RATIOfresh 250/400 Freshwater Unit

Freshwater Unit for Higher Water Capacities

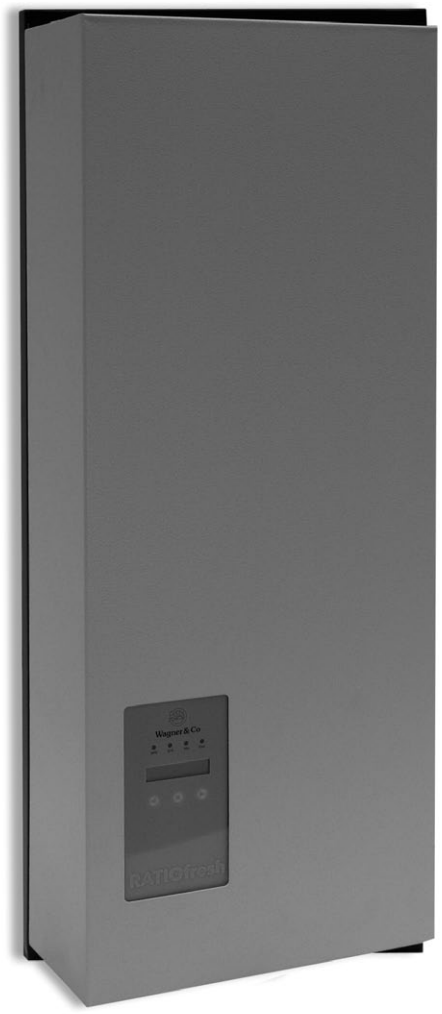

Figure 1 Freshwater Unit RATIOfresh 250/400

Product Characteristics

- Hygienic hot water preparation with continuous-flow heater principle
- High output with a tapping capacity of 25 and 40 l/min, respectively
- High solar yield thanks to very efficient stainless steel plate heat exchanger and low return flow temperatures achieved through precise demand adjustment
- Incl. protection against legionella by thermal disinfection of the hot water and circulation pipe networks
- With integrated circulation function
- Suitable for mounting to wall or storage cylinder
- Can be combined with all common heat sources in connection with a buffer storage

Content

1. Technical Data

Table 1 Technical Data		
Features	**RATIOfresh 250**	**RATIOfresh 400**
Order no.	150 300 65	150 300 66
Nominal tapping capacity 10 °C → 45 °C (sec.) 60 °C (prim.) → RATIOfresh 250 65 °C (prim.) → RATIOfresh 400	25 l/min	40 l/min
Transmission capacity 10 °C → 45 °C (sec.) 10 °C → 60 °C (sec.)	61 kW 87 kW	98 kW 139 kW
Performance coefficient acc. to DIN 4708 T3: 10 °C → 45 °C (sec.), 82 °C (prim.) Performance coefficient for other temperature conditions: 10 °C → 60 °C (sec.), 75 °C (prim.) 10 °C → 60 °C (sec.), 82 °C (prim.)	NL = 13 NL = 11 NL = 7	NL = 19,5 NL = 17 NL = 11
Hot water temperature setting range	25 - 70 °C	
Circulation return temperature	5 - 70 °C	
Pressure loss secondary (Δ p)	< 370 mbar for 25 l/min	< 490 mbar for 40 l/min
Max. operating temperature	Primary 95 °C, secondary 95 °C	
Max. operating pressure	Primary 6 bar, secondary10 bar	
Heat exchanger	Copper welded stainless steel plate heat exchanger	
Water volume of heat exchanger	1.1 l (primary side) / 1.2 l (secondary side)	1.6 l (primary side) / 1.7 l (secondary side)
Primary circuit pump	Wilo ST 25/6, 3-steps, 43/61/82W	
Controller	RATIOfresh domestic water heating controller integrated in unit	
Temperature sensor	4 x KTY Buffer storage sensor with 3.5 m cable length (prolongable)	
Sensor for volume flow	Volume flow meter Qn 2.5 in cold water flow	
Voltage	230 V / 50 Hz	
Protection class (controller)	IP 44	
Max. power input (power consumption of pumps)	2 x 400 W	
Power consumption during stand-by modus	0.6 W	
Casing material	Powder coated steel	
Colour	Top: light grey – RAL 7035 Bottom: black-grey – RAL 7021	
Weight	26 kg	28 kg
Dimensions (H x W x D)	940 x 350 x 181 mm	
Mounting options	Wall mounting, storage cylinder mounting in connection with the buffer storage series RATIO (except RATIO 300 G and RATIO 700 without heat exchanger)	

Special Variation

For the operation in connection with down streamed galvanised tubes, our special version "RATIOfresh Alfanova" is available. It comes without copper-soldered connections in the stainless steel plate heat exchanger.

