



6-way characterised control valves in the four-star “Crowne Plaza” hotel in Belgrade, Serbia

Energy-efficient hydraulic decoupling of the heating and cooling circuits

The former “Intercontinental” hotel in the New Belgrade district is in a prime location — not far from the Old Town and right next to the international “Sava Center” that seats 4000 people. In 2013, the new owner “Crown Plaza” hotel chain invested 40 million Euros refurbishing the building. When the hotel reopened on the 30.12.2013, there were already around 30,000 pre-booked reservations for the 415 rooms for 2014. With its innovative, motorised 6-way characterised control valves, Belimo supplied a significant proportion of the new, energy-efficient HVAC system with air-handling ceilings in every room.

Type of building	Hotel
Project	Renovation
Trade	HVAC
Products	500 x 6-way characterised control valves 500 x LR24A-MF
Commissioning	30.12.2013

Initial situation

The main focus of the engineering company “Me.com”, which is based in Belgrade, was designing an energy-efficient heating and cooling system that conformed to the hotel operator’s specifications – a low-temperature heating system operated by a heat pump. A four-pipe system was built into the cavities between the rooms so that different zones in the hotel can be heated and cooled at the same time in line with demand. This system supplies the fan-coil units – which are perfectly designed for quiet operation and located in the ceilings of the rooms with hot or cold water.

Project requirements

The operator defined two conditions:

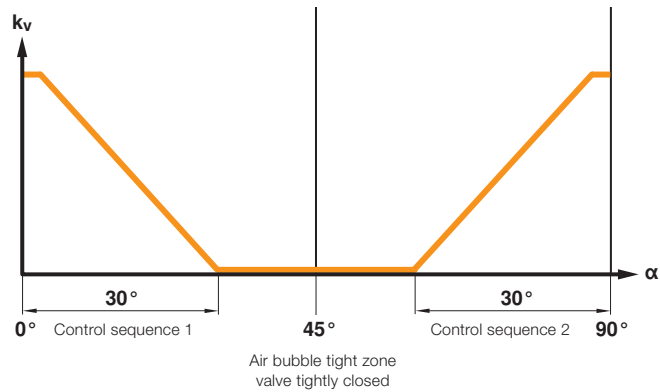
- The HVAC solution should allow the guest to choose at any time whether the room should be heated or cooled
- It should be possible to service the HVAC system without disturbing the guest

Belimo solution

Belimo's 6-way characterised control valve solution proved to be the perfect fit as the fan-coil units, feature two supplies and one high capacity heat exchanger. What's more, all of the valves and installations could be placed between the rooms. This means that any servicing work can be carried out in the corridor without disturbing the guests. Most of the 6-way characterised control valves used had a nominal diameter of DN 15. Only some of the larger rooms were fitted with DN 20 valves. In total, 500 of these valves were installed with actuators. As the temperatures in the hotel rooms are regulated using a PWM signal (pulse width modulation), the LR24A-MF multi-function actuator from Belimo could also be used. Thanks to the innovative valve design, the two heating and cooling circuits are now hydraulically decoupled, which stops hot and cold water from mixing. Nevertheless, both circuits can be controlled individually and precisely.

Customer benefit

- Energy-efficient heating and cooling control
- Individual zone control enables different areas of the hotel to be heated or cooled at the same time
- Energy efficient fan-coil units with high capacity
- Fan-coil units make almost no noise at the lowest fan speed
- A 6-way characterised control valve replaces up to four conventional gate valves
- Space-saving design enables installation between rooms, meaning that they can also be serviced from the corridor without disturbing guests



The “dead zone” is a distinctive feature of the 6-way characterised control valves from Belimo. In this energy-dense zone, the product creates an air bubble-tight seal on both the heating and the cooling circuit. This seal means that the valve prevents energy losses, reduces pump power consumption and helps to reduce operating costs. In the “Crowne Plaza”, the first control sequence is used for heating and the second for cooling. The controller is programmed so that the valves regulate the required room temperatures from as low as the first fan speed, thereby ensuring that they operate quietly. The fan speed only increases if the desired temperature cannot be reached. When the guest leaves the room, the actuator moves the valve into a neutral position, stopping the water circulation in the heat exchanger. The control unit is now in “standby” mode. Thanks to this intelligent interaction between characterised control valves and control units, the rooms can be run in an energy-efficient manner without getting too cold in winter or too hot in summer.

Customer satisfaction

According to the hotel management, the central requirements of the HVAC system have been met: “For us, energy efficiency means that the fan-coil unit fans switch off as soon as the guest leaves the room and removes the key card from the energy-saving slot. Also the 6-way characterised control valves from Belimo then switch to the neutral position, meaning that no water flows unnecessarily to the fan coil unit. Above all, however, room comfort has significantly increased: depending on the room temperature, our guests can now heat or cool their rooms to suit their individual needs.”



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