Pressure reducer
245-246-271

Function

ICMA pressure reducers are devices that reduce and stabilize the incoming pressure from the water supply.
Pressure reducers allow correct use on domestic systems, reducing malfunctions due to external pressure which is generally high and variable, and extending the life of the system components.







Products

ARTICLE	DESCRIPTION
245	Pressure reducer with female pipe union connection
245+243	Pressure reducer with female pipe union connection and manometer
246	Pressure reducer with female connection
246+243	Pressure reducer with female connection and manometer
271	Pressure reducer with male pipe union connection
271+243	Pressure reducer with male pipe union connection and manometer

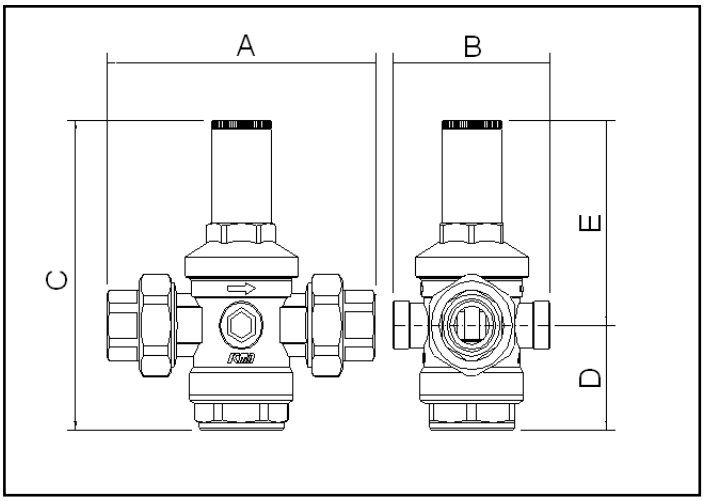
Technical features

TECHNICAL DATA	
Body:	Brass CW617N UNI EN 12165
Internal Components:	Brass CW617N UNI EN 12165
Anti-leakage devices:	NBR+EPDM
Spring:	Stainless steel
Manometer plug caps:	PA 66
Manometer plug size:	¼" F

PERFORMANCE	
Max upstream pressure:	40 bar
Max. reduction ratio (recommended):	2,5
Downstram setting range:	1 ÷ 6 bar
Production setting:	3 bar
Operating temperature:	5°C ÷ 80 °C
Working fluid:	water

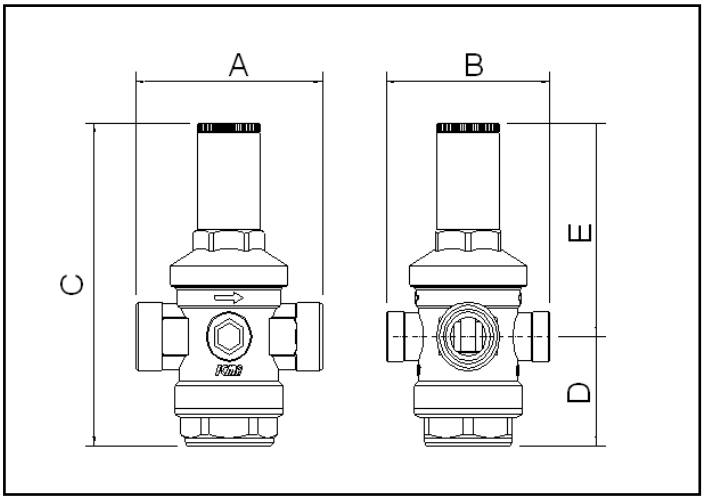
Dimensions

Art. 245



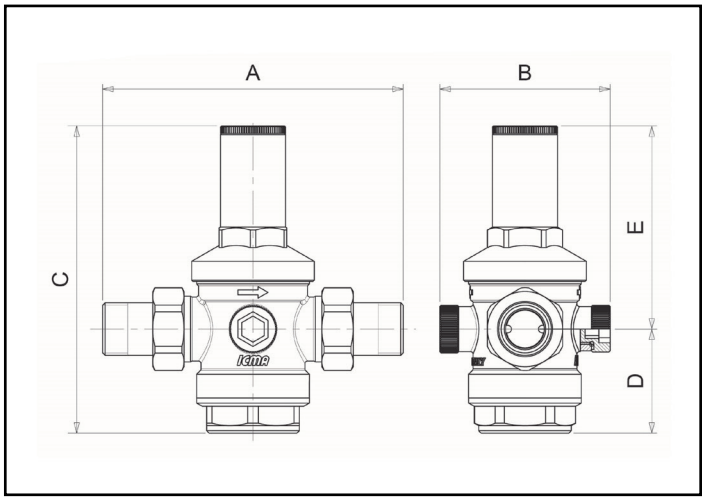
Art.	A [mm]	B [mm]	C [mm]	D [mm]	E [mm]
245 ½"	116	68	123	42	81
245 ¾"	137	83	148	45	103
245 1"	142	83	148	45	103
245 1 ¼"	164	91	202	60	142
245 1 ½"	164	91	202	60	142
245 2"	200	105	206	64	142

