Ferroli

# HGA

AIR-WATER
HEAT PUMPS
FOR OUTDOOR INSTALLATION


TECHNICAL MANUAL

The manufacturer declines all the responsabilities 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.

# TABLE OF CONTENTS

# GENERAL FEATURES

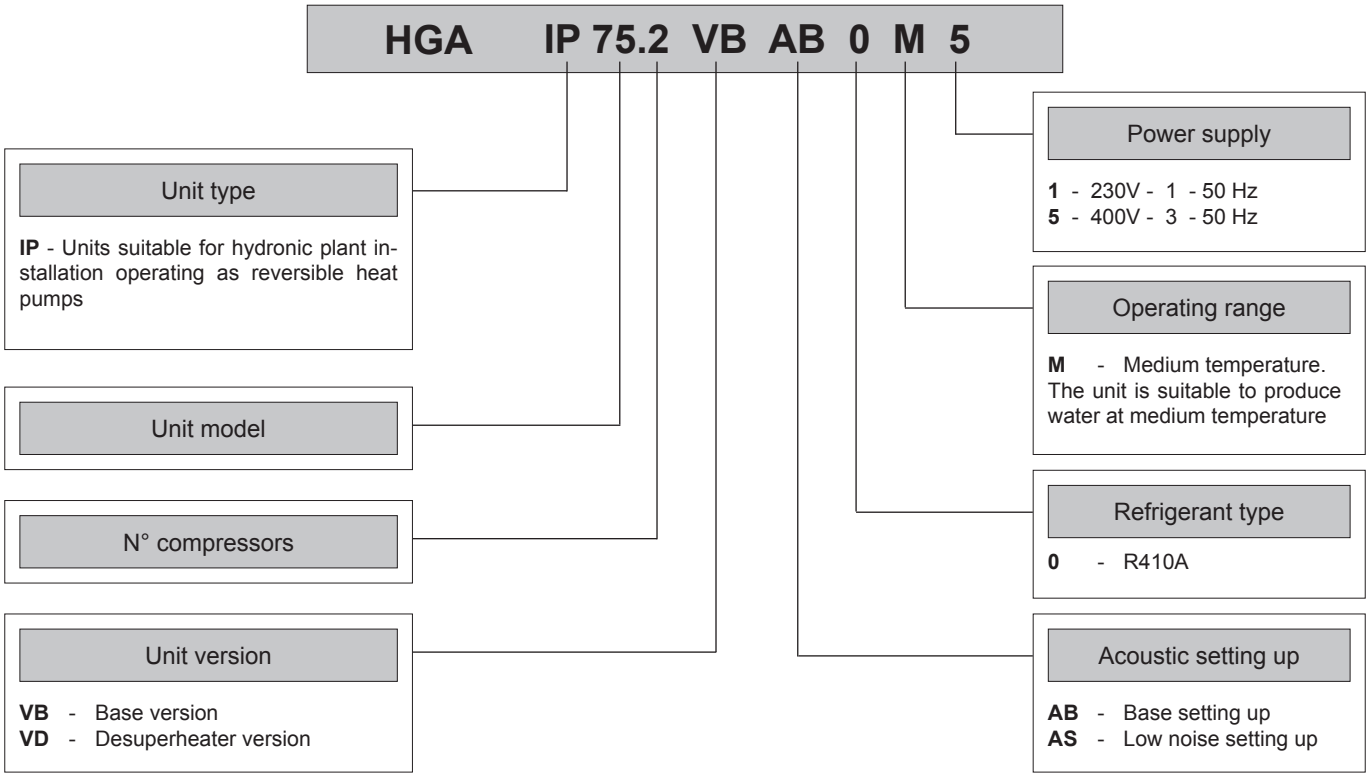
## Unit description

This series of **air-water** heat pumps satisfies the heating, cooling and domestic hot water production requirements of autonomous or centralized residential plants of medium and large size. All the units are suitable for outdoor installation and can be applied to **fan coil** plants, **radiant** floor plants and high efficiency **radiators** plants.
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 "active cooling" (refrigerant circuit inversion). When the unit is used in radiant floor plants, to avoid condensate generation, a room humidity sensor can be installed. During cooling mode operation a part of the heating power in excess can be recovered for the domestic hot water production (VD version).
The **internal programmer clock** allows to define different daily switching programs for heating, cooling and domestic hot water production.

The refrigerant circuit, contained in a box repaired from the air flow to simplify the maintenance operations, is equipped with two scroll compressors mounted on damper supports, brazed plate heat exchangers, electronic expansion valve, reverse cycle valve, axial fans, finned coil realized with copper pipes and alluminium fins. The circuit is protected by high and low pressure switches and flow switches on the plate heat exchanger.
The compressors are arranged in tandem on a single refrigerant circuit and allow the capacity modulation according to the plant requests in order to guarantee a high seasonal efficiency.
The plate heat exchanger and all the hydraulic pipes are thermally insulated in order to avoid condensate generation and reduce thermal losses.
The axial fans, equipped with electronic control of the rotational speed, guarantee high efficiencies in all the operating conditions and the possibility to reduce the noise level during the night.
All the units are provided with a phase sequence and correct sequence controller device and with an outdoor temperature sensor in order to realize the climatic control.
All the units are accurately built and individually tested in the factory. Only electric and hydraulic connections are required for installation.

## Unit identification code

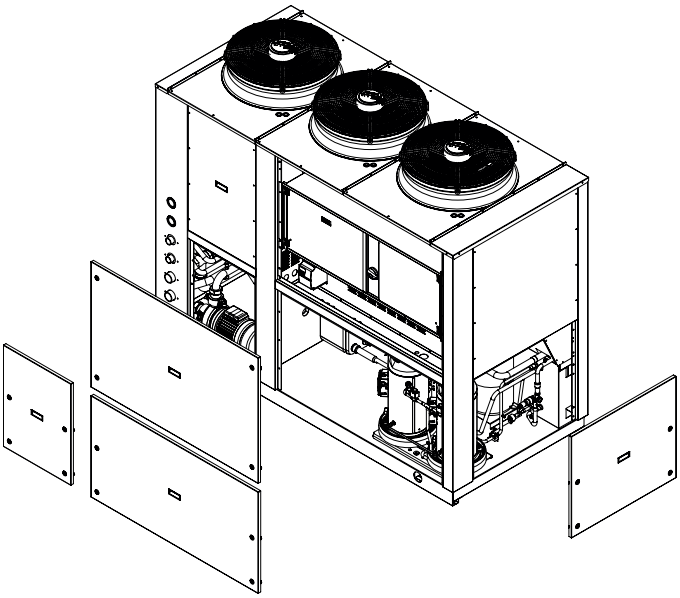
The codes that identify the units and the meaning of the letters used are described below.



## Description of components

**External structure.** Basement, supporting structure and lateral panels are made of galvanized and painted sheet-steel to guarantee good resistance to atmospheric agents. Accessibility to internal parts is possible removing the frontal and lateral panels. For extraordinary manteinances also the other panels can be removed.

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



The scroll **compressors (1)** are mounted on damper supports and are protected against overtemperatures and overcurrents. Each compressor is equipped with an electrcal heater, that is activated when the compressor turns off, to keep the compressor crankcase oil temperature high enough to prevent migration of the refrigerant during winter stops and to evaporate any liquid present in the crankcase, in order to prevent possible liquid rushes on starting.

The **plant side heat exchanger (2)** is a brazed stainless steel plate heat exchanger, properly insulated to avoid condensate generation and to minimize thermal losses, and protected by a flow switch that detects whatever water flow lack.

The **source side heat exchanger (3)** is a finned coil realized with grooved copper pipes and hydrophilic aluminium fins with waved profile to increase the heat exchange coefficient. A tray is placed under the coil to collect the condensate generated in heating mode.

The **expansion device (4)**, an electronic expansion valve, allows the unit to adjust itself to the different operating conditions keeping steady the set superheating.

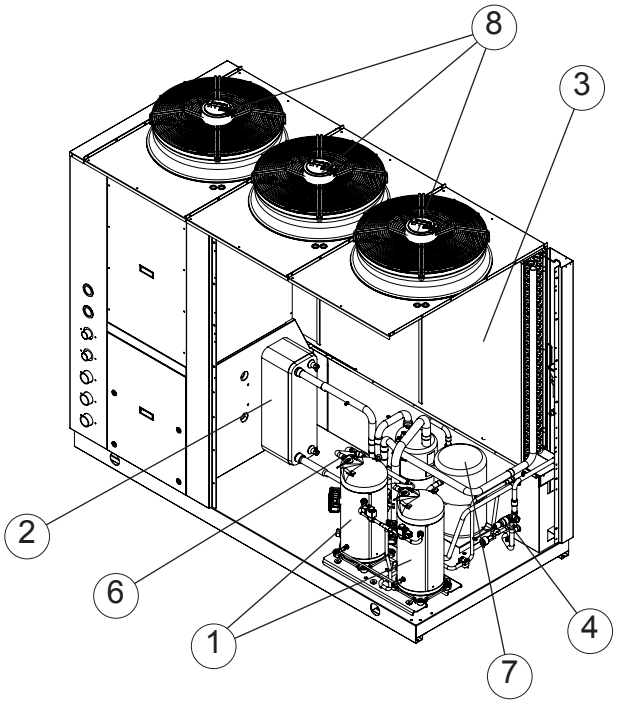
The refrigerant circuit of each unit contains moreover solid core hermetic **filter dryer (5) t**o restrain impurity and moisture residuals that could be present in the circuit, **high and low pressure switches** in order to assure the compressor to operate inside the permitted limits, **4 way reverse cycle valve (6)** to allow operating mode change reversing the refrigerant flow, **liquid receiver (7)** to compensate the different refrigerant charge required in heating and in cooling mode and 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 and expansion valve upstream pressure). All the pipes of the refrigerant circuit are properly insulated to avoid condensate generation and minimize thermal losses

The **axial fans (8)** are equipped with an high efficiency electronically commutated (EC) motor and guarantee high efficiencies in all the operating conditions.

