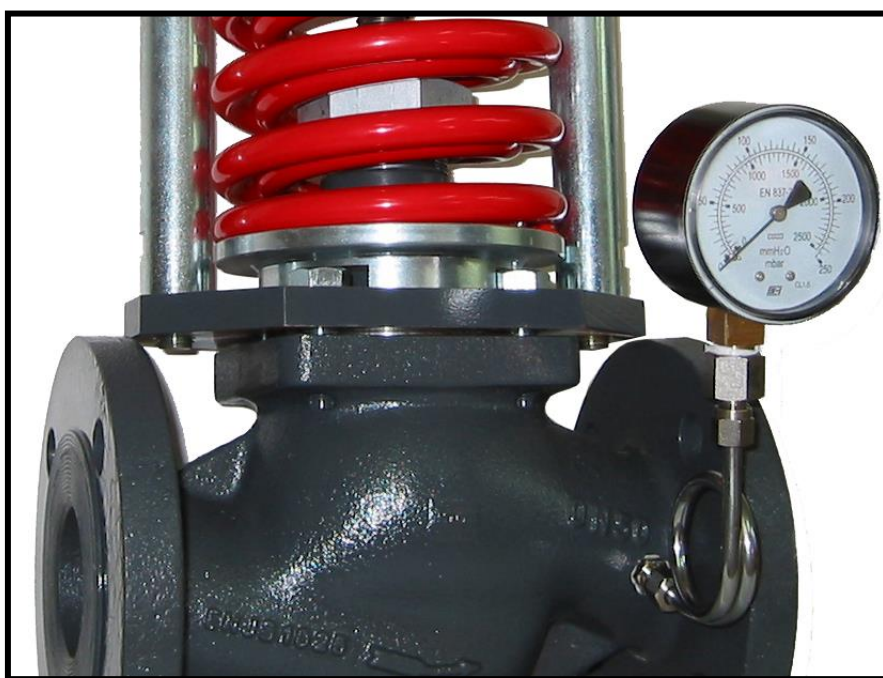




VALFONTA



USE, INSTALLATION AND MAINTENANCE MANUAL

PRESSURE REDUCING VALVE MODEL **M1**



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1. IDENTIFICATION PLATE LEGEND

a) CE marked is required in accordance with PED 2014/68/UE

SERIAL NR. DN **CE**
 MODEL ☐ EN ☐ ANSI
 PN Pin Pout MEDIUM
 RANGE Kvs - Cv
 BODY MAT. Tmax
 www.valfonta.com **VALFONTA** BARCELONA




b) CE marked is NOT required in accordance with PED 2014/68/UE

SERIAL NR. DN
 MODEL ☐ EN ☐ ANSI
 PN Pin Pout MEDIUM
 RANGE Kvs - Cv
 BODY MAT. Tmax
 www.valfonta.com **VALFONTA** BARCELONA

SERIAL N.	VALVE IDENTIFICATION NUMBER. VALFONTA WILL NEEDS THIS NUMBER FOR SPARE PARTS OR COMMENTS RESPECT OF THIS VALVE.
MOD.	VALVE MODEL
DN	VALVE NOMINAL DIAMETER
PN	VALVE NOMINAL PRESSURE
MEDIUM	FLUID
P.IN	INLET PRESSURE
P.OUT	OUTLET PRESSURE
BODY	BODY MATERIAL
KVS.	KV VALVE



ATEX marked required according to DIRECTIVE 94/9/EC

 VALFONTA E 08915 – Badalona (ESPAÑA)	
TYPE: PRESSURE REDUCING VALVES SELF - ACTUATED	
MANUFACTURING YEAR:	MANUFACTURING NUMBER:
 II 2 G D	c IIC Tx c IIIC Tx°C 
TECHNICAL FILE IN CUSTODY : LOM CERTIFICATION NUMBER: LOM 14.034 U	

Reference	Denomination
II 2	ATEX category, zones 1 & 21
G	Class I application (flammable liquids and gases)
D	Class II application (combustible dust)
c IIC	Safety construction protection mode for substances IIC
C IIIC	Safety construction protection mode for substances IIIC
Tx / Tx°C	Termal class according fluid temp. used
LOM	Number of certification from ExNB (LOM)



PRESSURE REGULATOR WITHOUT AUXILIARY ENERGY

PRESSURE REDUCING VALVE MODEL **M1**

2. MAIN FEATURES

The M1 model is self-operated bellows sealed pressure reducing valve.

This series of regulators is suitable for steam, compressed air, gases and liquids.

Very quick response to the demand.

Globe valve, single seat, outlet pressure regulated by diaphragm and inlet pressure balanced (from DN65).

Stem sealed by bellow of double layer in stainless steel.

To avoid any damage on the bellows M1 series is provided of anti rotation system.

Actuator mounts diaphragm with intermediate reinforced lining.

Regulation range between 0,1 and 15 barg with different actuators.

Fluids

Liquids, compressed air, neutral gases and steam.

