ÖkoFEN

Technical Guide for Contractors

Accumulator

ENGLISH

17355_EN

Title:	Technical Guide
Article number:	17355_EN 2.1
Version valid from:	03/2021
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Contents

1 Pellaqua

The Pellaqua tank program developed by ÖkoFEN is the optimally coordinated interface between your pellet boiler and solar collectors. The three tank models of the Pellaqua tank program have different construction possibilities and offer the optimal solution for your customers.

The Pellaqua product line inludes System Tank, Combination Tank and Buffer Tank. They are available from 600 to 2.000 liter.

Product equipment

- Buffer tank made of steel
- Return stratification channel
- 8 tappings 1½“ IG
- 90° angle connections
- 4 sensor sockets ½“
- 5 sensor holders
- 1x air valve 1 ½“ IG
- Base insulation
- Fleece insulation 100mm
- 4 connecting pieces insulation
- Working pressure: 3 bar
- Maximum operating temperature 95°C

Benefits Pellaqua

Key purchasing factors	Feature	Tangible benefit for the customer
Everything from a single source	Pellaqua System Tank	Only one contact person – from offer to procurement of spare parts A perfect match for the ÖkoFEN Pellematic range and Pelletronic controller
Flexibility on offer	Valid for all tanks	From a simple accumulator tank to a fully equipped system cylinder including heating circuit assemblies, you can offer your customers a package with an exemplary price/performance ratio
	Hygienic DHW heating	We can supply each cylinder with or without a fresh water module, subject to customer requirements and preferences
Economical	Solar integration	The sun never sends a bill
	10 cm fleece insulation and floor insulation	Insulates ideal and reduces radiation losses
	Return stratification channel	Ensures better stratification and higher efficiency
	Longer run time of pellet boiler	Increases the annual output of the heating system

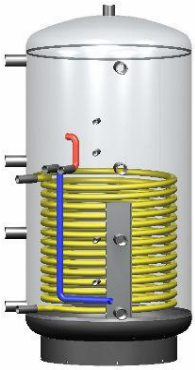
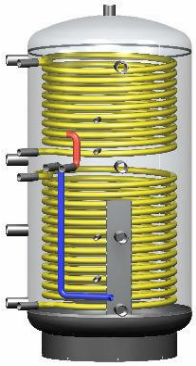
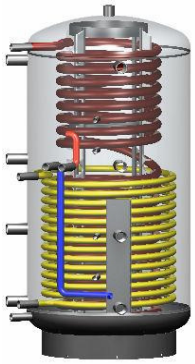
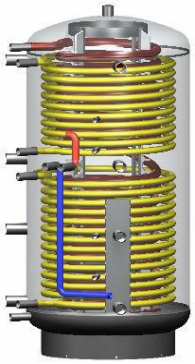
2 Product Description

2.1 Buffer tank

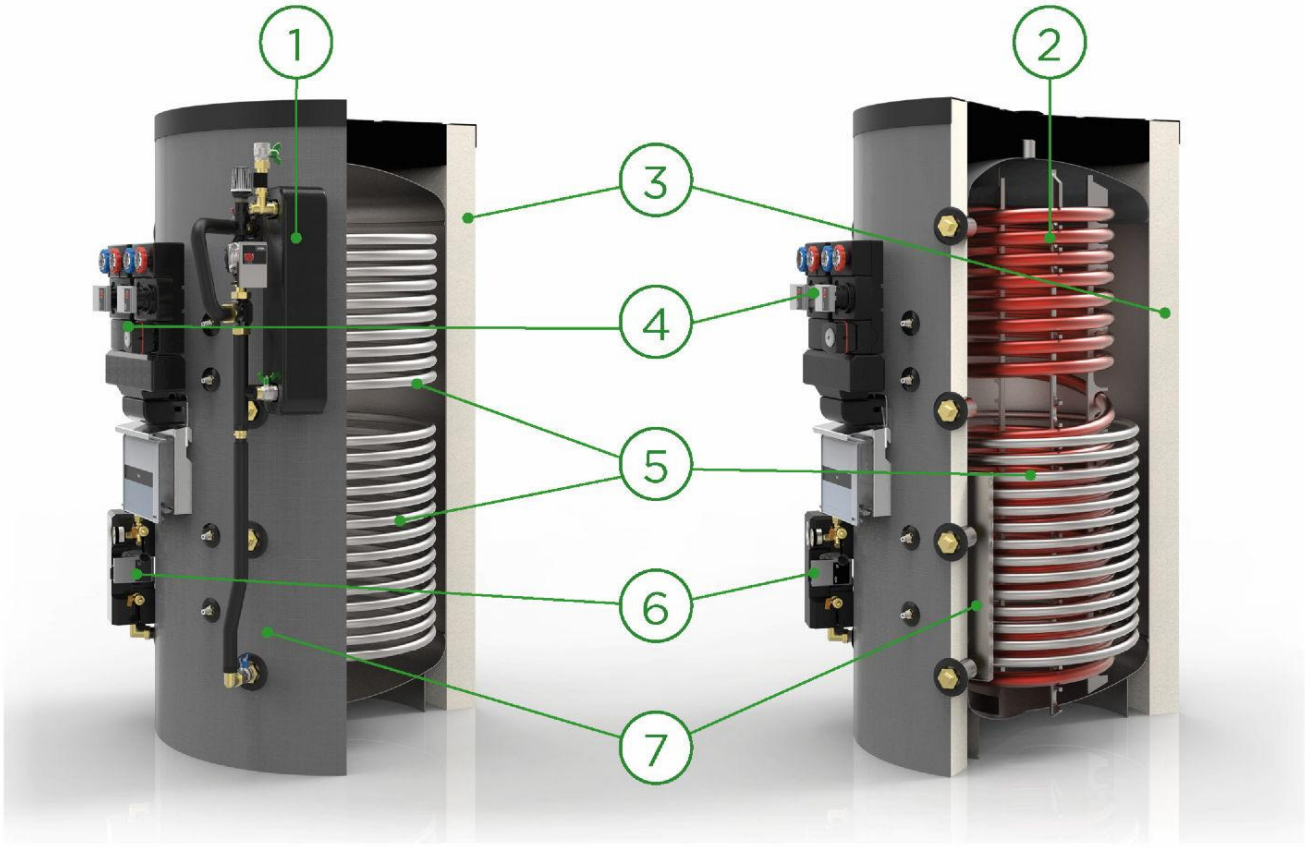
	SP
	
Sizes	600 800 1000 1500 2000
Return stratification channel	☑
Fleece insulation 100mm	☑
Solar tube heat exchanger	☒
Domestic hot water heating Stainless steel corrugated pipe-heat exchange	☒
Fresh Water Module	☑
Heating circuit(s)	☒

☑
combinable,
☒
not combinable

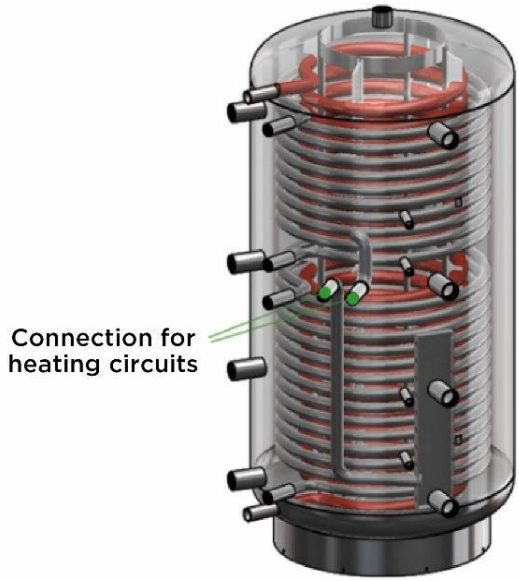
2.2 Pellaqua

	FW1R	FW2R	WR1R	WR2R
				
Sizes	600	800 1000	600	800 1000
Return stratification channel	☑	☑	☑	☑
Fleece insulation 100mm	☑	☑	☑	☑
Solar register Smooth pipe heat exchangeror	1	2	1	2
Domestic hot water heating Stainless steel corrugated pipe-heat exchange	☒	☒	☑	☑
Fresh Water Module	☑	☑	☒	☒
Heating circuit(s)	☑	☑	☑	☑
	☑ combinable, ☒ not combinable			

WITH FRESH WATER MODULE	WITH STAINLESS STEEL PIPE-HEAT EXCHANGER



1	Fresh Water Module	5	Solar tube heat exchanger
2	Stainless steel pipe-heat exchanger	6	Solar loading group
3	Fleece insulation 100mm	7	Return stratification channel
4	Heating circuit incl. insulation		

