

EN **Technical documentation**
(Industrial) Water heater and swimming pool heater



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Technical data

	Measure unit	TR-XL 150	TR-XL 200	TR-XL 250
Nominal heat output at 80/60°C max/min	kW	142,3/31,3	190,4/42,0	237,6/47,0
Nominal heat output at 40/30°C max/min	kW	151,2/35,4	202,3/47,4	252,3/53,4
Nominal heat input Hi max/min	kW	145,0/32,2	194,0/43,1	242,0/48,4
Efficiency at 80/60°C	%	98,2	98,2	98,2
Efficiency at 40/30°C	%	104,3	104,3	104,2
RAL 40 / 30°C average	%	110,4	110,4	110,4
Max. condensate flow	l/h	9,2	12,4	15,4
Gas consumption G20 max/min (10,9 kWh/m ³)	m ³ /h	13,3/3,0	17,8/4,0	22,2/4,4
Gas consumption G25 max/min (8,34 kWh/m ³)	m ³ /h	17,4/3,9	23,3/5,2	29,0/5,8
Gas consumption G31 max/min (12,8 kWh/kg)	kg/h	11,3/2,5	15,2/3,4	18,9/3,8
Gas pressure G20	mbar	20		
Gas pressure G25	mbar	25		
Gas pressure G31	mbar	30/50		
Maximum gas pressure	mbar	50		
Max. temperature flue gas (High limit)	°C	90		
Flue gas temperature at 80/60°C max/min	°C	75/58	75/58	75/58
Flue gas temperature at 40/30°C max/min	°C	54/30	54/30	55/30
Flue gas quantity max/min	m ³ /h	188/43	251/57	313/64
CO ₂ level G20/G25 max/min	%	10,2/9,4 ±0,2 (Restriction type 570 delta max/min ≥0,8%)		
CO ₂ level G31 max/min	%	11,9/10,0 ±0,2		
NO _x 80/60°C max/min	mg/kWh	38/19	38/19	36/18
CO 80/60°C max/min	mg/kWh	14/3	14/3	14/5
Max. permissible flue resistance max/min	Pa	200/10	200/10	200/10
Water volume	l	26	31	33
Water pressure max/min	bar	8/1		
Max. water temperature (High limit thermostat)	°C	100		
Maximum temperature setpoint	°C	90		
Nominal water flow at dT=20K	m ³ /h	6,1	8,1	10,1
Hydraulic resistance at nominal water flow rate	kPa	11,2	26,8	31,2
Electrical connection	V	230/400		
Frequency	Hz	50		
Mains connection fuse	A	16		
IP class		IP20		
Electrical consumption boiler max./min. (without pump)	W	176/56	267/56	286/69
Electrical consumption pump	W	190/9	190/9	310/12
Weight (empty)	Kg	290	332	366
Sound Power Level (LWA)	dB	70,3	70,3	70,3
Ionisation current max./min.	µA	10,6/4,4		
pH value condensate	-	3,2		
CE certification code	-	CE - 0063CQ3970		
Water connections	-	R2"	R2"	R2"
Gas connection	-	R1.1/2"	R1.1/2"	R1.1/2"
Flue gas connection (DN)	mm	150	150	200
Air intake connection (DN)	mm	130		
Condensate connection	mm	32		

