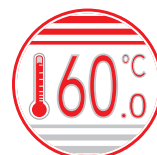


Ferrolì

HSW LT

WATER - WATER AND BRINE - WATER
HEAT PUMPS
FOR OUTDOOR OR INDOOR INSTALLATION



TECHNICAL MANUAL

The manufacturer declines all the responsibilities regarding inaccuracies contained in this manual, if due to printing or typing mistakes. The manufacturer reserves the right to apply changes and improvements to the products at any time without notice.

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GENERAL FEATURES

Unit description

This series of **water-water** heat pumps satisfies the heating, cooling and domestic hot water production requirements of residential plants of small and medium size.

All the units are suitable for outdoor or indoor installation and can be applied to **fan coil** plants, **radiant** floor plants and high efficiency **radiators** plants.

As source both water (from well, river, lake...) or brine solutions (from geothermic probes) can be used.

The control system allows to manage not only the refrigerant circuit but the whole plant with the possibility to choose different solutions both for the heating and cooling plant and for the domestic hot water management. The possibility of solar panels or other heating sources integration is also available.

The **heating** function optimizes the flow water temperature according both to the ambient temperature and to the outdoor temperature through climatic curves adaptable to the building features. It's possible to manage a storage tank and two independent circuits (a direct one and a mixed one).

The **domestic hot water** management allows to control the three way valve, the storage tank and the anti-legionella cycles (if necessary).

The **cooling** function can be realized through "passive cooling" (free cooling), through "active cooling" (refrigerant circuit inversion) or through both systems actuated in sequence. When the unit is used in radiant floor plants, to avoid condensate generation, a room humidity sensor can be installed.

The **internal programmer clock** allows to define different daily switching programs for heating, cooling and domestic hot water production.

The refrigerant circuit is equipped with scroll compressor mounted on damper supports, brazed plate heat exchangers, thermostatic expansion valve and reverse cycle valve (for reversible units). The circuit is protected by high and low pressure switches and flow switches on both the exchangers.

The outdoor structure is **thermally and acoustically insulated** in order to reduce sound propagation and to allow the installation in domestic places.

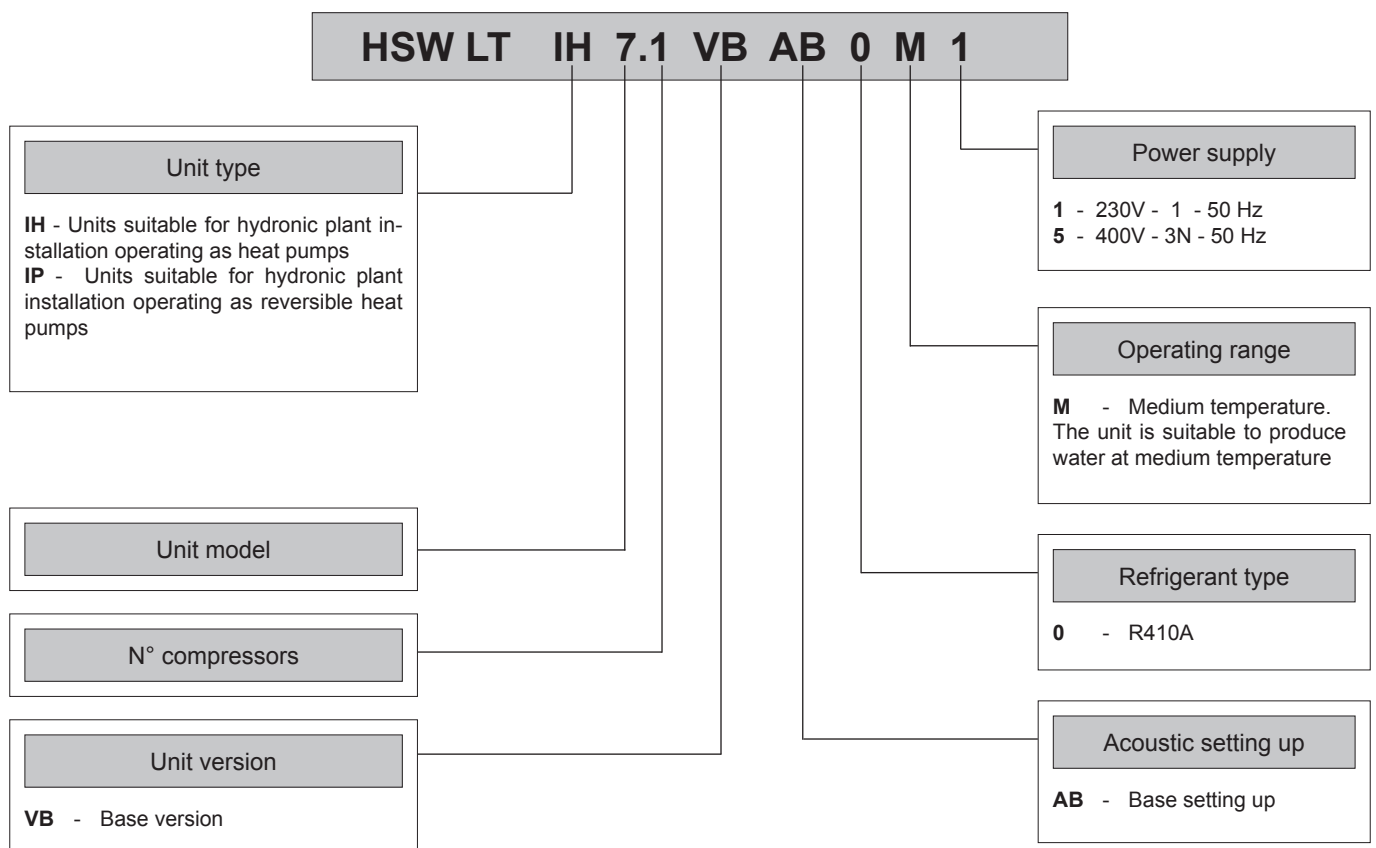
All the hydraulic pipes are thermally insulated to avoid condensate generation.

The three phase electrical power supply heat pumps are supplied with phase sequence and voltage controller integrated inside the unit controller.

All the units are accurately built and individually tested in the factory. Only electric and hydraulic connections are required for installation.

Unit identification code

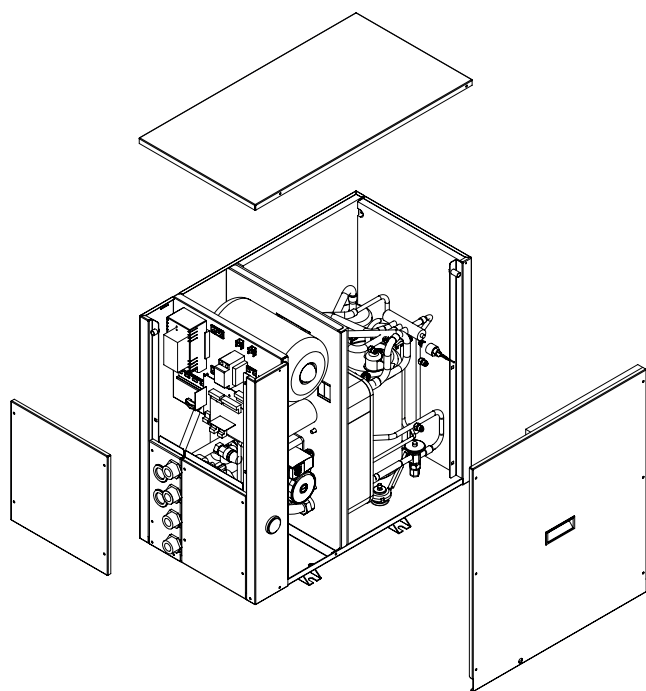
The codes that identify the units and the meaning of the letters used are described below.



GENERAL FEATURES

Description of components

External structure. Basement, lateral panels and upper panel, are thermally and acoustically insulated in order to minimize thermal losses and noise emissions in the surroundings. Accessibility to internal parts is possible removing the frontal panel, the upper panel and the electrical board panel. For extraordinary maintenances also the lateral panel can be removed.



Refrigerant circuit. It is contained inside a compartment separated from the hydraulic circuit to simplify maintenance and control operations.

The hermetic scroll **compressor** (1) is mounted on damper supports and is protected against overtemperatures and overcurrents.

The heat exchangers on the plant side (2) and on the source side (3) are realized with brazed stainless steel plates, properly insulated to avoid condensate generation and to minimize thermal losses, and protected by a flow switch that detects whatever water flow lack.

