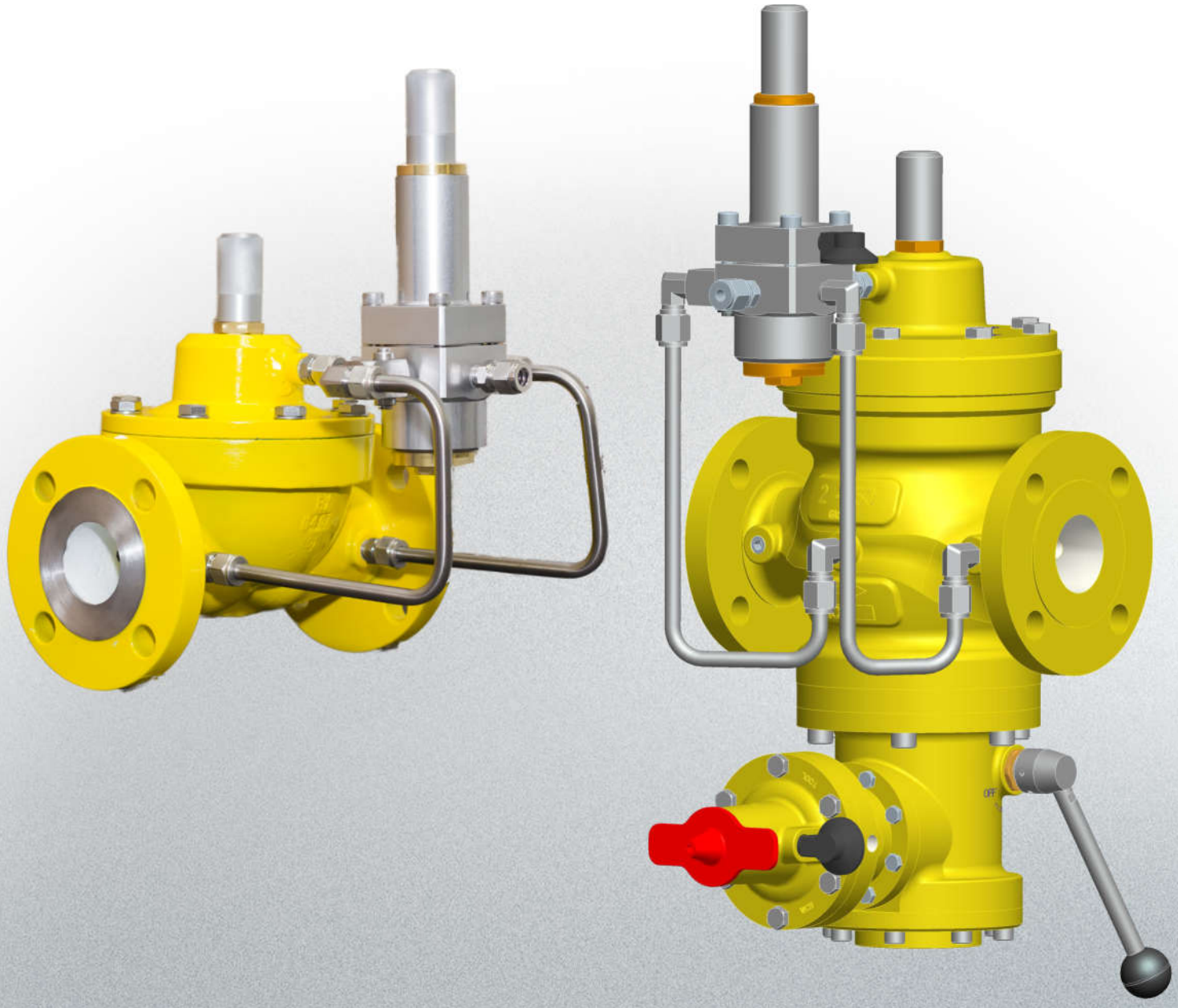
ARGOS

Pressure Regulator



GASCAT

INTRODUCTION

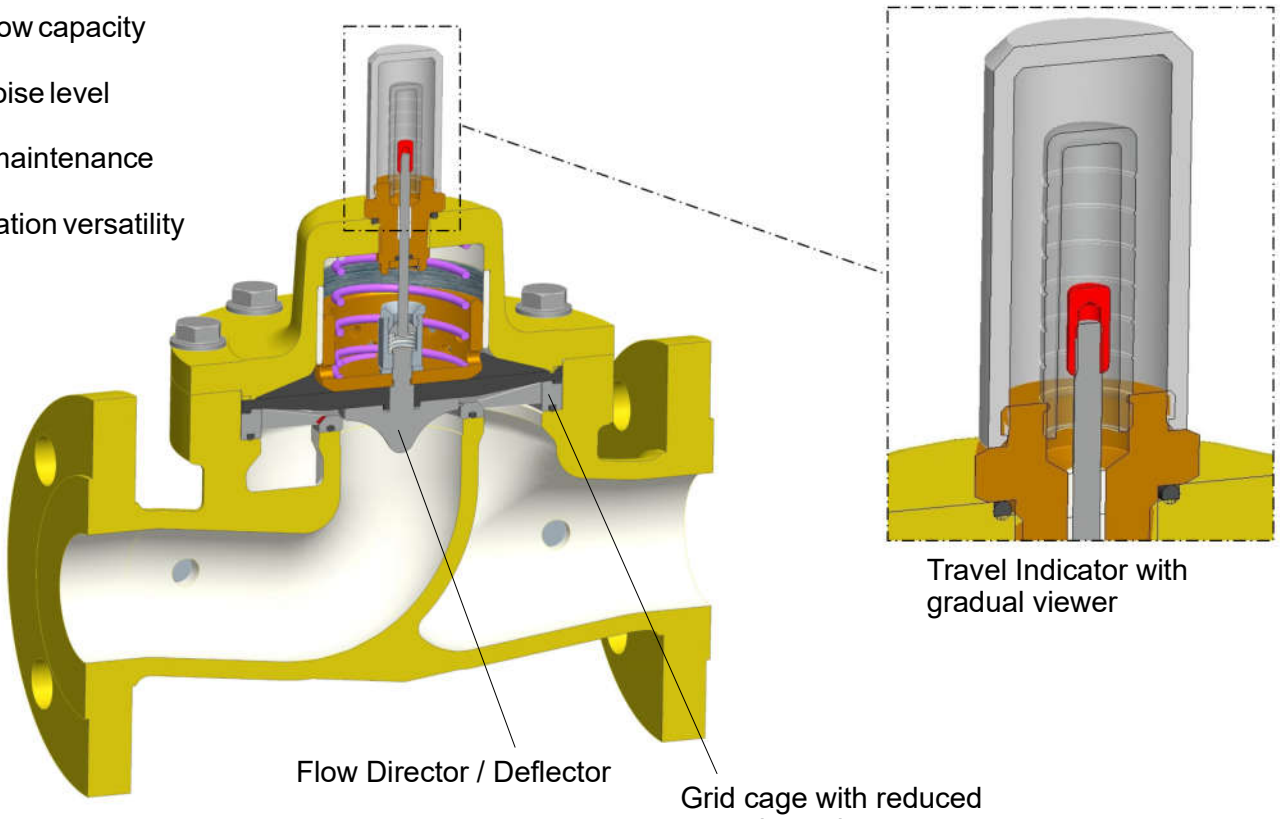
GASCAT's ARGOS is a pilot operated regulador developed for the ''easy to own and operate'' Natural gas Market. This regulator works extremely well at gate stations, as district regulators, and in industrial applications. It can be used as a single working regulator, a worker with a monitor, os as a two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