Max. inlet pressure 40 barg (DN15 to DN50)
25 barg (DN65 to DN150)

Sizes DN15 to DN150

Body material Nodular Iron GGG40.3
Carbon steel A216 WCB
Stainless steel A351 CF3M
Bronze RG10, on request

Connections Flanged DIN PN16-PN40
Flanged ANSI 150 / 300
Threaded BSP / NPT

Trim material Stainless steel Aisi 316L

Diaphragm Material EPDM -40°C to 125°C
EPDM + PTFE 125°C to 250°C

Seal material Graphited PTFE
NBR, PEEK, EPDM, ...

3. OPERATION

When the interruption valve is opened, the fluid comes into the reducing valve in the same direction of the arrow and moves the seal (C). The flow will depend on the final position between the seal (C) and the seat (B).

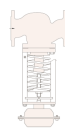
Once the installation is saturated and, using the regulation nut (F), we control the required outlet pressure value. Then, the outlet pressure is transmitted to the diaphragm (H) through the control line (L) and it moves the screws and the seal (C) according to the tension accumulated in the springs.

If this pressure overcomes set value, the valve will close proportionally to maintain outlet pressure. Starting from size DN65 valve is provided with a compensation gasket (D) to balance the inlet pressure.

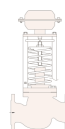
RECOMMENDATIONS

This series must be used only as a pressure reducing valve because any variation will be absorbed and compensated by the diaphragm.

The valve closes when outlet pressure increases.



Standard installation when temperature is upper 0°C



Another option for liquids and neutral gases until 80°C



This position is not admitted



Special ATEX instructions

- No limitation of use due to the ATEX substance.
- Limitations due to thermal class:

Class I (flammable liquids and gases)

TEMPERATURE CLASS	MAX. SURFACE TEMPERATURE	APPROPRIATE FOR SUBSTANCES WITH IGNITION TEMPERATURE
T1	450°C	Ti >450°C
T2	300°C	Ti >300°C
T3	200°C	Ti >200°C
T4	135°C	Ti >135°C
T5	100°C	Ti >100°C
T6	85°C	Ti >85°C

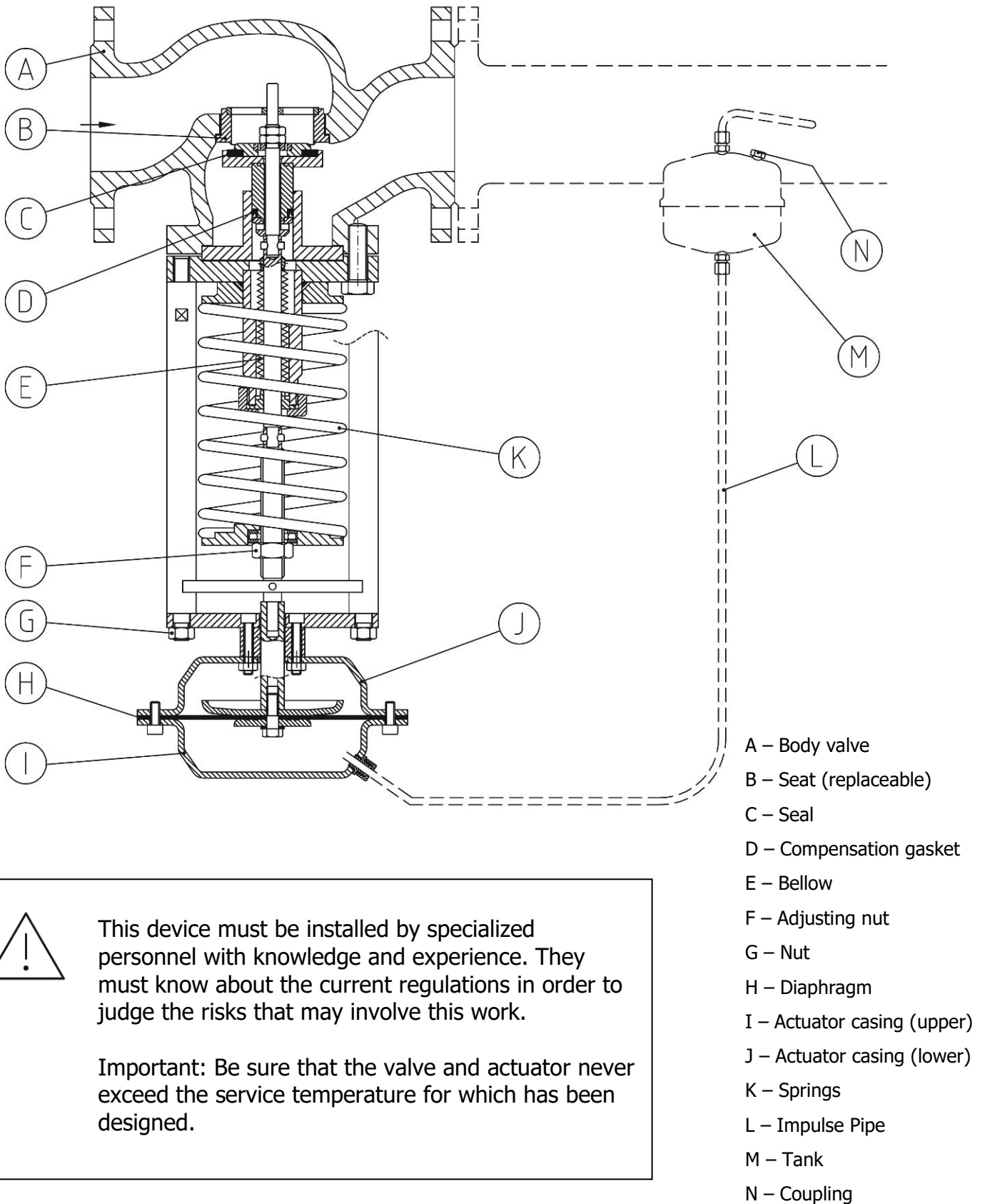
- Class II (combustible dust)

