ENGINEERING
TOMORROW

Danfoss

Upgrade your climate system
and benefit from five star
indoor comfort

Up to 30%
energy savings
by using Danfoss AB-QM pressure independent balancing & control valves in your climate system.

www.hbc.danfoss.com

From pipeline to bottom line

Energy bills are a substantial part of the exploitation costs of your hotel. The harsh reality is that those costs are likely to go up significantly in the future, putting even more pressure on your bottom line. Combine that with an increasing demand from your customers to stay in hotels that are environmentally responsible and you have a compelling case to seriously consider how you can reduce the energy consumption of your hotel.

There is good news too. Most existing cooling and heating systems can easily be improved without major changes or huge investments. If your hotel is still to be built, a little attention to how the installation is designed can make the improvements mostly cost neutral.

The Danfoss AB-QM will make your system better, more efficient and will result in more comfort for your guests. Can you afford not to use it?

Balance your needs

Most installations use water to transport energy. Water is cooled down by a chiller or heated up by a boiler and a pump will circulate it in the hotel where it is used in fancoil units, air handling units or radiators to cool or heat a room. It is crucial that the right amount of water is available at the right time. Unfortunately water has a tendency to follow the path of least resistance so measures need to be taken to ensure the right water distribution at all times.

To make matters worse, conditions in the system are not stable. Compare it with a situation at home where you will open the hot water tap in the kitchen to wash the dishes while somebody else is under the shower. This would often result in a temperature drop of the water in the shower.

Climate systems can suffer from the same issues where the fancoil or radiator in one room can take the water needed for another room, resulting in the wrong temperatures.

The Danfoss AB-QM automatically distributes the water through the installation and makes sure there is always enough water available at the right time. This has several benefits. For starters it makes sure you have always comfortable rooms and conference venues. Additionally it will make sure that all the equipment in the installation like chillers, boilers and pumps, are operating under optimal conditions which will result in substantial energy savings that can amount to 30% compared to other solutions.

Finally, because of the unique properties of the Danfoss AB-QM you will have more stable room temperatures, increasing the comfort.

Because AB-QM is reducing the number of components in the system and simplifying the commissioning, it will not substantially increase the installation cost and it will streamline the building process. This will make it easier to stay on budget and beat deadlines.

For a more technical explanation of the Danfoss AB-QM, please refer to page 6.

Small changes, big results

The Danfoss AB-QM pressure independent valve is specifically designed to fit seamlessly into modern installation designs. This fact is recognized by system designers and consultants the world over and the trend is a fast growing acceptance of pressure independent valves as the standard for good design.

CONVENTIONAL SYSTEM

A conventional system (fig. 1) would have a control valve and a balancing valve for each terminal unit (i.e. fancoil unit or air handling unit). In this set up the control valve takes care of the temperature control. It will open and close based on the demand from the room thermostat. The balancing valve is supposed to take care of the balancing.

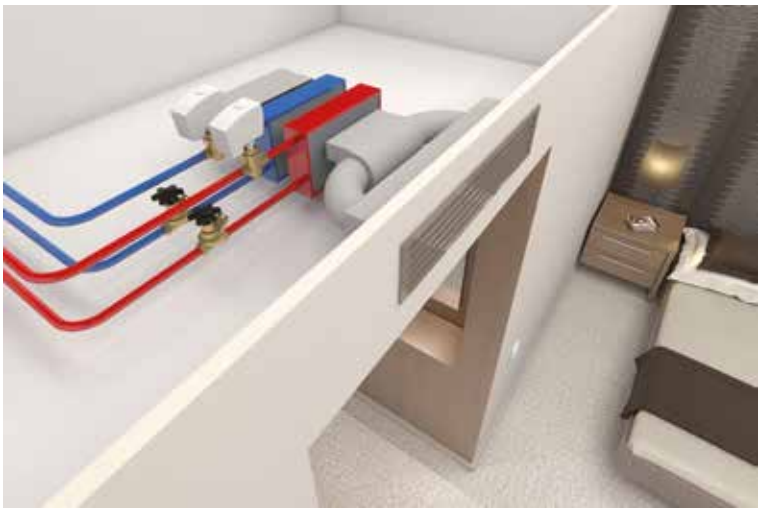


figure 1: *conventional system*

RECOMMENDED SYSTEM

Danfoss combined these two functions into one valve so instead of 2 valves you only need to mount one, reducing cost and complexity (fig. 2). Furthermore, a balancing valve needs to be measured and set to the right flow, a complicated and time consuming procedure. The AB-QM can simply be set to the required flow reducing labor cost and complexity.

