

ENGINEERING  
TOMORROW

*Danfoss*

ASV automatic balancing valves

# Drive **energy efficiency** and increase **customer satisfaction**

Automatic balancing and temperature control solutions for two-pipe heating systems.

Up to

**20%**

energy savings through  
correct system balancing.

[asv.danfoss.com](http://asv.danfoss.com)

# Automatic balancing for two-pipe heating systems

Every day you aim to deliver highly professional solutions and services to your customers. At the same time we at Danfoss work hard to discover the energy efficient solutions of tomorrow. Smart technical inventions and excellent engineering can help solve the increasing need for optimized infrastructure and energy efficiency while creating a better indoor climate to live and work in.

Take the many two-pipe heating systems present in apartment buildings, schools, offices and other buildings for instance, as much as 80-90% of them work inefficiently, wasting precious energy and causing residents' to complain. We know how to improve efficiency up to 20%, how to establish a noise-free system with even heat distribution and how to establish a fair heat cost allocation as well.

The solution to these issues is automatic balancing by using our ASV products. Together with our well-known radiator thermostats we provide a simple and effective solution that has proven itself for many years and is refined to meet your expectations for years to come.

**We are Danfoss and we are engineering tomorrow.**





# Getting the basics right

## Imbalance causes problems

One of the major challenges in two-pipe heating systems is a lack of good hydronic balancing. Both in full load and in partial load conditions, water circulation and therefore heat distribution throughout a building is often uneven.

In an attempt to prevent this, manual balancing valves and/or larger pumps are often installed to distribute the water better. Unfortunately this only works in full load conditions, provided the commissioning of the valves is correctly executed. Despite the efforts and costs spent, the system still results in complaints from residents about the heating, noise, high energy bills and unfair heat cost allocation. The chances

of you being tasked to come up with a good and cost effective solution are high, with 80-90% of all buildings having inefficient heating systems.

## Balance is everything

Fortunately, Danfoss offers a solution that eliminates pressure fluctuations, the root cause of imbalance in a two-pipe heating system. Meet your automatic balancing solution, meet the Danfoss ASV.

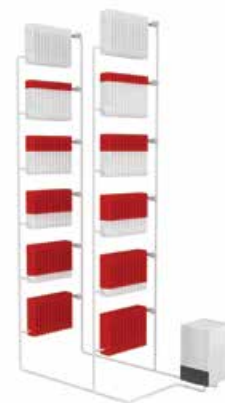
The riser fitted ASV solution comprises a differential pressure controller, type ASV-PV, and an associated partner valve, type ASV-BD. Both valves are connected to each other using an impulse tube. If the riser's pressure differential increases above the set point, the ASV-PV

controller immediately reacts and keeps the pressure differential constant. Installing an ASV combination ensures constant pressure differential as well as the correct flow within individual risers.

Danfoss RA-N pre-setting valves are used to establish the required design flow through each radiator. Together the ASV and RA-N automatically create an optimal hydronic balance within the system, whether under full or partial load conditions. This balance is never disrupted, there is no disturbance from noise, and energy consumption drops dramatically. Also, the well-established balance ensures the radiator heat cost allocators are more accurate, providing a fairer split in the energy costs among all residents.

## Characteristics of an **unbalanced** system

- Uneven heat distribution and differences in start up times
- Noise from the heating system
- Difficulty of controlling temperature
- A lot of energy waste
- High energy bills
- High complaint-handling costs
- Many complaint handling efforts



## **Automatic** balancing results

- Establish a future-proof heating system
- Flexibility to match all building types and needs
- Easy commissioning for both new build and retrofit
- Increased energy efficiency with short payback times
- Precise and fast reacting temperature control
- Proven solutions that eliminate hassles and tenant complaints



# The **benefits** of working with ASV

## **Proven and easy**

For an energy-efficient two-pipe heating system, your best choice is the technical versatile Danfoss ASV / RA-N combination. It has proven results, is easy to design, reliable in operation and offers a high level of control accuracy and cost savings.

## **Fast and reliable**

The ASV combination is fast to install, easy to maintain and will lead to fewer customer call-backs. Flushing, filling and commissioning the system can be done quickly with various installation possibilities. Whether it is a riser configuration with a group of radiators or a system branched off per apartment, ASV is the perfect solution, no matter if it's a renovation or a new-build project.



