A VALVE AND A METHOD OF OPERATING A VALVE

Technical field

The present invention relates to a valve having a balancing function for a fluid distribution system, and to a valve system comprising such a valve. The present invention also relates to a method of operating a valve in a fluid distribution system.

Background art

Fluid distribution systems, for e.g. heating, cooling and water supply are designed to feed a fluid from a source to a consumption point. Each consumption point typically has a calculated and designed flow or differential pressure requirement. However, depending on the type of hydronic system, the flow requirement is often variable over time and can change with factors like seasonality (e.g. summer or winter), that changes the load from the consumption points, temperature changes of the system fluid, changes in consumption of the system fluid (e.g. for drinking water).

Control valves are frequently used in fluid distribution systems and have a variable opening such that the flow rates can be controlled.

Balancing and control valves provide an additional feature/function. To balance the system, a hand wheel of the valve is turned for presetting a maximum opening of the valve, i.e. a maximum flow through the valve. For instance, for a valve having a valve seat with which a movable valve disc is cooperateable, the mechanics coupled to the hand wheel will limit how far from the valve seat the valve disc is allowed to move. An actuator of the valve will notice that the valve cannot be opened more and a control part can therefore be calibrated to control the movement of the valve within the set limits.

While the presetting function provided by existing balancing and control valves is beneficial for obtaining desired flows in, for instance, different parts of a building, they have the drawback that they are relatively complex and costly compared to ordinary valves without the balancing function.

Reference to any prior art in the specification is not an acknowledgment or suggestion that this prior art forms part of the common general knowledge in any jurisdiction or that this prior art could reasonably be expected to combined with other pieces of prior art by a skilled person in the art.

4. The valve according to any one of claims 1-3, wherein the control unit is adapted to receive a balancing signal representing said opening limitation value and/or said selected intermediate position.~~,~~

~~such as from a flow measuring device operatively connectable to the control unit, a user interface mounted on the valve or arranged in a remote position such as at a control device of a Building Management System (BMS), a dedicated control panel or arranged as a wireless communication device, such as a cell phone, computer or a remote control.~~

5. The valve according to any one of claims 1-4, wherein the control unit is adapted to receive a control signal for compensating for a difference between a measured value and a desired value of a physical property.~~, such as temperature, pressure or flow.~~

6. The valve according to any one of claims 1-5, wherein the position determining means and/or the control unit is adapted to send an output signal to a feedback loop, the output signal being representative of the current position of the valve closing member, wherein the control unit is adapted to receive an input signal from the feedback loop for effecting a corrective movement of the valve closing member if the current position of the valve closing member deviates from a desired position of the valve closing member.

7. The valve according to any one of claims 1-6, wherein the valve is for a heating/cooling distribution system~~, such as a district heating/cooling system,~~ or for a potable water distribution system.

8. A valve system, comprising

a valve according to any one of claims 1-7, and

a measuring device which is operatively connectable to the valve for measuring a physical property of the fluid in the valve, wherein the measuring device comprises communicating means operatively

comparing said current position with a desired position of the valve closing member,

making a corrective positioning of the valve closing member to compensate for the deviation between said current position and said desired position of the valve closing member.

13. The method according to any one of claims 9-12, wherein said step of adjusting the valve closing member to an intermediate position comprises measuring a physical property of the fluid in the valve and moving the valve closing member between said closed position and said fully opened-position, wherein said step of storing in a control unit data representative of said intermediate position is preceded by the step of sending a pre-setting signal to the control unit when said maximum desired opening has been reached.

14. The method according to any one of claims 9-13, comprising at least two pre-setting modes, ~~such as a winter mode and a summer mode,~~ wherein

in a first pre-setting mode said intermediate position is a first intermediate position between said closed position and said fully opened position,

in a second pre-setting mode said intermediate position is a second intermediate position between said closed position and said fully opened position,

wherein said first intermediate position is different from said second intermediate position.

15. The valve of claim 4 wherein the control unit is adapted to receive the balancing signal from a flow measuring device operatively connectable to the control unit.

16. The valve of claim 4 wherein the control unit is adapted to receive the balancing signal from a user interface mounted on the valve or arranged in a remote position.

17. The valve of claim 16 wherein the user interface is a control device of a Building Management System (BMS), a dedicated control panel or arranged as a wireless communication device.

18. The valve of claim 17 wherein the wireless communication device is a cell phone, computer or a remote control.

19. The valve of claim 5 wherein the physical property is temperature, pressure or flow.

20. The valve of claim 14 wherein the two pre-setting modes are a winter mode and a summer mode.