet Pressure Range	0,7 - 63,5 bar / 10 - 920 psi
Shut-off Pressure Range	0,5 - 60 bar / 7,3 - 820 psi
Temperature Range	-20°C ~ +60ºC
AC - Regulator Accuracy Class	Up to ± 2.5%
SG - Lock up Pressure Class	Up to 5%
AG - Shut-off Acuraccy Class	Up to ± 2.5%

ADJUSTING RANGE			
SPRING RANGE		SPRING COLOR	PILOT
bar	psi		
0,7 - 2,8	10- 40	SILVER	G30F
2 - 5,5	29 - 80	GREEN	
4,5 - 14	65 - 203	RED	
7 - 18,3	101 - 265	BROWN	
14 - 32	203 - 464	BLACK	
28 - 63,5	406 - 920		G32F

SSV ADJUSTING RANGE			
SPRING RANGE		SPRING COLOR	ACTUADOR
bar	psi		
0,5 - 1,3	7,3- 18,8	PURPLE	H
1 - 5	14,5 - 73	RED	
4 - 11	58 - 160	YELLOW	
10 - 16	145 - 232	BROWN	PH
14 - 38	203 - 551	ZINCARED	
28 - 60	406 - 870	WHITE	

SIZING

The sizing of Argos regulator is done based in the considerations as follow:
•Definition according to inlet and outlet pressure fi it is a critic or
sub-critic flow;
• Convertion based on correction factor the flow value found if the process fluid is different of natural gas;
• Limitation of use of pressure regulator when the flow capacity is approximately 90%;
• For active / monitor configuration it should be considered reduction of 30% in regulators flow capacity;
• For working / monitor configuration size the set considering the two stages of pressure reduction and single stage when the upstream regulator assumes the total pressure reduction control.

And is calculated utilizing the short equations from Standard DIN EN 334 , where:

Q = Flow in Nm^3/h;
P1 = Inlet pressure in bar absolute;
P2 = Outlet pressure in bar absolute;
KG = Regulator flow coefficient.

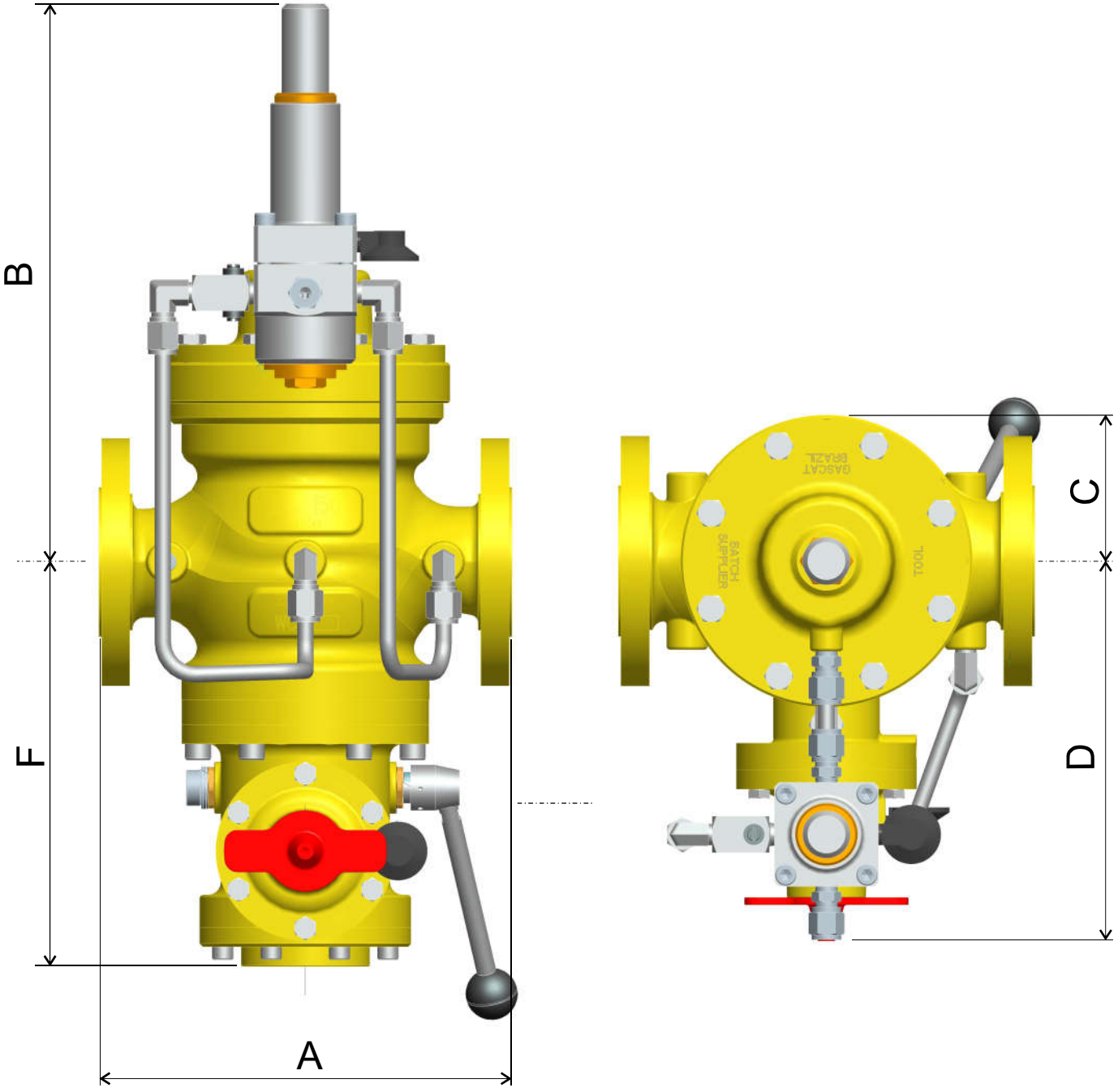
ND	KG / RESTRITORS	
	100%	50%
1''	420	210
2''	1500	750
3''	2900	1450
4''	6400	3200
6''	12500	6250