Table 2 Technical Data RATIOfresh Alfanova 250 and 400		
Features	**RATIOfresh Alfanova 250**	**RATIOfresh Alfanova 400**
Order no.	150 301 77	150 301 78
Heat exchanger	Welded stainless steel plate heat exchanger	
For further technical data please refer to RATIOfresh 250 or 400.		

2. Dimensions

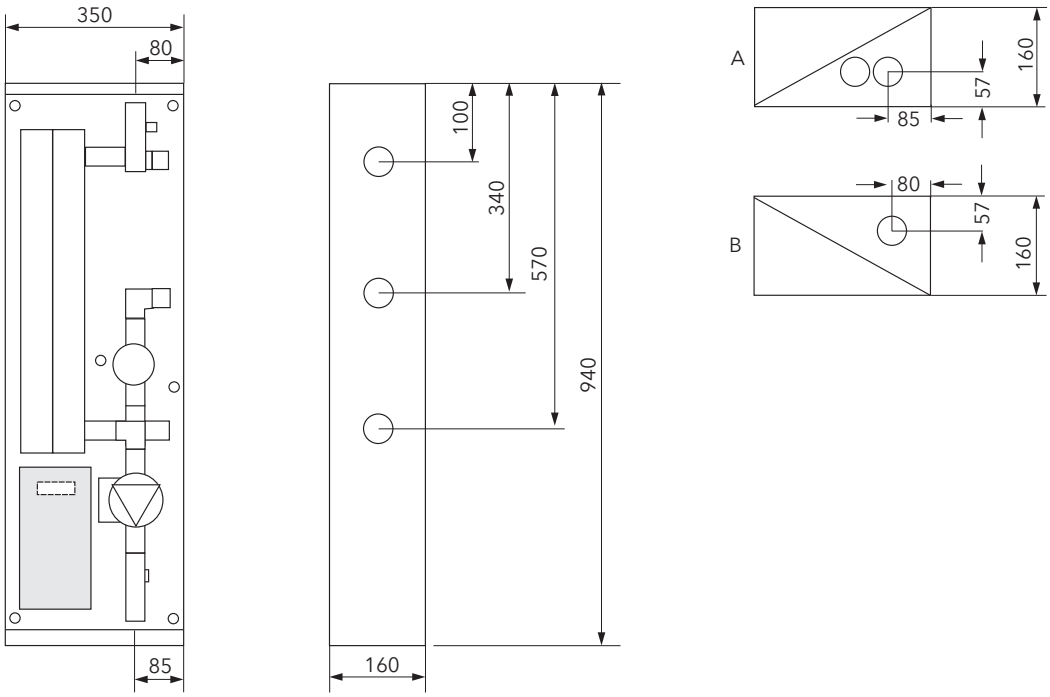

Figure 2 External dimensions RATIOfresh 250/400 in mm

3. Functional Description

Basic Principle
The RATIOfresh 250/400 Freshwater Unit heats up domestic water via the flow-through principle. When hot water is drawn, the primary circuit pump (3) pumps heating water from the buffer storage through the stainless steel plate heat exchanger (2).
On the other side of the plate heat exchanger (secondary circuit), the domestic water is heated up to the set temperature (adjustable at controller (1), factory-setting 50 °C). The now cooled heating water flows back to the lower section of the buffer storage.

Output Regulation
With the assistance of temperature sensors in hot water exit (12) and primary flow (16), the output of the primary circuit pump is precisely matched to the tapping volume flow.
The speed control of the primary circuit pump allows for a constant tapping temperature and low primary return flow temperatures. The latter helps to improve the temperature stratification within the buffer storage.

Protection against Legionella
The unit allows for thermal disinfection of the hot water and circulation pipes with a programmable schedule. If required, aux. heating of the storage cylinder can be requested via a potential-free relay, and then the pipe network can be disinfected with hot water.

