INSTALLATION & OPERATION MANUAL
PRESSURE REGULATOR VALVE
MODEL BRISE PLUS

GASCAT

INDEX

1 – INSTRUCTIONS PRIOR TO COMMISSIONING

It should be clearly understood that the information given under the Commissioning Instructions below do not intend to revoke or substitute instructions laid by any relevant entity and reference should be made to the relevant Standards and/or existent recommendations on this subject.

It is implied that before Commissioning the performance of the appropriate "Cleaning and Purification Procedures" will be observed and all the instructions contained in "Pressurization" and "Labor Safety and Health Standards" shall be strictly attended.

The recommendations of valves' suppliers, as for instance, "open slowly" or "open very slowly" should be strictly observed.

1.1 – SAFETY AND HEALTH

Regulators, valves, and other pressurized components that contain toxic or flammable gases, or other hazardous products, are potentially dangerous if not correctly operated and maintained. It is mandatory that all users of these equipments are properly instructed and warned on their potential danger, and certify yourself that the personnel responsible for installation, test, commissioning, operation, and maintenance of the plant are skilled enough to perform their duties. Instruction manuals are provided for orientation of the operators, but it is supposed that they have a basic knowledge level. If any doubts or ambiguities remain that could affect the proper procedures ask ***Gascat*****,** which will be pleased to instruct, or to provide the suitable service or instruction. **NOT TO TAKE ANY RISK**. Our telephone, fax numbers, and e-mail are the following:

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The comments below, while not completely inclusive, provide guidance on possible sources of risk to safety and health.

1.1.1 – NOISE

Regulators, valves, and other pressure reducers can produce high noise levels, which can be harmful to persons exposed to them for long periods of time. Users should assure themselves that appropriate provisions will be taken, in order to foresee health safety of employees and/or third parties, according to valid standards and recommendations.

1.1.2 – INSTALLATION

All equipment, piping, and vessels are designed to support mechanical efforts, as, for instance, torque and bending momentum, in addition to internal pressure. However, careful shall be exercised during installation not to develop excessive efforts, which can cause cracks that may result in serious breakage when the regulator is put into operation. Excessive tensions can also be caused if the equipment is overburden by piping, which should be otherwise appropriately supported.

All regulators, shutoff valves, relief valves, etc., shall be installed taking into account the correct flow sense.

Impulse lines are important components of any control system and it is essential for them to be correctly installed according to instructions.

Impulse lines should be appropriately supported to reduce excessive vibration, which can provoke fatigue breaks. They should also be positioned so that they cannot serve as feet or hands supports. Impulse lines should be slightly sloping so that liquids and condensates drain towards the main piping.

Auxiliary systems should not be changed, or modified, without knowledge of the operation conditions and permission of the responsible in charge.

1.1.3 – OPERATION

Depending on the regulator type, its valve can be positioned fully open. Consequently, when a regulator is put into operation, the shutoff valves should be open slowly so that the regulator valve can assume its regulating position. If the valves are quickly opened the upstream pressure can pass downstream through the regulator and over-pressurize downstream the main line.

All regulators, etc., should operate with the regulating spring specified by the manufacturer. This provision is particularly important when operating relief or shutoff valves, since incorrect springs can hinder a relief valve to open and a shutoff valve to close at the proper time.

Provisions should be taken to avoid water input through breathing and ventilation openings.

1.1.4 – MAINTENANCE

Regulators and valves contain gases at pressures that sometimes are higher than the atmospheric pressure. Before trying to investigate any problem or to perform service maintenance of the equipment, they should be safely de-pressurized. Besides, as most gases can be flammable, poisonous, corrosive, or somehow, dangerous, it may be necessary to purge the installation with an inert gas, as nitrogen. Special precautions are necessary for operation with oxygen or hydrochloric gas and the user should be reassured that appropriate procedures are implemented.

Eventually, it is not enough to isolate the high-pressure device, since high pressures can be retained downstream of isolation valves. Do not try to remove covers, plugs, etc., before these parts are properly freed-up. Even so, it is advisable to consider if high-pressure gas can be present at the time of removal of covers and plugs.

Most regulators use spiral springs as the loading device. It is important to reduce the load of these springs relieving their loaders as much as possible. In some cases, some residual load may last, even though the spring is relaxed to the limits of its housing.

There is not a recommendation about the frequency to change the repair kit due several different variables in the process that changes installation by installation as, for example, process gas quality, service conditions etc. The repair kit should be changed when the regulator has problems during operation, as leakage, increase in set pressure and also others that become the quality and regulator performance different.

However, ***Gascat*** recommends that after all regulators opening during maintenance service the repair kit must be changed. It is also indicated to change a complete repair kit and not only specific part (example o'ring, obturator), to have the all spare parts with same life time.

Gascat already inform to avoid all non original and genuine parts.

2 – INTRODUCTION

2.1 – SCOPE OF MANUAL

This Instruction manual has as objective supply information about operation, installation and maintenance about BRISE PLUS pressure regulator manufactured by GASCAT.

2.2 – DESCRIPTION

Brise Plus pressure regulating valve was designed by ***Gascat's*** Engineering to assist many different applications and service conditions according to valve configuration. Brise Plus series is a pilot pressure regulating valve and it can be utilized with all non-corrosive gas group and for corrosive gases when built in special versions.

Due "top entry" characteristics it is not necessary to remove the valve of the pipe for maintenance service or clean up the regulator. Brise Plus also is recognized by robust construction, high performance, with accuracy of ± 2.5% (or better depending on the configuration - ± 1%), with high flow capacity.

Brise Plus Series was designed specially for gas distribution in low pressure or any other application where is necessary an excellent regulation and low lock-up.

2.3 – SPECIFICATIONS

2.3.1 – AVAILABLE CONFIGURATIONS

BRISE PLUS SC: Pilot operated pressure regulator spring to close (fail close).

BRISE PLUS pressure regulators are classified as SC in accordance with standard DIN EN 334 directives, for fail condition.

2.3.2 – AVAILABLE CONNECTIONS

ND	FLANGE ASME B16.5	FLANGE DIN 2633	THREAD
1”	150#RF	PN 16	NPT-F
2”	150#RF	PN 16	NPT-F
3”	150#RF	PN 16	-

2.3.3 – TEMPERATURE LIMITS

Operating temperature: -20°C a 60°C

Ambient temperature: -20°C a 60°C

The temperature limits informed at this manual or in any applicable standard must not be exceeded under any circumstances, at risk of damage the equipment, safety of installation and safety of people involved in the operation.

2.3.4 – FLOW COEFICIENT

DN	KG
1”	496
2”	1600
3”	3000

2.3.5 – VALVE WEIGHT

DN	150# / PN16 / NPT-F
1”	28 Kg
2”	38 Kg
3”	48 Kg

2.3.6 – MAXIMUM WORKING PRESSURE

150# / PN 16 / NPT-F
16 bar

The pressure limit informed at this manual or in any applicable standard must not be exceeded under any circumstances, at risk of damage the equipment, safety of installation and safety of people involved in the operation.

2.3.7 – PRESSURE REGULATOR SPRING RANGE (SET-POINT)

G-50 PILOT (old model)		
SPRING COLOR	**PART NUMBER**	**RANGE**
RED	01.50.08	7,5 – 16,5 mbar
BLUE	01.50.09	12,5 – 21,0 mbar
GREEN	01.50.10	15,0 – 35,0 mbar
ORANGE	01.50.11	30,0 – 70,0 mbar
BLACK	01.50.67	55,0 – 140,0 mbar
WHITE	01.50.21	70,0 – 350,0 mbar
GREY	01.50.24	200,0 – 1000,0 mbar
BROWN	01.50.12	700,0 – 2400,0 mbar

G-80 PILOT (old model, with plane diaphragm)		
SPRING COLOR	**PART NUMBER**	**RANGE**
YELLOW	01.53.33	20 – 60 mbar
BLUE	01.50.09	45 – 85 mbar
WHITE	01.50.21G	60 – 220 mbar
BLACK	01.50.67	170 – 320 mbar
SILVER	01.50.21P	230 – 400 mbar
GREY	01.50.24	350 – 1100 mbar
BROWN	01.50.12	1050 – 2500 mbar

G-80 PILOT		
SPRING COLOR	**PART NUMBER**	**RANGE**
BLUE	01.53.35	20 – 130 mbar
WHITE / GREY	01.50.21A	90 – 250 mbar
SILVER	01.50.21P	230– 400 mbar
GREY	01.50.24	350 – 1100 mbar
BROWN	01.50.12	1050 – 2500 mbar
G-31 PILOT		
SPRING COLOR	**PART NUMBER**	**RANGE**
GREEN	01.49.65	2,0 – 4,0 bar

The yellow/grey spring with the part number 01.50.09P (range: 20 – 50 mbar) was discontinued and replaced to blue spring, part number 01.53.35.

2.3.8 – SLAM SHUT VALVE SPRING RANGE (SET-POINT)

SSV – ACTUADOR L		
SPRING COLOR	**PART NUMBER**	**RANGE**
GREEN	01.53.46*	25 – 70 mbar
BLACK	01.53.47	50 – 150 mbar
SSV – ACTUATOR H		
SPRING COLOR	**PART NUMBER**	**RANGE**
BLACK	01.51.98A	80 – 280 mbar
BLUE	01.53.35	200 – 340 mbar
WHITE	01.53.36	300 – 680 mbar
RED	01.53.37	650 – 1070 mbar
PURPLE	01.53.38	780 – 1200 mbar
ORANGE	01.53.51	1000 – 2100 mbar
GRAY	01.53.38H	2000 – 3600 mbar

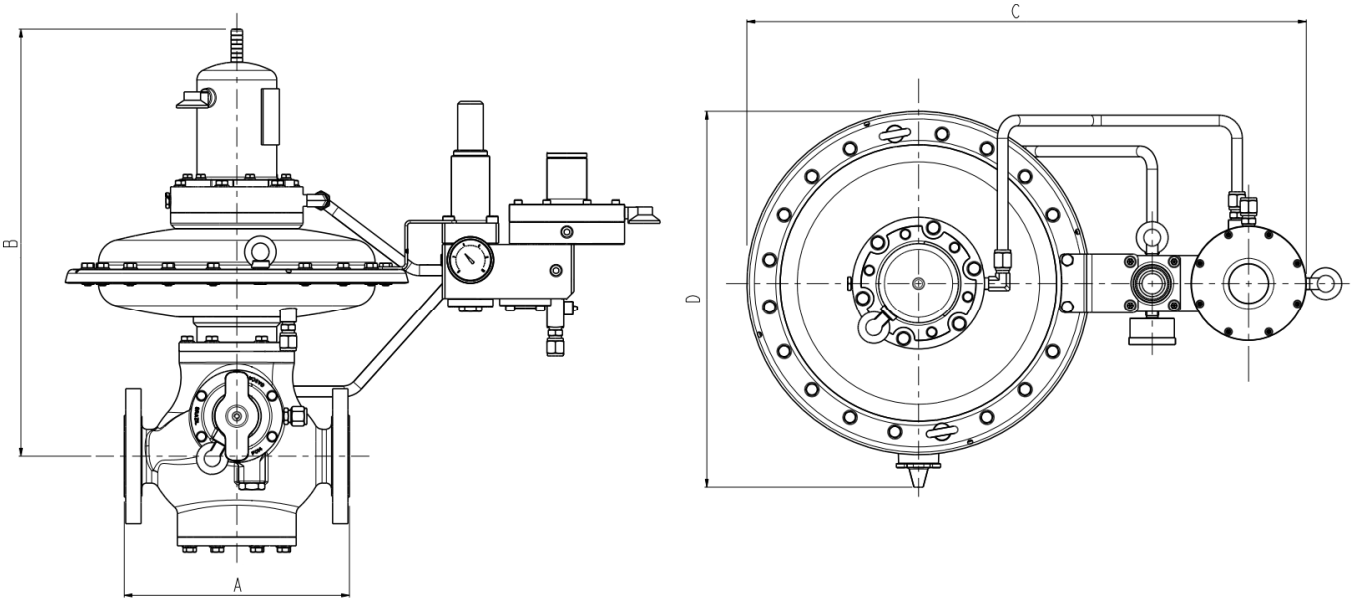
*Note: To the ND 3” when to use the green adjusting spring, part number 01.53.46, the grey / orange color closing spring with part number 01.52.10 must be used. To every others applications, the yellow closing spring, part number 01.50.72 must be used.