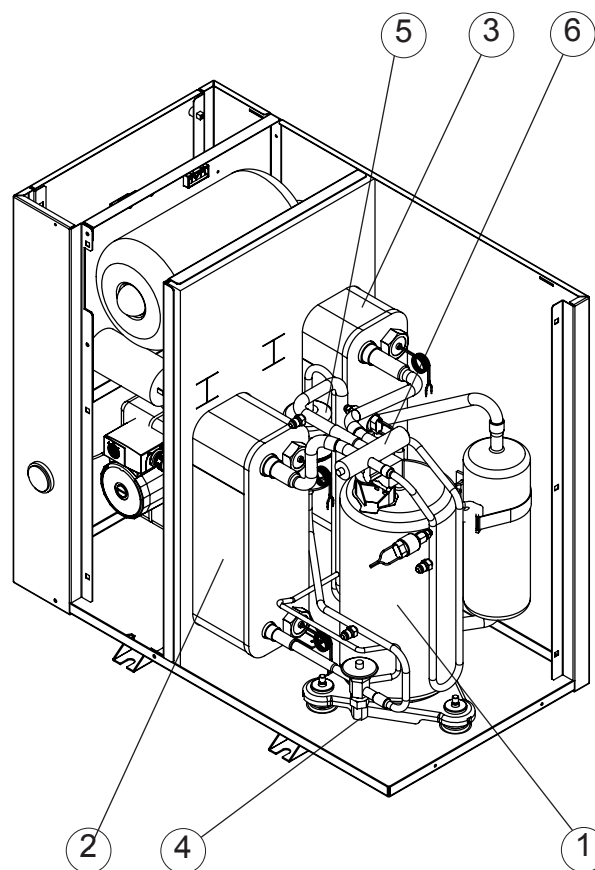
The expansion device (4), a thermostatic expansion valve with external equalizer, allows the unit to adjust itself to the different operating conditions keeping steady the set superheating. The refrigerant circuit of each unit contains moreover solid core hermetic **filter dryer** (5) to restrain impurity and moisture residuals that could be present in the circuit, **high and low pressure switches** in order to assure the compressor to operate inside the permitted limits, **4 way reverse cycle valve** (6) to allow operating mode change reversing the refrigerant flow (only for reversible heat pumps), **pressure connections**

SAE 5/16" - UNF 1/2" - 20 equipped with pin, gasket and blind nut, as required for the use of R410A refrigerant (they allow the complete check of the refrigerant circuit : compressor inlet pressure, compressor outlet pressure, thermostatic expansion valve upstream pressure and pressure drops accross the filter). All the pipes of the refrigerant circuit are properly insulated to avoid condensate generation and to minimize thermal losses.

Hydraulic circuit. All the pipes are thermally insulated to avoid condensate generation and minimize thermal losses. The hydraulic circuit on the plant side is equipped with expansion vessel, safety valve and manometer and can be equipped with a standard, high head or modulating circulation pump (option).

Electrical panel. It contains all the power, control and security components necessary to guarantee the unit to work properly. The unit is managed by a **microprocessor controller** to which all the electrical loads and the control devices are connected. The user interface, to be placed indoor, allows to view and to modify, if necessary, all the parameters of the unit.

All the units are supplied with an **outdoor temperature sensor**, to be installed outside, in order to realize the climatic control.



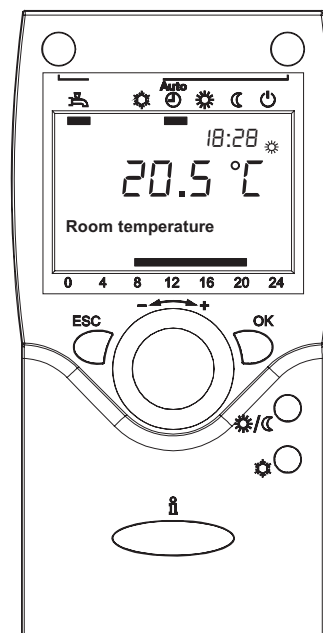
GENERAL FEATURES

Control system

The microprocessor controller is able to manage not only the unit itself but also all that components of the plant which allow to realize a complete system.

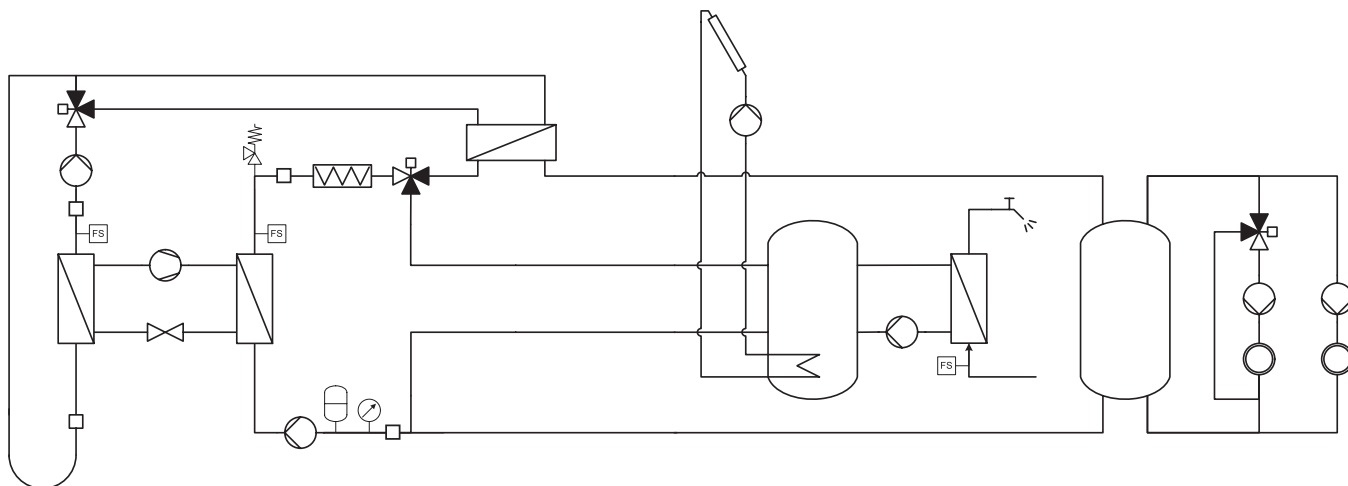
The main functions of the control system are :

- room temperature control according to the outdoor temperature (climatic control)
- domestic hot water production (management of 3 way valve, storage tank, anti legionella cycles...)
- management of a heating and/or cooling mixed circuit (pump and 3 way mixing valve)
- management of a heating direct circuit (only pump)
- management of a storage tank for heating and/or cooling
- management of electrical heaters for heating and domestic hot water (3 steps logic)
- solar panels integration
- supplementary heat sources integration
- room humidity control for cooling with radiant systems
- internal programmer clock (for heating, cooling and domestic hot water)
- digital input for electrical energy low tariff
- alarm memory management and diagnostic
- compressor and pump operating hour counter
- possibility to manage more units in cascade (maximum 16)



Besides the user interface of the unit to be placed indoor, wired or wireless remote thermostats are available which allow to control all the operating parameters of the unit and to acquire the temperature in the different zones in order to realize a more precise and comfortable control.

The unit controller is able to manage a lot of different plant solutions enabling automatically the necessary control algorithms according to the components which have been connected. The management of such components is possible through additional expansion modules which communicate with the unit by means of an internal bus and provide all the inputs and outputs required to fulfil a complete system.



The controller is able to manage up to **two zones in heating** (one by means of a mixed circuit and the other by means of a direct circuit) and **one zone in cooling** (by means of a mixed circuit).

It's possible to realize more complex plants connecting to the heat pump controller further expansion modules in order to extend without limits the number of zones to be managed.

For each zone the following parameters can be set :

- set point
- daily or weekly operating time table
- climatic control curve
- room control sensor : it can be in common with the other zones or independent (in that case it's necessary to install an additional room thermostat)

GENERAL FEATURES

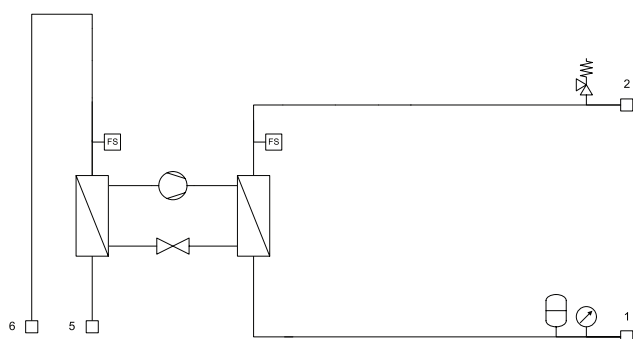
Options

Plant side flow rate management	Pump (standard, high head or modulating)	Allows the circulation of the water on the plant side. With the modulating pump is possible to control the flow rate in order to keep constant the temperature difference between inlet and outlet.
Soft starter		Reduces the compressor start current.

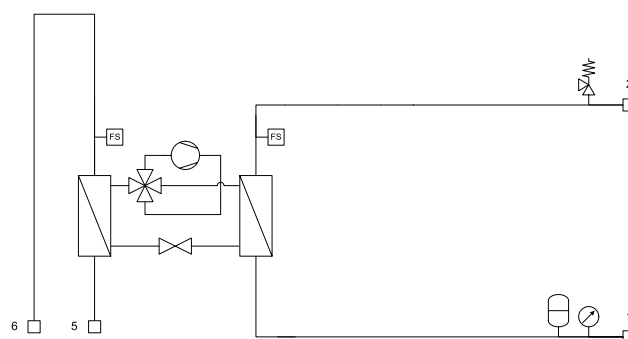
The controller flexibility and the big number of options available allow to get, for each model, a lot of different configurations that integrate inside the heat pump many components of the plant and allow to realize compact and tested installations.

In order to select the right configuration it is necessary to define the type of plant to which the heat pump will be connected, both for what concerning the heating and cooling circuits, and for what concerning the domestic hot water management.