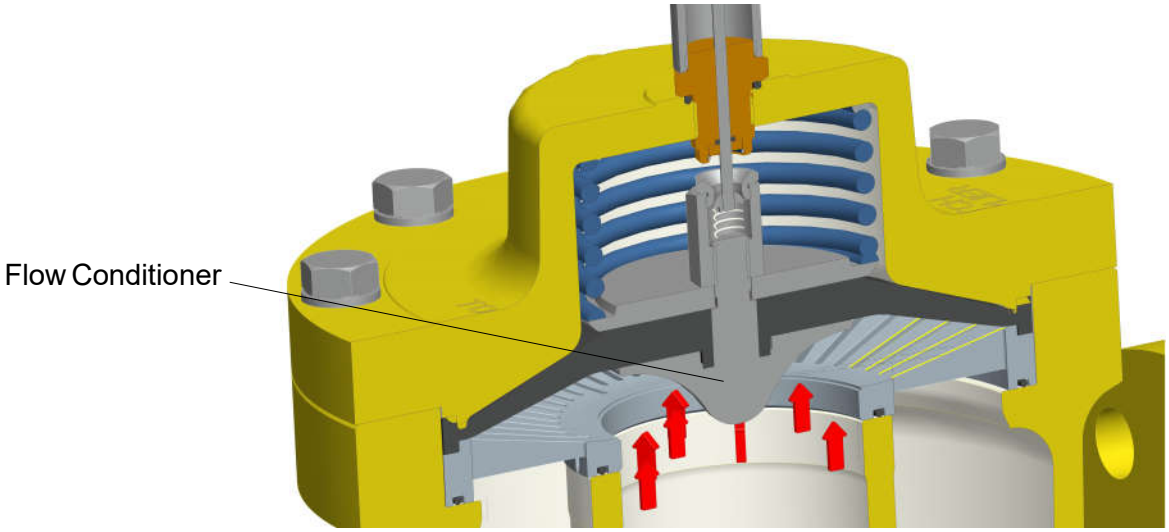


TRAVEL INDICATOR

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).

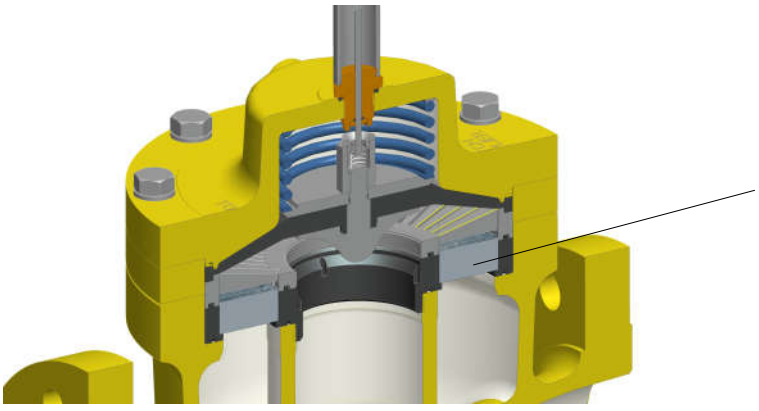
FLOW CONDITIONER

The Flow Conditioner 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.



INTERNAL SILENCER - Metal Foam Ni-Cr 35%

When it is necessary to meet a specific noise limit, an additional silencer can be used to significantly reduce the noise level (dBA). The ARGOS pressure regulator can be supplied with an integrated silencer, both in the standard version and in versions equipped with an SSV shut-off device. High-efficiency noise attenuation occurs directly at the point of generation (immediately after the pressure reduction), preventing noise propagation.With the integrated silencer, the valve flow coefficient (KG) is approximately 5% to 10% lower compared to the corresponding version without the silencer. Due to the regulator's modular design, the silencer can also be installed later, both on the standard ARGOS version and on versions equipped with an SSV shut-off device, without requiring modifications to the main piping.The pressure reduction and control functions remain identical to those of the standard version.



Model	Passage Area	Noise Reduction (Dba)	Pressure Loss (%)
ISG-1	Ø1,4 10 PPI	8 - 10	5
ISG-2	Ø0,9 20 PPI	12 - 15	10

PILOTS

The G42L, G30F and G32F pilots have been developed to deliver superior performance in pilot-operated pressure regulators, ensuring stability, fast response and precise adjustment even under demanding operating conditions.

Key Advantages:

High control accuracy – Maintains stable outlet pressure even in the presence of flow variations or inlet pressure fluctuations.

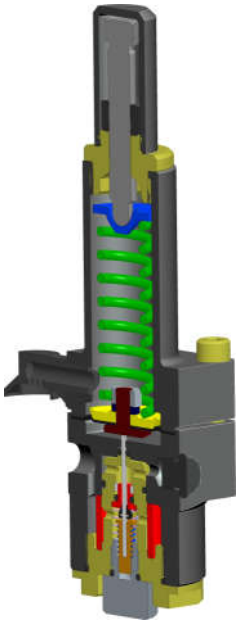
Fast response – Optimized design ensures immediate adjustment, reducing pressure oscillations and protecting the system.

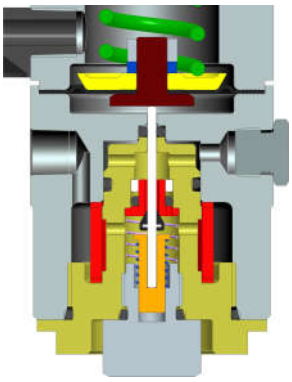
Robust construction – Manufactured with high-strength materials, ensuring long service life and reduced maintenance requirements.

Application versatility – Compatible with a wide range of operating pressures, allowing easy adaptation to different industrial processes and gas distribution applications.

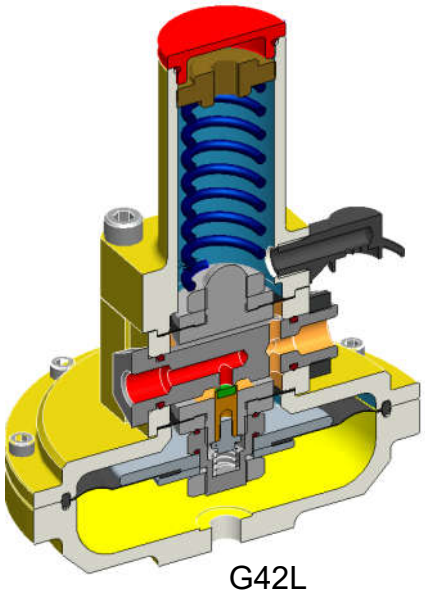
Low maintenance – Modular design that simplifies inspection and component replacement, minimizing unplanned downtime.

The G42L, G30F and G32F pilots represent an ideal solution for applications requiring precise control, reliability and adaptability, ranging from gas distribution networks to high-performance industrial processes.