2.3.9 – ACCURACY AND LOCK UP

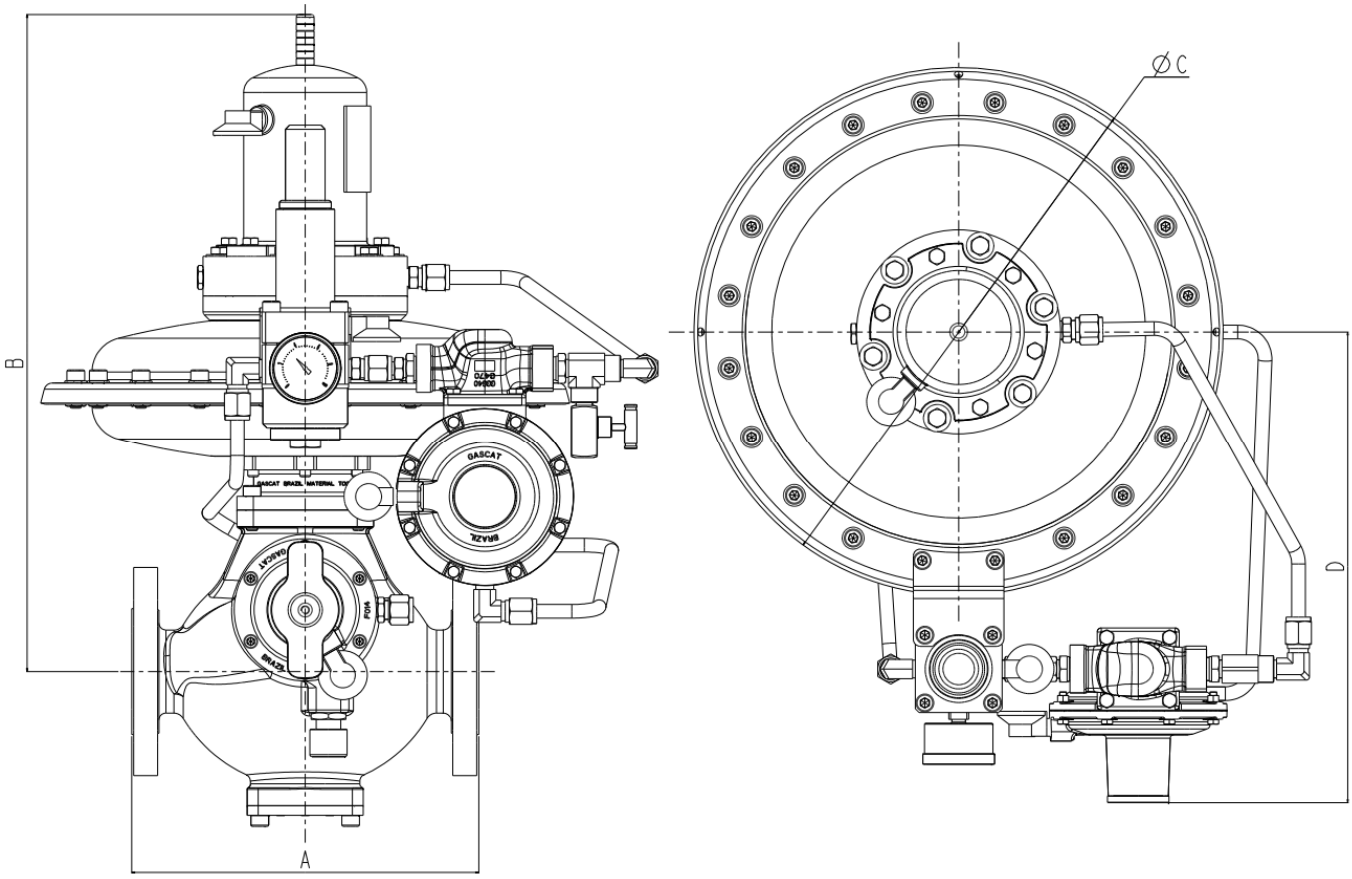
Pressure regulator: AC up to 2,5% / SG up to 5%

SSV: AG up to 5

2.3.10 – PRESSURE REGULATOR DIMENSIONS (STANDARD LAYOUT)



DIMENSIONS (mm)				
	A (RF)	B	C	D
ND	150# / PN16	150# / PN16	150# / PN16	150# / PN16
1”	184	327	538	363
2”	254	463	621	422
3”	298	501	621	422
General Tolerance = ± 2.0				



DIMENSIONS (mm)				
	A (RF)	B	C	D
ND	150# / PN16	150# / PN16	150# / PN16	150# / PN16
1”	184	327	290	280
2”	254	463	356	340
3”	298	501	356	340
General Tolerance = ±2.0				

3 – OPERATING PRINCIPLE

Brise Plus Series works by loading pressure principle by pilot in the upper cover diaphragm of main valve that, through the pressure differential between loading and inlet, it moves the diaphragm and, consequently, the main stem and obturador. It increase and/or decrease the valve opening.

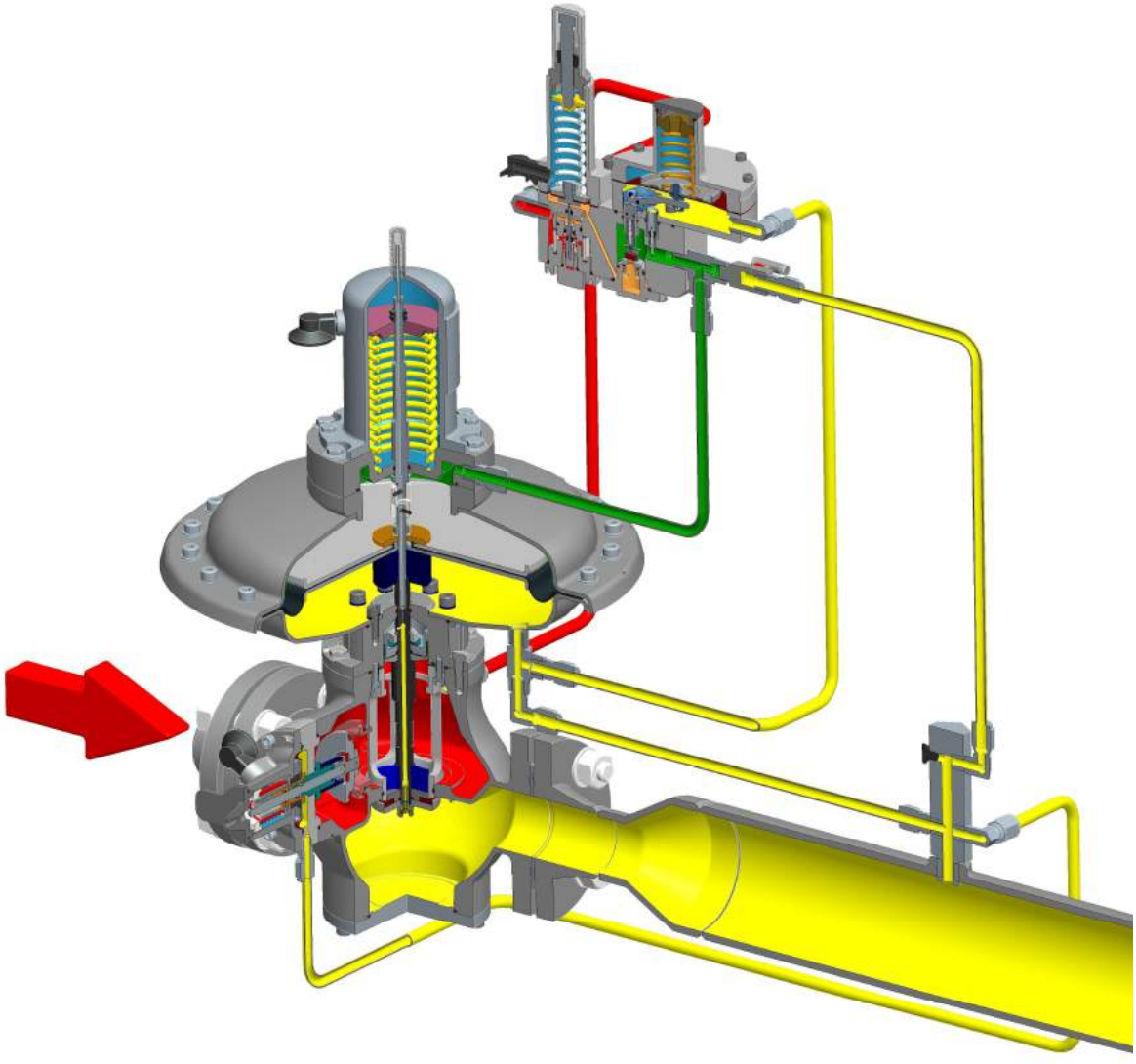
The outlet pressure is controlled by a low pressure pilot. An adjustable pre-regulator is usually used to assure a stable feeding pressure to the low pressure pilot and the accuracy of the system.

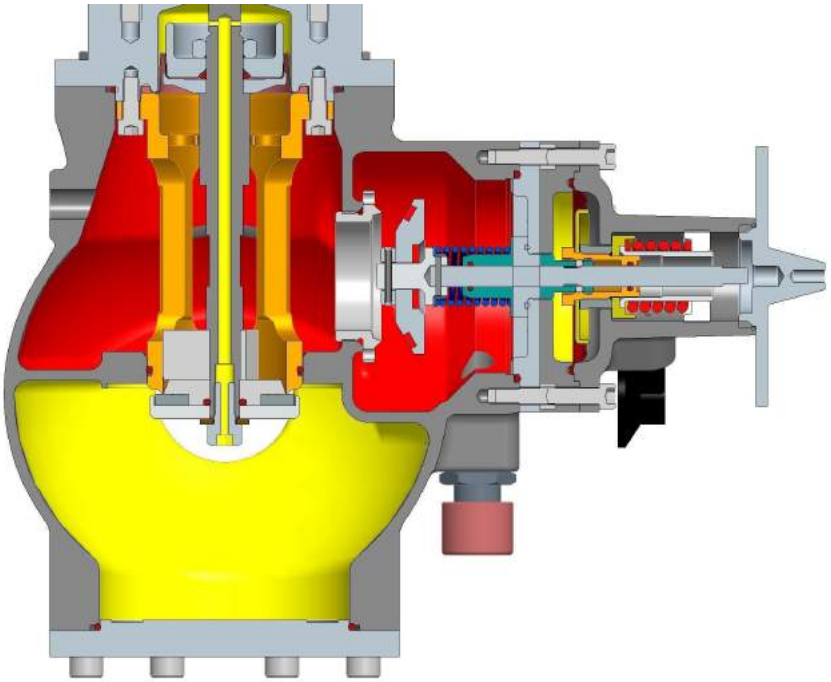
A filter is assembled upstream the pre-regulator and pilot to protect them against gas / installation impurities.

When there is gas flow, the pilot compares the outlet pressure with the adjusted pressure in the pilot spring. If the pressure under the pilot diaphragm is lower than the desirable pressure the pilot will open and feed the upper chamber actuator of main valve.

If the gas flow decrease or it is interrupted, then the outlet pressure begins increasing and it is compared with the adjusted pressure in the pilot spring. If the outlet pressure is greater than the pilot set pressure, the pilot will close and the pressure in the upper and lower chamber of the main valve will be the same; so the main valve will be closed by the force of the closer spring.

A bleed valve assembled downstream of loading pressure will provide a variation in the gas passage orifice, increasing or decreasing the regulator response. It also provides an opposite velocity in the closing procedure of main valve. The equilibrium will be according to the each process.





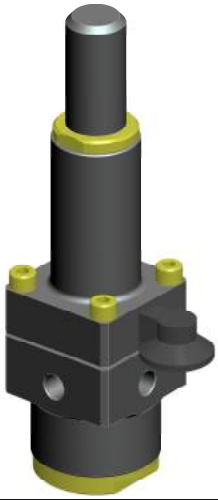
SIDE VIEW

3.1 – PRE PILOT AND INTERNAL FILTER

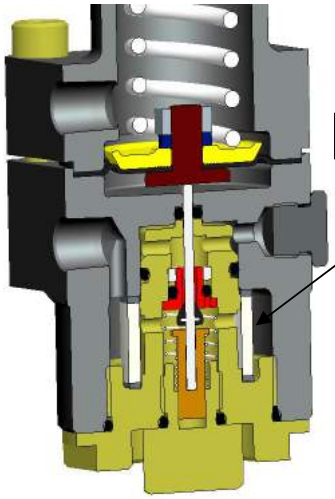
The pressure regulator model BRISE PLUS manufacture by GASCAT can use pre pilot model G-38 or G-43 (Booster).

The function of this pre pilot is reduce the pilot inlet pressure and reduce the effects of inlet pressure variation increasing the accuracy and performance of equipment.

G-38 pilot is assembled with an internal filter element (10 microns) to protect the pre-pilot and pilot internal against solid contaminants as black pounder for example, however this filter must not substitute the station filter.



G-38 PRE PILOT

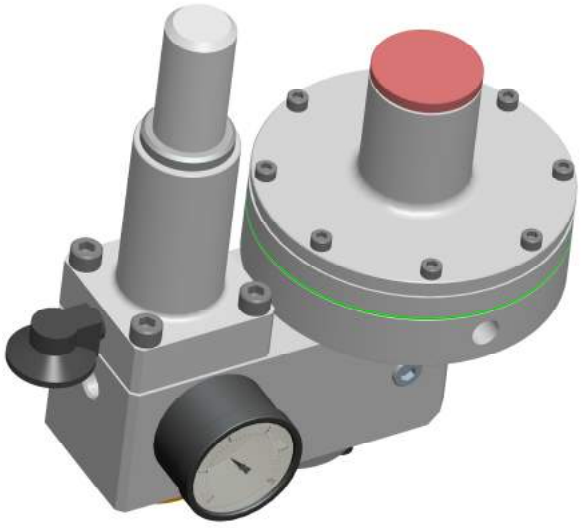


3.2 – PILOT

The pressure regulator model BRISE PLUS manufacture by GASCAT use pilot model G-80 or G-43M+31 depending of the desired set-point. If the set-point is greater than 2.4 bar, applies the G-43M + G31.

