

ENGINEERING  
TOMORROW

*Danfoss*

AB-PM

# Consistent hydronic control **Continuous energy savings**

AB-PM automatic balancing valve – for a reliable and energy-saving heating system.

**1 valve**

needed instead of 3

for pressure, flow  
and zone control of  
water-based heating  
systems.



# Three functions one valve

The ideal residential heating solution is reliable and easy to maintain. A solution that helps to reduce heating costs, improve indoor comfort and eliminate noise. Danfoss has developed a new type of balancing valve that can do all those things.

The AB-PM valve is a combined automatic balancing valve. It incorporates a differential pressure controller, a flow limiter and a zone controller. All three functions in a single valve.

**AB-PM is simply the perfect solution for:**

- Horizontal two-pipe radiator systems
- Floor heating systems.

The AB-PM valve converts an unbalanced variable flow system into a reliable and balanced heating system with proper heat distribution, even at partial loads. Thanks to the stable low differential pressure across all the thermostatic radiator valves, the heating system also becomes noise free.

The zone controller function makes it possible to control room temperature when at home or during the night. This is done by connecting an on/off actuator and a room controller to the valve, resulting in energy savings and improved indoor comfort. During holidays, the zone

valve can be used to ensure that the radiator or floor heating system provides a minimum temperature needed to protect the water-based pipe system from frost.

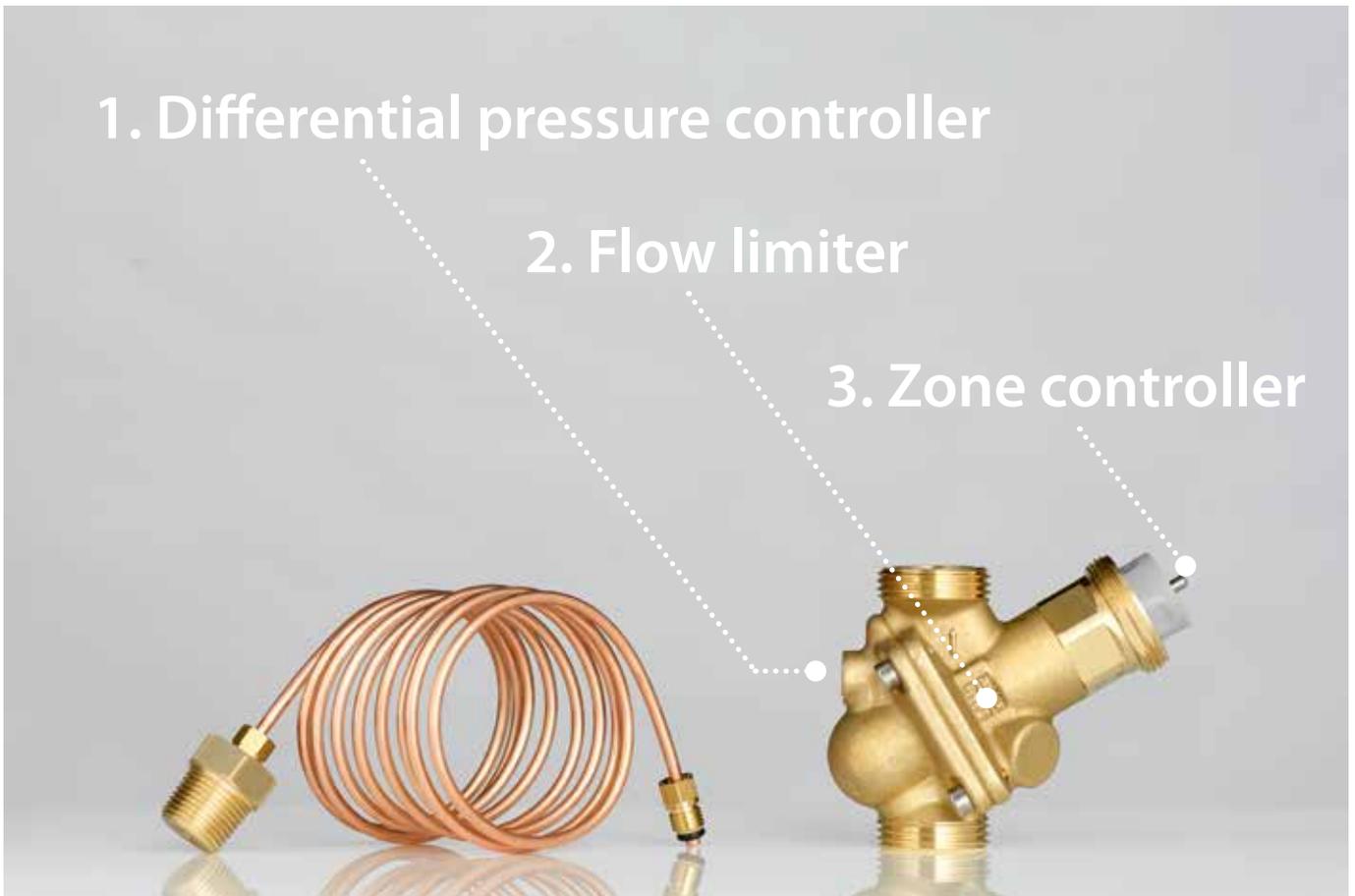
The AB-PM valve effectively replaces three separate valves. With its compact design, it is easy and fast to install and ideal for small spaces, such as in manifold cabinets.