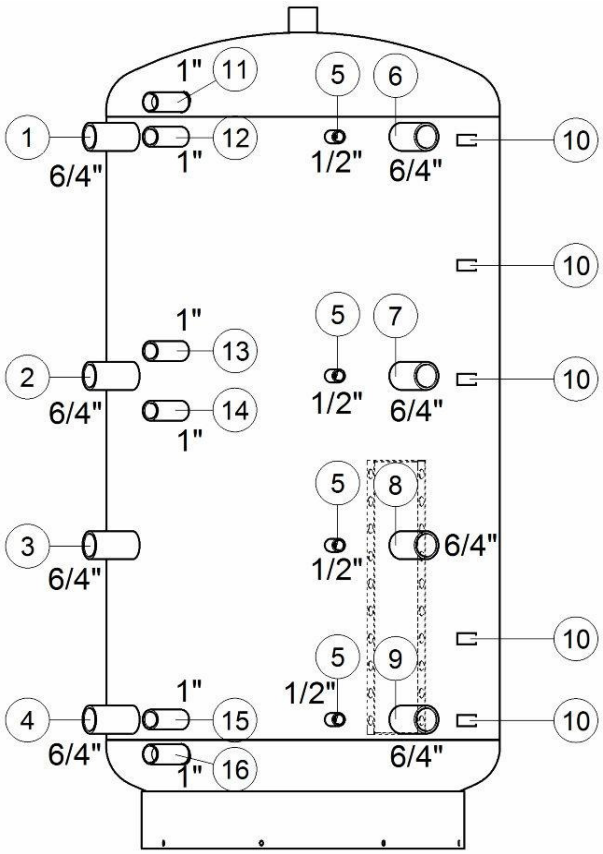


3 Hydraulic

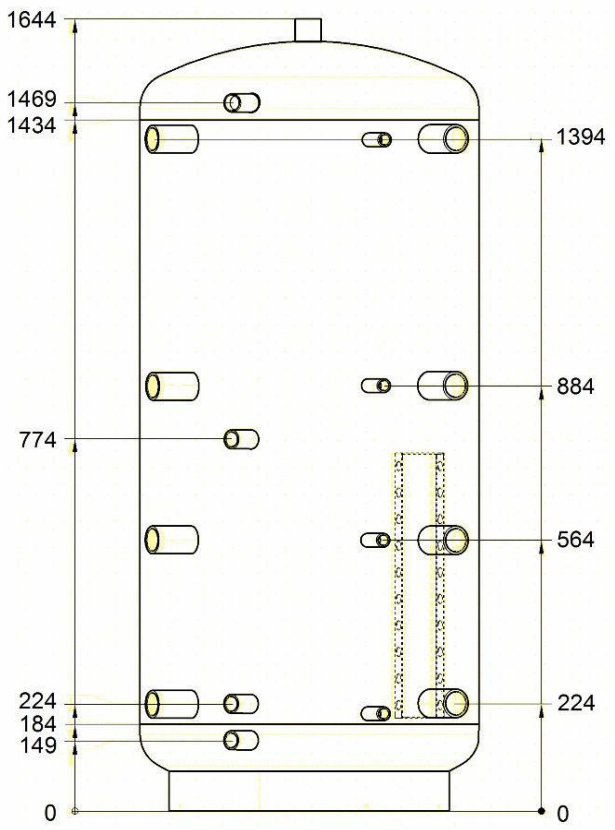
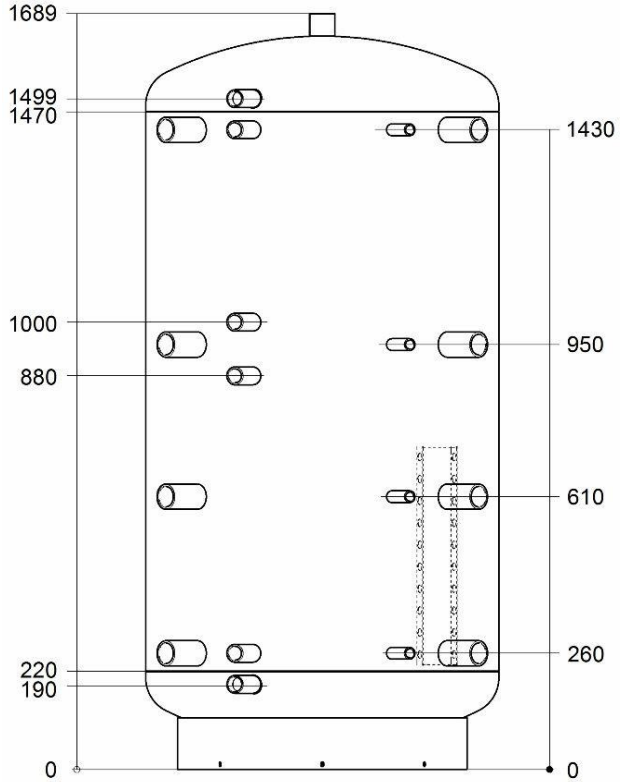
3.1 Connector Arrangement

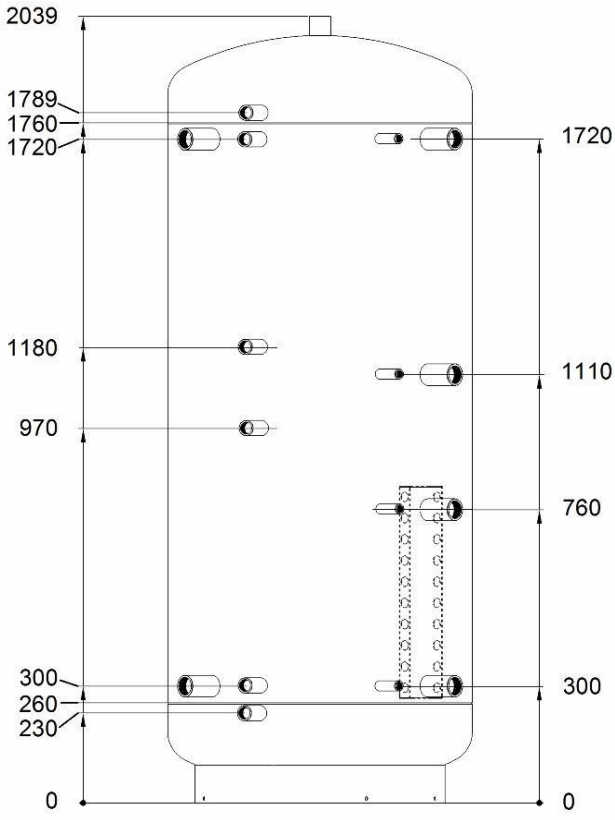
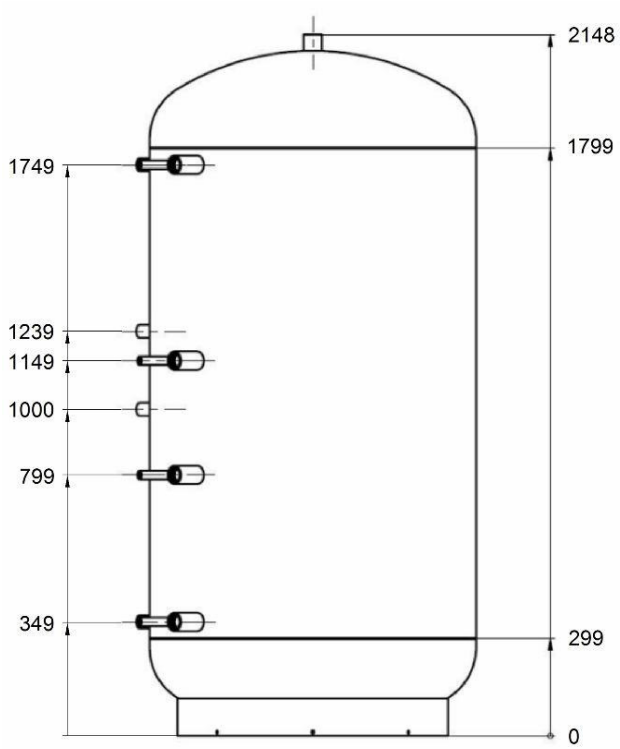
The connector arrangement shows where and at what height the connectors are located for the hydraulic connections. Mind in any case our Hydraulic connecting diagrams in the boiler instructions!