$$T(x) \leq 2/3 MIT_{cloud}$$

$$T(x) \leq 5 \text{ mm } MIT_{layer} - 75 \text{ K}$$



4. SCHEME



This device must be installed by specialized personnel with knowledge and experience. They must know about the current regulations in order to judge the risks that may involve this work.

Important: Be sure that the valve and actuator never exceed the service temperature for which has been designed.



5. ASSEMBLY

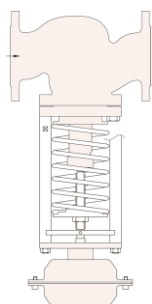
The pipe must be cleaned carefully before installing the valve, to prevent that any small element or impurity may affect the reducing valve work.

It is also very important to install a strainer in front of the valve in order to protect it.

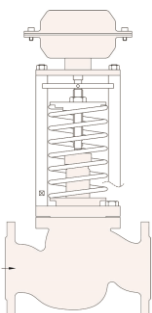
Reducing valve must be installed in a horizontal pipe and the direction of the flow should be in the same direction that shows the valve body.

When the steam is condensed, the pipe should be inclined to help with the evacuation.

Assembly Position



Standard position for any fluids and temperature above 0°C



Position for gases and liquids when the temperature of the fluid does not exceed 80 °C

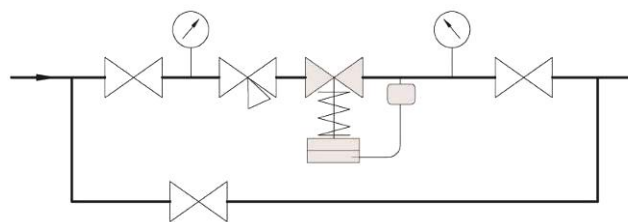


This situation is not allowed because the valve would not work properly.

The supports holding the valve will be done in the pipe and as close as possible to the flanges but never fixed in the valve or the actuator, to eliminate unnecessary tensions.

Installation in by-pass

If you install a valve in bypass, which is highly recommended, it must spliced back to the main pipe after the control line, and with their check valves, according to the scheme:



Control line

The control line must be connected to the main pipeline in downstream pressure, at least 1 meter from the valve, through a tube (10 x 1 mm).

However, if after the valve, there is a distributor, the connection of the control line must be connected to the distributor, although there are several meters between them.

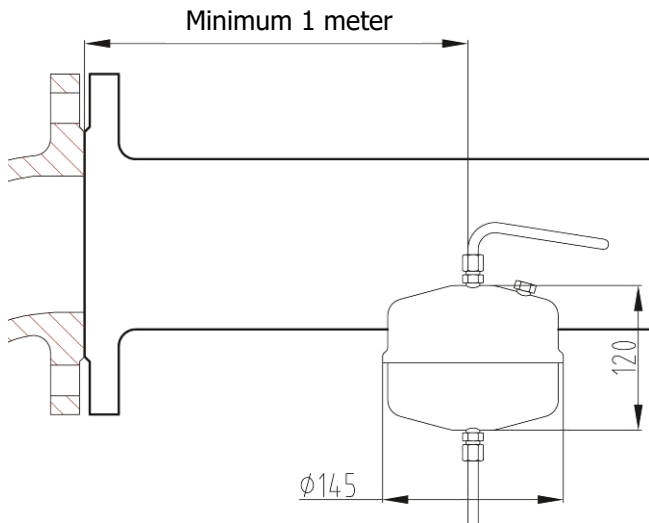
If the reducing valve oscillates, it is recommended to install a needle valve in the control line.

Condensation Tank

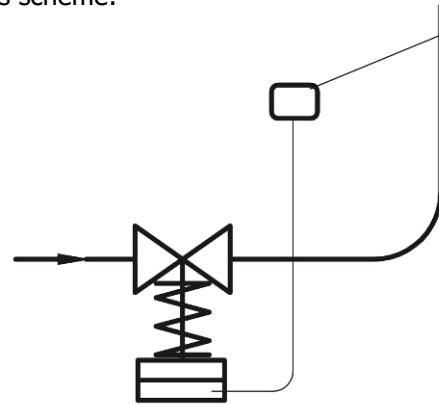
The Condensing Pot will be only necessary for liquids with temperatures above 125°C and steam, in order to protect the membrane from overheating. The pot is always in the highest place of the pipe.

The connection of the control line of the pot to the main pipe will be made laterally to the center of it and with a slight slope to slide into the pipe.