**Hydraulic circuit.** All the pipes are thermally insulated to avoid condensate generation and minimize thermal losses. The circuit can be equipped with a standard, high head or modulating circulation pump (option). The circuit is always equipped also with expansion vessel, safety valve and air vents.

**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.

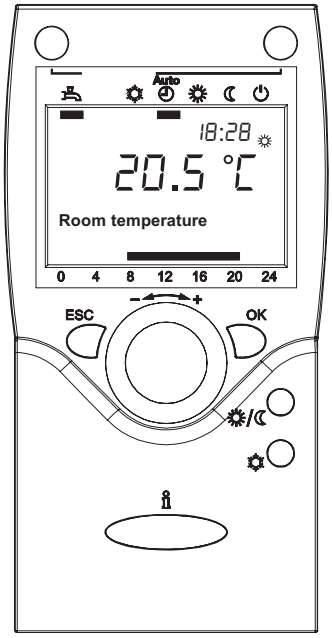
All the units are supplied with an **outdoor temperature sensor,** to be installed outside, in order to realize the climatic control.



## Control system

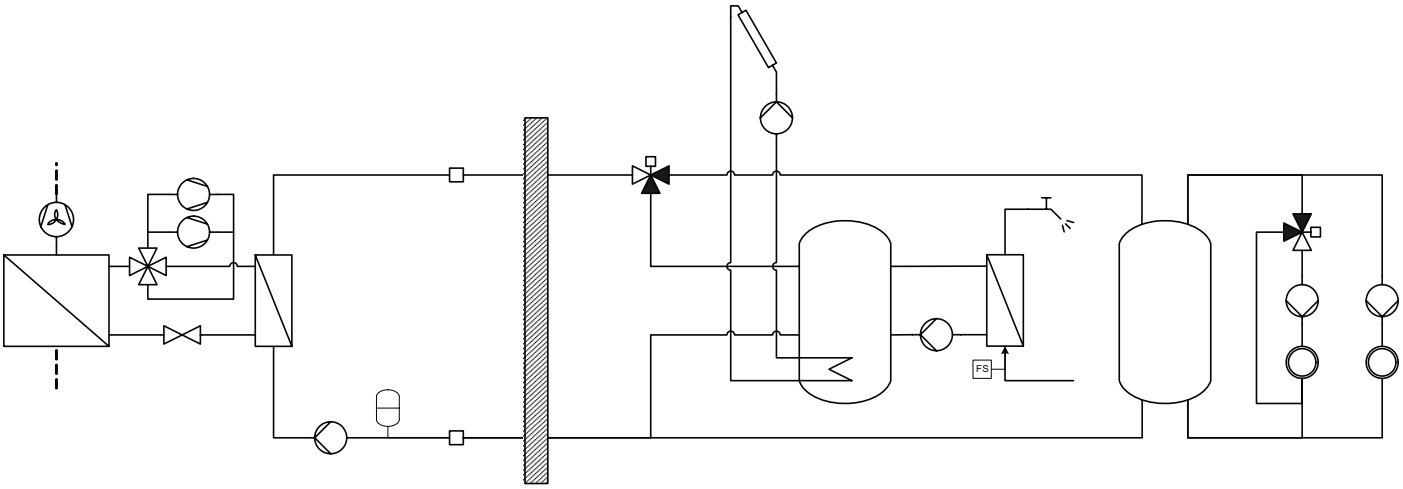
The microprocessor controller is able to manage not only the unit itself but also all that components of the plant which allow to realize a complete system.
The main functions of the control system are :

- 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
- 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 algorythms 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)

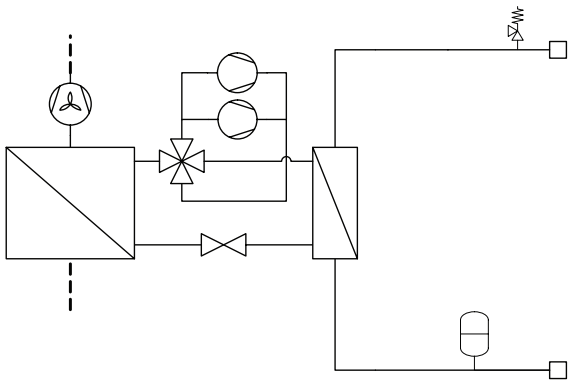
## Options

| | | |
|---|---|---|
| **Version** | **VD - Desuperheater version** | Allows to recover a part of the available heating power (and otherwise not used during cooling operating mode) for the domestic hot water production. |
| **Acoustic setting up** | **AS - Low noise acoustic setting up** | Allows to reduce the noise produced by the unit by means of the refrigerant circuit vane acoustic insulation and sound jackets on the compressors. |
| **Plant side flow rate management** | **Standard pump** | Allows the circulation of the water on the plant side. |
| | **High head pump** | Allows the circulation of the water on the plant side and guarantees a higher available static head. |
| | **Modulating pump** | Allows the circulation of the water on the plant side keeping constant the temperature difference between inlet and outlet. |
| **Domestic hot water production** | **3 way valve** | Allow to divert the hot water produced by the heat pump from the heating circuit to the domestic hot water circuit. |
| **Soft starter** | | Reduces the compressor start current. |

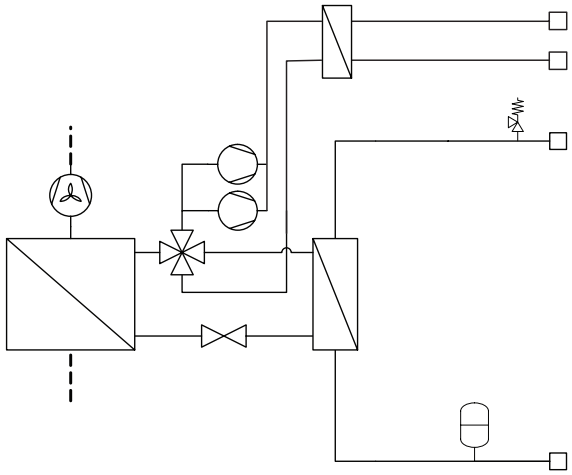
The controller flexibility and the big number of options available allow to get, for each model, a lot of different configurations that integrate inside the heat pump many components of the plant and allow to realize compact and tested installations.

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.

**Reversible heat pump (IP) without options**

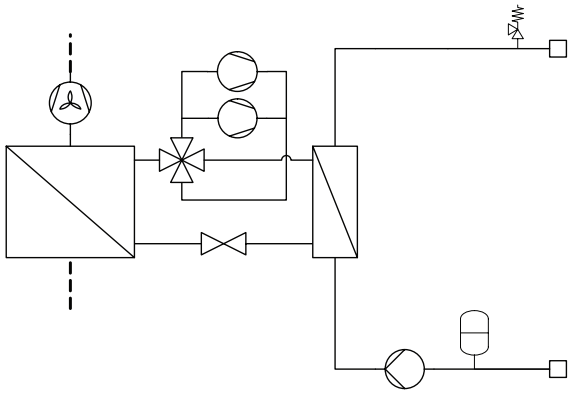


**Opzione "Version" : "Desuperheater version (VD)"**

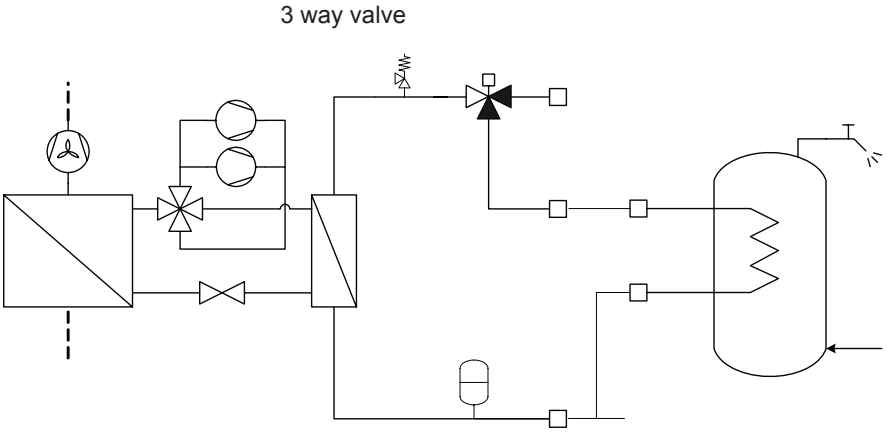


**Option “Plant side flow rate management”**

Pump (standard or high head or modulating)



**Option “Domestic hot water production”**




In this configuration the heat pump can be coupled to a domestic hot water tank equipped with a coil designed for a maximum water temperature between 55°C and 60°C.

The anti legionella cycles have to be performed by means of electrical heaters placed on the heat pump outlet (see option “Integrative electrical heaters”) or directly inside the tank.

