Claims

1. A hydronic system (1) comprising a flow control module (39) for controlling the flow in ~~a~~the hydronic system (1), wherein the hydronic system (1) comprises

- a primary side (3) with a first port (21) in fluid connection with an output (23) of at least one source element (7), a second port (27) in fluid connection with an input (29) of the at least one source element (7), and at least one controllable primary side flow actuator (9) for providing a primary side flow (q_1),
- a secondary side (5) with a third port (31) in fluid connection with an input (33) of at least one load element (11), a fourth port (35) in fluid connection with an output (37) of the at least one load element (11), and at least one controllable secondary side flow actuator (13) for providing a secondary side flow (q_2), and
- an intermediary transfer element (17) between the primary side (3) and the secondary side (5), wherein the intermediary transfer element (17) is in fluid connection with the first port (21), the second port (27), the third port (31) and the fourth port (35),

characterised in that

the flow control module (39) is configured to calibrate a measurement of a first temperature differential (ΔT_c) between a temperature at the first port (21) and a temperature at the third port (31) in a first situation when the primary side flow (q_1) exceeds the secondary side flow (q_2), and in that the flow control module (39) is configured to calibrate a measurement of a second temperature differential (ΔT_h) between a temperature at the fourth port (~~21~~35) and a temperature at the second port (~~31~~27) in a second situation when the secondary side flow (q_2) exceeds the primary side flow (q_1).

2. The ~~flow control module (39)~~hydronic system (1) according to claim 1, wherein the flow control module (39) is configured to force the hydronic system (1), for calibration purposes, into the first situation and/or second situation by controlling the primary side flow actuator (9) and/or the secondary side flow actuator (13).

3. The ~~flow control module (39)~~hydronic system (1) according to any of the preceding claims, wherein the flow control module (39) is configured to identify the first situation and/or the second situation by comparing the first temperature differential (ΔT_c) with the second temperature differential (ΔT_h).

4. The ~~flow control module (39)~~hydronic system (1) according to any of the preceding claims, wherein the flow control module (39) is configured to identify the first situation and/or the second situation when a certain pre-defined threshold on the absolute value of a signed deviation value ($\Delta\Delta T$) between the first temperature differential (ΔT_c) and the second temperature differential (ΔT_h) is exceeded.

5. The ~~flow control module (39)~~hydronic system (1) according to any of the preceding claims, wherein the flow control module (39) is configured to adapt the thermal power transfer of the intermediary transfer element (17) by controlling the primary side flow (q_1) by means of the at least one controllable primary side flow actuator (9) and/or the secondary side flow (q_2) by means of the at least one controllable secondary side flow actuator (13) in a continuous or regularly closed-loop manner based on minimising a signed deviation value ($\Delta\Delta T$) being correlated with the thermal power transfer of the intermediary transfer element (17).

6. The ~~flow control module (39)~~hydronic system (1) according to claim 5, wherein the flow control module (39) is configured to maintain a current primary side flow (q_1) if the signed deviation value ($\Delta\Delta T$) is between a negative reference value and a positive reference value.

7. The ~~flow control module (39)~~hydronic system (1) according to claim 5 or 6, wherein the flow control module (39) is configured to increase the primary side flow (q_1) if the signed deviation value ($\Delta\Delta T$) is below a negative reference value.

8. The ~~flow control module (39)~~hydronic system (1) according to any of the claims 5 to 7, wherein the flow control module (39) is configured to maintain the primary side flow (q_1) if the signed deviation value ($\Delta\Delta T$) is below a negative reference value and the primary side flow (q_1) is at or above a predetermined maximum threshold (q_{max}).

9. The ~~flow control module (39)~~hydronic system (1) according to any of the claims 5 to 8, wherein the flow control module (39) is configured to decrease the secondary side flow (q_2) if the signed deviation value ($\Delta\Delta T$) is below a negative reference value and the primary side flow (q_1) cannot be increased.

10. The ~~flow control module (39)~~hydronic system (1) according to any of the claims 5 to 9, wherein the flow control module (39) is configured to decrease the primary side flow (q_1) if the signed deviation value ($\Delta\Delta T$) is above a positive reference value.