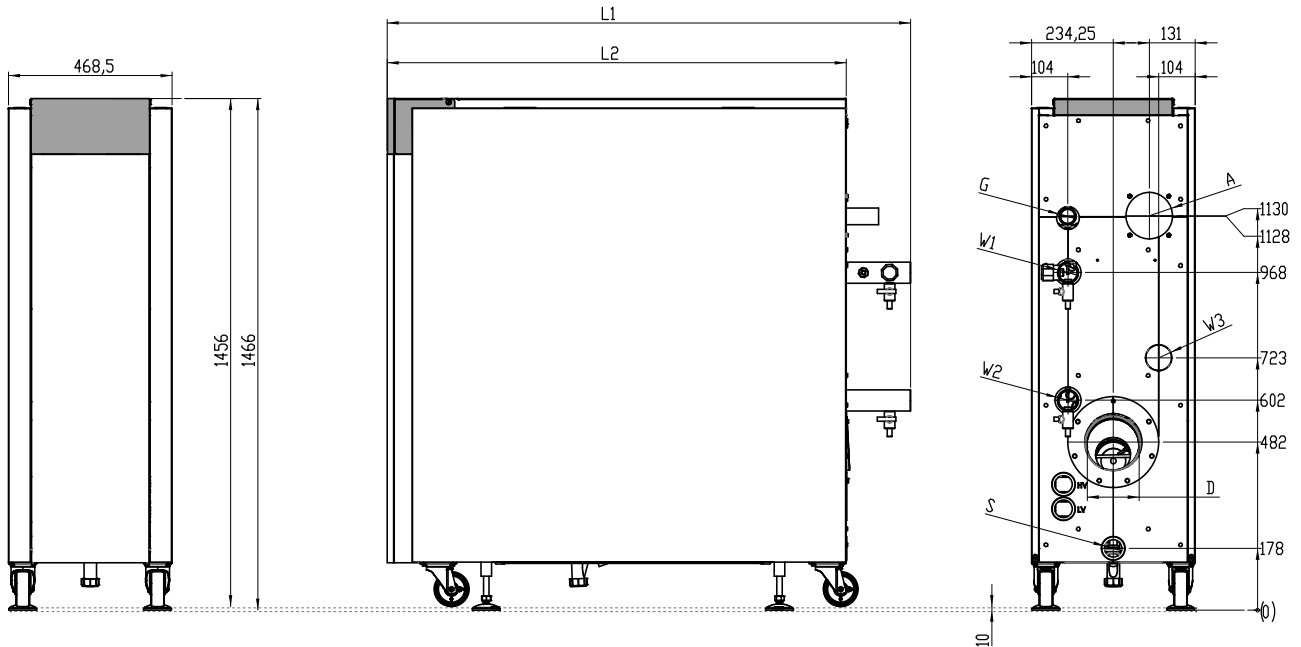
Technical data

	Measure unit	TR-XL 300	TR-XL 400	TR-XL 500	TR-XL 570
Nominal heat output at 80/60°C max/min	kW	285,7/56,5	381,3/75,2	476,7/94,6	540,2/120,0
Nominal heat output at 40/30°C max/min	kW	303,3/64,2	404,3/85,6	505,2/106,9	572,8/135,1
Nominal heat input Hi max/min	kW	291,0/58,2	388,0/77,6	485,0/97,0	550,0/122,2
Efficiency at 80/60°C	%	98,2	98,3	98,3	98,2
Efficiency at 40/30°C	%	104,2	104,2	104,2	104,2
RAL 40 / 30°C average	%	110,4	110,4	110,4	110,3
Max. condensate flow	l/h	18,5	24,7	30,7	34,8
Gas consumption G20 max/min (10,9 kWh/m ³)	m ³ /h	26,7/5,3	35,6/7,1	44,5/8,9	50,5/11,2
Gas consumption G25 max/min (8,34 kWh/m ³)	m ³ /h	34,9/7,0	46,5/9,3	58,2/11,6	65,9/14,7
Gas consumption G31 max/min (12,8 kWh/kg)	kg/h	22,7/4,5	30,3/6,1	37,9/7,6	43,0/9,5
Gas pressure G20	mbar	20			
Gas pressure G25	mbar	25			
Gas pressure G31	mbar	30/50			
Maximum gas pressure	mbar	50			
Max. temperature flue gas (High limit)	°C	90			
Flue gas temperature at 80/60°C max/min	°C	75/58	75/59	75/59	76/58
Flue gas temperature at 40/30°C max/min	°C	55/30	56/30	56/30	56/30
Flue gas quantity max/min	m ³ /h	377/77	502/102	628/128	712/161
CO ₂ level G20/G25 max/min	%	10,2/9,4 ±0,2 (Restriction type 570 delta max/min ≥0,8%)			
CO ₂ level G31 max/min	%	11,9/10,0 ±0,2			
NO _x 80/60°C max/min	mg/kWh	36/18	34/17	37/18	40/19
CO 80/60°C max/min	mg/kWh	14/5	14/8	16/5	18/1
Max. permissible flue resistance max/min	Pa	160/10	400/10	300/10	484/10
Water volume	l	60	63	71	77
Water pressure max/min	bar	8/1			
Max. water temperature (High limit thermostat)	°C	100			
Maximum temperature setpoint	°C	90			
Nominal water flow at dT=20K	m ³ /h	12,2	16,3	20,3	23,1
Hydraulic resistance at nominal water flow rate	kPa	11,9	32,3	34,3	57,1
Electrical connection	V	230/400			
Frequency	Hz	50			
Mains connection fuse	A	16			
IP class		IP20			
Electrical consumption boiler max./min. (without pump)	W	230/69	486/69	620/64	676/61
Electrical consumption pump	W	310/12	470/25	590/25	800/38
Weight (empty)	Kg	434	496	540	595
Sound Power Level (LWA)	dB	70,3	77,3	77,3	77,3
Ionisation current max./min.	µA	10,6/4,4			
pH value condensate	-	3,2			
CE certification code	-	CE - 0063CQ3970			
Water connections	-	DN65 PN16	DN65 PN16	DN65 PN16	DN65 PN16
Gas connection	-	R1.1/2"	R1.1/2"	R2"	R2"
Flue gas connection (DN)	mm	200	250	250	250
Air intake connection (DN)	mm	130	130	150	150
Condensate connection	mm	32	32	32	32

Dimensions

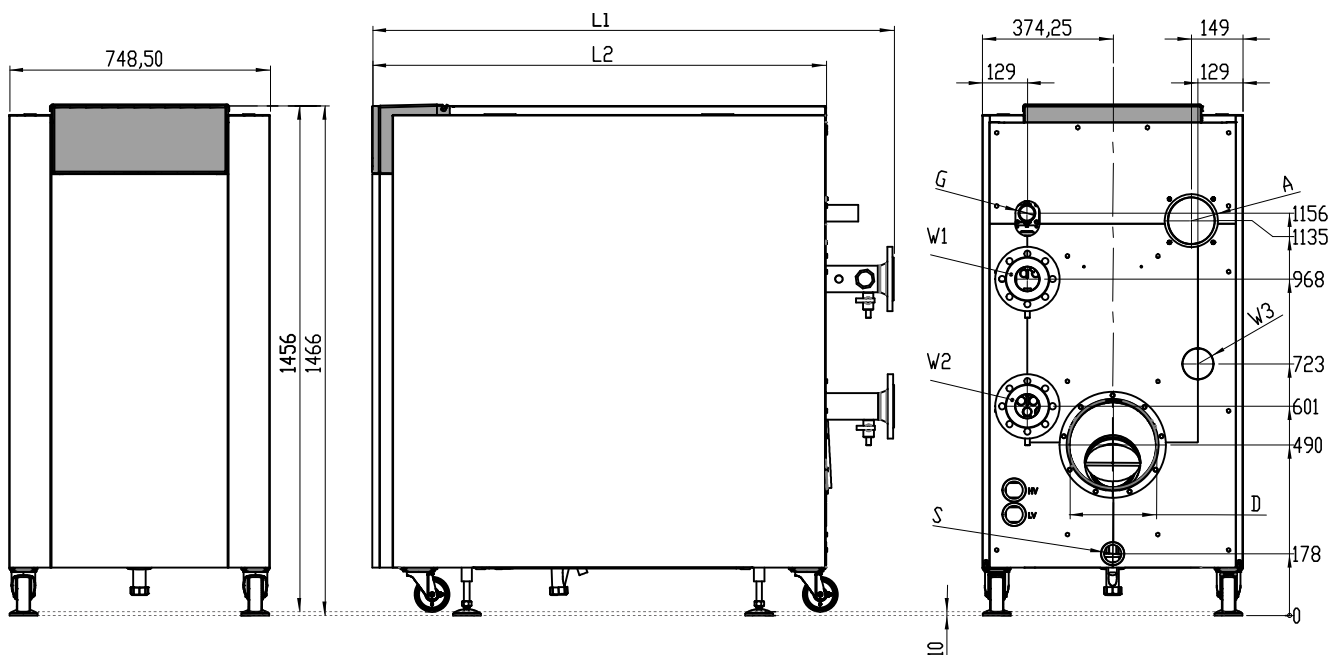
(IP / IND)

TRIGON XL 150-200-250



Model	TR-XL 150	TR-XL 200	TR-XL 250	TR-XL 300	TR-XL 400	TR-XL 500	TR-XL 570
L1 [mm]	1349	1499	1649	1348	1496	1646	1769
L2 [mm]	1165	1315	1465	1152	1302	1452	1602
A [mm]	ø130					ø150	
G	1 ½"					2"	
D [mm]	150	150	200	200	250		
S [mm]	32						
W1, W2, W3	R 2"			DN65 PN16			