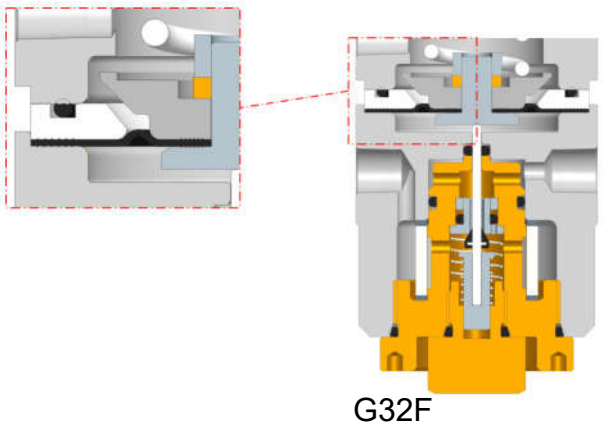




G30F



G42L



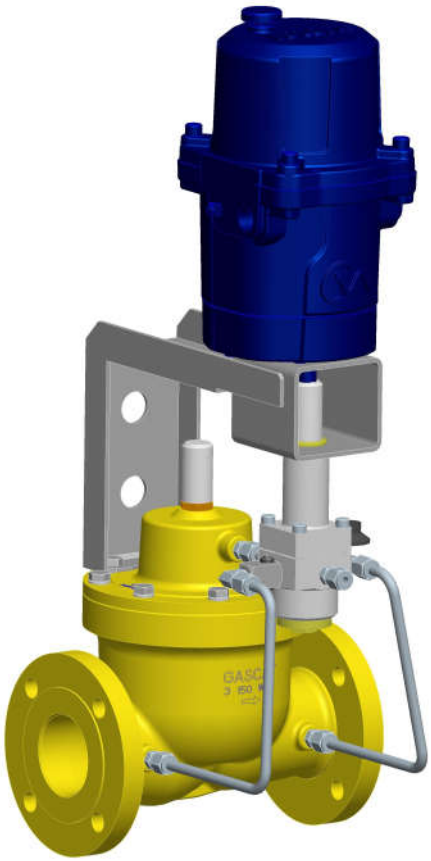
G32F

Model	Maximum Allowable Pressure (bar)	Downstream Adjustable Pressure (bar)
G42L	16	0.05 - 1
G30F / G42	100	0.7 - 32
G32F / G40		28 - 63,5

Note: Check the table ‘‘Adjusting Range’’, on 11 page.

ELETRONIC SET POINT CONTROL

The ARGOS regulator may be configured for remote setpoint control via electronic signal with the assition of an Eletronic Setpoint Control system. Pressure control setpoint may be reised/lowered remotely by an RTU (Remote Terminal Unit)

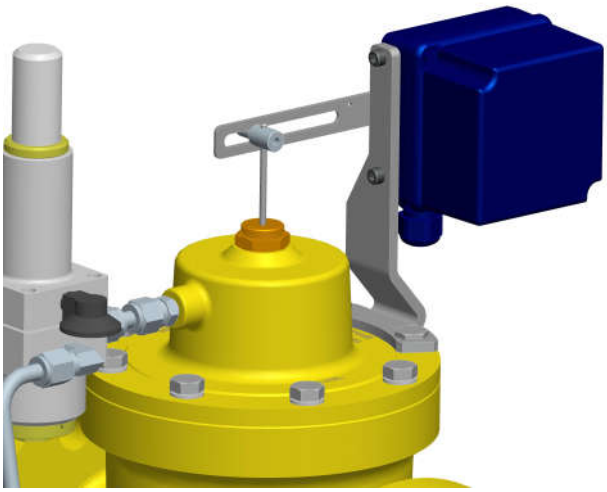


Electrical Supply	11-30 VDC (12-24 VDC nominal) 95-250 VAC, 47-63 Hz (110-240 VAC, 50-60 Hz nominal)
Control Methods	**Analogue Control** 4 - 20 mA
	Pulse Control Switch closure (2) UP & DN, 4-30 VDC loop isolated from supply
	Modbus Comm. 2-wire RS-485 network for direct communication to a PLC or DCS using Modbus RTU protocol
Analogue Feedback	4-20 mA, isolated from supply

POSITION TRANSMITTER 4-20mA

Accurately monitor the opening position of the ARGOS actuator in real time

The position transmitter converts the mechanical displacement of the actuator shaft or stem into a standardized 4–20 mA analog signal, enabling direct integration with supervisory systems (SCADA, PLC, DCS) and ensuring full traceability of the operation.



Key Benefits:

- Real-time monitoring of the actuator opening percentage, enabling preventive adjustments and rapid corrective actions.

- Simple integration with industrial automation systems, without the need for additional converters.

- High reliability in harsh environments, featuring robust construction and protection against dust and moisture.

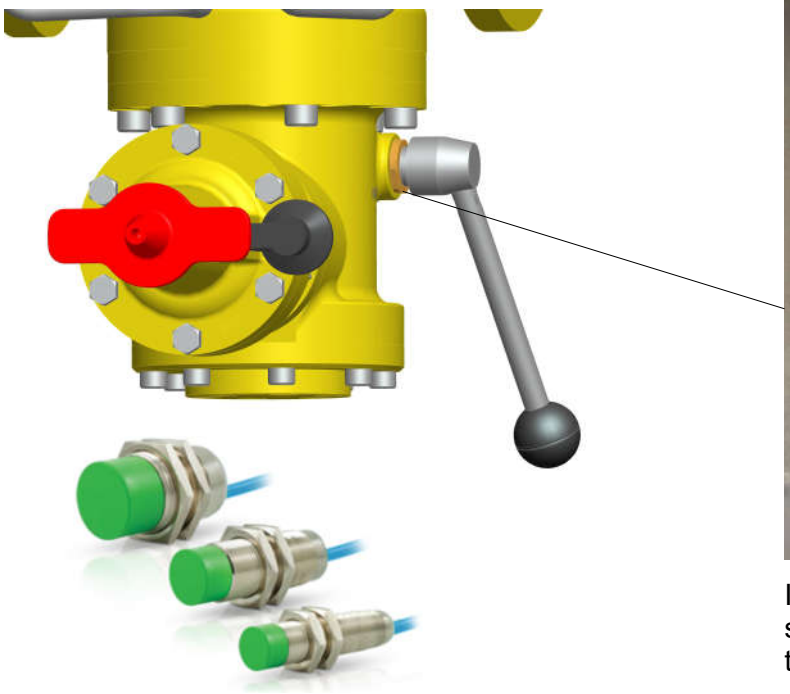
- Easy installation on new pressure regulators or on units already in operation.

- High accuracy and measurement stability, ensuring repeatability even under continuous operating cycles.

