

# How to modernize a central heating system?

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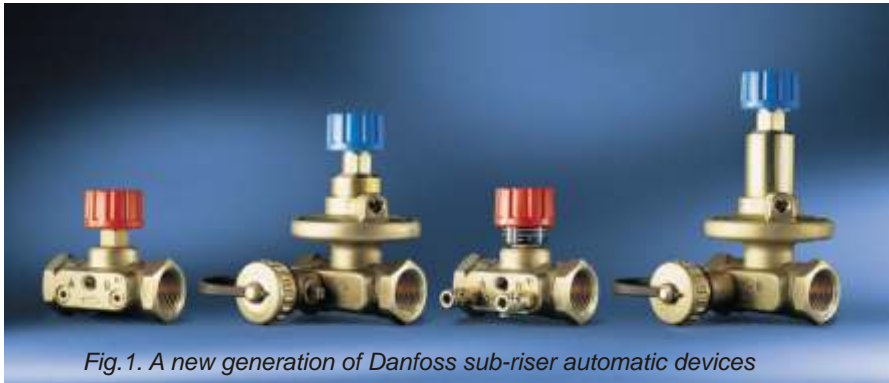


Fig. 1. A new generation of Danfoss sub-riser automatic devices

the control of the riser involves the use of orifices or manual control valves, the thermostatic heater valve is also subject to such considerable changes of pressure (Fig. 3a).

Noises and whistles that are often very troublesome for users may be generated in the system. However, when the control takes place in ASV valves, in spite of the changes of demand for heat, the pressure difference in the riser remains constant.

An efficient system of central heating is the element of a building that determines the microclimate inside a house. The system is to provide heat to rooms depending on the changing demand. The key to such a solution is the correct division of pressure and flow in the whole working system. Such tasks have to be realized automatically. The effect is a quiet and stable work of all devices without excessive load.

Danfoss Company has been a leading producer of valves for the automatic control of flow in heating risers for many years. This presentation is aimed at introducing the new range of ASV-type devices for the automatic regulation of central heating systems (Fig. 1).

The latest series of sub-riser automatic devices can be applied in three control systems. Each system consists of an automatic valve and

a cut-off valve and is designed for the control and maintenance of the constant difference of pressures. The ASV-P and ASV-M system maintains the difference of pressures at the base of a riser at the level of 10kPa, and the ASV-PV and ASV-M or ASV-I systems at the level of 5-25 kPa. The solution consisting of an ASV-PV control is used when the necessary pressure difference at the base of a riser is unknown or the valves without an initial setting have been applied (Fig. 2).

One of the offered solutions is a system consisting of an ASV-Q control unit and an ASV-M cut-off valve. This system is designed to reduce the necessary flow through a riser. This applies also to e.g. 'candle risers'. In the course of the normal operation of the central heating system some fluctuations of pressure excess occur at the base of the riser. When

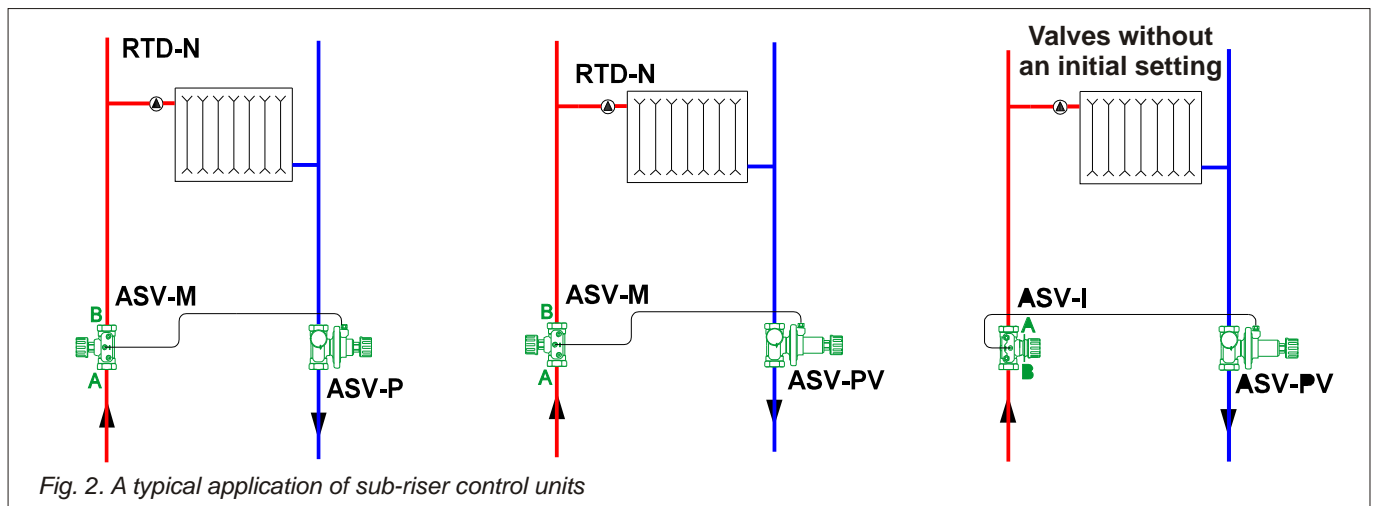
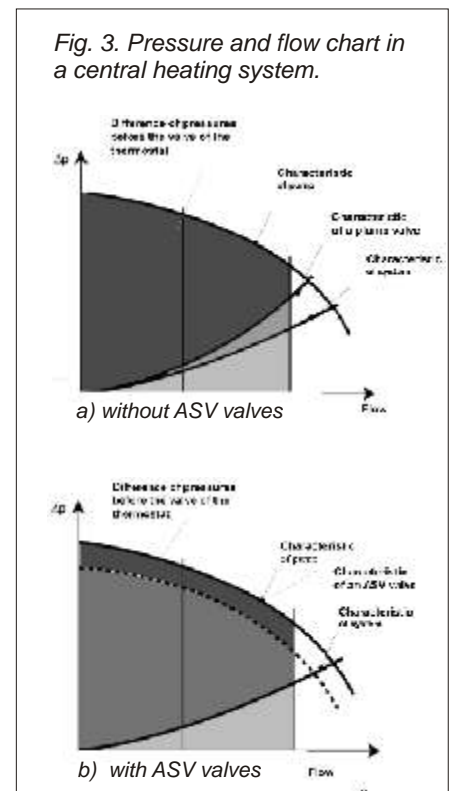