## 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 fans in their normal operating mode. |
| **Coil protection grilles** | Protect the external surface of the finned coil. |
| **3 way valve for domestic hot water** | Allow to divert the hot water produced by the heat pump from the heating circuit to the domestic hot water circuit. |
| **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. |
| **Wireless transmitter** | Connected to the unit controller, allows to communicate with wireless remote control and 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 hygrostat** | 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. |

# TECHNICAL DATA AND PERFORMANCES

## Technical data

| Frame | 1 | | 2 | | 3 | | |
|---|---|---|---|---|---|---|---|
| **Model** | **45.2** | **55.2** | **65.2** | **75.2** | **85.2** | **95.2** | U.M. |
| Power supply | 400 - 3 - 50 | 400 - 3 - 50 | 400 - 3 - 50 | 400 - 3 - 50 | 400 - 3 - 50 | 400 - 3 - 50 | V-ph-Hz |
| **Refrigerant** | | | | | | | |
| Type | R410A | | | | | | - |
| **Compressor** | | | | | | | |
| Type | scroll | | | | | | - |
| Quantity | 2 | | | | | | n° |
| Oil charge | 3,4 | 3,4 | 3,4 | 3,4 | 3,4 | 3,4 | kg |
| **Refrigerant circuit** | | | | | | | |
| Number of circuits | 1 | 1 | 1 | 1 | 1 | 1 | - |
| Power steps | 0 - 50 - 100 | 0 - 50 - 100 | 0 - 50 - 100 | 0 - 50 - 100 | 0 - 50 - 100 | 0 - 50 - 100 | % |
| **Plant side heat exchanger** | | | | | | | |
| Type | stainless steel brazed plates | | | | | | - |
| Quantity | 1 | | | | | | n° |
| Water volume | 7,0 | 8,0 | 9,0 | 10,0 | 12,0 | 14,0 | l |
| **Source side heat exchanger** | | | | | | | |
| Type | finned coil | | | | | | - |
| Quantity | 1 | | | | | | n° |
| Frontal surface | 1,71 | 1,71 | 2,56 | 2,56 | 3,42 | 3,42 | $m^2$ |
| **Fans** | | | | | | | |
| Type | axial with high efficiency EC motor | | | | | | - |
| Quantity | 2 | | 3 | | 4 | | n° |
| Diameter | 630 | 630 | 630 | 630 | 630 | 630 | mm |
| Maximum rotational speed | 1140 | 1140 | 1140 | 1140 | 1140 | 1140 | rpm |
| Total installed power | 1,94 | 1,94 | 2,91 | 2,91 | 3,88 | 3,88 | kW |
| **Plant side hydraulic circuit** | | | | | | | |
| Safety valve set point | 6 | 6 | 6 | 6 | 6 | 6 | bar |
| Expansion vessel volume | 12 | 12 | 12 | 12 | 12 | 12 | l |
| **Plant side pump - standard and modulating (option)** | | | | | | | |
| Type | centrifugal pump | centrifugal pump | centrifugal pump | centrifugal pump | centrifugal pump | centrifugal pump | - |
| Quantity | 1 | 1 | 1 | 1 | 1 | 1 | n° |
| Installed power | 1,5 | 1,5 | 1,5 | 1,5 | 1,5 | 1,5 | kW |
| **Plant side pump - high head (option)** | | | | | | | |
| Type | centrifugal pump | centrifugal pump | centrifugal pump | centrifugal pump | centrifugal pump | centrifugal pump | - |
| Quantity | 1 | 1 | 1 | 1 | 1 | 1 | n° |
| Installed power | 3,0 | 3,0 | 3,0 | 3,0 | 3,0 | 3,0 | kW |

# TECHNICAL DATA AND PERFORMANCES

## NOMINAL performances - HIGH TEMPERATURE plants

| Frame | | 1 | | 2 | | 3 | | |
|---|---|---|---|---|---|---|---|---|
| Model | | 45.2 | 55.2 | 65.2 | 75.2 | 85.2 | 95.2 | U.M. |
| Power supply | | 400 - 3 - 50 | 400 - 3 - 50 | 400 - 3 - 50 | 400 - 3 - 50 | 400 - 3 - 50 | 400 - 3 - 50 | V-ph-Hz |
| IP | **Heating A7W55** ( source : air in 7°C d.b. 6°C w.b. / plant : water in 47°C out 55°C ) | | | | | | | |
| | Heating capacity | 45,1 | 51,9 | 61,2 | 68,4 | 77,1 | 90,0 | kW |
| | Power input | 14,4 | 16,7 | 19,7 | 22,1 | 24,8 | 29,0 | kW |
| | COP | 3,13 | 3,11 | 3,11 | 3,10 | 3,11 | 3,10 | - |
| | Water flow rate plant side | 4914 | 5655 | 6658 | 7442 | 8390 | 9796 | l/h |
| | Pressure drops plant side | 8 | 8 | 9 | 9 | 8 | 8 | kPa |
| | **Heating A2W55** ( source : air in 2°C d.b. 1°C w.b. / plant : water in 47°C out 55°C ) | | | | | | | |
| | Heating capacity | 37,0 | 42,5 | 50,1 | 56,0 | 63,1 | 73,6 | kW |
| | Power input | 14,3 | 16,5 | 19,4 | 21,8 | 24,5 | 28,7 | kW |
| | COP | 2,59 | 2,58 | 2,58 | 2,57 | 2,58 | 2,56 | - |
| | Water flow rate plant side | 4032 | 4631 | 5459 | 6102 | 6876 | 8020 | l/h |
| | Pressure drops plant side | 5 | 5 | 6 | 6 | 5 | 5 | kPa |
| | **Heating A-7W55** ( source : air in -7°C d.b. -8°C w.b. / plant : water in 47°C out 55°C ) | | | | | | | |
| | Heating capacity | - | - | - | - | - | - | kW |
| | Power input | - | - | - | - | - | - | kW |
| | COP | - | - | - | - | - | - | - |
| | Water flow rate plant side | - | - | - | - | - | - | l/h |
| | Pressure drops plant side | - | - | - | - | - | - | kPa |

Data declared according to **EN 14511.** The values are referred to units without options or accessories.

# TECHNICAL DATA AND PERFORMANCES

## NOMINAL performances - STANDARD plants

| Frame | | 1 | | 2 | | 3 | | |
|---|---|---|---|---|---|---|---|---|
| Model | | 45.2 | 55.2 | 65.2 | 75.2 | 85.2 | 95.2 | U.M. |
| Power supply | | 400 - 3 - 50 | 400 - 3 - 50 | 400 - 3 - 50 | 400 - 3 - 50 | 400 - 3 - 50 | 400 - 3 - 50 | V-ph-Hz |
| IP | **Heating A7W45** ( source : air in 7°C d.b. 6°C w.b. / plant : water in 40°C out 45°C ) | | | | | | | |
| | Heating capacity | 46,9 | 54,1 | 63,7 | 71,1 | 80,2 | 93,6 | kW |
| | Power input | 12,5 | 14,5 | 17,0 | 19,0 | 21,4 | 25,1 | kW |
| | COP | 3,75 | 3,73 | 3,75 | 3,74 | 3,75 | 3,73 | - |
| | Water flow rate plant side | 8133 | 9367 | 11036 | 12322 | 13903 | 16215 | l/h |
| | Pressure drops plant side | 19 | 20 | 21 | 22 | 19 | 19 | kPa |
| | **Heating A2W45** ( source : air in 2°C d.b. 1°C w.b. / plant : water in 40°C out 45°C ) | | | | | | | |
| | Heating capacity | 38,8 | 44,7 | 52,6 | 58,7 | 66,3 | 77,4 | kW |
| | Power input | 12,3 | 14,3 | 16,7 | 18,7 | 21,0 | 24,8 | kW |
| | COP | 3,15 | 3,13 | 3,15 | 3,14 | 3,16 | 3,12 | - |
| | Water flow rate plant side | 6726 | 7751 | 9124 | 10184 | 11505 | 13417 | l/h |
| | Pressure drops plant side | 14 | 14 | 15 | 15 | 14 | 14 | kPa |
| | **Heating A-7W45** ( source : air in -7°C d.b. -8°C w.b. / plant : water in 40°C out 45°C ) | | | | | | | |
| | Heating capacity | 31,2 | 36,0 | 42,3 | 47,3 | 53,3 | 62,2 | kW |
| | Power input | 11,9 | 13,9 | 16,3 | 18,2 | 20,5 | 24,0 | kW |
| | COP | 2,62 | 2,59 | 2,60 | 2,60 | 2,60 | 2,59 | - |
| | Water flow rate plant side | 5422 | 6239 | 7334 | 8203 | 9246 | 10792 | l/h |
| | Pressure drops plant side | 9 | 9 | 10 | 10 | 9 | 9 | kPa |
| | **Cooling A35W7** ( source : air in 35°C d.b. / plant : water in 12°C out 7°C ) | | | | | | | |
| | Cooling capacity | 38,7 | 44,6 | 52,5 | 58,6 | 66,1 | 77,1 | kW |
| | Power input | 12,2 | 14,1 | 16,6 | 18,6 | 20,9 | 24,6 | kW |
| | EER | 3,17 | 3,16 | 3,16 | 3,15 | 3,16 | 3,13 | - |
| | Water flow rate plant side | 6659 | 7671 | 9027 | 10074 | 11361 | 13266 | l/h |
| | Pressure drops plant side | 14 | 14 | 15 | 15 | 13 | 14 | kPa |

Data declared according to **EN 14511.** The values are referred to units without options or accessories.

