

# Tank units for chilled water

## Hydronic systems: HPT



Carbon steel tank and tubes insulated with anti-condensate elastomere



The HPT units are hydraulic units with buffer tanks designed to reduce the production time of conditioning and cooling systems. They can be equipped with all different kinds of water coolers.

The HPT units are made of:

- carbon steel tank and tubes insulated with anti-condensate elastomere
- Centrifugal single or double pump with a shut-off valve
- Switchboard with possibility to alternate the pumps with every start-up (2 pump version), to start-up the backup pump in case of breakdown (2 pump version), magnetothermic protection, cleaned contact to signalise the distance between the pumps, protection category IP56
- Expansion vessel
- Safety valve
- Deaerator
- Fill-up/discharge valve
- Base in galvanized and coated steel sheets
- Self-supporting panels in galvanized and coated steel sheets for installations outside.

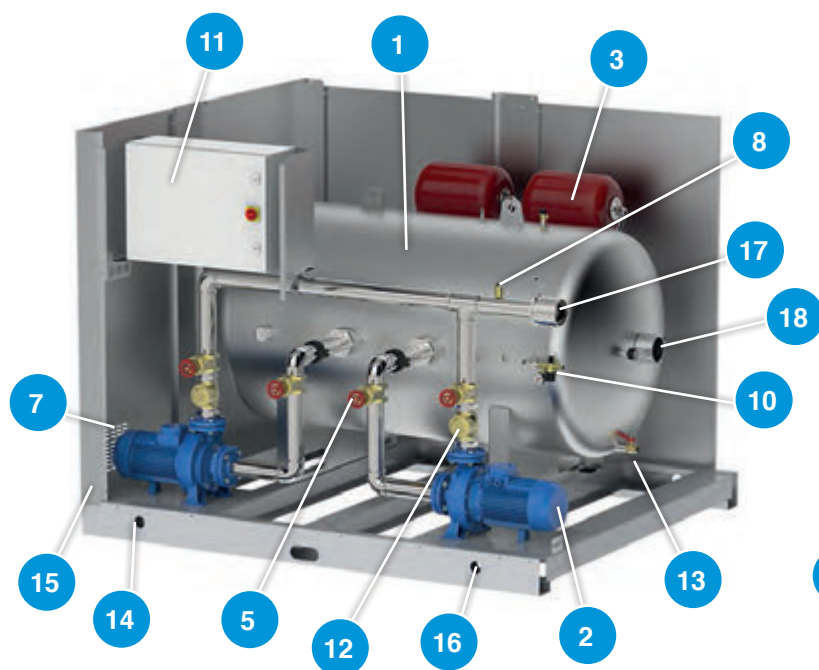
### Available versions

The broad range of pump-tank combinations makes it possible to meet all requirements. Numerous versions are available: with a single or a double pump and with tanks with a capacity of 100, 200, 300, 500, 750, 1000, 1500 and 2500 liters.

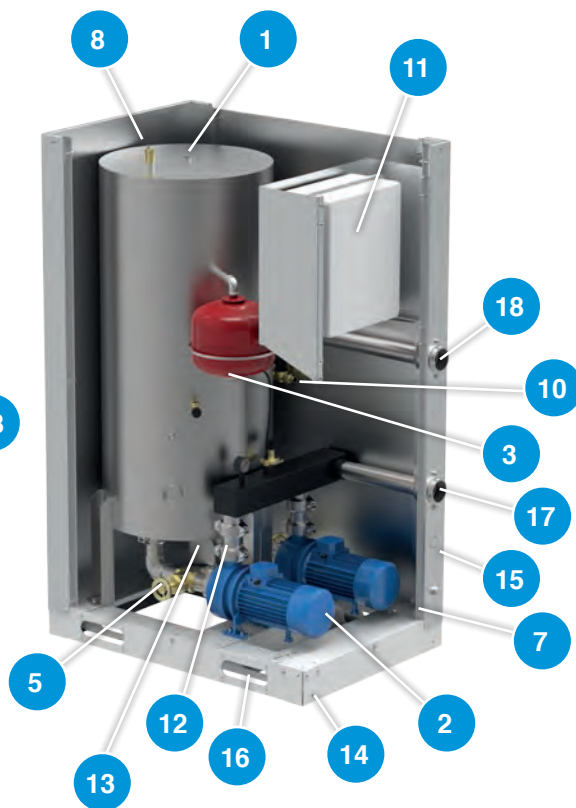
# Hydronic systems

## HPT: components

Horizontal HPT



Vertical HPT



### Components

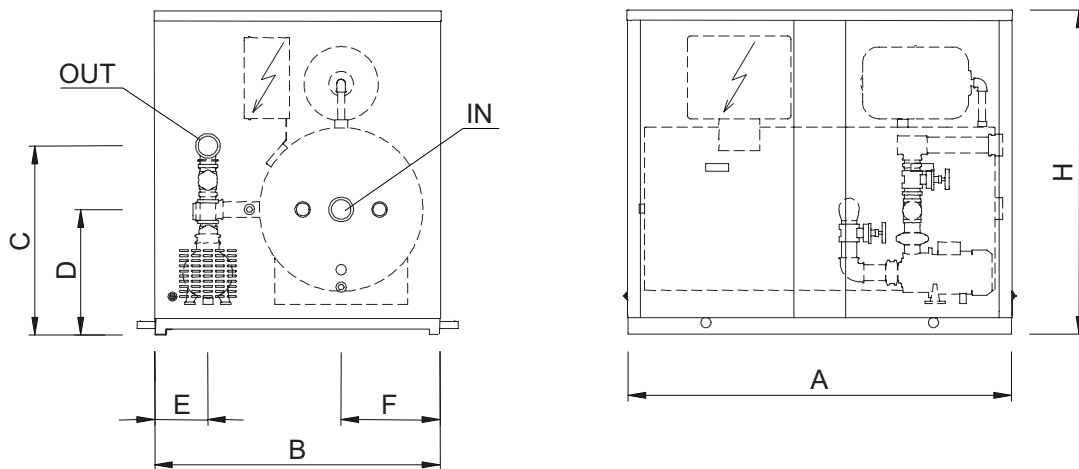
- 1 tank
- 2 circulator
- 3 expansion vessel
- 5 on-off valve
- 7 automatic ventilation system
- 8 pressure relief valve
- 9 filling tap
- 10 automatic filling unit
- 11 switchboard
- 12 Control valve (version with 2 pumps)
- 13 outlet
- 14 Anchoring point (4-6 holes M12/ Ø14)
- 15 inlet power grid
- 16 jacking points
- 17 Flow to the device
- 18 Return from the device

### Components

- 1 tank
- 2 circulator
- 3 expansion vessel
- 5 on-off valve
- 7 automatic ventilation system
- 8 pressure relief valve
- 9 filling tap
- 10 automatic filling unit
- 11 switchboard
- 12 control valve (version with 2 pumps)
- 13 outlet
- 14 inlet power grid
- 15 jacking points
- 16 flow to the device
- 17 return from the device