Not reversible heat pump (IH) without options

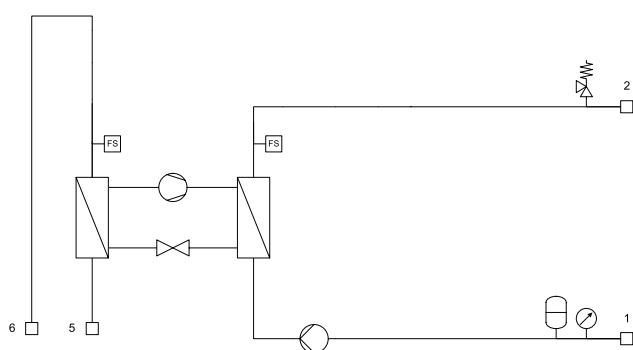


Reversible heat pump (IP) without options



Option "Plant side flow rate management"

Pump (standard or high head or modulating)



GENERAL FEATURES

Accessories

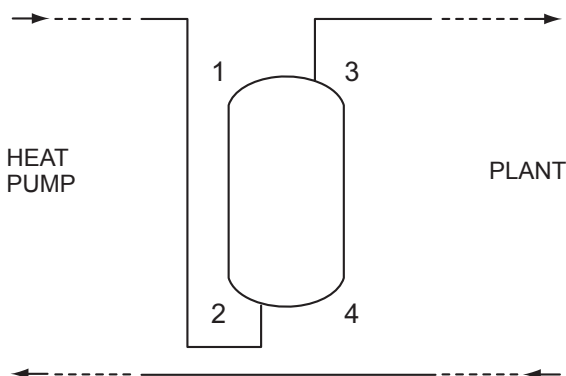
Rubber vibration dampers	Allow to reduce the transmission to the unit support plane of the mechanical vibrations generated by the compressor and by the pumps in their normal operating mode.
Plant tank	Allows to increase the thermal inertia of the plant and to guarantee a higher stability of the water sent to the hydronic distribution circuits.
Remote thermostat (wired or wireless)	Allows operating mode selection and set point adjustment. The on board temperature sensor can be used in order to realize a climatic control.
Remote control (wired or wireless)	Replicates all the control and visualization functionalities of the controller installed on the unit. The on board temperature sensor can be used in order to realize a climatic control.
LPB bus interface	Connected to the unit controller, allows to communicate on the LPB bus, required for the cascade management.
Wireless transmitter	Connected to the unit controller, allows to communicate with the wireless remote control and the wireless outdoor temperature sensor.
BSB wireless transmitter	Connected to the communication bus (BSB) of the unit controller, allows to communicate with the wireless remote control and the wireless outdoor temperature sensor.
Wireless repeater	Extends wireless operating range.
Wireless adaptor for outdoor temperature sensor	Allows to transform the wired outdoor temperature sensor, standard for all the units, in a wireless sensor.
Condensate sensor	In cooling mode it allows the minimum flow temperature control when condensate generation occurs.
Room hygostat	In cooling mode it allows the minimum flow temperature control according to the room humidity.
Room humidity sensor (with or without display)	In cooling mode it allows the minimum flow temperature control according to the room dew point, calculated from the measured room humidity.
Transformer 230V / 24V - 3VA	It assures the correct power supply for the condensate sensor and for the room humidity sensor.

ACCESSORY : Plant tank

The tank is equipped with 4 hydraulic fittings and can therefore be configured either as tank in the flow or as primary-secondary tank modifying the connection pipes with the heat pump.

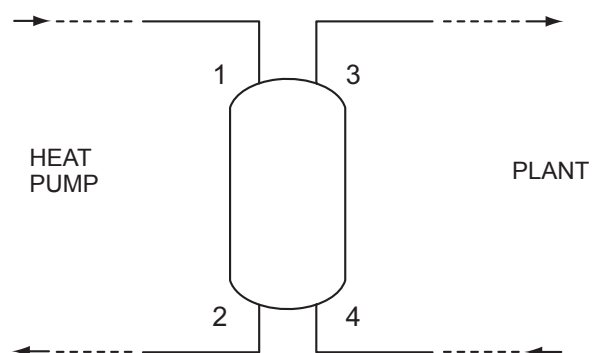
Tank in the flow

The tank allows to increase the thermal inertia of the system. The distribution circuits must be designed taking into account the minimum water flow rate to be guaranteed through the heat pump and the required available static heads. The heat pump control is based on the return temperature which is steadily monitored keeping always running the heat pump circulation pump.



Primary - secondary tank

The tank, besides increasing the thermal inertia of the system, operates also as hydraulic separator allowing an optimized management of the distribution circuits of the plant. The heat pump control is based on the tank temperature and the heat pump circulation pump is activated only when necessary.



GENERAL FEATURES

Technical data

Frame	1					
Model	3.1	5.1	7.1	9.1	11.1	U.M.
Power supply	230 - 1 - 50	230 - 1 - 50	230 - 1 - 50	230 - 1 - 50	230 - 1 - 50	V-ph-Hz
Refrigerant						
Type	R410A	R410A	R410A	R410A	R410A	-
Compressor						
Type	rotary	rotary	rotary	rotary	rotary	-
Quantity	1	1	1	1	1	n°
Power steps	0 - 100	0 - 100	0 - 100	0 - 100	0 - 100	%
Oil charge	0,35	0,43	0,67	1,13	1,13	kg
Plant side heat exchanger						
Type	stainless steel brazed plates	stainless steel brazed plates	stainless steel brazed plates	stainless steel brazed plates	stainless steel brazed plates	-
Quantity	1	1	1	1	1	n°
Water volume	0,53	0,53	0,53	0,67	0,84	l
Source side heat exchanger						
Type	stainless steel brazed plates	stainless steel brazed plates	stainless steel brazed plates	stainless steel brazed plates	stainless steel brazed plates	-
Quantity	1	1	1	1	1	n°
Water volume	0,67	0,67	0,67	0,84	1,04	l
Plant side hydraulic circuit						
Safety valve set point	3	3	3	3	3	bar
Expansion vessel volume	5	5	5	5	5	l
Plant side pump - standard (option)						
Type	3 speed glandless pump	3 speed glandless pump	3 speed glandless pump	3 speed glandless pump	3 speed glandless pump	-
Quantity	1	1	1	1	1	n°
Installed power	0,14	0,14	0,14	0,14	0,14	kW
Plant side pump - high headed (option)						
Type	3 speed glandless pump	3 speed glandless pump	3 speed glandless pump	3 speed glandless pump	3 speed glandless pump	-
Quantity	1	1	1	1	1	n°
Installed power	0,15	0,15	0,15	0,15	0,15	kW
Plant side pump - modulating (option)						
Type	inverter glandless pump	inverter glandless pump	inverter glandless pump	inverter glandless pump	inverter glandless pump	-
Quantity	1	1	1	1	1	n°
Installed power	0,14	0,14	0,14	0,14	0,14	kW
Plant tank (accessory)						
Volume	40	40	40	40	40	l

TECHNICAL DATA AND PERFORMANCES

NOMINAL performances - HIGH TEMPERATURE plants

Frame	1					
Model	3.1	5.1	7.1	9.1	11.1	U.M.
Power supply	230 - 1 - 50	230 - 1 - 50	230 - 1 - 50	230 - 1 - 50	230 - 1 - 50	V-ph-Hz

IH

Heating W10W55 (source : water in 10°C out 7°C / plant : water in 47°C out 55°C)						
Heating capacity	2,82	4,27	5,72	7,78	9,85	kW
Power input	0,84	1,28	1,75	2,37	3,03	kW
COP	3,36	3,34	3,27	3,28	3,25	-
Water flow rate plant side	307	465	623	847	1072	l/h
Pressure drops plant side	1	3	6	7	8	kPa
Water flow rate source side	566	858	1141	1552	1955	l/h
Pressure drops source side	3	8	12	14	15	kPa
Heating B0W55 (source : brine in 0°C out -3°C / plant : water in 47°C out 55°C)						
Heating capacity	2,15	3,25	4,36	5,93	7,50	kW
Power input	0,81	1,23	1,68	2,27	2,92	kW
COP	2,65	2,64	2,60	2,61	2,57	-
Water flow rate plant side	234	354	475	646	817	l/h
Pressure drops plant side	-1	1	3	4	5	kPa
Water flow rate source side	426	643	856	1168	1463	l/h
Pressure drops source side	2	5	8	9	10	kPa

IP	Heating W10W55 (source : water in 10°C out 7°C / plant : water in 47°C out 55°C)						
	Heating capacity	2,76	4,19	5,61	7,63	9,69	kW
	Power input	0,82	1,27	1,74	2,33	3,00	kW
	COP	3,37	3,30	3,22	3,27	3,23	-
	Water flow rate plant side	301	457	611	830	1055	l/h
	Pressure drops plant side	0	3	6	7	7	kPa
	Water flow rate source side	555	838	1112	1518	1918	l/h
	Pressure drops source side	3	7	12	14	14	kPa
	Heating B0W55 (source : brine in 0°C out -3°C / plant : water in 47°C out 55°C)						
	Heating capacity	2,10	3,19	4,28	5,81	7,37	kW
	Power input	0,79	1,21	1,67	2,24	2,89	kW
	COP	2,66	2,64	2,56	2,59	2,55	-
	Water flow rate plant side	229	348	466	633	803	l/h
	Pressure drops plant side	-1	1	3	4	5	kPa
	Water flow rate source side	417	630	834	1139	1432	l/h
	Pressure drops source side	2	5	8	9	9	kPa

Data declared according to **EN 14511**. The values are referred to units without options or accessories. Brine = water with 30% ethylene glycol.