# 1. Differential pressure controller

# 2. Flow limiter

# 3. Zone controller



## Easy sizing, setting and installation

Using our sizing and selection table, you can quickly install and preset the AB-PM valve, without the need for complex calculations. Simply determine the required flow and differential pressure in the riser and preset AB-PM accordingly. AB-PM will take care of the rest, without further commissioning. It's that easy.

### AB-PM selection is based on:

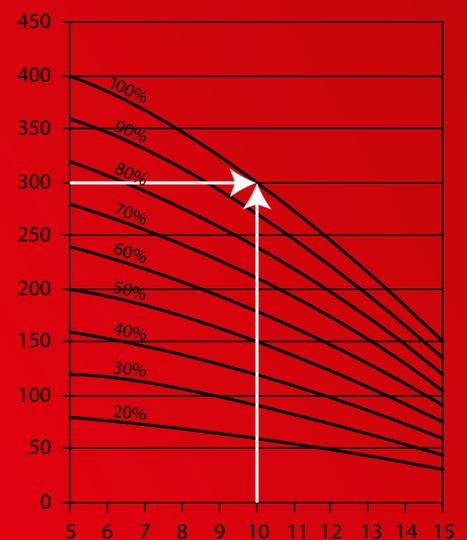
- required flow in riser / loop - (l/h)
- required differential pressure in riser / loop - (kPa)

### Setting

Setting AB-PM is quick and easy without complicated calculations. Simply set the knob to the desired value, based on the required flow and differential pressure in the loop.

### Installation – simply quicker and easier

With AB-PM, you only need one valve instead of three separate valves. This will significantly reduce installation time and labor costs. You will also need fewer fittings and tailpieces. Once AB-PM is installed and preset, there is no need for further commissioning.



# Recommended application 1

## Horizontal two-pipe radiator system

### Description

In new multi-residential buildings, a horizontal two-pipe radiator system typically features an individual connection for each apartment. At a central point in the apartment, a cabinet is installed with a manifold where all connections come together. This way the energy consumption can be controlled for each apartment. The thermostatic valves on the radiators convert heating systems from a static to a dynamic, variable-flow system. When renovating, conventional systems with individual boilers in each apartment can be replaced with central boilers for increased efficiency. Each apartment retains the original piping but will now have its own connection.

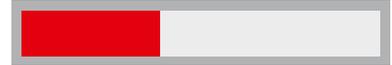
### How does AB-PM benefit you?