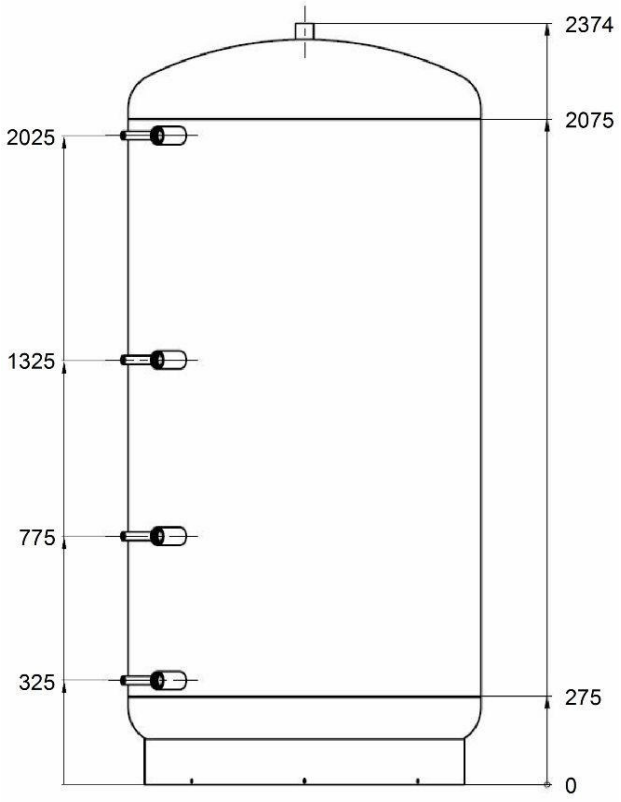
Buffer tank and combination tank



1	Boiler flow – with baffle plate
2	disposable
3	disposable – with baffle plate
4	Solar loading flow – with baffle plate
5	Solar sensor or heating circuit sensor
6	disposable
7	disposable
8	disposable *
9	disposable *
10	Sensor pocket
11	DHW connection – mains water
12	Flow upper solar register
13	Return upper solar register
14	Flow lower solar register
15	Return lower solar register
16	Cold water connection mains water
*)	is led into the return channel layer.

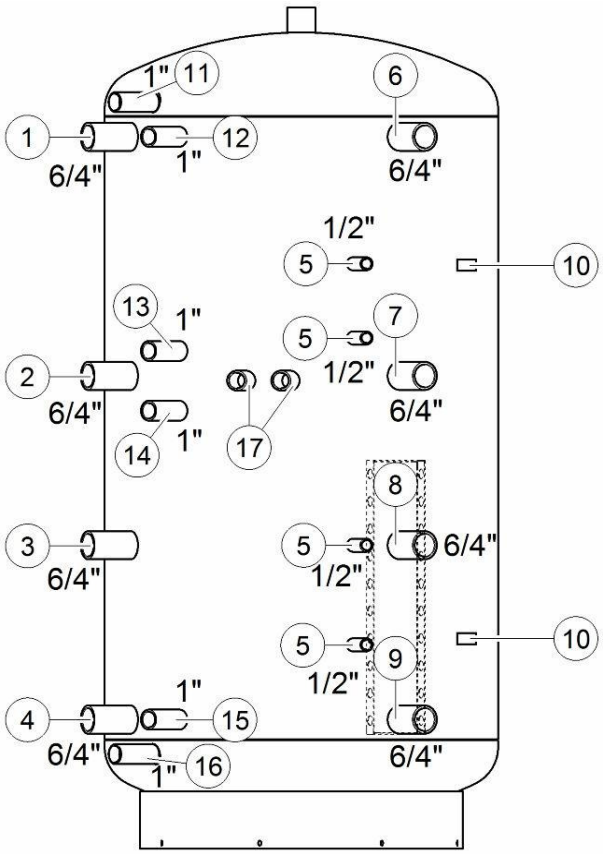
Buffer tank/combination tank 600 liter	Buffer tank/combination tank 800 liter
	

Buffer tank/combination tank 1000 liter	Buffer tank/combination tank 1500 liter
	

Buffer tank/combination tank 2000 liter	
	

All dimensions in mm!

The baffle plates at the connections have the purpose to make a proper stratification possible or rather to avoid a influenced stratification. Basically the baffle plate at the hydraulic connection does not have to be considered not separately but the installation of a heating rod for instance is not possible when the baffle plate is not bent up. The return channel layer makes it possible to integrate different flow temperatures into the accumulator on the secondary side (heating return) optimally. Thereby unnecessary mixings of the water temperature are avoided, which leads to fewer boiler starts and therefore to an energy saving.

Pellaqua		
	1	Boiler flow – with baffle plate
	2	disposable
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	6	disposable
	7	disposable
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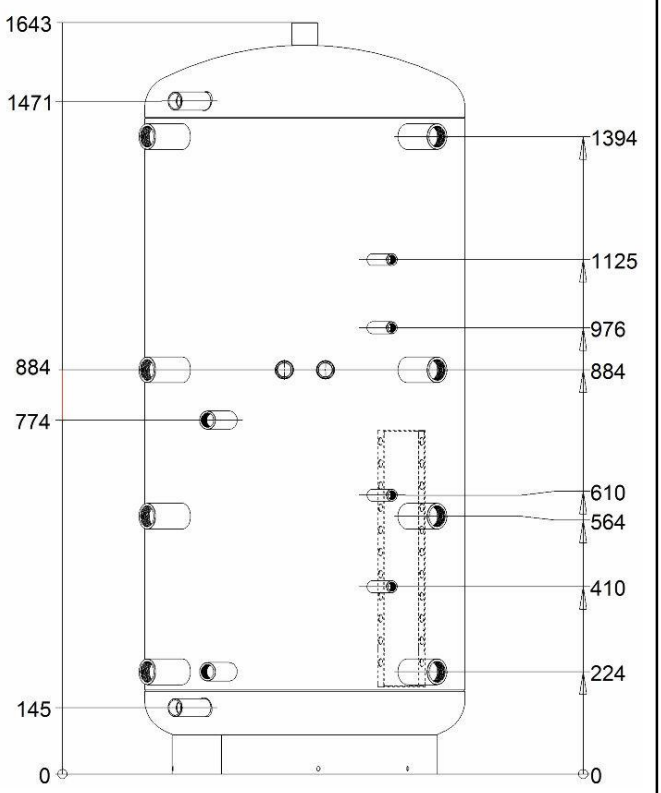
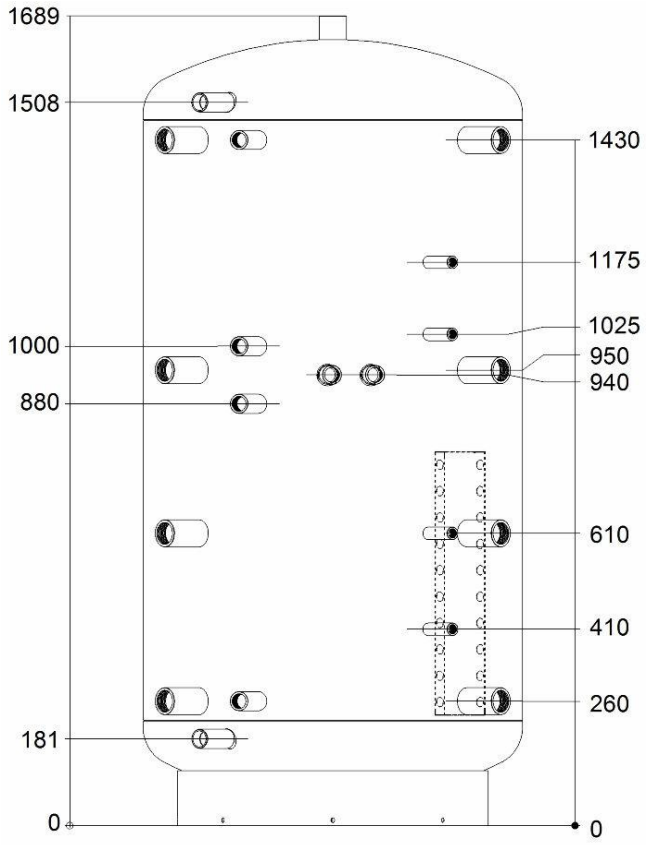
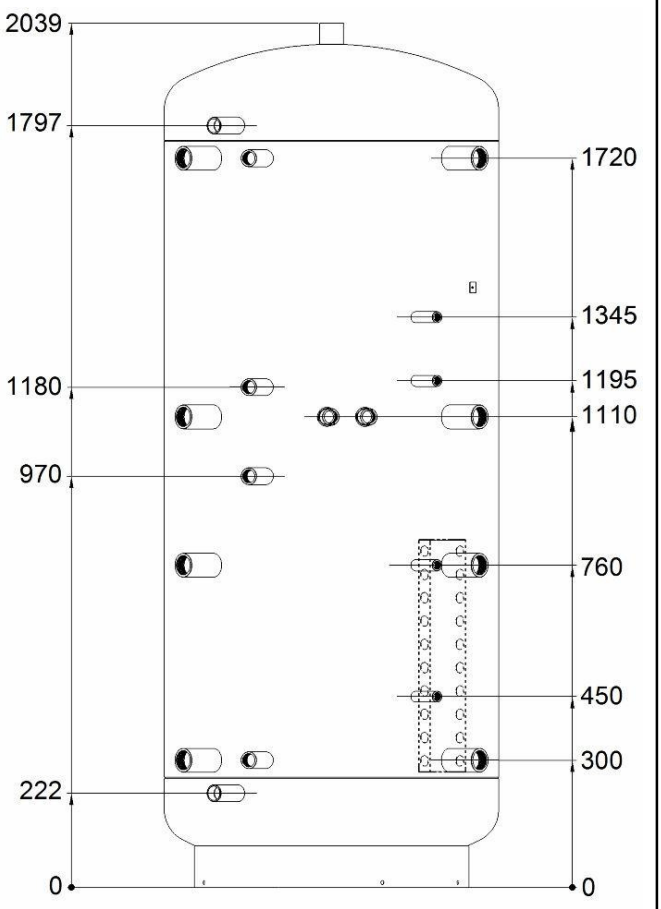
	11	DHW connection – mains water
	12	Flow upper solar register
	13	Return upper solar register
	14	Flow lower solar register
	15	Return lower solar register
	16	Cold water connection mains water
	17	Connection heating circuit
	*)	is led into the return channel layer.