Operating in Stand-by Modus
The stand-by temperature keeping function allows for instant hot water supply, also after long times without tapping. This function can also be utilised as frost protection.

Switching, Primary Return Flow
For long circulation times (e. g. in apartment blocks) it may be energetically reasonable, to lead the return flow of the primary circuit into two different levels of the buffer. This can be easily realised in combination with a temperature-difference-controller and switching valves (see fig. 9).

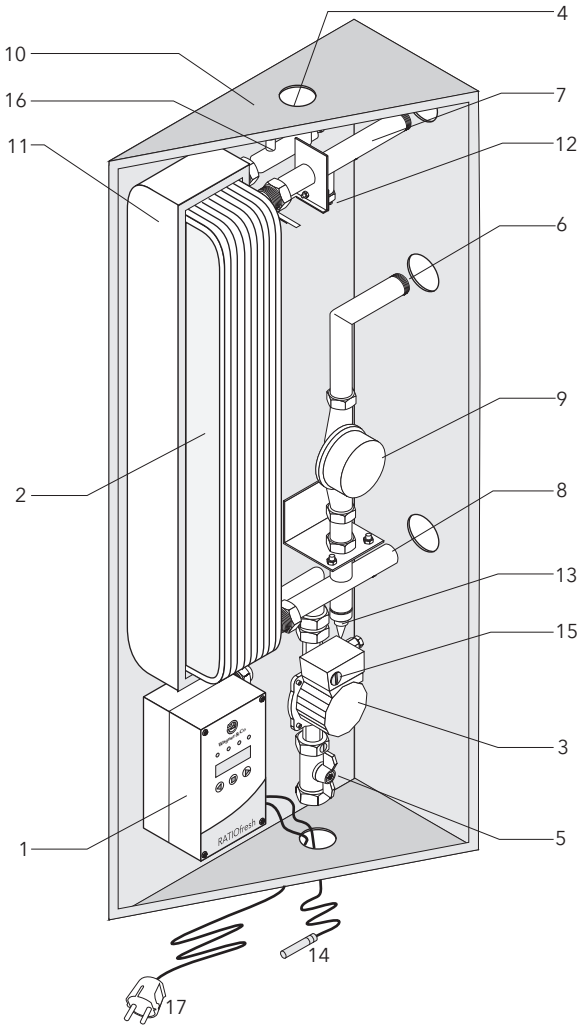

Figure 3 The most important components of the unit
***1** RATIOfresh controller; **2** heat exchanger; **3** primary circuit pump; **4** primary circuit flow with cut-off valve (1" male, flat sealing); **5** primary circuit return flow with ball valve and integrated gravity brake (ret. flow stopper, 1" male, flat sealing); **6** cold water inlet (1" male, flat sealing); **7** hot water outlet (1" male, flat sealing); **8** circulation connection (½" female); **9** vol. flow meter; **10** encasing bottom; **11** heat exchanger insulation made from EPP; **12** temperature sensor hot water outlet; **13** temperature sensor cold water / return flow; **14** temperature sensor prim. circuit storage cylinder flow (buffer storage sensor); **15** switch for pump speed level; **16** temperature sensor, primary circuit flow; **17** mains plug*