TECHNICAL DATA AND PERFORMANCES

NOMINAL performances - STANDARD plants

Frame	1					
Model	3.1	5.1	7.1	9.1	11.1	U.M.
Power supply	230 - 1 - 50	230 - 1 - 50	230 - 1 - 50	230 - 1 - 50	230 - 1 - 50	V-ph-Hz

IH	Heating W10W45 (source : water in 10°C out 7°C / plant : water in 40°C out 45°C)						
	Heating capacity	3,10	4,70	6,31	8,58	10,8	kW
	Power input	0,72	1,10	1,51	2,04	2,62	kW
	COP	4,31	4,27	4,18	4,21	4,12	-
	Water flow rate plant side	539	815	1093	1486	1877	l/h
	Available static head plant side	60	52	43	36	30	kPa
	Water flow rate source side	683	1032	1378	1878	2361	l/h
	Pressure drops source side	5	10	17	19	20	kPa
	Heating B0W45 (source : brine in 0°C out -3°C / plant : water in 40°C out 45°C)						
	Heating capacity	2,32	3,51	4,72	6,40	8,11	kW
	Power input	0,70	1,07	1,47	1,99	2,55	kW
	COP	3,31	3,28	3,21	3,22	3,18	-
	Water flow rate plant side	403	610	819	1111	1406	l/h
	Available static head plant side	63	58	52	48	44	kPa
	Water flow rate source side	515	779	1037	1409	1775	l/h
	Pressure drops source side	3	7	11	13	13	kPa

IP

Heating W10W45 (source : water in 10°C out 7°C / plant : water in 40°C out 45°C)						
Heating capacity	3,03	4,61	6,19	8,40	10,6	kW
Power input	0,71	1,09	1,50	2,02	2,59	kW
COP	4,27	4,23	4,13	4,16	4,09	-
Water flow rate plant side	527	799	1072	1456	1842	l/h
Available static head plant side	60	53	44	37	31	kPa
Water flow rate source side	666	1009	1347	1835	2310	l/h
Pressure drops source side	5	10	16	19	19	kPa
Heating B0W45 (source : brine in 0°C out -3°C / plant : water in 40°C out 45°C)						
Heating capacity	2,27	3,44	4,62	6,27	7,96	kW
Power input	0,69	1,06	1,46	1,96	2,53	kW
COP	3,29	3,25	3,16	3,20	3,15	-
Water flow rate plant side	395	598	801	1088	1382	l/h
Available static head plant side	63	58	53	48	45	kPa
Water flow rate source side	503	760	1009	1378	1737	l/h
Pressure drops source side	3	6	11	12	13	kPa
Cooling W30W7 (source : water in 30°C out 35°C / plant : water in 12°C out 7°C)						
Cooling capacity	2,73	4,13	5,54	7,52	9,54	kW
Power input	0,59	0,91	1,26	1,69	2,16	kW
EER	4,63	4,54	4,40	4,45	4,42	-
Water flow rate plant side	469	710	952	1294	1641	l/h
Available static head plant side	62	56	48	43	38	kPa
Water flow rate source side	575	873	1174	1592	2021	l/h
Pressure drops source side	4	8	13	15	15	kPa
Cooling B30W7 (source : brine in 30°C out 35°C / plant : water in 12°C out 7°C)						
Cooling capacity	2,67	4,05	5,42	7,35	9,33	kW
Power input	0,60	0,92	1,28	1,72	2,21	kW
EER	4,45	4,40	4,23	4,27	4,22	-
Water flow rate plant side	458	695	932	1265	1605	l/h
Available static head plant side	62	56	49	44	39	kPa
Water flow rate source side	615	933	1256	1702	2162	l/h
Pressure drops source side	4	9	15	17	18	kPa

Data declared according to **EN 14511**. The values are referred to units without options or accessories. Brine = water with 30% ethylene glycol.

TECHNICAL DATA AND PERFORMANCES

NOMINAL performances - RADIANT plants

Frame	1					
Model	3.1	5.1	7.1	9.1	11.1	U.M.
Power supply	230 - 1 - 50	230 - 1 - 50	230 - 1 - 50	230 - 1 - 50	230 - 1 - 50	V-ph-Hz

IH	Heating W10W35 (source : water in 10°C out 7°C / plant : water in 30°C out 35°C)						
	Heating capacity	3,37	5,11	6,85	9,31	11,8	kW
	Power input	0,59	0,89	1,24	1,69	2,18	kW
	COP	5,71	5,74	5,52	5,51	5,41	-
	Water flow rate plant side	584	883	1183	1607	2043	l/h
	Available static head plant side	59	50	40	32	25	kPa
	Water flow rate source side	798	1209	1612	2193	2782	l/h
	Pressure drops source side	7	14	22	25	26	kPa
	Heating B0W35 (source : brine in 0°C out -3°C / plant : water in 30°C out 35°C)						
	Heating capacity	2,49	3,78	5,07	6,88	8,72	kW
	Power input	0,58	0,89	1,23	1,66	2,14	kW
	COP	4,29	4,25	4,12	4,14	4,07	-
	Water flow rate plant side	431	655	876	1190	1507	l/h
	Available static head plant side	63	57	50	46	41	kPa
	Water flow rate source side	608	923	1228	1670	2103	l/h
	Pressure drops source side	4	9	15	17	17	kPa

IP

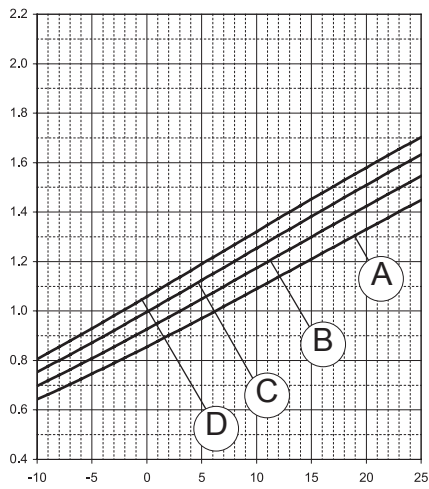
Heating W10W35 (source : water in 10°C out 7°C / plant : water in 30°C out 35°C)						
Heating capacity	3,30	5,01	6,72	9,13	11,6	kW
Power input	0,58	0,89	1,23	1,67	2,15	kW
COP	5,69	5,63	5,46	5,47	5,40	-
Water flow rate plant side	571	866	1160	1576	2009	l/h
Available static head plant side	59	51	41	33	26	kPa
Water flow rate source side	780	1181	1578	2147	2730	l/h
Pressure drops source side	6	13	21	24	25	kPa
Heating B0W35 (source : brine in 0°C out -3°C / plant : water in 30°C out 35°C)						
Heating capacity	3,30	5,01	6,72	9,13	11,6	kW
Power input	0,58	0,89	1,23	1,67	2,15	kW
COP	5,69	5,63	5,46	5,47	5,40	-
Water flow rate plant side	571	866	1160	1576	2009	l/h
Available static head plant side	59	51	41	33	26	kPa
Water flow rate source side	780	1181	1578	2147	2730	l/h
Pressure drops source side	6	13	21	24	25	kPa
Cooling W30W18 (source : water in 30°C out 35°C / plant : water in 23°C out 18°C)						
Cooling capacity	3,59	5,43	7,27	9,87	12,6	kW
Power input	0,59	0,90	1,25	1,69	2,17	kW
EER	6,08	6,03	5,82	5,84	5,81	-
Water flow rate plant side	619	938	1257	1709	2173	l/h
Available static head plant side	58	49	37	28	21	kPa
Water flow rate source side	722	1094	1470	1995	2541	l/h
Pressure drops source side	6	12	19	21	22	kPa
Cooling B30W18 (source : brine in 30°C out 35°C / plant : water in 23°C out 18°C)						
Cooling capacity	3,51	5,30	7,11	9,63	12,3	kW
Power input	0,60	0,92	1,28	1,72	2,22	kW
EER	5,85	5,76	5,55	5,60	5,54	-
Water flow rate plant side	605	916	1229	1667	2121	l/h
Available static head plant side	59	49	38	30	23	kPa
Water flow rate source side	771	1166	1570	2127	2710	l/h
Pressure drops source side	7	13	22	25	26	kPa

Data declared according to **EN 14511**. The values are referred to units without options or accessories. Brine = water with 30% ethylene glycol.

TECHNICAL DATA AND PERFORMANCES

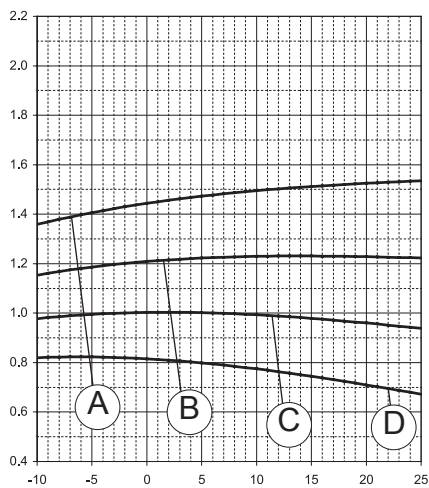
HEATING performances

Heating capacity (brine)



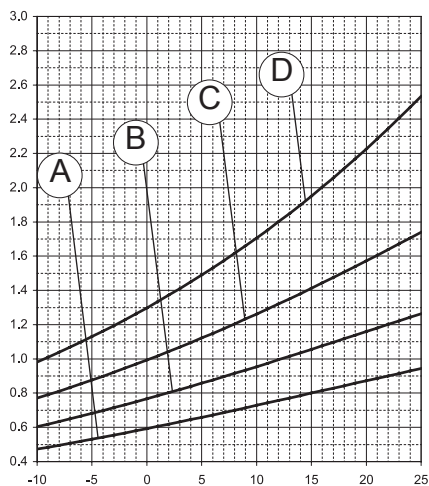
Inlet temperature - source side [°C]

Power input (brine and water)



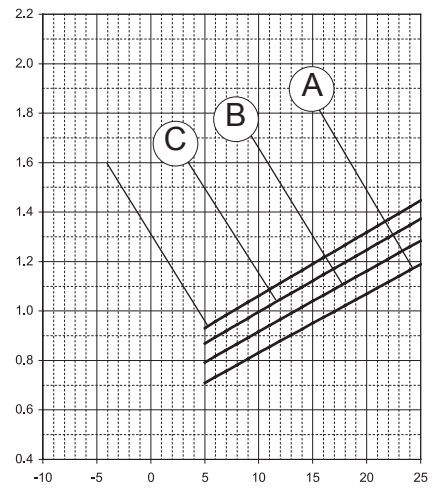
Temperatura ingresso - lato sorgente [°C]

COP (brine)



Inlet temperature - source side [°C]

Heating capacity (water)



Inlet temperature - source side [°C]

The graphs allow to get the corrective factors to be applied to the nominal performances in order to obtain the real performances in the selected operating conditions.

