
Save up to 20% on the heating bill with radiator thermostats

House owners, housing associations and tenants are experiencing that expenses for heating are rising considerably. A development which probably will not change in the future and which has made it more attractive to save energy and money by improvement of the heating system.

Often it is a good idea to renovate the whole system. However, in all systems an important step to a lower heating bill is the replacement of manual valves with new radiator thermostats. It is a reasonable investment and the expenses in connection with the investment will soon be recovered.

What is a radiator thermostat?

The radiator thermostat consists of a valve on which a thermostatic sensor is mounted. It is easy for the installer to replace the old manual valve with a new radiator thermostat.

And for the tenants it is even easier: they set the radiator thermostat on the wanted temperature by turning the dial of the thermostat (e.g. 20 °C in the living room, 17 °C in the bed room etc.). The radiator thermostat will then maintain this temperature until the setting of the thermostat again is changed.

Why and how much will be saved with such a simple change of the heating system?

The most essential reason for achieving considerable energy saving with a radiator thermostat is the fact that the radiator thermostat only uses the quantity of energy which is necessary to keep the wanted temperature. The thermostat is saving energy with the so called "free heat". The radiator thermostat exploits "free heat" if the weather changes from cloudy to sunshine. Then the radiator thermostat will lower the energy consumption as the sun gradually heats the room. The same will happen when heat emits from people in the room, switched on light, television etc., and the other way around the radiator thermostat will increase the energy consumption when for example it is getting darker and the sunshine is no longer filling the room with heat or when the temperature outside drops.

Danfoss - the world's leading manufacturer of radiator thermostats - has tested the possible energy savings by using radiator thermostats. The results showed savings of up to 20%! That means that investments in radiator thermostats typically will be recovered in

less than two years. On average a radiator thermostat works for 20 years without maintenance: the savings on your energy bill are therefore quite considerable during the life of a radiator thermostat. Not only financial advantages are obtained, but also the environment benefits from radiator thermostats.

What is inside a radiator thermostat?

The handle of a thermostat contains a gas which is extending as the room temperature is increasing. When the temperature drops the gas contracts.

When the gas of the thermostatic sensor is extending it is pushing the spindle of the valve and thereby gradually closing for the flow of warm water into the radiator. When the room temperature drops the gas contracts and the flow of water for heating will increase - simple, automatically and without use of energy for the regulation.

Most of the thermostatic sensors in the market are using different kind of fluids or wax. But Danfoss has chosen gas for the RA sensor range as it has a number of advantages: Gas reacts faster on temperature changes thus the room temperature is maintained with as small fluctuations as possible. In that way the free heat is exploited better. Moreover, the gas maintains its fine regulation abilities during the whole life of the thermostat; in other words the quality of the gas is not changed as it gets older.

Optimal heating distribution with pre-setting valves

Danfoss supplies thermostatic valves for all types of systems and pipe sizes. RA-G valves are designed for one-pipe systems; they allow a big flow of water through the valve. In a one-pipe system a bypass is established past the radiators thus some of the hot water flows directly to the following radiators of the heating system.

In two-pipe systems RA-N valves with built-in pre-setting are mounted. The idea of the pre-setting is to regulate the water flow for each radiator thus only the water necessary to heat the room is supplied. This ensures the heating capacity is the same, even for rooms at the end of the supply pipe.

The pre-setting is set on the pre-setting ring of the RA-N valve and without use of any tools. Then a thermostatic sensor is mounted. The pre-setting is only set once unless the structure of the system later is

changed. When the sensor is mounted the pre-setting ring will be hidden thus no unintended turning of the ring can be carried out.

Choose a thermostatic sensor which fits the placing of the radiator

As standard RA thermostats with built-in sensor is mounted. That is, the temperature is measured inside the handle of the sensor.

However, in some situations a built-in sensor cannot measure the room temperature because the heat from the pipes or the radiator is collected around the thermostat. For example, when the radiator is placed in a niche, below a broad window frame, hidden behind the curtains or is mounted pointing upwards. The solution is a RA thermostat with a remote sensor. The remote sensor is connected to the handle with a 2 m capillary tube, which is placed on the wall where the room temperature can be measured correctly. If placing of the radiator makes it difficult to set the temperature a remote setting sensor may be chosen instead. In this case, the regulation is mounted at the wall (up to 8 m from the radiator valve) and is connected to the valve with a capillary tube.

If unauthorized persons have access to change regulations of the sensor a RA thermostatic valve with temperature limitation of max. 21°C can be installed. Another possibility is a thermostatic sensor on which both maximum and minimum temperature can be limited or the thermostat can be locked in a certain setting.

All RA thermostatic sensors have a frost protection setting which turns the heat on when there is a risk of frost in the room.

Inform the end users

The largest possible energy savings are obtained when end users operate the radiator thermostats correctly. Therefore it is very important to inform the end users of function and correct setting of the radiator thermostat.

Danfoss has published a user guide with information about

- how to set the temperature
- how to exploit the "free heat"
- how to save on energy expenses
- the best way to air the room
- how to set the temperature over night
- how to set the temperature when you are away for longer period of time

and other practical hints regarding energy savings.

Complete district heating solution

Danfoss invented the radiator thermostat more than 50 years ago and has through all the years improved the operation and the design of the radiator thermostat.

This article has dealt a lot with the heating automatic control devices which are installed in the home of the end user. However, the know-how of Danfoss within heating controlling equipment includes many other areas. If we go down to cellar level Danfoss has developed a number of products which together with the radiator thermostat ensure optimal operation of heating systems based on water.

We can among many other products mention flow limiter type ASV-Q and automatic riser valve type ASV-P which ensures an optimal water distribution in a system with more risers. With a weather compensator type ECL an automatic adjustment of the operation of the heating system for the weather type can be obtained, automatic reduction of flow temperature over night etc.

There are a number of possibilities and the optimal solution differs from system to system. As one of the most experienced suppliers of district heating controlling equipment Danfoss analyses the possibilities in each case to find the optimum solution.