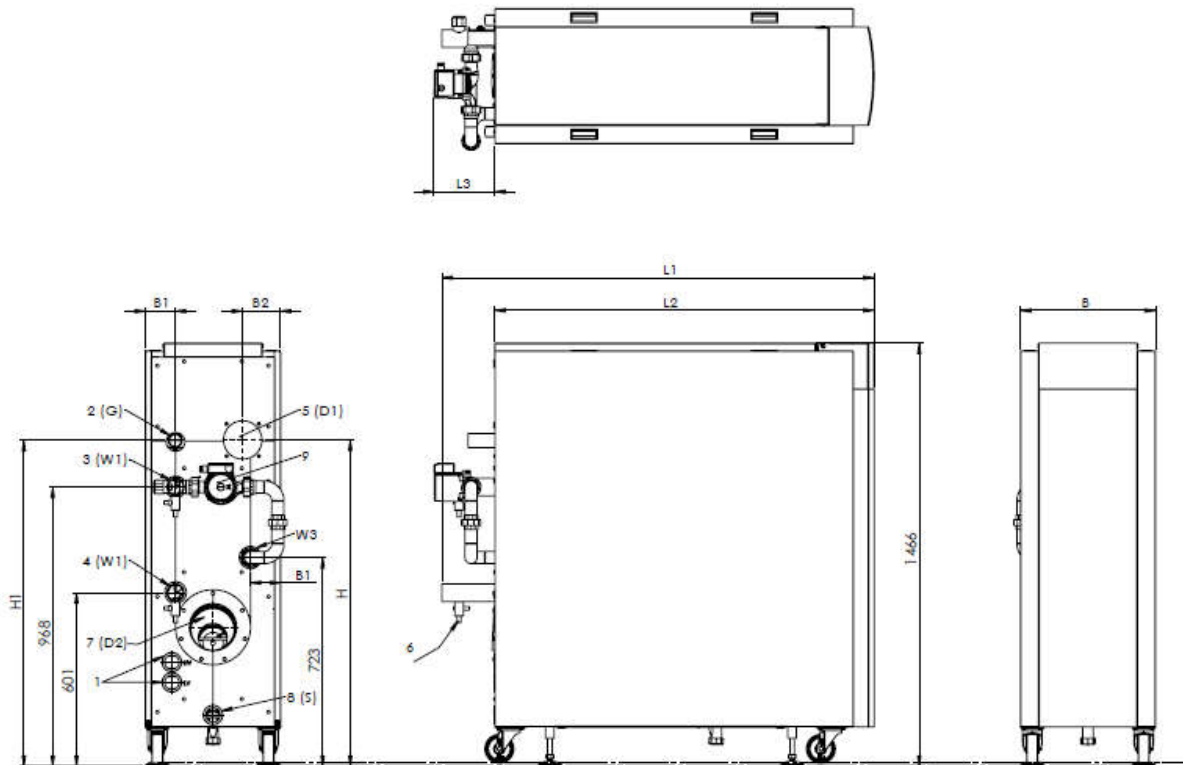
TRIGON XL 300-400-500-570



Dimensions

(IP bypass / IND bypass)

TRIGON XL150-200-250



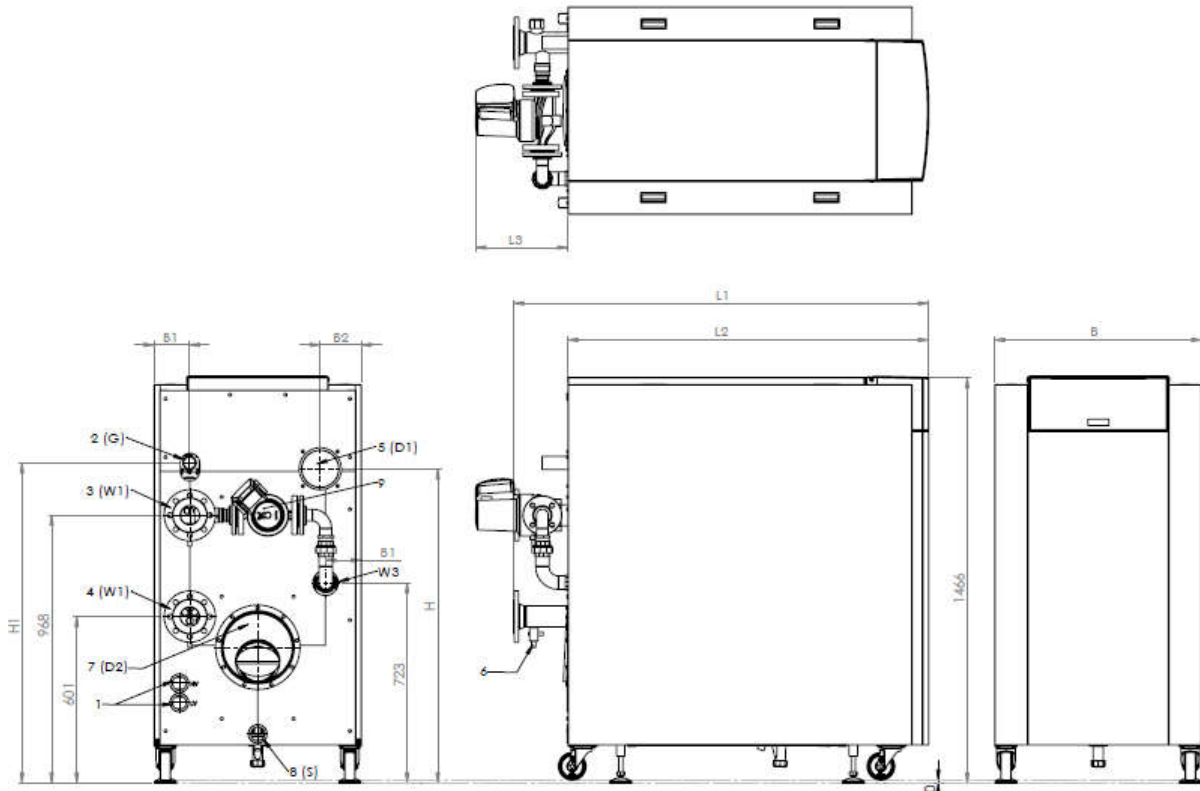
Model	TR-XL 150	TR-XL 200	TR-XL 250
L1 [mm]	1349	1499	1649
L2 [mm]	1165	1315	1465
L3 [mm]	210		
H [mm]	1130		
H1 [mm]	1128		
B [mm]	468,5		
B1 [mm]	104		
B2 [mm]	131		
D1 [mm]	ø130		
D2 [mm]	150	200	
G [R"]	1 ½"		
S [mm]	32		
W1, W2, W3 [R"/DN]	R 2"		

- 1 Electrical connections
- 2 Gas supply
- 3 Water supply
- 4 Water return
- 5 Air intake
- 6 Boiler water drain valve 1/2"
- 7 Flue gas outlet
- 8 Condensate drain
- 9 Bypass pump