The reference nominal conditions are :

WATER-WATER units : W10W35

source : water in 10°C out 7°C

plant : water in 30°C out 35°C

BRINE-WATER units : B0W35

source : brine in 0°C out -3°C

plant : water in 30°C out 35°C

Outlet temperature

plant side :

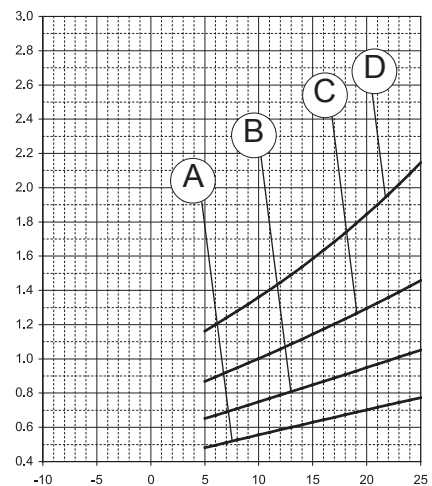
A = 55°C

B = 45°C

C = 35°C

D = 25°C

COP (water)

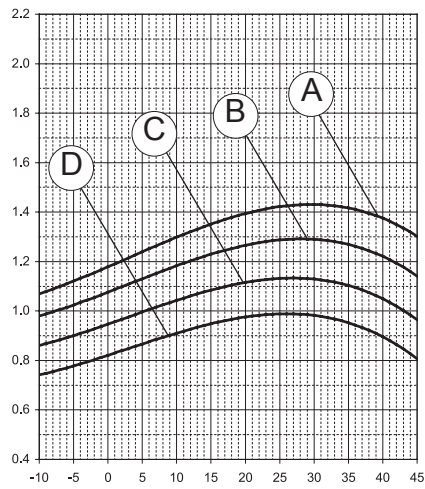


Inlet temperature - source side [°C]

TECHNICAL DATA AND PERFORMANCES

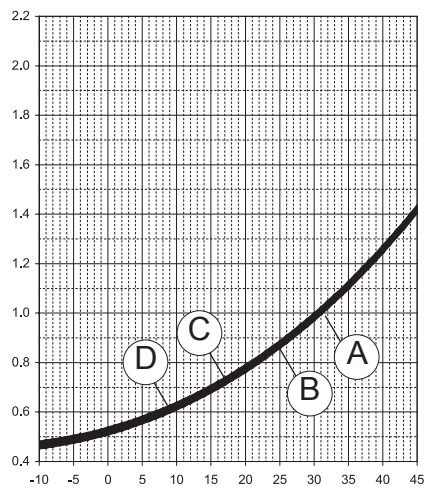
COOLING performances

Cooling capacity (brine and water)



Inlet temperature - source side [°C]

Power input (brine and water)



Inlet temperature - source side [°C]

The graphs allow to get the corrective factors to be applied to the nominal performances in order to obtain the real performances in the selected operating conditions.

The reference nominal conditions are :

WATER-WATER units : W30W7

source : water in 30°C out 35°C

plant : water in 12°C out 7°C

BRINE-WATER units : B30W7

source : brine in 30°C out 35°C

plant : water in 12°C out 7°C

Outlet temperature

plant side :

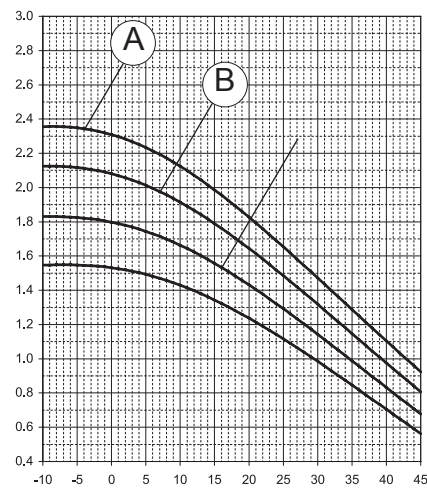
A = 24°C

B = 18°C

C = 12°C

D = 7°C

EER (brine and water)



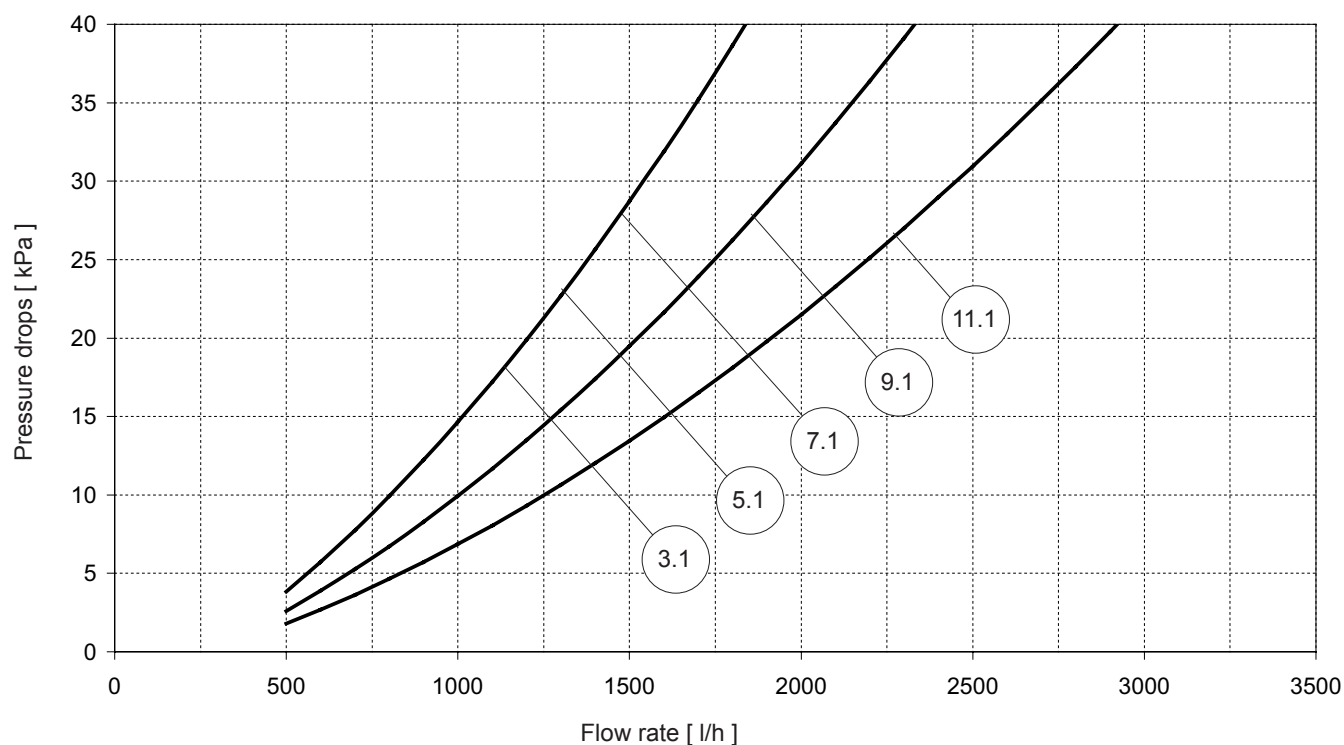
Inlet temperature - source side [°C]

The performances of the units, when used as brine - water, are referred to applications in which the source side fluid is a solution of water and 30% ethylene glycol by volume.
Such a concentration guarantees a freezing temperature of about -15°C and allows the unit to work inside the declared operating limits.