AB-PM installed in a two-pipe radiator system provides stable pressure for the thermostatic radiator valves, helping them perform better and eliminating noise problems. It also provides flow limitation for simple and accurate balancing for each individual apartment. By adding an actuator (TWA-Z) to the AB-PM, connected to a room controller or timer, additional functions such as zone control, night set-back or vacation mode are possible.

**End-users benefit from a reliable heating system, even heat distribution and reduced energy consumption.**

### Design complexity

Low/medium



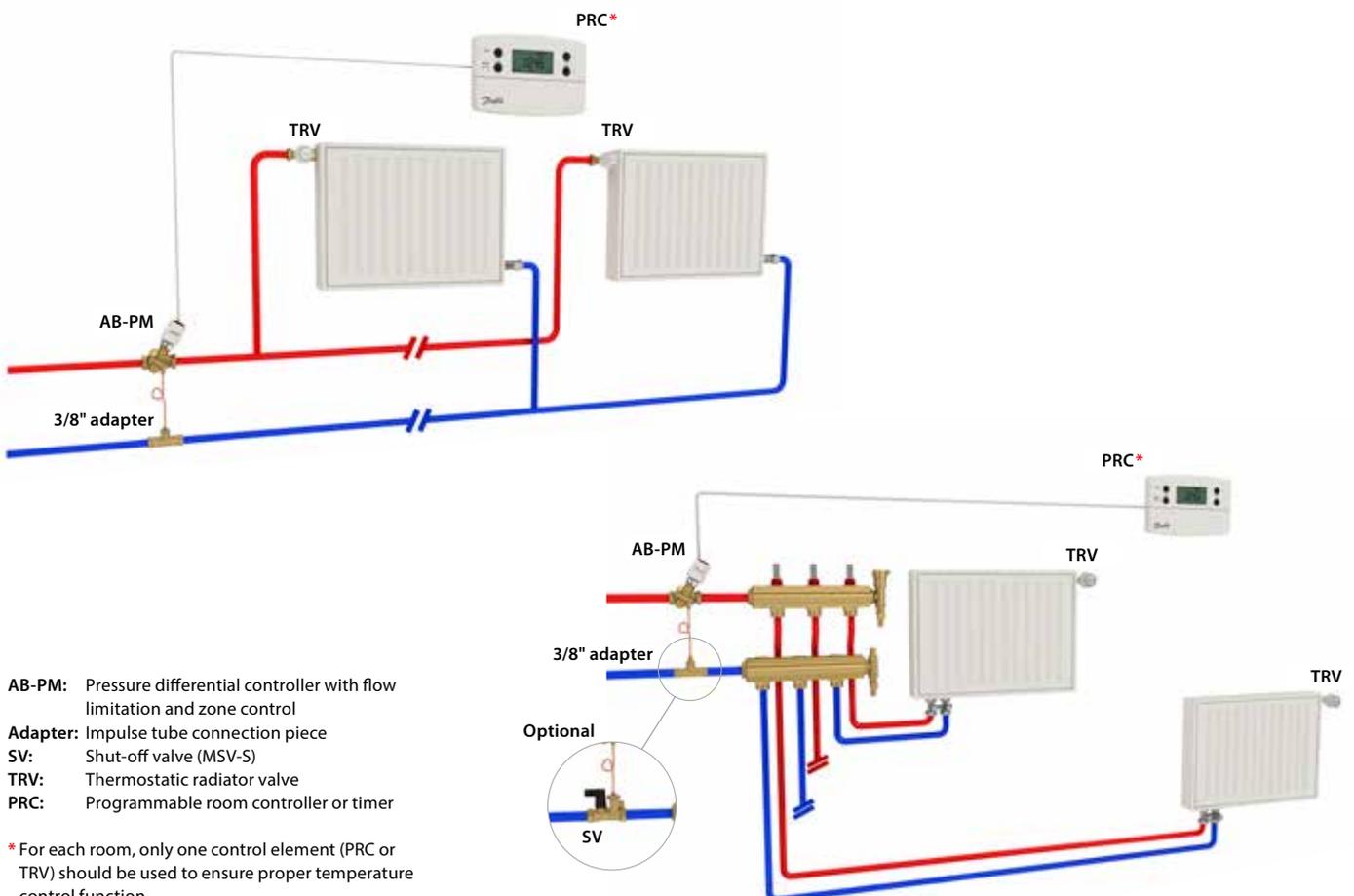
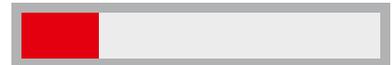
### Initial investment