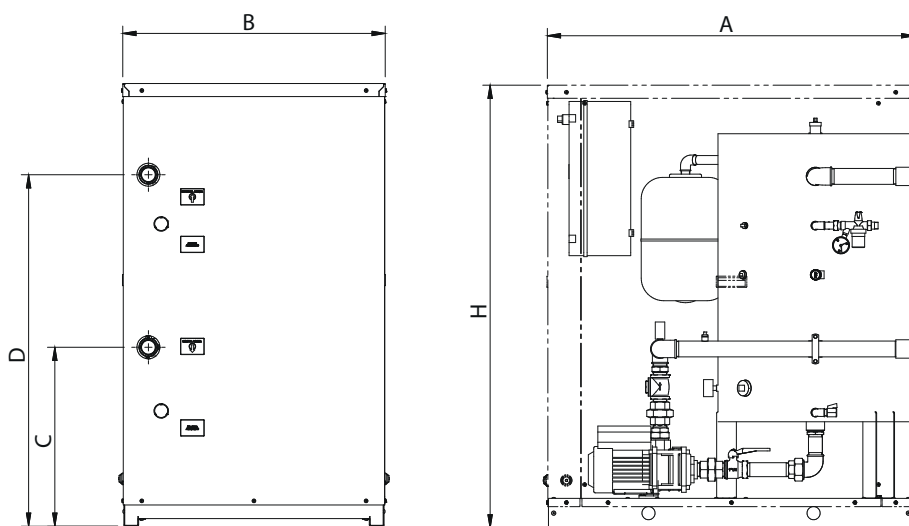
# Hydronic systems

## HPT: dimensions and connections



### Horizontal HPT dimensions

capacity l	A mm	B mm	H mm	C mm	D mm	E mm	F mm	IN inch	OUT inch
300	1504	1120	1265	738	490	212	388	2"1/2	2"1/2
500	1504	1120	1265	738	490	212	388	2"1/2	2"1/2
750	2044	1200	1510	940	604	185	440	3"	3"
1000	2044	1200	1510	940	604	185	440	3"	3"
1500	2260	1900	1782	1145	829	262	703	4"	4"
2000	2260	1900	1782	1145	829	262	703	4"	4"



### Vertical HPT dimensions

capacity l	A mm	B mm	H mm	C mm	D mm	E mm	P mm	IN inch	OUT inch
100	1120	800	1350	546	1002	100	45	1" 1/2	1" 1/2
200	1120	800	1350	546	1072	80	45	1" 1/2	1" 1/2
300	1100	760	1726	558	1008	60	-	1" 1/2	1" 1/2

# HPT hydronic system: user's conditions

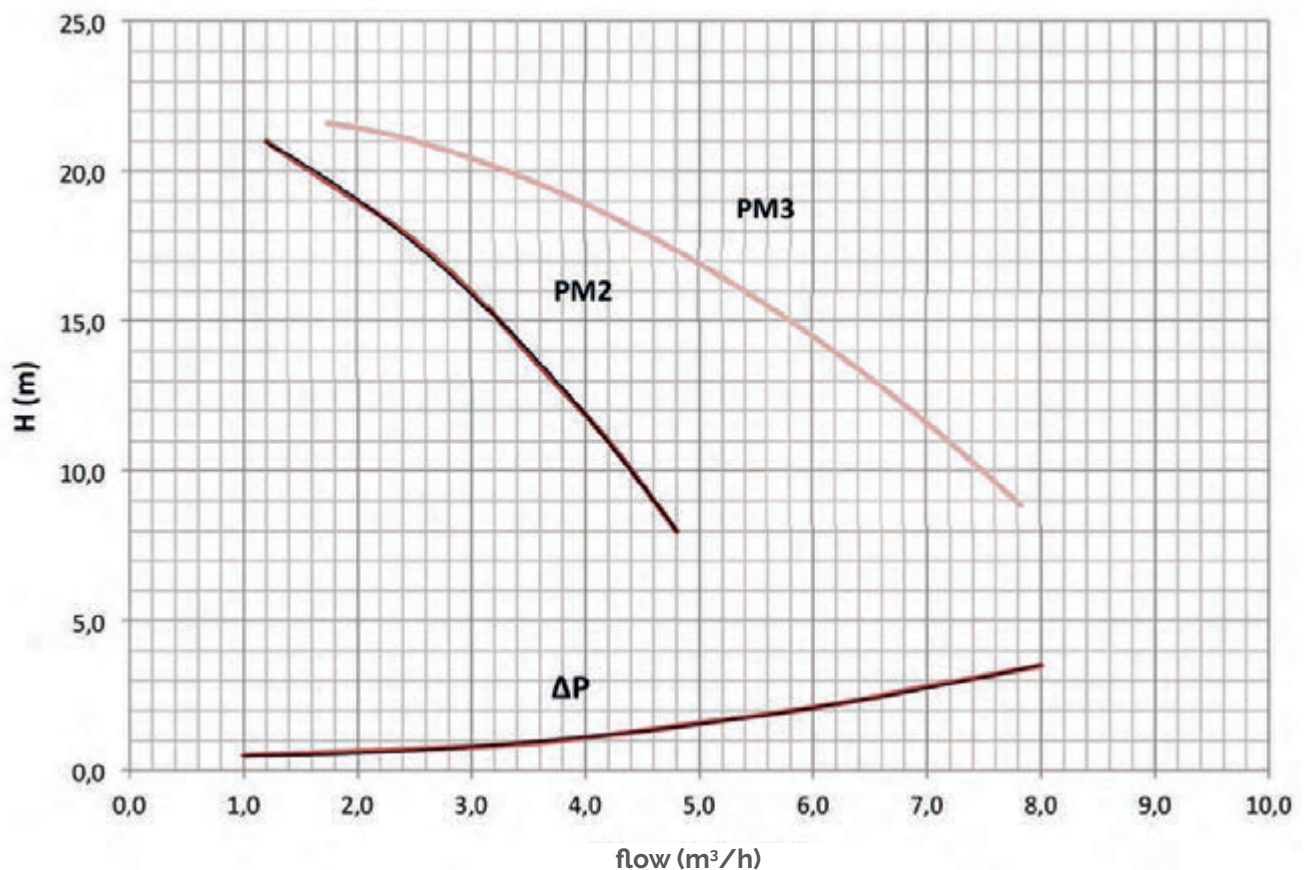
## Normal user conditions

The tank is designed to be connected to a conditioning device, coupled with a chiller which takes heat from the device thanks to a standard nominal thermal leap (7-12°C). The average operating temperature is approximately 10°C and the operating pressure varies between 0.5 and 2.5 bar. The replacement of fluid in the tank depends on the functioning of the device or cooling unit, indicated by the intersection of the characteristic curve of the pump and of the device. The HPT unit is meant to be used with a heat pump, but can also function in relatively high temperatures, max 50°C and a max pressure of 3 bar. When the HPT is used in an environment with low winter temperatures, it is recommended to use anti-freeze liquid or resistance. Alternatively we recommend emptying the hydraulic circuit, to prevent the water from freezing.

## Protective measures

The HPT is protected from possible functioning errors and incautious manoeuvres (!) through the installation of two devices: the differential pressure switch (optional) and the safety valve. A possible problem is the malfunctioning of the centrifugal pump, which can cause the vector fluid to stop flowing and consequently the freezing of the fluid. The use of a differential pressure switch (supplied on request), which blocks the compressor, prevents this inconvenience. The HPT is equipped, in the standard version, with an expansion vessel and a safety valve. In case of wrong manoeuvres, or other events that cause overpressure, the safety valve, calibrated at 3 bar, is automatically activated. The expansion vessel, preloaded, intervenes whenever an excessive dilation of the fluid occurs.