4. Hydraulic Characteristics

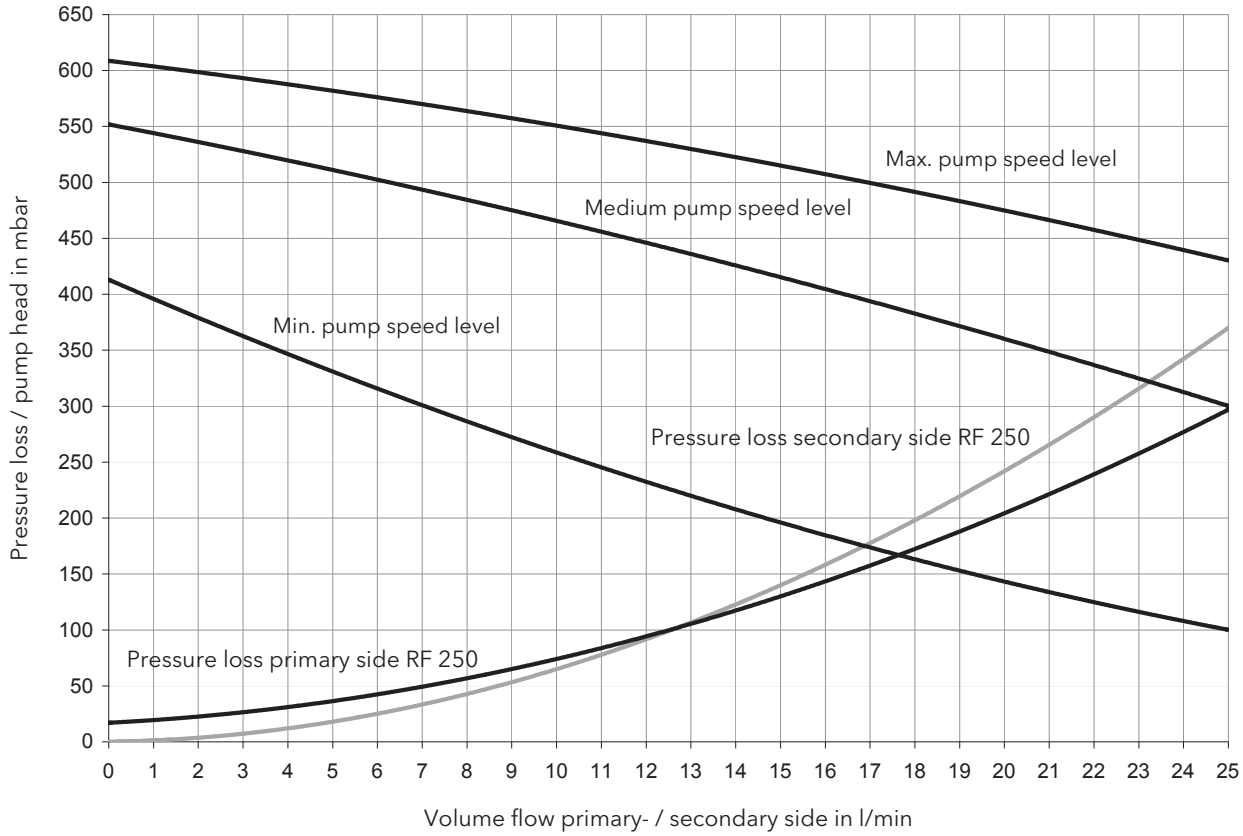

Figure 4 Pressure loss curves and pump characteristics RATIOfresh 250

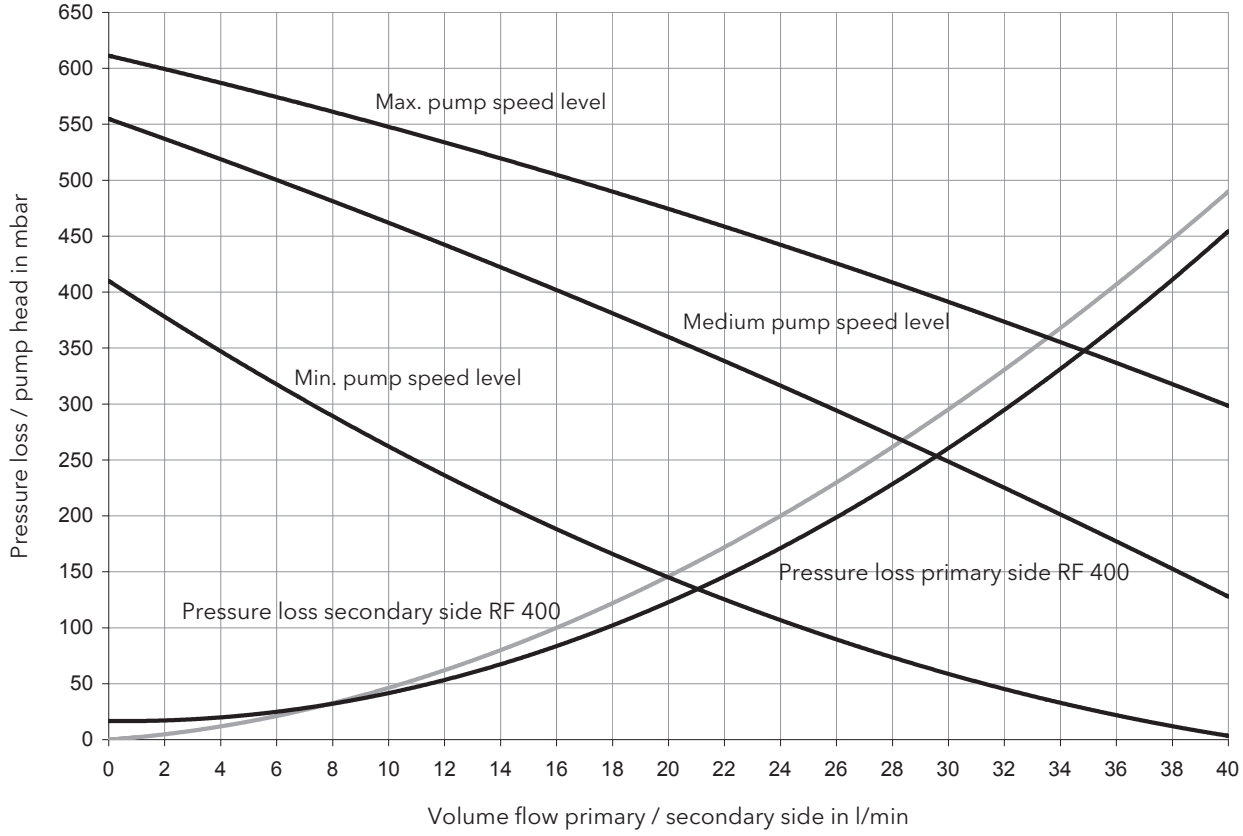

Figure 5 Pressure loss curves and pump characteristics RATIOfresh 400

5. Volume Flow and Temperature Specifications

Table 3 Volume Flow- and Temperature Specifications of RATIOfresh 250 for Various Hot Water Temperatures				
Hot water temperature [°C]	**Tapping volume flow [l/min]**	**Required temperature primary side [°C]**	**Required volume flow primary side [l/min]**	**Return flow temperature prim. circuit**
45	10	50	13	23
		60	8.1	16
45	15	50	21.9	26
		60	12.8	18
45	25	60	23.4	22
		70	17.3	18
60	10	65	14.5	30
		75	9.4	21
60	15	65	24.9	34
		75	15.1	24
60	25	75	28.2	29
		80	24	26

Table 4 Volume Flow and Temperature Specifications of RATIOfresh 400 for Various Hot Water Temperatures				
Hot water temperature [°C]	**Tapping volume flow [l/min]**	**Required temperature primary side [°C]**	**Required volume flow primary side [l/min]**	**Return flow temperature prim. circuit**
45	15	50	19.1	22
		60	12.1	16
45	25	55	26.2	21
		65	18.4	17
45	40	65	31.5	20
		75	24.7	17
60	15	65	21.2	29
		75	14	20
60	25	65	30.4	28
		75	25.2	24
60	40	85	33.7	24
		90	30.4	22

6. Controller RATIOfresh 250/400

- Controller for domestic hot water preparation with precise output adjustment
- Protection against legionella
- Temperature keeping (standby function) for fast hot water supply
- Integrated circulation control
- Illuminated display and intuitive menu navigation in 5 languages
- Serial interface RS 232 for data readout
- Frost protection
- For further information please see "Operating Manual Controller RATIOfresh 250/400"

Figure 6 Fresh water controller RATIOfresh 250/400

7. Mounting Options

- Wall mounting
- Mounting to storage cylinder (see fig. 7) in connection with all types of RATIO buffer tanks, except RATIO 300 G and RATIO 700 (version without heat exchanger)

Figure 7 Storage cylinder mounting of RATIOfresh 250/400 (with removed top cover) in combination with RATIO buffer storage

8. Accessories

Table 5 Accessories RATIOfresh 250/400	
Item	**Order no.**
Storage cylinder extension set	139 000 28
Combi fitting set 1"-22 mm for tube connection	819 100 87
3-way-valve 1" for return flow switch	160 101 44

