Hoval

TransTherm® aqua

Hoval domestic water systems

Buffer storage solution
Fresh water module

Extensive | Hygienic | Economical

Hoval | Responsibility for energy and environment

Hoval domestic water systems

Careful handling of a valuable resource.

Water is life!

However, water does not only mean life, it is also a habitat. This underlines how domestic water heating systems are subject to stringent hygiene requirements with regard to "water" for drinking. This is also covered in the relevant standards for the operation, planning and execution of domestic water heating systems. Hoval is very aware of its responsibilities in this regard and fulfils these requirements conscientiously.

Content

TransTherm® aqua L
Buffer storage solution.

Turnkey station for heating domestic water using the buffer storage principle. With stainless steel plate heat exchangers, copper soldering. TopTronic® E system controller built in.
Range of application: high hot water requirements. Combination with CombiVal E or CombiVal C storage tank – for new buildings and renovations.

Hygienic water heating
Complete heating of the entire contents of the tank, automatic legionella protection through complete charging of the tank to a high temperature.

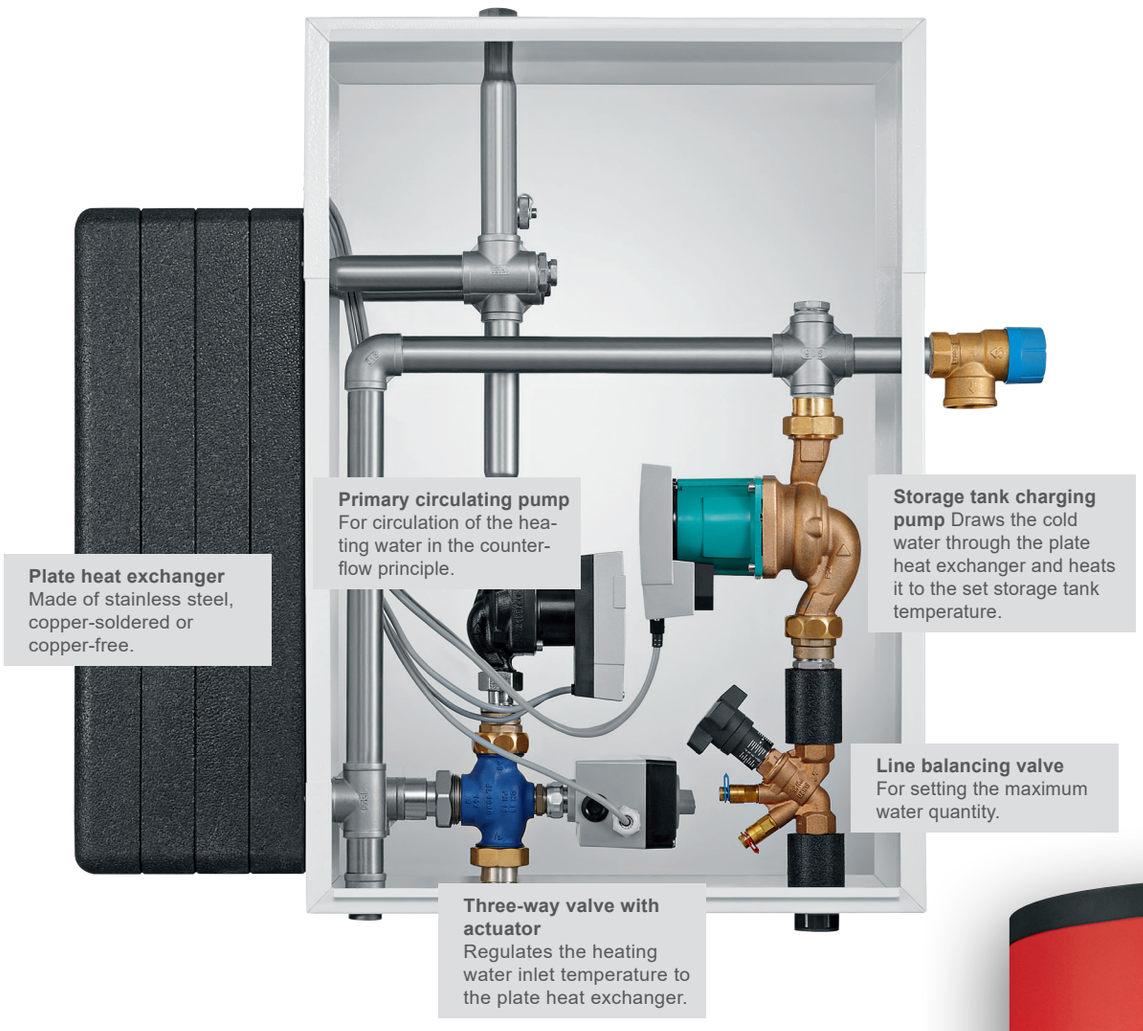
Compact construction
Compact unit with low space requirement mounted in casing, larger outputs can be configured according to customer requirements.

High efficiency
High draw-off capacity with small storage tank charging output, high peak draw-off.

Latest modular control
Simple, intuitive operating concept with touchscreen and clear graphical representation of the plant condition. Can be expanded at any time due to modular design.

Domestic hot water output 50 - 275 kW
CombiVal E charging tank: 300 - 2000 litres
CombiVal C charging tank: 200 - 2500 litres

TransTherm® aqua L in detail



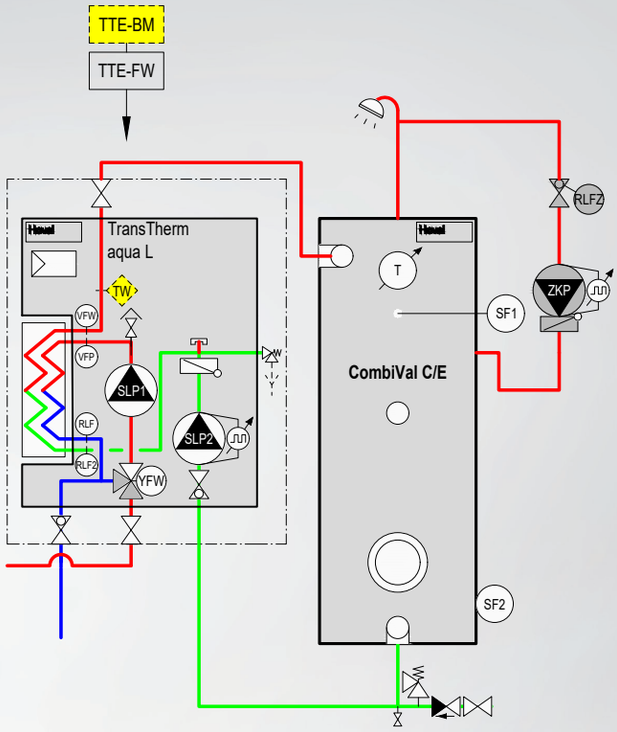
Functional principle

In the buffer storage solution, the hot water storage tank (without integrated heat exchanger) is "charged" with heated domestic water (hot water) from top to bottom via a stratified charge pump, i.e. stratified. This is why it is also called a stratified charging storage tank (stratified charging principle).
The buffer storage solution has an external heat exchanger. The heat exchanger is arranged outside the storage tank.

The design of the heat exchanger is based, on the one hand, on the primary heating power available, the charging temperature/domestic water temperature and, on the other hand, on the time available for recharging the storage tank. If the output parameters for the charging heat exchanger and domestic water storage tank are optimum, the charging heat exchanger will be operated constantly at its calculated output irrespective of the draw-off capacity drawn off in the domestic water network.

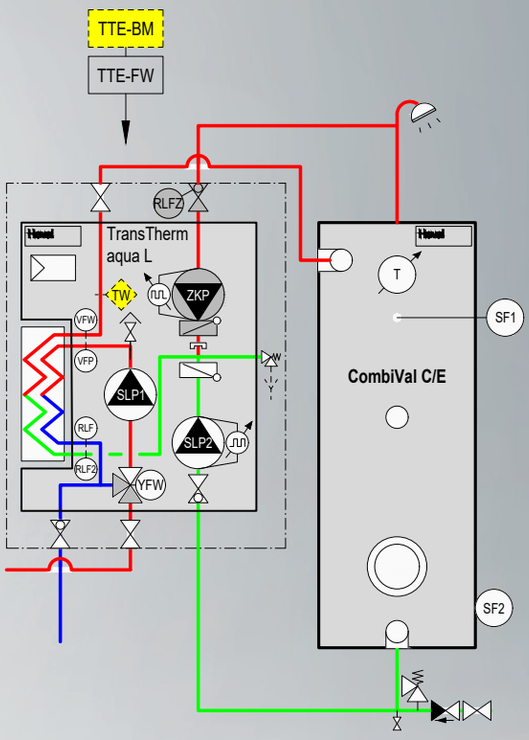
Water heating

TransTherm® aqua L
- Circulation via storage tank
- Storage tank charging system



Water heating

TransTherm® aqua L
- Circulation via heat exchanger
- Storage tank charging system



TTE-FW	Basic module district heating/ fresh water
TW	Flow temperature monitor (if required)
VFP	Primary flow sensor
VFW	Flow sensor hot water
RLF	Primary return sensor
RLF2	Return sensor cold water
SF1	Calorifier sensor 1
SF2	Calorifier sensor 2
RLFZ	Circulation sensor
SLP1	Buffer sensor 1
SLP2	Calorifier charging pump primary
YFW	Calorifier charging pump secondary
ZKP	Three-way valve with actuator
	Recirculation pump
Option	
BM	TopTronic® E control module

Range

Calorifier charging module

TransTherm® aqua L type	Output kW
(1-10)	50
(1-16)	90
(1-20)	115
(1-30)	175
(1-40)	230
(1-50)	275

“Technical” description of function

Charging operation with automatic output adjustment:
The primary heating side has pilot control by the HC1 (PFC33) via a 3-point control valve (YFW) and the feed pump (SLP1/ DKP).

This heating circuit is active as soon as there is a set value request.
The reference value request comes from a storage tank charging to calorifier sensor 1 (SF1) under domestic hot water reference value minus switch-on diff. water heating par. 05-000 or a circulation request.

This reference value (DHW reference value + charging reference value increase par. 05-001 + charging reference value increase mixer control par. 05-034) can now be passed on via the Hoval CAN bus system to the Hoval heat generator or via 0-10 V, 4-20 mA (via VA1) to other heat generators.