Fig. 2. A typical application of sub-riser control units



Fig. 4. The portable measuring instrument PFM 3000

The excess is reduced by an ASV regulator. The thermostatic heater valve is subject to the constant difference of pressures (Fig. 3b).

Danfoss offers a wide range of diameters, from DN15 to DN40. They allow operating the flow of up to 3100 l/h.

A portable measuring instrument PFM 3000 (Fig. 4) is used for the complete monitoring of the flow and pressures in a central heating system.

The measuring instrument takes advantage of the design of valves that allows taking impulses of the pressure from the flowing medium. It may be done from behind or in front of the valve. Based on the measured value of the pressure drop and the set characteristic of the valves the instrument displays the current flow. The measurements may be taken in sequence and the data may be recorded and sent to a computer.

The instrument is controlled via a hierarchically set menu, in which, apart from the current measurement, it is also possible to select the unit of measure, the length of a measurement cycle and the mode of data transmission.

The measuring instrument may also regulate the setting of the valve for defined flows, which allows possible correction of designed values and the optimisation of the system control process.

The instrument is powered indepen-

### Advantages of the ASV system

ASV valves are a series of well-designed fittings that guarantee a constant difference of pressure in a riser, the possibility of cutting-off, emptying or filling a riser, the measurement of the flow in a riser, the smooth control of the pressure difference and the possibility of limiting the flow.

ASV series is available in diameters from 15 to 40 mm with an internal thread, an external thread or to be connected with welding the mutual positioning of connecting endings and the control makes it easy to access the system during the assembly and operation.

ASV series has a lightened valve head which means that the control is independent of the volume of pressure produced by the pump; in this way the potential errors of control of the pressure difference are reduced to the errors due to hysteresis and proportionality deviation.

ASV series is packed in polystyrene foam that can be used as insulation.

In single-pipe systems first and foremost in order to reduce the flow the ASV-Q flow regulator is offered. This flow limiter operates as a limiter compensated by pressure, in which a specific flow is set. It remains constant irrespective of the changes of pressure in the system.

The dynamic regulation of pressure difference at the base of the riser.

Reduced costs of starting the system the optimal division of water.

It is not necessary to set or regulate the system again when the system is being modified or developed.

Simple dimensioning of the system.

The possible application with modernized systems.

Easy assembly and operation.

No noises during the work of thermostatic valves.

### Possibilities of specific ASV systems

	ASV-P +ASV-M	ASV-PV +ASV-M	ASV-PV +ASV-I
Maintenance of constant difference of pressure at the base of a riser	+	+	+
Possibility of cutting a riser off	+	+	+
Possibility of filling/emptying a riser	+	+	+
Possibility of flow measurement	(+)*	(+)*	+
Possibility of pressure difference setting modification		+	+
Possibility of limiting the maximum flow in a riser			+

(+)\* Measurement endings are provided as auxiliary accessories

dently and is provided with the auxiliary equipment that makes the work and storage more comfortable: a carrier, a case and a charger for the batteries.

The automatic valves of sub-riser control have been used since the

beginning of the 90. in the thermo-renovation of commune buildings in Sweden. The savings resulting from the use of ASV in modernizing old systems reach 10% and even more in a combination with other methods of renovation. ■