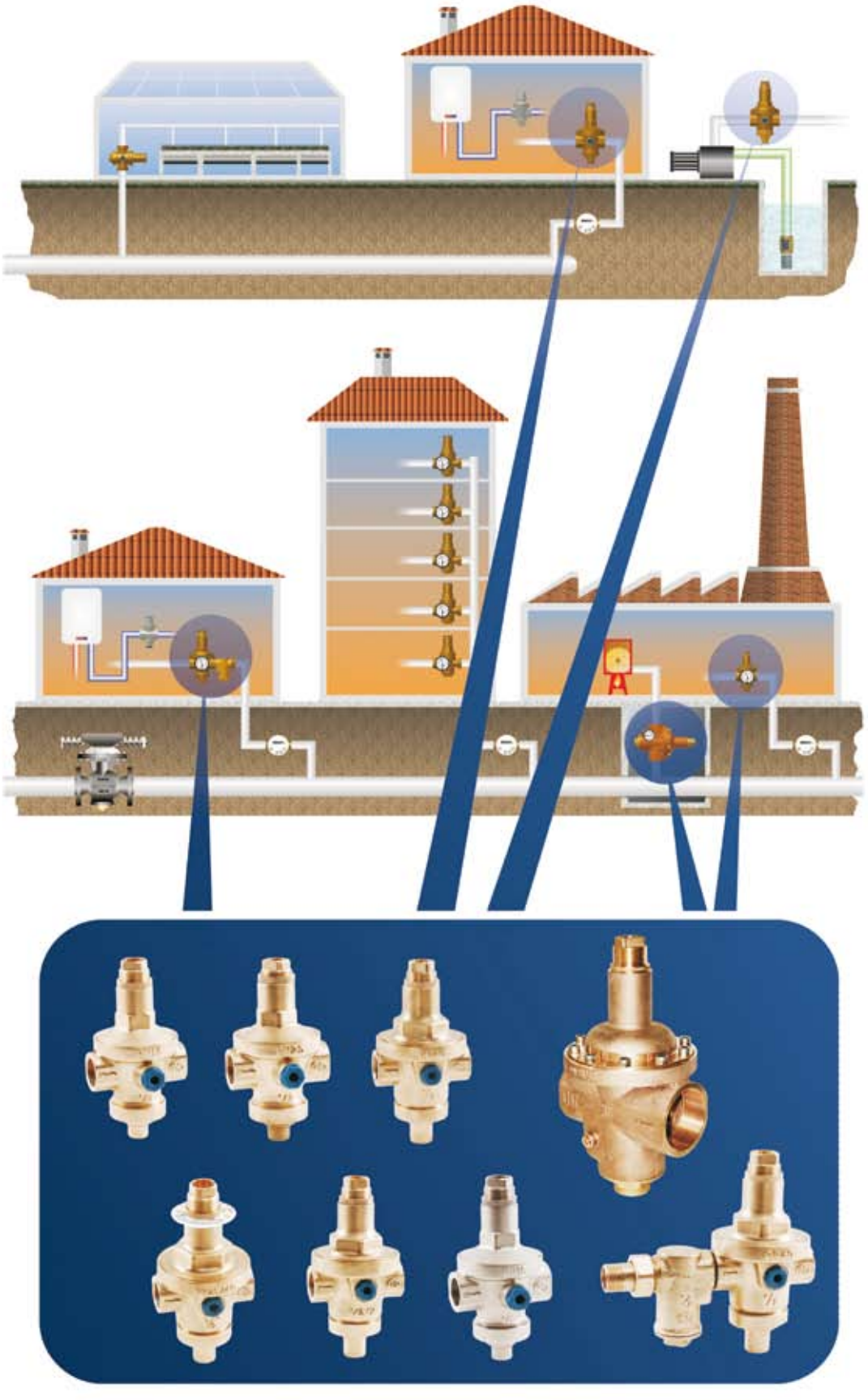
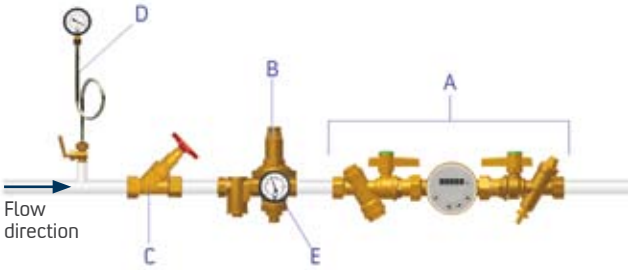
PRESSURE REDUCING VALVES WITH DIAPHRAGM