This pilot is responsible by the control of feed pressure of main regulator actuator and by consequence of the pressure regulator aperture.

G-43 BOOSTER + G-31 PILOT



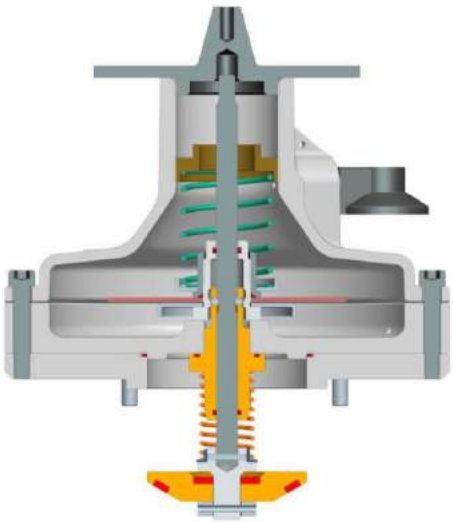
G-80 PILOT

3.3 – SLAM SHUT VALVE BUILT-IN

Due to its high versatility, the BRISE PLUS regulator features two slam shut valve actuator models for precise use at lower pressures and medium pressures.

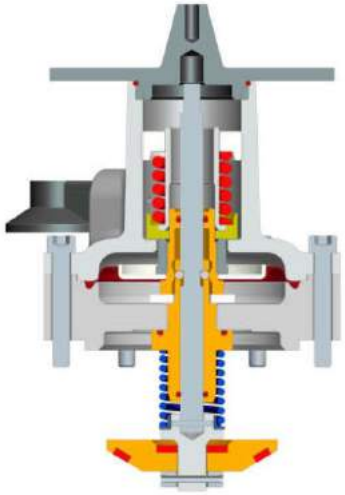
3.3.1 – L ACTUATOR

For the lower shutting pressures (25 to 150 mbar) the BRISE PLUS regulator uses the L Actuator, designed with a larger diaphragm area and lighter internal, proving the required sensitivity.



3.3.2 – H ACTUATOR

For medium working pressures (80 mbar to 3.5 bar) the BRISE PLUS regulator uses the H actuator, a high rangeability and compact design.



4 – INSTALLATION

4.1 – CHECKING SYSTEM INTEGRITY

Before installing the pressure regulator it's necessary to insure that:

1) The equipment are in perfect conditions or has evidences of damage during the transport, in case of perceptible damage in the equipment do not proceed with installations and get in contact with GASCAT.

2) The space provided for the acess and installation of equipment is appropriate, including future maintenance.

3) The installation was designed to support the load imposed by the equipment.

4) The inlet and outlet pipe connections are in the same level.

5) All connections for sense line and discharge line requested by the model of pressure regulator are arranged in the pipeline and respect the dimensions provided by manufacturer.

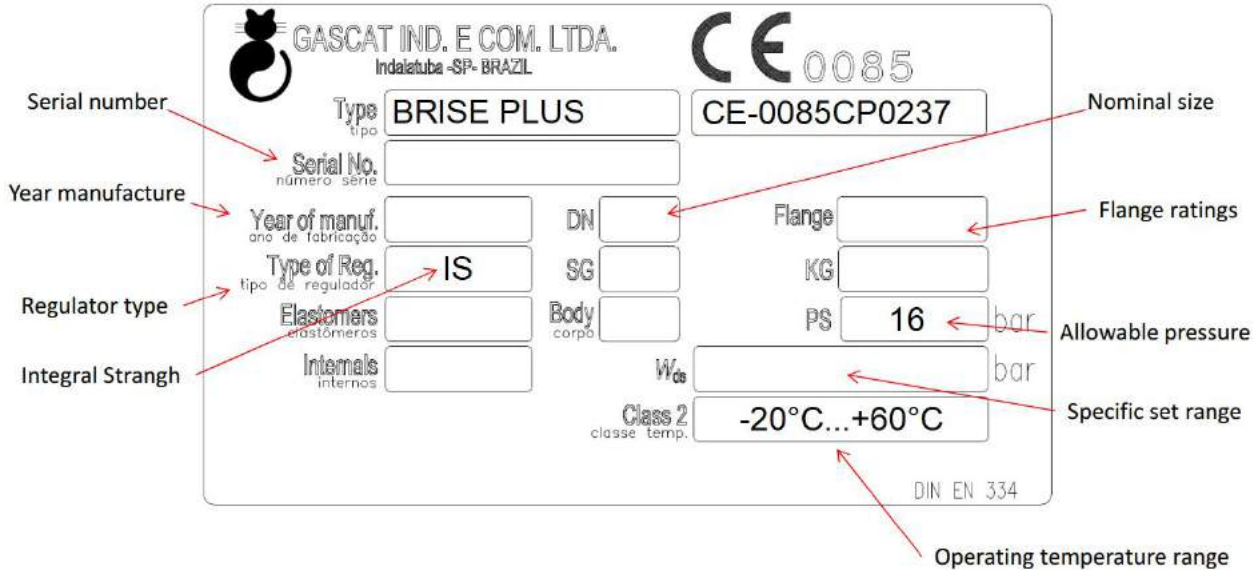
6) Was arranged pressure indicators at the inlet and outlet of the pressure regulator to insure the correct adjustment of set point during the commissioning.

7) Was arranged a vent line between the pressure regulator and the first block valve in the outlet of stream to help the operator during the start-up.

8) Check the flow direction in the valve body and pay attention in the installation to assure that the valve are in the correct position.

4.2 – PRESSURE REGULATOR NAMEPLATE

Before installation, checking is recommended to ascertain that the conditions of use are in conformity with the specifications of the equipment. These specifications are recalled with the symbols on the plate fitted on pressure regulator.



4.3 – FILTER

We recommended the installation of a basket type filter, with minimum 150 mesh, as close as possible to the regulator input, without being joined flange to flange, because, if the filter is installed immediately upstream of the regulator, it can produce turbulence that will cause disturbances in the pressure control of the regulator. Care with the filter installation is essential to the perfect operation of the apparatus, because, particles eventually found in the piping can lodge themselves the seat and the shutter, damaging them and producing direct flow.

4.4 – CLEANING

Check piping cleaning before the installation of the regulator. We recommended a complete purge of the line with nitrogen or compressed air.

4.5 – FLOW DIRECTION AND ASSEMBLY OPTIONS

Before starting the equipment installation, it is necessary to check if:

9) The equipment is in perfect conditions, or it has evidence of damage during transportation. If so, do not proceed with the installation and contact GASCAT.

10) The space provided for access and installation of the equipment is adequate for future maintenance.

11) The installation is designed to support the load applied by the equipment.

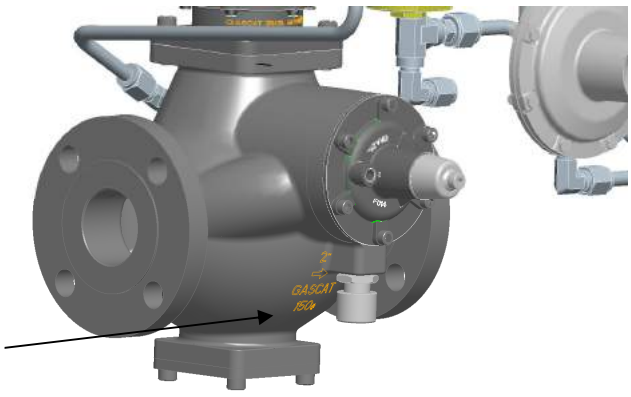
12) The inlet and outlet connections, where the pressure regulator shall be installed, are perfectly aligned.

13) All necessary pressure-sensing pick-ups, downstream of the equipment pipeline, were provided respecting the dimensions recommended by the manufacturer.

14) A pressure gauge, or any other pressure-measuring device, was foreseen for the upstream and downstream of the equipment to allow for the correct setting up at the operation start-up.

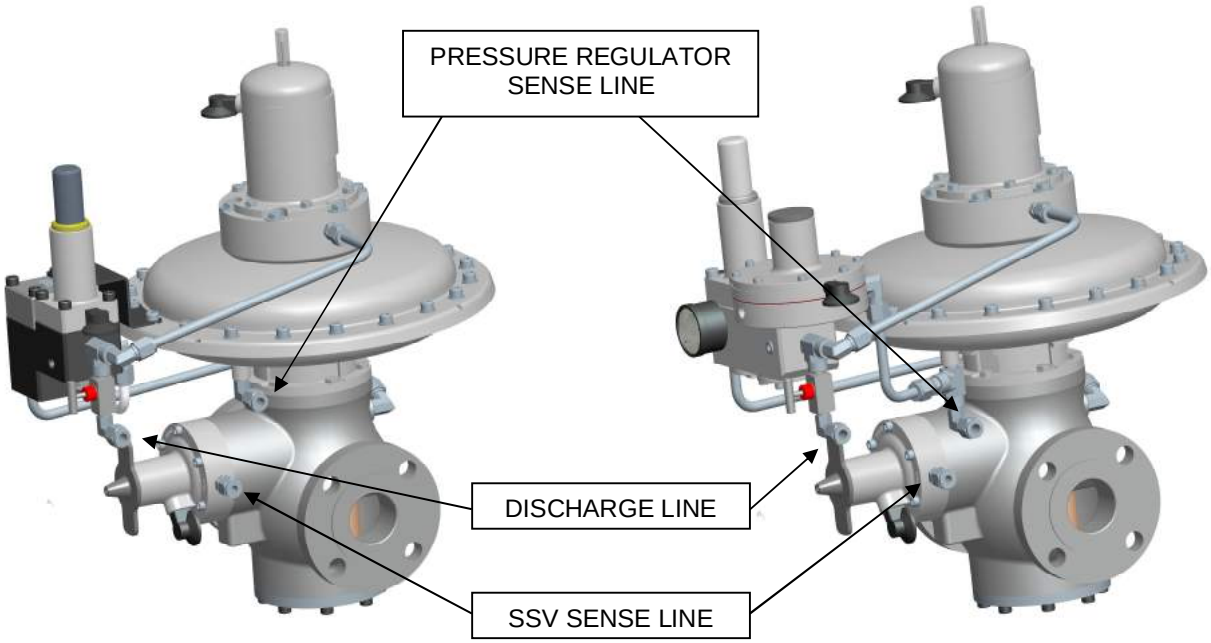
15) A vent line was planned between the regulator and the first outlet shut-off valve to assist the operator during start-up.

16) Check the flow direction marked on the body of the pressure-regulating valve and pay attention at the time of its installation so that it is properly positioned.



4.6 – SENSE LINE

After install the pressure regulator model BRISE PLUS in the stream, you must connect the sensing lines and discharge line as showed as follow:



The correct positioning of pressure regulators sense line in the pipeline is essential for the proper functioning of the pressure regulator, for this reason it's important to install the impulse take at a distance of 5 times the nominal pipe diameter from the outlet of pressure regulator at a pipe stretch free from obstruction, with a pipe diameter sized to a velocity not higher than 25 m/s (considering the minimum pressure and the maximum flow)

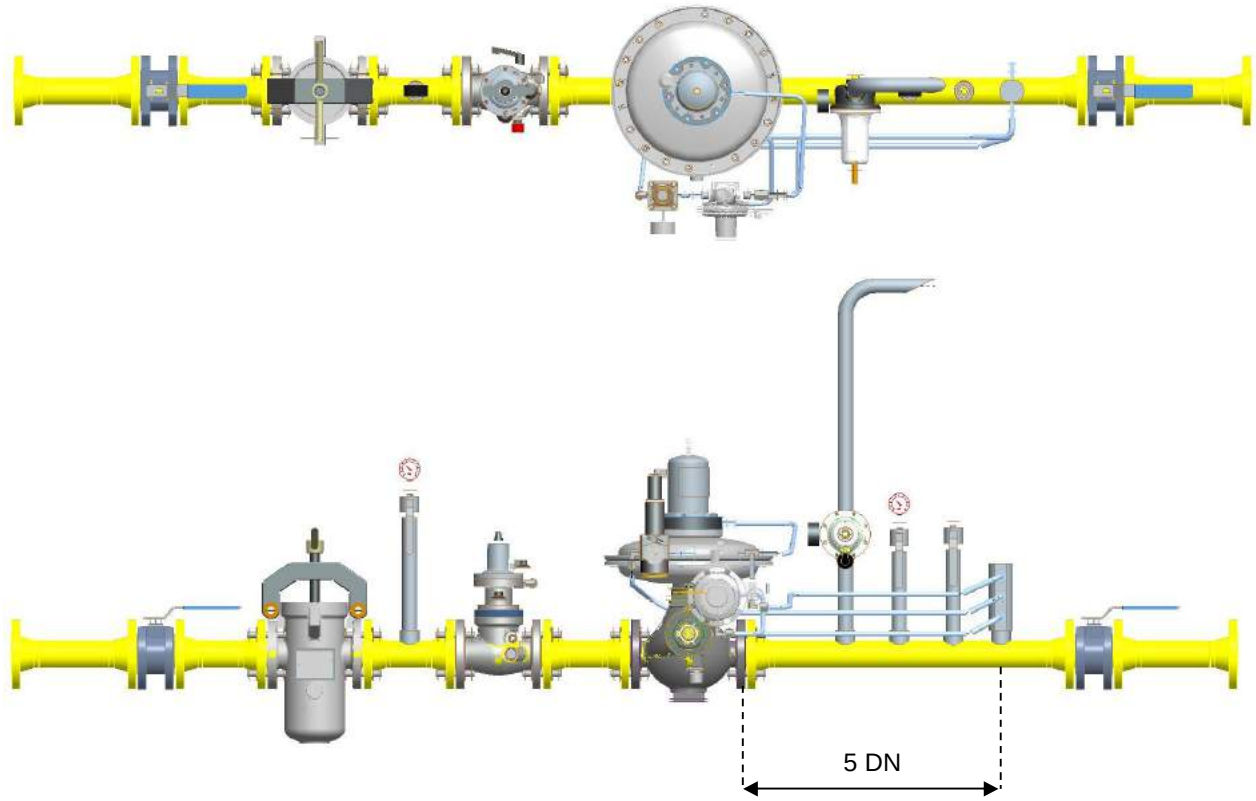
We do not recommend installations of any type of block valve in the sensing lines.