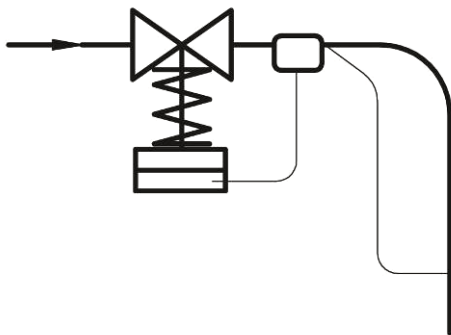
All the connections of the actuator and the condenser pot are for a 10x1 tube.



If the control line connection is placed over the outlet flange, the condenser pot must be installed according to this scheme:



If the connection of the control line is located below the outlet flange, the condenser pot installation should be according to the following scheme:



Start-up

If the steam or liquid flows over 125 ° C is necessary to install and fill the pot. Screw the cap and tight it.

Open the check valves slowly (to prevent water hammer).

To adjust the set pressure (downstream pressure), turn the regulating nut. Compressing the spring (turn right) increases the outlet pressure and decompressing the spring, decreases.

Dimensions, weight and Kv

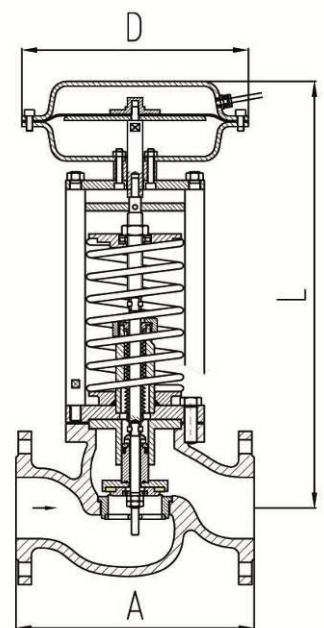
DN	15	20	25	32	40	50	65	80	100	125	150
Kv (m³/h)	3.5	5	9	13.5	22	32	57	82	115	190	240
A EN (mm)	130	150	160	180	200	230	290	310	350	400	480*
A ANSI150 (mm) (inches)	○	○	184 7,25"	-	222 8,75"	254 10"	276 10,9"	298.5 11,75"	352.5 13,88"	-	451 17,75"
A ANSI300 (mm) (inches)	○	○	197 7,76"	-	235 9,25"	267 10,51"	292 11,5"	317.5 12,50"	368 14,49"	-	-
L (mm)	440	445	450	455	463	475	560	560	575	600	640
Weight (kg.)	20	22	24	28	32	35	52	57	68	85	105

* DN150 face to face: optionally 450 mm

Outlet pressure ranges (diameters D in mm.)

Range (bar g)	DN15 DN20	DN25 DN32	DN40 DN50	DN65	DN80	DN100	DN125	DN150
0,1 - 1,5	295	295	295	295	350	350	-	-
1 - 3	255	255	255	255	295	295	295	350
2 - 5	230	230	230	230	255	255	255	295
4 - 8	195	195	195	195	230	230	230	255
7 - 15	175	175	175	175	195	195	195	230

Approximate diameter of the recommended actuator (mm)





ATEX requirements

- **IMPORTANT!** The respective national regulations as well as general engineering rules governing the installation and operation of equipment in explosive atmospheres must be observed.
- The valves are ATEX category "II 2 GD" according to 100a ATEX Directive (94/9/EC).
- **IMPORTANT!** The device can only be used in potentially explosive locations Class I (gases, vapors or liquids) Zones 1 and 2 and Class II (combustible dusts) areas 21 and 22, according to the specifications in the Directive 1999/92/EC , as well as the Electro technical Regulations.

Electrostatic discharges

Under certain conditions, electrostatic discharges that are capable of ignite explosive atmospheres, can be produced. The most important measure of protection is equipotential bonding of all conductive parts and earthing.

In order to avoid electrostatics discharges, the installation of devices and control elements must be earthing.

- **IMPORTANT!** Connecting the valves to process: it should be ensured electrical continuity of $<10^6 \Omega$.
- **IMPORTANT!** National regulations on maintenance, service, inspection and repair of apparatus and equipment for explosive atmospheres, as well as general engineering rules must be observed.

COMMISSIONING

IMPORTANT! User is the only responsible for a safe use of the devices.

In use, parts that affect the explosion protection of the valves must be checked and act accordingly, f.e.:

- Fixing Elements -screws, nuts, shafts, etc.- see technical documentation of the product supplied. It must be ensure its tightening, proper operation and / or change when necessary. After 2.500h of working or 6 natural months (whichever comes first).
- The seals will be replaced by original spare parts: every 25,000 hours or when periodic inspections result said (the lower range).
- Any other action arising from inspection and maintenance plan, set by the user
- **IMPORTANT!** If repainting the valves and / or spare parts, ensure there is no paint on moving parts, mounting flange and closure sealing.

INSPECTIONS

- **IMPORTANT!** National Regulations must be observed. It is user's responsibility to establish an inspection and maintenance plan for these devices in order to ensure their proper use.
- Inspections must be performed by "qualified staff" because of the kind of equipment and / or installation.
- Purposes can be used to guide the requirements of the UNE-EN 60079-17, in order to establish the inspection plan.
- **IMPORTANT!** When inspections are "Detailed" or it is degree is "Close", the devices will be completely shut out.