## **Installer-friendly settings**

Setting the required pressure differential is easy with the clearly visible setting scale. The set point can easily be changed by turning the setting ring manually. The setting can be locked to prevent unauthorized changes. No special equipment, measuring instruments or spare parts are required. The setting is not affected when the shut-off feature is used, this avoids unexpected changes of the set point after service or maintenance activities.

## **Robust and accurate**

All sizes of ASV-PV pressure differential controller have a membrane and pre-attached valve specifically tailored to that size. The valve cone and seat are made from brass and do not have O-ring's. This means a reliable, robust construction and a very precise differential pressure control, especially during low partial load conditions.

## **Easy flushing and filling**

To fill and flush a system the ASV can temporarily be locked in an open position by a flushing ring accessory. This functionality ensures that flushing and filling are possible via both the supply or return pipe. This accessory opens the ASV-PV >100% for fast and reliable cleaning of the system.

## **Small dimensions**

As system pipes are often located in small areas it is important to have the smallest possible installation dimensions. No matter the DN size, Danfoss ASV dimensions are among the smallest in the category of automatic balancing valves present in the market.

ASV-BD



## Balance risers for even heat distribution

### Easy balancing

By installing ASV in the individual risers it is easy to balance all riser flows. Balancing the system ensures an even heat distribution throughout the building during all system load conditions. Rooms will neither be under or over heated, meaning no overflows or unnecessary water circulation, thus significantly reducing energy waste.

### Maximum control

The ASV combination makes each riser pressure independent, meaning that system changes in parts of the building do not influence water flow. By providing stable differential pressure in the riser at all times a thermostatic radiator valve can easier be commissioned and control room temperatures even better. The ASV solution creates a well-balanced and reliable heating system without noise problems.

## Control room temperatures for increased comfort

### Easy settings

Danfoss also offers the best solution for controlling the flow to radiators with the RA-N radiator valves. It is easy to set the precise flow for the radiator without using any tools or equipment. If the entire system is pre-set in this way, energy costs will be reduced to a minimum and residents will enjoy maximum levels of comfort and only pay their fair share of costs.

### 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.



RA-N + RA2000

# Choosing the best solution

Danfoss ASV has been around for about 30 years, and our radiator thermostats for more than 70 years. Both products are constantly improved to meet changing market and customer needs. One specific customer request is to find a simple and price competitive solution for those heating systems having separated riser and return pipes, limited pump head pressure or a relatively small amount of radiators per riser.

## Dynamic Valve™ alternative

To cover those needs Danfoss developed the *Dynamic Valve™* (RA-DV), another automatic balancing solution for two-pipe heating systems. Compared to the riser fitted ASV solution this involves a radiator fitted valve with a built-in pressure controller. Both products offer a similar solution to the same challenges, just performed in another way.

To help you make the correct choice we grouped the most important selection criteria together in the below table. The main differentiator between the two solutions is the maximum system differential pressure. The *Dynamic Valve™* is specially developed for systems having a pump head capacity of up to 6 meters (60 kPa) and is compatible with most existing radiators requiring a maximum flow capacity of 135 l/h.

## Technical versatile ASV

The ASV/RA-N combination offers ultimate technical versatility and is especially well suited for systems with pump head capacities higher than 6 meters (60 kPa). The standard 5-25 kPa setting range covers typical radiator heating system needs. The combination has few limitations and is the best choice, especially for situations where pre-setting radiator valves are









already present or for systems with many radiators per riser.

Finding the best solution depends a lot on the building, the heating system and other practical details. Our sales engineers can advise you and help you select the best option for each particular project.

SOLUTIONS	PRESSURE	RADIATOR	SYSTEM	ECONOMY
<p><b>Radiator fitted RA-DV</b></p> 	<p>Max. differential pressure = <b>60 kPa</b></p>	<p><b>Max. flow = 135 l/h</b>            P = 3140 W at <math>\Delta T = 20K</math>            P = 4700 W at <math>\Delta T = 30K</math></p>	<ul style="list-style-type: none"> <li>✓ Best choice for complex riser designs</li> <li>✓ Best choice when main risers/return pipes are difficult to access</li> <li>✓ Best choice when main riser/return pipes are distant from each other</li> </ul>	<ul style="list-style-type: none"> <li>✓ Best choice for risers with few radiators</li> </ul>
<p><b>Riser fitted ASV + radiator fitted RA-N</b></p> 	<p>Max. differential pressure = <b>150 kPa</b></p>	<p>No flow (l/h) limitations</p>	<ul style="list-style-type: none"> <li>✓ Best choice if the max. differential pressure is unknown</li> <li>✓ Best choice when well-functioning pre-setting valves are present</li> <li>✓ Only choice for systems with built-in valves</li> </ul>	<ul style="list-style-type: none"> <li>✓ Best choice for risers with many radiators</li> </ul>

# Comprehensive product range

For all two-pipe radiator heating systems we recommend using an automatic balancing solution. Danfoss offers all the products you need.