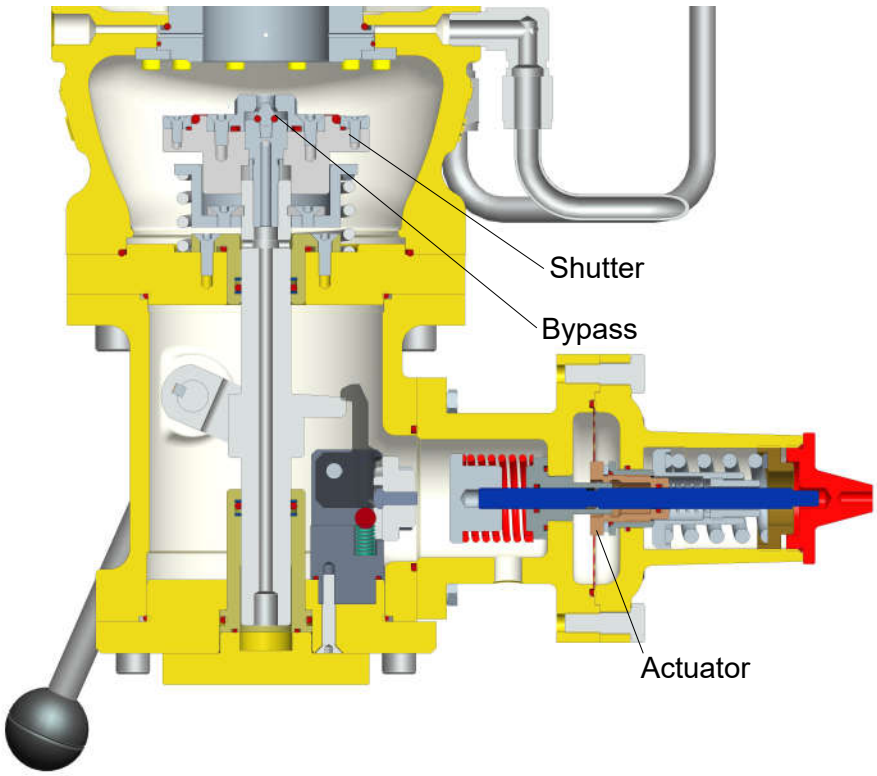
- Improved process control and optimization, particularly in applications requiring operational history recording.

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.

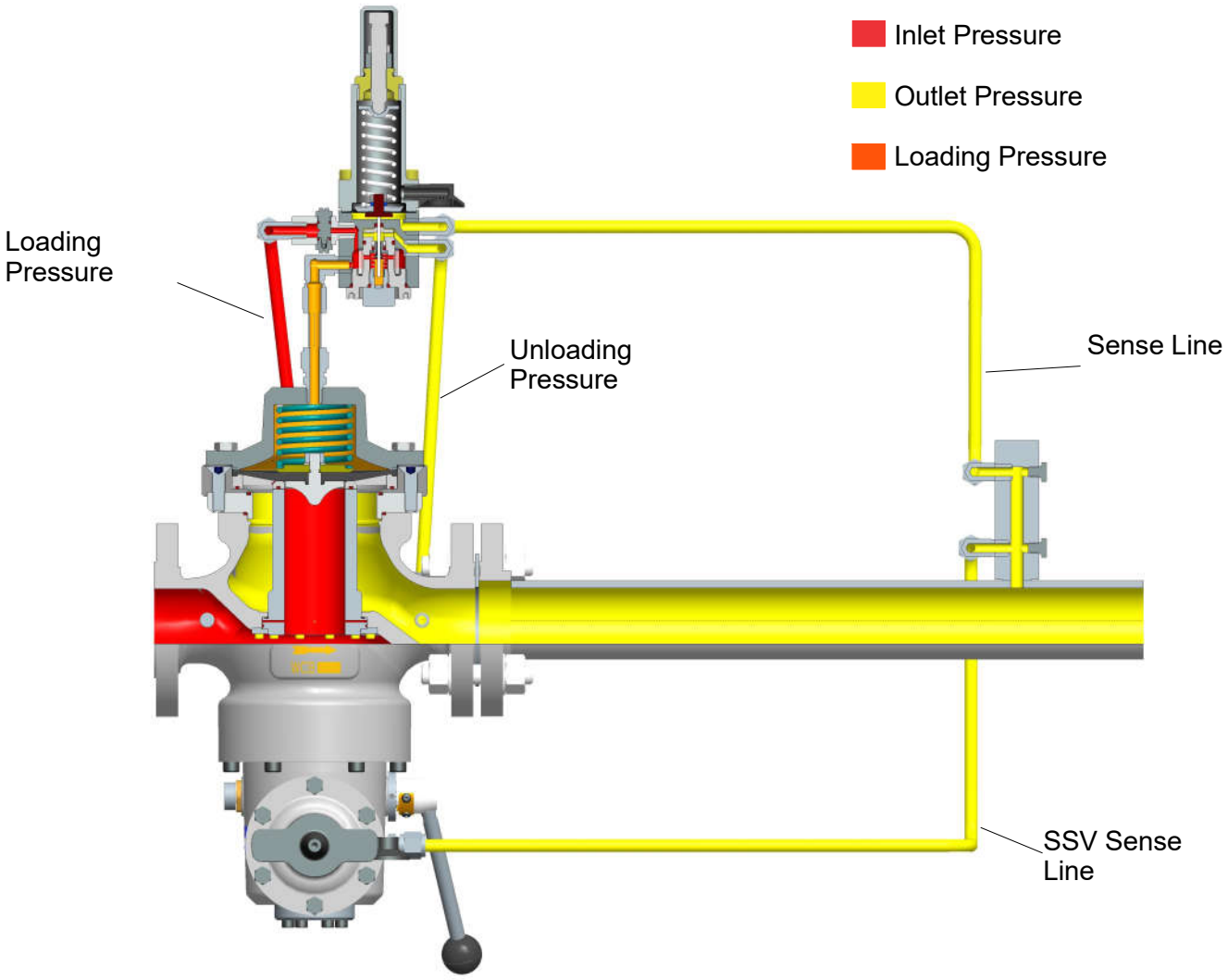


PRESSURE REGULATOR WORKING PRINCIPLE

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.