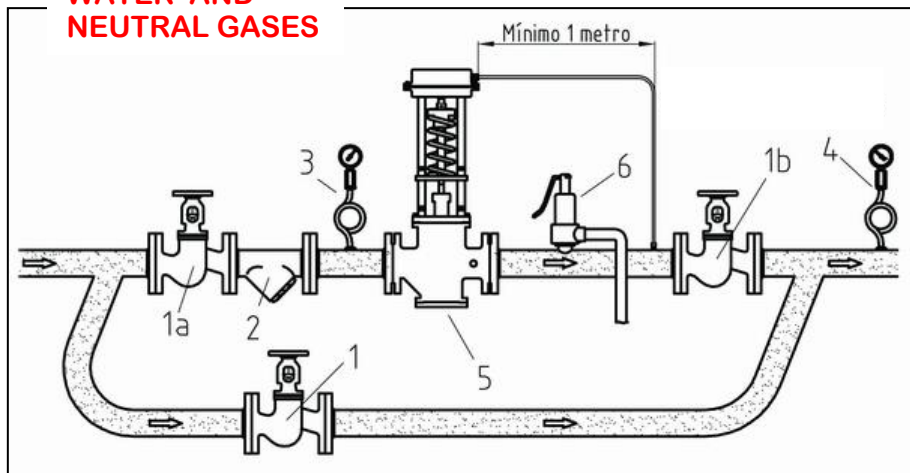
6. POSSIBLE BREAKDOWNS

Symptom	Possible reason	Solution
You can not adjust the outlet pressure.	The actuator does not get pressure.	Clean or replace capture of control and check "racords" of connection.
Outlet pressure rises above the set one.	Pressure port blocked.	Clean or replace capture of control and check "racords" of connection.
	Actuator escape	Inspect diaphragm and gaskets and replace them if they are damaged.
	Eroded seal	Dismantle the actuator, springs and the body cover of the valve to inspect the seal. Replace it if it is necessary.
	Balancing gasket wear	Dismantle the actuator, springs and the body cover of the valve to inspect the balancing gasket. Replace it if it is necessary. (only DN65 to DN100)
	Bellows failure	Dismantle the actuator, springs and the body cover of the valve to inspect the bellow. Replace it if it is necessary.
In total charge, the outlet pressure is under the required one.	Submeasured valve for the requested load.	Check if the valve size is enough for that load. Replace it for a bigger DN valve.
It does not provide the total charge and the valve is properly dimensioned.	The valve does not reach the maximum path.	Consult with the manufacturer.
The flow is low and the outlet pressure oscillates.	Too big control line	Replace the 10x1 pipe for the 6x4 one, and all the racords necessary for his connection.
	Too big increasing pressure	Install two valves in series to reduce the reducing rate.
	The outlet pressure control line is very close to the valve.	Check that the line is at least 1 m. from any valve to avoid turbulences.



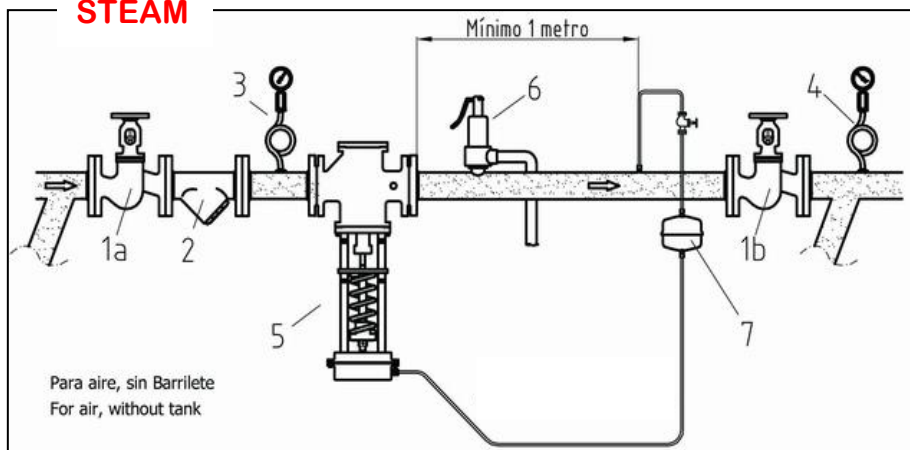
7. INSTALLATION DRAWINGS

WATER AND NEUTRAL GASES



- 1.- Isolation Valve
- 2.- Filter
- 3.- Inlet pressure gauge
- 4.- Outlet pressure gauge
- 5.- Reducing Valve M1
- 6.- Safety Valve
- 7.- Condensating tank