If the Hoval heat generator signals enable via the Hoval CAN bus system then the pilot control circuit HC1 becomes active.
With other heat generators that are requested via 0-10 V, 4-20 mA or enable contact, this switches on immediately → the primary circuit is always active when there is a request! (see above). If circulation is switched off and the hot water reference temperature has been reached, the primary side is also switched off.

When the enable temperature (DHW setpoint temperature or switch-on temperature DHW par. 05-052) is reached on the sensor VFW/VF, RLF or VFP/VE5, the process water pump SLP2 switches on. Discharge protection (switch-on temp. DHW tank circuit pump hysteresis par. 05-058) hysteresis 8 K is active in this case and would switch the process water pump SLP2 off again in case of a temperature interruption.

Start-up/switch-on optimisation.
The process water pump SLP2 accelerates to the highest possible speed with a ramp of approx. 90 seconds. This is limited by the charging temperature. This means the pump speed is reduced if the charging temperature cannot be achieved.
Control uses the “P-band charging pump VL 05-102” and “Reset time charging pump VL 05-103” parameters.

Once the DHW setpoint temperature on the calorifier sensor 1 (SF1) has been reached, speed control of the process water pump SLP2 additionally takes place according to the “Charging pump speed mode” parameter (05-099) as follows:

Mode 0:
If SF2 is below [RLF - “Differential set ch. pump RL 05-101” – “P_band charging pump RL 05-100”], SLP2 is controlled at its maximum.
If SF2 is above [RLF - “Differential set ch. pump RL 05-101”], SLP2 is controlled at its minimum.
There is a straight line between these points.

Mode 1:
If SF2 is below [SF1 - “Differential set ch. pump RL 05-101” – “P_band charging pump RL 5-100”], SLP2 is controlled at its maximum.
If SF2 is above [SF1 - “Differential set ch. pump RL 05-101”], SLP2 is controlled at its minimum.
There is a straight line between these points.

The charging temperature is also considered in both modes.

Discharge protection:
The discharge protection is deactivated ex-works in order to allow temporary commissioning at low system temperatures.
This is done using parameter 0.0.33002 (General/Sensors/VE2 function) in position 4 = DHW charging cancel and a “jumper” on terminal +12 V to VE2.
A warning is displayed when the discharge protection is deactivated.
The discharge protection must be reactivated in the final commissioning!

Circulation mode:
For Aqua L, the circulation must be set to the default.
The circulation temperature is set using the time program special heating programs circulation.
Several circulating pump functions can be configured using parameter 05-006. The factory setting is configuration 3 (active after time program with reference value forwarding and speed control).

The process water pump SLP2 in the buffer storage circuit has an after-run time par. 05-009 (60 seconds), in order to minimise limescale build-up in the heat exchanger.

The first heating circuit of the controller is active as pilot control circuit HC1 in circulation mode. The speed-controlled circulating pump ZKP/ SLP1 regulates the required circulation temperature at the circulation sensor RLFZ.

Legionella protection:
To protect against the build-up of legionella bacteria, the domestic hot water buffer storage tank is completely charged through 1x daily (at the latest 23.5 h after the last charging finished). The complete charging through is ensured because the temperature sensor RLF2 in the cold water line is located at the outflow of the domestic hot water buffer storage tank.

Legionella protection circuit:
A legionella protection circuit can be set. The switching can be selected every day or every week. The legionella temperature can be set between 65...70 °C. The necessary primary charging temperature must be 5 K above the legionella temperature.

The legionella circuit is controlled according to parameter “Legionella protection mode” 05-017.

Mode 0 = No legionella protection circuit
Mode 1 = Legionella protection circuit active. Charging through with “Legionella protection temperature” up to SF2 incl. after-run time.
Mode 2 = Mode 1 active - in addition, the “Legionella protection temperature circulation” must be reached on the circulation sensor
Mode 3 = Legionella protection circuit active. Charging through until the “Legionella protection temperature” is reached on the DHW return sensor incl. after-run time.
Mode 4 = Mode 3 active - in addition, the “Legionella protection temperature circulation” must be reached on the circulation sensor.
Modes 5 to 8 correspond to modes 1 to 4, whereby an additional legionella protection function (charging up to SF2) is carried out every day at the set time.

General:
The temperatures of calorifier sensor 1 (SF1), calorifier sensor 2 (SF2), the return sensor for the cold water line (RLF2/VE3), the return sensor for the heat exchanger (RLF) and the circula-tion sensor (RLFZ/VE7) can be configured on the TTE control module for analysis and evaluation purposes.

Domestic hot water configuration

Dimensioning according to N number.

Performance data

TransTherm® aqua L (1-10 to 1-50)
Temperature primary 70 °C flow/30 °C return

Domestic water heating

			Cold water 10 °C Domestic water 60 °C					
		TransTherm® aqua L	(10)	(16)	(20)	(30)	(40)	(50)
		kW	50	90	115	175	230	275
		m³/h	0.86	1.54	1.97	3.00	3.94	4.71
		l/min	14.3	25.7	32.9	50.0	65.7	78.6
		l/s	0.2	0.4	0.5	0.8	1.1	1.3
Tank size l								
200	**V̇s**	**l/10 min**	343	457	529	-	-	-
	Hourly output	l/h at 60 °C	1057	1743	2171	-	-	-
	NL index		13	22	29	-	-	-
300	**V̇s**	**l/10 min**	443	557	629	800	-	-
	Hourly output	l/h at 60 °C	1157	1843	2271	3300	-	-
	NL index		21	31	39	57	-	-
400	**V̇s**	**l/10 min**	543	657	729	900	-	-
	Hourly output	l/h at 60 °C	1257	1943	2371	3400	-	-
	NL index		23	41	49	69	-	-
500	**V̇s**	**l/10 min**	643	757	829	1000	1157	-
	Hourly output	l/h at 60 °C	1357	2043	2471	3500	4443	-
	NL index		25	44	56	80	100	-
800	**V̇s**	**l/10 min**	943	1057	1129	1300	1457	-
	Hourly output	l/h at 60 °C	1657	2343	2771	3800	4743	-
	NL index		33	52	64	94	123	-
1000	**V̇s**	**l/10 min**	1143	1257	1329	1500	1657	1786
	Hourly output	l/h at 60 °C	1857	2543	2971	4000	4943	5714
	NL index		38	57	69	100	128	152
1500	**V̇s**	**l/10 min**	-	1757	1829	2000	2157	2286
	Hourly output	l/h at 60 °C	-	3043	3471	4500	5443	6214
	NL index		-	71	83	114	143	167
2000	**V̇s**	**l/10 min**	-	2257	2329	2500	2657	2786
	Hourly output	l/h at 60 °C	-	3543	3971	5000	5943	6714
	NL index		-	84	97	128	158	182
2500	**V̇s**	**l/10 min**	-	2757	2829	3000	3157	3286
	Hourly output	l/h at 60 °C	-	4043	4471	5500	6443	7214
	NL index		-	99	115	144	174	198

V̇s **l/10 min** 10 minutes peak flow rate at 60 °C

NL index Performance figure in accordance with DIN 4708 = number of flats which can be supplied with domestic hot water when the calorifier is heated and permanently reheated with the heat generator (standard flat: 1 bath - 4 rooms - 3.5 persons)

Performance data

TransTherm® aqua L (1-10 to 1-50)

Tapping point (mixing temperature)

			Cold water 10 °C Domestic water 45 °C					
		TransTherm® aqua L	(10)	(16)	(20)	(30)	(40)	(50)
		kW	50	90	115	175	230	275
		m³/h	1.22	2.20	2.82	4.29	5.63	6.73
		l/min	20.4	36.7	46.9	71.4	93.9	112.2
		l/s	0.3	0.6	0.8	1.2	1.6	1.9
Tank size l								
200	**V̇s**	**l/10 min**	490	653	755	-	-	-
	Hourly output	l/h at 45 °C	1510	2490	3102	-	-	-
	NL index		13	22	29	-	-	-
300	**V̇s**	**l/10 min**	633	796	898	1143	-	-
	Hourly output	l/h at 45 °C	1653	2633	3245	4714	-	-
	NL index		21	31	39	57	-	-
400	**V̇s**	**l/10 min**	776	939	1041	1286	-	-
	Hourly output	l/h at 45 °C	1796	2776	3388	4857	-	-
	NL index		23	41	49	69	-	-
500	**V̇s**	**l/10 min**	918	1082	1184	1429	1653	-
	Hourly output	l/h at 45 °C	1939	2918	3531	5000	6347	-
	NL index		25	44	56	80	100	-
800	**V̇s**	**l/10 min**	1347	1510	1612	1857	2082	-
	Hourly output	l/h at 45 °C	2367	3347	3959	5429	6776	-
	NL index		33	52	64	94	123	-
1000	**V̇s**	**l/10 min**	1633	1796	1898	2143	2367	2551
	Hourly output	l/h at 45 °C	2653	3633	4245	5714	7061	8163
	NL index		38	57	69	100	128	152
1500	**V̇s**	**l/10 min**	-	2510	2612	2857	3082	3265
	Hourly output	l/h at 45 °C	-	4347	4959	6429	7776	8878
	NL index		-	71	83	114	143	167
2000	**V̇s**	**l/10 min**	-	3224	3327	3571	3796	3980
	Hourly output	l/h at 45 °C	-	5061	5673	7143	8490	9592
	NL index		-	84	97	128	158	182
2500	**V̇s**	**l/10 min**	-	3939	4041	4286	4510	4694
	Hourly output	l/h at 45 °C	-	5776	6388	7857	9204	10306
	NL index		-	99	115	144	174	198

V̇s **l/10 min** 10 minutes peak flow rate at 45 °C

NL index Performance figure in accordance with DIN 4708 = number of flats which can be supplied with domestic hot water when the calorifier is heated and permanently reheated with the heat generator (standard flat: 1 bath - 4 rooms - 3.5 persons)

TransTherm® aqua F
Fresh water module.

Turnkey station for heating domestic water using the continuous flow principle. With stainless steel plate heat exchangers, copper soldering. Built-in TopTronic® E system controller.
Centralised or decentralised domestic water heating with high hygiene standards, combined with an energy buffer tank. Flats, single family homes – for new buildings and renovations.

Hygienic water heating
Heating using the continuous flow principle, no storage of domestic water, therefore legionella risk greatly reduced.