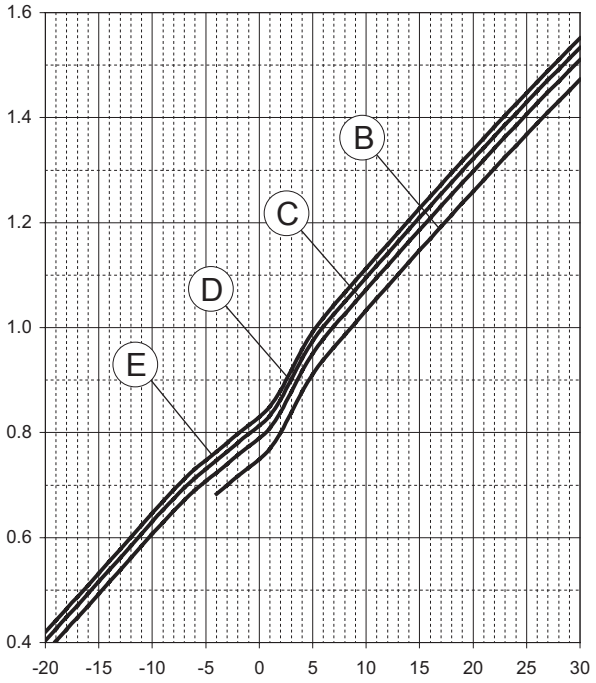
## NOMINAL performances - RADIANT plants

| | Frame | 1 | | 2 | | 3 | | |
|---|---|---|---|---|---|---|---|---|
| | **Model** | **45.2** | **55.2** | **65.2** | **75.2** | **85.2** | **95.2** | U.M. |
| | Power supply | 400 - 3 - 50 | 400 - 3 - 50 | 400 - 3 - 50 | 400 - 3 - 50 | 400 - 3 - 50 | 400 - 3 - 50 | V-ph-Hz |
| IP | **Heating A7W35** ( source : air in 7°C d.b. 6°C w.b. / plant : water in 30°C out 35°C ) | | | | | | | |
| | Heating capacity | 48,2 | 55,4 | 65,2 | 72,9 | 82,2 | 95,8 | kW |
| | Power input | 10,3 | 11,9 | 14,0 | 15,7 | 17,7 | 20,7 | kW |
| | COP | 4,68 | 4,66 | 4,66 | 4,64 | 4,64 | 4,63 | - |
| | Water flow rate plant side | 8313 | 9559 | 11257 | 12573 | 14183 | 16538 | l/h |
| | Pressure drops plant side | 20 | 20 | 22 | 22 | 20 | 20 | kPa |
| | **Heating A2W35** ( source : air in 2°C d.b. 1°C w.b. / plant : water in 30°C out 35°C ) | | | | | | | |
| | Heating capacity | 40,0 | 46,0 | 54,1 | 60,5 | 68,3 | 79,6 | kW |
| | Power input | 10,1 | 11,7 | 13,7 | 15,4 | 17,3 | 20,3 | kW |
| | COP | 3,96 | 3,93 | 3,95 | 3,93 | 3,95 | 3,92 | - |
| | Water flow rate plant side | 6910 | 7949 | 9352 | 10443 | 11793 | 13750 | l/h |
| | Pressure drops plant side | 14 | 15 | 16 | 16 | 14 | 14 | kPa |
| | **Heating A-7W35** ( source : air in -7°C d.b. -8°C w.b. / plant : water in 30°C out 35°C ) | | | | | | | |
| | Heating capacity | 32,4 | 37,3 | 43,9 | 49,0 | 55,3 | 64,4 | kW |
| | Power input | 9,72 | 11,3 | 13,3 | 14,8 | 16,7 | 19,5 | kW |
| | COP | 3,33 | 3,30 | 3,30 | 3,31 | 3,31 | 3,30 | - |
| | Water flow rate plant side | 5594 | 6442 | 7585 | 8468 | 9559 | 11135 | l/h |
| | Pressure drops plant side | 10 | 10 | 11 | 11 | 10 | 10 | kPa |
| | **Cooling A35W18** ( source : air in 35°C d.b. / plant : water in 23°C out 18°C ) | | | | | | | |
| | Cooling capacity | 50,9 | 58,7 | 69,0 | 77,1 | 87,0 | 102,0 | kW |
| | Power input | 13,2 | 15,3 | 18,1 | 20,2 | 22,7 | 26,7 | kW |
| | EER | 3,86 | 3,84 | 3,81 | 3,82 | 3,83 | 3,82 | - |
| | Water flow rate plant side | 8811 | 10156 | 11949 | 13345 | 15052 | 17570 | l/h |
| | Pressure drops plant side | 23 | 23 | 25 | 25 | 22 | 22 | kPa |

Data declared according to **EN 14511.** The values are referred to units without options or accessories.

## HEATING performances

Heating capacity




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 condition is :

**A7W35**

source : air in 7°C d.b. 6°C w.b.

plant : water in 30°C out 35°C

Outlet temperature

plant side :

A = 65°C

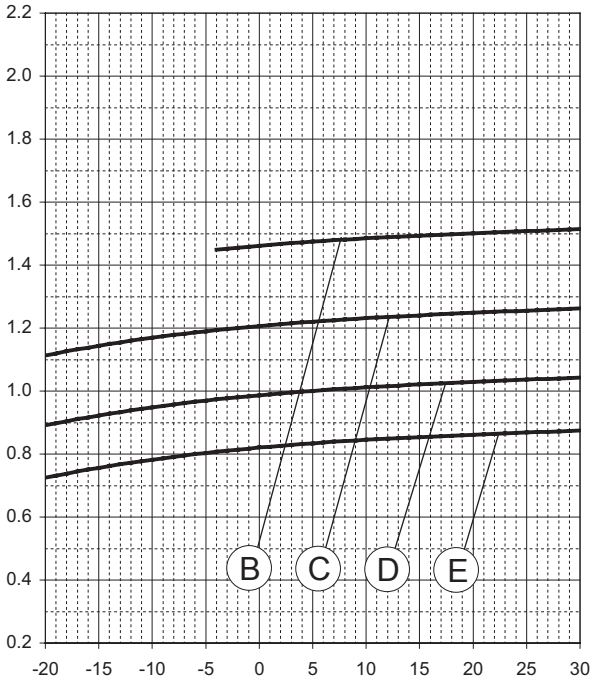
B = 55°C

C = 45°C

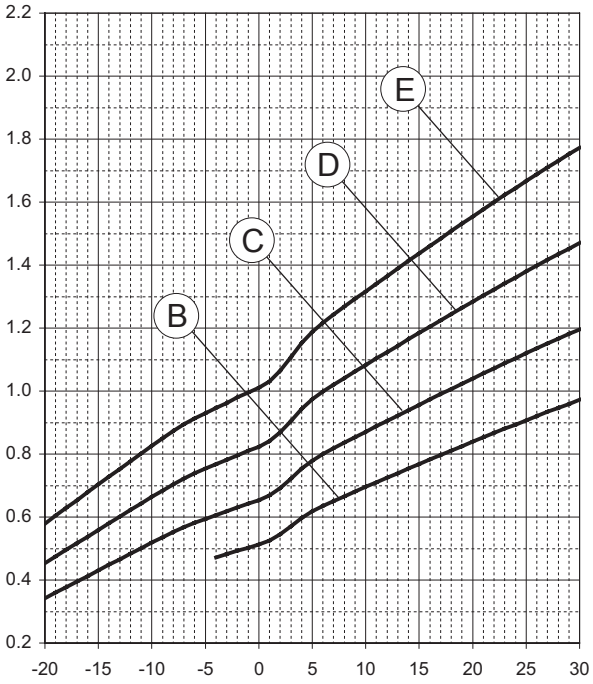
D = 35°C

E = 25°C

Power input

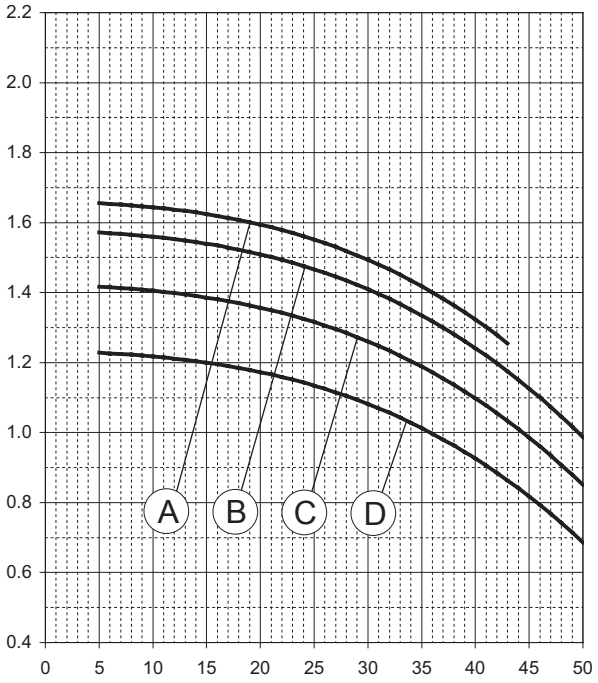



COP



## COOLING performances

Cooling capacity




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 condition is :