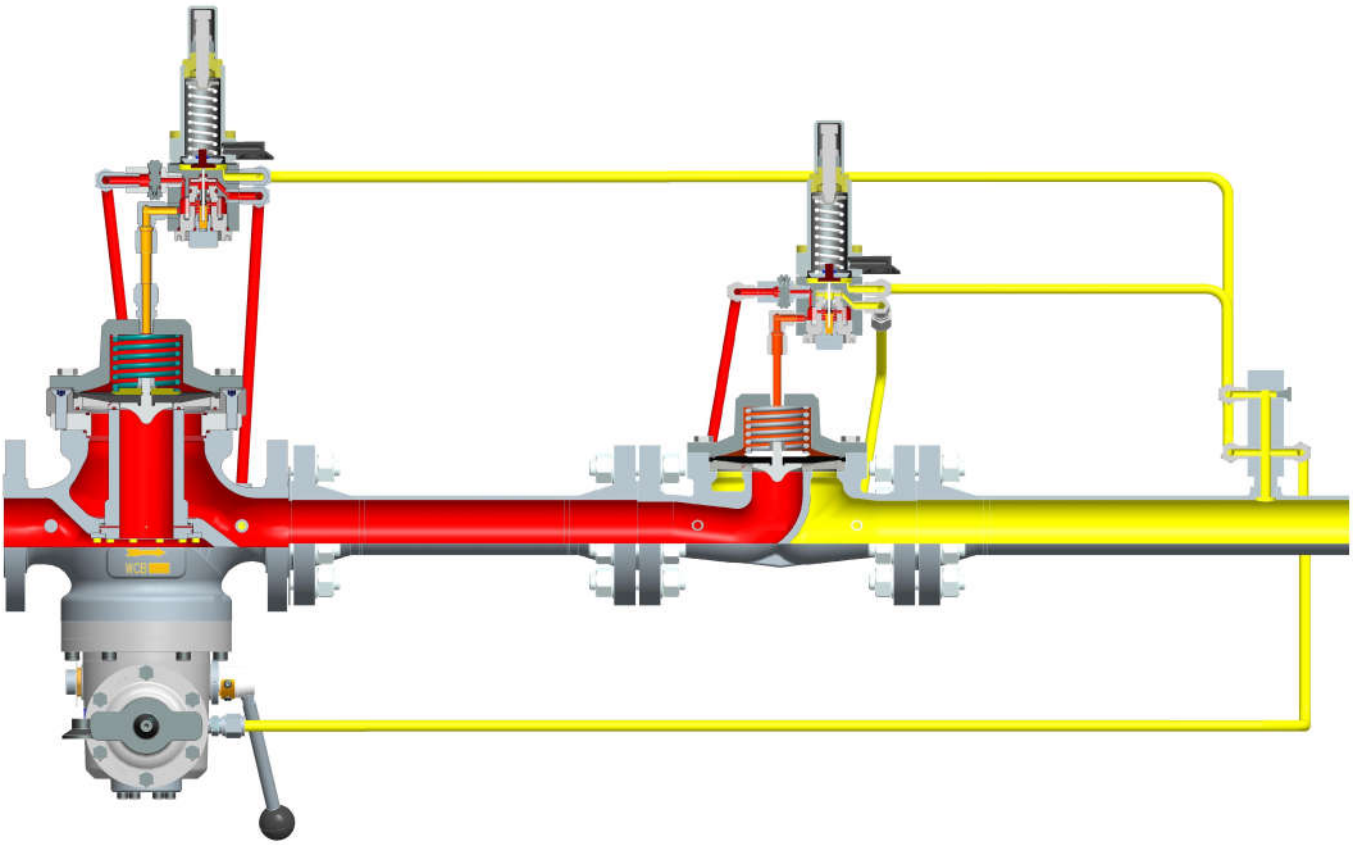


STANDBY MONITOR SYSTEM

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.

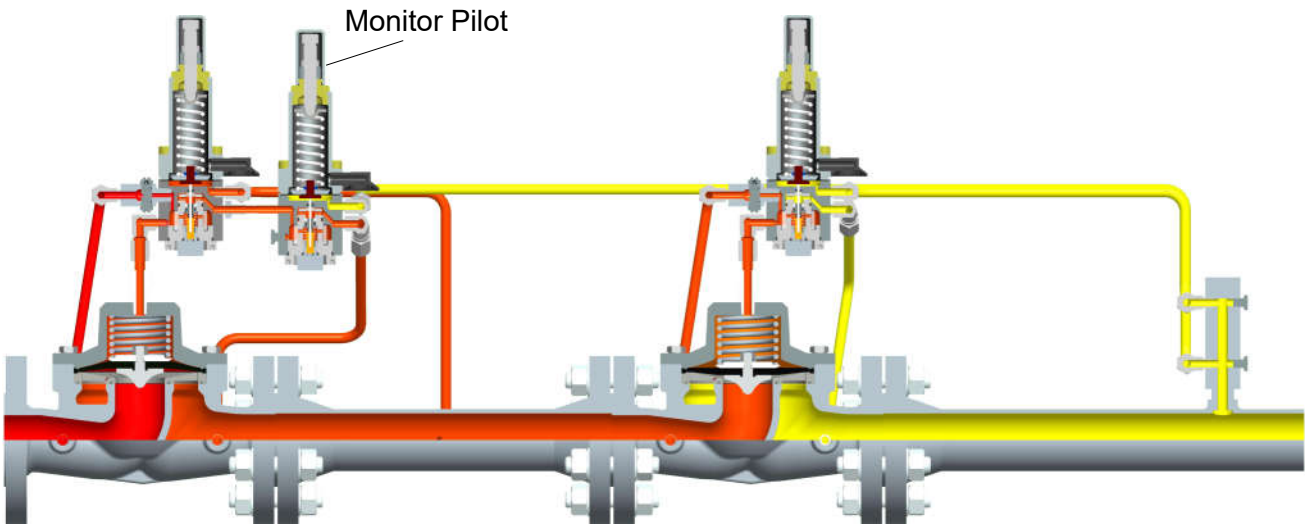
SISTEMA ATIVO / MONITOR



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.



FLOW LIMITER CONFIGURATION

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.

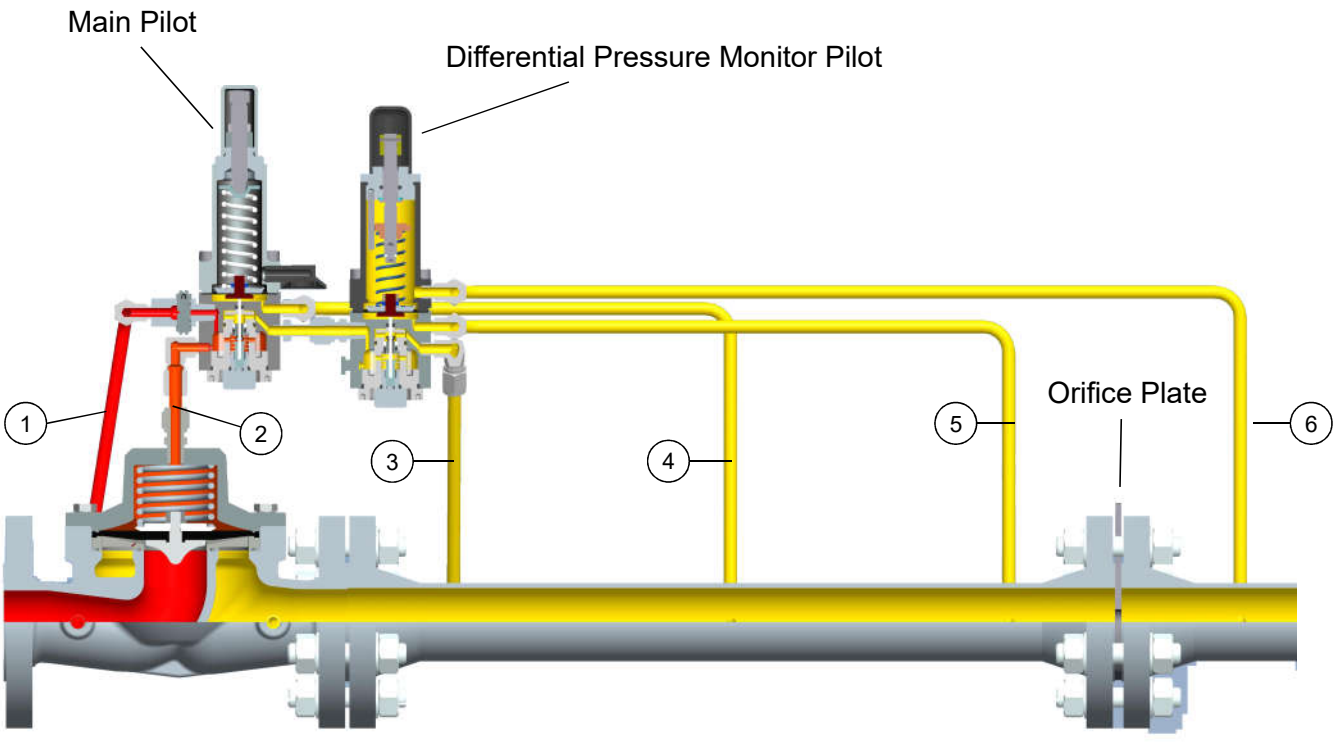
In this condition the main pilot is responsable for pressure regulating. It is sensing line (4) is connected before the orifice plate distant around 5~8 times the pipe size as in normal installations.

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.