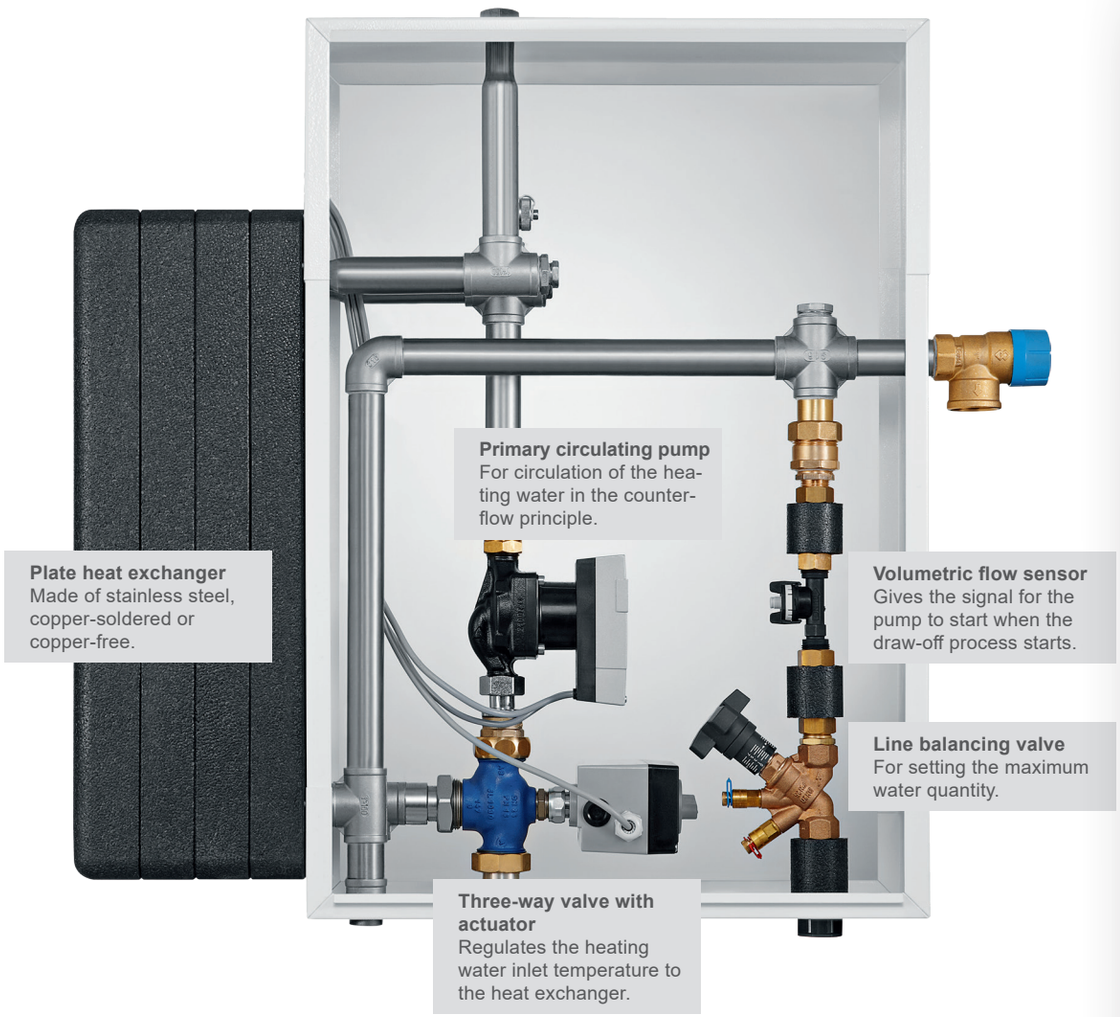
Compact construction
Compact unit with low space requirement mounted in casing, larger outputs can be configured according to customer requirements.

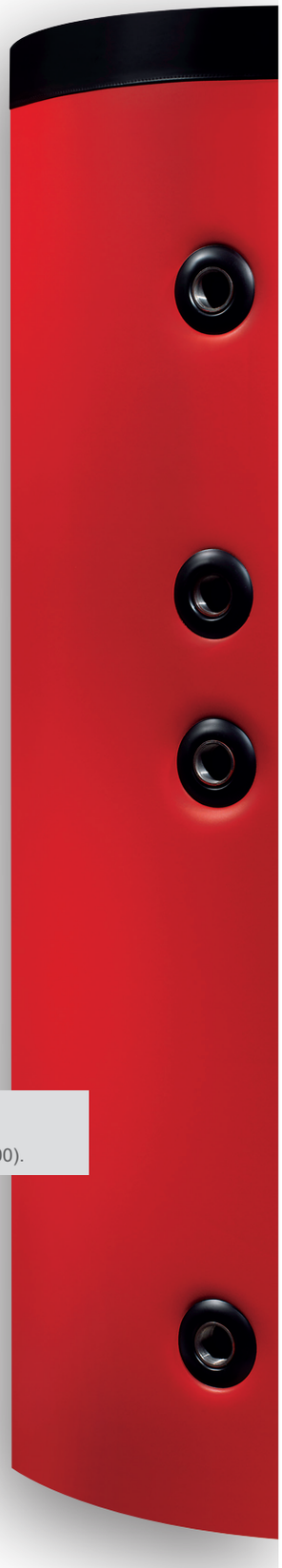
High efficiency
High draw-off capacity with small storage tank charging output, high peak draw-off.

Latest modular control
Simple, intuitive operating concept with touchscreen and clear graphical representation of the plant condition. Can be expanded at any time due to modular design.

Domestic hot water output: 50 - 275 kW in the casing
Domestic hot water output 350 - 700 kW on stand frame

TransTherm® aqua F in detail





Energy buffer storage tank
EnerVal (100-2000).

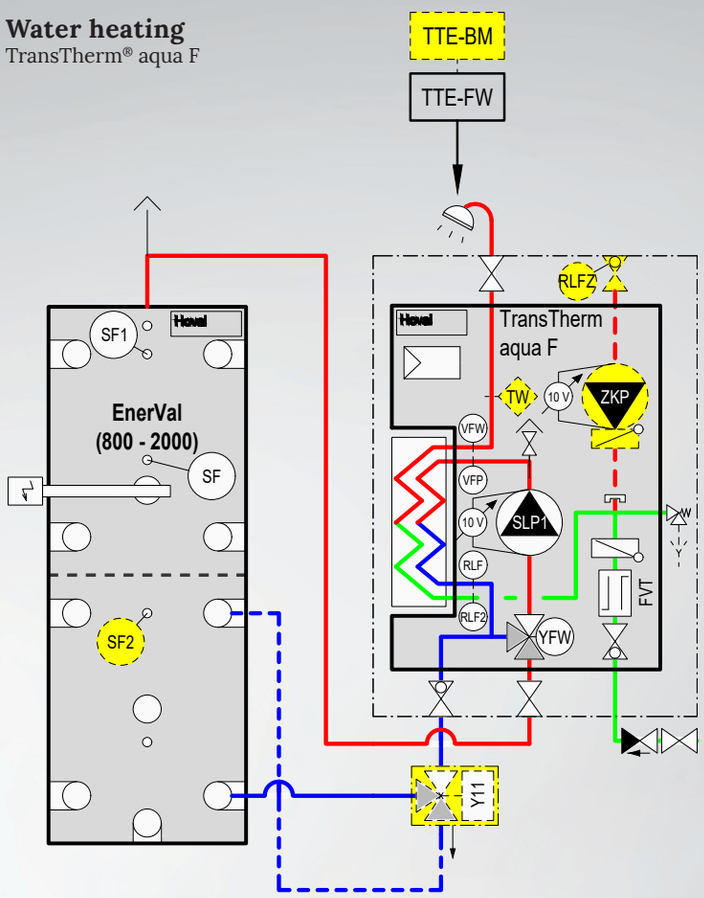
Functional principle

This type of domestic water heating is intended to avoid storing large quantities of heated water for long periods. The reason is that fresh and hygienically pure hot water should reach the draw-off points. Ultimately, however, the temperature, quality of the domestic water installation and the maintenance of the system are decisive with regard to achieving this objective.

Features of systems with fresh water stations

- Particularly hygienic water heating using the continuous flow principle, as no hot water storage is required.
- Rapid availability of hot water.
- Individual configuration of the nominal draw-off capacity possible.
- Large heating water cooling when there are draw-offs and thus low return temperatures can be achieved, i.e. ideal for heating with district heating and combination with condensing boiler technology and solar plants.
- Observe water hardness to avoid limescale build-up in the plate heat exchanger.

Water heating
TransTherm® aqua F



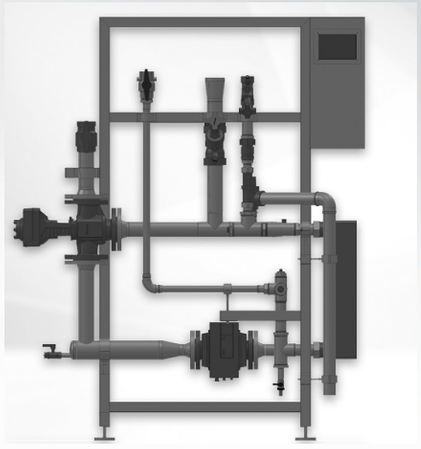
TTE-FW	Basic module district heating/fresh water
TW	Flow temperature monitor (if required)
VFP	Flow sensor primary
VFW	Flow sensor DHW
RLF	Return sensor primary
RLF2	Return sensor cold water
SF	Calorifier sensor
SF1	Calorifier sensor 1
RLFZ	Circulation sensor
SLP1	Calorifier charging pump primary
FVT	Flow rate sensor
YFW	Three-way valve with actuator
ZKP	Recirculation pump
Y11	Return switching with actuator

Option

BM	TopTronic® E control module
SF2	Calorifier sensor 2

Range
Fresh water module

TransTherm® aqua F type	Output kW
(6-10)	50
(6-16)	90
(6-20)	115
(6-30)	175
(6-40)	230
(6-50)	275



Range
Fresh water module

TransTherm® aqua F type	Output kW
(6-60)	350
(6-70)	450
(6-80)	580
(6-90)	700

“Technical” description of function

Charging operation with automatic output adjustment:
The primary heating side has pilot control by the HC1 (PFC33) via a 3-point control valve (YFW) and the feed pump (SLP/DKP/SLP1).

This heating circuit is active as soon as there is a set value request.
The reference value request results from a DHW draw-off, circulation request or the temperature holding via a time program.

The reference value (DHW reference value + charging reference value increase par. 05-001) is now passed onto the control valve YFW for pilot control.
The speed-controlled pump SLP/DKP/SLP1 regulates the reference value (DHW reference value) on the heat exchanger outlet.

The switching valve Y11/YK1 is switched after temperature comparison RLF to SF2. If RLF > SF2 then the upper area of the buffer storage tank is stratified.