**A35W7**

source : air in 35°C d.b.

plant : water in 12°C out 7°C

Outlet temperature

plant side :

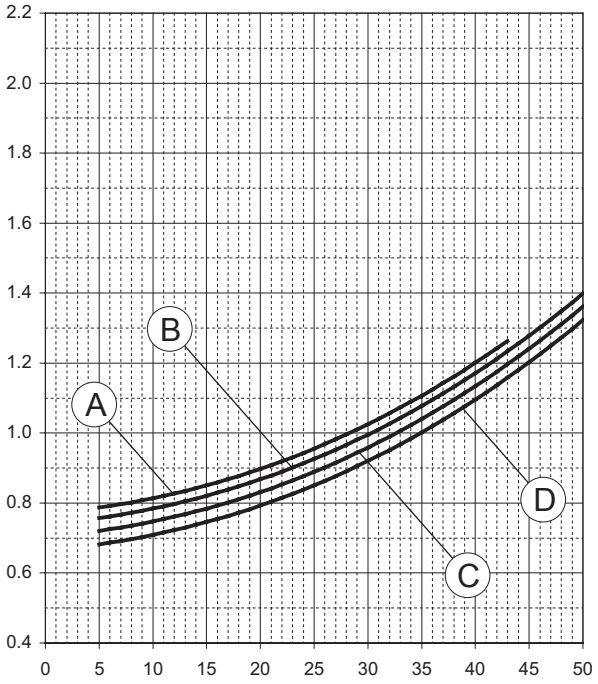
A = 24°C

B = 18°C

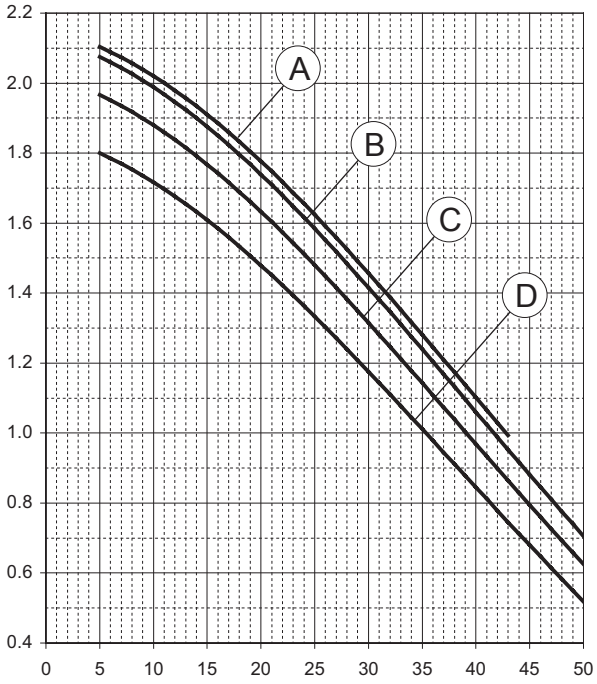
C = 12°C

D = 7°C

Power input

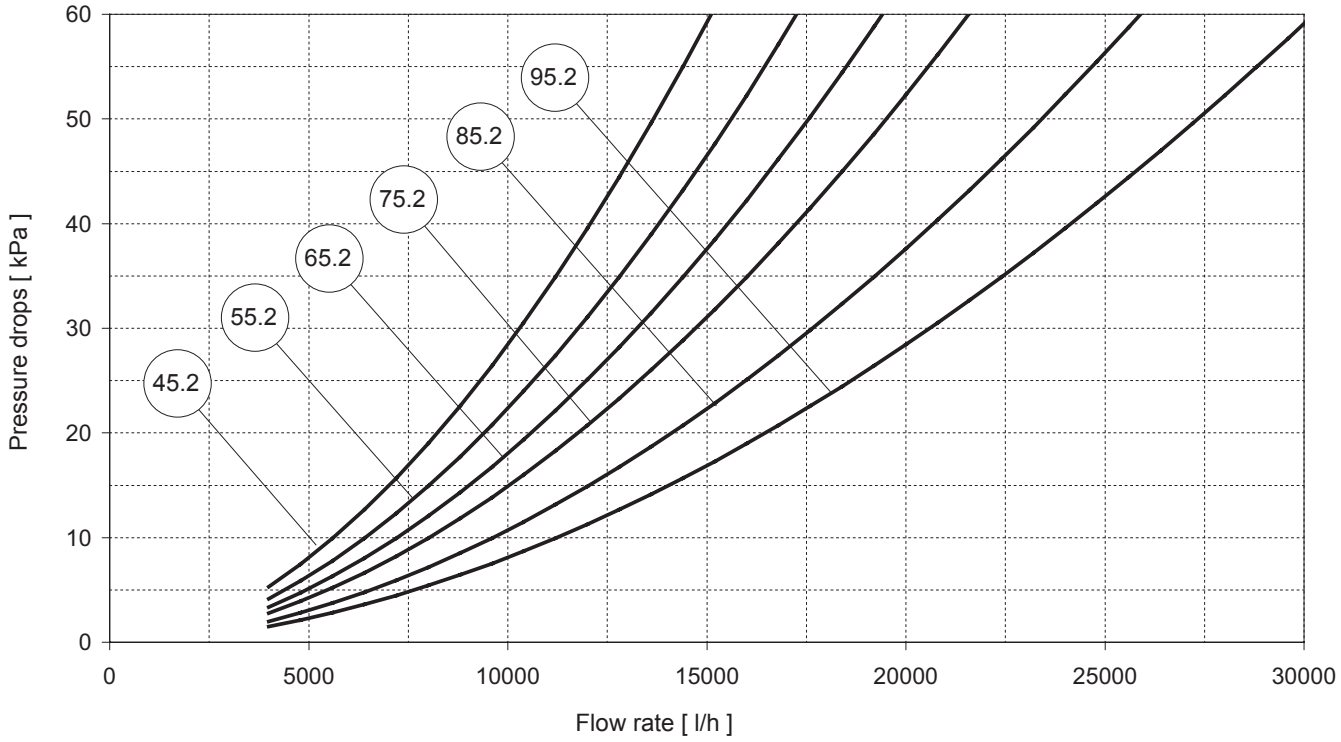



EER

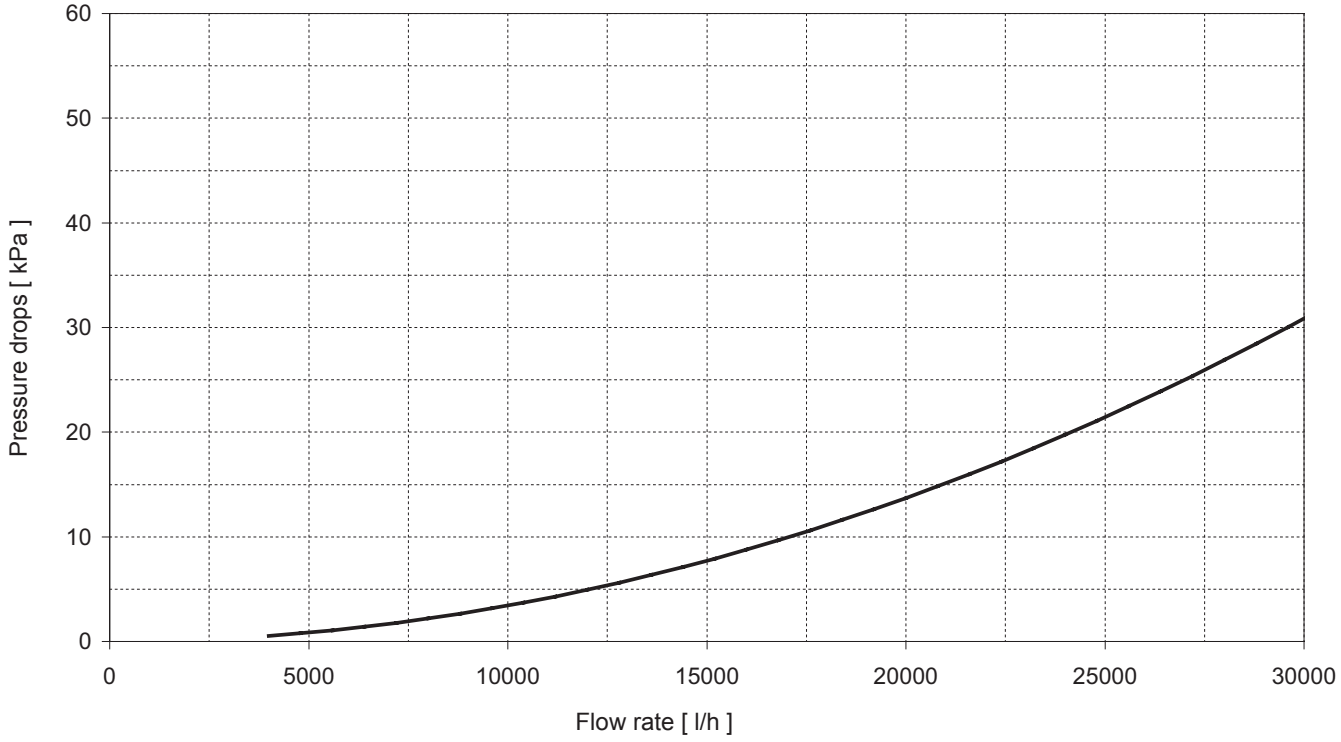