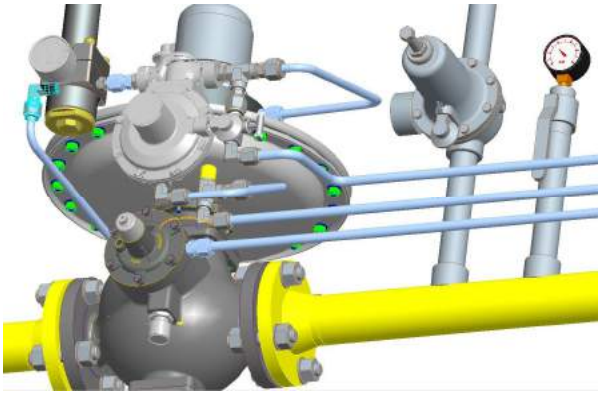
The connections of BRISE PLUS sense and discharge line are normally supplied for 10 mm OD pipe, however other connections could be arranged under consult.

We recommend to not use pulse pick-up downstream of regulator with orifices with nominal diameter less than 3/8".

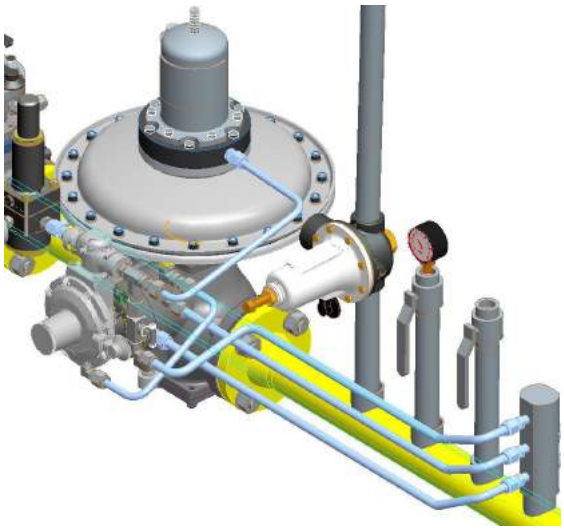
Note: The distance and gas velocity recommended at this manual for the impulse take are generic, other values for distance and velocity could be used under GASCAT analysis of installation, for more information get in contact with GASCAT.

4.7 – RECOMMENDED INSTALLATION SCHEME





VALVE CON. VIEW 1

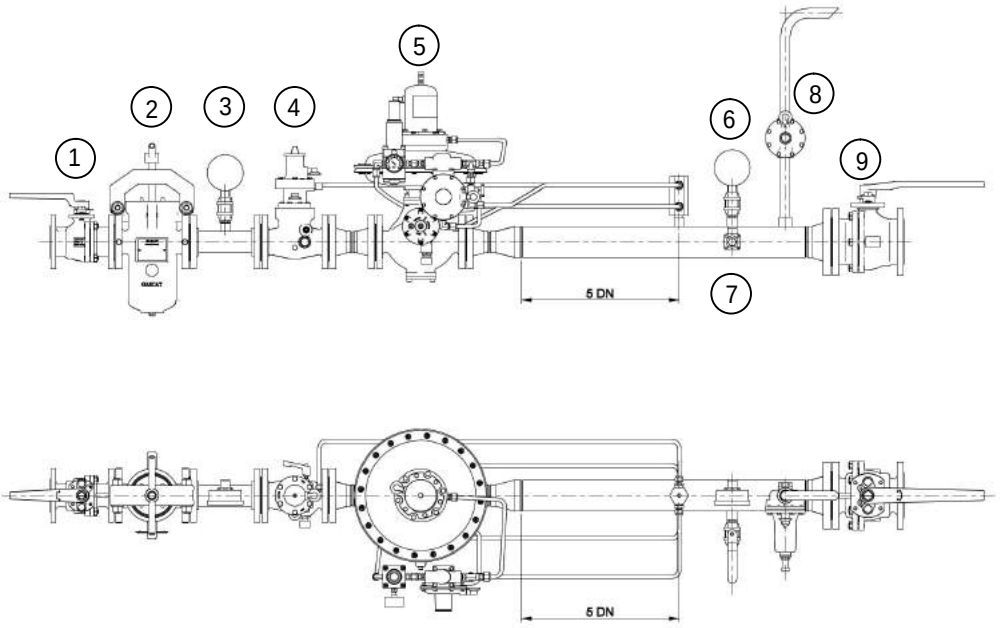


VALVE CON. VIEW 2

4.8 – OTHER IMPORTANT DEVICES FOR A SAFETY INSTALLATION

It is recommended for a safety installation:

1. Manual On-Off valve (sphere or similar)
2. Filter (with drain if possible)
3. Manometer (for inlet pressure)
4. Slam-shut Valve (model GIPS-L)
5. Pressure regulator + SSV (Brise Plus + G10)
6. Manometer (for outlet pressure)
7. Purge valve ND ½"
8. Partial Pressure Relief Valve (CH Series)
9. Manual On-Off valve (sphere or similar)



5 – COMMISSIONING AND START UP

5.1 – PRESSURE REGULATOR ADJUSTMENT

Always, before proceeding with the equipment commissioning it is important to:

1) Check if the equipment is properly installed according to the recommendations of item 4.5 of this manual.

2) Shut the blocking valves of the inlet, output and bypass (if applicable)

3) Open vent valve downstream of the last pressure regulator installed on the span.

4) Make sure that the station is depressurized.

ATTENTION:

* Under no circumstances proceed with pressurization of the span where the equipment is installed by the downstream valve of the equipment.

* Under no circumstances proceed with the depressurization of the span where the equipment is installed by the valve located upstream of the equipment, such as the filter drain.

5) Check if all connectors are properly secured in the station before starting pressurization of the span.

6) Check if the installed equipment has suitable operating conditions, using the information available on the nameplate attached to the equipment.

7) Make sure that the SSV is in the shut position.

ATTENTION:

GASCAT's SSV are sent to the field already calibrated, however, depending on transport conditions and the equipment handling the valve may have its set point changed.

Therefore, we recommend that you check the SSV set point with the help of an external air supply directly connected to the actuator, before proceeding with the pressurization of the span.

The model BRISE PLUS valves are not sent to the field with adjusted set points; this measure tends to preserve the life of the equipment internals. Therefore, after receiving a pressure regulator valve model BRISE PLUS, remember that you must perform the set point adjustment before putting the equipment into operation.

The pressure reducing station setting shall be in accordance with the DIN EN 12186 / NBR 12712 standards and all other regulations in force in the region where it will operate.

1) Close slowly the on-off manual valve upstream of regulator.
2) Close slowly the on-off manual valve downstream of regulator.
3) Certify that the springs of pre pilot and pilot are totally released.
4) Certify that bleed (discharge valve / needle valve) is open in 1/8 of turn.
5) Open the purge valve installed downstream of regulator 1/8 of turn.
6) Open slowly the on-off manual valve upstream of regulator verifying the gas pressure.

5.1 – PRESSURE REGULATOR ADJUSTMENT

1) First of all it's important to check if the incorporated SSV is armed, it's possible to check it pulling the stem of SSV, you will hear a characteristic noise.
   To pull the stem remember to use the cover of SSV.
   Don't forget to equalize the pressure at the SSV by the by-pass valve before try to rearm the stem.
2) Adjust the set pressure of pre pilot G-38 in 0.5 bar plus the desired outlet pressure, for example if you want to adjust the valve in 0.5 bar, you must adjust your pre pilot in 1.0 bar. You can verify the pre pilot adjusted pressure in the pressure indicator connected to the pre pilot.
   When you are operating with a booster G-43 it's not necessary to adjust anything, the booster will adjust automatically the feeding pressure to pilot.
3) Adjust the outlet pressure of the pressure regulator turning the regulating screw located in the top side of the pilot G-50 or G-31, very slowly, in the clockwise direction.
4) You must follow the pressure increase by the pressure indicator located downstream of pressure regulator.
5) Check the pressure and if necessary adjust the discharge valve aperture.
6) Close the purge valve and check the pressure regulator lock up.
7) Verify if the regulator is totally tight (without gas leak) checking the gauge manometer in the outlet pipe. After lock up the pressure should keep without any variation.
8) Open slowly the on-off manual valve downstream the regulator.

5.2 – RECOMMENDED TOOLS FOR START-UP

- ✓ Combination spanner size: 3/8" and 19 mm
- ✓ Adjustable spanner 1"

6 – TROUBLE SHOOTING

To maintain the pressure regulator in the correct conditions of operation, the pressure regulators model BRISE PLUS must be submitted to preventive maintenance, the periodicity depends of the flow, quantity/type of contaminants and the operation conditions.

Defect	Cause	Correction
Vibration	Problems in the installation	Verify if the pipe is correctly supported, if the vibration doesn't come from other devices or if it is inadequate sizing of some equipment.
	Damaged diaphragm or stem assembly of main valve damaged	Change the damaged pieces.
Outlet Pressure Variation	Low flow (less than 5% of maximum flow)	Verify the regulator sizing (check if is available a reduced orifice).
	Sensing line installed wrongly	Verify if the sensing line is too close of main valve of near of an equipment that my cause flow turbulence
	Bleed valve wrongly adjusted	Proced the adjustment of bleed valve with the regulator operating (working) to find the best position oo work.
Direct passage through the regulator or main valve totally opened	Main regulator stem locked	Verify the respective stem and change it if necessary.
	Sensing line damaged	Verify the sensing line and change it if necessary.
Outlet drop pressure / non-enough flow	Filter element dirty	Clean or change the filter element.
No Flow and No Outlet Pressure	Main diaphragm damaged	Change the main diaphragm.
Outlet pressure increase / Direct passage	Particles between obturator / seat or these parts damaged	Remove the inspection cover and obturator and clean the components (obturator e seat). Verify all other components and change if necessary.
	Particles between obturator / seat or these parts damaged	Remove the pilot balancin, clean it or change if necessary.

7 – WARRANTY

We warrant our products, for a 12 months period from the date of invoicing, if the products are in operation, extending the warrant up to 18 months, in case they are in stock. Such warranty only covers those cases for which the occurrence of production defects are evidenced, which remained unnoticed at the time the product delivery.

To present warranty is not valid if it is found that the defect or mishap was caused by accident, normal wear, inadequate installation, improper maneuvering or use, inadequate storage, assembly disregarding technical standards or if the buyer undertook repairs or changes in equipment by himself, without the manufacturer's previous authorization.

The information contained in this manual contains Gascat's supply conditions, independently of the verified performance.

The information herein contained shall not be interpreted or suggest performance warranty in relation to the final products, or the system usage purpose, nor should they serve as usage recommendation for any product or process mentioned in the specifications. This system should only be operated by qualified technician trained for this purpose; and no changes that may affects the system safety can be executed without our previous authorization.

GASCAT Ind and Com. Ltda. withhold the right to make changes without notice, introducing improvements in the described products drawings or specifications.

8 – STORAGE

The regulators should not suffer mechanical shock, not to risk internal components' damages.