Dimensions

(IP bypass / IND bypass)

TRIGON XL300-400-500-570



Model	TR-XL 300	TR-XL 400	TR-XL 500	TR-XL 570
L1 [mm]	1348	1496	1646	1769
L2 [mm]	1152	1302	1452	1602
L3 [mm]	221	334	336	369
H [mm]	1135			
H1 [mm]	1156			
B [mm]	748,5			
B1 [mm]	129			
B2 [mm]	149			
D1 [mm]	130		150	
D2 [mm]	200	250		
G [R"]	1 ½ "	2 "		
S [mm]	32			
W1, W2, W3 [R"/DN]	DN65 PN16			

- 1 Electrical connections
- 2 Gas supply
- 3 Water supply
- 4 Water return
- 5 Air intake
- 6 Boiler water drain valve 1/2"
- 7 Flue gas outlet
- 8 Condensate drain
- 9 Bypass pump

General

General

This document is meant to be used in addition to the TRIGON XL central heating boiler documentation, in case of having an (industrial) water heater or swimming pool heater. This document only contains the differences in construction and application to the central heating boiler version. General information on the boiler (transport, commissioning, maintenance, etc.) can be found in the central heating boiler documentation.

Technical description

The (industrial) water heater and swimming pool heater are applicable for direct heating of sanitary hot water or swimming pool water without using hydraulic separation (f.e. plate heat exchanger) in the system. All metallic materials in contact with water are made of stainless steel 1.4404. For the water heater, all components in contact with water are WRAS compliant.



Water quality

(Industrial) Water heater

As there is always fresh water flowing through the water heater, there are restrictions to the maximum flow temperature related to the hardness of the water.

The following table indicates the maximum flow temperatures for different water hardness values.

Not respecting these values can lead to damage of the heat exchanger.

For standard sanitary hot water systems the following applies:

Water hardness			Max temp setpoint
[°dH]	[°f]	[ppm CaCO ₃]	[°C]
2,8 - 8,4	5-15	50 - 150	75
8,4 - 11,2	15 - 20	150 - 200	65
> 11,2	> 20	> 200	water treatment

pH-value should be between 7,0 – 9,5. Chloride level should not exceed 50mg/l.

For industrial hot water systems (higher flow temperatures) the following applies:

Water hardness			Max temp setpoint
[°dH]	[°f]	[ppm CaCO ₃]	[°C]
0 - 0,56	0 - 1	0 - 10	90
0,56 - 2,8	1-5	10-50	80
> 2,8	> 5	> 50	water treatment

pH-value should be between 7,0 – 9,5. Chloride level should not exceed 50mg/l.

Swimming pool heater

In order to protect the boiler against scaling problems due to the high water volume of the swimming pool, the high limit thermostat limits the boiler at 52°C. The maximum setpoint is limited at 45°C.

Water hardness			Max temp setpoint
[°dH]	[°f]	[ppm CaCO ₃]	[°C]
< 11,2	< 20	< 200	45
> 11,2	> 20	> 200	water treatment

7,0 – 8,0. Chloride level should not exceed 50mg/l.

To avoid high concentrations of chemicals in the boiler, water treatment should be done after and not before the swimming pool boiler!

Water quality

Hot water production (water heater only)

The following table shows the tapping volumes which can be achieved with a water heater, based on a cold water inlet temperature of 10°C.

Boiler type	Output at 80-60°C	flow 50°C	flow 60°C	flow 65°C	flow 70°C	flow 80°C	flow 90°C
	[kW]	[l/min]	[l/min]	[l/min]	[l/min]	[l/min]	[l/min]
TR-XL 150	142	51,1	40,8	37,1	34	29,2	25,5
TR-XL 200	190	68,3	54,7	49,7	45,5	39	34,2
TR-XL 250	238	85,6	68,5	62,2	57,1	48,9	42,8
TR-XL 300	286	102,8	82,3	74,8	68,6	58,8	51,4
TR-XL 400	381	137	109,6	99,6	91,3	78,3	68,5
TR-XL 500	477	171,5	137,2	124,7	114,3	98	85,8
TR-XL 570	540	194,2	155,3	141,2	129,4	111	97,1

Hydraulic connection

(Industrial) Water heater

The TR-XL (industrial) water heater must be installed in such a way, that a minimum water flowrate of 30% of the nominal flow rate can be assured at all times when the burner is switched on.

The water heater can increase the water temperature by maximum 17K in a single cycle.

This means that the water has to cycle through the heater several times when f.e. cold water of 10°C has to be heated up to 60°C (3 times).

This is normally done by installing the water heater in combination with a buffer tank. The flow rate from the tank to the water heater and back can then be secured by the (primary) water heater pump.

The table below shows the nominal water flow data at a ΔT of 17K, plus the pump data of the (optional) pump kit for each type of water heater.

Boiler type	dT	Nominal flow	Boiler resistance	Pump type	Pump curve	Pump head	Available head
	[K]	[m ³ /h]	[kPa]	[-]	[-]	[kPa]	[kPa]
TR-XL 150	17	7,2	15	UPS 32-80B	3	37	22
TR-XL 200		9,5	37	UPS 32-120FB	3	62	25
TR-XL 250		12	43	UPS 40-120FB	3	66	23
TR-XL 300		14,4	16	UPS 40-120FB	3	34	18
TR-XL 400		19,2	44	UPS 50-120FB	3	66	22
TR-XL 500		24	47	UPS 65-120FB	3	61	14
TR-XL 570		27,2	79	UPS 65-180FB	3	106	27

Hydraulic connection

Bypass water heater

When a higher temperature increase than 17K should be achieved directly within one step, this can be done by using a water heater with internal bypass.