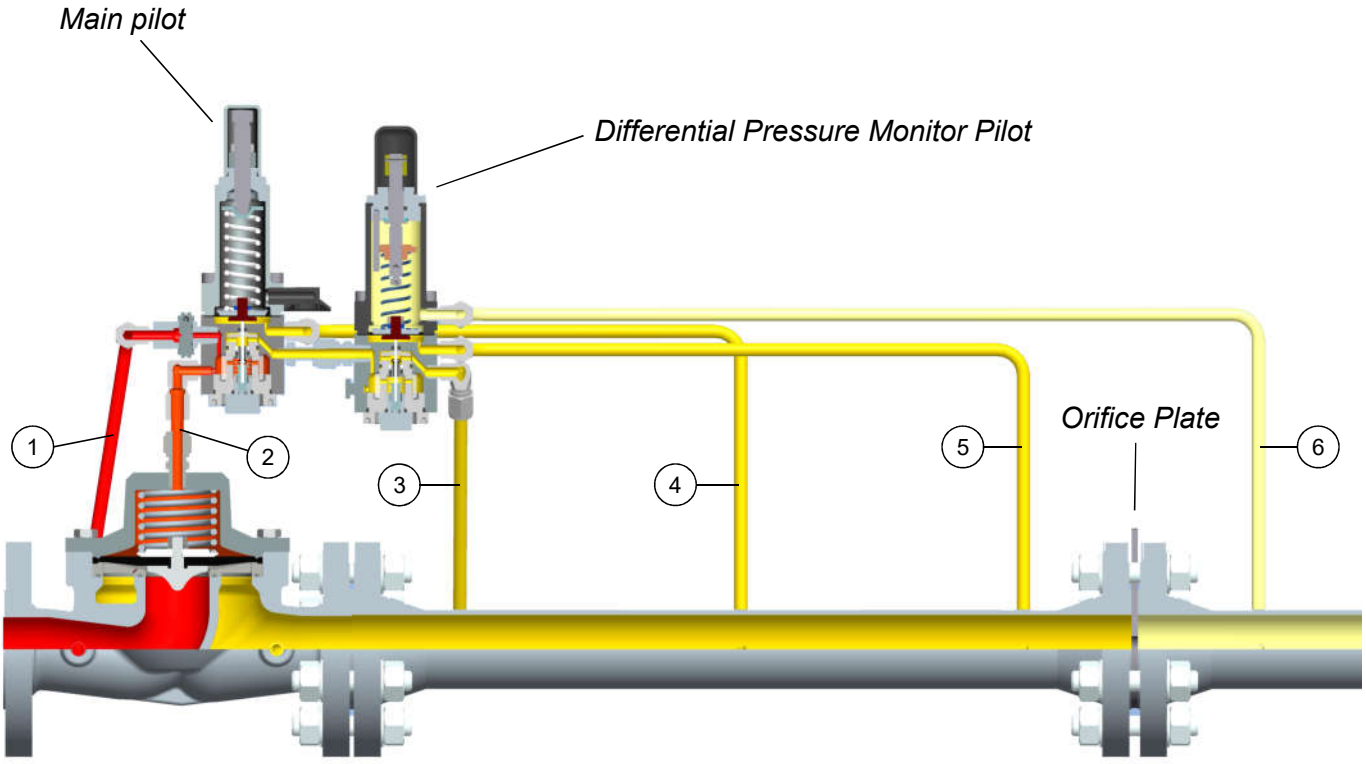
WORK PRINCIPLE WITH INCREASE IN DIFFERENTIAL PRESSURE

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

Main Regulator		Pilots	
Component	**Material**	**Component**	**Material**
Body	Aço Carbono ASTM A216 GR.WCB	Body	Aluminum AL 6351 T6
Cover		Cover	
Cage	Hard Anodizing Aluminum	Internals	Ss316
Elastomers	Buna N	Elastomers	Buna N

Note: The materials indicated above refer to the standard models. Different materials may be supplied according to the technical specification.

OPERATION LIMITS	
Maximum Upstream Pressure	103 bar / 1500 psi
Dowsntream Pressure Range	0.05 - 63.5 bar / 0.73 - 949 psi
SSV Pressure Range	0.045 - 60 bar / 0.66 - 870 psi
Temperature Range	-20°C ~ +60ºC
AC - Accuracy Class	Up to ± 2.5%
SG - Lock-up	Up to 5%
AG - SSV Accuracy Class	Up to ± 1%
IS (Integral Strength), conforme EN334	

Note: Additional functional features and/or extended temperature ranges are available upon request.

PRESSURE REGULATOR			
ADJUSTING RANGE		SPRING COLOR	PILOT
50 - 115 mbar	0.58 - 1.7 psi	BLUE	G42L
100 - 400 mbar	1.45 - 5.8 psi	SILVER	
300 - 1000 mbar	4.35 -14.5 psi	GREEN	
0.7 - 2.8 bar	10- 40 psi	SILVER	G30F
2 - 5.5 bar	29 - 80 psi	GREEN	
4.5 - 14 bar	65 - 203 psi	RED	
7 - 18.3 bar	101 - 265 psi	BROWN	
14 - 32 bar	203 - 464 psi	BLACK	
28 - 63.5 bar	406 - 920 psi		G32F

SLAM SHUT-OFF DEVICE			
ADJUSTING RANGE		SPRING COLOR	ACTUATOR
80 - 280 mbar	1.16 - 4.06 psi	BLACK	H
200 - 600 mbar	2.9 - 8.7 psi	GRAY	
500 - 1300 mbar	7.3 - 18.8 psi	PURPLE	
1 - 5 bar	14.5 - 73 psi	RED	
4 - 11 bar	58 - 160 psi	YELLOW	
10 - 16 bar	145 - 232 psi	BROWN	PH
14 - 38 bar	203 - 551 psi	ZINCATED	
28 - 60 bar	406 - 870 psi	WHITE	

TECHNICAL CHARACTERISTICS

DN	END CONNECTION	CLASS
3/4" and 1"	NPT-F (ANSI B.20.1) BSP (BS 21 - DIN2999)	-
1" and 2"	Flange ANSI B16.5	150#, 300# and 600#
3", 4" and 6"		150# and 300#

DN	DIAPHRAGM	MAXIMUM UPSTREAM PRESSURE (bar)	MAXIMUM DIFFERENTIAL PRESSURE (bar)	MAXIMUM EMERGENCY PRESSURE (bar)	CLOSING SPRING COLOR
1"	NBR50	16	16	16	BLUE
	NBR70	22	22	25	RED AND ORANGE
		70	40	70	BLACK
	NBR80	70	70	103	
2"	NBR50	16	16	16	BLUE
	NBR70	22	22	25	RED AND ORANGE
		70	40	70	BLACK
	NBR80	70	70	103	
3"	NBR50	10	10	16	BLUE
	NBR70	22	22	25	RED AND ORANGE
		50	40	50	BLACK
	NBR80	50	50	50	
4"	NBR50	10	10	16	BLUE
	NBR70	22	22	25	RED AND ORANGE
		50	40	50	BLACK
	NBR80	50	50	50	
6"	NBR50	10	10	16	BLUE
	NBR70	22	22	25	RED AND ORANGE
		50	40	50	BLACK
	NBR80	50	50	50	

DESIGN STANDARDS AND APPROVALS

The product is certified in accordance with the European Directive 2014/68/EU (PED).
Leakage class: Bubble-tight, exceeding Class VIII according to ANSI/FCI 70-3.