11. The ~~flow control module (39)~~hydronic system (1) according to any of the claims 5 to 10, wherein the flow control module (39) is configured to maintain a current primary side flow (q_1) if the signed deviation value ($\Delta\Delta T$) is above a positive reference value and the primary side flow (q_1) is at or below a predetermined minimum threshold (q_{min}).

12. The ~~flow control module (39)~~hydronic system (1) according to any of the preceding claims, wherein the flow control module (39) is integrated in one of the at least one controllable primary side flow actuator (9) and/or one of the at least one controllable secondary side flow actuator (13).

13. The ~~flow control module (39)~~hydronic system (1) according to any of the preceding claims, wherein the flow control module (39) is integrated in a cloud-based computer system and/or a building management system (BMS).

14. A method for controlling the flow in a hydronic system (1), wherein the hydronic system (1) comprises

- a primary side (3) having a first port (21) in fluid connection with an output (23) of at least one source element (7), a second port (27) in fluid connection with an input (29) of the at least one source element (7), and at least one controllable primary side flow actuator (9) for providing a primary side flow (q_1),
- a secondary side (5) having a third port (31) in fluid connection with an input output (33) of at least one load element (11), a fourth port (35) in fluid connection with an output (37) of the at least one load element (11), and at least one controllable secondary side flow actuator (13) for providing a secondary side flow (q_2), and

- an intermediary transfer element (17) between the primary side (3) and the secondary side (3), wherein the intermediary transfer element is in fluid connection with the first port (21), the second port (27), the third port (31) and the fourth port (35),

the method comprising

calibrating a measurement of a first temperature differential (ΔT_c) between a temperature at the first port (21) and a temperature at the third port (31) in a first situation when the primary side flow (q_1) exceeds the secondary side flow (q_2), and

calibrating a measurement of a second temperature differential (ΔT_h) between a temperature at the fourth port (~~21~~35) and a temperature at the second port (~~31~~27) in a second situation when the secondary side flow (q_2) exceeds the primary side flow (q_1).

15. The method according to claim 14, further comprising a step of forcing the hydronic system (1) into the first situation and/or second situation by controlling the primary side flow actuator (9) and/or the secondary side flow actuator (13) prior to the calibrating steps.

16. The method according to claim 14 or 15, further comprising a step of identifying the first situation and/or the second situation by comparing the first temperature differential (ΔT_c) with the second temperature differential (ΔT_h).

17. The method according to claims 16, wherein the first situation and/or the second situation is identified when a certain pre-defined threshold on the absolute value of a signed deviation value ($\Delta\Delta T$) between the first temperature differential (ΔT_c) and the second temperature differential (ΔT_h) is exceeded.

18. The method according to any of the claims 14 to 17, further comprising a step of adapting the thermal power transfer of the intermediary transfer element (17) by controlling the primary side flow (q_1) by means of the at least one controllable primary side flow actuator (9) and/or the secondary side flow (q_2) by means of the at least one controllable secondary side flow actuator (13) unit in a continuous or regularly closed-loop manner based on minimising a signed deviation value ($\Delta\Delta T$) being correlated with the thermal power transfer of the intermediary transfer element (17).

19. The method according to claim 18, wherein a current primary side flow (q_1) is maintained if the signed deviation value ($\Delta\Delta T$) is between a negative reference value and a positive reference value.

20. The method according to claim 18 or 19, wherein the primary side flow (q_1) is increased if the signed deviation value ($\Delta\Delta T$) is below a negative reference value.

21. The method according to any of the claims 18 to 20, wherein the primary side flow (q_1) is maintained if the signed deviation value ($\Delta\Delta T$) is below a negative reference value and the primary side flow (q_1) is at or above a predetermined maximum threshold (q_{max}).

22. The method according to any of the claims 18 to 21, wherein the secondary side flow (q_2) is decreased if the signed deviation value ($\Delta\Delta T$) is below a negative reference value and the primary side flow (q_1) cannot be increased.

23. The method according to any of the claims 18 to 22, wherein the primary side flow (q_1) is decreased if the signed deviation value ($\Delta\Delta T$) is above a positive reference value.

24. The method according to any of the claims 18 to 23, wherein a current primary side flow (q_1) is maintained if the signed deviation value ($\Delta\Delta T$) is above a positive reference value and the primary side flow (q_1) is at or below a predetermined minimum threshold (q_{min}).