

Maintaining pressure in changeover systems

White paper



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Changeover systems have made big advances in recent years, especially in installations that operate at low temperatures (heat pumps, cold/heat sources). The changeover from the supply of heat to cold and back is done by means of three-way valves. However, if one of the valves only switches over partly or not at all, then both systems become hydraulically connected to each other.

Expansion vessels or automats in the separate systems contain a certain amount of water depending on the pressure present. If the systems come into contact with each other, these pressures will level out, allowing water to flow from one system to the other. If the systems are then separated again, there may be too much water in one system and too little water in the other.

Flamco therefore recommends installing a permanent pressure equalisation line in changeover systems.

Advantages of a pressure equalisation line

- It is the simplest technical solution. It avoids any faults caused by hydraulic short-circuiting across non/poorly closing valves.
- Financially affordable, because only one expansion (top-up) provision has to be installed.



What is the best place to install the pressure equalisation line?

- This can best be placed in the return (because the temperatures of the central heating and chilled water are closest to each other here).

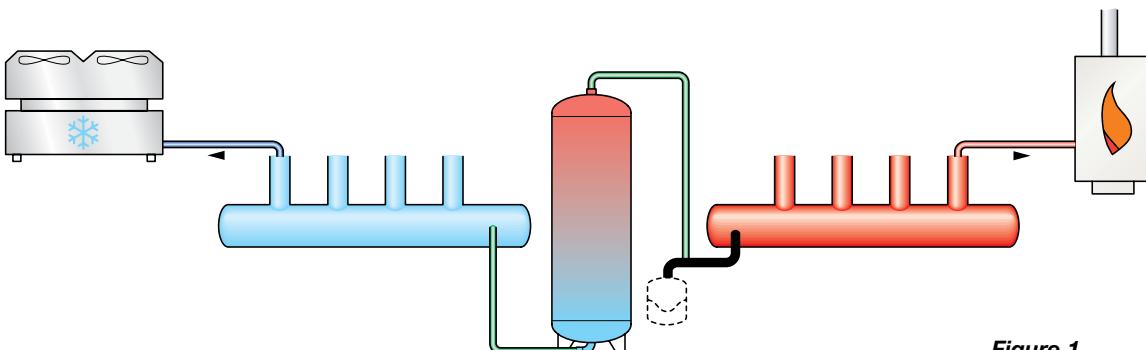


Figure 1

- In a place where it experiences no or only minimal influence from dynamic pressure differences (i.e. not too close to a circulation pump, for example). The best place is defined as the neutral point of the installation.
- For example in a common return line, the return collector or by a buffer vessel, where the line is connected to the bottom of the central heating buffer tank and to the top of the chilled water buffer tank in order to keep the temperature differences as small as possible.

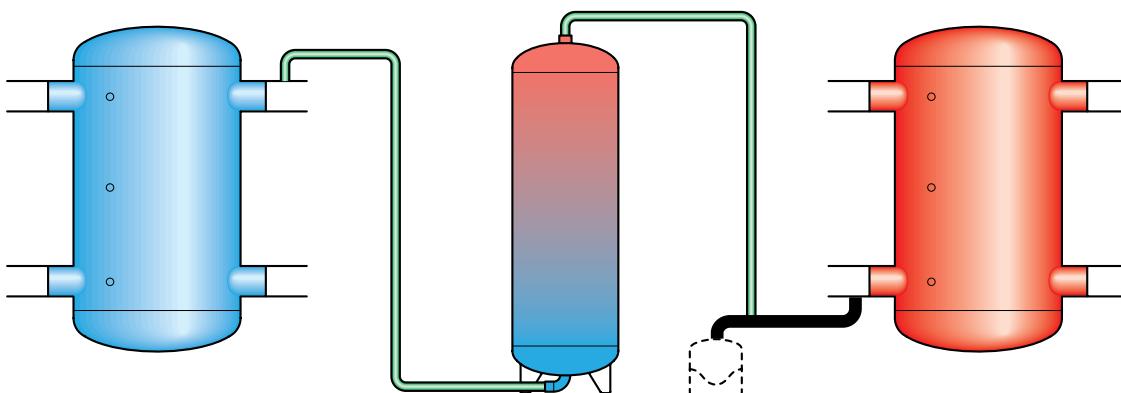


Figure 2



What is the best place for the expansion vessel?