Circulation mode:
For Aqua F, the circulation must be set to the default.
The circulation temperature is set using the time program special heating programs circulation.
Several circulating pump functions can be configured using parameter 05-006. The factory setting is configuration 3 (active after time program with reference value forwarding and speed control).

The pilot control circuit HC1 is active in circulation mode. The speed controlled circulating pump ZKP/SLP2 regulates the required circulation temperature at the circulation sensor RLFZ/VE7.

General:
The temperatures of calorifier sensor 1 (SF1), calorifier sensor 2 (SF2), the return sensor for the cold water line (RLF2/VE3), the return sensor for the heat exchanger (RLF) and the circulation sensor (RLFZ/VE7) or the flow sensor (VFP/VE5) can be configured on the TTE control module for analysis and evaluation purposes.

Buffer storage tank and domestic hot water configuration Dimensioning according to N number.

Residential units standard apartment according to DIN 4708	Peak heat demand standard apartment according to DIN 4708 with preparation 10 min	Sum flow rate domestic hot water calculation flow rate according to DIN 4708	Simultaneity factor according to DIN 4708	Peak flow rate (DHW)	Peak flow rate (DHW)	Peak flow rate (DHW)	Peak output (DHW)	Peak flow rate TransTherm® aqua F (DHW)	Peak flow rate TransTherm® aqua F (DHW)	Peak flow rate TransTherm® aqua F (DHW)	DHW calorifier output TransTherm® aqua F	TransTherm® aqua F	Required hot water volume at 70/30 °C (40 K)	Required hot water buffer storage tank volume at 70/30 °C (40 K)	Hot water buffer storage tank 1 EnerVal	Required recharging capacity	Required recharging capacity	Required recharging capacity
N	Prepa-ration	∑ VR at DHW 60 °C	g	$\dot{V}s$ at DHW 60 °C	$\dot{V}s$ at DHW 60 °C	$\dot{V}s$ at DHW 60 °C		$\dot{V}s$ at DHW 60 °C	$\dot{V}s$ at DHW 60 °C	$\dot{V}s$ at DHW 60 °C	Q at HT 70/30 °C DHW 10/60 °C	Type			Type	Time: 20 min 70/30 °C (40 K)	Time: 30 min 70/30 °C (40 K)	Time: 60 min 70/30 °C (40 K)
	[Wh]	[l/s]		[l/s]	[l/min]	[m³/h]	[kW]	[l/s]	[l/min]	[m³/h]	[kW]		[m³]	[m³]		[kW]	[kW]	[kW]
1	5820	0.17	1.00	0.17	10.01	0.60	35	0.24	14.3	0.86	50	(6-10)	0.13	0.16	(200)	23	15	8
2	11640	0.33	0.680	0.23	13.61	0.82	47	0.24	14.3	0.86	50	(6-10)	0.17	0.22	(200)	31	21	10
3	17460	0.50	0.544	0.27	16.33	0.98	57	0.43	25.8	1.55	90	(6-16)	0.20	0.27	(300)	37	25	12
4	23280	0.67	0.466	0.31	18.66	1.12	65	0.43	25.8	1.55	90	(6-16)	0.23	0.30	(300)	42	28	14
5	29100	0.83	0.415	0.35	20.77	1.25	72	0.43	25.8	1.55	90	(6-16)	0.26	0.34	(500)	47	31	16
6	34920	1.00	0.377	0.38	22.64	1.36	79	0.43	25.8	1.55	90	(6-16)	0.28	0.37	(500)	51	34	17
7	40740	1.17	0.349	0.41	24.45	1.47	85	0.43	25.8	1.55	90	(6-16)	0.31	0.40	(500)	55	37	18
8	46560	1.33	0.349	0.47	27.94	1.68	97	0.55	33.0	1.98	115	(6-20)	0.35	0.45	(500)	63	42	21
9	52380	1.50	0.308	0.46	27.74	1.66	97	0.55	33.0	1.98	115	(6-20)	0.35	0.45	(500)	63	42	21
10	58200	1.67	0.292	0.49	29.23	1.75	102	0.55	33.0	1.98	115	(6-20)	0.37	0.47	(500)	66	44	22
11	64020	1.83	0.279	0.51	30.72	1.84	107	0.55	33.0	1.98	115	(6-20)	0.38	0.50	(500)	70	46	23
12	69840	2.00	0.268	0.54	32.19	1.93	112	0.55	33.0	1.98	115	(6-20)	0.40	0.52	(500)	73	49	24
13	75660	2.17	0.258	0.56	33.57	2.01	117	0.55	33.0	1.98	115	(6-20)	0.42	0.55	(500)	76	51	25
14	81480	2.34	0.249	0.58	34.89	2.09	122	0.84	50.2	3.01	175	(6-30)	0.44	0.57	(500)	79	53	26
15	87300	2.50	0.242	0.61	36.33	2.18	127	0.84	50.2	3.01	175	(6-30)	0.45	0.59	(800)	82	55	27
16	93120	2.67	0.235	0.63	37.63	2.26	131	0.84	50.2	3.01	175	(6-30)	0.47	0.61	(800)	85	57	28
17	98940	2.84	0.228	0.65	38.79	2.33	135	0.84	50.2	3.01	175	(6-30)	0.49	0.63	(800)	88	59	29
18	104760	3.00	0.223	0.67	40.17	2.41	140	0.84	50.2	3.01	175	(6-30)	0.50	0.65	(800)	91	61	30
19	110580	3.17	0.217	0.69	41.27	2.48	144	0.84	50.2	3.01	175	(6-30)	0.52	0.67	(800)	94	62	31
20	116400	3.34	0.212	0.71	42.44	2.55	148	0.84	50.2	3.01	175	(6-30)	0.53	0.69	(800)	96	64	32
21	122220	3.50	0.208	0.73	43.72	2.62	153	0.84	50.2	3.01	175	(6-30)	0.55	0.71	(800)	99	66	33
22	128040	3.67	0.204	0.75	44.92	2.70	157	0.84	50.2	3.01	175	(6-30)	0.56	0.73	(800)	102	68	34
23	133860	3.84	0.200	0.77	46.04	2.76	161	0.84	50.2	3.01	175	(6-30)	0.58	0.75	(800)	104	70	35
24	139680	4.00	0.196	0.78	47.08	2.82	164	0.84	50.2	3.01	175	(6-30)	0.59	0.77	(800)	107	71	36
25	145500	4.17	0.193	0.80	48.29	2.90	168	0.84	50.2	3.01	175	(6-30)	0.60	0.78	(800)	110	73	37
26	151320	4.34	0.190	0.82	49.44	2.97	173	0.84	50.2	3.01	175	(6-30)	0.62	0.80	(800)	112	75	37
27	157140	4.50	0.187	0.84	50.53	3.03	176	0.84	50.2	3.01	175	(6-30)	0.63	0.82	(800)	115	76	38
28	162960	4.67	0.184	0.86	51.56	3.09	180	0.84	50.2	3.01	175	(6-30)	0.64	0.84	(800)	117	78	39
29	168780	4.84	0.181	0.88	52.54	3.15	183	1.10	65.8	3.95	230	(6-40)	0.66	0.85	(800)	119	79	40
30	174600	5.00	0.179	0.90	53.75	3.22	188	1.10	65.8	3.95	230	(6-40)	0.67	0.87	(1000)	122	81	41
31	180420	5.17	0.176	0.91	54.61	3.28	191	1.10	65.8	3.95	230	(6-40)	0.68	0.89	(1000)	124	83	41
32	186240	5.34	0.174	0.93	55.73	3.34	194	1.10	65.8	3.95	230	(6-40)	0.70	0.91	(1000)	126	84	42
33	192060	5.50	0.172	0.95	56.81	3.41	198	1.10	65.8	3.95	230	(6-40)	0.71	0.92	(1000)	129	86	43
34	197880	5.67	0.170	0.96	57.85	3.47	202	1.10	65.8	3.95	230	(6-40)	0.72	0.94	(1000)	131	87	44
35	203700	5.84	0.168	0.98	58.85	3.53	205	1.10	65.8	3.95	230	(6-40)	0.74	0.96	(1000)	133	89	44
36	209520	6.01	0.166	1.00	59.81	3.59	209	1.10	65.8	3.95	230	(6-40)	0.75	0.97	(1000)	136	90	45
37	215340	6.17	0.164	1.01	60.73	3.64	212	1.10	65.8	3.95	230	(6-40)	0.76	0.99	(1000)	138	92	46
38	221160	6.34	0.163	1.03	61.99	3.72	216	1.10	65.8	3.95	230	(6-40)	0.78	1.01	(1000)	141	94	47
39	226980	6.51	0.161	1.05	62.84	3.77	219	1.10	65.8	3.95	230	(6-40)	0.79	1.02	(1000)	143	95	48
40	232800	6.67	0.159	1.06	63.65	3.82	222	1.10	65.8	3.95	230	(6-40)	0.80	1.03	(1000)	144	96	48
41	238620	6.84	0.158	1.08	64.84	3.89	226	1.10	65.8	3.95	230	(6-40)	0.81	1.05	(1000)	147	98	49
42	244440	7.01	0.156	1.09	65.58	3.93	229	1.10	65.8	3.95	230	(6-40)	0.82	1.07	(1000)	149	99	50
43	250260	7.17	0.155	1.11	66.71	4.00	233	1.10	65.8	3.95	230	(6-40)	0.83	1.08	(1000)	151	101	50
44	256080	7.34	0.154	1.13	67.82	4.07	237	1.31	78.8	4.73	275	(6-50)	0.85	1.10	(1500)	154	103	51
45	261900	7.51	0.152	1.14	68.46	4.11	239	1.31	78.8	4.73	275	(6-50)	0.86	1.11	(1500)	155	104	52
46	267720	7.67	0.151	1.16	69.52	4.17	243	1.31	78.8	4.73	275	(6-50)	0.87	1.13	(1500)	158	105	53
47	273540	7.84	0.150	1.18	70.56	4.23	246	1.31	78.8	4.73	275	(6-50)	0.88	1.15	(1500)	160	107	53
48	279360	8.01	0.149	1.19	71.58	4.29	250	1.31	78.8	4.73	275	(6-50)	0.89	1.16	(1500)	162	108	54
49	285180	8.17	0.148	1.21	72.58	4.35	253	1.31	78.8	4.73	275	(6-50)	0.91	1.18	(1500)	165	110	55
50	291000	8.34	0.146	1.22	73.06	4.38	255	1.31	78.8	4.73	275	(6-50)	0.91	1.19	(1500)	166	110	55
51	296820	8.51	0.145	1.23	74.01	4.44	258	1.31	78.8	4.73	275	(6-50)	0.93	1.20	(1500)	168	112	56
52	302640	8.67	0.144	1.25	74.94	4.50	261	1.31	78.8	4.73	275	(6-50)	0.94	1.22	(1500)	170	113	57
53	308460	8.84	0.143	1.26	75.86	4.55	265	1.31	78.8	4.73	275	(6-50)	0.95	1.23	(1500)	172	115	57
54	314280	9.01	0.142	1.28	76.75	4.60	268	1.31	78.8	4.73	275	(6-50)	0.96	1.25	(1500)	174	116	58