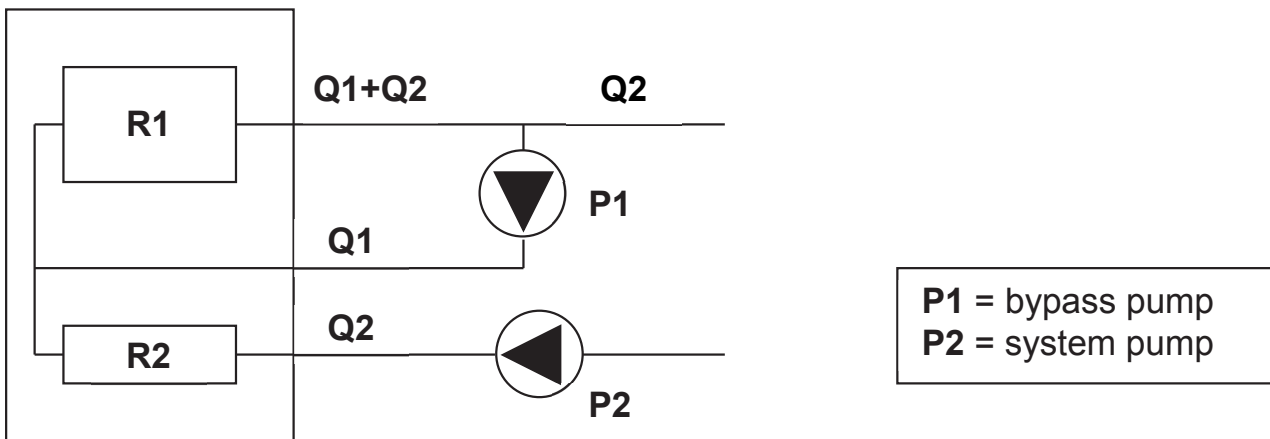
The internal bypass pump will provide the additional ΔT on top of the 17K.

When using a water heater with bypass, the internal bypass pump will not transport the hot water from the water heater to the system.

Therefore a system pump should be selected, based on the desired ΔT .

Below you will find a schematic drawing of the situation, plus two tables with all the necessary information for the selection of the system pump.

Please be aware that for the calculation method an additional resistance of 10 kPa for the system piping is included.



		Bypass pump data							
		TRX-L 150	TRX-L 200	TRX-L 250	TRX-L 300	TRX-L 400	TRX-L 500	TRX-L 570	
Pump type	[-]	UPS 32-80B	UPS 32-80B	UPS 32-80B	UPS 32-80B	UPS 32-120FB	UPS 40-120FB	UPS 50-120FB	
Voltage	[V]	230	230	230	230	230	230	400	
$\Delta T = 40K$	Curve setting	[-]	2	2	3	3	1	1	1
$\Delta T = 50K$			2	3	3	3	2	2	2
$\Delta T = 55K$			2	3	3	3	2	2	2
$\Delta T = 60K$			2	3	3	3	3	2	2
$\Delta T = 70K$			2	3	3	3	3	3	2
$\Delta T = 80K$			2	3	3	3	3	3	2

Hydraulic connection

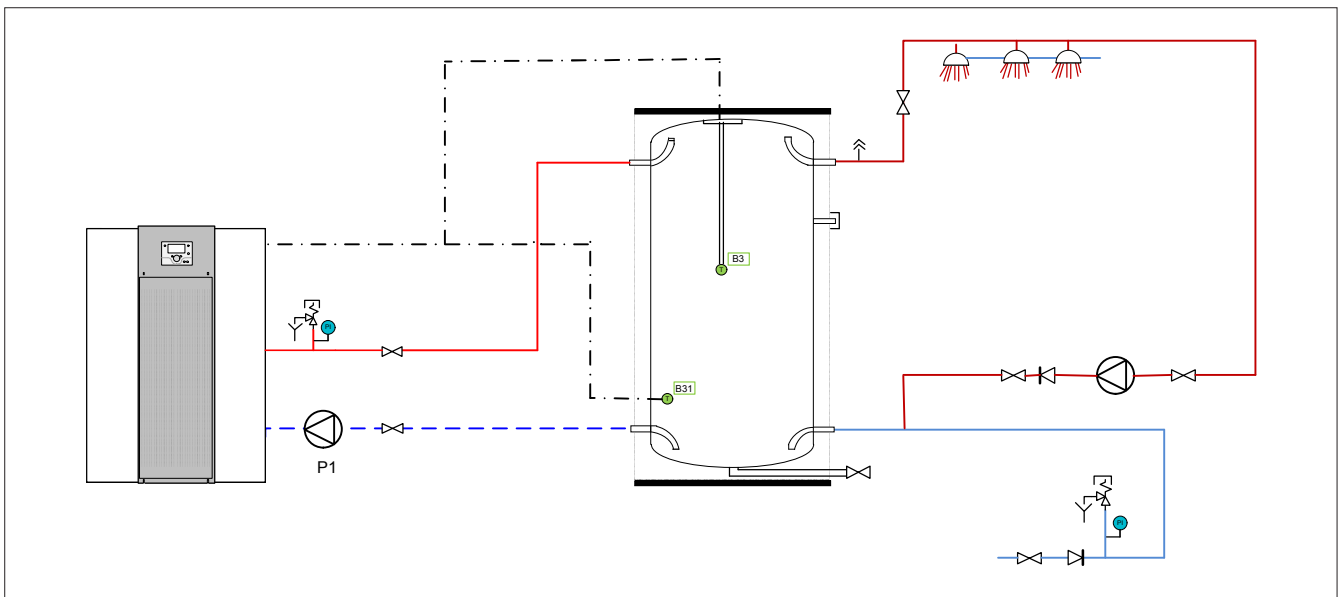
System pump design data									
			TRX-L 150	TRX-L 200	TRX-L 250	TRX-L 300	TRX-L 400	TRX-L 500	TRX-L 570
$\Delta T = 40K$	Flow rate	[m ³ /h]	3.1	4.1	5.1	6.1	8.2	10.2	11.6
	Req. pump head	[kPa]	35.5	28.9	57.3	50.7	42.3	49.0	60.6
$\Delta T = 50K$	Flow rate	[m ³ /h]	2.4	3.2	4.1	4.9	6.5	8.2	9.2
	Req. pump head	[kPa]	30.3	58.5	50.8	44.4	40.8	56.3	64.6
$\Delta T = 55K$	Flow rate	[m ³ /h]	2.2	2.9	3.7	4.4	5.9	7.4	8.4
	Req. pump head	[kPa]	27.3	56.4	48.7	41.4	34.7	53.0	61.4
$\Delta T = 60K$	Flow rate	[m ³ /h]	2.0	2.7	3.4	4.1	5.4	6.8	7.7
	Req. pump head	[kPa]	26.2	55.4	46.6	39.3	58.6	47.9	69.1
$\Delta T = 70K$	Flow rate	[m ³ /h]	1.7	2.3	2.9	3.5	4.7	5.8	6.6
	Req. pump head	[kPa]	24.2	52.3	44.4	35.2	51.4	61.6	66.8
$\Delta T = 80K$	Flow rate	[m ³ /h]	1.5	2.0	2.6	3.1	4.1	5.1	5.8
	Req. pump head	[kPa]	22.1	50.2	40.3	30.2	45.3	53.5	65.6

System examples

The following examples are only meant to give an indication of the possibilities available with the TR-XL (industrial) water heater. These examples cannot be used in a project without any further analysis of the project situation by an authorized company.