## HPT-V 100-200

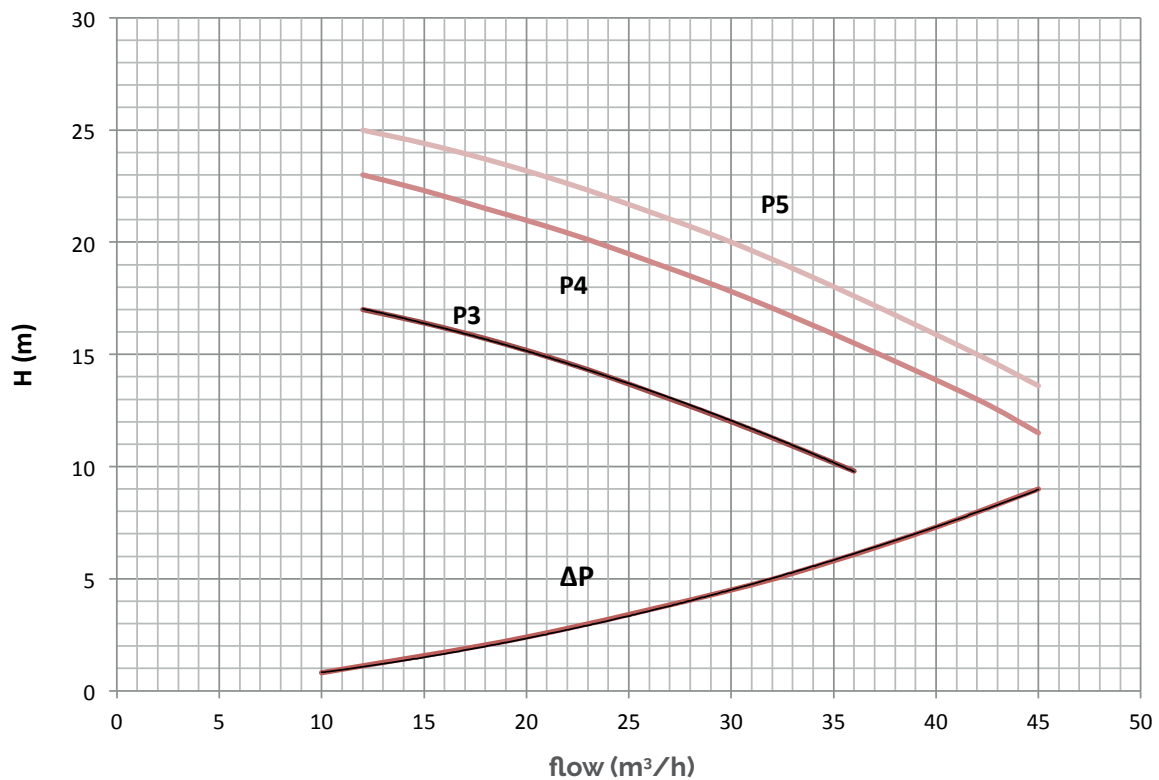
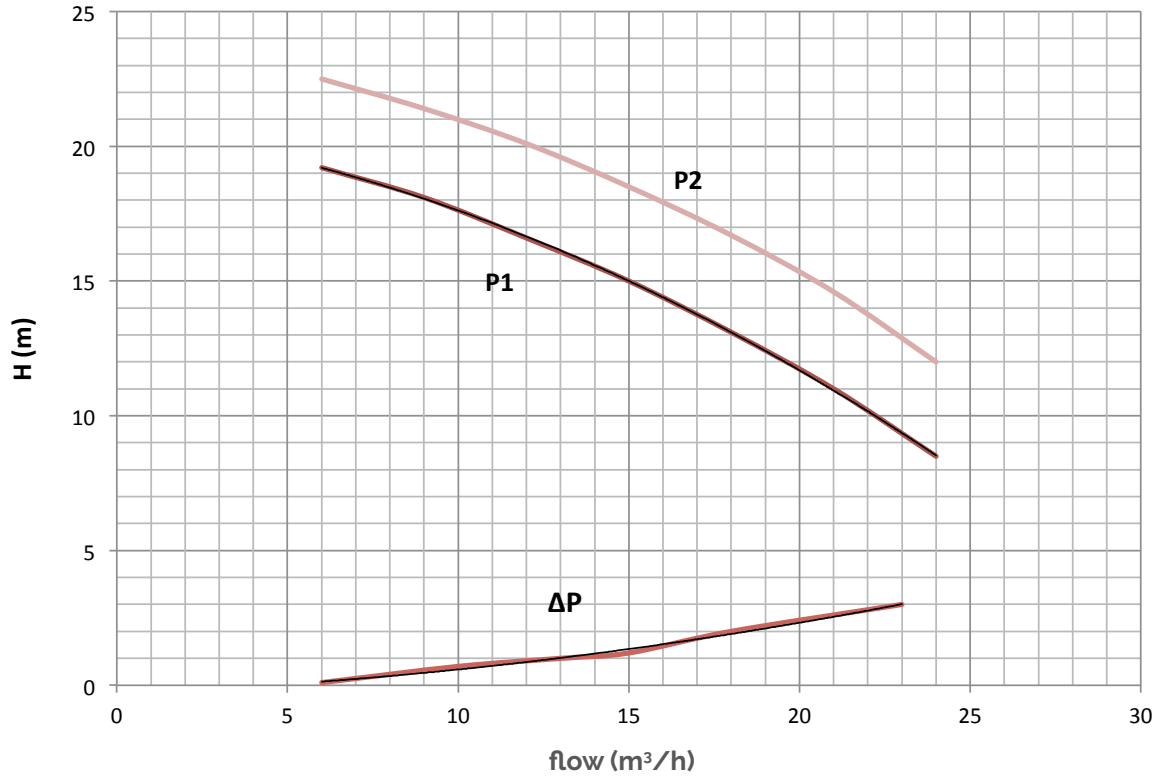


