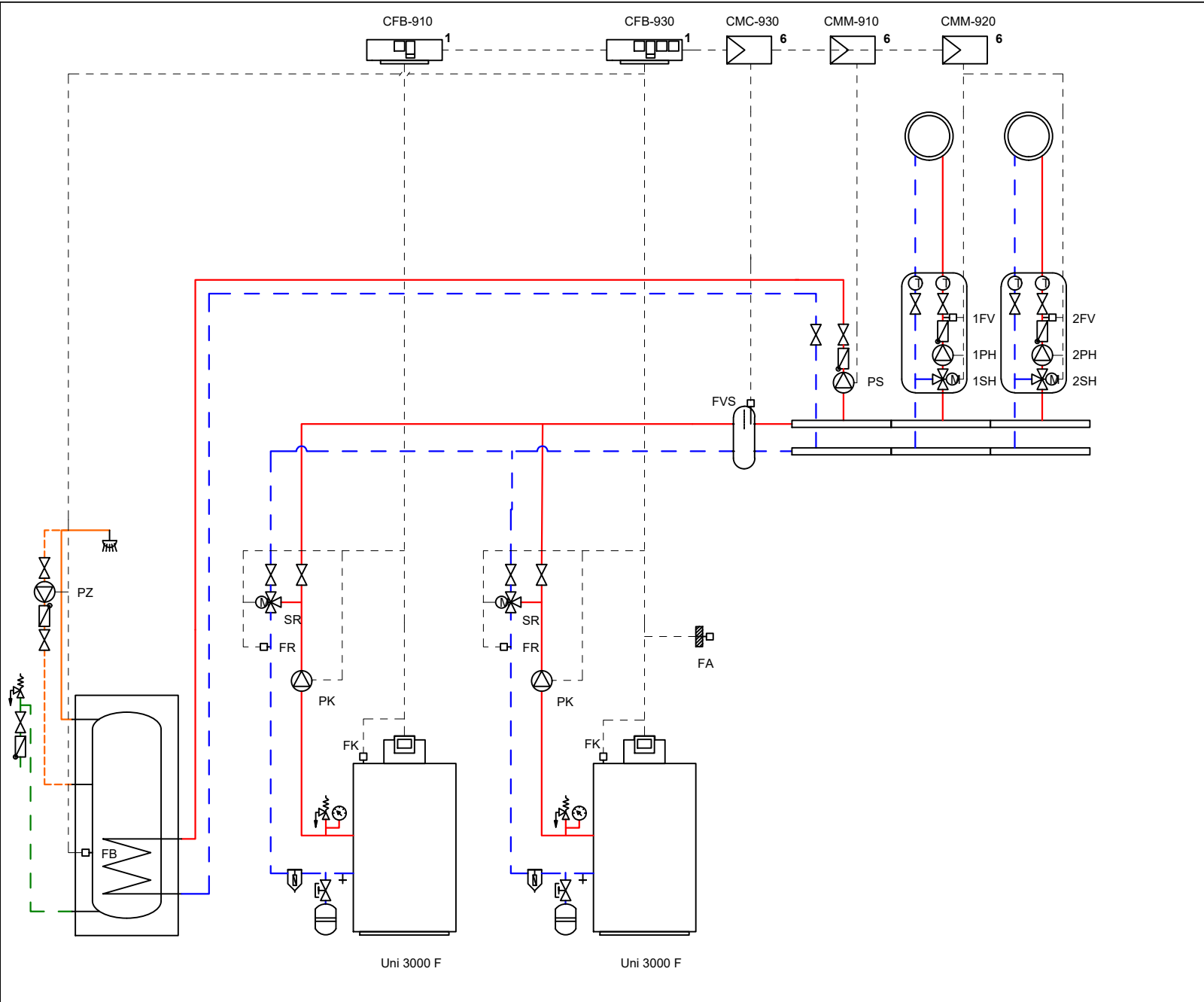


Module position:

- 1 On the heat/cooling source
- 2 On the heat/cooling source or on the wall
- 3 In the station
- 4 In the station or on the wall
- 5 On the wall
- 6 In the controller

The system schematic shown is a non-binding schematic diagram. The circuit diagram/connection diagram contains details on the electrical wiring. Observe national and regional regulations, technical rules and guidelines.