Pellaqua 600 liter	Pellaqua 800 Liter
	

Pellaqua 1000 liter	
	

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3.2 Overview installation electric heating rod

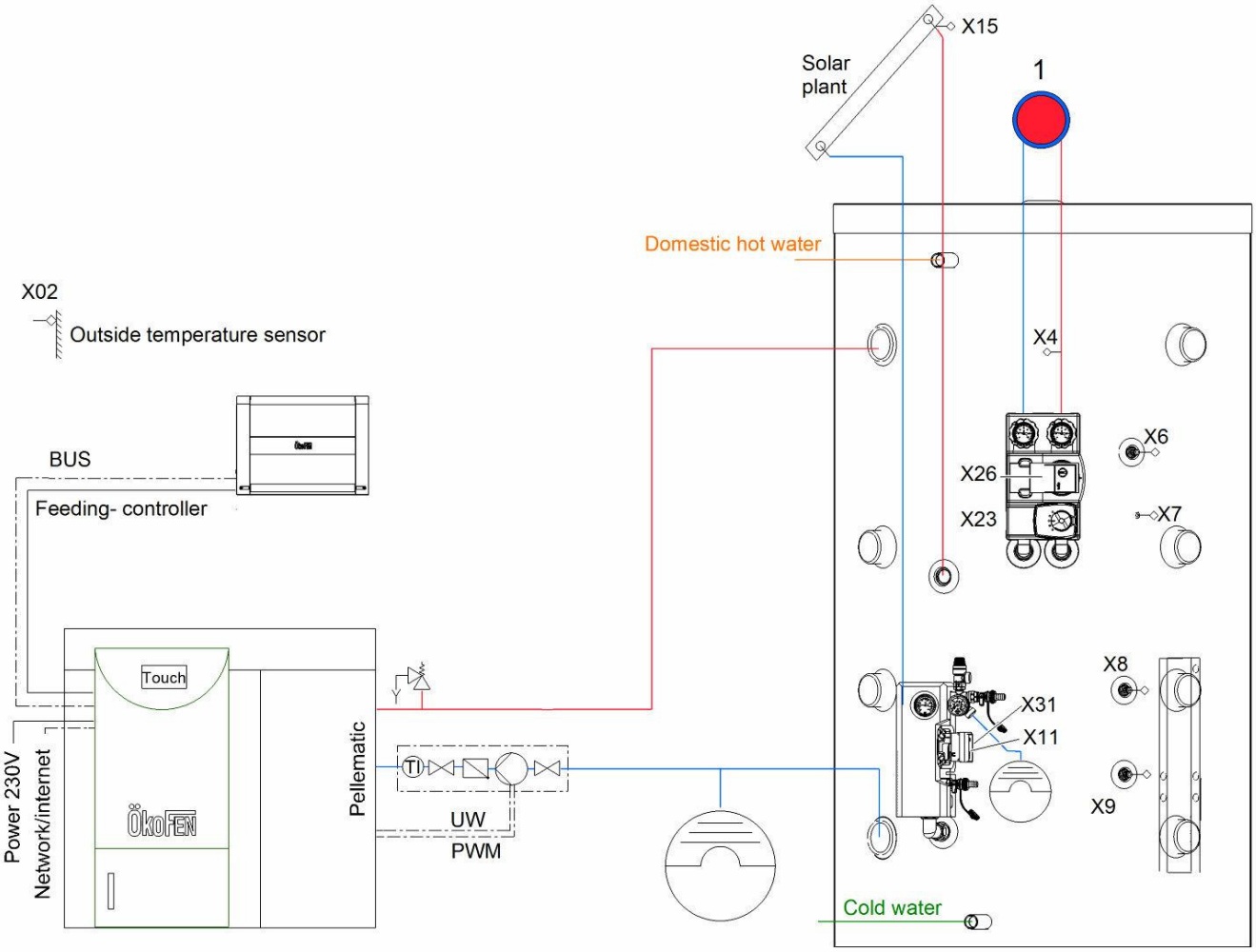
	SP 600 800 1000 1500 2000	FW 800 1000	FW1R 600 800	FW2R 1000	WR 600 800 1000	WR1R 600 800	WR2R 1000
1	* ☑	* ☑	* ☑	☒	☒	☒	☒
2	☑	☑	☑	☑	☑	☑	☑
3	* ☑	* ☑	☒	☒	☒	☒	☒
4	* ☑	* ☑	☒	☒	☒	☒	☒
5	* ☑	* ☑	* ☑	☒	☒	☒	☒
6	☑	☑	☑	☑	☑	☑	☑
7	☒	☒	☒	☒	☒	☒	☒
8	☒	☒	☒	☒	☒	☒	☒

* Remoce baffle plate!

3.3 Examples

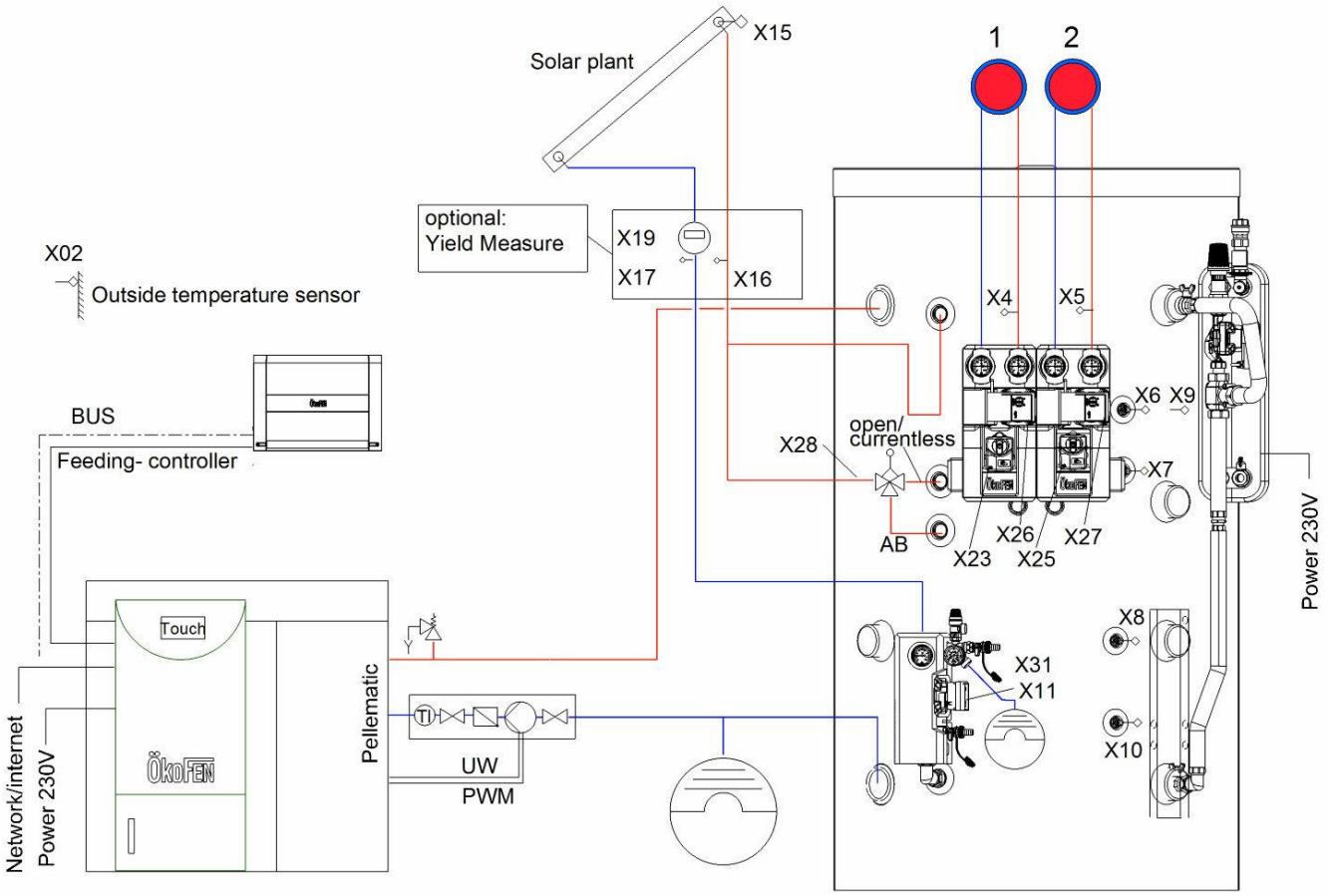
Example 1:

- Pellet boiler
- Pellaqua with one solar tube heat exchanger
- Corrugated pipe
- 1 heating circuit



Example 2:

- Pellet boiler
- Pellaqua with 2 solar tube heat exchanger and diverter valve
- Fresh water module
- 2 heating circuits



3.4 Heating circuit group

Ball valves incl. thermometer and integrated Non—return valve in return-side (blue)

Pump Wilo Yonos Para RSTG (PWM) 15/7,5; 130mm with 3m cable; 1” external thread

Progressive controller VRG438 DN20 Kvs 2-8 clickfit servomotor ARA561 3-point 230V 6Nm 120sec. 3m cable click-fit

2 heating circuits (with distributor), not modularly expandable optional distributor for 3 heating circuits

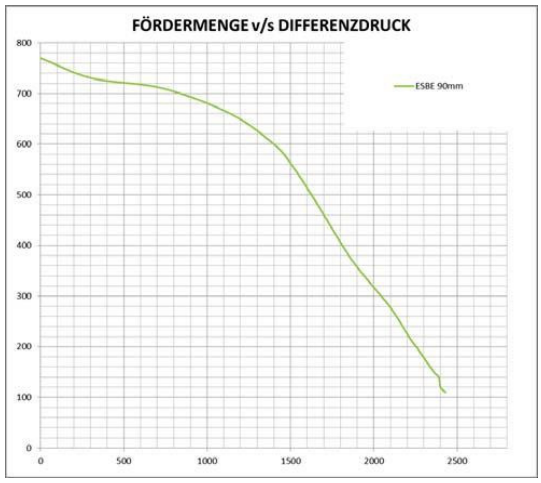
T pieces are supplied with the boiler

1 heating circuit

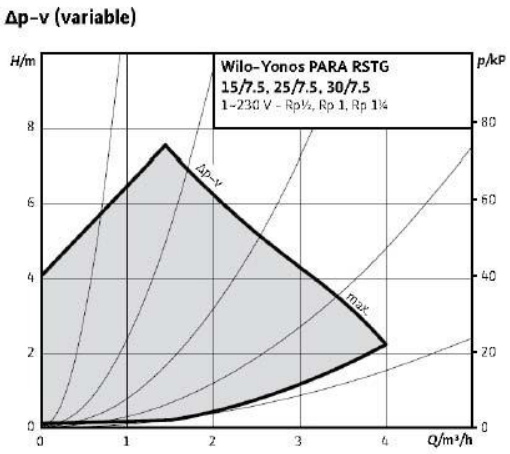
2 heating circuits

Technical data	
Dimensions between axes	90 mm
Connection producer	1” external thread flat sealing
Connection consumer	1” internal thread
Mounting dimensions:	
Height	300 mm
Width	190 mm
Depth	120 mm
Recommendation / performance limits:	
ffor floor heating	max. 18 kW per HC
for radiator heating	max. 32 kW per HC
Flow capacity	2–8
Pump	Wilo Yonos Para RSTG 15/7,5

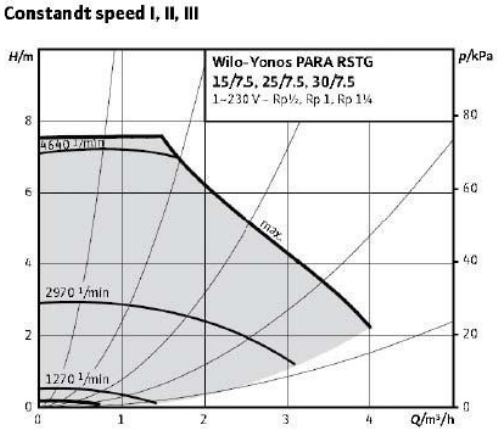
Flow rate curve



Pump diagram Yonos-Para 15/7,5



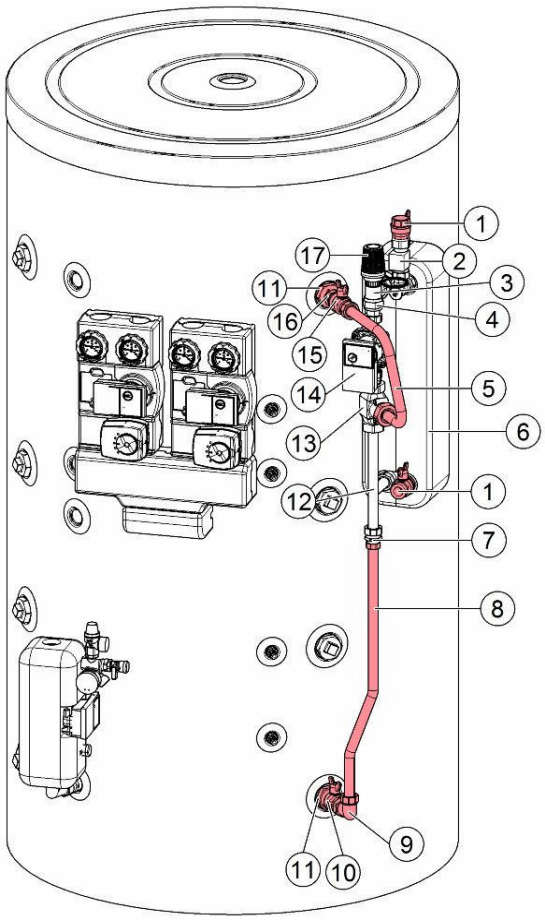
Pump diagram Yonos-Para 15/7,5



3.5 The Fresh water module

The fresh water module prepares hygienic, fresh, domestic hot water.
Even in the case of varying flow temperatures and/or varying differential pressures, the fresh water module generates a constant DHW temperature.

The fresh water module is ideal for heating systems with accumulator tanks, in which very low heating flow temperatures and low return temperatures are desired, because the stainless steel plate heat exchanger ensures excellent cooling of the return temperature in combination with the circulation pump.



1*	Drinking Water Ball Valve 1”	7*	Compression fitting Ø 22mm	13	Charging valve 60°C
2	Flow switch	8*	Return pipe	14	Boiler controlled pump
3	Angle valve	9*	Elbow	15*	Flow ball valve
4	Adapter coupling	10*	Return ball valve	16*	Transition piece
5*	Flow pipe	11*	Reduction R6/4” external thread - R1” internal thread	17	Thermostatic head with spiral immersion sensor
6	Plate heat exchanger – stainless steel with insulation	12	Return pipe T piece		

* Parts market with * are components of the connecting kit (Article no.: 80725), which must be ordered separately.