Art. 246



Art.	A [mm]	B [mm]	C [mm]	D [mm]	E [mm]
246 ½"	78	68	123	42	81
246 ¾"	84	68	123	42	81
246 1"	93	83	148	45	103
246 1 ¼"	109	83	148	45	103
246 1 ½"	122	91	202	60	142
246 2"	126	91	202	60	142
246 2" ½"	170	105	206	64	142

Art. 271



Art.	A [mm]	B [mm]	C [mm]	D [mm]	E [mm]
271 ½"	137	68	123	42	81
271 ¾"	137	68	123	42	81
271 1"	168	83	148	45	103
271 1" ¼	168	83	148	45	103

Function principle

The gearbox operation is based on the balance of two opposing forces that develop inside it.
The spring produces a thrust towards the opening of the fluid passage section as opposed to the pressure produced by the water pressure (Fig.1). The variable compression of the spring, recovers the pressure variations of the public water supply.
In this way the two forces cancel each other, keeping the value of the downstream calibration pressure constant regardless of the changes in the value of the upstream pressure.

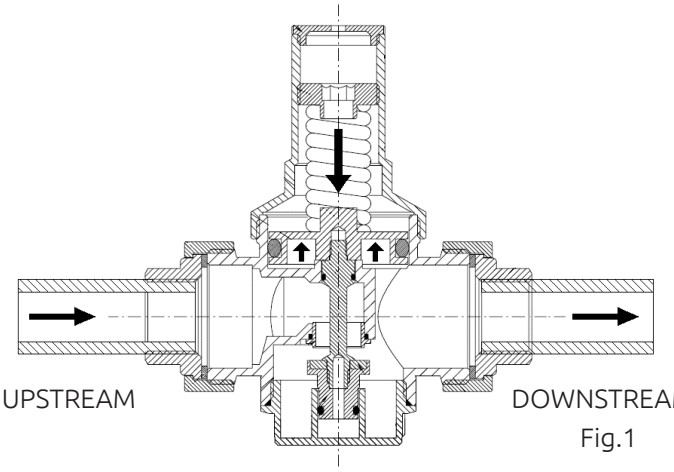


Fig.1

Function with flow

When opening a water utility, the valve (1) moves downwards, opening the passage of water, this is due to the force exerted by the spring on the diaphragm (2) which in these conditions becomes prevalent with respect to that exerted by the water.
Increasing the demand for water causes an increase in the passage of the fluid through the passage section caused by the decrease in pressure to which the valve is normally subjected.
The opening of several users causes a pressure drop (Δp) downstream and a consequent increase in the flow rate (Q) as shown in fig.2.

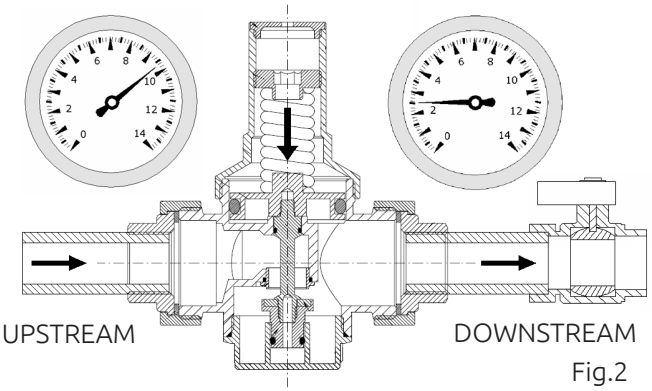


Fig.2

Function without flow

When the loads are closed, the downstream pressure increases until it reaches the value set during the calibration phase

