ENGINEERING
TOMORROW

Danfoss

The natural **connection between energy savings** and a **balanced two-pipe system**

Our Renovation+ Solution is your automatic technology for perfect Hydronic Balancing of communal installations.

1 year

payback time when you upgrade your two-pipe heating system with our flexible Renovation+ Solution.

www.twopipesolutions.danfoss.com

Is there an obvious connection between

- ⊕ Temperature control?
- ⊕ A reliable, balanced system?
- ⊕ Energy savings?

Yes!

THE RETURN OF COMMUNAL INSTALLATIONS

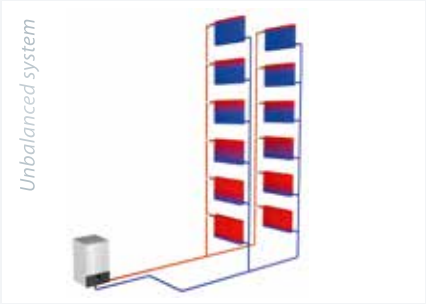
The term 'communal systems' invokes images of those used in apartment buildings in the '60s and '70s. These installations were popular, however caused problems such as: a high degree of imbalance, complaints about noise and high energy consumption.

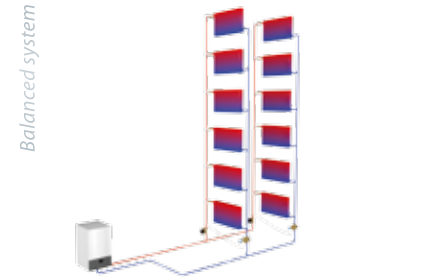
Today, however, the idea of a central heating installation for multi residential buildings is an excellent one, particularly from a technical point of view. In fact, a growing preference for installations that include a central heat pump or other sustainable energy generation devices suggests a real comeback for communal systems.

GETTING THE BASICS RIGHT

Balance is everything

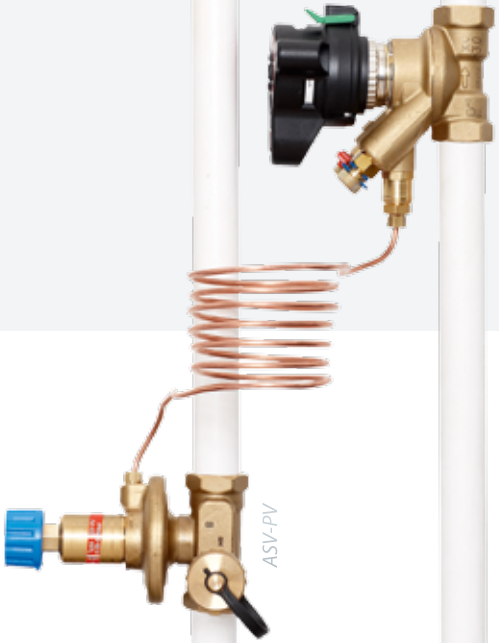
One of the major challenges faced by communal systems is a lack of good hydronic balancing. Water circulation is often uneven. This means that some parts of the system are heated too quickly and too much, while other parts are only heated after a long wait or not heated enough at all.





To prevent this, larger pumps are often installed with a greater head of pressure to circulate the water better. Unfortunately, this affects pressure differentials and energy consumption within the system. Besides, the higher pressure differential, the greater the noise from the system, particularly from radiator valves.

This results in complaints from residents about the heating, noise and high energy bills. Using variable speed pumps is often seen as the solution to these balancing problems. This is a mistake. While this type of pump can make a useful contribution, it does not solve the increase of multiple pressure differential over the pressure controller at partial load conditions.



THE ASV SOLUTION

Fortunately, Danfoss offers an ideal solution for problems like these.

The automatic Danfoss ASV solution comprise a differential pressure controller, type ASV-PV, and an associated partner valve, type ASV-BD. The ASV-PV is fitted into the return pipe and the partner valve is fitted into the supply pipe. Both valves are linked to each other using a capillary tube.

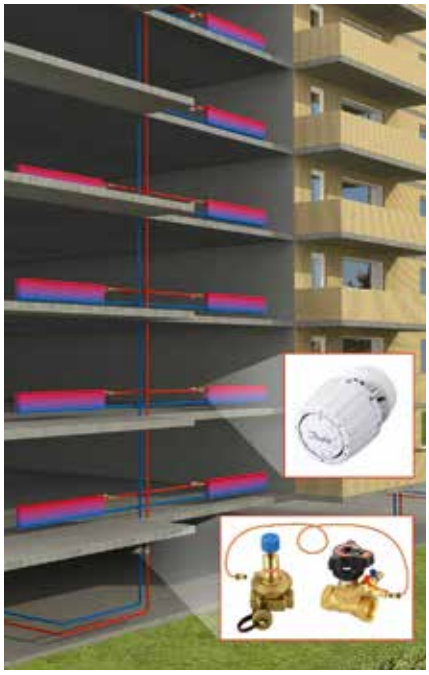
The pressure controller has a standard setting of 10 kPa, but can easily be adjusted to another setting with just an Allen key. If the pressure differential tends to become greater than this setting, then the automatic balancing valve immediately reacts and keeps the pressure differential constant. By this the flow in the controlled riser or loop does not increase due to any system load changes. Adding a Ra-N valve on each radiator ensures that there is also the right balance between radiators on each riser. Installing an ASV combination ensures an optimal pressure differential as well as the correct flow within the individual risers. The ASV automatically creates an optimal hydronic balance within the installation, whether under full or partial load. This balance is never disrupted, there is no disturbance from noise, and energy consumption drops dramatically.