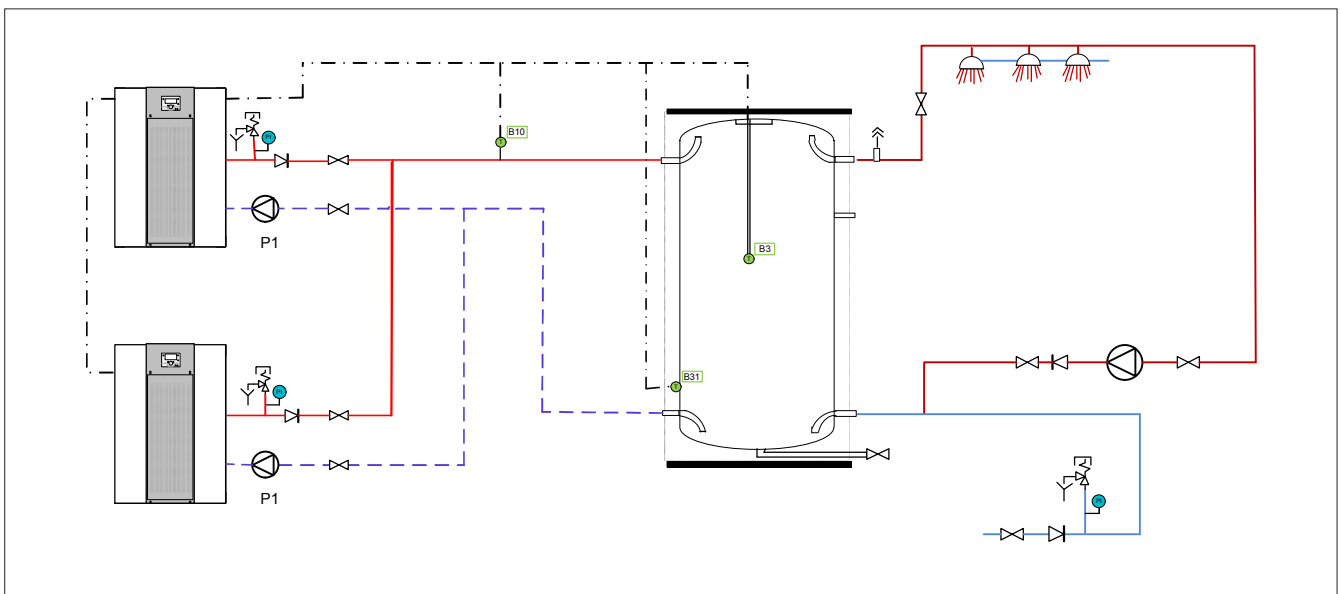
System 1: water heater with buffer tank

Water heater connected to a buffer tank, with the cold water feed and recirculation line combined before returning to the buffer tank. This is the most common way to connect a water heater. Having the cold water feed combined with the recirculation line results in less start/stop sequences of the water heater and creates a stable temperature control in a normal hot water installation.



System 2: water heater cascade

When having a constant high demand of hot water, it is useful to install a high capacity water heater (or even a cascade of multiple water heaters) in combination with a small buffer tank. The Buffer tank is only covering the starting delay of the boilers, after that the boilers completely cover the hot water demand constantly.