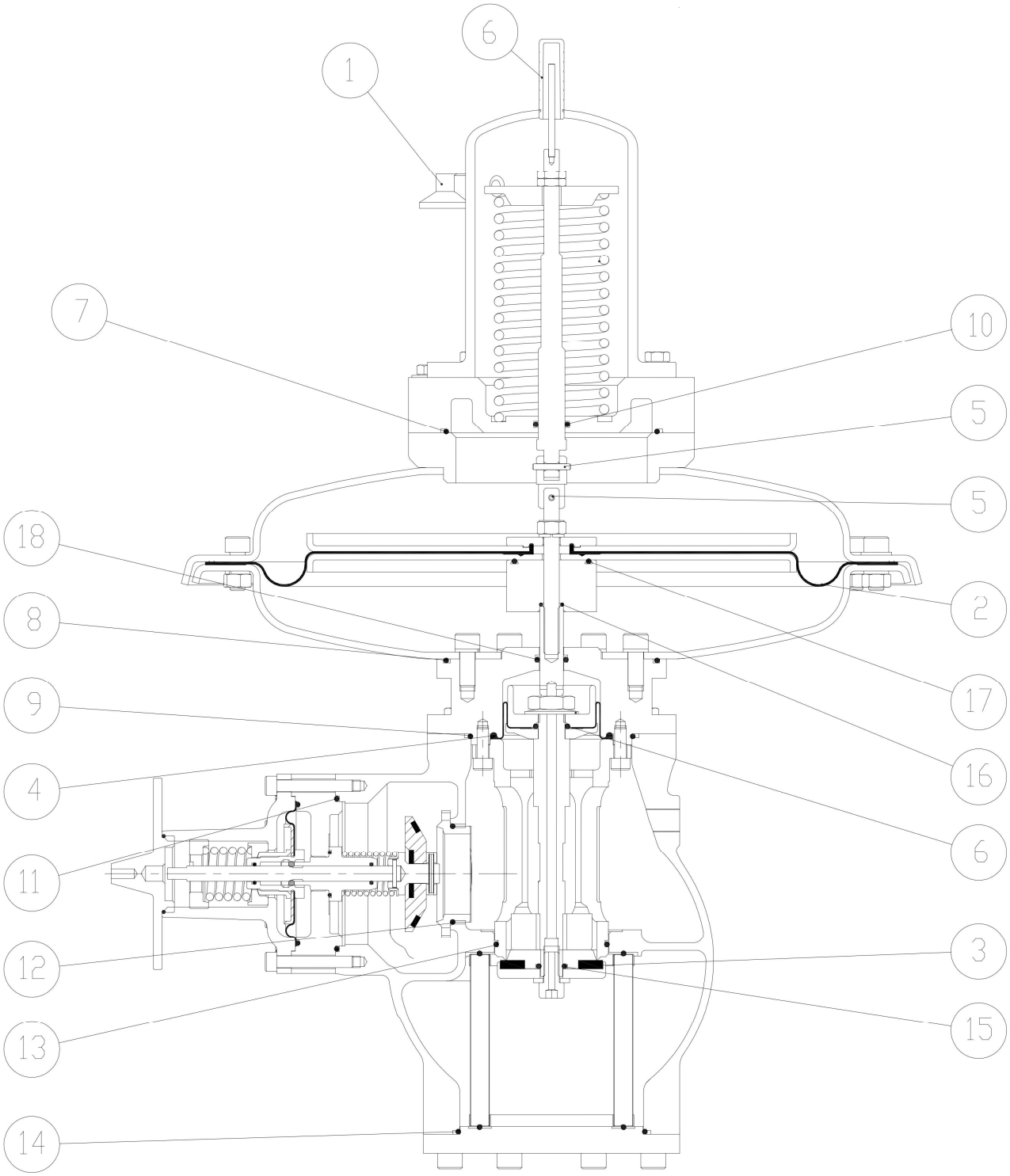
The regulators should be stored at a clean and dry place, protected from bad weather

9 – GENERAL RECOMMENDATION

1) We test our regulators and valves at the requested operation conditions.
2) Criteria and maintenance steps are contained in manuals, however, for any doubt on the use, operation, or maintenance, contact Gascat's technical department that will give you proper guidance.
3) ***Gascat*** supplies, on request, a complete replacement kit.

10 – COMPONENTS & SPARE PARTS

Find below the components positions and spare parts components of BRISE PLUS, PRE PILOT G-38, PILOT G-50, PILOT G-80 and PILOT-G43M+31.


6
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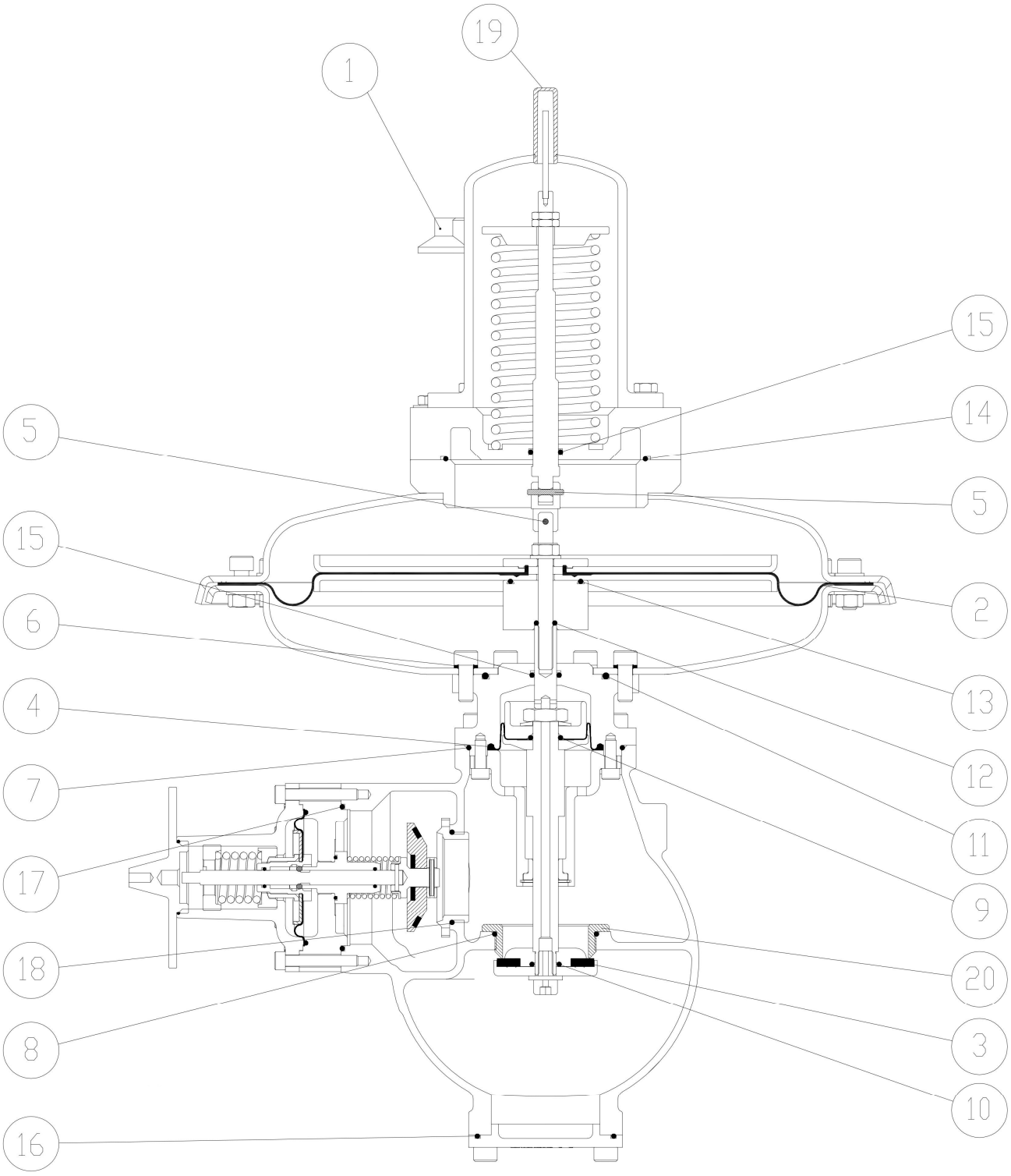
14

POS.	DESCRIPTION	QTY
1	RELIEF	1
2	DIAPHRAGM	1
3	SHUTTER LINING	1
4	DIAPHRAGM	1
5	PIN	2
6	VIEWFINDER	1
7	O'RING	1
8	O'RING	1
9	O'RING	1
10	O'RING	1
11	O'RING	1
12	O'RING	1
13	O'RING	1
14	O'RING	1
15	O'RING	1
16	O'RING	1
17	O'RING	1
18	O'RING	1


19
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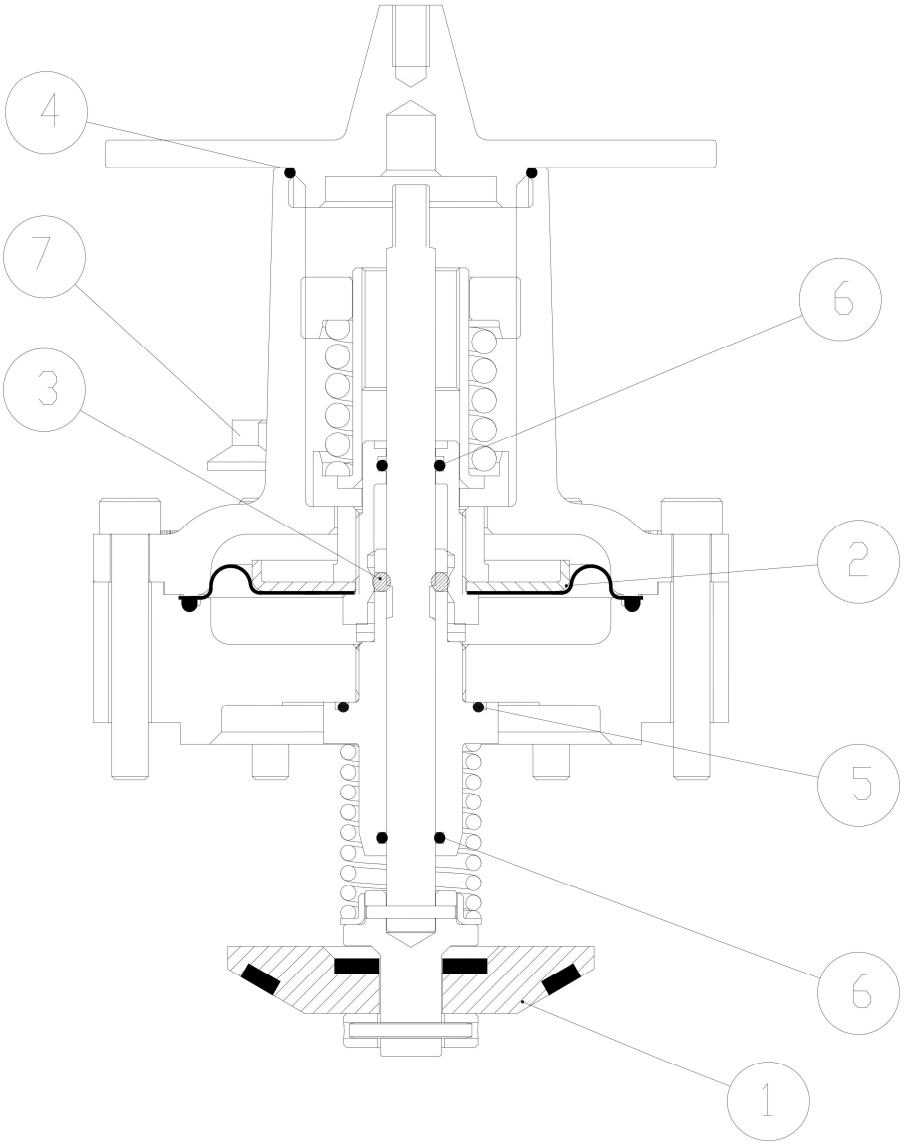
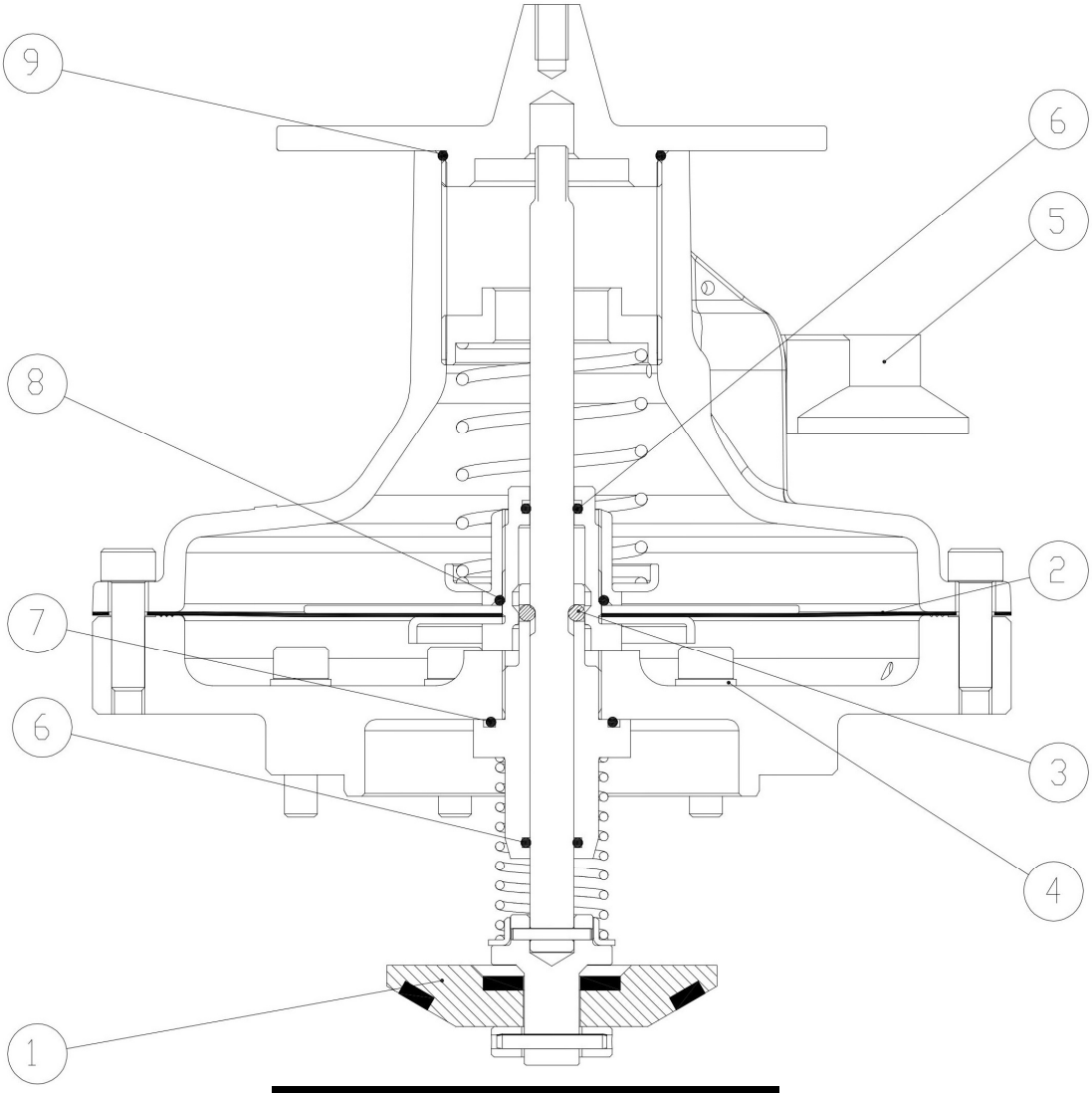
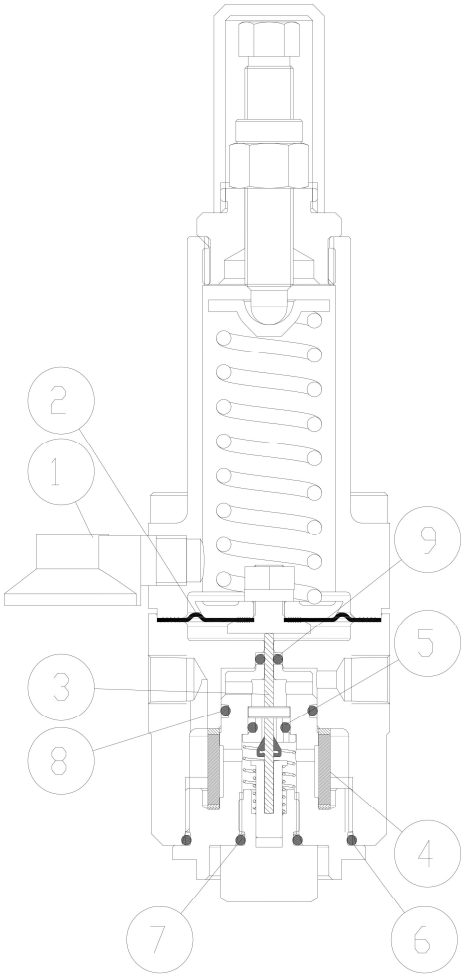
POS.	DESCRIPTION	QTY
1	RELIEF	1
2	DIAPHRAGM	1
3	SHUTTER LINING	1
4	DIAPHRAGM	1
5	PIN	2
6	GASKET	6
7	O'RING	1
8	O'RING	1
9	O'RING	1
10	O'RING	1
11	O'RING	1
12	O'RING	1
13	O'RING	1
14	O'RING	1
15	O'RING	2
16	O'RING	1
17	O'RING	1
18	O'RING	1
19	VIEWFINDER	1
20	SEAT	1