$\Delta P$ : pressure loss of the HPT unit

# HPT hydronic systems

## Prevalence and pressure loss curve

HPT 300-500

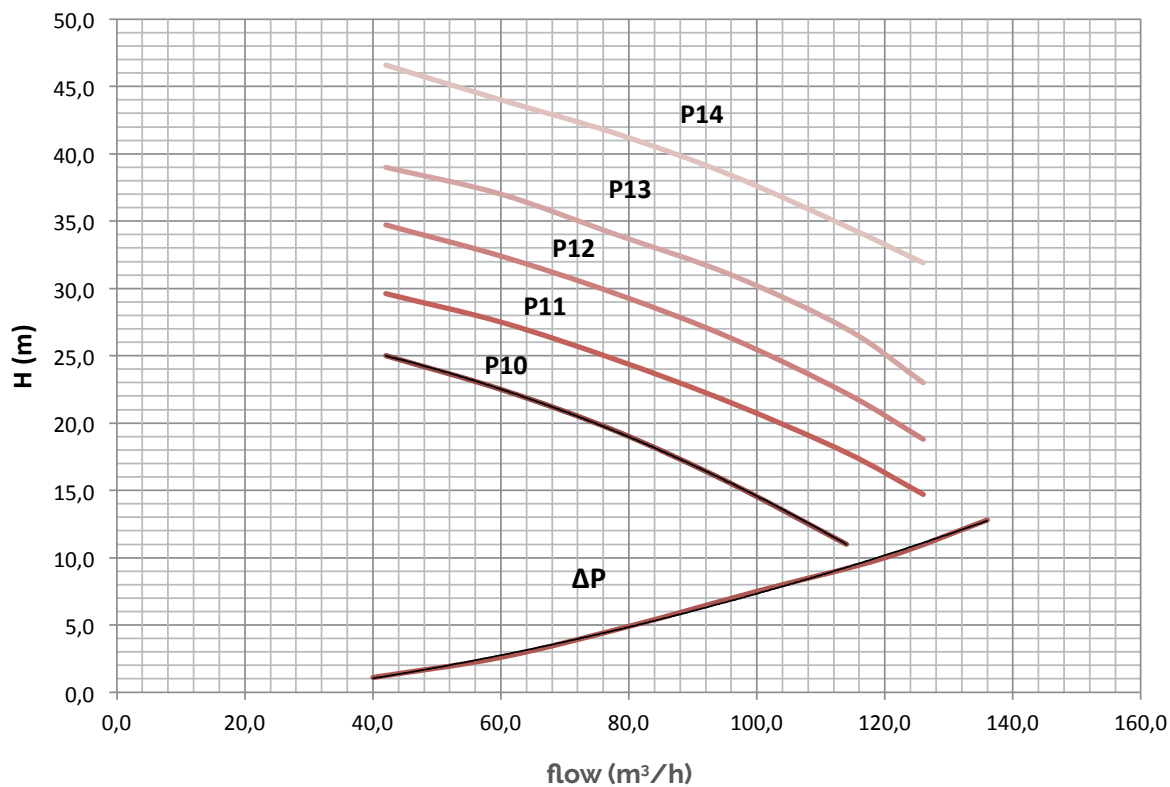
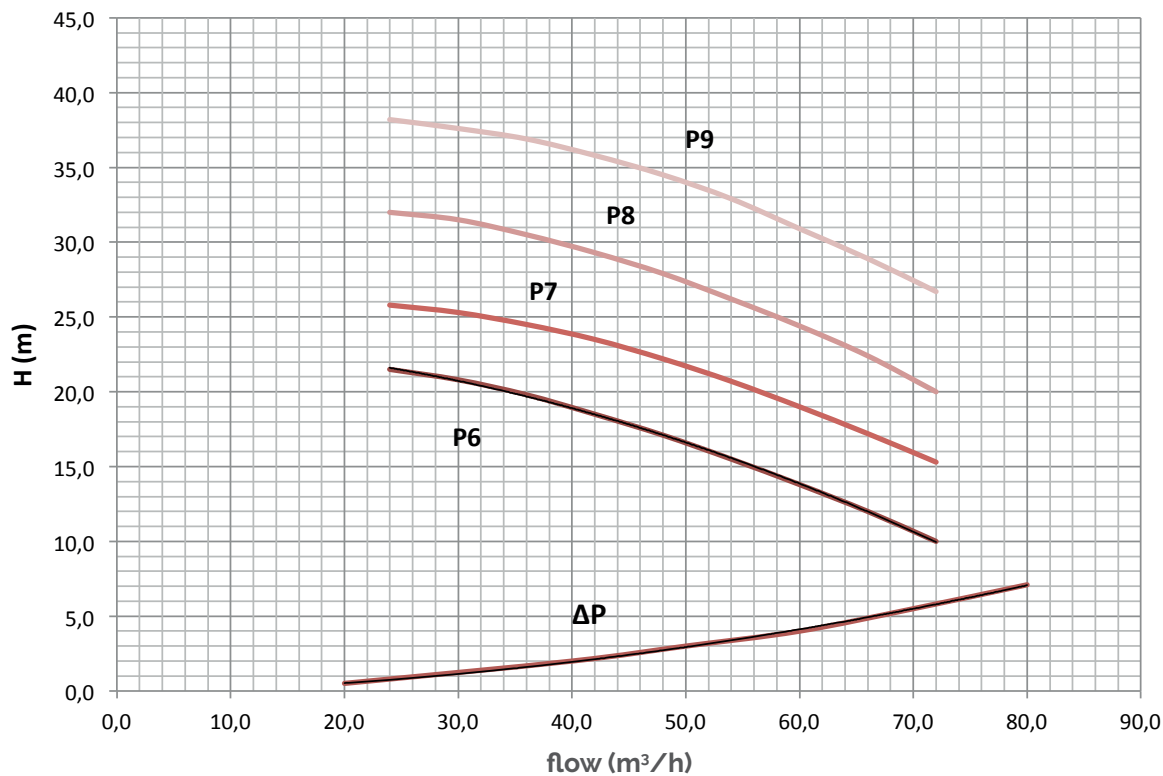