STEAM



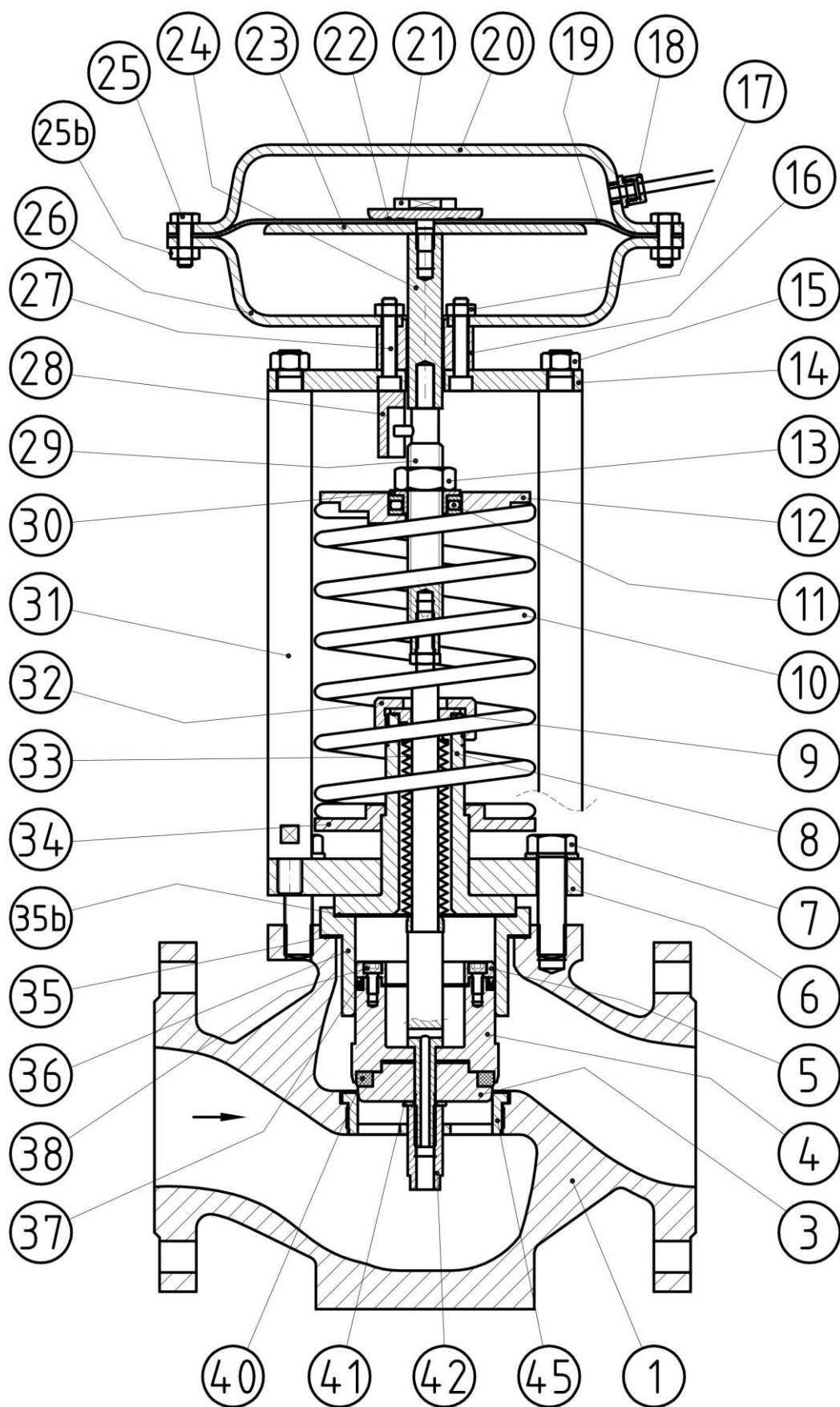
Technical data

Nominal pressure	PN16-PN25-PN40 or CLASS 150-CLASS 300		
Nominal size	DN15 to DN50	DN65 to DN80	DN100 to DN150
Max. permissible differential pressure Δp	25 bar	20 bar	16 bar
Max. permissible temperature: body	Refer to technical sheet HT-101		
Max. permissible temperature: plug	metal: 250°C PTFE+GR: 220°C PEEK: 250°C EPDM: 125°C FPM: 150°C NBR: 80°C	metal: 220°C PTFE+GR: 220°C PEEK: 250°C EPDM: 125°C FPM: 150°C NBR: 80°C	
	Diaphragm EPDM till 125°C Diaphragm EPDM+PTFE and condensation tank till 250°C		
Max. permissible temperature: actuator			