Figure 8 Storage cylinder mounting kit

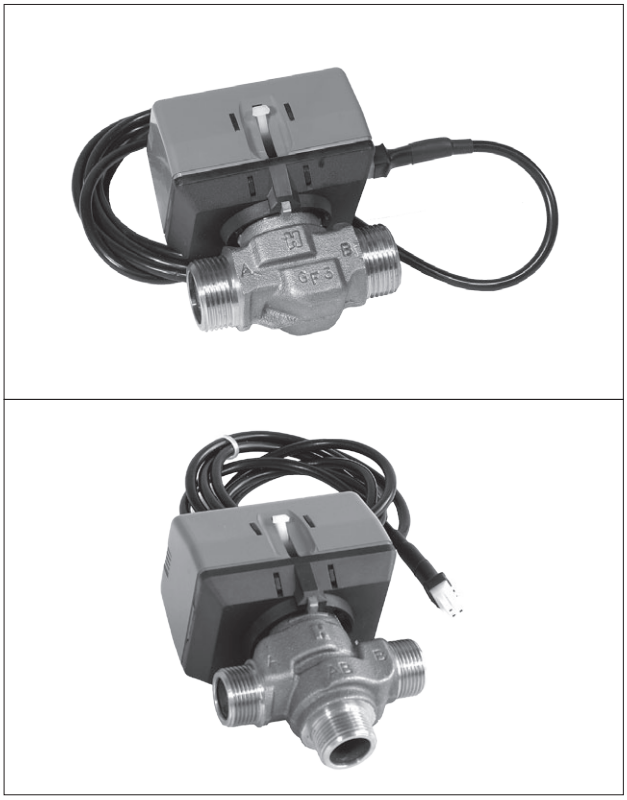

Figure 9 Two and three way switching valves

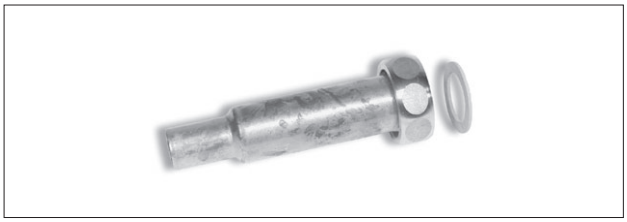

Figure 10 Combi fitting 1"