Residential units standard apartment according to DIN 4708	Peak heat demand standard apartment according to DIN 4708 with preparation 10 min	Sum flow rate domestic hot water calculation flow rate according to DIN 4708	Simultaneity factor according to DIN 4708	Peak flow rate (DHW)	Peak flow rate (DHW)	Peak flow rate (DHW)	Peak output (DHW)	Peak flow rate TransTherm® aqua F (DHW)	Peak flow rate TransTherm® aqua F (DHW)	Peak flow rate TransTherm® aqua F (DHW)	DHW calorifier output TransTherm® aqua F	TransTherm® aqua F	Required hot water volume at 70/30 °C (40 K)	Required hot water buffer storage tank volume at 70/30 °C (40 K)	Hot water buffer storage tank 1 EnerVal	Required recharging capacity	Required recharging capacity	Required recharging capacity
N	Preparation	∑ VR at DHW 60 °C	g	$\dot{V}s$ at DHW 60 °C	$\dot{V}s$ at DHW 60 °C	$\dot{V}s$ at DHW 60 °C		$\dot{V}s$ at DHW 60 °C	$\dot{V}s$ at DHW 60 °C	$\dot{V}s$ at DHW 60 °C	Q at HT 70/30 °C DHW 10/60 °C	Type			Type	Time: 20 min 70/30 °C (40 K)	Time: 30 min 70/30 °C (40 K)	Time: 60 min 70/30 °C (40 K)
	[Wh]	[l/s]		[l/s]	[l/min]	[m³/h]	[kW]	[l/s]	[l/min]	[m³/h]	[kW]		[m³]	[m³]		[kW]	[kW]	[kW]
55	320100	9.17	0.141	1.29	77.62	4.66	271	1.31	78.8	4.73	275	(6-50)	0.97	1.26	(1500)	176	117	59
56	325920	9.34	0.140	1.31	78.47	4.71	274	1.31	78.8	4.73	275	(6-50)	0.98	1.28	(1500)	178	119	59
57	331740	9.51	0.140	1.33	79.87	4.79	279	1.31	78.8	4.73	275	(6-50)	1.00	1.30	(1500)	181	121	60
58	337560	9.67	0.139	1.34	80.69	4.84	282	1.69	101.2	6.07	350	(6-60)	1.01	1.31	(1500)	183	122	61
59	343380	9.84	0.138	1.36	81.49	4.89	284	1.69	101.2	6.07	350	(6-60)	1.02	1.32	(1500)	185	123	62
60	349200	10.01	0.137	1.37	82.27	4.94	287	1.69	101.2	6.07	350	(6-60)	1.03	1.34	(1500)	187	124	62
61	355020	10.18	0.136	1.38	83.03	4.98	290	1.69	101.2	6.07	350	(6-60)	1.04	1.35	(1500)	188	126	63
62	360840	10.34	0.135	1.40	83.77	5.03	292	1.69	101.2	6.07	350	(6-60)	1.05	1.36	(1500)	190	127	63
63	366660	10.51	0.135	1.42	85.12	5.11	297	1.69	101.2	6.07	350	(6-60)	1.06	1.38	(1500)	193	129	64
64	372480	10.68	0.134	1.43	85.83	5.15	299	1.69	101.2	6.07	350	(6-60)	1.07	1.40	(1500)	195	130	65
65	378300	10.84	0.133	1.44	86.52	5.19	302	1.69	101.2	6.07	350	(6-60)	1.08	1.41	(1500)	196	131	65
66	384120	11.01	0.132	1.45	87.19	5.23	304	1.69	101.2	6.07	350	(6-60)	1.09	1.42	(1500)	198	132	66
67	389940	11.18	0.132	1.48	88.52	5.31	309	1.69	101.2	6.07	350	(6-60)	1.11	1.44	(1500)	201	134	67
68	395760	11.34	0.131	1.49	89.16	5.35	311	1.69	101.2	6.07	350	(6-60)	1.11	1.45	(1500)	202	135	67
69	401580	11.51	0.130	1.50	89.78	5.39	313	1.69	101.2	6.07	350	(6-60)	1.12	1.46	(1500)	204	136	68
70	407400	11.68	0.130	1.52	91.08	5.46	318	1.69	101.2	6.07	350	(6-60)	1.14	1.48	(1500)	207	138	69
71	413220	11.84	0.129	1.53	91.67	5.50	320	1.69	101.2	6.07	350	(6-60)	1.15	1.49	(1500)	208	139	69
72	419040	12.01	0.128	1.54	92.24	5.53	322	1.69	101.2	6.07	350	(6-60)	1.15	1.50	(1500)	209	139	70
73	424860	12.18	0.128	1.56	93.52	5.61	326	1.69	101.2	6.07	350	(6-60)	1.17	1.52	(1500)	212	141	71
74	430680	12.34	0.127	1.57	94.06	5.64	328	1.69	101.2	6.07	350	(6-60)	1.18	1.53	(1500)	213	142	71
75	436500	12.51	0.127	1.59	95.33	5.72	333	1.69	101.2	6.07	350	(6-60)	1.19	1.55	(1500)	216	144	72
76	442320	12.68	0.126	1.60	95.84	5.75	334	1.69	101.2	6.07	350	(6-60)	1.20	1.56	(1500)	217	145	72
77	448140	12.84	0.126	1.62	97.10	5.83	339	1.69	101.2	6.07	350	(6-60)	1.21	1.58	(1500)	220	147	73
78	453960	13.01	0.125	1.63	97.58	5.86	340	1.69	101.2	6.07	350	(6-60)	1.22	1.59	(1500)	221	148	74
79	459780	13.18	0.124	1.63	98.04	5.88	342	1.69	101.2	6.07	350	(6-60)	1.23	1.59	(1500)	222	148	74
80	465600	13.34	0.124	1.65	99.29	5.96	346	1.69	101.2	6.07	350	(6-60)	1.24	1.61	(2000)	225	150	75
81	471420	13.51	0.123	1.66	99.72	5.98	348	1.69	101.2	6.07	350	(6-60)	1.25	1.62	(2000)	226	151	75
82	477240	13.68	0.123	1.68	100.95	6.06	352	1.69	101.2	6.07	350	(6-60)	1.26	1.64	(2000)	229	153	76
83	483060	13.85	0.122	1.69	101.35	6.08	354	1.69	101.2	6.07	350	(6-60)	1.27	1.65	(2000)	230	153	77
84	488880	14.01	0.122	1.71	102.57	6.15	358	2.17	130.0	7.80	450	(6-70)	1.28	1.67	(2000)	233	155	78
85	494700	14.18	0.121	1.72	102.94	6.18	359	2.17	130.0	7.80	450	(6-70)	1.29	1.67	(2000)	233	156	78
86	500520	14.35	0.121	1.74	104.15	6.25	363	2.17	130.0	7.80	450	(6-70)	1.30	1.69	(2000)	236	157	79
87	506340	14.51	0.120	1.74	104.49	6.27	365	2.17	130.0	7.80	450	(6-70)	1.31	1.70	(2000)	237	158	79
88	512160	14.68	0.120	1.76	105.69	6.34	369	2.17	130.0	7.80	450	(6-70)	1.32	1.72	(2000)	240	160	80
89	517980	14.85	0.120	1.78	106.89	6.41	373	2.17	130.0	7.80	450	(6-70)	1.34	1.74	(2000)	242	162	81
90	523800	15.01	0.119	1.79	107.19	6.43	374	2.17	130.0	7.80	450	(6-70)	1.34	1.74	(2000)	243	162	81
91	529620	15.18	0.119	1.81	108.38	6.50	378	2.17	130.0	7.80	450	(6-70)	1.36	1.76	(2000)	246	164	82
92	535440	15.35	0.118	1.81	108.65	6.52	379	2.17	130.0	7.80	450	(6-70)	1.36	1.77	(2000)	246	164	82
93	541260	15.51	0.118	1.83	109.83	6.59	383	2.17	130.0	7.80	450	(6-70)	1.37	1.79	(2000)	249	166	83
94	547080	15.68	0.117	1.83	110.07	6.60	384	2.17	130.0	7.80	450	(6-70)	1.38	1.79	(2000)	250	166	83
95	552900	15.85	0.117	1.85	111.25	6.67	388	2.17	130.0	7.80	450	(6-70)	1.39	1.81	(2000)	252	168	84
96	558720	16.01	0.117	1.87	112.42	6.74	392	2.17	130.0	7.80	450	(6-70)	1.41	1.83	(2000)	255	170	85
97	564540	16.18	0.116	1.88	112.62	6.76	393	2.17	130.0	7.80	450	(6-70)	1.41	1.83	(2000)	255	170	85
98	570360	16.35	0.116	1.90	113.78	6.83	397	2.17	130.0	7.80	450	(6-70)	1.42	1.85	(2000)	258	172	86
99	576180	16.51	0.116	1.92	114.94	6.90	401	2.17	130.0	7.80	450	(6-70)	1.44	1.87	(2000)	261	174	87
100	582000	16.68	0.115	1.92	115.10	6.91	402	2.17	130.0	7.80	450	(6-70)	1.44	1.87	(2000)	261	174	87

TransTherm® aqua FS
Fresh water module.

Domestic water heating in the continuous flow principle with 2 heat exchangers. Reduction in lime precipitation by controlling the heating charging temperature via a 3-way valve.
Startup-optimised domestic hot water charging with speed-controlled charging pump when domestic water is drawn off. Optimum return cooling by means of the preheater-supplementary heater principle.
The TransTherm® aqua FS fresh water module must be combined with two heating water buffer storage tanks. The autonomous fresh water module is set up on a stand frame and is floor-standing.