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 Nm³/h;
P1 = Inlet pressure in bar absolute;
P2 = Outlet pressure in bar absolute;
KG = Regulator flow coefficient.

DN	KG			
	25%	50%	75%	100%
1"	105	210	420	420
2"	375	750	1125	1500
3"	725	1450	2175	2900
4"	1600	3200	4800	6400
6"	3125	6250	9375	12500

CRITICAL FLOW
P2 / P1 < 0.53
Q = (KG x P1) / 2

SUB-CRITICAL FLOW
P2 / P1 ≥ 0.53
$Q = KG \times \sqrt{P_2 \times (P_1 - P_2)}$

KG values in Nm³/h of natural gas (specific weight = 0.78 kg/m³). For gases other than those listed in the table below, the correction factor can be obtained using the following equation:

Gas	Relative Density (Kg/m³)	Correction Factor
Nitrogen	1.25	0.79
Air	1.29	0.77
Oxygen	1.43	0.74
Propane	2.02	0.62
Butane	2.70	0.53

$$\text{Correction Factor} = \sqrt{\frac{0.78}{\text{Relative Density}}}$$

Low Flow Application Considerations

The installation of an oversized regulator may result in unsatisfactory performance at low flow rates. Therefore, the most compact ARGOS model possible should always be selected (i.e., operating within a 10%–90% flow range), provided that it meets the required flow rate of the application. If there are any doubts regarding the most suitable orifice plate for your application, please contact the GASCAT Sales Department.

SIZING

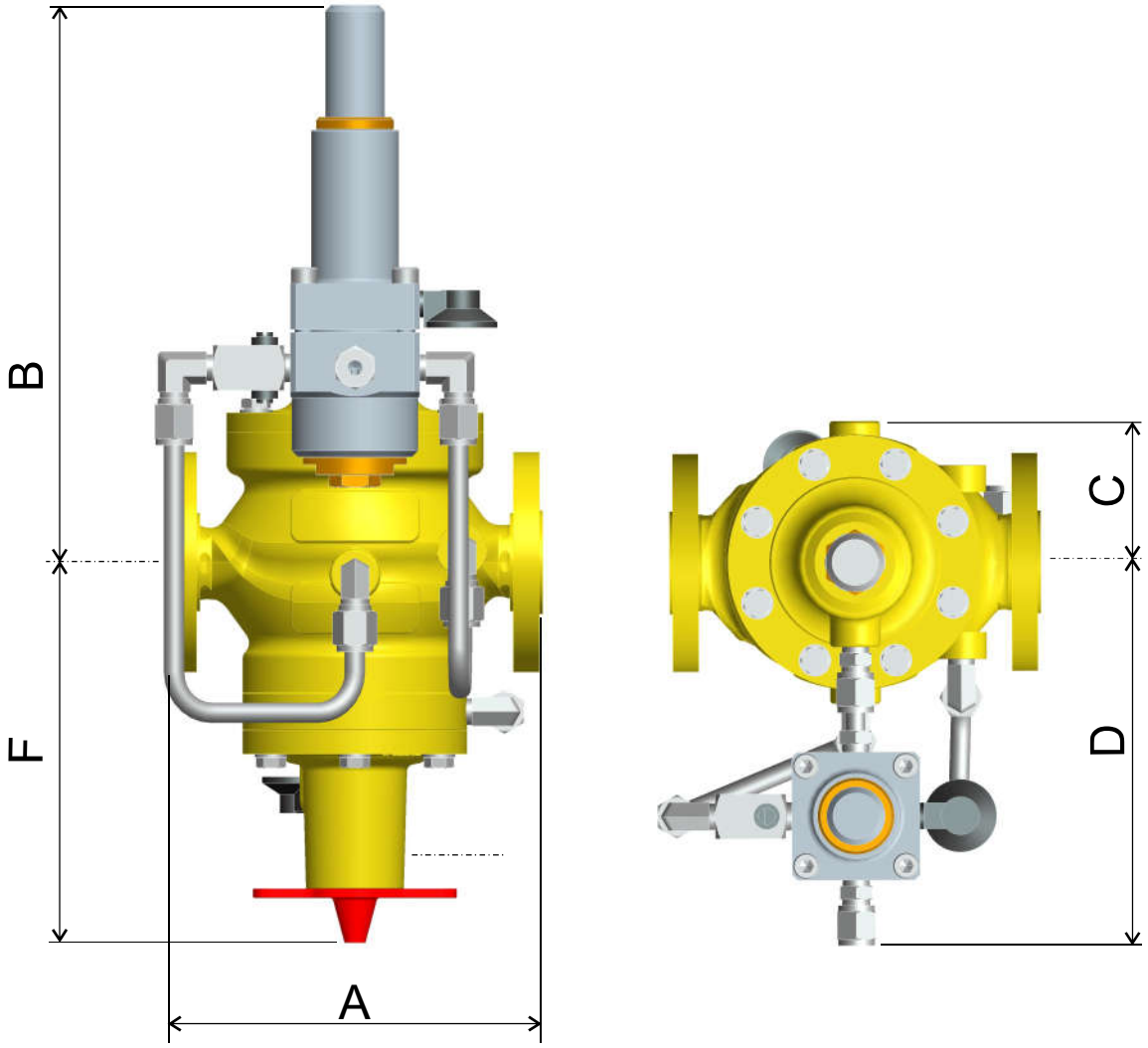
To ensure optimal performance, prevent premature erosion phenomena and limit noise emissions, it is recommended to verify that the gas velocity at the outlet flange does not exceed 150 m/s.
The gas velocity at the outlet flange can be calculated using the following formula:

V = Gas velocity [m/s]
Q = Flow [Nm³/h]
DN = Nominal Diameter [mm]
P_d = Dowstream Pressure]bara]