## Plant side hydraulic performances

**Pressure drops - unit without options**

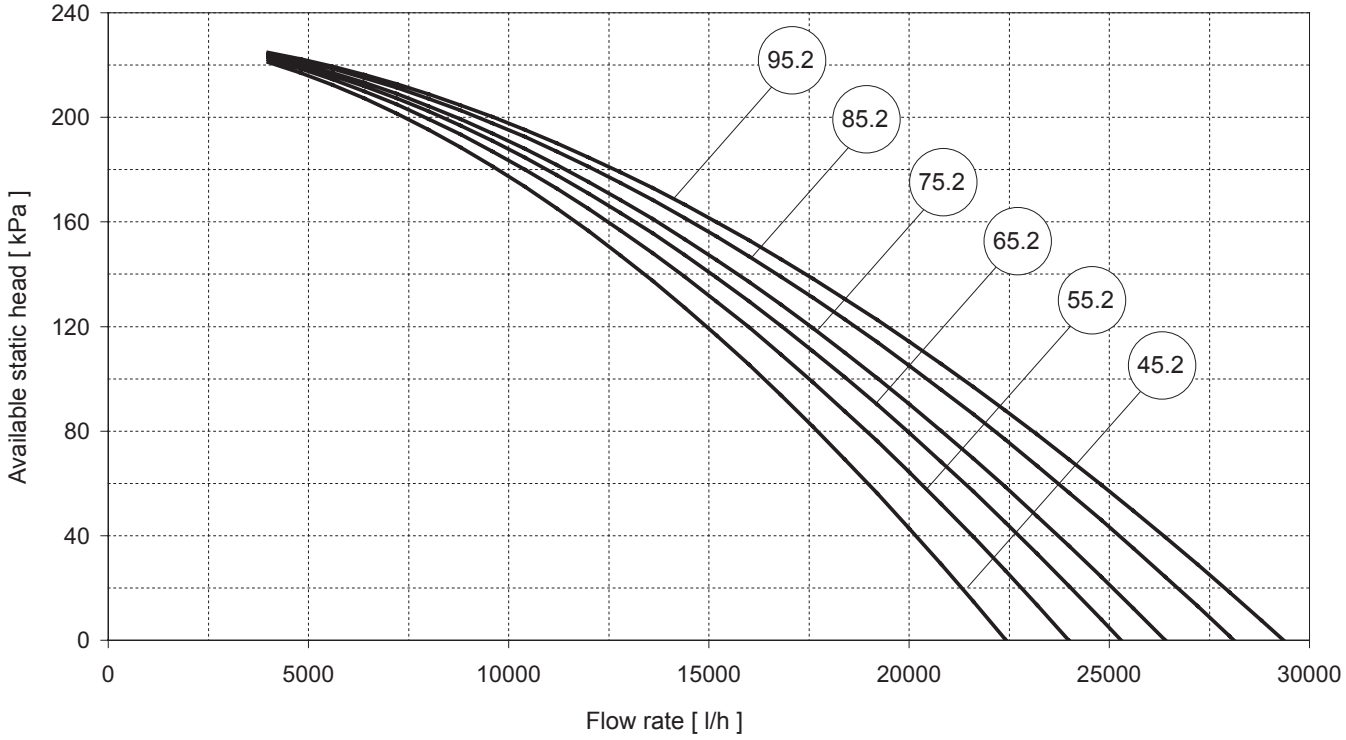



**Pressure drops to be added - unit with option "Domestic hot water production" : “3 way valve”**

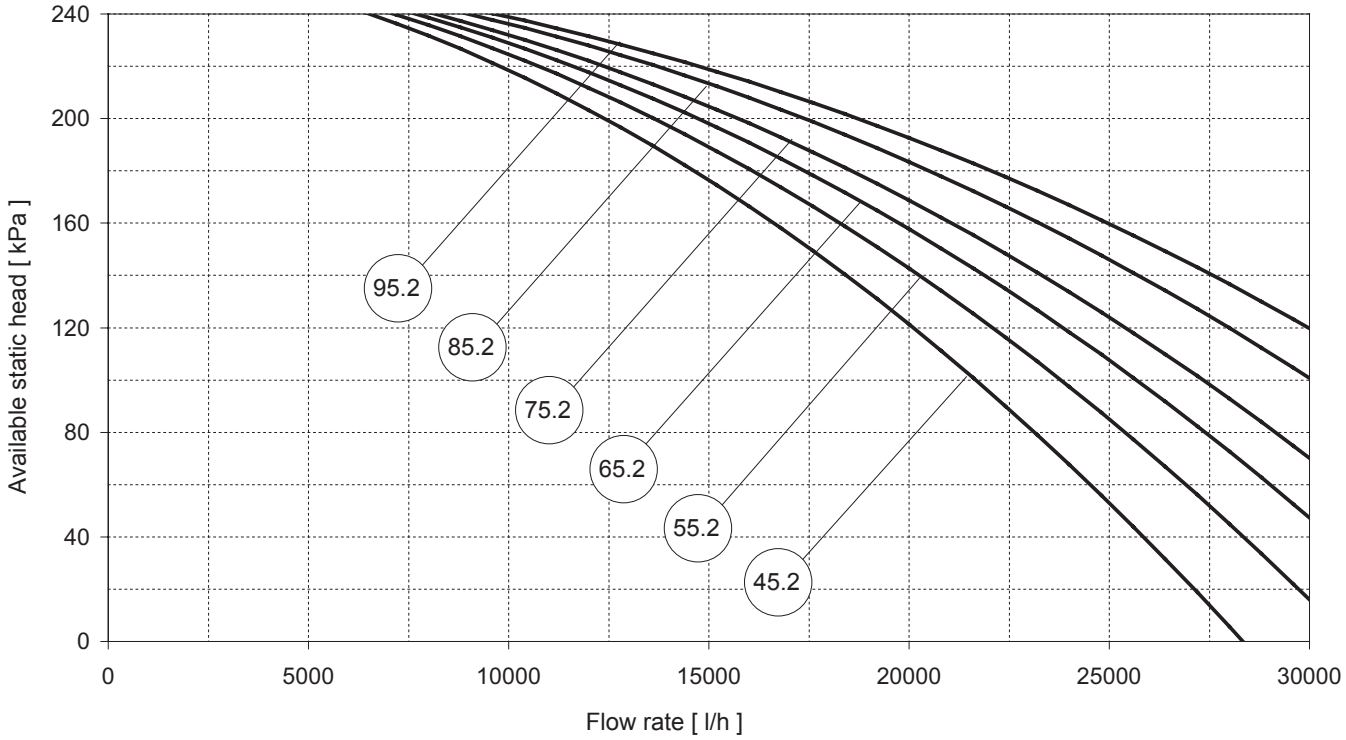



*The graphs are referred to units operating with water at the temperature of 10°C (density 1000 kg/m³).*