	RISER FITTED ASV SOLUTION	RADIATOR FITTED RA-DV SOLUTION
<b>Riser mounted products</b>	<p><b>ASV-PV differential pressure controller</b></p> <ul style="list-style-type: none"> <li>+ ASV-BD partner valve</li> <li>• DN 15 – 50</li> <li>• Setting range 5 – 25 kPa</li> <li>• Kvs 1.6 – 16.0 (ASV-BD 3.0 – 40.0)</li> <li>• PN 16</li> <li>• Recommended differential pressure 10 kPa</li> <li>• Max. pump head capacity 15 m (150 kPa)</li> </ul>  	
<b>Riser mounted products</b>	<p><b>RA-N pre-setting radiator valve</b></p> <ul style="list-style-type: none"> <li>• DN 10 – 25</li> <li>• Setting range 10 – 230 l/h (RA-N 10/15 in position 1 and RA-N 20/25 in position N, <math>\Delta P = 5</math> kPa)</li> <li>• PN 10</li> <li>• Recommended differential pressure 5 kPa</li> </ul> 	<p><b>RA-DV pressure independent radiator valve</b></p> <ul style="list-style-type: none"> <li>• DN 10 – 20</li> <li>• Setting range 25 – 135 l/h</li> <li>• PN 10</li> <li>• Required differential pressure 10 kPa</li> <li>• Max. pump head capacity 6 m (60 kPa)</li> </ul> 
<b>Thermostatic sensors for RA-N and RA-DV</b>	<ul style="list-style-type: none"> <li>• RA 2000 series, gas filled</li> <li>• RAW, RAE, RAS-C2 and RA-X series, liquid filled</li> <li>• eco, electronic stand alone</li> <li>• connect™ with Danfoss Link™ CC, electronic wireless</li> </ul>    	

## Built for flexibility

Our flexible automatic balancing solutions offer tailor-made improvements for your two-pipe heating system projects. No matter the building, system specifications or practical circumstances both Danfoss ASV and *Dynamic Valve™* solutions provide a perfect fit for each situation.

### Both solutions will:

- Establish improved temperature control
- Establish even heat distribution and fair heat cost allocation
- Eliminate noise problems
- Save energy



Scan to see an animation about the ASV automatic balancing solution

## Renovation<sup>+</sup> concept

Renovation<sup>+</sup> is a dynamic Danfoss solution in response to the urgent need to reduce the huge amount of energy currently being wasted in buildings across Europe.

The Renovation<sup>+</sup> concept provides integrated smart solutions for the renovation or retrofitting of both one- and two-pipe heating systems. Offering a wide range of products and solutions, it is mainly aimed at upgrading the energy efficiency of existing heating systems in residential buildings. Both *Dynamic Valve™* and the ASV solution are part of the Danfoss Renovation<sup>+</sup> concept.

## See you at **hbc.danfoss.com**

Danfoss Hydronic Balancing & Control's first point of contact can be found online. By visiting **hbc.danfoss.com** or one of our many local websites you can find a complete toolbox of support material. These tools can help you to make the best product selection for each of your projects. Find the best suitable product with the right dimensions and prepare the right setting to make the job on site as easy as possible.

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Expand your toolbox  
with a regular visit to  
**hbc.danfoss.com**.



### Literature

Both commercial and technical literature help you to explain our products and solutions to your customers and help you find the best products for your projects. You can find brochures, case stories, technical datasheets and instruction manuals.



### Tools

Videos and educational animations help you to understand our products better. Calculation tools and software that can help you with on-site commissioning.



### Social media

Besides visiting our websites you can also follow us on social media. At **youtube.com/DanfossHeating** you can find our videos. Just click on 'Hydronic Balancing & Control'.

Or stay up to date by following us on Twitter at  
**twitter.com/DanfossBalance**

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