$$V = \frac{Q \times 10^4}{28{,}26 \times DN^2 \times P_d}$$

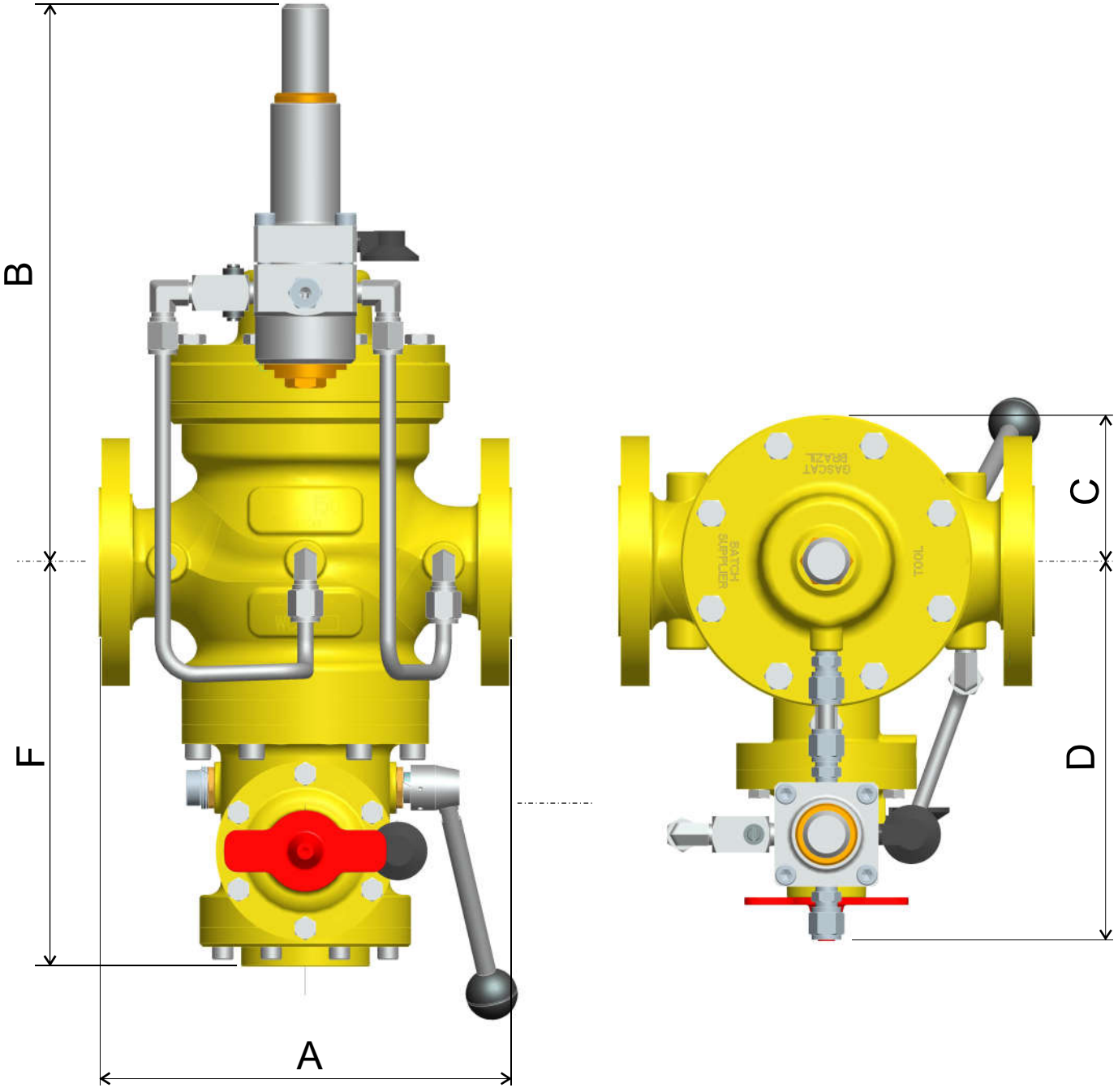
DIMENSIONS AND WEIGHTS (150#)

DIMESIONS (mm)						WEIGHT (kg)
DN	A	B	C	D	F	
1"	184	308	75	190	190	19
2”	254	345	83	210	221	25
3”	298	400	105	242	256	40
4”	352	430	140	235	276	55
6”	451	515	178	260	320	76



DIMENSIONS AND WEIGHT

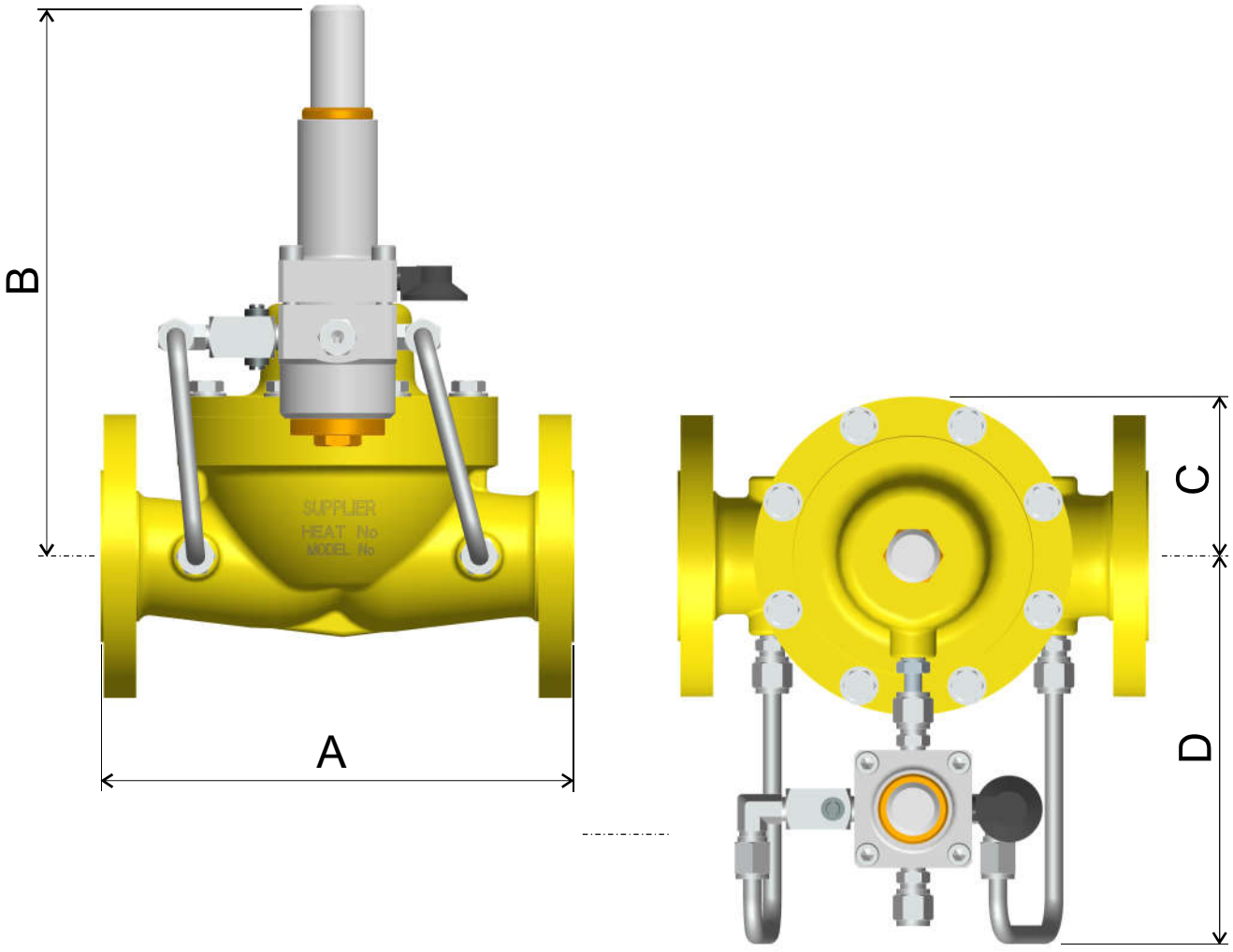
DIMENSIONS (mm)							WEIGHT (kg)	
DN	A		B	C	D	F		
	300#	600#					300#	600#
1"	197	210	308	75	232	249	19.5	21
2”	267	286	345	83	210	250	26	28
3”	317	-	400	105	232	290	41	-
4”	368	-	430	140	245	314	57	-
6”	473	-	515	178	280	378	79	-



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	-	370	105	242	28	29	-
4”	352	368	-	395	134	235	42	44	-
6”	451	473	-	480	178	260	61	64	-

Face-face - ND 1”-NPT-F - 203mm



GASCAT

Gascat Indústria e Comércio Ltda.
Rodovia SP 73, nº 1141 - Distrito Industrial
Indaiatuba - SP - Brasil - CEP 13.347-390
Phone.: (55 19) 3936-9300
sales@gascat.com.br

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