General information for the installer/heating engineer:

- Install a dirt trap in the cold water feed pipe and clean it at regular intervals.
- Connection to DHW circulation is possible as an option. (Article no.: 80725–1)

Fresh water module - Technical data:

Max. performance at operating point A	25 l/min	
Operating point A	10–45/65°C (cold water - domestic hot water / flow)	
Dimensions		
Width / Height / Depth	155 / 570 / 123 mm	
Weight	17 kg	
Cover	EPP - insulation jacket – 2 parts	
Connections	with connection set	without connection set
Heating flow	R 6/4" AG	G 5/4" AG
Heating return	R 6/4" AG	G 1" IG
Cold water	1" IG	G 1" AG
Warm water	1" IG	G 1" IG
Max. sleeve distance acc. flow/acc. return	1840 mm (vertical)	
Max. operating pressure DHW side	6 bar	
Max. operating pressure Heating water side	3 bar	
Max. Accumulator Temp.	90°C	
Min. Accumulator Temp.	60°C at adjusted DHW- temperature 50°C	
Water temperature regulator	adjustable from 20°C – 60°C	
Pump data		
Charge Pump	230V, 50Hz, Wilo Yonos Para RS 25/6	
Power	3 – 45 Watt	
Current	0,028 - 0,44 A	

Information regarding the corrosive effect of water on soldered plate heat exchangers

The soldered plate heat exchanger is made from stainless steel 316 or 304 and copper solder. In this case, the resistance of both stainless steel and copper must be considered.
Particular attention must be paid to compliance with the values in the following table. In addition, mixed installations **(especially with galvanised pipes) must be avoided**.

pH-value	7 - 9	Free chlorine	< 0,5 ppm
SO_4^{---}	< 100 ppm	Fe^{+++}	< 0,5 ppm
HCO_3^- / SO_4^{--}	> 1	Mn^{+++}	< 0,05 ppm
Cl^-	< 50 ppm	CO_2	< 10 ppm
PO_4^-	< 2 ppm	H_2S	< 50 ppb
NH_3	< 0,5 ppm	Conductivity	> 50 µS/cm, < 600 µS/cm
Wall temperature	< 65 °C	Oxygen	< 0,1 ppm
Total hardness	4,0 - 8,5 °dH		

All specified details are for information only and cannot be used as a basis for warranty claims.
To prevent pitting below coverings, all types of incrustation and contamination must be avoided in the heat exchanger.
Furthermore, the water flow rate and contamination with S02 and iron are relevant.
The redox potential of the solution (a function of the oxidising compounds, such as oxygen, hypochlorous acid and sodium carbonate) must also be observed. In practice, the fresh water module shows up to a value of 15 ° d hardness high resistance to calcification.
At higher values, a decalcification plant can increase the maintenance interval significantly!

3.6 Single-line solar station

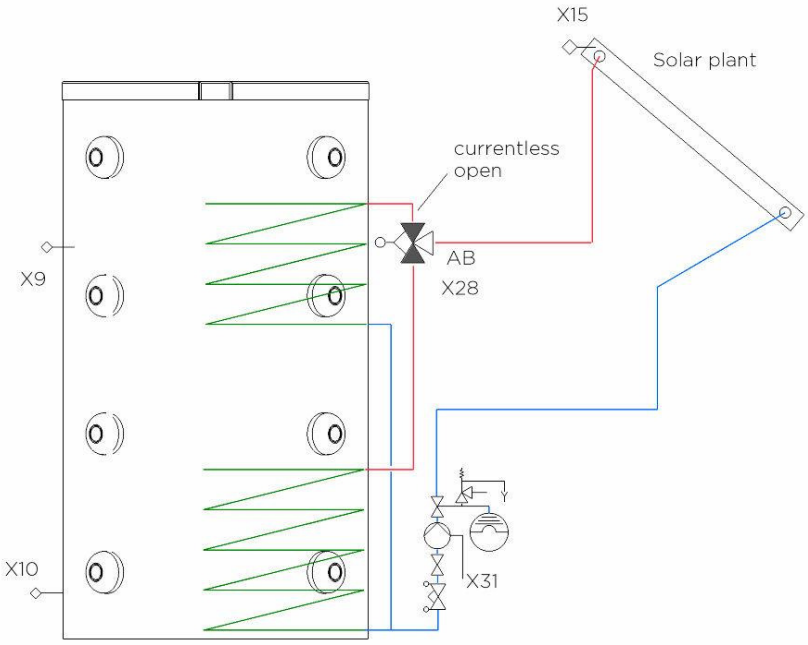
Control station ready for assembly (no solar controller) with boiler controled pump type Solar 15/7

- Overall length 130mm
- Factory-wired
- Line regulator valve with KFE valve
- Wall holder for expansion vessel incl. corrugated hose and MAG clutch
- Check valve, can be opened
- Thermometer integrated in multifunctional isolation valve with flow indication 2– 16 l/min.
- EPP insulation
- Bleeder pipe
- Clamp ring-screw connection and adapter to 3/4“ internal thread
- Connection for expansion vessel, flatsealing

Hydraulic connecting diagram solar connection with diverter valve

Variant 1 - first top - then bottom

= Register top is big enough for solar field

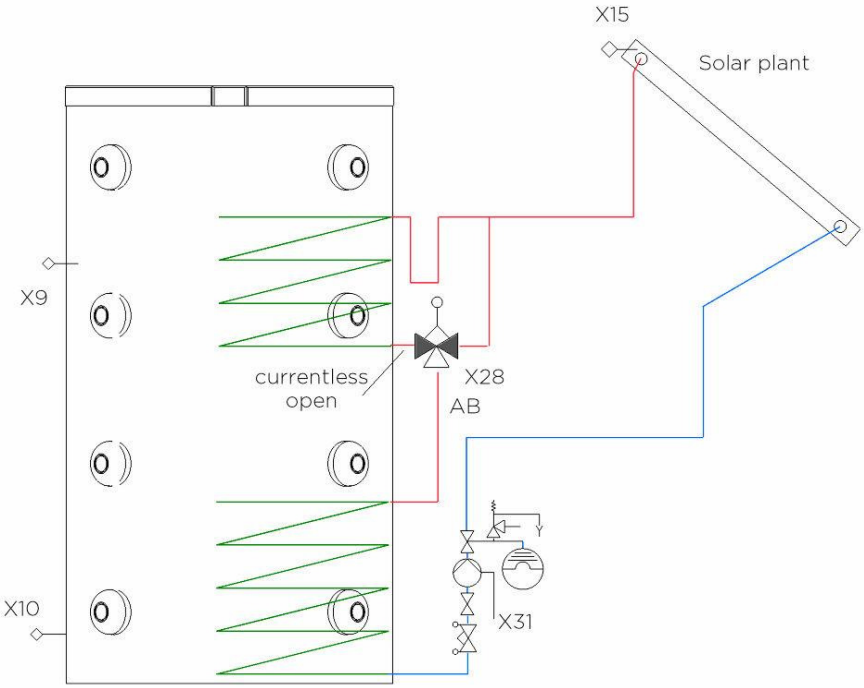


Performance limit variant 1

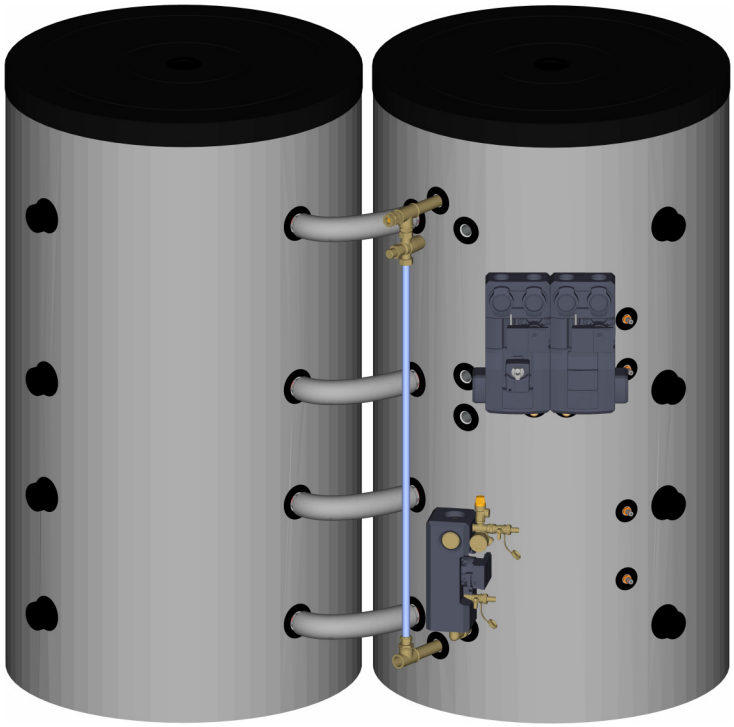
800 liter	up to 10 m²
1000 liter	up to 12 m²

Variant 2 - first both - than bottom

= Solar field is too large for register top



If you require a larger cylinder volume in order to connect a larger collector array, it is possible to increase the total cylinder capacity accordingly with an "extension cylinder".