ΔP: pressure loss of the HPT unit

# HPT hydronic systems

## Prevalence and pressure loss curve

HPT 750-1000

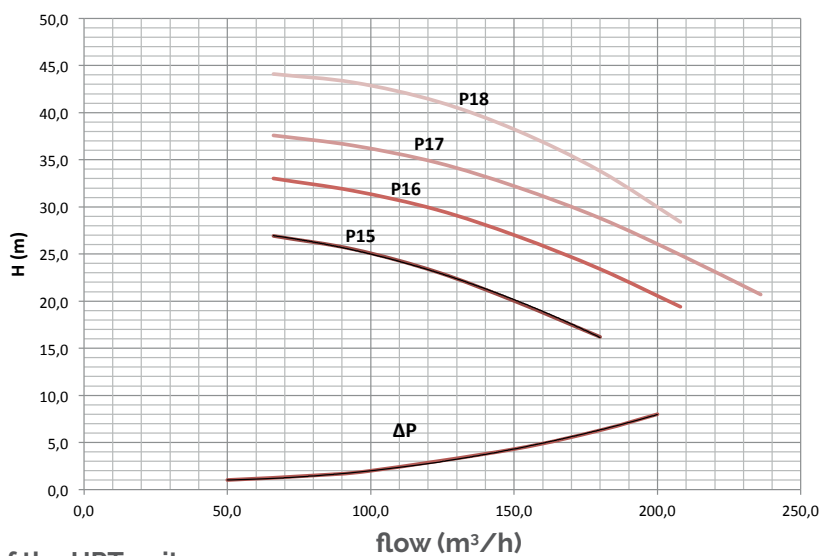
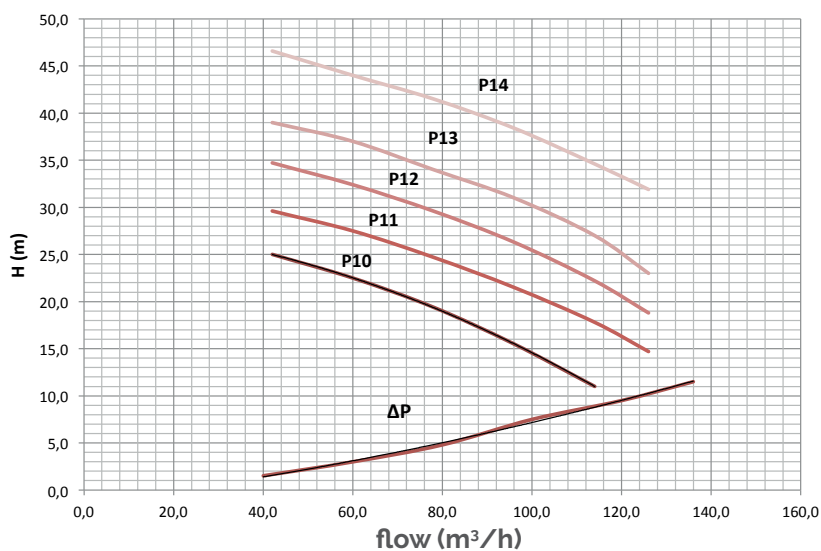
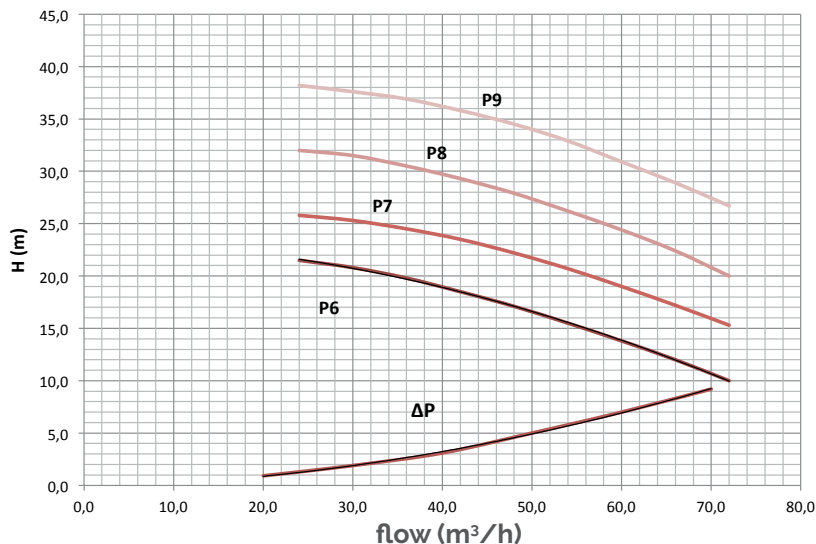


ΔP: pressure loss of the HPT unit

# HPT hydronic systems

## Prevalence and pressure loss curve

HPT 1500-2500



$\Delta P$ : pressure loss of the HPT unit

# HPT hydronic systems

## technical information

Pump model	Tank capacity l	Wsb1 kg	Wsb2 kg	F.L.I kW	F.L.A. (400/3/50) A	F.L.A. (230/1/50) A	Ve l
PM2	100			0,45		3,2	18
	200			0,45		3,2	18
PM3	100			0,45		3,2	18
	200			0,45		3,2	18
P1	300	186	216	1,1	2,5		25
	500	208	238	1,1	2,5		25
P2	300	188	220	1,5	3,2		25
	500	210	242	1,5	3,2		25
P3	300	188	220	1,5	3,4		25
	500	210	242	1,5	3,4		25
P4	300	191	225	2,2	4,8		25
	500	213	247	2,2	4,8		25
P5	300	194	231	3	5,6		25
	500	215	253	3	5,6		25
P6	750	341	428	3	6,1		25
	1000	364	455	3	6,1		25
	1500	513	586	3	6,1		3x25
	2500	565	638	3	6,1		3x25
P7	750	341	428	4	8,7		25
	1000	364	455	4	8,7		25
	1500	513	586	4	8,7		3x25
	2500	565	638	4	8,7		3x25
P8	750	370	485	5,5	10,4		25
	1000	392	512	5,5	10,4		25
	1500	565	696	5,5	10,4		3x25
	2500	613	732	5,5	10,4		3x25
P9	750	370	485	7,5	13,6		25
	1000	392	512	7,5	13,6		25
	1500	565	696	7,5	13,6		3x25
	2500	613	732	7,5	13,6		3x25
P10	750	373	493	5,5	10,4		25
	1000	396	520	5,5	10,4		25
	1500	569	696	5,5	10,4		3x25
	2500	617	740	5,5	10,4		3x25



# HPT hydronic systems technical information

Pump model	Tank capacity l	Wsb1 kg	Wsb2 kg	F.L.I kW	F.L.A. (400/3/50) A	Ve l
P11	750	377	501	7,5	13,6	25
	1000	400	528	7,5	13,6	25
	1500	569	696	7,5	13,6	3x25
	2500	617	740	7,5	13,6	3x25
P12	750	377	501	9,2	17,2	25
	1000	400	528	9,2	17,2	25
	1500	569	696	9,2	17,2	3x25
	2500	617	740	9,2	17,2	3x25
P13	750	377	501	11	21,3	25
	1000	400	528	11	21,3	25
	1500	569	696	11	21,3	3x25
	2500	617	740	11	21,3	3x25
P14	1500	628	814	15	27,7	3x25
	2500	680	866	15	27,7	3x25
P15	1500	628	814	11	20,2	3x25
	2500	680	866	11	20,2	3x25
P16	1500	634	826	15	26,6	3x25
	2500	686	878	15	26,6	3x25
P17	1500	646	850	18,5	33	3x25
	2500	698	902	18,5	33	3x25
P18	1500	660	878	22	40,4	3x25
	2500	712	930	22	40,4	3x25

Pve (bar) 1,5 Ps (ba) 3 T min (°C) -10

## Legend

Wsb 1 Weight HPT with 1 pump (empty)  
 Wsb 2 Weight HPT with 2 pumps (empty)  
 FLI maximum absorbed power  
 FLA Max absorbed current  
 Ve capacity of the expansion vessel  
 Pve Preload of the expansion vessel  
 Ps Max operating pressure  
 Tmin min temperature of the liquid

# Hydronic systems

## HPT codes

PUMPS		HPT MODEL								
		100 vertical	200 vertical	300 vertical	300	500	750	1000	1500	2500
PM2	1P	838011058X	838011062X							
PM2	2P	838011059X	838011063X							
PM3	1P	838011060X	838011064X							
PM3	2P	838011061X	838011065X							
P1	1P			838010891X	838010349	838010359				
P1	2P			838010896X	838010354	838010364				
P2	1P			838010892X	838010350	838010360				
P2	2P			838010897X	838010355	838010365				
P3	1P			838010893X	838010351	838010361				
P3	2P			838010898X	838010356	838010366				
P4	1P			838010894X	838010352	838010362				
P4	2P			838010899X	838010357	838010367				
P5	1P			838010895X	838010353	838010363				
P5	2P			838010900X	838010358	838010368				
P6	1P					838010879X	838010374	838010384	838010705	838010689
P6	2P					838011056X	838010379	838010389	838010458	838010682
P7	1P						838011384X	838011386X	838011388X	838011390X
P7	2P						838011385X	838011387X	838011389X	838011391X
P8	1P						838010375	838010385	838010704	838010688
P8	2P						838010380	838010390	838010630	838010681
P9	1P						838011392X	838011394X	838011396X	838011398X
P9	2P						838011393X	838011395X	838011397X	838011399X