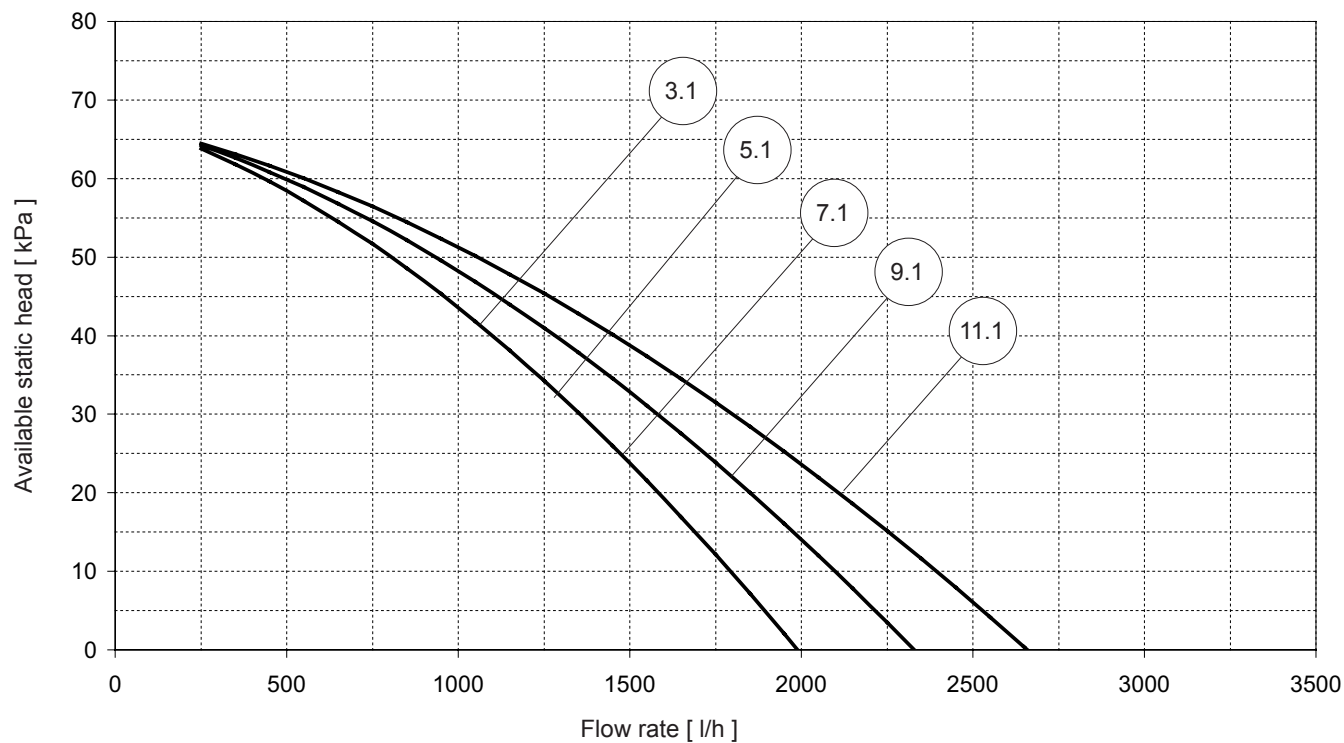
TECHNICAL DATA AND PERFORMANCES

Plant side hydraulic performances

Pressure drops - unit without options



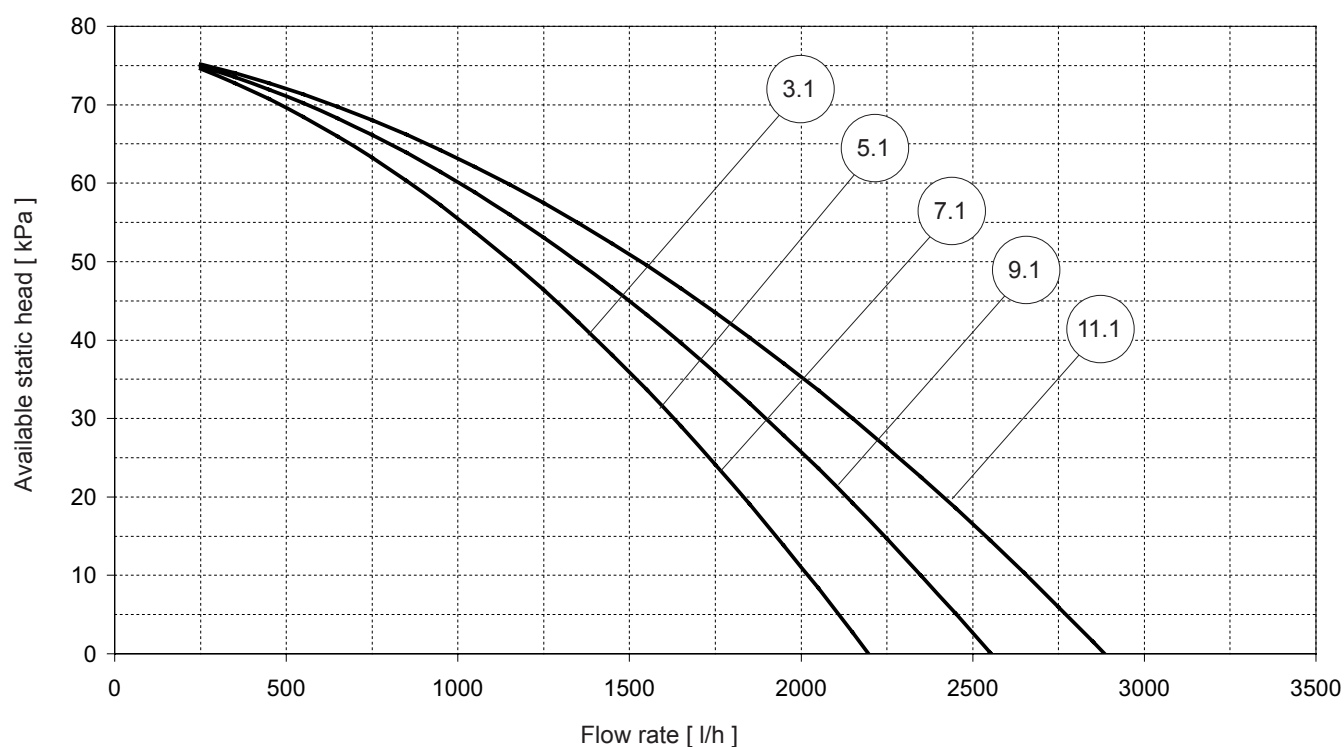
Available static head - unit with option "Plant side flow rate management" : "Standard pump"



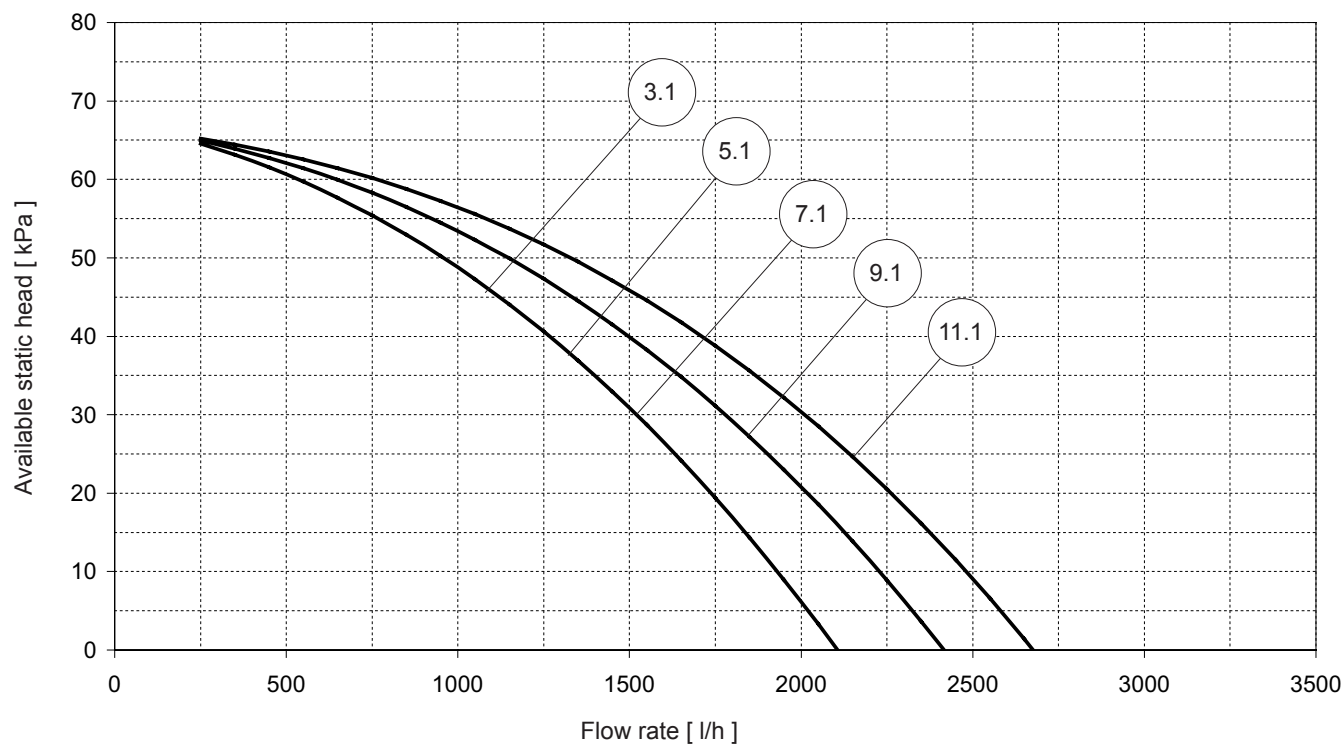
The graphs are referred to units operating with water at the temperature of 10°C (density 1000 kg/m³).

TECHNICAL DATA AND PERFORMANCES

Available static head - unit with option "Plant side flow rate management" : "High head pump"



Available static head - unit with option "Plant side flow rate management" : "Modulating pump"