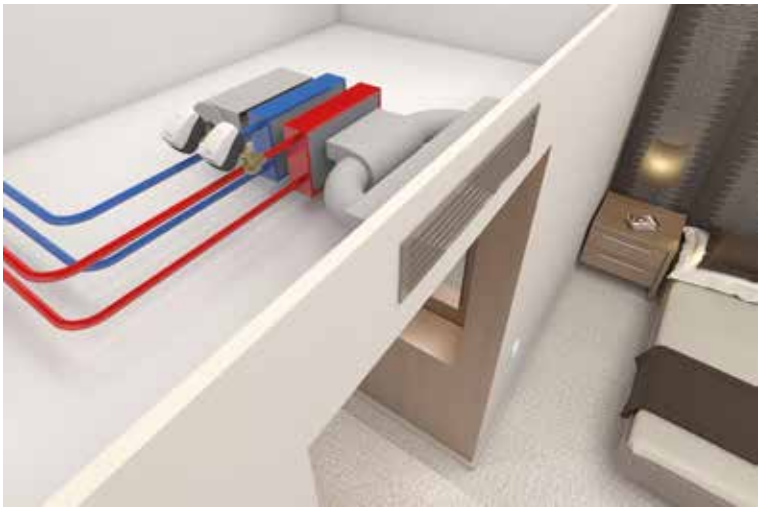


figure 2: *recommended system*

Savings with AB-QM

CALCULATIONS

Selecting the right AB-QM is much less complicated than sizing and selecting conventional control valves.

INVESTMENT

Much less products needed because all balancing valves can be cut from the project. This means saving on products, on mounting the valves and on balancing the valves.

ENERGY

By providing the right flow at the right time, the AB-QM optimizes chiller and boiler efficiencies and reduces pumping costs.

COMFORT

The AB-QM will create much better installations, which leads to happier guests and therefore less complaints. Complaints cost you time and your reputation.

How to get with the times

Pressure independent valves are quickly becoming the standard for designing efficient and green installations. However, that is a fairly recent trend that is still ongoing and existing installations might have been designed using outdated technology. Fortunately it is relatively painless to upgrade your installation to a 5-star system.

For a hotel the rooms need to be available to make money, so it is not realistic to close down the hotel to upgrade the installation. Because of the properties of the Danfoss AB-QM that is not needed. The valves can be exchanged on a room by room basis without interfering with the operation of the hotel.

If you are uncertain the AB-QM will be a good choice for you, Danfoss can offer to run a small analysis for you to predict what savings to expect.
This will give you a good indication of the status of your installation and what the payback time for upgrading should be.

How does it work?

The working principle is as simple as it is effective. The AB-QM consists of two different parts: the control valve (orange) and the differential pressure controller (blue). The integrated membrane of the pressure controller maintains a constant differential pressure across the valve. The flow through a valve is determined by the kv value and the differential pressure across the valve. Because the differential pressure is now constant, overflows are prevented and the authority of the AB-QM to control the flow is ensured.

FIGURES 1-3

In the illustrations you can see the membrane in action. If the differential pressure across the valve increases, the membrane will immediately be pushed down and close the pressure controller (2). If the differential pressure decreases, the membrane will instantly move up again (3).

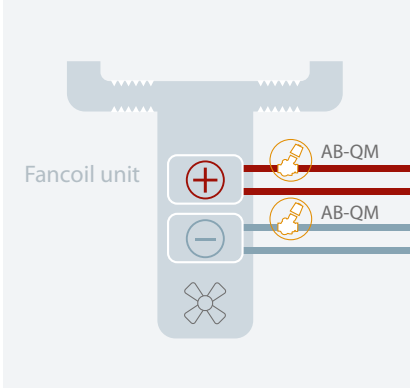
YOUR BENEFITS:

Constant differential pressure across the control valve, resulting in accurate flow limitation and 100% authority.

