Balancing valves

Differential pressure balancing valves



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Why balancing is essential

In any distribution network, even the simplest, the circuits closest to the heat pump tend to receive a higher flow rate, whilst those further away receive less. This imbalance causes temperature differences between rooms. An unbalanced system can **reduce the efficiency of control valves**; the solution to this problem is the use of **balancing valves**. For example, in the case of heating, they distribute heat optimally throughout the system, thereby maintaining **system stability** and preventing underheating or overheating, resulting in **energy savings**.

Main functions

Flow rate control
Precise flow rate control throughout the entire system

Pressure control
Uniform distribution of heat/ cooling across all circuits.

Temperature control
Constant temperature control prevents temperature fluctuations.

Energy efficiency
Optimal system balancing reduces energy consumption, significantly improving the system's energy efficiency.

Static valves

Static valves are designed for manual flow balancing and are typically installed on manifolds or risers upstream of heat exchangers. They offer **precise flow control** thanks to the numerical indicator on the handwheel and allow **the position** to **be locked** to maintain the set calibration. Furthermore, they incorporate a **shut-off function** useful for maintenance and troubleshooting, along with **self-sealing measurement points** that allow differential pressure to be measured and flow rate to be calculated.

W-STBV-25T balancing valve



The W-STBV static balancing valve is designed for flow regulation in cooling and heating systems.

DN15 - DN50

W-STBV-16Q balancing valve



The W-STBV series static balancing valve is designed for flow control in cooling and heating systems.

DN65 - DN300

Dynamic valves

Dynamic valves are designed to maintain a constant differential pressure between the supply and return, automatically compensating for load variations and ensuring **automatic regulation** without the need for an electrical power supply. They are equipped with **pressure gauges** on the handwheel and **integrated measurement points**. They are generally installed on **the return**, often in combination with a static valve on the supply. These valves are particularly suitable for systems with electronic control valves or terminals sensitive to pressure variations.

W-DPBV-20T balancing valve



The W-DPBV series differential pressure control valve is designed to maintain a constant pressure difference between the supply and return pipes of a bypass, a control valve or a shut-off valve in an air conditioning or heating system.

DN15 - DN50

W-DPBV-16Q balancing valve



The W-DPBV series differential pressure control valve is designed to maintain a constant pressure difference between the supply and return pipes of a bypass, a control valve or a shut-off valve in an air conditioning or heating system.

DN65 - DN150

Valve installation

Before installation, it is essential to thoroughly clean the pipes and remove any filters, as well as to observe the flow direction indicated on the valve body. The recommended minimum distances must be maintained: 5 pipe diameters before a bend, 2 after, and 10 pipe diameters from the pump. In the case of dynamic valves, the pressure tap must be connected between the supply and return lines, and pressure gauges must be installed for monitoring. During system testing and flushing, the handwheel must be fully open to prevent internal damage to the valve. Differential pressure adjustment is carried out by turning the handwheel and checking the reading on the pressure gauges.

Advantages of use

Improved system efficiency

Well-balanced systems consume less energy, significantly reducing operating costs and environmental impact.

Greater comfort

In HVAC systems, balanced heating and cooling allow for more consistent regulation of the indoor climate.

Less wear and tear

By preventing pressure fluctuations and excessive flow, balancing valves extend the service life of pumps, pipework and other components.

Simpler maintenance and troubleshooting

Well-balanced systems make it easier to identify and resolve problems, as every part of the system operates as intended.



Why calibration is important

Calibration allows the valve to be set to the design value, preventing over- or under-flow in the circuits. Correct adjustment reduces energy consumption, prevents noise and ensures thermal comfort in the rooms.
Static and dynamic valves are fitted with self-sealing measurement points: by connecting a differential pressure gauge or an electronic instrument, it is possible to measure the pressure difference ΔP between the two points, a fundamental value for calculating the actual flow rate in the circuit. Before taking the measurement, it is important to ensure that the system is in a stable condition, open the valves at the measurement points, connect the probes and read the ΔP value in kPa or bar.

Valve calibration

To set the valve, turn the handwheel to the opening value specified in the design, lock the position using the locking mechanism, and verify the flow rate by measuring ΔP and comparing it with the calculated value. If the flow rate does not match the design, adjust the opening and repeat the measurement. It is good practice to carry out the calibration with all valves in the circuit open, to note down the opening values and ΔP for each circuit, to use calibrated instruments in good condition, and to close the measurement points at the end of the test to prevent leaks.

Formulas for calculating flow rate:

$Q=Kv \times \sqrt{\Delta P}$

- Q is the flow rate in m^3/h
- Kv is the value specified by the manufacturer
- ΔP is the differential pressure in bar

If ΔP is in kPa, the formula becomes:

$Q=Kv \times \sqrt{\Delta P/100}$

Conclusion

Calibration and flow rate calculation are simple yet crucial operations.
The choice between static and dynamic valves depends on the type of system and the control requirements. Correct balancing ensures comfort, reduced consumption and long-term durability.



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