3.7 Hydraulic Connection of the Secondary Return Line

The return pump is controlled by the Pelletronic Touch (time program) and a return temperature sensor.
The running time of the return pump must be as short as possible. The pump should only be activated at times when there is a requirement for hot water. The running time must be adapted to the supply network.

In order to maintain heat stratification in the cylinder, the circulation lance is mounted in the corrugated tube heat exchanger at the accumulator´s hot water outlet. It can therefore be connected to the domestic water system in the building.
The secondary return line must be connected to the domestic hot water pipe by means of threaded couplings.

Secondary return line

NOTICE

Material damage - heat loss

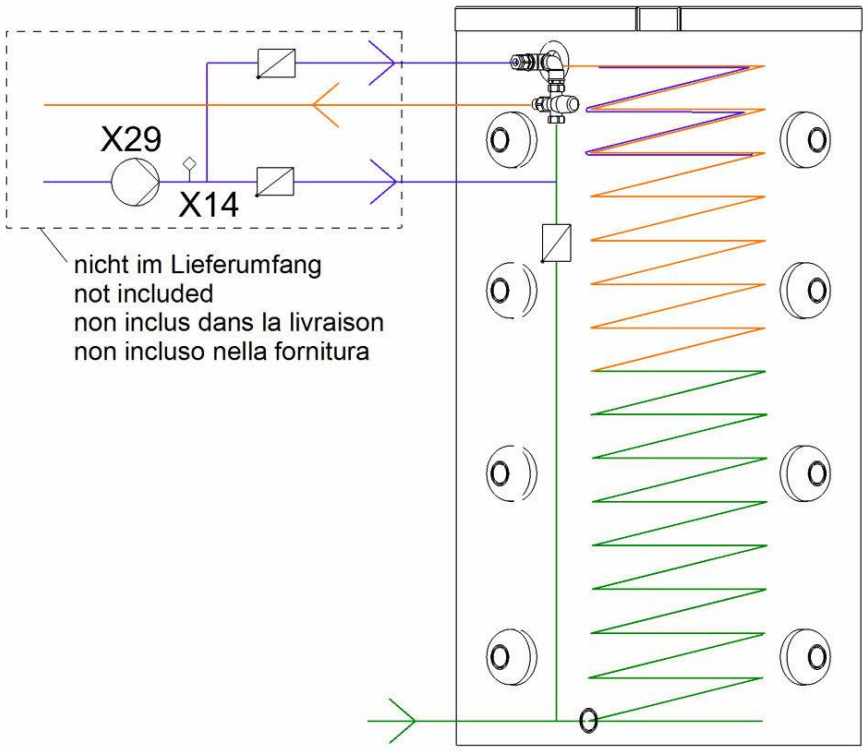
The accumulator must be installed properly.
Pay attention to the flow direction of the secondary return line.
Non-return valves must be fitted.

NOTICE

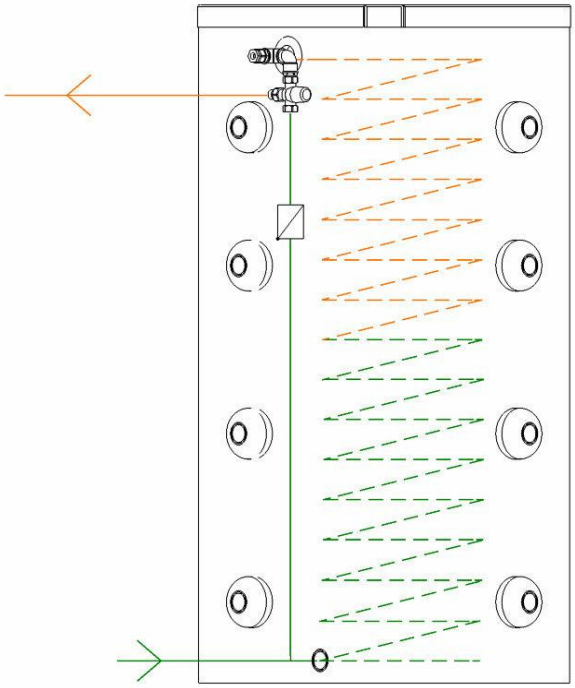
Risk of corrosion

Stainless steel must be handled with appropriate tools.

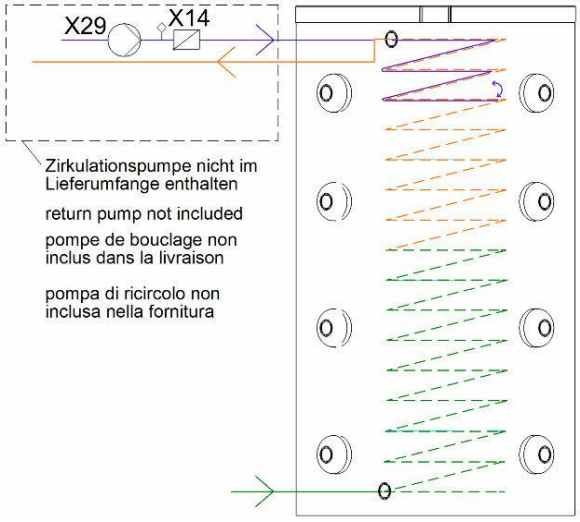
Scheme DHW blending + circulation (Art. no.: 80123–1):



Scheme DHW blending (Art. no.: 80118–1):



Scheme circulation (Art. no.: 80120–1):



⚠CAUTION

Installation

The required additional parts are in the scope of supply of the ordered sets and are to be assembled on site according to the schmes above.

4 Requirements for an accumulator

4.1 Guidelines and Standards for an accumulator

The current versions of the relevant national standards must be observed.

Austria – H 5195-1, published 01/12/2010

Prevention of damage in closed-circuit hot water heating systems.

- Contamination:

  Dirt and other contaminants represent significant contributory factors to corrosion. The introduction of contamination into the heating system must therefore be prevented. This must be taken into consideration as early as the planning stage.

- The operator of the heating system is responsible for conducting tests on the condition of the heating water.

- Such tests must be conducted no less than every 2 years on heating systems with a water capacity of up to 5000 litres and no less than once a year on systems with a capacity of over 5000 litres.

- Flushing water:

  The water used for flushing the system prior to initial startup or re-commissioning must be clear, odourlessand free of suspended matter below 25 µm.

- A system report must be prepared for every system after initial startup and re-commissioning.

- Replenishing water must be odourless and free of suspended matter below 25 µm. If the annual amount ofreplenishing water exceeds the capacity of the expansion tank, the following parameters must be compliedwith.

Water capacity	Degree of German hardness
Up to 1000 litres	Up to 17
Über 1000 – 5000 litres	Up to 6
Über 5000 litres	Up to 0,5

- If protective agents are used, compliance must be ensured with the permissible concentration range in heating water.

Type of protective agent	Permissible concentration [mg]
Phosphate P2O5	5 - 30
Polysilicates, SiO2	20 - 60
Polysilicates,	10 - 50
Sulphide denoted as SO3	10 - 30
Molybdate denoted as MoO4	150 - 500

Germany – VDI 2035, published 10/2009
Sheet 1 — Scale formation in DHW and hot water heating systems.

Sheet 2 — Water-side corrosion in DHW and hot water heating systems.

4.2 Manufacturer's Guidelines

Compliance with the manufacturer's guidelines ensures that your system is an example of state-of-the-art technology and also secures your warranty entitlements.

In all work, you must observe the current applicable legal requirements and the relevant safety regulations:

- for Austria: ÖNORM, EN, ÖVGW-TRF and ÖVE
- for Germany: DIN, EN, DVGW, TRGI, TRF and VDE
- for Switzerland: SEV, SUVA, SVGW, SVTI, SWKI and VKF

You must also observe the connection requirements for the domestic hot water supply equipment and instructions for the heat generator.

The following points must be observed:

1. Installing the heating system:

   - The cylinder may only be connected to closed-circuit heating systems.
   - The cylinder may only be connected to approved piping systems.
   - ÖkoFEN recommends the installation of a DHW mixer as scalding protection.
   - The piping must be insulated sufficiently to reduce cooling losses.
   - The building clearance for installing and removing the cylinder must be ensured.
   - The cylinder must be installed in such a way that it can be shut off and emptied.
   - ÖkoFEN recommends use of a pressure regulator in the DHW building connection.
   - A fine filter (backwash filter) must be installed in the DHW building connection.
   - The pH value must be at least 5.0.
   - Materials that emit chlorides (e.g. seals) are prohibited.
   - In the case of connection to galvanised pipes, no iron or zinc particles may be washed into the DHW heat exchanger. It is advisable to install a dirt trap.
   - If a corrosion protection additive is employed, it must be compatible with stainless steel.