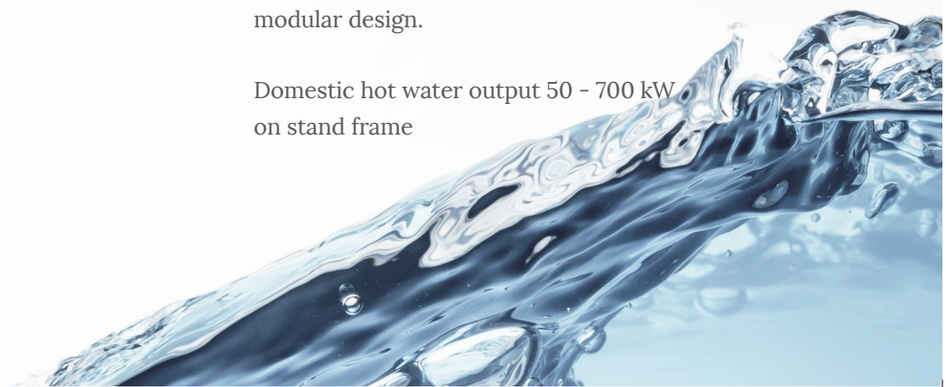
Hygienic water heating
Heating using the continuous flow principle, no storage of domestic water, therefore legionella risk greatly reduced.

Compact construction
Compact unit with low space requirement mounted on steel frame.

High efficiency
High draw-off capacity with small storage tank charging output, high peak draw-off. Optimum utilisation of condensing boiler technology through low return temperatures.

Latest modular control
Simple, intuitive operating concept with touch-screen and clear graphical representation of the plant condition. Can be expanded at any time due to modular design.

Domestic hot water output 50 - 700 kW on stand frame



TransTherm® aqua FS in detail

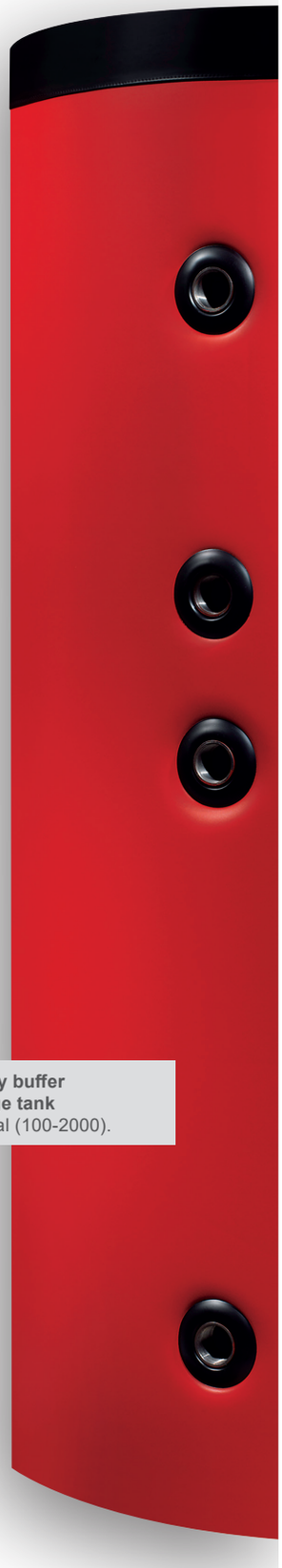
Circulation
In the plate heat exchanger (supplementary heater), the domestic hot water circulation is heated to 60 °C.

Control panel with TopTronic® E control
For controlling all the procedures.

Plate heat exchanger
Supplementary heater
Made of stainless steel, copper-soldered or copper-free.

Plate heat exchanger
Preliminary heater
Made of stainless steel, copper-soldered or copper-free.

Volumetric flow sensor
Gives the signal for the pump to start when the draw-off process starts.



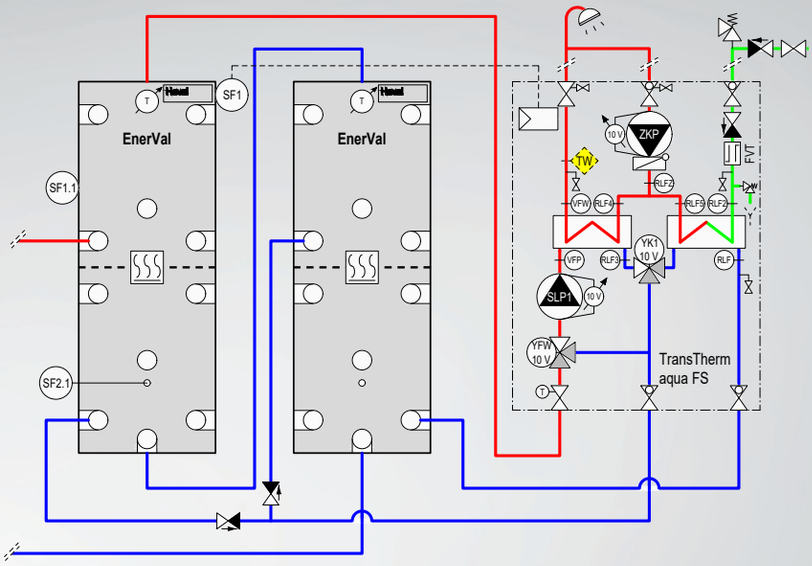
Energy buffer storage tank
EnerVal (100-2000).

Functional principle

The TransTherm® aqua FS is a special extension of the TransTherm® aqua F fresh water module. The special feature of this fresh water module is that the return flow temperature can be further cooled down via a second heat exchanger.
This is controlled by the controller via the second mixer output YK1 with 0-10 volts by means of a preset setpoint temperature at the sensor RLF. To do this, it is necessary not to fully charge the buffer storage tank (1) located before it.

The middle zone of the buffer storage tank is used in this system to be able to regulate the desired flow temperature/draw-off temperature under certain conditions, depending on the valve position.
There is no CAN bus communication between the TransTherm® aqua FS and the buffer storage tanks installed before it. No set value is sent to the buffer storage tanks.
The buffer storage tanks must be constantly heated for constant operation.

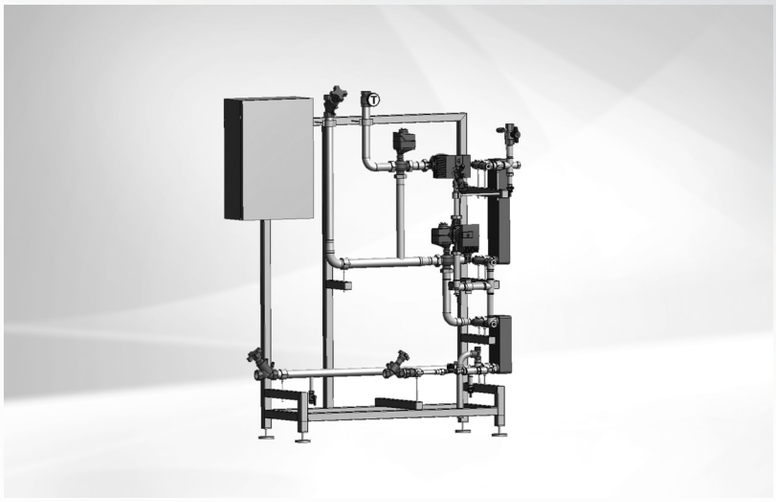
Water heating
TransTherm® aqua FS



TTE-FW	Basic module district heating/fresh water
TW	Temperature monitor (if required)
VFW	Flow sensor DHW
RLF4	Return sensor DHW
RLF5	Return sensor DHW
RLF2	Return sensor cold water
RLFZ	Return sensor circulation
SF1	Calorifier sensor
SF1.1	Calorifier sensor (heat generator)
SF2.1	Calorifier sensor (heat generator)
ZKP	Circulation sensor
FVT	Flow rate sensor
VFP	Flow sensor primary
RLF3	Return sensor HT primary
RLF	Return sensor LT primary
SLP1	Calorifier charging pump
YFW	Three-way valve with drive (mixing valve)
YK1	Three-way valve with drive (distributor valve)
ZKP	Circulating pump

Optional

BM	TopTronic® E control module



Range
Fresh water module

TransTherm® aqua FS type	Output kW
(7-10)	50
(7-16)	90
(7-20)	130
(7-30)	175
(7-40)	220
(7-50)	275
(7-60)	358
(7-70)	453
(7-80)	569
(7-90)	717

General information about the TransTherm aqua FS

The aqua FS is a special extension of the fresh water station aqua F. The special feature of this station is that the return flow temperature can be further cooled down via a second heat exchanger. This is controlled by the controller via the second mixer output YK1 via 0-10 V at VA1 by means of a preset setpoint temperature at the sensor RLF. To do this, it is necessary not to fully charge the buffer storage tank 1 located before it. The middle zone of the entire buffer storage tank is used in this system to be able to regulate the desired flow temperature/draw-off temperature under certain conditions, depending on the valve position. There is no CAN bus communication between the fresh water station and the buffer storage tanks installed before it. As with the fresh water station TransTherm aqua F, no set value is sent to the buffer storage tanks. The buffer storage tanks located before a fresh water station must be constantly heated for constant operation.

"Technical" description of function

The primary heating side has pilot control by the HC1 (PFC33) via a 3-point control valve (YFW by 0-10 V over VA5) and the feed pump (SLP1/DKP).

This heating circuit is active as soon as there is a set value request.
The set value request results from a DHW draw-off, a circulation request or the temperature holding via a time program.

The reference value (DHW reference value + charging reference value increase par. 05-001) is now passed onto the control valve YFW for pilot control.
The pump SLP1/DKP is speed-controlled by a 0-10 V and regulates the set value (DHW set value) at the heat exchanger outlet.

Heating water charging return control via second heat exchanger and specified set value

Each time fresh water is drawn off, the return temperature is controlled by means of a specified set value via parameter 35-000 "Setpoint temperature RLF aqua FS" at the sensor RLF via mixer YK1.

If the flow rate sensor FVT/VE10 detects a flow rate due to fresh water being drawn off, the mixer YK1 reacts immediately and opens the flow through to the lower plate heat exchanger to a greater or lesser extent depending on the draw-off volume.

The reaction of the mixer YK1 can be set via parameter 35-005 "Reinforcement valve opening..." and parameter 35-015 "Start time valve opening...". The start process is started every time fresh water is drawn off. After the draw-off process starts, the valve is opened to the fixed valve opening setting for the respective start time of the valve opening. After the set start time has elapsed, the mixer YK1 on the sensor RLF controls at the set value.

If the mixing valve YK1 to the lower heat exchanger is completely open due to a considerable draw-off flow rate, the flow temperature at a cooler temperature from the centre of the storage tank might be too high, and this is controlled via the valve YFW at the sensor VFP/VE5. Therefore, the buffer storage tank must not be fully charged! Ideally, a TransTherm aqua FS is equipped with two storage tanks.