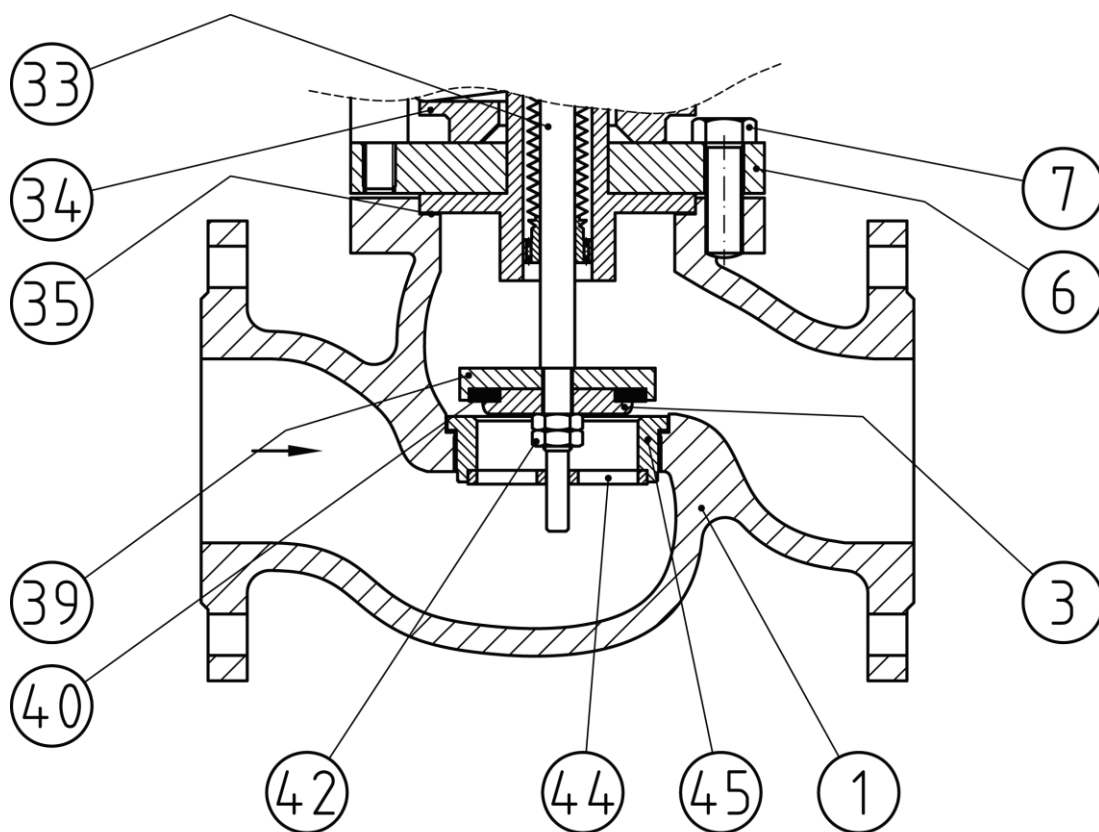


8. DISMANTLING AND ASSEMBLING THE VALVE

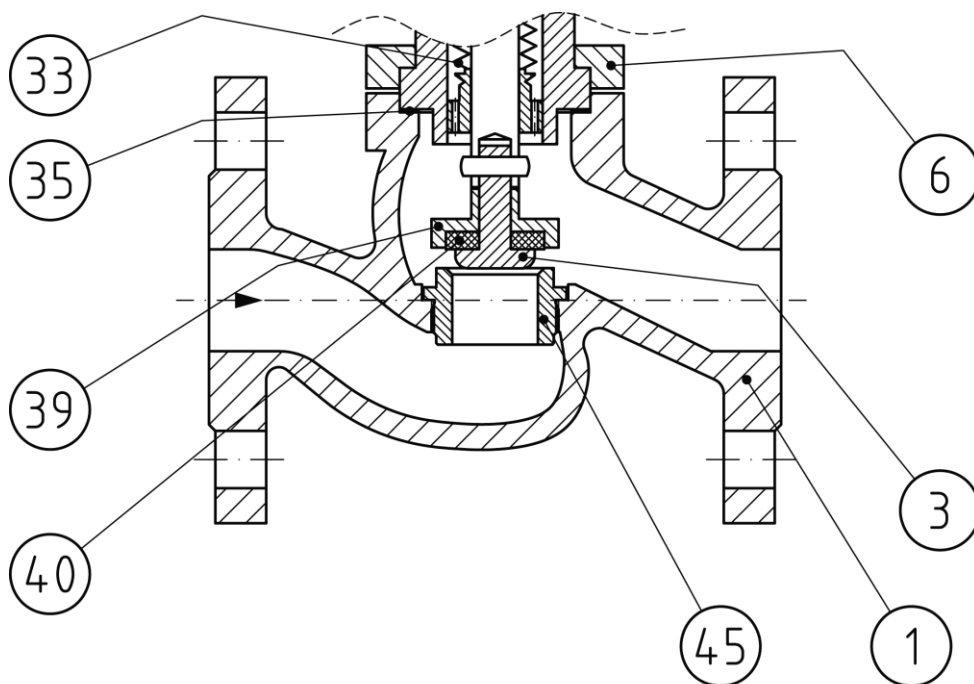
- a.** Unscrew completely the adjusting nut (13) to loosen the springs.
- b.** Ensure there is no pressure in the pipe line and the temperature of valve and pipe is ambient.
- c.** Unscrew the nuts (15).
- d.** Remove actuator group. In a workbench, if necessary, replace the diaphragm (19) and o-rings (22):
 - i. Unscrew bolts and nuts (25).
 - ii. Remove diaphragm group and unscrew nut (21) of stem (24).
 - iii. Replace diaphragm (19) and o-rings (22) and reassemble in reverse.
- e.** Remove columns (31), regulation nut (13), Guide (30), axial bearing (11), upper spring support (12), bellow nut (32) and lower support spring (34).
- f.** Unscrew bolts (7).
- g.** Lift total seal group (seal, cover, guide, stems) of the body.
- h.** If necessary, replace seat (40) and bellow group (33):
 - b. Remove seal group, cover, guide and stems.
 - a. DN40 – DN100: Unscrew nut/s (42) and remove support seal (3) and washer seal (39).
 - b. DN15 – DN32: Remove the pin (42) and support seal (3) and washer seal (39).
 - c. Replace seal (40) if necessary.
 - c. Remove and replace bellow group.
 - a. DN65 - DN100: Remove guide (36), unión pin and replace bellow group (33) with o-rings (9) if necessary, and the compensation gasket (37).
 - b. DN15 – DN50: Replace bellow group (33) with o-rings (9) if necessary.
- i.** Check the seal to assure is not damaged.
- j.** Clean and reassembly.