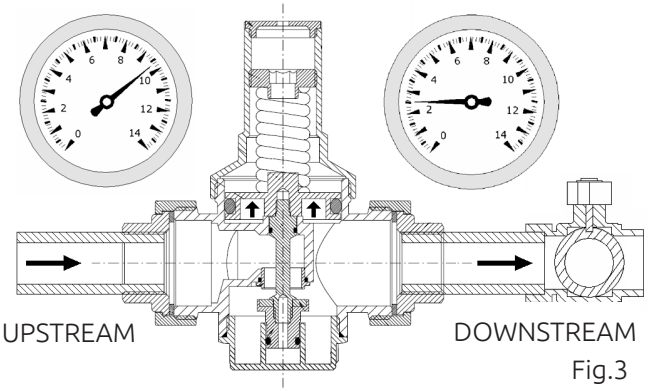
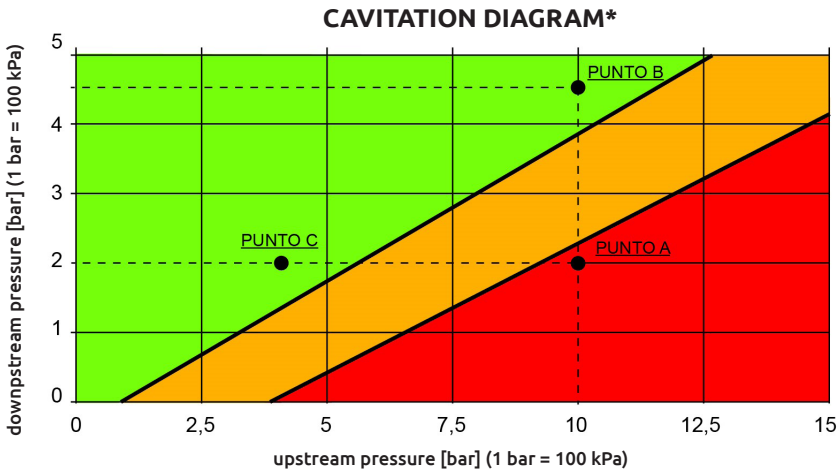


Fig.3

Pressure reducer sizing

To avoid cavitation phenomena and thus component noise, it is recommended to dimension the number of pressure reducers required for a certain pressure drop. The cavitation diagram shows three zones of pressure reducer operation as a function of upstream and downstream pressures:

- **ZONE 1:** Malfunction zone
- **ZONE 2:** Critical zone.
- **ZONE 3:** Optimum operating zone.



To avoid cavitation phenomena, it is recommended that the pressure reducer work inside ZONE 3 and, furthermore, to avoid that the ratio between the maximum pressure upstream and the regulation pressure downstream of the reducer exceeds the value of 2.5

SIZING
In the event that a pressure reducer is to be operated between the following pressure values [POINT A]:
• P upstream: PM = 10 bar
• P downstream: PV = 2 bar

As can be seen from the diagram, there is a risk of cavitation at these working pressure values. To avoid such phenomena, and bearing in mind that the ratio between the maximum upstream pressure and the downstream control pressure must not exceed the value of 2.5, a second pressure reducer can be used in series, so that the same pressure jump is obtained through two separate pressure jumps

The conceivable solution, therefore, is to use two pressure reducers in series, both of which must work in ZONE 3 of the diagram, distribute the pressure difference over two reduction jumps and whose pressure ratio is no greater than 2.5.

Possible solution:
Pressure reducer A [POINT B]:
• P upstream: PMA = 10 bar
• P downstream: PVA = 4,5 bar
Pressure ratio: 10/4.5 = 2.2 < 2.5

Pressure reducer B [POINT C]:
• P upstream: PMB = 4,5 bar
• P downstream: PVB = 2 bar
Pressure ratio: 4,5/2 = 2,2 < 2,5