The mixing valve YK1 for the heating water charging return is controlled via the VA1 0-10 V output. It must therefore be ensured that the jumper on the TTE-FW for output VA1 on the board of the controller is correctly set to position "V" (Volt)!

Circulation mode:

For the TransTherm aqua FS, the circulation must be set to the default.
The circulation temperature is set using the time program special heating programs circulation.
Several circulating pump functions can be configured using parameter 05-006. The factory setting is configuration 3 (active after time program and speed control – with the TransTherm aqua FS there is no communication for set value forwarding. The buffer storage tanks located before the station must be kept warm at all times).

The pilot control circuit HC1 is active in circulation mode. The speed-controlled circulating pump ZKP/SLP1 regulates the required circulation temperature at the circulation sensor RLFZ/VE7.

Buffer storage tank and domestic hot water configuration Dimensioning according to N number.

Residential units standard apartment according to DIN 4708	Peak heat demand standard apartment according to DIN 4708 with preparation 10 min	Sum flow rate domestic hot water calculation flow rate according to DIN 4708	Simultaneity factor according to DIN 4708	Peak flow rate (DHW)	Peak flow rate (DHW)	Peak flow rate (DHW)	Peak output (DHW)	Peak flow rate TransTherm® aqua FS (DHW)	Peak flow rate TransTherm® aqua FS (DHW)	Peak flow rate TransTherm® aqua FS (DHW)	DHW calorifier output TransTherm® aqua FS	TransTherm® aqua FS	Required hot water volume at 70/30 °C (40 K)	Required hot water buffer storage tank volume at 70/30 °C (40 K)	Hot water buffer storage tank 2 EnerVal	Required recharging capacity	Required recharging capacity	Required recharging capacity
N	Preparation	∑ VR at DHW 60 °C	g	$\dot{V}s$ at DHW 60 °C	$\dot{V}s$ at DHW 60 °C	$\dot{V}s$ at DHW 60 °C		$\dot{V}s$ at DHW 60 °C	$\dot{V}s$ at DHW 60 °C	$\dot{V}s$ at DHW 60 °C	Q at HT 70/30 °C DHW 10/60 °C	Type			Type	Time: 20 min 70/30 °C (40 K)	Time: 30 min 70/30 °C (40 K)	Time: 60 min 70/30 °C (40 K)
	[Wh]	[l/s]		[l/s]	[l/min]	[m³/h]	[kW]	[l/s]	[l/min]	[m³/h]	[kW]		[m³]	[m³]		[kW]	[kW]	[kW]
1	5820	0.17	1.00	0.17	10.01	0.60	35	0.24	14.3	0.86	50	(7-10)	0.13	0.16	(200)	23	15	8
2	11640	0.33	0.680	0.23	13.61	0.82	47	0.24	14.3	0.86	50	(7-10)	0.17	0.22	(200)	31	21	10
3	17460	0.50	0.544	0.27	16.33	0.98	57	0.43	25.8	1.55	90	(7-16)	0.20	0.27	(200)	37	25	12
4	23280	0.67	0.466	0.31	18.66	1.12	65	0.43	25.8	1.55	90	(7-16)	0.23	0.30	(200)	42	28	14
5	29100	0.83	0.415	0.35	20.77	1.25	72	0.43	25.8	1.55	90	(7-16)	0.26	0.34	(200)	47	31	16
6	34920	1.00	0.377	0.38	22.64	1.36	79	0.43	25.8	1.55	90	(7-16)	0.28	0.37	(200)	51	34	17
7	40740	1.17	0.349	0.41	24.45	1.47	85	0.43	25.8	1.55	90	(7-16)	0.31	0.40	(300)	55	37	18
8	46560	1.33	0.349	0.47	27.94	1.68	97	0.62	37.3	2.24	130	(7-20)	0.35	0.45	(300)	63	42	21
9	52380	1.50	0.308	0.46	27.74	1.66	97	0.62	37.3	2.24	130	(7-20)	0.35	0.45	(300)	63	42	21
10	58200	1.67	0.292	0.49	29.23	1.75	102	0.62	37.3	2.24	130	(7-20)	0.37	0.47	(300)	66	44	22
11	64020	1.83	0.279	0.51	30.72	1.84	107	0.62	37.3	2.24	130	(7-20)	0.38	0.50	(300)	70	46	23
12	69840	2.00	0.268	0.54	32.19	1.93	112	0.62	37.3	2.24	130	(7-20)	0.40	0.52	(500)	73	49	24
13	75660	2.17	0.258	0.56	33.57	2.01	117	0.62	37.3	2.24	130	(7-20)	0.42	0.55	(500)	76	51	25
14	81480	2.34	0.249	0.58	34.89	2.09	122	0.62	37.3	2.24	130	(7-20)	0.44	0.57	(500)	79	53	26
15	87300	2.50	0.242	0.61	36.33	2.18	127	0.62	37.3	2.24	130	(7-20)	0.45	0.59	(500)	82	55	27
16	93120	2.67	0.235	0.63	37.63	2.26	131	0.62	37.3	2.24	130	(7-20)	0.47	0.61	(500)	85	57	28
17	98940	2.84	0.228	0.65	38.79	2.33	135	0.84	50.2	3.01	175	(7-30)	0.49	0.63	(500)	88	59	29
18	104760	3.00	0.223	0.67	40.17	2.41	140	0.84	50.2	3.01	175	(7-30)	0.50	0.65	(500)	91	61	30
19	110580	3.17	0.217	0.69	41.27	2.48	144	0.84	50.2	3.01	175	(7-30)	0.52	0.67	(500)	94	62	31
20	116400	3.34	0.212	0.71	42.44	2.55	148	0.84	50.2	3.01	175	(7-30)	0.53	0.69	(500)	96	64	32
21	122220	3.50	0.208	0.73	43.72	2.62	153	0.84	50.2	3.01	175	(7-30)	0.55	0.71	(500)	99	66	33
22	128040	3.67	0.204	0.75	44.92	2.70	157	0.84	50.2	3.01	175	(7-30)	0.56	0.73	(500)	102	68	34
23	133860	3.84	0.200	0.77	46.04	2.76	161	0.84	50.2	3.01	175	(7-30)	0.58	0.75	(500)	104	70	35
24	139680	4.00	0.196	0.78	47.08	2.82	164	0.84	50.2	3.01	175	(7-30)	0.59	0.77	(500)	107	71	36
25	145500	4.17	0.193	0.80	48.29	2.90	168	0.84	50.2	3.01	175	(7-30)	0.60	0.78	(500)	110	73	37
26	151320	4.34	0.190	0.82	49.44	2.97	173	0.84	50.2	3.01	175	(7-30)	0.62	0.80	(500)	112	75	37
27	157140	4.50	0.187	0.84	50.53	3.03	176	0.84	50.2	3.01	175	(7-30)	0.63	0.82	(500)	115	76	38
28	162960	4.67	0.184	0.86	51.56	3.09	180	0.84	50.2	3.01	175	(7-30)	0.64	0.84	(500)	117	78	39
29	168780	4.84	0.181	0.88	52.54	3.15	183	1.05	63.1	3.78	220	(7-40)	0.66	0.85	(800)	119	79	40
30	174600	5.00	0.179	0.90	53.75	3.22	188	1.05	63.1	3.78	220	(7-40)	0.67	0.87	(800)	122	81	41
31	180420	5.17	0.176	0.91	54.61	3.28	191	1.05	63.1	3.78	220	(7-40)	0.68	0.89	(800)	124	83	41
32	186240	5.34	0.174	0.93	55.73	3.34	194	1.05	63.1	3.78	220	(7-40)	0.70	0.91	(800)	126	84	42
33	192060	5.50	0.172	0.95	56.81	3.41	198	1.05	63.1	3.78	220	(7-40)	0.71	0.92	(800)	129	86	43
34	197880	5.67	0.170	0.96	57.85	3.47	202	1.05	63.1	3.78	220	(7-40)	0.72	0.94	(800)	131	87	44
35	203700	5.84	0.168	0.98	58.85	3.53	205	1.05	63.1	3.78	220	(7-40)	0.74	0.96	(800)	133	89	44
36	209520	6.01	0.166	1.00	59.81	3.59	209	1.05	63.1	3.78	220	(7-40)	0.75	0.97	(800)	136	90	45
37	215340	6.17	0.164	1.01	60.73	3.64	212	1.05	63.1	3.78	220	(7-40)	0.76	0.99	(800)	138	92	46
38	221160	6.34	0.163	1.03	61.99	3.72	216	1.05	63.1	3.78	220	(7-40)	0.78	1.01	(800)	141	94	47
39	226980	6.51	0.161	1.05	62.84	3.77	219	1.05	63.1	3.78	220	(7-40)	0.79	1.02	(800)	143	95	48
40	232800	6.67	0.159	1.06	63.65	3.82	222	1.05	63.1	3.78	220	(7-40)	0.80	1.03	(800)	144	96	48
41	238620	6.84	0.158	1.08	64.84	3.89	226	1.31	78.8	4.73	275	(7-50)	0.81	1.05	(1000)	147	98	49
42	244440	7.01	0.156	1.09	65.58	3.93	229	1.31	78.8	4.73	275	(7-50)	0.82	1.07	(1000)	149	99	50
43	250260	7.17	0.155	1.11	66.71	4.00	233	1.31	78.8	4.73	275	(7-50)	0.83	1.08	(1000)	151	101	50
44	256080	7.34	0.154	1.13	67.82	4.07	237	1.31	78.8	4.73	275	(7-50)	0.85	1.10	(1000)	154	103	51
45	261900	7.51	0.152	1.14	68.46	4.11	239	1.31	78.8	4.73	275	(7-50)	0.86	1.11	(1000)	155	104	52
46	267720	7.67	0.151	1.16	69.52	4.17	243	1.31	78.8	4.73	275	(7-50)	0.87	1.13	(1000)	158	105	53
47	273540	7.84	0.150	1.18	70.56	4.23	246	1.31	78.8	4.73	275	(7-50)	0.88	1.15	(1000)	160	107	53
48	279360	8.01	0.149	1.19	71.58	4.29	250	1.31	78.8	4.73	275	(7-50)	0.89	1.16	(1000)	162	108	54
49	285180	8.17	0.148	1.21	72.58	4.35	253	1.31	78.8	4.73	275	(7-50)	0.91	1.18	(1000)	165	110	55
50	291000	8.34	0.146	1.22	73.06	4.38	255	1.31	78.8	4.73	275	(7-50)	0.91	1.19	(1000)	166	110	55
51	296820	8.51	0.145	1.23	74.01	4.44	258	1.31	78.8	4.73	275	(7-50)	0.93	1.20	(1000)	168	112	56
52	302640	8.67	0.144	1.25	74.94	4.50	261	1.31	78.8	4.73	275	(7-50)	0.94	1.22	(1000)	170	113	57
53	308460	8.84	0.143	1.26	75.86	4.55	265	1.31	78.8	4.73	275	(7-50)	0.95	1.23	(1000)	172	115	57
54	314280	9.01	0.142	1.28	76.75	4.60	268	1.31	78.8	4.73	275	(7-50)	0.96	1.25	(1000)	174	116	58
55	320100	9.17	0.141	1.29	77.62	4.66	271	1.31	78.8	4.73	275	(7-50)	0.97	1.26	(1000)	176	117	59