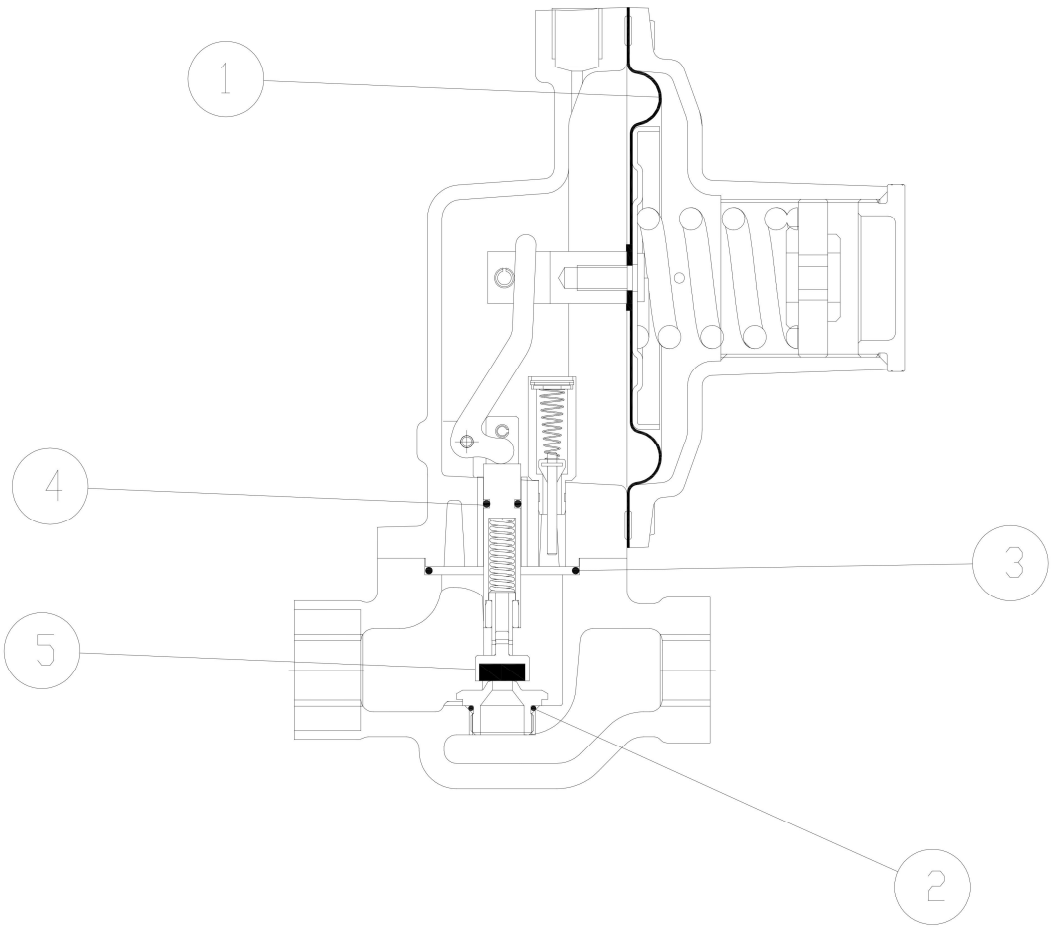
SHUT-OFF H		
POS.	DESCRIPTION	QTY
1	SHUTTER	1
2	DIAPHRAGM	1
3	SPHERE	4
4	O'RING	1
5	O'RING	1
6	O'RING	2
7	RELIEF	1



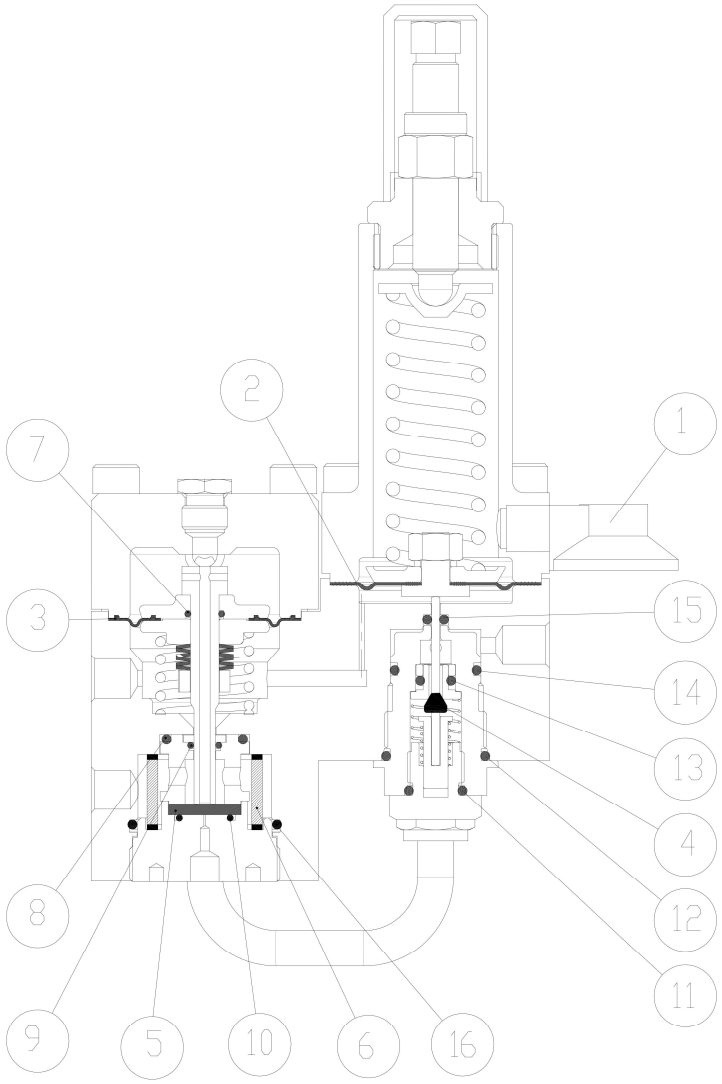
SHUT-OFF L		
POS.	**DESCRIPTION**	**QTY**
1	SHUTTER	1
2	DIAPHRAGM	1
3	SPHERE	4
4	GASKET	6
5	RELIEF	1
6	O'RING	2
7	O'RING	1
8	O'RING	1
9	O'RING	1



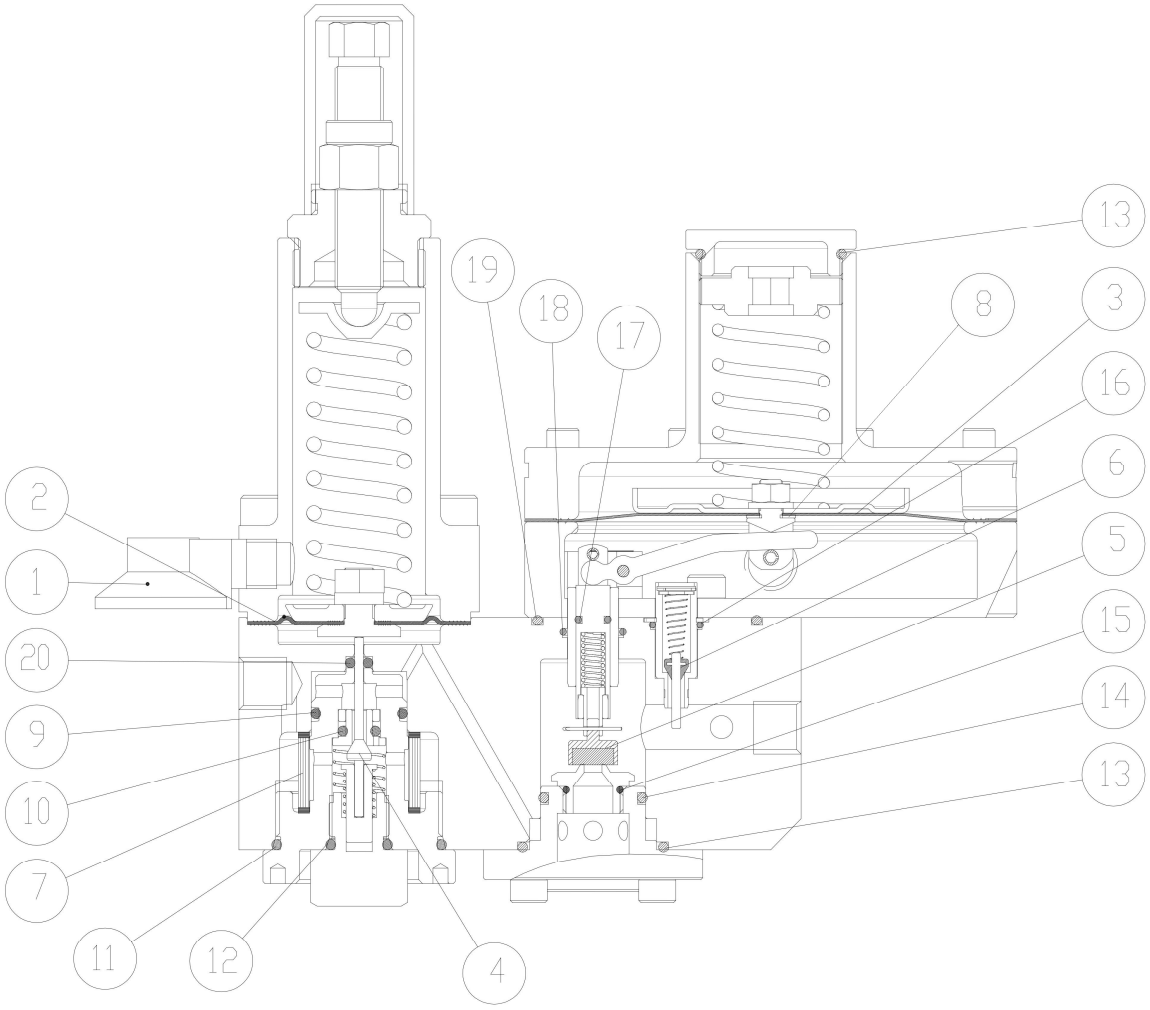
PRE PILOT G-38 → COCE: 28.20.41F		
POS.	**DESCRIPTION**	**QTY**
1	RELIEF	1
2	DIAPHRAGM	1
3	SHUTTER	1
4	FILTER ELEMENT	1
5	O'RING	1
6	O'RING	1
7	O'RING	1
8	O'RING	1
9	O'RING	1