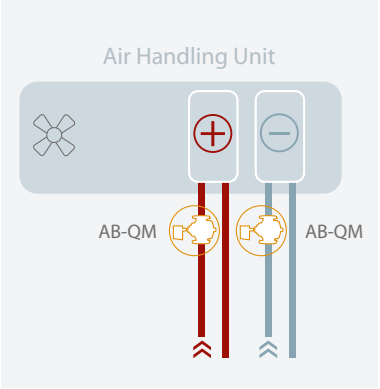
APPLICATIONS

The Danfoss AB-QM is the obvious choice of a control valve for water based units, like an Air Handling Unit or fancoil unit. The AB-QM combined with a Danfoss actuator, ensures the required flow in every unit and maintains hydronic balance in the system. AB-QM is successfully applied in offices, hotels, hospitals, airport terminals, and in buildings where accurate temperature control is extremely important, such as in laboratories or food processing facilities.

Example 1: *Fancoil unit heating/cooling, 4-pipe system*



Example 2: *Air Handling Unit (AHU)*



Clear differences between conventional and new AB-QM solution

The **Sunway Resort Hotel & Spa i**n Kuala Lumpur, Malaysia had a wish to renovate all their hotel rooms. Although the owners of the hotel were already positive about the use of Danfoss AB-QM pressure independent balancing and control valves, they wanted to have some additional proof for the possible energy savings and benefits.

Tests with a Danfoss data logger, the Hydronic Analyzer, that were conducted for a period of 4 years provided the clear differences between the conventional and new solution.

"With this Danfoss solution in the hotel we were able to use less chillers than needed. On top of that the fast commissioning time of the AB-QM pressure independent valve was a great advantage, which meant we managed to finish the whole project in time".

Chief Engineer – Mr. Chin

TWO DIFFERENT SETUPS TO PROVE THE CASE

The hotel has about 500 fancoil units that were originally equipped with a conventional solution, 2-way control valves and manual balancing valves. When the first phase of the hotel renovation was finished, one third of the hotel rooms was equipped with about 150 pieces of AB-QM. At that time Danfoss offered the hotel owner to test the system with the hydronic analyzer comparing the two solutions: conventional and the AB-QM.

The results of the analysis showed significant energy saving potential, both on the energy for pumping and the efficiency of the chiller. Upgrading of all 500 fancoil units with AB-QM valves would improve the efficiency of the chiller and also save on pumping, about 60% on the overall energy bill.

BENEFICIAL RESULTS

Overall the installation of pressure independent balancing and control valves clearly showed substantial benefits for the Sunway Lagoon Hotel. Not only did it increase the comfort in the rooms, but it also maximized the chiller efficiency which lowered the energy bills. With simplified calculations now being possible, the estimated payback time on the new solution was significantly shorter. The fast and smooth commissioning of the AB-QM valves also saved a great amount of time and did not interrupt the daily business at the resort.

Advantages of the renovation solution

- No extra installations needed
- High energy efficiency
- Low maintenance costs
- Shorter start up time
- Good control characteristics
- Increased room comfort

ENGINEERING
TOMORROW

JW Marriott Hangzhou hotel *****

Location: Hangzhou, China
Applied products: pressure independent balancing & control valves (AB-QM), automatic balancing valves (ASV) and manual balancing valves (MSV).

Waldorf Astoria hotel *****

Location: Amsterdam, the Netherlands
Applied products: pressure independent balancing & control valves (AB-QM) and automatic balancing valves (ASV).

ITC Royal Gardenia Bengaluru *****

Location: Bangalore, India
Applied products: pressure independent balancing & control valves (AB-QM).
Platinum LEED Rated Hotel

Hilton Garden Inn ****

Location: Rseszów, Poland
Applied products: pressure independent balancing & control valves (AB-QM), automatic balancing valves (ASV) and manual balancing valves (MSV).

The Meydan hotel *****

Location: Dubai, United Arab Emirates
Applied products: pressure independent balancing & control valves (AB-QM).

Jin Jiang hotel *****

Location: Shanghai, China
Applied products: pressure independent balancing & control valves (AB-QM).
Remark: Tallest hotel in the world

Find more Danfoss references at **www.hbc.danfoss.com** under references & case stories

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