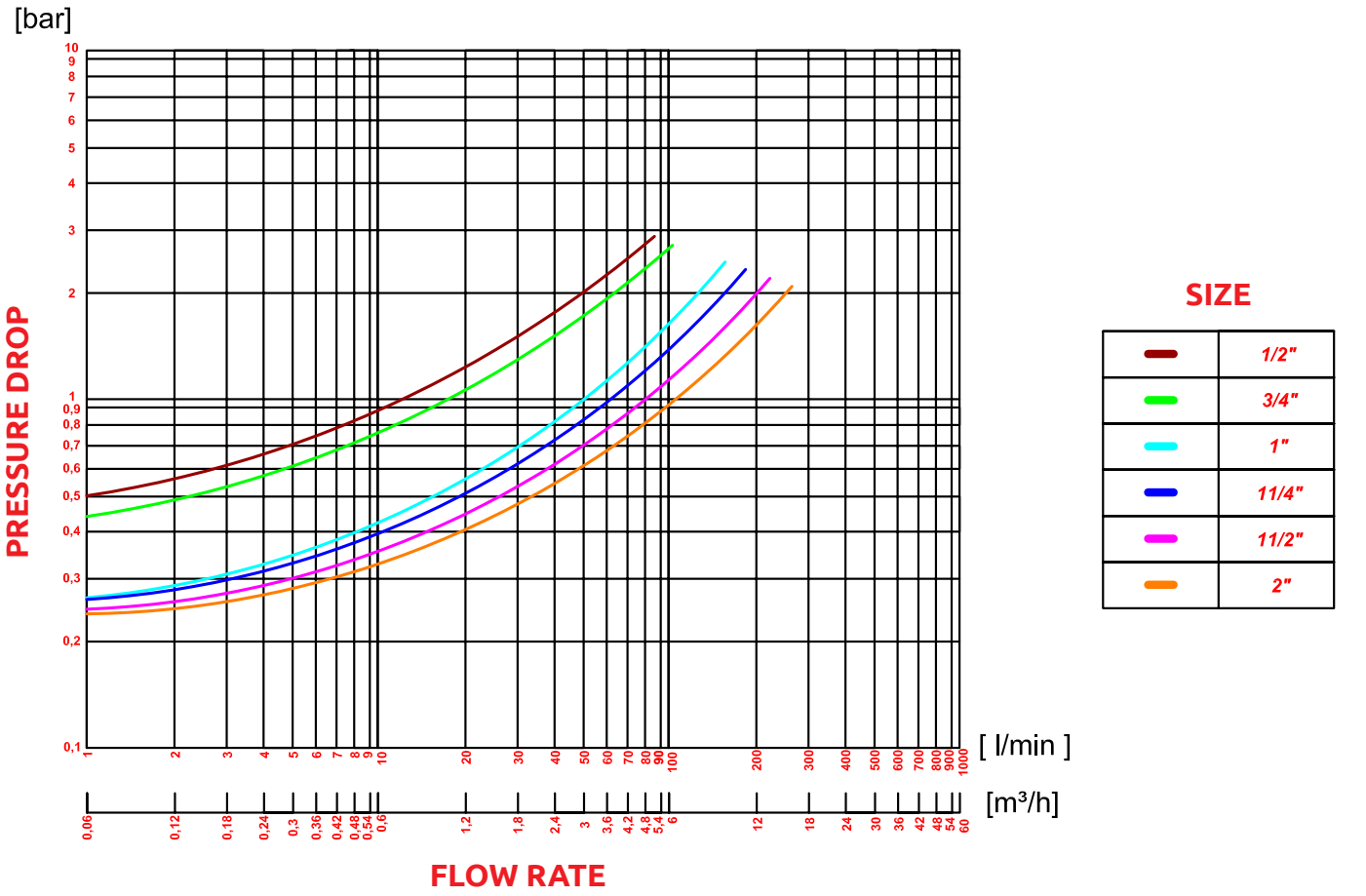
Cavitation phenomena in the pressure reducer can be controlled, in addition to acting on the pressure drop, also by choosing an optimal value for the velocity of the fluid flowing through it.
It is therefore advisable to choose the diameter of the pressure reducer so that the fluid velocities passing through it are within the following values:

• For water:
V = 0,7 ÷ 1,5 m/s (residential use)
V = 1 ÷ 3,5 m/s (industrial use)

***The cavitation diagram is only intended to provide the technician with a quick rough reference for associating the chosen component with a given system size. The values given in the table are not binding and therefore do not represent the performance limits of the components.**

Pressure drop diagram

Pressure reducing valve Art. 246
PRESSURE DROP DIAGRAM



The load loss diagram of the gearbox represents the pressure loss according to the flow at the output of the users

Calculation example:
Take, for example, the 1 "gearbox with 3 bar pre-calibration (300KPa). Assume a flow rate of 1500 l / h at the exit of a user.
From the diagram it is found that for this flow rate Q there is a pressure value P1 of 0.6 bar (60KPa).
The pressure value of the pressure reducer at the outlet of the user will read the value of pressure Po => 3-0.6 = 2.4 bar (240KPa).