Residential units standard apartment according to DIN 4708	Peak heat demand standard apartment according to DIN 4708 with preparation 10 min	Sum flow rate domestic hot water calculation flow rate according to DIN 4708	Simultaneity factor according to DIN 4708	Peak flow rate (DHW)	Peak flow rate (DHW)	Peak flow rate (DHW)	Peak output (DHW)	Peak flow rate TransTherm® aqua FS (DHW)	Peak flow rate TransTherm® aqua FS (DHW)	Peak flow rate TransTherm® aqua FS (DHW)	DHW calorifier output TransTherm® aqua FS	TransTherm® aqua FS	Required hot water volume at 70/30 °C (40 K)	Required hot water buffer storage tank volume at 70/30 °C (40 K)	Hot water buffer storage tank 2 EnerVal	Required recharging capacity	Required recharging capacity	Required recharging capacity
N	Preparation	∑ VR at DHW 60 °C	g	$\dot{V}s$ at DHW 60 °C	$\dot{V}s$ at DHW 60 °C	$\dot{V}s$ at DHW 60 °C		$\dot{V}s$ at DHW 60 °C	$\dot{V}s$ at DHW 60 °C	$\dot{V}s$ at DHW 60 °C	Q at HT 70/30 °C DHW 10/60 °C	Type			Type	Time: 20 min 70/30 °C (40 K)	Time: 30 min 70/30 °C (40 K)	Time: 60 min 70/30 °C (40 K)
	[Wh]	[l/s]		[l/s]	[l/min]	[m³/h]	[kW]	[l/s]	[l/min]	[m³/h]	[kW]		[m³]	[m³]		[kW]	[kW]	[kW]
56	325920	9.34	0.140	1.31	78.47	4.71	274	1.31	78.8	4.73	275	(7-50)	0.98	1.28	(1000)	178	119	59
57	331740	9.51	0.140	1.33	79.87	4.79	279	1.31	78.8	4.73	275	(7-50)	1.00	1.30	(1000)	181	121	60
58	337560	9.67	0.139	1.34	80.69	4.84	282	1.71	102.6	6.16	358	(7-60)	1.01	1.31	(1000)	183	122	61
59	343380	9.84	0.138	1.36	81.49	4.89	284	1.71	102.6	6.16	358	(7-60)	1.02	1.32	(1000)	185	123	62
60	349200	10.01	0.137	1.37	82.27	4.94	287	1.71	102.6	6.16	358	(7-60)	1.03	1.34	(1000)	187	124	62
61	355020	10.18	0.136	1.38	83.03	4.98	290	1.71	102.6	6.16	358	(7-60)	1.04	1.35	(1000)	188	126	63
62	360840	10.34	0.135	1.40	83.77	5.03	292	1.71	102.6	6.16	358	(7-60)	1.05	1.36	(1000)	190	127	63
63	366660	10.51	0.135	1.42	85.12	5.11	297	1.71	102.6	6.16	358	(7-60)	1.06	1.38	(1000)	193	129	64
64	372480	10.68	0.134	1.43	85.83	5.15	299	1.71	102.6	6.16	358	(7-60)	1.07	1.40	(1000)	195	130	65
65	378300	10.84	0.133	1.44	86.52	5.19	302	1.71	102.6	6.16	358	(7-60)	1.08	1.41	(1000)	196	131	65
66	384120	11.01	0.132	1.45	87.19	5.23	304	1.71	102.6	6.16	358	(7-60)	1.09	1.42	(1000)	198	132	66
67	389940	11.18	0.132	1.48	88.52	5.31	309	1.71	102.6	6.16	358	(7-60)	1.11	1.44	(1000)	201	134	67
68	395760	11.34	0.131	1.49	89.16	5.35	311	1.71	102.6	6.16	358	(7-60)	1.11	1.45	(1000)	202	135	67
69	401580	11.51	0.130	1.50	89.78	5.39	313	1.71	102.6	6.16	358	(7-60)	1.12	1.46	(1000)	204	136	68
70	407400	11.68	0.130	1.52	91.08	5.46	318	1.71	102.6	6.16	358	(7-60)	1.14	1.48	(1000)	207	138	69
71	413220	11.84	0.129	1.53	91.67	5.50	320	1.71	102.6	6.16	358	(7-60)	1.15	1.49	(1000)	208	139	69
72	419040	12.01	0.128	1.54	92.24	5.53	322	1.71	102.6	6.16	358	(7-60)	1.15	1.50	(1500)	209	139	70
73	424860	12.18	0.128	1.56	93.52	5.61	326	1.71	102.6	6.16	358	(7-60)	1.17	1.52	(1500)	212	141	71
74	430680	12.34	0.127	1.57	94.06	5.64	328	1.71	102.6	6.16	358	(7-60)	1.18	1.53	(1500)	213	142	71
75	436500	12.51	0.127	1.59	95.33	5.72	333	1.71	102.6	6.16	358	(7-60)	1.19	1.55	(1500)	216	144	72
76	442320	12.68	0.126	1.60	95.84	5.75	334	1.71	102.6	6.16	358	(7-60)	1.20	1.56	(1500)	217	145	72
77	448140	12.84	0.126	1.62	97.10	5.83	339	1.71	102.6	6.16	358	(7-60)	1.21	1.58	(1500)	220	147	73
78	453960	13.01	0.125	1.63	97.58	5.86	340	1.71	102.6	6.16	358	(7-60)	1.22	1.59	(1500)	221	148	74
79	459780	13.18	0.124	1.63	98.04	5.88	342	1.71	102.6	6.16	358	(7-60)	1.23	1.59	(1500)	222	148	74
80	465600	13.34	0.124	1.65	99.29	5.96	346	1.71	102.6	6.16	358	(7-60)	1.24	1.61	(1500)	225	150	75
81	471420	13.51	0.123	1.66	99.72	5.98	348	1.71	102.6	6.16	358	(7-60)	1.25	1.62	(1500)	226	151	75
82	477240	13.68	0.123	1.68	100.95	6.06	352	1.71	102.6	6.16	358	(7-60)	1.26	1.64	(1500)	229	153	76
83	483060	13.85	0.122	1.69	101.35	6.08	354	1.71	102.6	6.16	358	(7-60)	1.27	1.65	(1500)	230	153	77
84	488880	14.01	0.122	1.71	102.57	6.15	358	1.71	102.6	6.16	358	(7-60)	1.28	1.67	(1500)	233	155	78
85	494700	14.18	0.121	1.72	102.94	6.18	359	1.71	102.6	6.16	358	(7-60)	1.29	1.67	(1500)	233	156	78
86	500520	14.35	0.121	1.74	104.15	6.25	363	2.16	129.9	7.79	453	(7-70)	1.30	1.69	(1500)	236	157	79
87	506340	14.51	0.120	1.74	104.49	6.27	365	2.16	129.9	7.79	453	(7-70)	1.31	1.70	(1500)	237	158	79
88	512160	14.68	0.120	1.76	105.69	6.34	369	2.16	129.9	7.79	453	(7-70)	1.32	1.72	(1500)	240	160	80
89	517980	14.85	0.120	1.78	106.89	6.41	373	2.16	129.9	7.79	453	(7-70)	1.34	1.74	(1500)	242	162	81
90	523800	15.01	0.119	1.79	107.19	6.43	374	2.16	129.9	7.79	453	(7-70)	1.34	1.74	(1500)	243	162	81
91	529620	15.18	0.119	1.81	108.38	6.50	378	2.16	129.9	7.79	453	(7-70)	1.36	1.76	(1500)	246	164	82
92	535440	15.35	0.118	1.81	108.65	6.52	379	2.16	129.9	7.79	453	(7-70)	1.36	1.77	(1500)	246	164	82
93	541260	15.51	0.118	1.83	109.83	6.59	383	2.16	129.9	7.79	453	(7-70)	1.37	1.79	(1500)	249	166	83
94	547080	15.68	0.117	1.83	110.07	6.60	384	2.16	129.9	7.79	453	(7-70)	1.38	1.79	(1500)	250	166	83
95	552900	15.85	0.117	1.85	111.25	6.67	388	2.16	129.9	7.79	453	(7-70)	1.39	1.81	(2000)	252	168	84
96	558720	16.01	0.117	1.87	112.42	6.74	392	2.16	129.9	7.79	453	(7-70)	1.41	1.83	(2000)	255	170	85
97	564540	16.18	0.116	1.88	112.62	6.76	393	2.16	129.9	7.79	453	(7-70)	1.41	1.83	(2000)	255	170	85
98	570360	16.35	0.116	1.90	113.78	6.83	397	2.16	129.9	7.79	453	(7-70)	1.42	1.85	(2000)	258	172	86
99	576180	16.51	0.116	1.92	114.94	6.90	401	2.16	129.9	7.79	453	(7-70)	1.44	1.87	(2000)	261	174	87
100	582000	16.68	0.115	1.92	115.10	6.91	402	2.16	129.9	7.79	453	(7-70)	1.44	1.87	(2000)	261	174	87

Notes

Hoval quality.
You can count on us.

Hoval

As a specialist in heating and climate technology, Hoval is your experienced partner for system solutions. For example, you can heat water with the sun's energy and your rooms with oil, gas, wood or a heat pump. Hoval ties together the various technologies and also integrates room ventilation into the system. So you can save energy while looking after the environment and your costs – and still enjoy the same level of comfort.

Hoval is one of the leading international companies for indoor climate solutions. More than 75 years of experience continuously motivate us to design innovative system solutions. We manufacture complete systems for heating, cooling and ventilation to more than 50 countries.

We take our responsibility for the environment seriously. Energy efficiency is at the heart of the heating and ventilation systems we design and develop.

Responsibility for energy and environment

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Your Hoval partner