# Hydronic systems

## HPT codes

PUMPS		HPT MODEL								
		100 vertical	200 vertical	300 vertical	300	500	750	1000	1500	2500
P10	1P						838010376	838010386	838010703	838010687
P10	2P						838010381	838010391	838010696	838010680
P11	1P						838010377	838010387	838010702	838010686
P11	2P						838010382	838010392	838010695	838010679
P12	1P						838011400X	838011402X	838011404X	838011406X
P12	2P						838011401X	838011403X	838011405X	838011407X
P13	1P						838010378	838010388	838010701	838010685
P13	2P						838010383	838010393	838010694	838010678
P14	1P								838010700	838010684
P14	2P								838010693	838010677
P15	1P								838011380X	838011382X
P15	2P								838011381X	838011383X
P16	1P								838010699	838010707
P16	2P								838010692	838010459
P17	1P								838010698	838010683
P17	2P								838010691	838010676
P18	1P								838010697	838010706
P18	2P								838010690	838010633

1P single pump  
2P double pump

# HPT hydronic systems: vertical

## Distribution of the weight

### Single pump unit

pump model	tank capacity l	W1 kg	W2 kg	W3 kg	W4 kg
PM2	100	50	115	86	199
	200	54	124	92	215
PM3	100	50	115	86	199
	200	56	129	96	223
P1	300	73	38	61	31
P2	300	74	38	61	31
P3	300	74	38	61	32
P4	300	75	39	62	32
P5	300	76	39	63	32

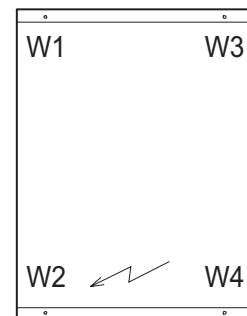
### Double pump unit

pump model	tank capacity l	W1 kg	W2 kg	W3 kg	W4 kg
PM2	100	54	124	92	215
	200	55	129	95	222
PM3	100	54	125	93	216
	200	56	129	96	223
P1	300	59	59	59	59
P2	300	60	60	59	59
P3	300	60	60	60	60
P4	300	61	61	61	61
P5	300	63	63	62	62

### Legend

PM2,PM3,PM4,PM5: Pump model

Top view

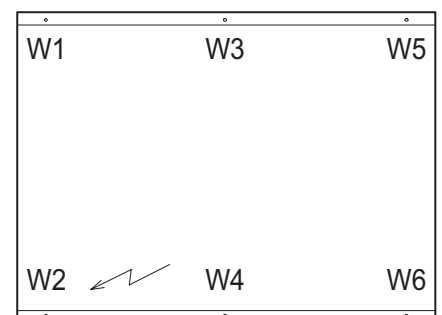


[Horizontal HPT >](#)

### Legend

PM2, PM3...PM 18: Pump model

Top view



# HPT hydronic systems: horizontal

## Dimensions and connections

### Single pump unit

pump model	tank capacity l	W1 kg	W2 kg	W3 kg	W4 kg	W5 kg	W6 kg
P1	300	148	96	154	102	-	/-
	500	219	134	226	141	-	-
P2	300	148	96	154	102	-	-
	500	219	134	226	141	-	-
P3	300	148	96	154	102	-	-
	500	219	134	226	141	-	-
P4	300	148	96	154	102	-	-
	500	219	134	226	141	-	-
P5	300	148	96	154	102	-	-
	500	219	134	226	141	-	-
P6	750	232	123	238	129	244	135
	1000	297	148	303	154	309	160
	1500	369	291	375	298	382	305
	2500	571	446	578	452	584	459
P7	750	232	123	238	129	244	135
	1000	297	148	303	154	309	160
	1500	369	291	375	298	382	305
	2500	571	446	578	452	584	459
P8	750	230	128	239	137	249	147
	1000	294	153	304	163	314	173
	1500	368	305	376	314	385	322
	2500	576	451	583	457	589	464
P9	750	230	128	239	137	249	147
	1000	294	153	304	163	314	173
	1500	368	305	376	314	385	322
	2500	576	451	583	457	589	464
P10	750	230	128	239	137	249	147
	1000	294	153	304	163	314	173
	1500	368	305	376	314	385	322
	2500	576	451	583	457	589	464
P11	750	230	128	239	137	249	147
	1000	294	153	304	163	314	173
	1500	368	305	376	314	385	322
	2500	576	451	583	457	589	464
P12	750	230	128	239	137	249	147
	1000	294	153	304	163	314	173
	1500	368	305	376	314	385	322
	2500	576	451	583	457	589	464
P13	750	235	133	244	142	254	152
	1000	292	159	305	172	318	185
	1500	365	315	377	327	389	338
P14	2500	571	459	581	469	591	479
	1500	365	318	379	331	392	345
P15	2500	570	470	581	482	593	499
	1500	365	318	379	331	392	345
P16	2500	570	470	581	482	593	499
	1500	365	318	379	331	392	345
P17	2500	572	472	583	484	595	501
	1500	367	320	381	333	394	347
P18	2500	575	475	586	487	598	504
	1500	370	323	384	336	397	350

### Double pump unit

pump model	tank capacity l	W1 kg	W2 kg	W3 kg	W4 kg	W5 kg	W6 kg
P1	300	152	112	153	113	/	/
	500	227	153	227	153	/	/
P2	300	152	112	153	113	/	/
	500	227	153	227	153	/	/
P3	300	152	112	153	113	/	/
	500	227	153	227	153	/	/
P4	300	152	112	153	113	/	/
	500	227	153	227	153	/	/
P5	300	152	112	153	113	/	/
	500	227	153	227	153	/	/
P6	750	245	152	243	150	241	149
	1000	310	181	308	179	306	177
	1500	379	321	377	319	376	318
	2500	581	456	588	462	594	469
P7	750	245	152	243	150	241	149
	1000	310	181	308	179	306	177
	1500	379	321	377	319	376	318
	2500	581	456	588	462	594	469
P8	750	245	172	245	172	245	172
	1000	311	198	310	197	309	196
	1500	383	353	382	352	381	351
	2500	589	497	586	494	583	491
P9	750	245	172	245	172	245	172
	1000	311	198	310	197	309	196
	1500	383	353	382	352	381	351
	2500	589	497	586	494	583	491
P10	750	245	172	245	172	245	172
	1000	311	198	310	197	309	196
	1500	383	353	382	352	381	351
	2500	589	497	586	494	583	491
P11	750	245	172	245	172	245	172
	1000	311	198	310	197	309	196
	1500	383	353	382	352	381	351
	2500	589	497	586	494	583	491
P12	750	245	172	245	172	245	172
	1000	311	198	310	197	309	196
	1500	383	353	382	352	381	351
	2500	589	497	586	494	583	491
P13	750	255	182	255	182	255	182
	1000	314	215	313	214	312	212
	1500	382	377	381	376	380	375
P14	2500	587	519	584	516	581	513
	1500	388	388	387	387	386	386
P15	2500	587	546	584	543	581	539
	1500	388	388	387	387	386	386
P16	2500	587	546	584	543	581	539
	1500	390	390	389	389	388	388
P17	2500	587	546	584	543	581	539
	1500	394	394	393	393	392	392
P18	2500	591	550	588	547	585	543
	1500	399	399	398	398	397	397
	2500	596	555	593	552	590	548

# HPT hydronic systems

## capacity of the expansion vessel

### Max water content in the device and the dimensions of the expansion vessel

On the first chart, the max water content in the hydraulic device which is compatible with the capacity of the expansion vessel (supplied with every HPT model) and with the start-up value of the safety valve (3 bar for all models) is indicated. If the actual water volume in the device, the storage tank included, is more than the operative conditions on the chart, more expansion vessels need to be installed.