No. 6721836190

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**Bosch**

### Explanation of symbols

| Symbol  | Name                                    | Symbol | Name   | Symbol | Name                                |
|---|---|--------|--|--------|-------------------------------------|
| <b>Pipework/cables</b>                                |   |        |  |        |                                     |
|   | Flow - heating/solar                    |        | Brine return   |        | DHW circulation                     |
|   | Return - heating/solar                  |        | Potable water  |        | Electrical wiring                   |
|   | Brine flow                              |        | DHW  |        | Electrical wiring with break        |
| <b>Mixing valves/valves/temperature sensors/pumps</b> |   |        |  |        |                                     |
|   | Valve                                   |        | Pressure differential controller                                 |        | Pump                                |
|   | Inspection bypass                       |        | Pressure relief valve  |        | Non-return valve                    |
|   | Flow regulating valve                   |        | Safety assembly  |        | Temperature sensor/switch           |
|   | Pressure relief valve                   |        | 3-way mixing valve (mixing/distribution)                         |        | Safety temperature limiter          |
|   | Filter shut-off valve                   |        | DHW mixer, thermostatic  |        | Flue gas temperature sensor/switch  |
|   | Cap valve                               |        | 3-way mixing valve (changeover)                                  |        | Flue gas temperature limiter        |
|   | Valve, mechanically controlled          |        | 3-way mixing valve (change over, de-energised when closed to II) |        | Outside temperature sensor          |
|   | Valve, thermally controlled             |        | 3-way mixing valve (change over, de-energised when closed to A)  |        | Wireless outside temperature sensor |
|   | Shut-off valve, magnetically controlled |        | 4-way mixing valve   |        | ...wireless...                      |
| <b>Miscellaneous</b>                                  |   |        |  |        |                                     |
|   | Thermometers                            |        | Drain outlet with siphon   |        | Low loss header with sensor         |
|   | Manometer                               |        | System separation according to EN1717                            |        | Heat exchanger                      |
|   | Drain & fill valve                      |        | Expansion vessel with cap valve                                  |        | Flow rate measuring device          |
|   | Water filter                            |        | Magnetite separator  |        | Tundish                             |
|   | Heat meter                              |        | Air separator  |        | Heating circuit                     |
|   | DHW outlet                              |        | Automatic air vent   |        | Underfloor heating circuit          |
|   | Relay                                   |        | Expansion joint  |        | Low loss header                     |
|   | Immersion heater                        |        |  |        |                                     |

### Descriptions

|     |   |
|-----|---|
| KR  | Flow-check valve                              |
| PK  | Boiler circuit pump                           |
| RK  | Return  |
| VK  | Flow  |
| VSL | Safety flow                                   |
| SR  | Actuator, return temperature raising facility |
| SV  | Pressure relief valve                         |
| SK  | Boiler circuit actuator                       |
| SH  | Heating circuit actuator                      |
| VHK | Heating circuit flowrate                      |
| VPK | Boiler circuit pump flow rate                 |
| TWH | Flow temperature limiter                      |
| DV  | Throttle valve                                |
| FA  | Outside temperature sensor                    |
| FK  | Boiler temperature sensor                     |
| FV  | Flow temperature sensor                       |
| FB  | DHW temperature sensor                        |
| FZ  | Auxiliary temperature sensor                  |
| FVS | Strategy sensor                               |
| FR  | Return temperature sensor                     |
| PK  | Boiler circuit pump                           |
| PH  | Heating circuit actuator                      |
| PS  | Cylinder primary pump                         |
| PZ  | DHW circulation pump                          |

### Low loss header

A low loss header (hydraulic balancing) is used to hydraulically separate the boiler circuit and the heating circuits.