**Available static head - unit with option “Plant side flow rate management” : “Standard pump”**

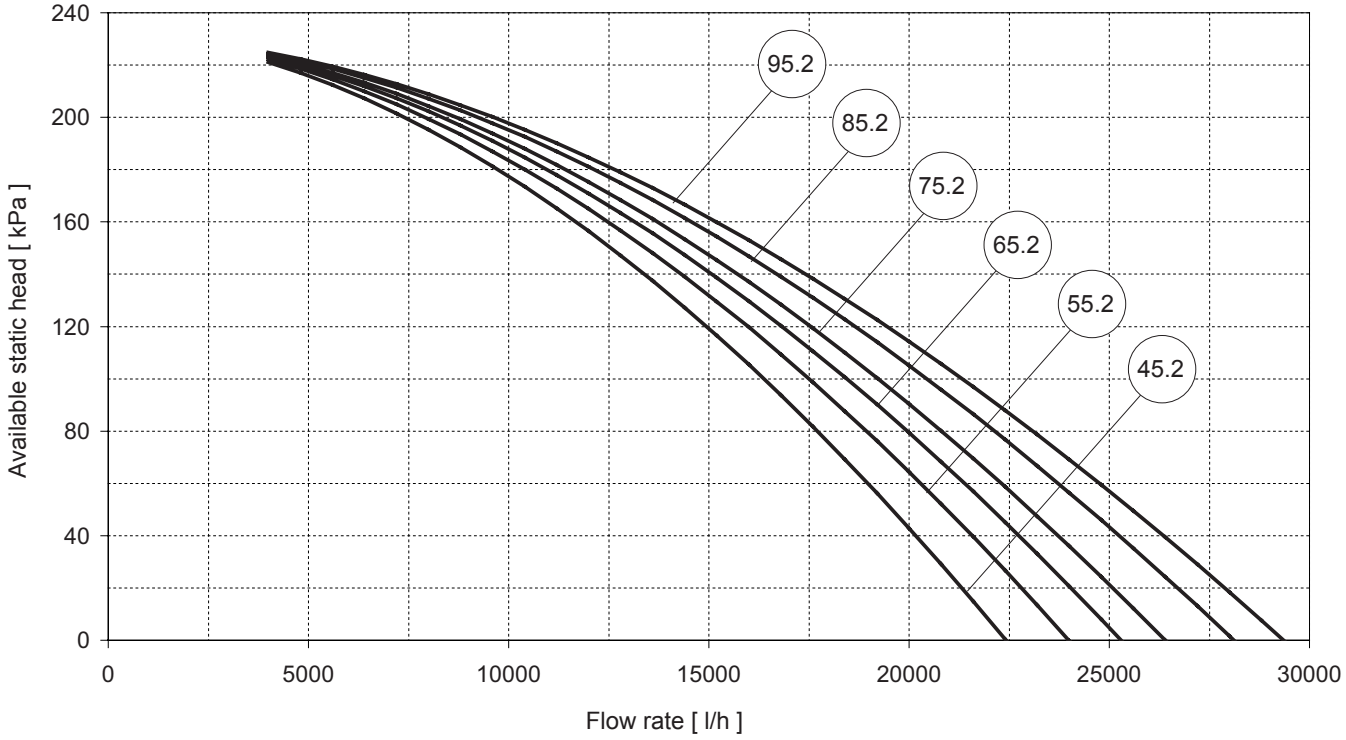



**Available static head - unit with option “Plant side flow rate management” : “High head pump”**




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

**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).*

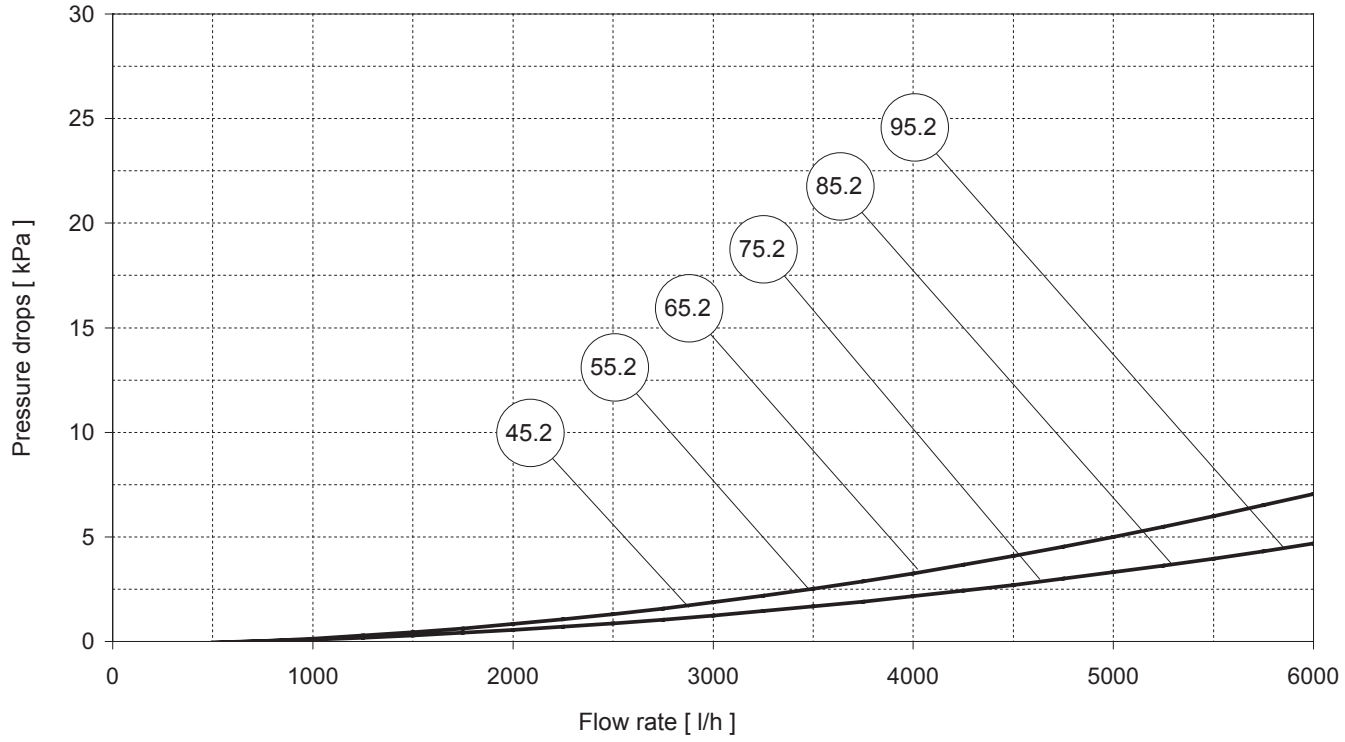
**Performances DESUPERHEATER**

| Frame | 1 | | 2 | | 3 | | |
|---|---|---|---|---|---|---|---|
| **Model** | **45.2** | **55.2** | **65.2** | **75.2** | **85.2** | **95.2** | U.M. |
| Power supply | 400 - 3 - 50 | 400 - 3 - 50 | 400 - 3 - 50 | 400 - 3 - 50 | 400 - 3 - 50 | 400 - 3 - 50 | V-ph-Hz |

| | **Cooling A35W7-W45** ( source : air in 35°C d.b. / plant : water in 12°C out 7°C / heat recovery : water in 40°C out 45°C ) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Cooling capacity | 40,2 | 46,4 | 54,6 | 60,9 | 68,7 | 80,2 | kW |
| | Power input | 11,9 | 13,7 | 16,1 | 18,2 | 20,4 | 23,9 | kW |
| | EER | 3,38 | 3,39 | 3,39 | 3,35 | 3,37 | 3,36 | - |
| **IP** | Water flow rate plant side | 6916 | 7980 | 9387 | 10486 | 11824 | 13798 | l/h |
| | Pressure drops plant side | 15 | 15 | 16 | 16 | 15 | 15 | kPa |
| | Heating capacity (desuperheater) | 11,9 | 13,7 | 16,2 | 18,1 | 20,4 | 23,8 | kW |
| | EER with heat recovery | 4,38 | 4,39 | 4,40 | 4,34 | 4,37 | 4,35 | - |
| | Water flow rate desuperheater side | 2068 | 2381 | 2815 | 3146 | 3545 | 4136 | l/h |
| | Pressure drops desuperheater side | 0,9 | 1,2 | 1,6 | 1,3 | 1,7 | 2,3 | kPa |

Data declared according to **EN 14511**. The values are referred to units with the only option "VD - Desuperheater version".

**Pressure drops desuperheater - unit "VD - Desuperheater version"**

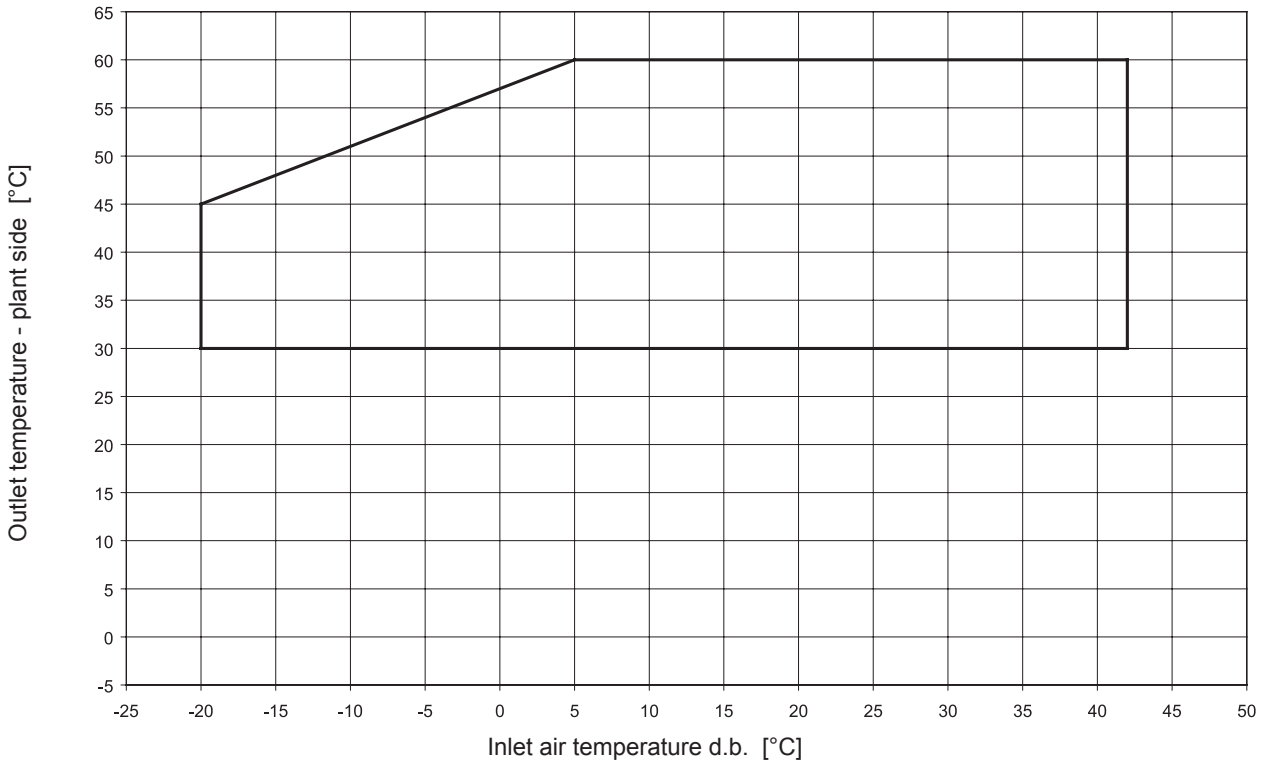



*The graphs are referred to units operating with water at the temperature of 10°C (density 1000 kg/m³).*