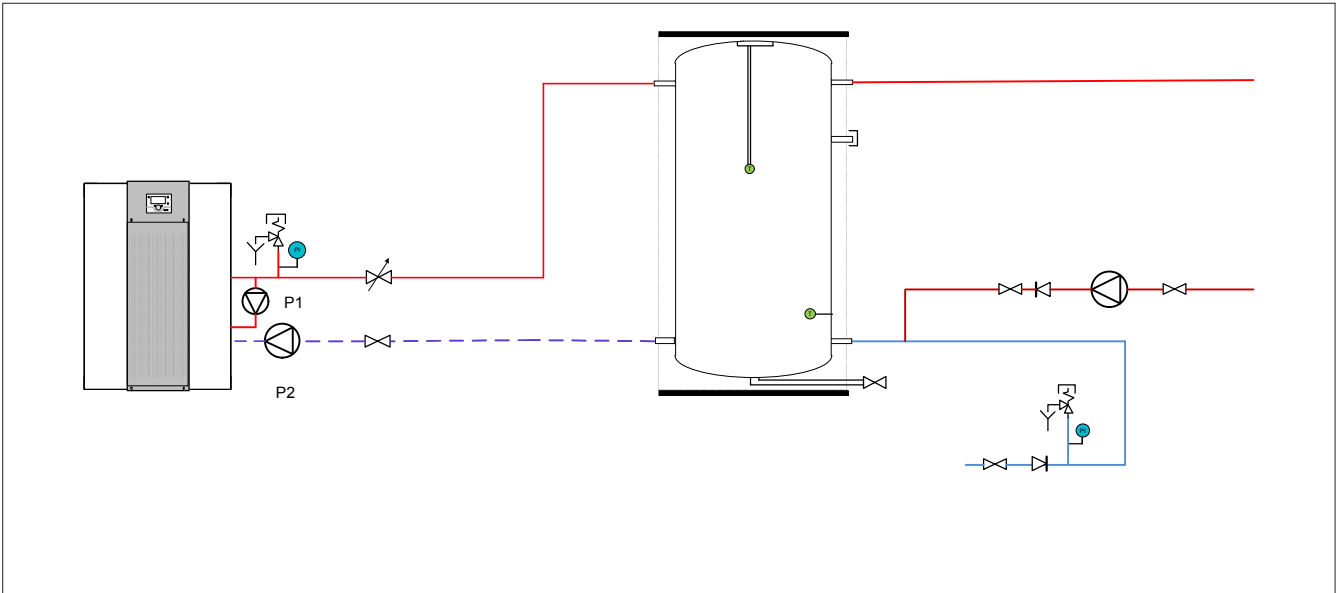


System examples

System 3: bypass water heater with buffer tank

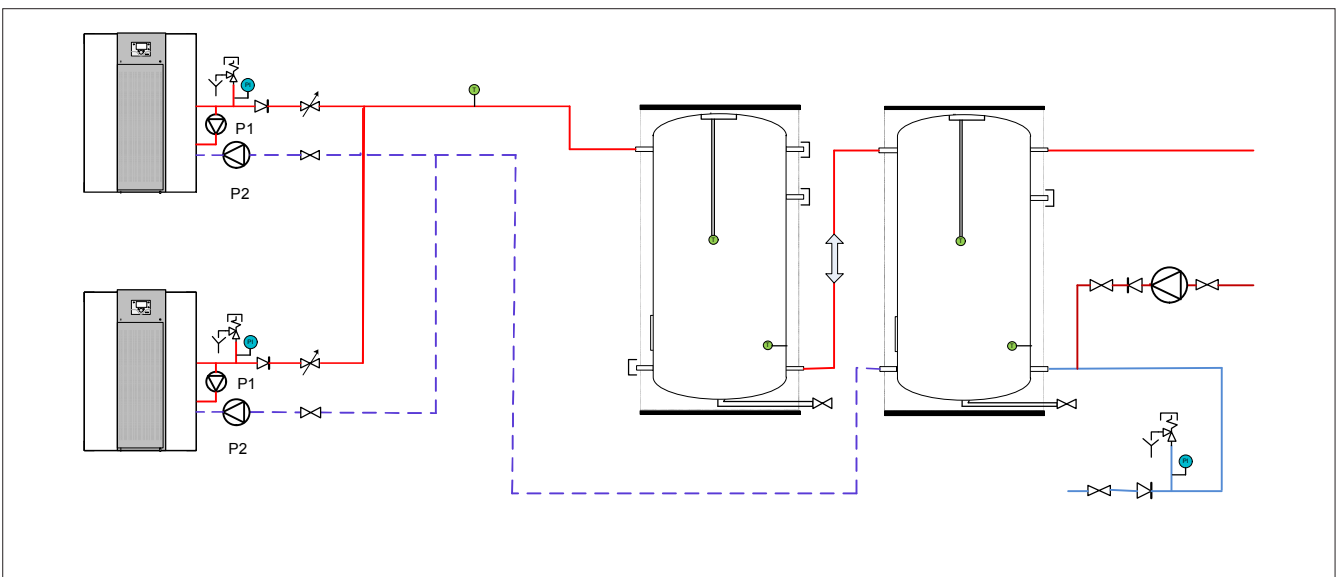
This system is mainly used in industrial processes, where there is a requirement for direct increase of the water temperature with more than 17K, without having a constant demand.

Without the buffer tank the bypass water heater would generate many starts and stops and have a restive regulation.



System 4: bypass water heater cascade with 2 buffer tanks

This system is mainly used in industrial processes, where there is a requirement for direct increase of the water temperature with more than 17K, without having a constant demand. Without the buffer tank the bypass water heater would generate many starts and stops and have a restive regulation.



System examples

Swimming pool heater

The TR-XL swimming pool heater should be installed in parallel with the main water flow, going back from the filtering installation to the swimming pool. The swimming pool heater can increase the water temperature by maximum 15K at once.

As a swimming pool installation is an open system, with hardly any static pressure, it is necessary to create a pressure of at least 0.5 bar in the boiler by installing a regulation valve in the flow connection of the heater.

The table below shows the nominal water flow data at a ΔT of 15K, plus the pump data of the (optional) pump kit for each type of swimming pool heater.

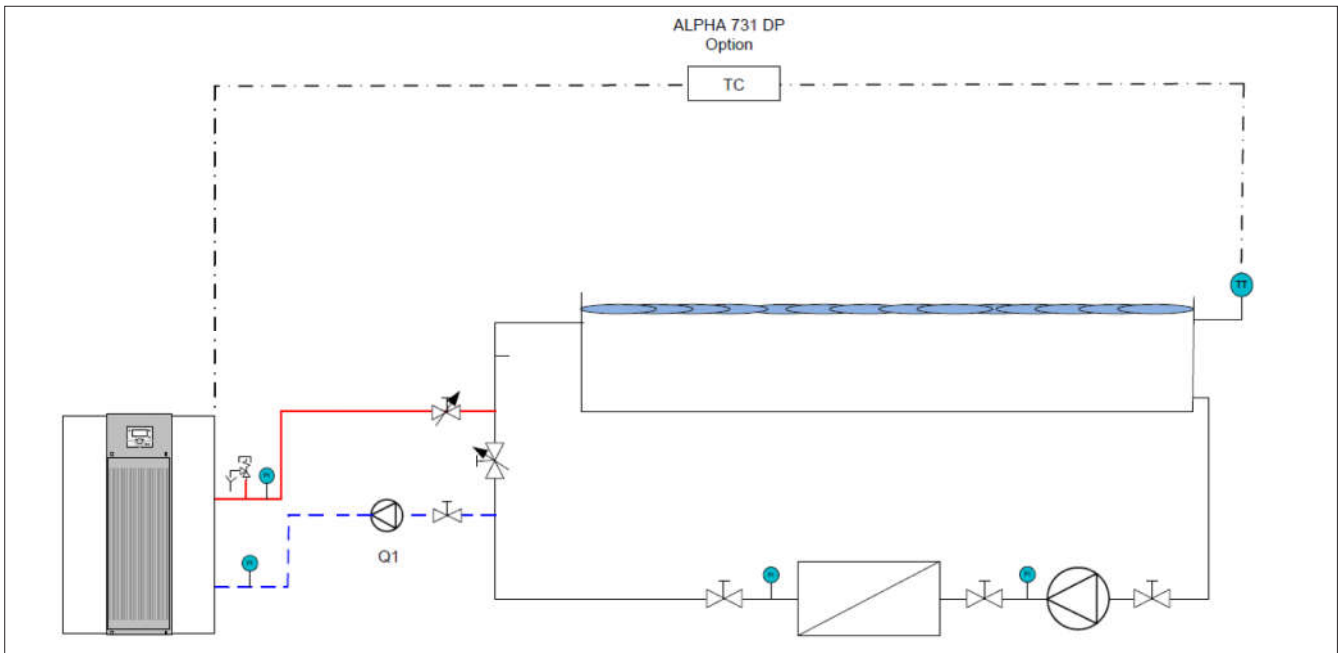
Water flow data swimming pool heater								
	ΔT	Nominal flow rate	Boiler resistance	Req. static pressure	Pump type	Voltage	Pump head	Residual pump head
	[K]	[m ³ /h]	[kPa]	[kPa]	[-]	[V]	[kPa]	[kPa]
TR-XL 150	15	8.1	18	50	COM350/05	230	90	22
TR-XL 200		10.8	32	50	COM350/09	230	110	28
TR-XL 250		13.6	50	50	COM350/15	230	145	45
TR-XL 300		16.3	27	50	COM350/11	230	102	25
TR-XL 400		21.7	48	50	CO500/22	400	140	42
TR-XL 500		27.2	75	50	CO500/30	400	161	36
TR-XL 570		30.8	98	50	CO500/30	400	151	3

System examples

The following examples are only meant to give an indication of the possibilities available with the TR-XL swimming pool heater. These examples can not be used in a project without any further analysis of the project situation by an authorized company.