Medium



### Operational cost

Low



# Recommended application 2

## Floor heating system

### Description

Floor heating systems are rapidly gaining in popularity, thanks to their ability to provide improved comfort at lower energy consumption levels than traditional heating solutions. These systems generally have a manifold with one loop available for each room. With a room thermostat in each room, the indoor temperature is controlled via the zone valve on each loop. This turns the system from a static into a dynamic, variable-flow system, which requires automatic balancing. Placing an AB-PM valve in front of the manifold delivers automatic balancing for each apartment, independently of other apartments in the same building.

### How does AB-PM benefit you?

Thanks to the integrated differential pressure controller, AB-PM helps in avoiding common problems such as uneven heat distribution and interference between apartments in the same building by ensuring the correct flow, no matter what the load in the system is. AB-PM's easy-to-use flow limitation function ensures proper balancing throughout the heating system and also offers the possibility of zone control.

End-users benefit from a stable and energy saving system.

### Design complexity

Medium



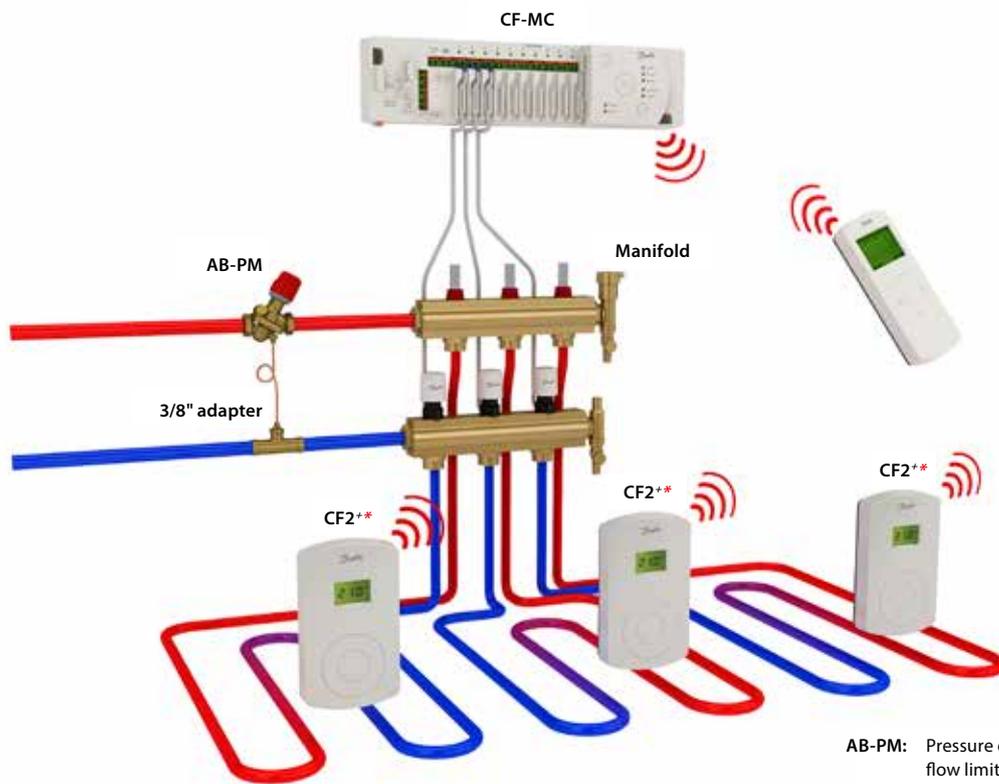
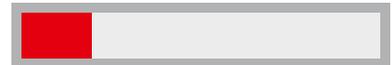
### Initial investment