Tav. 1

Hydraulic height H Preload of the expansion vessel		m bar	15 1,80	10 1,50
HPT 100	Max water capacity in the circuit in liters (1)		708	885
	Max water capacity in the circuit in liters (2)		453	567
HPT 200	Max water capacity in the circuit in liters (1)		708	885
	Max water capacity in the circuit in liters (2)		453	567
HPT 300	Max water capacity in the circuit in liters (1)		984	1230
	Max water capacity in the circuit in liters (2)		630	788
HPT 500	Max water capacity in the circuit in liters (1)		984	1230
	Max water capacity in the circuit in liters (2)		630	788
HPT 750	Max water capacity in the circuit in liters (1)		984	1230
	Max water capacity in the circuit in liters (2)		630	788
HPT 1000	Max water capacity in the circuit in liters (1)		984	1230
	Max water capacity in the circuit in liters (2)		630	788
HPT 1500	Max water capacity in the circuit in liters (1)		1964	2461
	Max water capacity in the circuit in liters (2)		1261	1576
HPT 2500	Max water capacity in the circuit in liters (1)		2953	3691
	Max water capacity in the circuit in liters (2)		1891	2363

### Operative conditions

- (1) cooling
  - Min temp of fluid = 4°C
  - Max temp of fluid = 40°C
- (2) heating (heat pump)
  - Min temp of fluid = 4°C
  - Max temp of fluid = 50°C

Tav. 2

Water temperature				
Water/glycol mix.	max.	min.	Correction factor	Reference
10%	40	-2	0.507	(1)
10%	5	-2	0.686	(2)
20%	40	-4	0.434	(1)
20%	50	-4	0.604	(2)
30%	40	-6	0.393	(1)
30%	50	-6	0.555	(2)

# HPT hydronic systems

## Preload of the expansion vessel

The expansion vessel, of all models, is preloaded with a standard value of 1.5 bar. However, the value has to be adjusted to the height of the device H.

The formula used to calculate the preload value of the expansion vessel is:

$$P = (H / 10.2) + 0.3$$

Legend

H: height of the device in meters

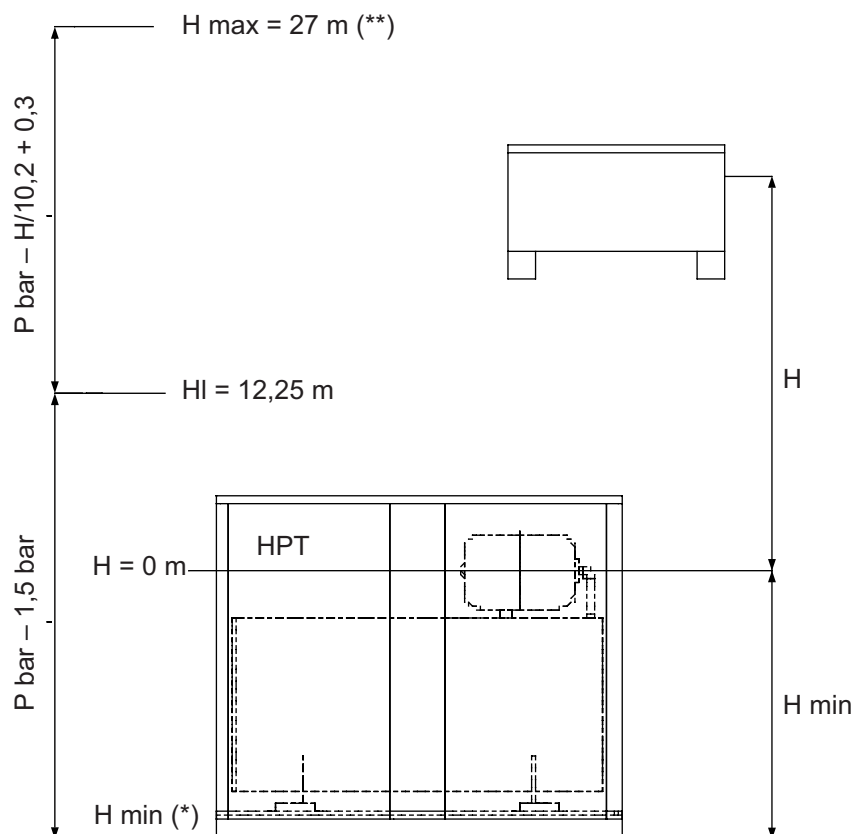
P: preload of the expansion vessel in bar

If the result of the preload value is less than the standard value, no steps should be taken. This means that for every installation with a height below 12.25 m, the preload of the expansion vessel should be 1.5 bar. In these cases the operator should only check the pressure value without carrying out any intervention.

Example:

You take a height H of 15.3 m. The preload value is:

$$P = (15.3 / 10.2) + 0.3 = 1.8 \text{ bar}$$



H height of the device

Hmax: max height of the device

H1: height when the preload of the expansion vessel is the same as the standard value

\* verify that the lowest point of the device can support the device's pressure

\*\* verify that the highest point of the device is not higher than H max = 27 m

# HPT hydronic systems

## Accessories

### **Inverter**

Every pump can be managed with an inverter. The units equipped with an inverter have a pressure sensor, 0-10 bar which communicates with the inverter through a 4-20 mA signal. All regulation parameters are preloaded during the testing phase in the factory. The user has only to select the set point value for the wanted pressure.

### **Kit with electric anti-freeze resistor**

The kit is installed in the inside of the tank and has an electric resistor of 1300 W for tanks up to 1000l and two electric resistors of 1300 W for tanks with a larger capacity. The kit also contains a anti-freeze bithermostat (-35/+35°C) and is assembled, cabled and tested before delivery.

### **Timer for alternative pumps**

In the version with double pump, the timer can be used to manage the shift between the pumps in intervals of a determined time. Without the timer, the shift between pumps is carried out with every start-up.

#### **ATTENTION**

If the system is active 24/7 the shift between pumps is not guaranteed by the standard group. In this case it is recommended to use a timer.

### **Differential pressure switch**

This is a safety measure which makes it possible to verify the flow in the system. The device generates an alarm signal but does not automatically stop the device.

### **Soundproof covering**

Soundproof covering is available and significantly decreases the sound emission by the device.

### **Anti-vibration feet**

A set of anti-vibration feet which can be put on the supportive points of the device. They are supplied non-assembled.

### **Filter**

Mesh filter, with 1000 micron holes, to be attached to the outside of the unit in order to protect the pump from any impurities of the devices.

### **Balancing valve**

The valve is to be attached to the outside in order to regulate the flow in the circuit. It is especially recommended in devices with a variable pressure drop.

### **Packaging in a wooden case**

Protective packaging adapted to risky transport and long distances.