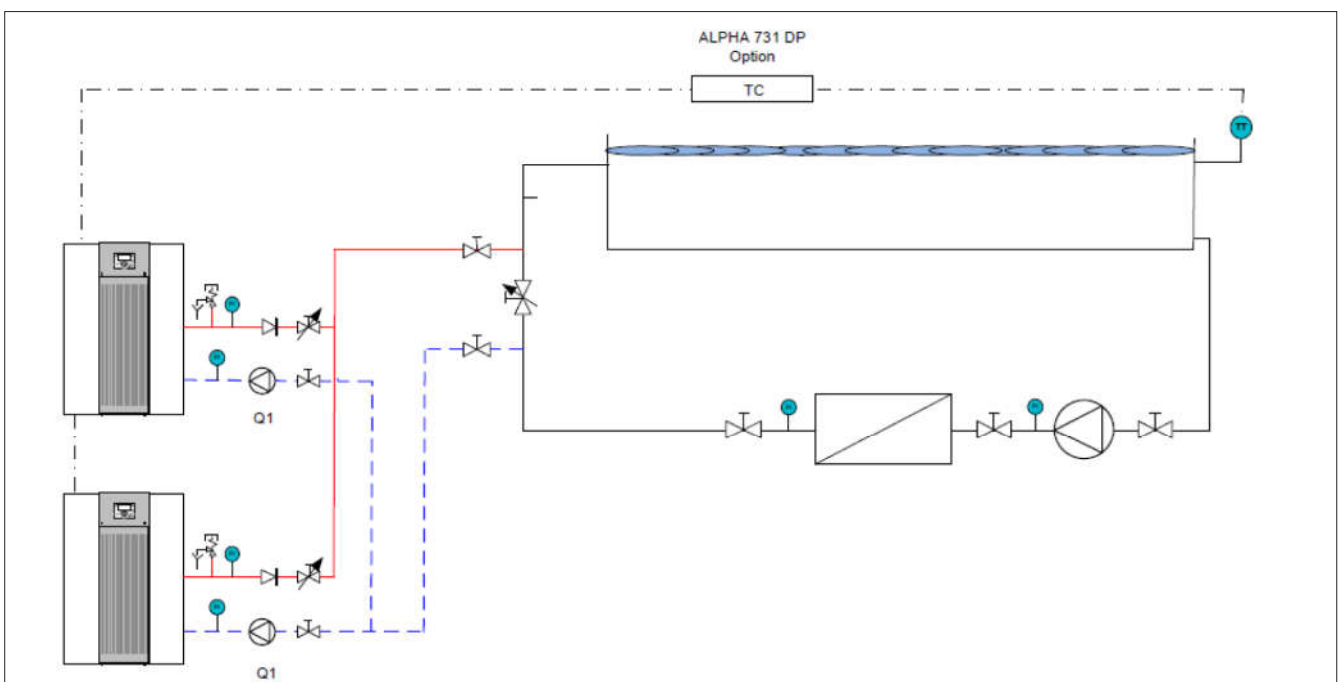
System 6: bypass water heater with buffer tank

The swimming pool heater is installed in parallel with the swimming pool circulation loop, after the filtering installation. The swimming pool heater only heats up a partial flow, which is mixed in the main loop to the swimming pool.



System 7: swimming pool heater cascade below pool water level

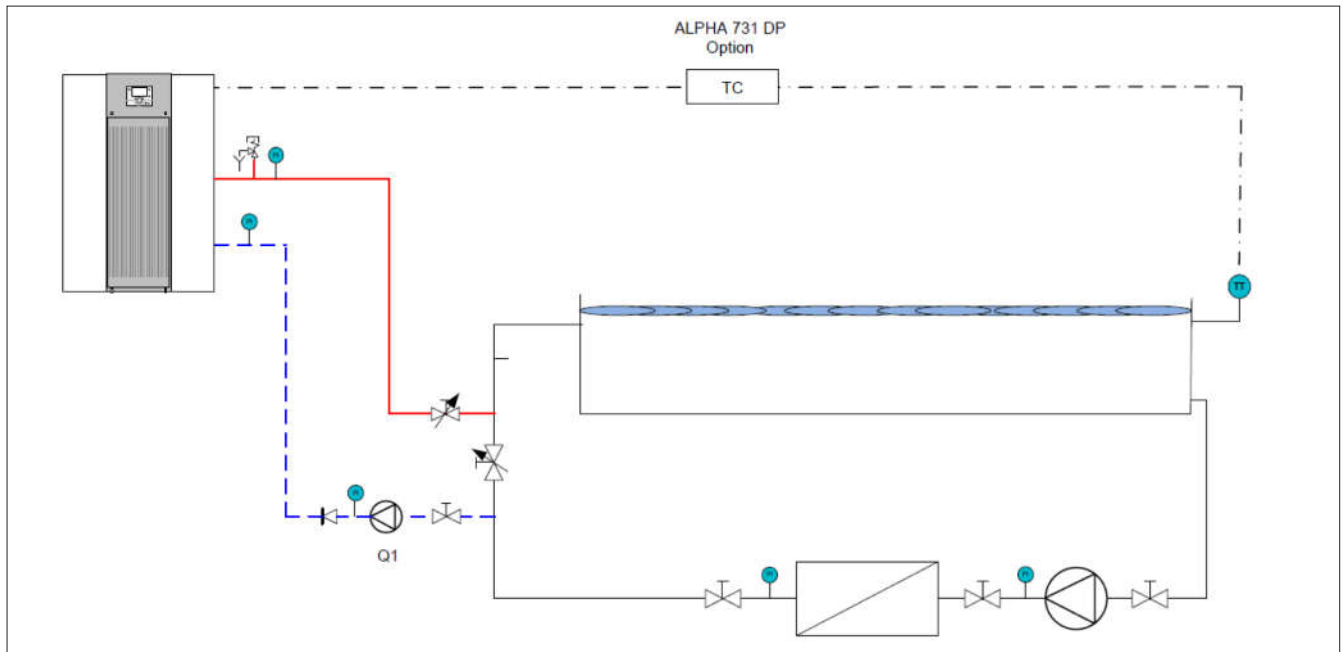
In this situation the swimming pool heaters are connected in parallel to the circulation loop as well. It is important to connect the heaters in such a way, that both heaters are flushed with an equal water flow rate. This can be done with a regulation valve or by connecting the heaters in reversed return.



System examples

System 8: swimming pool heater above pool water level

The swimming pool heater is installed in parallel with the swimming pool circulation loop, after the filtering installation. The swimming pool heater only heats up a partial flow, which is mixed in the main loop to the swimming pool.



Service:

www.elco.net