2. Loading the accumulator

   Optionally, the speed of this pump can be controlled by the boiler controller. Provision mustbe made for a safety pressure relief valve (3 bar) in the accumulator loading circuit.

1 heating circuit

Boiler controller terminal → Output ZW (hot water)

NOTICE

When using 1 heating circuit, at least software version 4.00 is required

2 heating circuits

Boiler controller terminal → Output UW

Regardless of the software version, a heating circuit controller is required for two heating circuits.

3. Underfloor and wall heating

NOTICE

Material damage

Use of a flow temperature limiter in low-temperature systems. Electrical connection of the temperature limiter according to manufacturer's guidelines.

The accumulator is connected to an underfloor heating system via a mixed heating circuit.

In the case of underfloor heating systems with plastic pipes according to DIN 4727 (PD), DIN 4728 (PP type 2) and DIN 4729 (VPE) (not 100% impermeable to oxygen diffusion), the following is advisable:

- Corrosion-resistant heat exchanger for system separation
- Anti-corrosion agent

Corrosion and sedimentation damage attributable to disregarding these recommendations will not
be compensated.

In the case of underfloor and wall heating systems with plastic piping impermeable to oxygen according to DIN 4726 E or with copper piping, there are no additional requirements.

4. Radiator heating

As standard, the accumulator is connected to a radiator system with a mixed heating circuit. As standard, the buffer tank achieves a temperature of at least 60°C.

5. Solar thermal system

Both flat-plate and tubular collectors can be connected to the buffer tank. In order to prevent damage to the collectors, pay attention to the correct concentration of antifreeze in the heat transfer medium.

NOTICE

A heat exchanger register for connection to a solar thermal system is not provided. This can be realised by an external plate heat exchanger.

4.3 Installation Room

The accumulator can be installed either in the boiler room or a neighbouring room.

Conditions in the installation room:

- The access opening must be at least as large as the maximum unit dimension of the accumulator.
- The ceiling height must at least correspond to the height of the accumulator with insulation (without ventilation).
- The installation room must be frost-proof.
- The floor of the installation room must be capable of bearing the whole weight of the accumulator after filling.

5 Model Sizes - Technical Data

Accumulator	600	800	1000
Tank volume	571 liter	732 liter	925 liter
Diameter without insulation	700 mm	790 mm	790 mm
Diameter with insulation	900 mm	990 mm	990 mm
Height without insulation	1644 mm	1686 mm	2041 mm
Height with insulation	1700 mm	1760 mm	2090 mm
Tilted height	1690 mm	1740 mm	2085 mm
Weight (depending on type)	84 – 156 kg	97 – 202 kg	114 – 232 kg

Materials			
Behälter	ST 235 JR	ST 235 JR	ST 235 JR
Corrugated pipe heat exchanger for drinking water	1.4404	1.4404	1.4404
Smooth pipe heat exchanger	ST 235 JR	ST 235 JR	ST 235 JR

Max. operating pressure			
Heating circuit	3 bar	3 bar	3 bar
Corrugated pipe heat exchanger for drinking water	10 bar	10 bar	10 bar
Solar smooth pipe heat exchanger	10 bar	10 bar	10 bar

Heat exchanger area (depending on type)			
Corrugated pipe heat exchanger for drinking water	5 m^2	6 m^2	7,5 m^2
1. Solar smooth pipe heat exchanger	2,4 m^2	2,8 m^2	3,0 m^2
2. Solar smooth pipe heat exchanger	-	2,0 m^2	2,4 m^2

Heat exchanger capacity			
Corrugated pipe heat exchanger for drinking water	25 l	30 l	38 l
1. Solar smooth pipe heat exchanger	18 l	21 l	23 l
2. Solar smooth pipe heat exchanger	-	15 l	18 l

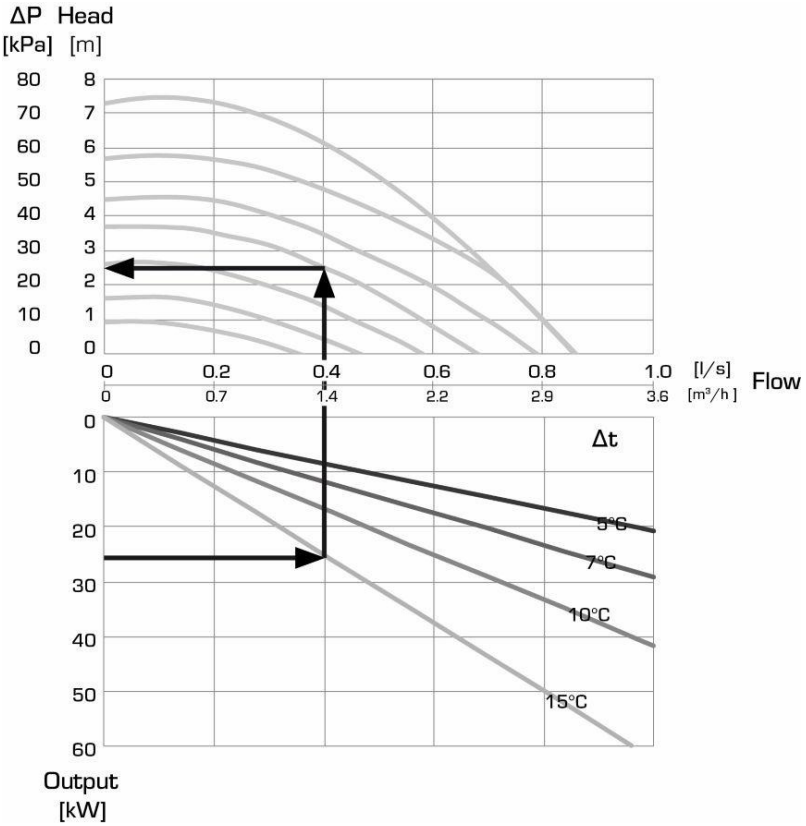
NL rating according to DIN 4708–3 ***			
with 12 kW afterheating	NL 2	NL 2	NL 4
with 15 kW afterheating	NL 2,5	NL 2,5	NL 5
with 20 kW afterheating	NL 3	NL 3	NL 6
with 25 kW afterheating	NL 4	NL 4	NL 7
with 32 kW afterheating		NL 4,5	NL 8
with 36 kW afterheating		NL 5	NL 9

Discharge			
without afterheating (at 63° C accumulator temperature, through-loaded, 40° C water delivery, 15 l/min)	480 l	555 l	720 l
Max. water delivery 30 l/min*	30 l/min	30 l/min	50 l/min

Energy efficiency labelling			
Insulation	100 mm fleece	100 mm fleece	100 mm fleece
Standby losses [kWh/24h]	2,71	2,81	3,46
Energy efficiency class	C	C	C
Standing loss [W]	113	117	144

Technical data for the pump group:

Dimensions between axes	90mm
Connection producer	1” external thread flat sealing
Connection consumer	1” internal thread
Mounting dimensions:	
Height	300mm
Width	190mm
Depth	120mm
Recommendation / performance limits:	
for floor heating	max. 18 kW per heating circuits
for radiator heating	max. 32 kW per heating circuits
Flow capacity	2–8
Pump	Wilo Yonos Para RSTG 15/7,5



6 FAQ

1. What water quality is required for the Pellaqua? What happens if the limits are exceeded?

   - Domestic hot water: We always recommend use of a dirt filter in the cold water feed pipe. Pay particular attention to your water quality when over 12 °dH.
     Please contact your ÖkoFEN representative for further details.
     Heating water in the accumulator tank: Observe ÖNORM H5195 and VDI 2035 in this regard. Detailed information can be found in section Guidelines and Standards for an accumulator.

2. What is the maximum output I can connect to a mixed HC built onto the Pellaqua?

   - see chapter Heizkreisgruppe.

3. Is it possible to connect a third heating circuit to the Pellaqua?

   - Yes, with distributor for 3 heating circuits.

4. Can I link together several buffer tanks?

   - If required, the accumulator volume can be enlarged/doubled with an additional cylinder.
     See chapter Einstrang Solarstation

5. What is the recommended space requirement for practicable operation and maintenance?

   - Provision must be made for a space requirement of approx. 70 cm in front of the Pellaqua for connection and maintenance of the complete hydraulic system. No specific clearances are required at the sides and rear.

6. Is maintenance necessary?

   - In principle, the Pellaqua is maintenance-free. Depending on system size, the water quality must be checked at specific intervals (see ÖNORM H5195–1, Germany: VDI 2035).

7 Notes