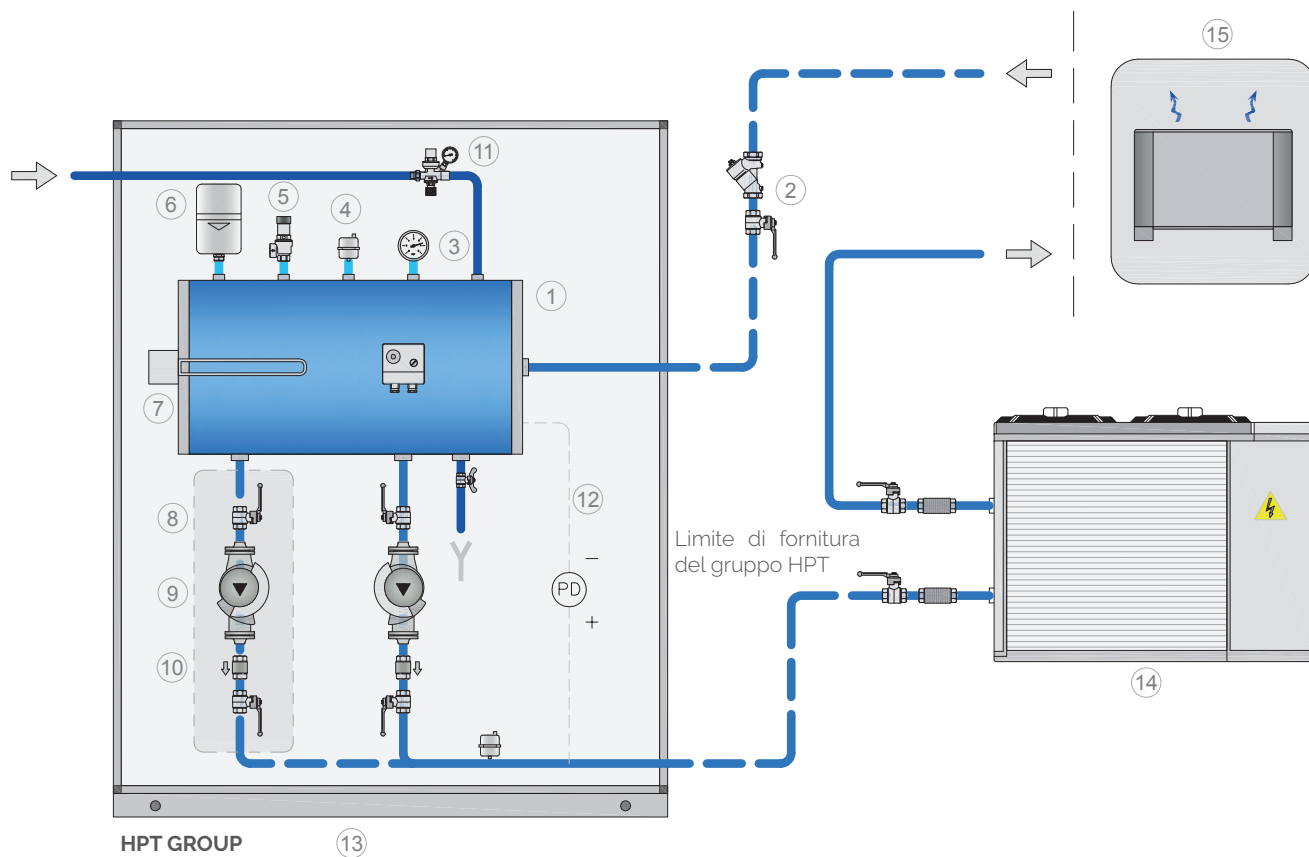
### **Package for overseas transport.**

Extra packaging for maritime transport, with a wooden case in accordance with the international standards ISPM-15, a protective bag and hygroscopic salt.



# HPT hydronic systems

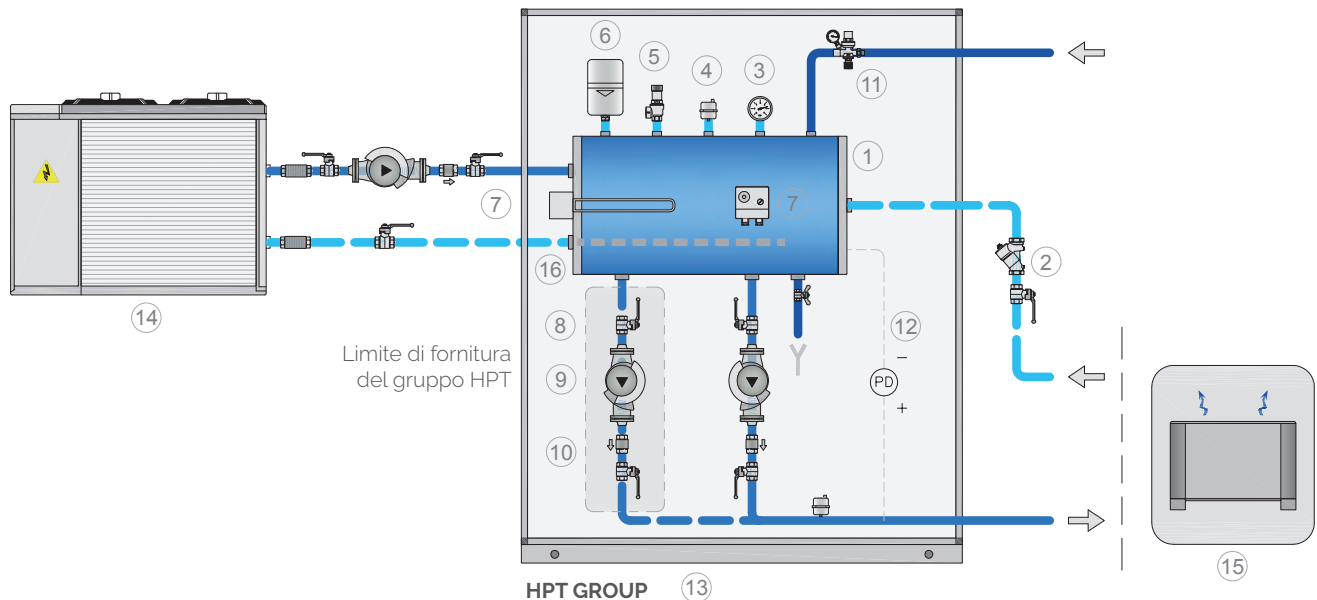
## Layout 1



### Legend

1. storage tank
2. Y filter. Optional, supplied non-assembled
3. Manometer
4. deaerator
5. Safety valve
6. Expansion vessel
7. Kit with electric anti-freeze resistance and anti-freeze thermostat (optional)
8. on-off valve
9. Circulator
10. Check valve (only version with 2 pumps)
11. automatic filling unit
12. differential pressure switch (optional)
13. self-supporting wooden structure for outside placement
14. Chiller
15. Device

# HPT hydronic system Layout 2



## Legend

1. storage tank
2. Y filter. Optional, supplied non-assembled
3. Manometer
4. Deaerator
5. Safety valve
6. Expansion vessel
7. Kit with electric anti-freeze resistance and anti-freeze thermostat (optional)
8. on-off valve
9. circulator
10. check valve (only version with 2 pumps)
11. Automatic filling unit
12. Differential pressure switch (optional)
13. Self-supporting wooden structure for outdoor placement
14. Chiller
15. Device