



INTEGRATED ENGINEERING SOLUTION



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Pressure Independent Balancing Control Valve (PICV)

Greenhouse gas emissions, especially CO₂, has long been the major topic in the climate change context, and is interlinked with energy consumption. The major contributor to energy consumption within a building complex comes from the heating systems. Hence it is inevitable to improve the systems efficiency, thus minimizing the consumption and greenhouse gas emissions, achieving a sustainable energy system.



Modern building complexes adopts communal heating to as the primary heating source to achieve energy saving, where the heating system of the building is centralized, supplied from a common heat source or boiler. However, due to the scale of the heating system, it is often hydronic imbalanced, causing uneven flow within pipes, system inefficiencies and higher energy consumption. To compensate it, the hot water system operates at higher temperature, with additional pump power so that the heat may be distributed evenly throughout the building, the boiler/ heat pump system operating away from optimal efficiency.

To overcome such issues, Danfoss AB-QM PICV (Pressure Independent Balancing Control Valve) may be implemented to the existing system without major retrofit to better the system efficiency and mitigate the impact of hydronic imbalance. To leverage the current IoT technology, smart buildings may introduce Engineering HVAC 4.0, which can provide high precision actuator control and real time data for BMS. Danfoss AB-QM PICV combined the functionality of four products into one, actuator control, flow & energy monitor, bus communication device and data portal. The versatility of the actuator makes it applicable to different operations, with the likes of both residential and non-residential buildings, suitable for both cooling and heating systems.



Key applications for the Danfoss AB-QM includes:

- Fan Coil Unit
- Air Handling Unit
- Radiator Panel
- Cooling Towers
- Chillers

With the implementation of the digital solution for building's HVAC system, the energy saving could reach up to 50% compared to traditional systems. The savings mainly come from the high precision automated actuator in controlling proper hydronic balance by alternating the water flow. Having a balanced hydronics, it minimizes the over pumping, hence reduces the energy consumption of the system by 3%.

To achieve a high efficient with lower energy consumption heating system, the hydronics must be well balanced throughout its operations, such that the pumping work within the system is minimized. It may be achieved by implementing Danfoss AB-QM PICV, with a constant flow even at partial load. Considering the vast advantages of Danfoss AB-QM PICV, it has been widely used for chilled water systems projects, including but not limited to,

- Khalid Stadium (Doha, Qatar)
- Bvlgari Hotel (Dubai, UAE)

- Al-Tayar Factory (Dammam-KSA)
- Yanbu Power and Desalination Plant – Phase 3 (Yanbu, KSA)

What's Next

Automatic Thermal Balancing System