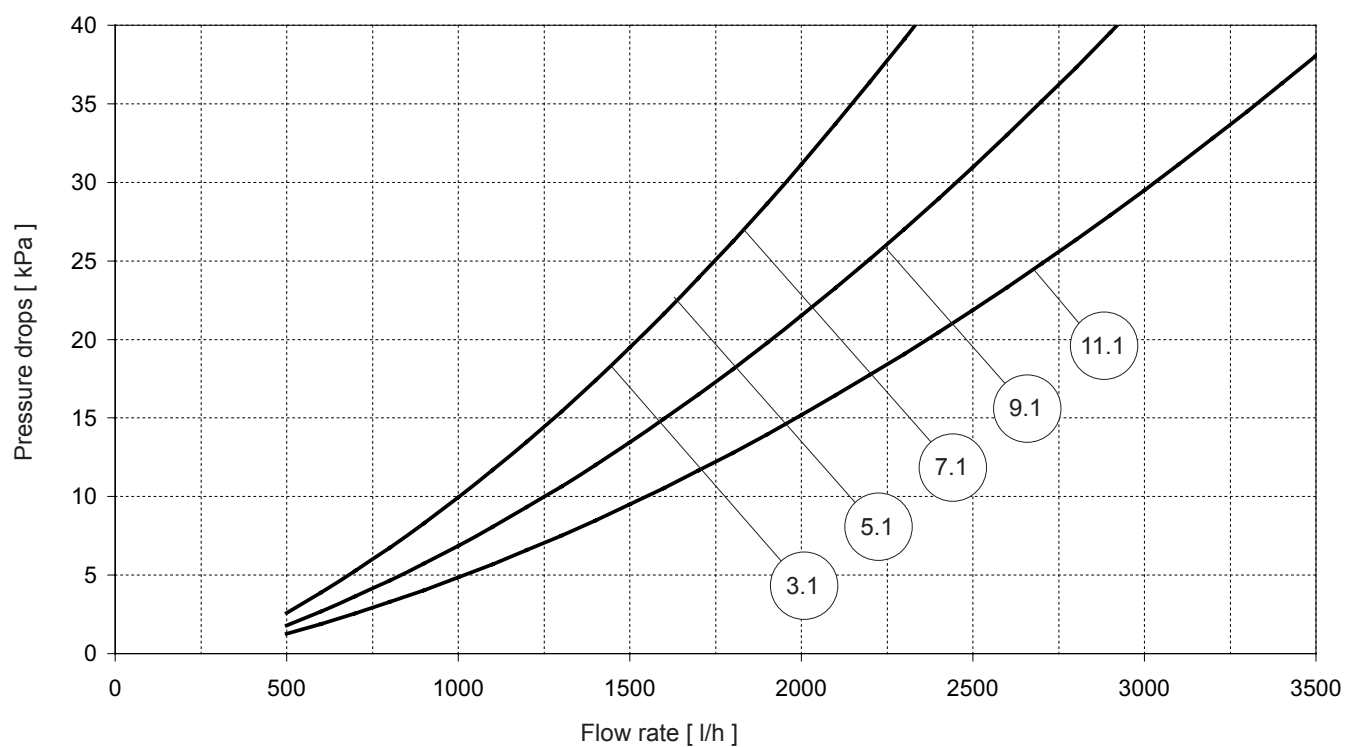


The graphs are referred to units operating with water at the temperature of 10°C (density 1000 kg/m³).

TECHNICAL DATA AND PERFORMANCES

Source side hydraulic performances

Pressure drops - unit without options

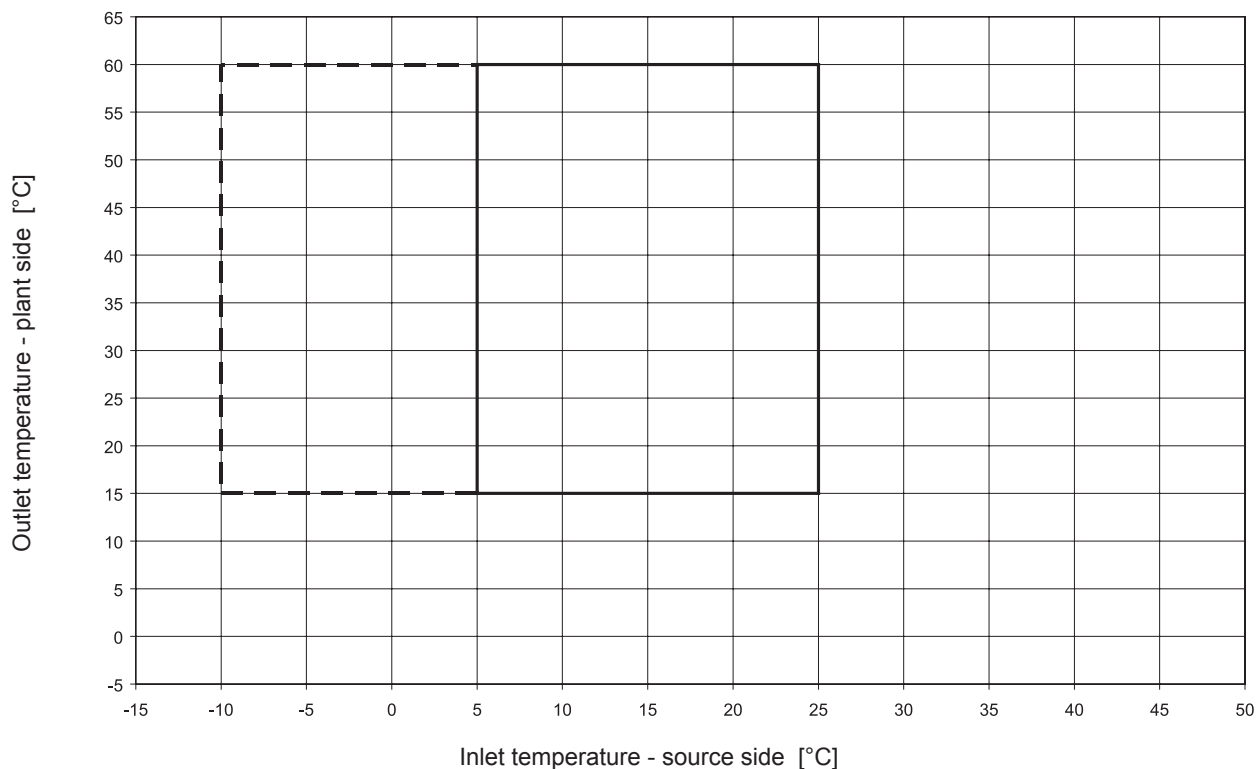


TECHNICAL DATA AND PERFORMANCES

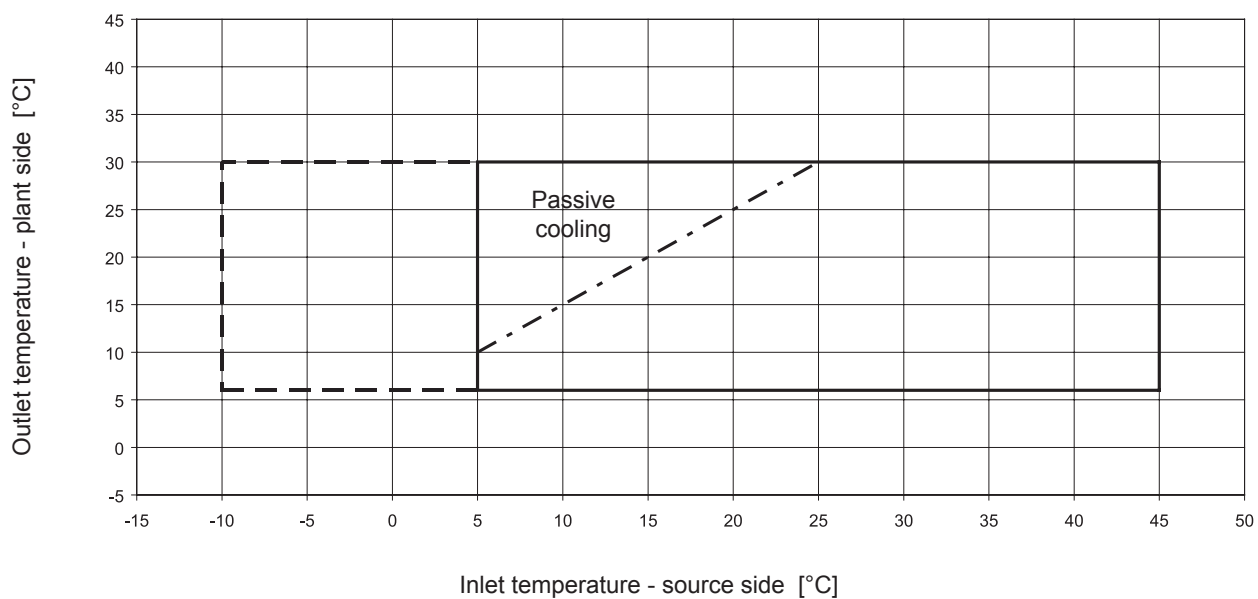
Operating limits

The graphs reported below show the operating area inside which the correct working of the unit is guaranteed. The dotted lines show the operating area when brine solutions in the source side hydraulic circuit are used.

HEATING



COOLING



Temperature difference between unit inlet and outlet		Plant side	Source side	
ΔT max	Maximum value	11	5	°C
ΔT min	Minimum value	3	1	°C

TECHNICAL DATA AND PERFORMANCES

Electrical data

Frame	1					
Model	3.1	5.1	7.1	9.1	11.1	U.M.

Unit

Power supply		230-1-50	230-1-50	230-1-50	230-1-50	230-1-50	V-ph-Hz
F.L.A.	Maximum total current input	5,2	7,0	9,4	12,6	16,3	A
F.L.I.	Maximum total power input	1,1	1,5	2,0	2,7	3,5	kW
M.I.C.	Maximum total start current	35	44	52	81	112	A
	Maximum total start current with soft starter (option)	31	34	37	41	42	A

Plant side pump - standard (option)

Power supply		230-1-50	230-1-50	230-1-50	230-1-50	230-1-50	V-ph-Hz
F.L.A.	Maximum total current input	0,7	0,7	0,7	0,7	0,7	A
F.L.I.	Maximum total power input	0,14	0,14	0,14	0,14	0,14	kW

Plant side pump - high head (option)

Power supply		230-1-50	230-1-50	230-1-50	230-1-50	230-1-50	V-ph-Hz
F.L.A.	Maximum total current input	0,8	0,8	0,8	0,8	0,8	A
F.L.I.	Maximum total power input	0,15	0,15	0,15	0,15	0,15	kW

Plant side pump - modulating (option)

Power supply		230-1-50	230-1-50	230-1-50	230-1-50	230-1-50	V-ph-Hz
F.L.A.	Maximum total current input	0,7	0,7	0,7	0,7	0,7	A
F.L.I.	Maximum total power input	0,14	0,14	0,14	0,14	0,14	kW

Noise levels

Modello	Sound power levels [dB] by octave bands [Hz]								Sound power level		Sound pressure		
											at 1 meter	at 5 meters	at 10 meters
	63	125	250	500	1000	2000	4000	8000	[dB]	[dB(A)]	[dB(A)]	[dB(A)]	[dB(A)]
3.1	82,2	72,3	57,3	40,7	40,0	31,6	29,9	30,9	83	60	46	34	28
5.1	83,2	73,3	58,3	41,7	41,0	32,6	30,9	31,9	84	61	47	35	29
7.1	83,2	73,3	58,3	41,7	41,0	32,6	30,9	31,9	84	61	47	35	29
9.1	84,2	74,3	59,3	42,7	42,0	33,6	31,9	32,9	85	62	48	36	30
11.1	84,2	74,3	59,3	42,7	42,0	33,6	31,9	32,9	85	62	48	36	30

Reference conditions

Performances referred to units operating in heating mode at nominal conditions W10W35.