Installing a low loss header brings many benefits:

- Sizing boiler circuit pump and actuators is easy. Interaction between the heating water flow inside the boiler and in the heat consumer circuits is prevented. Boiler and heat consumers are only supplied with the assigned water flow.
- May be used in single and multi-boiler systems, subject to the heating circuit control system.
- Actuators on both sides of the low loss header provide optimum operation if they are sized correctly. The hydraulic balancing line can also be used as a sludge trap, subject to being sized correctly.
- Where there is a large pressure drop on the water side and large distances between boiler and heating circuits, a split into primary and secondary side is possible.

### Sizing the low loss header

Correct sizing is crucial to the function of the low loss header. To ensure good separation with the simultaneous function as a dirt separator, size the line in such a way that there is virtually no pressure drop between the flow and return. At the nominal amount of water, a flow velocity of 0.1 m/s to 0.2 m/s can be expected. This also enables the simultaneous use as a sludge trap. To be able to capture the heating circuit flow temperature, provide a sensor well of 200 mm to 300 mm length in the upper area of the hydraulic balancing line on the heating circuit side.

$$D = \sqrt[4]{\frac{\dot{V}_{Kges}}{v} \times \frac{1}{2827}}$$

*Calculating the size of the low loss header*

|                  |   |
|------------------|---|
| D                | Diameter of the hydraulic balancing line in m       |
| v                | Flow velocity in m/s                                |
| $\dot{V}_{Kges}$ | Total boiler circuit flow rate in m <sup>3</sup> /h |

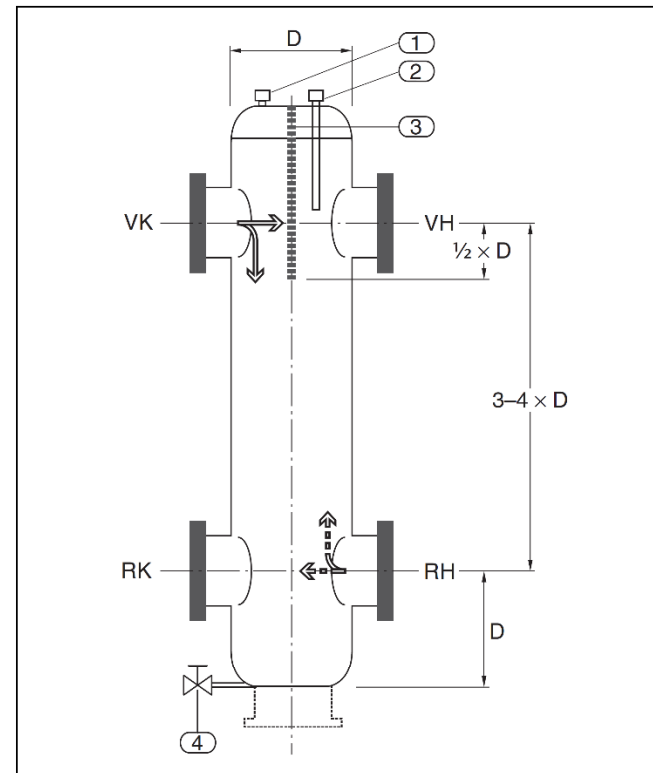
### Example

Given:

- Total flow rate  $\dot{V}_{Kges} = 223.6 \text{ m}^3/\text{h}$
- Flow velocity (assumption)  $v = 0.2 \text{ m/s}$

Result:

- Diameter of the hydraulic balancing line  $D \sim 0.63 \text{ m}$



*Main diagram of a low loss header*

|    |                       |
|----|-----------------------|
| RH | Heating system return |
| RK | Return                |
| VH | Heating system flow   |
| VK | Flow                  |

- [1] Female connection for an air vent valve
- [2] Female connection for a sensor well 1/2 "
- [3] Perforated partition
- [4] Quick-acting valve