- A Flexcon compression expansion automat or membrane pressure expansion vessel can be connected to the pressure equalisation line or in the return line.
- The Flamcomat pump expansion automat has two system connections due to the deaeration function. This automat can best be placed in the central heating with both connections in the return line or one of the connections in the pressure equalisation line (see figure 3). Ensure the connection diameter of the automat is at least the same as the diameter of the equalisation line. Additionally, an ENA vacuum degasser can be placed in the chilled water system if necessary.

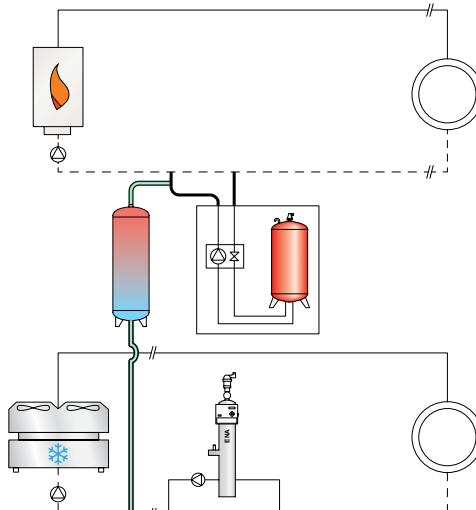


Figure 3

How big do the equalisation line and the expansion vessel have to be?

- The diameter of the pressure equalisation line should be as small as possible to limit unwanted flow and thus any temperature mixing.
- If the expansion line is coupled to the pressure equalisation line, both must be sufficiently dimensioned to enable expansion to take place without an increase in pressure. The diameter of the pressure equalisation line up to the system must be at least as large as the connection diameter of the expansion vessel.
- A separating vessel (e.g. Flexcon VSV) should be included in the line to prevent any temperature mixing.
- The size of this intermediate vessel is dependent upon various factors, but 0.5% of the (chilled water) system capacity should be applied as a rule of thumb.
- We recommend calculating the expansion requirement by adding up the expansion volumes of both systems.

| | Max. system capacity |
|---------|----------------------|
| VSV 50 | 10,000 l |
| VSV 100 | 20,000 l |
| VSV 200 | 40,000 l |

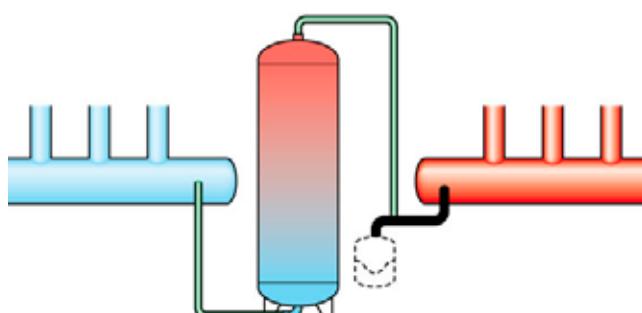


Figure 4



What else do I need to consider?

- The central heating should be connected to the top of the separating vessel and the chilled water to the bottom.
- The pressure equalisation line must not be affected by dynamic pressure differences that could be caused by circulation pumps, etc.
- Connecting the expansion vessel near to or in the pressure equalisation line explicitly positions the neutral point there, which achieves minimal flow across the pressure equalisation line.
- The separating vessel may be insulated (it does not serve as a cooling vessel here).
- Install a shut-off valve/drain on both sides for service purposes.

If you have any further questions, please contact:

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