INSTALLATION AND USE

For a highly functional, energy-efficient communal installation, choose a Danfoss ASV combination, as they are user-friendly, easy to set up and offer a high level of precision and cost savings.

Danfoss automatic balancing valves can be installed in various ways. Systems with a riser configuration, such as those used for a group of radiators, can be balanced per loop. This is sometimes the case for older installations in apartment buildings. In fact, ASV is the perfect solution if the installation involves a renovation.

In other cases, an installation can branch off per apartment from the central distribution system. In these cases, the ASV can be installed at the apartment access point.



You decide your upgrade level

RA-N

RA2000 sensor

ASV-PV

ASV-BD

ADDITIONAL BENEFITS:

User-friendly settings

Setting the required pressure differential is easy. All you need is an Allen key. No special equipment, no measuring instruments and no spare parts.

High-precision settings

All sizes of ASV-PV pressure differential controller have a membrane specifically tailored to that size. This means that the valve controls the pressure differential very precisely and maintains it at exactly the right level.

Additional savings

For the ASV-PV to work correctly, an internal loss of max. 10 kPa is required, no matter what the desired pressure differential is. This is quite different from other pressure differential controllers. In many cases, this means that the pump required for the installation can be smaller.

Protection ring

The setting of the RA-N radiator valve can be locked with a protection ring. This avoids that individual changes will affect the flow in the entire installation.

We provide the flexibility

Control indoor room temperatures for energy savings

Easy settings

Danfoss also offers the best solution for controlling the flow to various radiators by means of radiator valves. It is easy to set the precise flow for the radiator without using any tools or equipment. If the entire installation is managed in this way, energy costs will be reduced to a minimum and residents will enjoy maximum levels of comfort.

Maximum comfort

Offering additional comfort to residents means that the radiator valves must be provided with a thermostatic control element. This allows the temperature to be controlled separately in each room. Danfoss offers a wide range of radiator room sensors for people who want optimal control and superior quality and design.

Balance all risers for even heat distribution

Easy balancing

By installing ASV in the individual risers it is easy to balance all riser flows. Balancing the installation will ensure an even heat distribution throughout the building even during partial load. Rooms will not be under or over heated and there will be no overflows or unnecessary circulation, which causes waste of energy.

Maximum control

Our ASV combination makes each riser independent, which means that system changes in other parts of the building do not have any influence. By providing stable differential pressure in the riser at all times a thermostatic radiator valve can control room temperatures even better. Our Renovation^{+} Solution for two-pipe systems will create a balanced and reliable system without noise claims and little maintenance.

THE SOLUTION PAID ITSELF BACK IN ONLY ONE YEAR

Renovation+ Solution case

The building in our case study is a medium high residential building located in Szczecin, Poland and was built in 1982. The heating system is a typical two-pipe system with cast-iron radiators.

In 1996 the first steps were taken in renovation of the building. On each radiator, Danfoss thermostatic radiator valves were mounted, followed by heat cost allocators in 2003.

Originally the heating system was balanced with manual balancing valves, and after further insulation, the manual valves were replaced with automatic balancing valves in 2005.

From the year 2006 we could see a dramatic decrease in energy spending. A total of 29,8% compared to the years 2003-2005, due to the automatic balancing solution in combination with the thermostatic radiator valves. A solution which we refer to as a Renovation+ Two-pipe solution.

In this particular case, the investment of the Danfoss equipment paid itself back in only one year.

For more information about this and other cases we refer to our website.
www.twopipesolutions.danfoss.com

Investment

Danfoss equipment used in this case:
389 pieces of thermostatic radiator valves for each radiator (standard Danfoss pre-setting valve DN15 and sensor).
26 pieces of differential pressure controllers for each riser (ASV-PV + ASV-M dimension DN15-25).

- Investment costs: **€ 3724**
- Energy saving: **276.3 GJ**
- Energy price: **€ 13.2 per GJ**
- Pay back time: **1 year**

COMPREHENSIVE PRODUCT RANGE

For radiator heating systems in residential buildings Danfoss recommends:

- ASV-P or ASV-PV automatic differential pressure controllers (DN15 to DN40/50) combined with associated ASV-BD or ASV-M partner valves (DN15 to DN40/50)

- Radiator valves RA-N with presetting function (DN10 to DN25) combined with a thermostatic sensor, type:
  - Gas filled RA2000 series
  - Liquid filled RAW, RAE, RAS-C2 or RAX
  - Electronic *living eco*® or *living connect*® + *Danfoss Link*™ *CC*

Step by step renovation

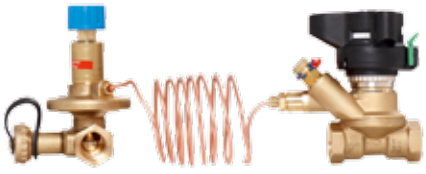
When renovating a two-pipe radiator heating system in residential buildings, you are looking for a reliable solution with reasonable investment costs that will bring you maximum return on investment.

Our Renovation^{+} two-pipe solution is flexible and therefor it is the perfect fit for each situation. Depending on the renovation budget you can upgrade the two-pipe installation step by step. Each step will bring more comfort and energy savings.

- Improved temperature control
- Even heat distribution
- Eliminate noise problems
- Save energy

Conclusion:

The flexible Danfoss Renovation^{+} Solution offers a tailor made improvement of your two-pipe heating installation.



Learn more about our products on our website:
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Quality is the real plus

State-of-the-art heating systems are more than the sum of the solutions and components. If you need assistance or inspiration to optimise your solutions, Danfoss has substantial application knowhow ready for you to employ. Our industry leading position and years of experience mean that Danfoss is the preferred advisor and partner to consultants and system integrators when specifying heating system solutions for new buildings and renovation projects.

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