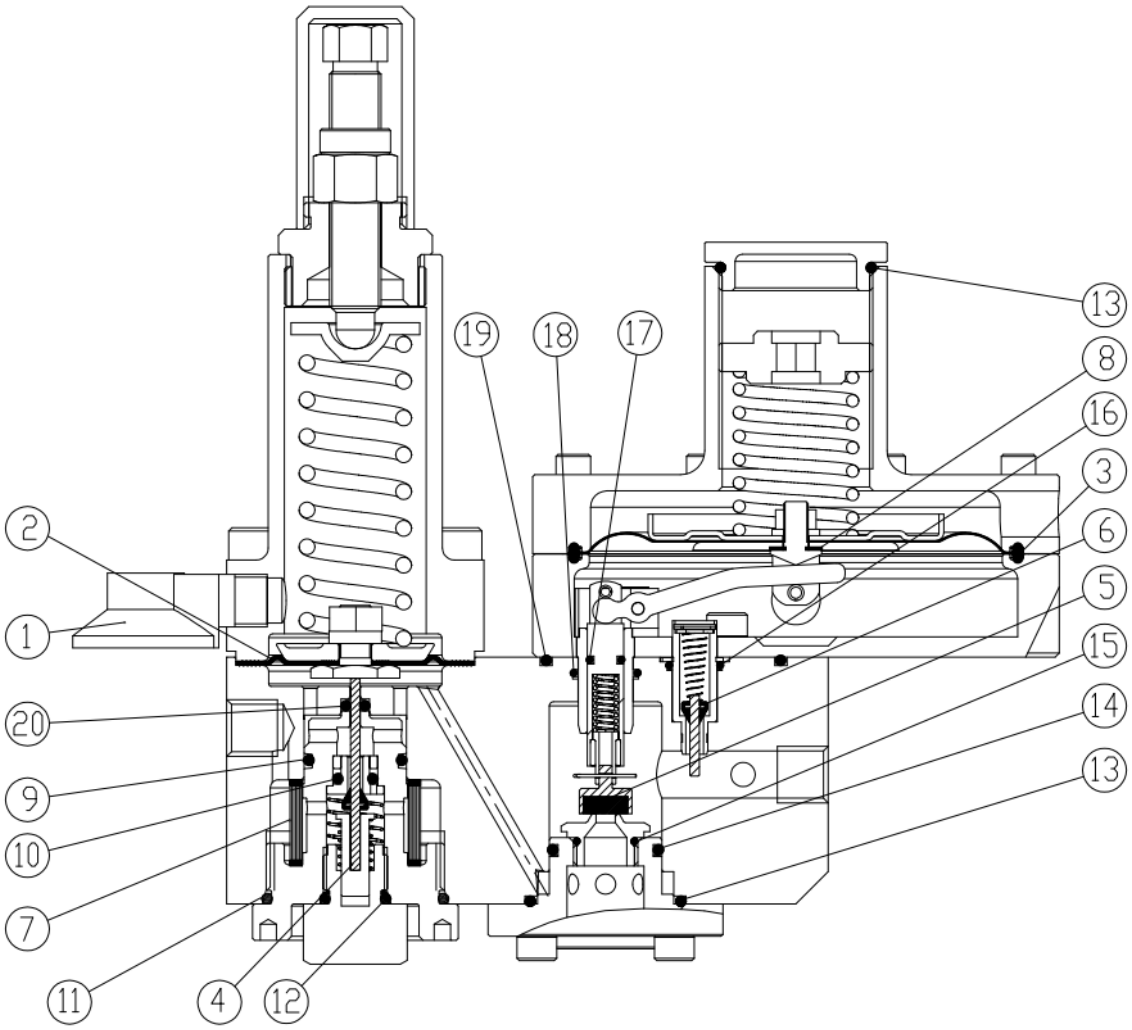
PILOT G-50 → CODE: 22.20.02		
POS.	**DESCRIPTION**	**QTY**
1	DIAPHRAGM	1
2	O'RING	1
3	O'RING	1
4	O'RING	1
5	O'RING	1



PILOT G-43M+G31 → CODE: 28.21.10.FH65					
POS.	DESCRIPTION	QTY	POS.	DESCRIPTION	QTY
1	RELIEF	1	9	O'RING	1
2	DIAPHRAGM	1	10	O'RING	1
3	DIAPHRAGM	1	11	O'RING	1
4	SHUTTER	1	12	O'RING	1
5	LINING SHUTTER	1	13	O'RING	1
6	FILTER ELEMENT	1	14	O'RING	1
7	O'RING	1	15	O'RING	1
8	O'RING	1	16	O'RING	1



PILOT G-80 (old version) → CODE: 28.21.28_KIT					
POS.	**DESCRIPTION**	**QTY**	**POS.**	**DESCRIPTION**	**QTY**
1	RELIEF	2	11	O'RING	1
2	DIAPHRAGM	1	12	O'RING	1
3	DIAPHRAGM	1	13	O'RING	2
4	SHUTTER	1	14	O'RING	1
5	SHUTTER	1	15	O'RING	1
6	INTERNAL RELIEF	1	16	O'RING	1
7	FILTER ELEMENT	1	17	O'RING	1
8	GASKET	1	18	O'RING	1
9	O'RING	1	19	O'RING	1
10	O'RING	1	20	O'RING	1



G-80 PILOT → CODE: 28.21.28A_KIT					
POS.	DESCRIPTION	QTY	POS.	DESCRIPTION	QTY
1	RELIEF	2	11	O'RING	1
2	DIAPHRAGM	1	12	O'RING	1
3	DIAPHRAGM	1	13	O'RING	2
4	SHUTTER	1	14	O'RING	1
5	SHUTTER	1	15	O'RING	1
6	INTERNAL RELIEF	1	16	O'RING	1
7	FILTER ELEMENT	1	17	O'RING	1
8	GASKET	1	18	O'RING	1
9	O'RING	1	19	O'RING	1
10	O'RING	1	20	O'RING	1

11 – PROCEDURE FOR BRISE PLUS REGULATOR DISASSEMBLY

Before proceeding with the equipment disassembly, check if all the conditions set out in item 5.1 of this manual have been observed.

Under no circumstances start the equipment disassembly if it is pressurized.

The disassembly procedure given below refers to the components' positions shown in the diagram of section 6.0 of this manual.

11.1 MAIN REGULATOR VALVE

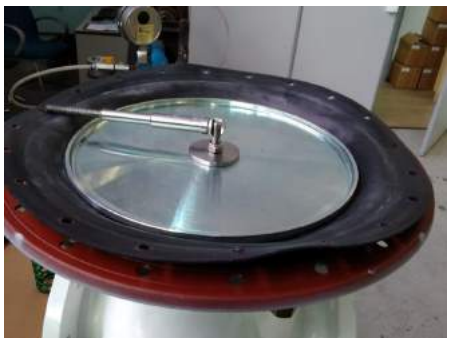
1) Discharge the pilot adjusting spring by turning the adjustment screw (19 mm wrench) counterclockwise.
2) Remove the pilot connections and the pipes (19 mm wrench).
3) Remove the screws that fix the pilot support in the main covers (6 mm allen wrench and 13 mm wrench).



4) Remove the screws along the cap and the closing spring cover and remove them (7/16" wrench and 13 mm wrench).
5) Remove the screws along the main covers (6 mm allen wrench and 13 mm wrench).







6) Remove the pin with a pin punch tool and remove the top plate (13 mm wrench).
7) Remove the screw along the bottom cover and remove the it (6 mm allen wrench).
8) Remove the intermediate (ND2" = 13 mm / DN3" = 19 mm wrench).

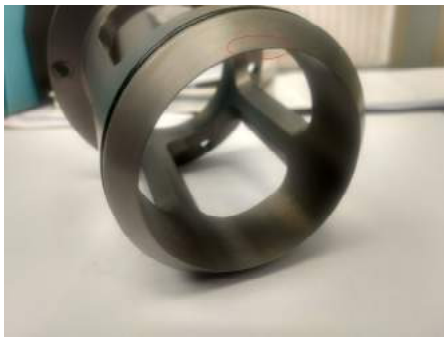







9) Remove the Shutter (ND2” = 6 mm / DN3” = 8 mm wrench) and with a tool (ND2” = 12 mm / DN3” = 17 mm wrench) fix the main shaft.
10) Remove the Seat Cage (allen wrench 5 mm). Be careful to do not damage the shutter surface.





11) There are two options to disassembly the Rolling Diaphragm. With two tools (ND2” = 7/8” / DN3” = 15/16” wrench and ND2” = 12 mm / DN3” = 17 mm wrench) or with a tool (ND2” = 7/8” / DN3” = 15/16” wrench) and a bench vise.

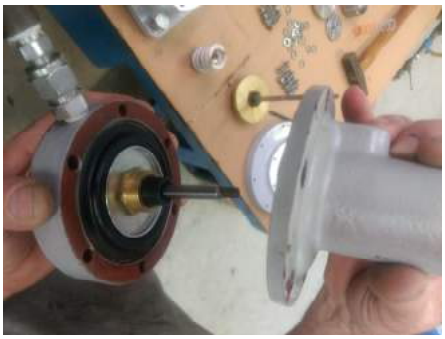


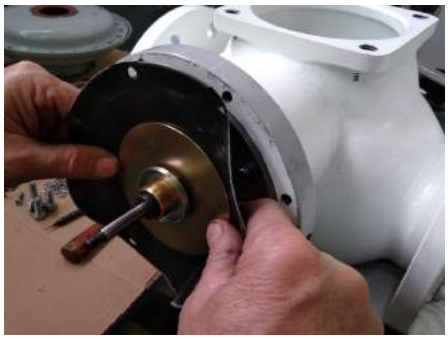


11.2 SLAM SHUT VALVE (ACTUATOR L & H)

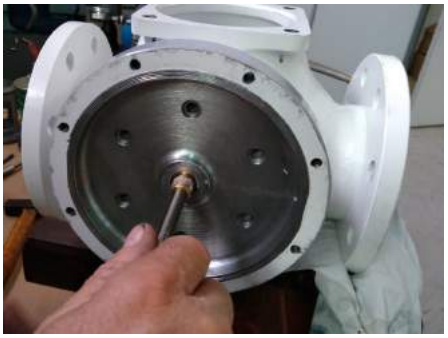
1) Discharge the SSV adjusting spring by turning the spring adjusting counterclockwise (15 mm wrench).
2) Remove all screws along the SSV cover (4mm wrench).





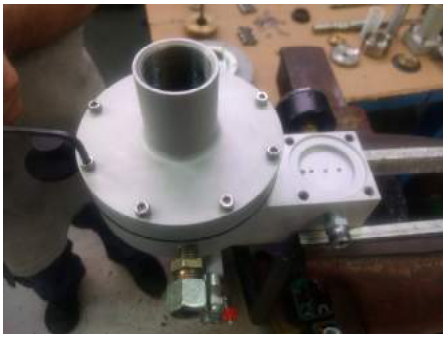
3) Disassembly the diaphragm with a combination of the two tools 1” wrench.
4) To the L model, it is necessary a 5 mm allen wrench to finish the disassembly.