Medium/high



### Operational cost

Low



- AB-PM: Pressure differential controller with flow limitation
- Adapter: Impulse tube connection piece
- CF2+\*: (Programmable) room controller
- CF-MC: Master controller CF2+

\* or other wired /wireless room thermostats



# Significant benefits using AB-PM solution in Aarhus, Denmark

Danfoss has tested the AB-PM differential pressure controller with flow limitation in combination with TWA-Z for zone control and a QT thermostatic element to control return temperature in one-family house heating applications.

The test was carried out on five similar one-family houses, located in one neighborhood in Aarhus, Denmark. All five houses are connected to the district energy system for hot water and heating. In three of the five houses, an AB-PM valve was installed to replace the original differential pressure controller in the heating system. The other two houses were left untouched to act as a reference.

**Test case consists of a total of five houses:**

**1 house:** installed with AB-PM + TWA-Z actuator for zone control

**2 houses:** installed with AB-PM + QT thermostatic element for return temperature control

**2 houses:** no changes made to original system – used as reference

## **Very promising**

The first results, measured from winter 2011 until spring 2012, show significant reduction in energy consumption compared to the reference houses, with variations of between 7-18% per month. More thorough testing is needed to draw definite conclusions and to see how these differences can be translated into energy savings. So far, however, the use of AB-PM in one-family house heating applications appears to offer significant energy reduction potential.

## AB-PM

Type *)	DN	Ext. thread (ISO 228/1)	Code No.
	15	G ¾ A	003Z1402
	20	G 1 A	003Z1403
	25	G 1¼ A	003Z1404

\*) AB-PM valve including 1.5 m impulse tube and 3/8" impulse tube adapter

## Maximum flow

Type	DN 15 at 100% setting	DN 20 at 100% setting	DN 25 at 100% setting
Qmax	300 l/h at 10 kPa	600 l/h at 10 kPa	1200 l/h at 10 kPa

## Partner valve

Type *)	DN	Connection (ISO 228/1)	Code No.
MSV-S	15	G ¾* (ext. thread)	003Z4111
	20	G 1* (ext. thread)	003Z4112
	25	G 1¼ (int. thread)	003Z4013
Impulse tube connection piece		¾ - 1/16	003L8143

\*) Eurocone DIN V 3838

## Actuator

Type	Power supply	Cable length	Code No.
TWA-Z NO *)	24 V AC	1.2 m	082F1260
	230 V AC		082F1264
TWA-Z NC *)	24 V AC	1.2 m	082F1262
	230 V AC		082F1266

\*) up to 60% of Qmax on AB-PM DN25

## Optional – for additional energy savings

Type	Description	Comments	Code No.
Room controller	Room thermostat for heating application	Power supply: 230 V	Via Danfoss Sales Company
QT	Thermostatic return temperature controller	Temp. range: 35-60 °C	Via Danfoss Sales Company

## Accessories

Type	To pipe	To valve	Code No.
Tail piece threaded (1 pcs.)	R ½	DN 15	003Z0232
	R ¾	DN 20	003Z0233
	R 1	DN 25	003Z0234
Tailpiece welding (1 pcs.)		DN 15	003Z0226
		DN 20	003Z0227
		DN 25	003Z0228
Tailpiece soldering (1 pcs.)		DN 15	003Z7017



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### **Hydronic Balancing & Control**

Specific information about hydronic balancing & control valves can be found at:  
**[www.hbc.danfoss.com](http://www.hbc.danfoss.com)**

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