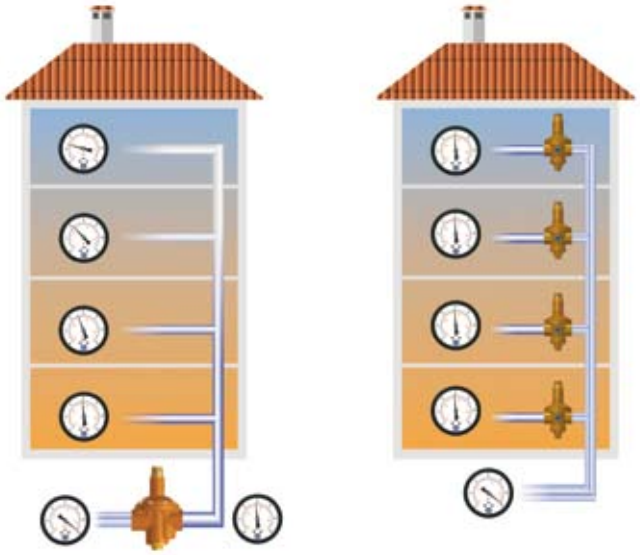


PRESSURE REDUCING VALVES WITH DIAPHRAGM

The use of a pressure reducing valve is necessary for limiting the pipeline working pressure for potable water distribution systems if the maximum possible static pressure, at any point in the potable water supply system, can reach or surpass the relative maximum allowable working pressure, or if there are apparatus and equipment attached that function exclusively at lower levels of pressure. In particular, these valves are recommended if the static pressure at intake points is larger than 5 bars, if the difference between the upstream pressure and the required downstream pressure is higher than 75%, and if the same pressure is required in the hot and cold water systems.

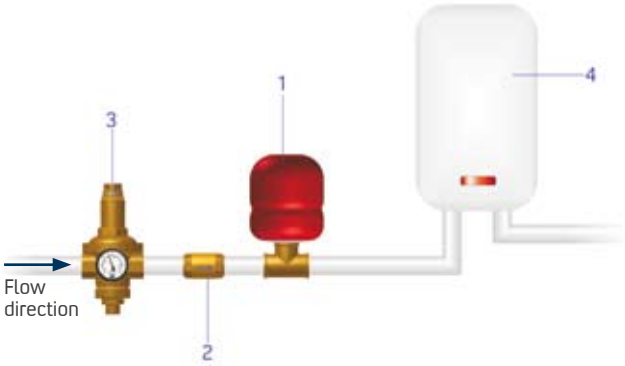


The installation of the pressure reducing valve with diaphragm in potable water supply systems (EN 806-2 §16)) is normally carried out on cold water pipe downstream the water meter system (A). For each pressure reducing valve (B), the water system should be set up for a shut off valve (C) a gauge (D) upstream that, in conjunction with a gauge (E) installed at the pressure inlets on the reducing valve's body, facilitate adjustment and maintenance. Should a By-pass tube be necessary, it should also be fitted with a pressure reducing valve. In order to limit the effects of backpressures, it is advisable to install a tract of pipe, of 5 times the length of the nominal diameter of the device used, downstream to the pressure reducing valve.