Unit placed in free field on reflecting surface (directional factor equal to 2).

The sound power level is measured according to ISO 3744 standard.

The sound pressure level is calculated according to ISO 3744 and is referred to a distance of 1 meter from the external surface of the unit.

TECHNICAL DATA AND PERFORMANCES

Weights

Frame		1					
Model		3.1	5.1	7.1	9.1	11.1	U.M.

Components weights

Unit without options			91	101	103	112	115	kg
Options	Plant side flow rate management	Standard pump	2	2	2	2	2	kg
		High head pump	3	3	3	3	3	
		Modulating pump	3	3	3	3	3	kg
Accessories								
Plant tank			52	52	52	52	52	kg

Transport weights

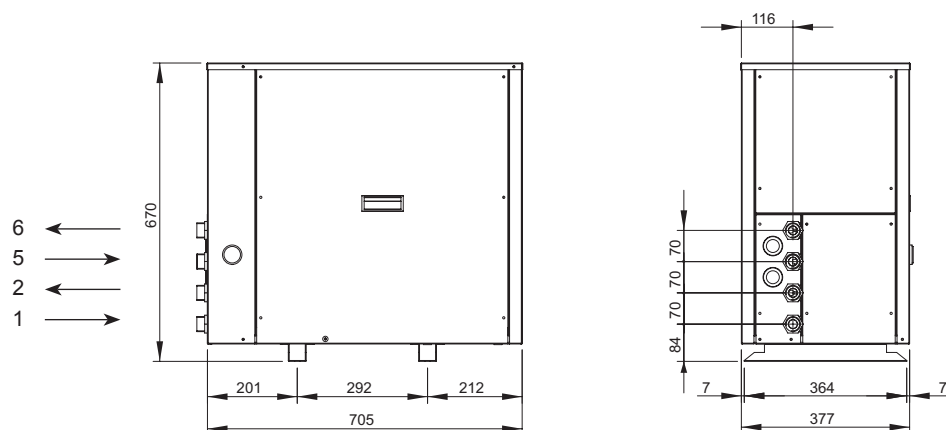
Unit without options			98	108	110	119	122	kg
Options	Plant side flow rate management	Standard pump	2	2	2	2	2	kg
		High head pump	3	3	3	3	3	
		Modulating pump	3	3	3	3	3	kg
Accessories								
Plant tank			59	59	59	59	59	kg

Operating weights

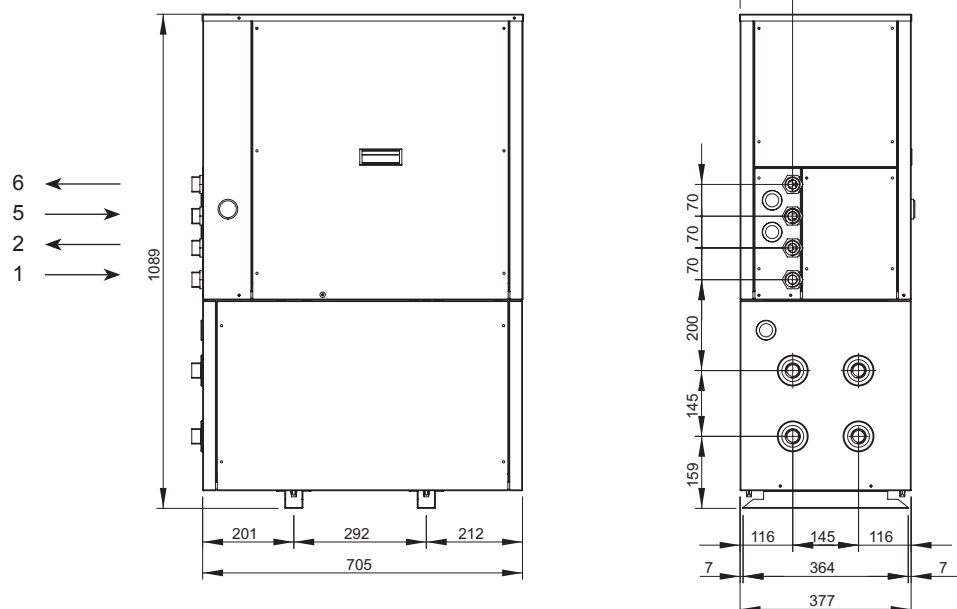
Unit without options			94	104	106	115	119	kg
Options	Plant side flow rate management	Standard pump	3	3	3	3	3	kg
		High head pump	4	4	4	4	4	
		Modulating pump	4	4	4	4	4	kg
Accessories								
Plant tank			92	92	92	92	92	kg

TECHNICAL DATA AND PERFORMANCES

Overall dimensions



Unit with accessory "Plant tank"

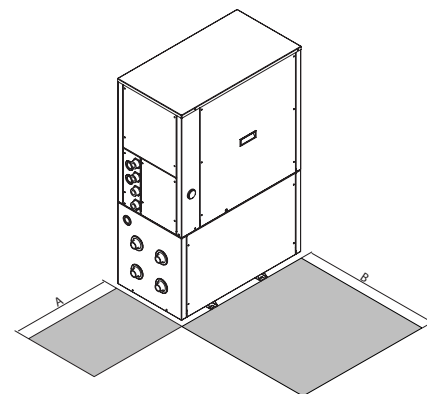
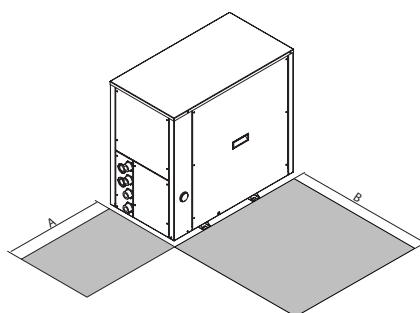


1	Source return	1" M
2	Source flow	1" M
5	Plant return	1" M
6	Plant flow	1" M

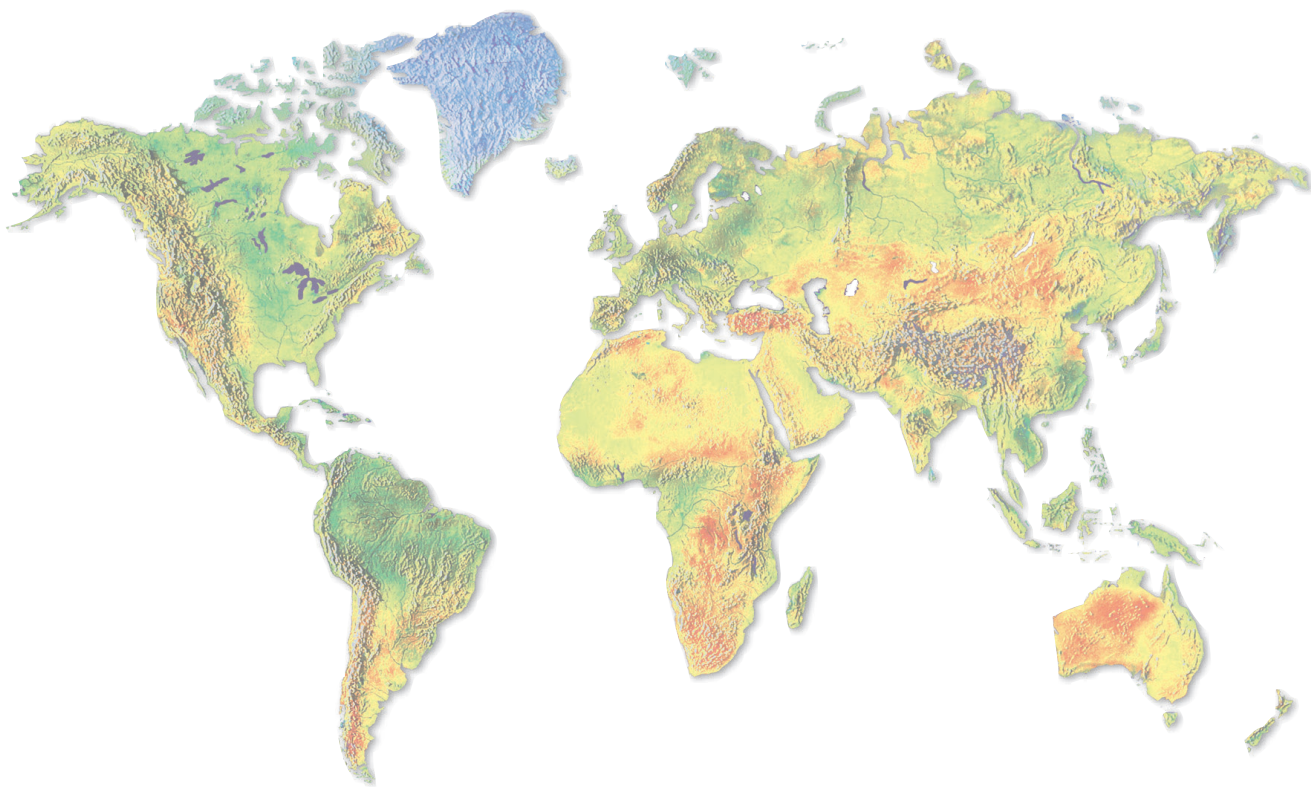
Minimum operating area

Respect the free area around the unit as shown in figure in order to guarantee a good accessibility and facilitate maintenance and control operations.

A	600 mm
B	600 mm



Unit with accessory
"Plant tank"



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