Installation

For a correct installation open all the supply valves to facilitate the cleaning of the system and expel the air possibly remaining in the pipes. We recommend the installation of shut-off valves upstream and downstream to facilitate any future maintenance operations.
After closing the downstream shut-off valve it is possible to carry out the calibration by unscrewing the plastic plug and acting on the screw placed on the top of the screw (Fig.4) Using an Allen key Ch.10 screw clockwise to increase the calibration pressure and anticlockwise to decrease it.
Through a pressure gauge it is possible to display the set value.
Models 245 - 246 have a factory setting of about 3 bar.

The gearbox can be installed in any position except upside down (Fig.5).

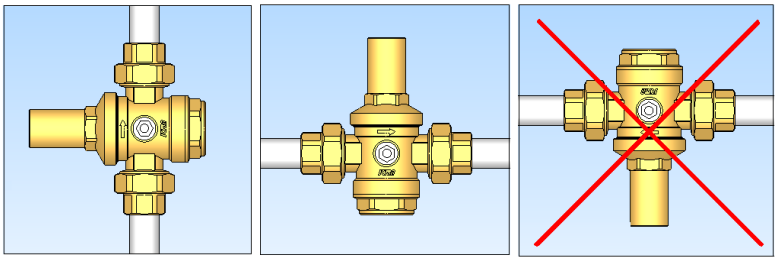


Fig.5

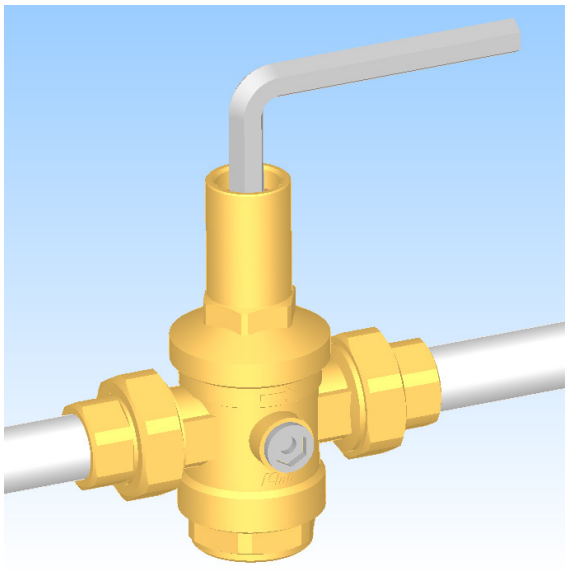


Fig.4

Noisless

The decrease in the passage that occurs during the pressure reduction can produce a noise factor.
This problem can be solved by the presence of a large chamber located in the valve outlet which gives rise to a low fluid velocity zone.

Installation advices and anomalies

Some of the anomalies that are normally attributed to pressure reducers are often caused by the lack of appropriate measures at the plant level. The most frequent cases are as follows:

The gear unit does not maintain the set calibration value
In most cases, the problem derives from the presence of impurities which, interposing on the seal seat, causes leakage and possible downstream pressure increases. To avoid this malfunction, we recommend installing a filter upstream of the gear unit. In the picture the model ICMA Art 50 oblique filter impurity collector(Fig.6)