In buildings with numerous floors, it is preferable to install lower-dimensioned pressure reducing valves for each floor instead of installing a single higher-dimensioned pressure reducing valve at the foundation of the building. It should in fact be taken into consideration that, in the ascension pipe distributing water to each floor, the water pressure drops.

In order to guarantee a secure and economic functioning of the heating system, it is recommended to install a pressure reducing valve before the heating exchanger, which will maintain the minimum working pressure (automatic refill) required by the heating systems. The European Norm EN12828 §4.7.4. stipulates that, for this application, the supply system should be furnished with an expansion tank (1), a check valve (2) and a tract of pipe between the reducing valve (3) and the water heater (4), with a length equal to 5 times the nominal diameter of the pressure reducing valve used. These setups are necessary in order to avoid dangerous overpressure downstream from the reducing valve due to overheating of the water by the boiler.



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COMPRESSED AIR

If the system uses compressed air instead of water, the recommended velocities are between 10 and 20 m/s and the subsequent flow capacity will be 10 times higher than that calculated for use with water.

CHOOSING A PRESSURE REDUCING VALVE

OR's pressure reducing valves, scaled according to their sizes, should be chosen according to the maximum inlet pressure, the setting range of the valve itself and the flow rate required. Once the above three parameters are known, the appropriate reducing valve can be chosen as indicated on the respective flow capacity diagrams.
PLEASE NOTE: The diagrams show the average velocity of the fluid equal to 2 m/sec. As the velocity of the water passing through the reducing valve increases, the noise level of the plant also increases, and it is thus recommended to choose a larger (thus less noisy) model when high acoustic comfort is an important factor (residential use). In any event, it is strongly recommend not to surpass 3 m/sec in order to prevent the excavating phenomenon.

OPERATION OF THE DIAPHRAGM-TYPE PRESSURE REDUCING VALVE

The figures on this page show a schematic structure of the OR pressure reducing valve. A flexible diaphragm (A) causes the obturator (B) to move as a consequence of the action of two opposing forces: from below, the water pressure in the pipeline downstream from the reducing valve, which tends to close the valve; and from above, the force of the spring (C) appropriately loaded according to the desired working pressure to be maintained, which tends to open the valve. The valve opens, as illustrated in Figure 2, when, following the supply of water to the tap, the pressure under the diaphragm falls and the force of the spring prevails; thus the opening of the valve is proportional to the flow during the drawing of water from the tap. As soon as the tap water supply is closed, the water in the downstream tube reaches a pressure capable of overcoming the force from the spring and the obturator thus rises up, closing the valve. Regulation of the pressure is obtained by screwing in the regulator (D) that compresses the spring to larger or smaller extent. The compensated seat of the pressure reducing valves "with compensation chamber" likewise aids in maintaining the preset value, even in conditions of strong inlet pressure variations, which could reach 40 bar: the upstream pressure pushes the obturator to an open position, and also acts upon the compensation chamber hub in the opposite direction, which achieves a substantial balance.
the seal seat insert in STAINLESS steel affords reliability and precision of the pressure reducing valves throughout the years, even in the most extreme working conditions.