9. Sample System Solutions

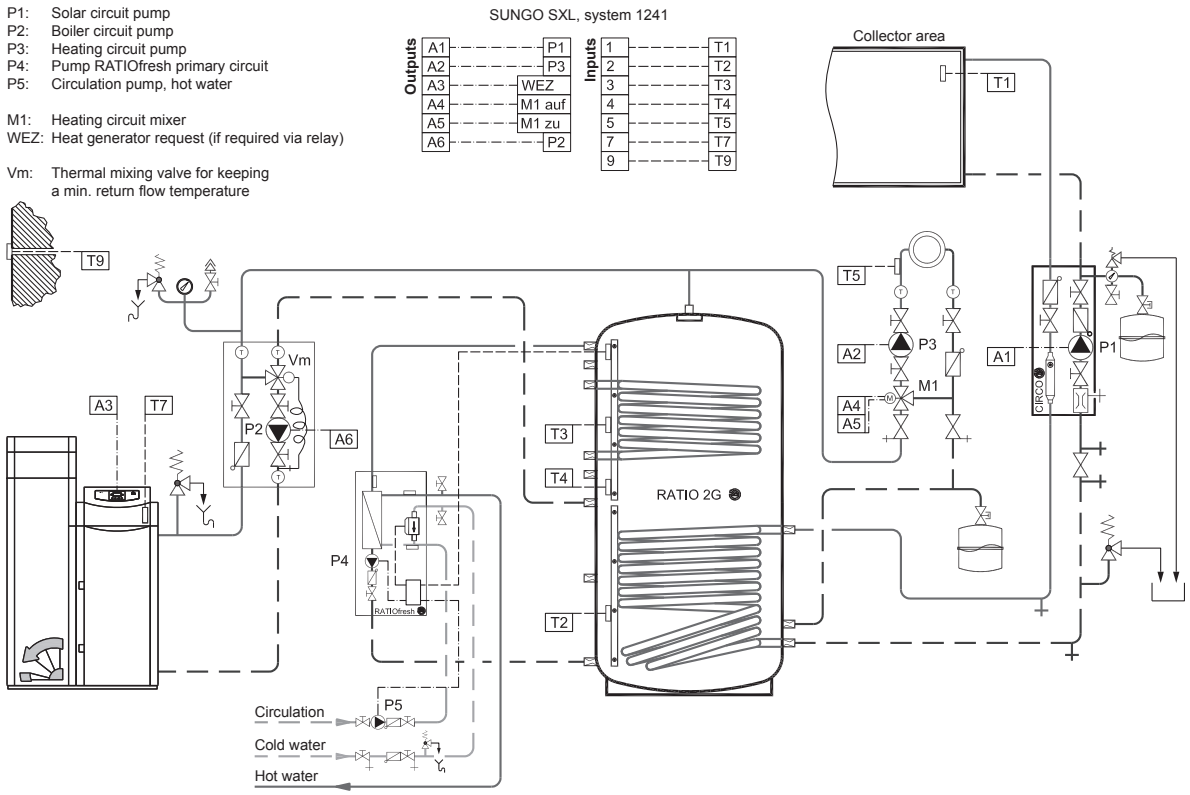

Figure 11 System solution with RATIOfresh 250/400, RATIO buffer storage, pellet boiler, mixed heating circuit and solar installation. The pellet boiler profits partially from the buffer volume for optimising its operating characteristics. During the summer half of the year, the solar installation meets the hot water demand almost completely and additionally provides space heating support in spring and fall.

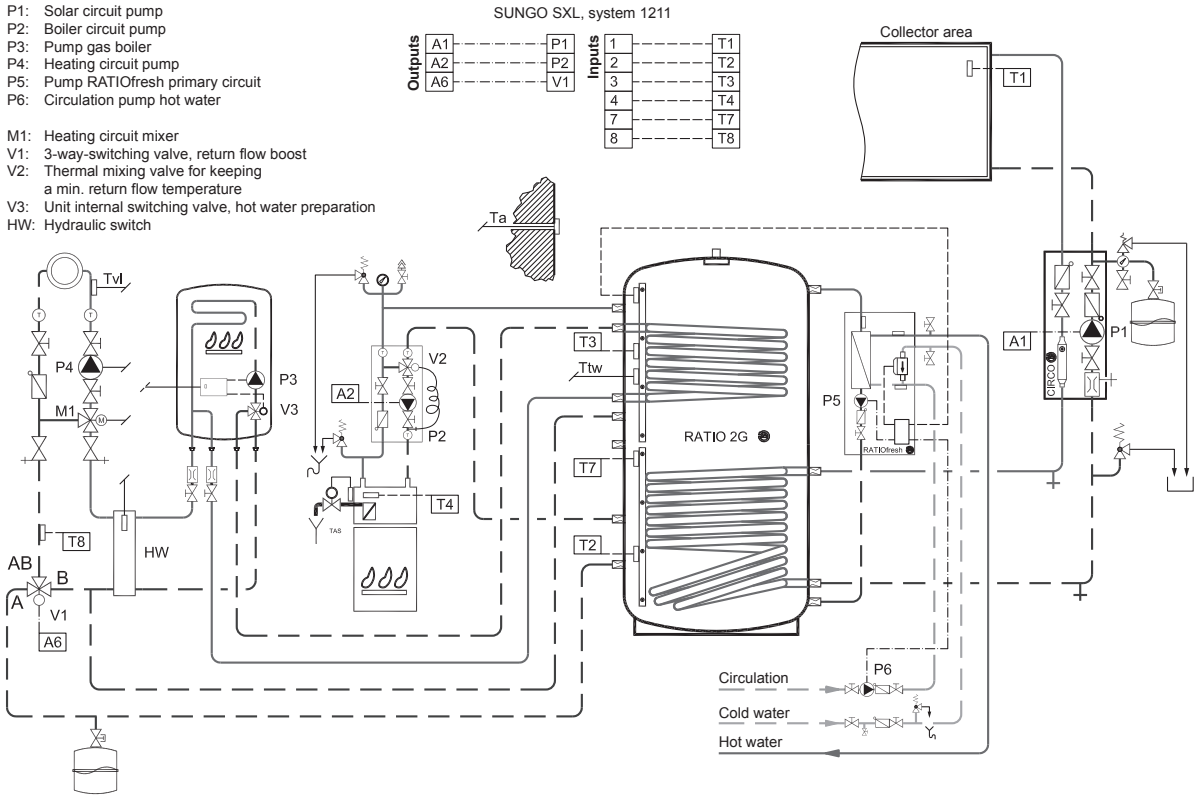

Figure 12 System solution with RATIOfresh 250/400, RATIO buffer storage, gas boiler, fire place with water pockets, mixed heating circuit and solar installation. Both, open fire place and solar installation, can load the buffer storage. The buffer storage heat is supplied to the heating circuit via return flow boost.

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