DN65 – DN150



DN40– DN50



DN15 – DN32



REF	DESCRIPTION	MATERIAL	
1	Body	Nodular Iron EN-JS1049 (GGG40.3), Bronze RG10, Carbon Steel 1.0619 (GSC-25N), Stainless steel 1.4408 (AISI 316)	
3	Lower support seal	1.4404 - SS 316L	
4	Bush	1.4404 - SS 316L	
5	Washer guide stem	1.4404 - SS 316L	
6	Cover	1.1191 - Carbon steel	1.4404 - SS 316L
7	Screw	8.8 - Carbon steel	A-2 Stainless St. (A-4 optionally)
8	Bellow guide	1.0570 or 1.1191 - Carbon steel	1.4404 - SS 316L
9	O-ring	Viton or Graphite+SS304	
10	Springs	1.0904 (Spring Carbon steel 55 Si 7)	
11	Ball bearing	1.3505 (Bearing steel 100 Cr 6)	
12	Upper support springs	1.1191 - Carbon steel	
13	Adjusting nut	8.8 - Carbon steel	
14	Support plate	1.1191 - Carbon steel	
15	Nut M12	8.8 - Carbon steel	
16	Support screws M8	8.8 - Carbon steel	
17	Nut M8	8.8 - Carbon steel	
18	Coupling	Brass / Stainless steel	
19	Diaphragm	EPDM, EPDM+PTFE, NBR, VITON, ...	
20	Actuator casing (upper)	1.0335 (Steel sheet with epoxy paint) or Stainless steel sheet AISI 316	
21	Diaphragm screw	1.4301 (Stainless steel AISI 304)	
22	O-ring	Viton	
23	Diaphragm plate	1.1191 - Carbon steel	
24	Diaphragm stem	1.1191 - Carbon steel	
25	Hexagonal screw	A-2 Stainless steel	
25b	Hexagonal Nut	A-2 Stainless steel	
26	Actuator casing (lower)	1.0335 (Steel sheet with epoxy paint) or Stainless steel sheet AISI 316	
27	Allen screw	8.8 - Carbon steel	
28	Antirotaion system	1.1191 - Carbon steel	
29	Regulation stem	1.4301 (Stainless steel AISI 304)	
30	Guide ball bearing	1.4307 (Stainless steel AISI 304L)	
31	Column	1.1191 - Carbon steel	
32	Nut guide bellow	1.1191 - Carbon steel	1.4404 (Stainless steel AISI 316L)
33	Bellow	1.4404 (Stainless steel AISI 316Ti)	
34	Lower support springs	1.1191 - Carbon steel	
35	Body Gasket	Graphite with SS304	
35b	Guide Gasket	Graphite with SS304	
36	Bush guide	1.4404 - SS 316L	
37	Balancing Gasket	Graphited PTFE	
38	Allen screw	A-2 Stainless steel	
39	Support seal	1.4404 - SS 316L	
40	Seal	Graphited PTFE (Consult for others)	
41	Washer	A-2 Stainless steel	
42	Nut	1.4404 - SS 316L	
45	Seat	1.4404 - SS 316L	



MAINTENANCE

Spare parts are subject to normal wear. They must be inspected and replaced when necessary.

The frequency of the inspections and maintenance depends on the severity of the service conditions. This section provides instructions about replacement, packing, stem, plug and seat.

All maintenance operations can be performed with the valve body installed.

Before any maintenance, ensure the valve is depressurised and clear of media, and isolate it both upstream and downstream. Be sure the temperature isn't dangerous.

IMPORTANT! Use only genuine parts or recommended by VALFONTA, SL

9. RECEIPT ON SITE

ATTENTION! Transport and storage of these devices should be in their original packaging.

RECEIPT ONSITE

When receiving the equipment on site, it should be unpacked to check that they agree with the request and delivery notes. At least, verification shall be performed:

- Visual,
- Mechanical

After these checks, if it will not be installed immediately, it will keep in dry and protected atmosphere.

Visual Inspection

Check that during transport, unloading and installation, the devices have not been damaged.

Mechanical Verification

Check all moving parts of the apparatus, as well as screws and other elements fulfill their mission.

IMPORTANT! If is observed abnormality during these guidelines reception, contact urgently VALFONTA to clarify responsibilities and put the devices in correct status.

The contents of that document are subject to change without notice.