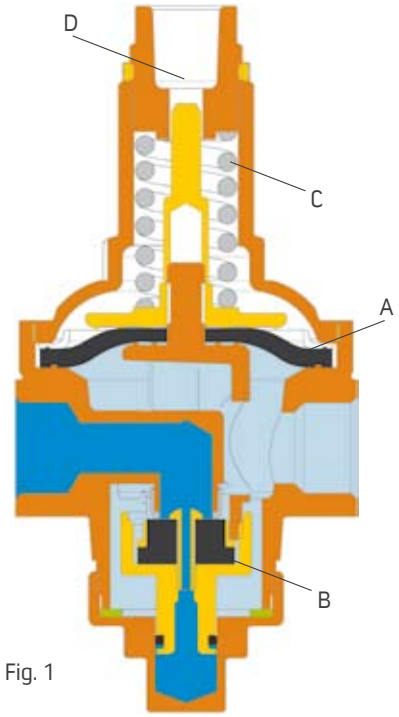

Fig. 1

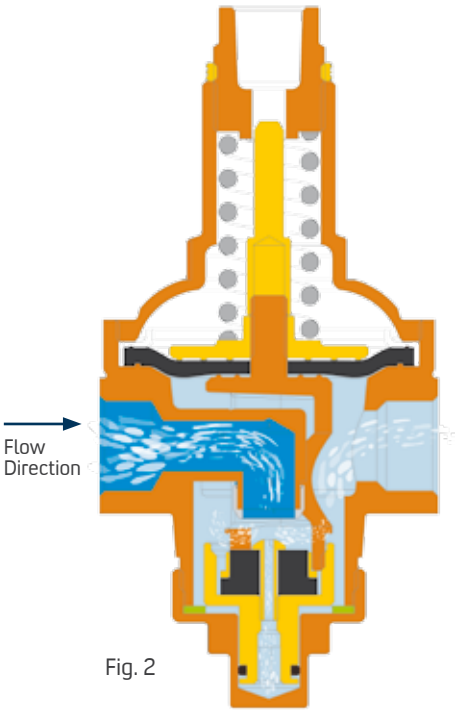

Fig. 2

The internal cavities have been designed to get noise levels below 30 dB (Class 2) for water velocities between 1.5 and 2.5 m/sec.
Both the spring and all the regulating elements are isolated from water and consequently are kept from technical/structural deterioration. The particular structure of the O-ring washers of the compensation chamber forestall any risk of jamming, incrustation or sticking (made of special flexible anti stick-slip Perox EPDM elastomer). The limited use of moving parts guarantees enhanced sensitivity and precision. The DIAPHRAGM that actions the obturator's movement can sustain strong outlet backpressures of up to 25 bar, whether they are pulsating (water hammers) or constant. Regulation is carried out with a regulator on the upper part of the valve that, when turned clockwise, increases the outlet pressure in compliance with the most recent European standards. All the OR pressure reducing valves are furnished with two test points for the reduced pressure, threading Rp ¼".

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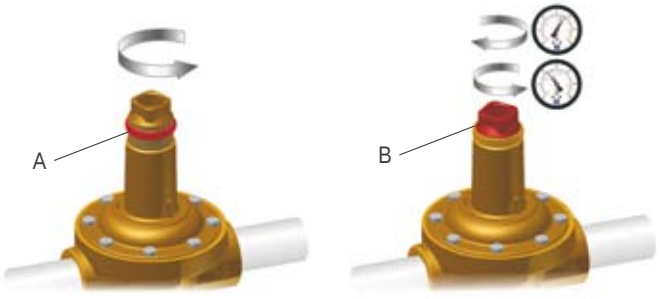
SETTING

1 - Prior to the installation, open all the taps to clean the system and expel any remaining air in the pipelines.
2 - Install the upstream and downstream shut off valves with a view to facilitating future maintenance tasks.
3 - Install the pressure reducing valve (ensuring its positioning is correct according to the arrow,which indicates the direction of the flow).
4 - Close the downstream shut off valve.
5 - Fix the preset values with the upper regulator. Remove the cover A and use regulator B to set the pressure: rotating clockwise will increase the pressure value; while rotating counterclockwise will decrease it.



6 - Control by reading the set pressure on a gauge. (The OR pressure reducing valves are factory preset at 3 bar)

WATER HAMMERS

A sudden overpressure, also called “water hammer” is one of the most common causes of damage to pressure reducing valves. When installing reducing valves on systems that may be subject to these phenomena, it is advisable to use devices especially designed to absorb water hammers.

PLEASE NOTE: Prior to installing or operating new pressure reducing valves, please pay particular attention to the information on the illustrated booklet packed with each OR pressure reducing valve.