CRITICAL FLOW
$P_2 / P_1 < 0.53$
$Q = (KG \times P_1) / 2$

SUB-CRITICAL FLOW
$P_2 / P_1 \geq 0.53$
$Q = KG \times \sqrt{P_2 \times (P_1 - P_2)}$

DIMENSIONS AND WEIGHTS

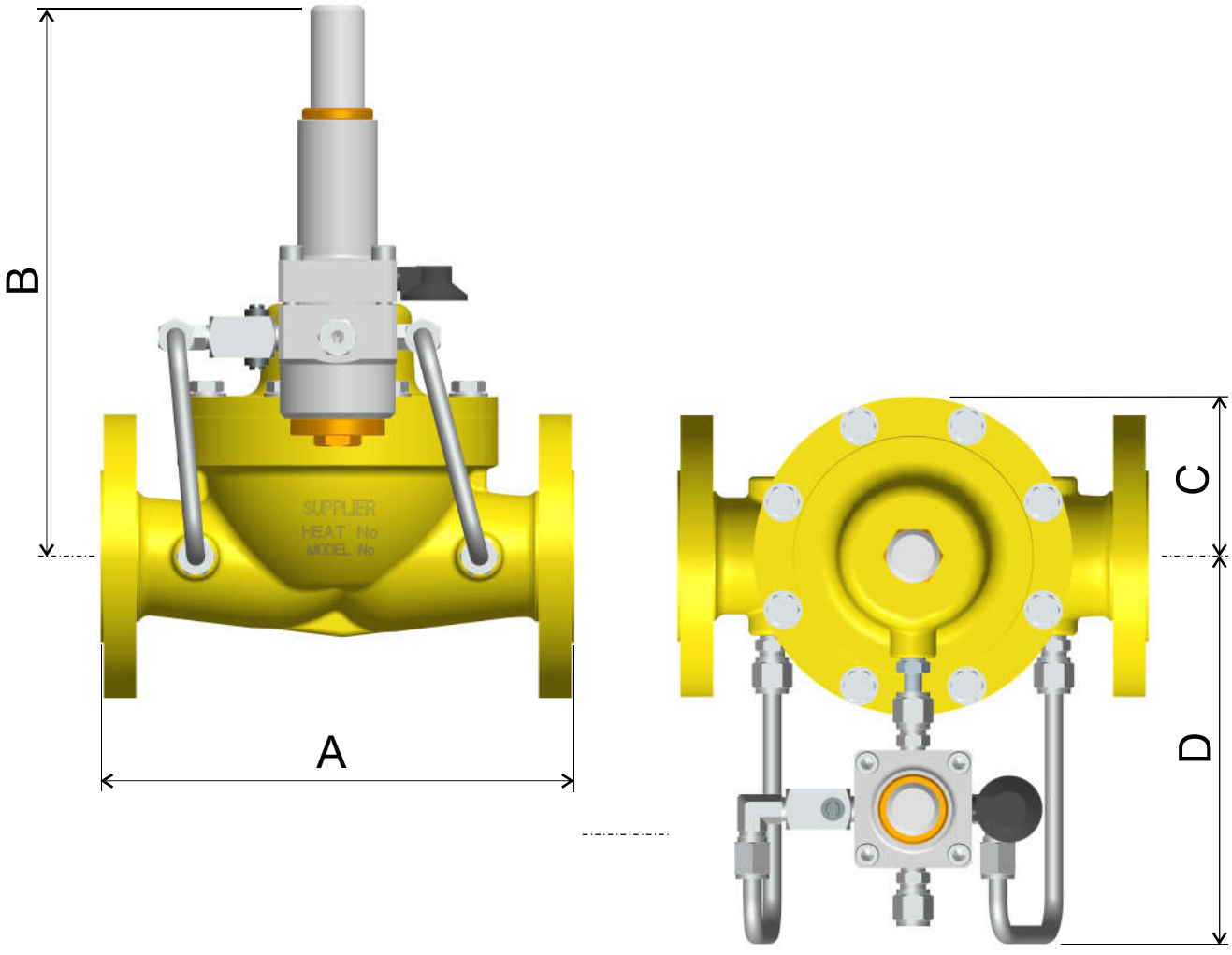
DIMENSIONS (mm)								WEIGHTS (kg)		
DN	A			B	C	D	F			
	150#	300#	600#					150#	300#	600#
1"	184	197	210	308	75	232	249	19	19.5	21
2”	254	267	286	345	83	210	250	25	26	28
3”	298	317	337	400	105	232	290	40	41	43
4”	352	368	394	430	140	245	314	55	57	59
6”	451	473	508	515	178	280	378	76	79	83



DIMENSIONS AND WEIGHTS

ND	DIMENSIONS (mm)						WEIGHTS (kg)		
	A			B	C	D			
	150#	300#	600#				150#	300#	600#
1"	184	197	210	265	61	190	11	11.5	13
2”	254	267	286	296	83	210	15	16	18
3”	298	317	337	370	105	242	28	29	31
4”	352	368	394	395	134	235	42	44	47
6”	451	473	508	480	178	260	61	64	70

Face-face - ND 1”-NPT-F - 203mm



GASCAT

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