11.3 G-80 PILOT

1) Remove all screws along the pilot covers (4 mm and 6 mm wrench).

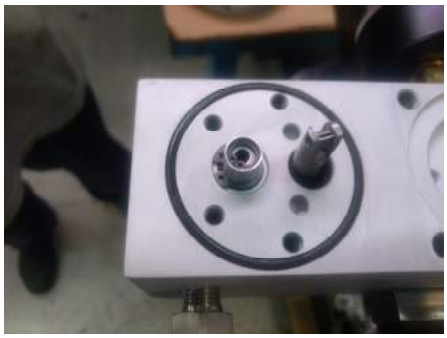




2) Remove the lever screws and the lower cover screws (3 mm, 5 mm and 10 mm wrench).





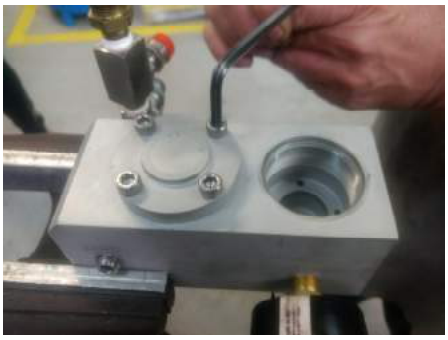
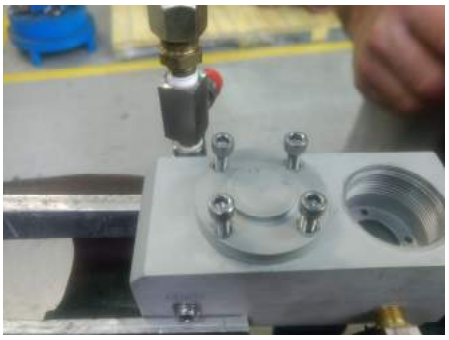
3) Turn the pilot upside down, remove the pilot cartridges (7/8", 1.1/2" wrench and 5 mm allen wrench).
4) Remove the seat (19 mm wrench).

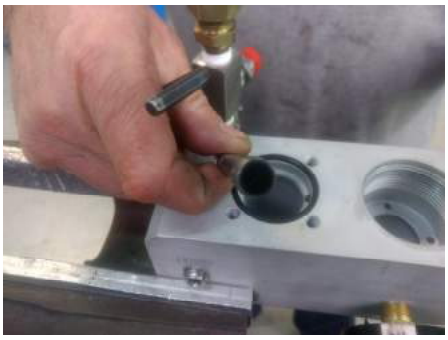










5) To disassembly the diaphragm it is necessary an allen tool 4.0mm (or similar) and a 10 mm wrench.



12 – PROCEDURE FOR BRISE PLUS REGULATOR ASSEMBLY

To make the assembly this pressure regulator valve, just follow the steps of the procedure in inverse order, but we shall make some observations on specific points that must be examined closely during the reassembly.

12.1 MAIN REGULATOR VALVE

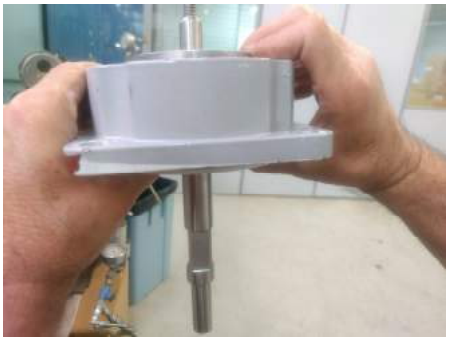
1) To make the assembly of the rolling diaphragm, turn reverse it and put in the rolling diaphragm plate. Be careful with the diaphragm align.





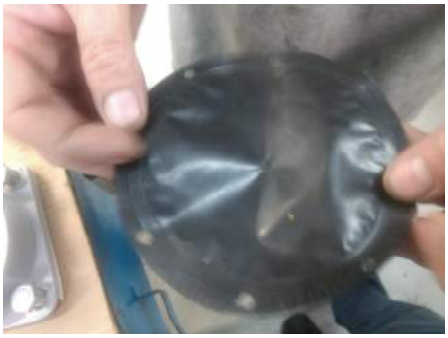
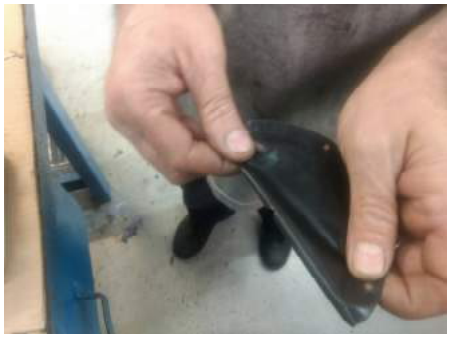

2) It is important when assembly the main diaphragm, rolling diaphragm and the shutter to fix the shaft to avoid the damage in them.



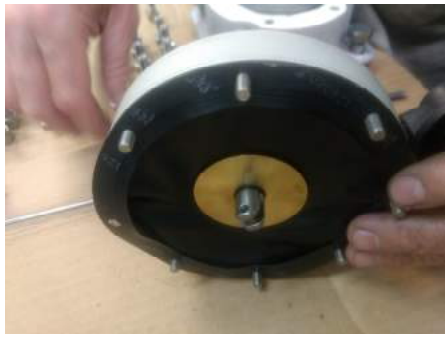



12.2 G-80 PILOT

1) To make the assembly of the diaphragm, fold it to do a “line” in the diaphragm and align with a allen tool 4 mm (or similar).
2) To assembly the diaphragm gasket, assembly the diaphragm set in the top cover with the screws to facilitate the assembly.

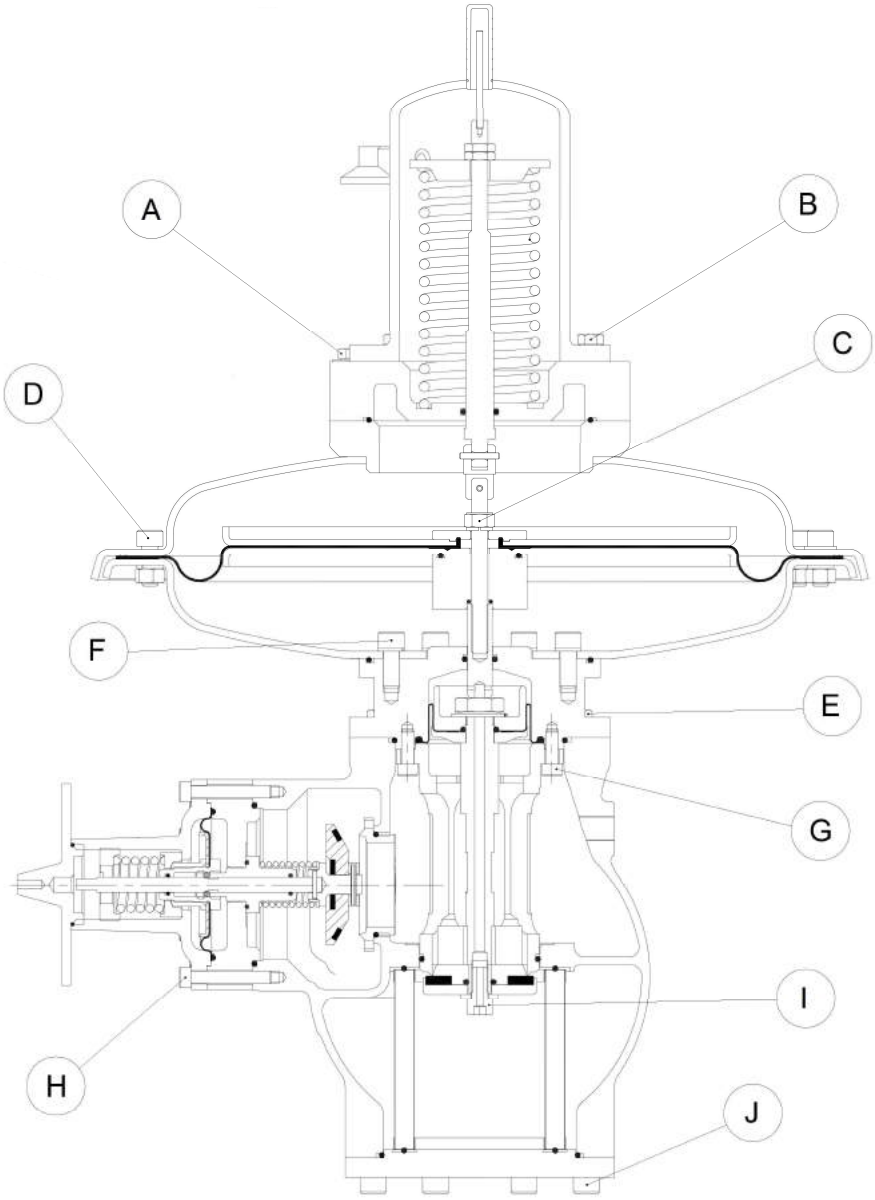





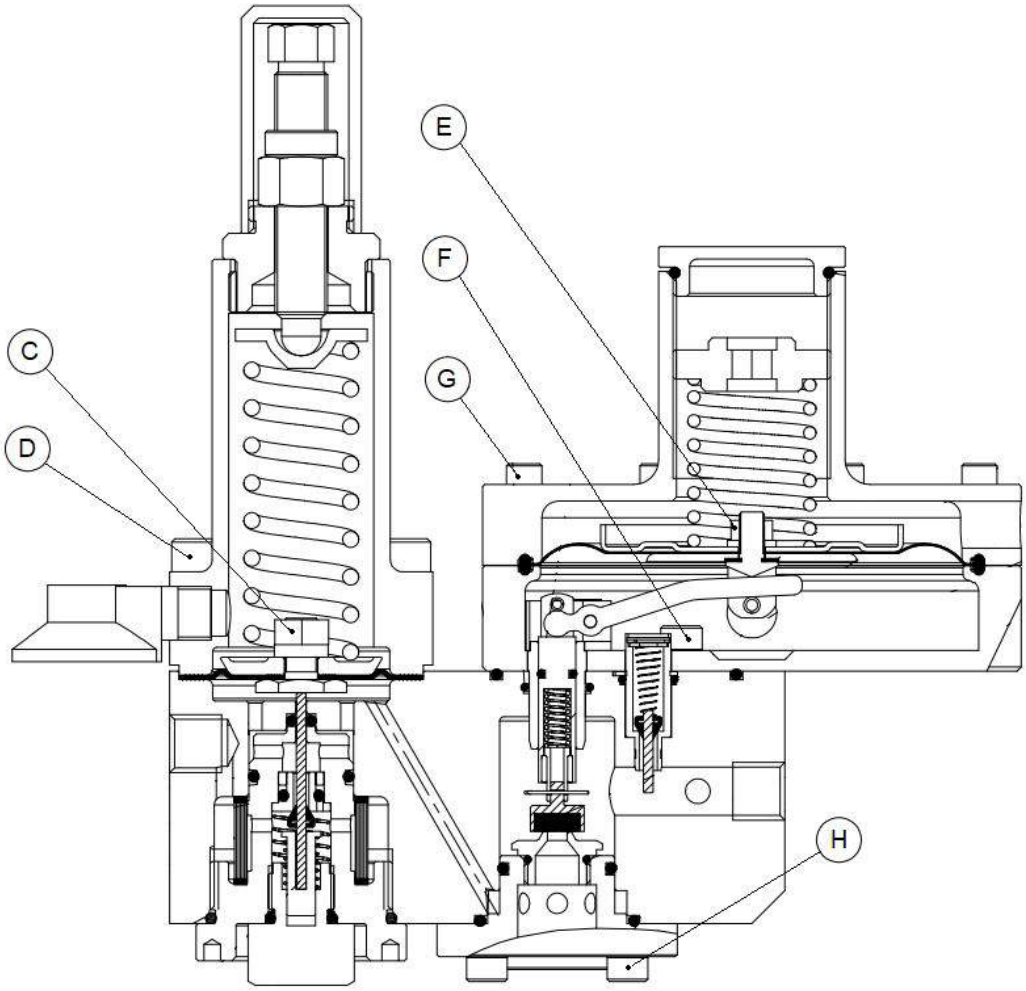


13 – RECOMMENDED TORQUES

When tightening fasteners arranged in a circular pattern, alternate the tightening of each fastener with the fastener directly across from it using a “star” criss-cross pattern for five times, until proper specified torque is achieved. Each time around, when all screws are tightened to the required torque, the diaphragm will compress a little until the plates are in direct, metal-to-metal, contact. It will take at least five times around before this happens. Only then will the applied torque on each screw remain at the required value.



BRISE PLUS		
ND	Screw	Torque [lbf.ft]
2	A	20
	B	15
	C	20
	D	20
	E	20
	F	20
	G	20
	H	15
	I	20
	J	20
3	A	20
	B	15
	C	20
	D	20
	E	20
	F	20
	G	20
	H	15
	I	23
	J	20



Screw	Torque [lbf.ft]
C	15
D	15
E	10
F	10
G	5
H	10