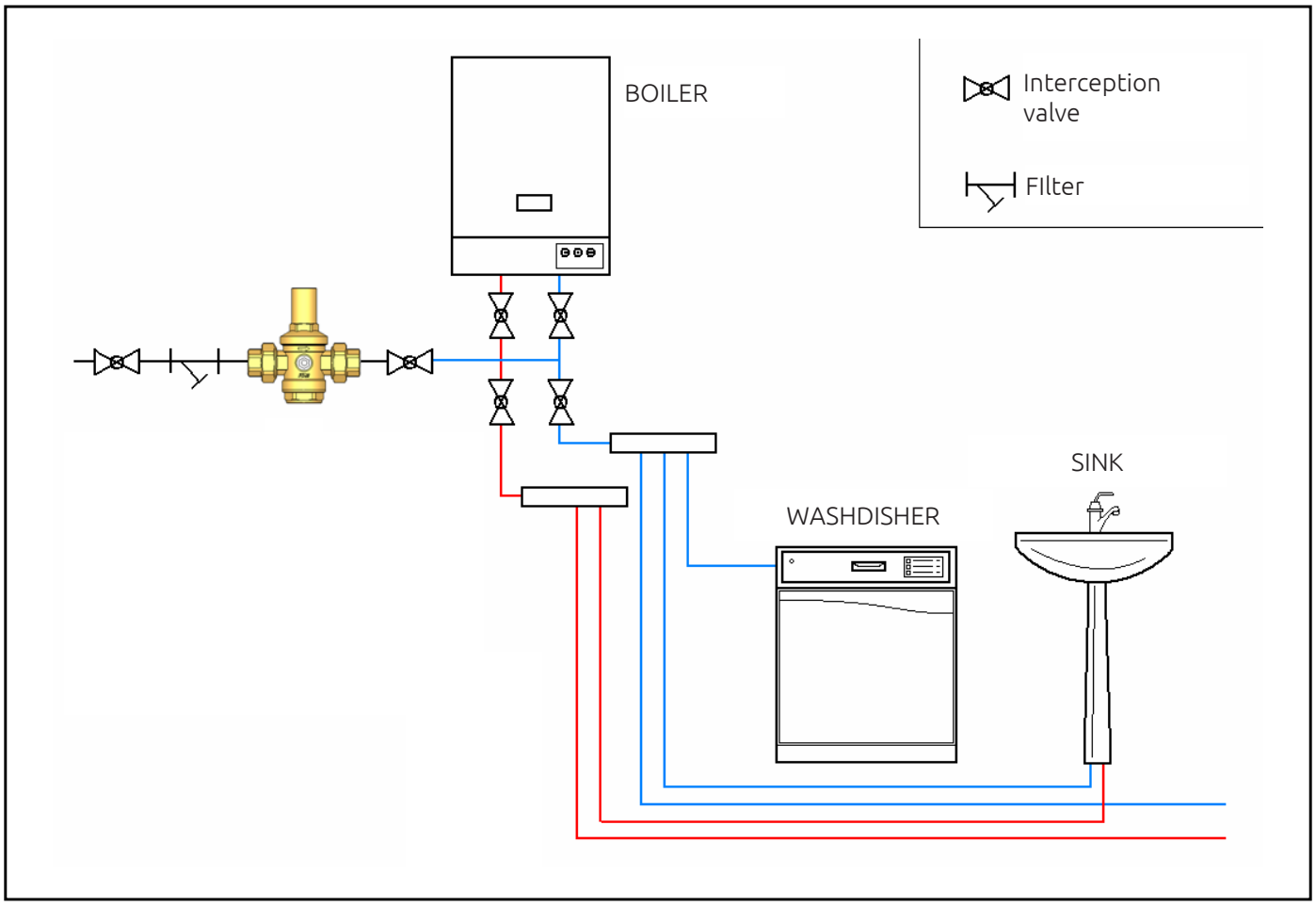
Fig.6

In the presence of a boiler there is an increase in pressure downstream of the reducer
The problem is due to the fact that the boiler causes overheating of the water and hence a subsequent increase in pressure due to the fact that in this case the gearbox is in the closed position.
To absorb the pressure increase, the solution provides for the installation of an expansion vessel between the reducer and the boiler.
It is recommended to install the pressure reducers inside wells or in technical rooms, the main reasons are due to the risk that the frost may cause breakage, facilitate the reading of the pressure gauge, facilitate inspection and maintenance operations.

Ram kick

To avoid the breakage of the pressure reducers installed in plants at risk, it is advisable to use specific components in order to absorb the so-called "water hammer" thus avoiding possible damage.

Application scheme



Safety



Read the installation and commissioning instructions carefully before operating the appliance in order to prevent accidents and system failures caused by improper use of the product. Please note that the right to the warranty is void in case of unauthorized modifications or tampering during the assembly and construction phase.

Working conditions

The limit values shown must in no way be exceeded. Operational safety is therefore ensured by respecting the general conditions and operating limit values described in this sheet.

Assembly and inspection safety rules

Assembly and inspection must absolutely be carried out by qualified, authorized personnel, who are familiar with the instructions given here. Before any work on the equipment is necessary to make sure that they are in rest conditions.

Maintenance

Maintenance operations must absolutely be carried out by qualified, authorized personnel, who are familiar with the instructions given here. Before any work on the equipment is necessary to make sure that they are in rest conditions.