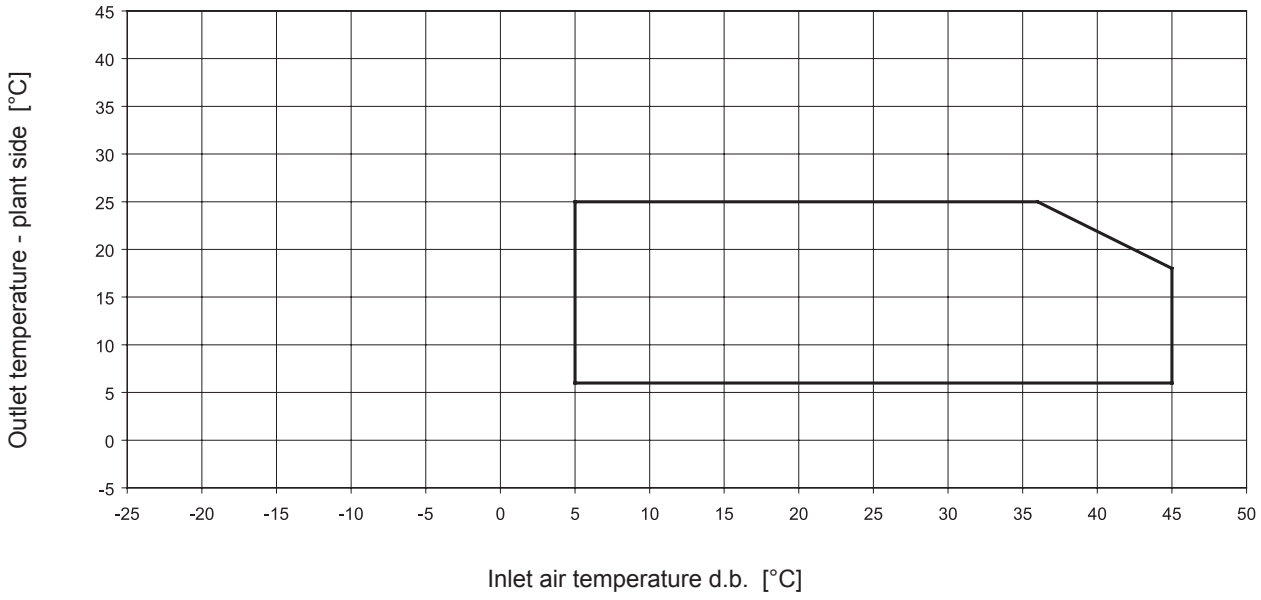
## Operating limits

The graphs reported below show the operating area inside which the correct working of the unit is guaranteed.

**HEATING**




**COOLING**




| Temperature difference between unit inlet and outlet | | Plant side | |
|---|---|---|---|
| ΔT max | Maximum value | 11 | °C |
| ΔT min | Minimum value | 3 | °C |

# TECHNICAL DATA AND PERFORMANCES

## Electrical data

| Frame | | 1 | | 2 | | 3 | | |
|---|---|---|---|---|---|---|---|---|
| Model | | 45.2 | 55.2 | 65.2 | 75.2 | 85.2 | 95.2 | U.M. |

Unit

| Power supply | | 400-3-50 | 400-3-50 | 400-3-50 | 400-3-50 | 400-3-50 | 400-3-50 | V-ph-Hz |
|---|---|---|---|---|---|---|---|---|
| F.L.A. | Maximum total current input | 34,3 | 38,3 | 43,5 | 47,3 | 56,4 | 64,6 | A |
| F.L.I. | Maximum total power input | 21,6 | 24,2 | 27,4 | 29,8 | 35,6 | 40,8 | kW |
| M.I.C. | Maximum total start current | 133 | 151 | 161 | 170 | 190 | 228 | A |
| | Maximum total start current with soft starter (option) | 74 | 85 | 92 | 98 | 112 | 136 | A |

Plant side pump - standard (option)

| Power supply | | 400-3-50 | 400-3-50 | 400-3-50 | 400-3-50 | 400-3-50 | 400-3-50 | V-ph-Hz |
|---|---|---|---|---|---|---|---|---|
| F.L.A. | Maximum total current input | 2,5 | 2,5 | 2,5 | 2,5 | 2,5 | 2,5 | A |
| F.L.I. | Maximum total power input | 1,5 | 1,5 | 1,5 | 1,5 | 1,5 | 1,5 | kW |

Plant side pump - high head (option)

| Power supply | | 400-3-50 | 400-3-50 | 400-3-50 | 400-3-50 | 400-3-50 | 400-3-50 | V-ph-Hz |
|---|---|---|---|---|---|---|---|---|
| F.L.A. | Maximum total current input | 5,1 | 5,1 | 5,1 | 5,1 | 5,1 | 5,1 | A |
| F.L.I. | Maximum total power input | 3,0 | 3,0 | 3,0 | 3,0 | 3,0 | 3,0 | kW |

Plant side pump - modulating (option)

| Power supply | | 400-3-50 | 400-3-50 | 400-3-50 | 400-3-50 | 400-3-50 | 400-3-50 | V-ph-Hz |
|---|---|---|---|---|---|---|---|---|
| F.L.A. | Maximum total current input | 2,5 | 2,5 | 2,5 | 2,5 | 2,5 | 2,5 | A |
| F.L.I. | Maximum total power input | 1,5 | 1,5 | 1,5 | 1,5 | 1,5 | 1,5 | kW |

## Noise levels

### Option "Acoustic setting up" : "AB - Base setting up"

| Model | Sound power levels [dB] by octave bands [Hz] | | | | | | | | Sound power level | | Sound pressure level | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | at 1 metre | at 5 metres | at 10 metres |
| | 63 | 125 | 250 | 500 | 1000 | 2000 | 4000 | 8000 | [dB] | [dB(A)] | [dB(A)] | [dB(A)] | [dB(A)] |
| **45.2** | 85,7 | 82,3 | 80,8 | 76,3 | 73,2 | 67,2 | 59,5 | 50,2 | 89 | **79** | 61 | 52 | 47 |
| **55.2** | 85,8 | 82,4 | 80,9 | 76,4 | 73,3 | 67,3 | 59,6 | 50,3 | 89 | **79** | 61 | 52 | 47 |
| **65.2** | 86,7 | 83,3 | 81,8 | 77,3 | 74,2 | 68,2 | 60,5 | 51,2 | 90 | **80** | 62 | 53 | 48 |
| **75.2** | 86,8 | 83,4 | 81,9 | 77,4 | 74,3 | 68,3 | 60,6 | 51,3 | 90 | **80** | 62 | 53 | 48 |
| **85.2** | 87,7 | 84,3 | 82,8 | 78,3 | 75,2 | 69,2 | 61,5 | 52,2 | 91 | **81** | 62 | 54 | 49 |
| **95.2** | 87,8 | 84,4 | 82,9 | 78,4 | 75,3 | 69,3 | 61,6 | 52,3 | 91 | **81** | 62 | 54 | 49 |

**Reference conditions**
Performances referred to units operating in heating mode at nominal conditions A7W35.
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.

### Option "Acoustic setting up" : "AS - Low noise setting up"

| Model | Sound power levels [dB] by octave bands [Hz] | | | | | | | | Sound power level | | Sound pressure level | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | at 1 metre | at 5 metres | at 10 metres |
| | 63 | 125 | 250 | 500 | 1000 | 2000 | 4000 | 8000 | [dB] | [dB(A)] | [dB(A)] | [dB(A)] | [dB(A)] |
| **45.2** | 80,9 | 78,8 | 77,1 | 73,4 | 69,9 | 65,7 | 60,0 | 52,5 | 85 | **76** | 58 | 49 | 44 |
| **55.2** | 81,0 | 78,9 | 77,2 | 73,5 | 70,0 | 65,8 | 60,1 | 52,6 | 85 | **76** | 58 | 49 | 44 |
| **65.2** | 81,9 | 79,8 | 78,1 | 74,4 | 70,9 | 66,7 | 61,0 | 53,5 | 86 | **77** | 59 | 50 | 45 |
| **75.2** | 82,0 | 79,9 | 78,2 | 74,5 | 71,0 | 66,8 | 61,1 | 53,6 | 86 | **77** | 59 | 50 | 45 |
| **85.2** | 82,9 | 80,8 | 79,1 | 75,4 | 71,9 | 67,7 | 62,0 | 54,5 | 87 | **78** | 59 | 51 | 46 |
| **95.2** | 83,0 | 80,9 | 79,2 | 75,5 | 72,0 | 67,8 | 62,1 | 54,6 | 87 | **78** | 59 | 51 | 46 |

**Reference conditions**
Performances referred to units operating in heating mode at nominal conditions A7W35.
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 | | 2 | | 3 | | |
|---|---|---|---|---|---|---|---|---|---|
| Model | | | 45.2 | 55.2 | 65.2 | 75.2 | 85.2 | 95.2 | U.M. |
| **Unit without options** | | | 635 | 670 | 785 | 795 | 905 | 920 | kg |
| Options | Version | Desuperheater version (VD) | 15 | 15 | 18 | 21 | 24 | 24 | kg |
| | Acoustic setting up | Low noise setting up (AS) | 65 | 65 | 75 | 75 | 85 | 85 | kg |
| | Plant side flow rate management | Standard pump | 25 | 25 | 26 | 26 | 29 | 29 | kg |
| | | High head pump | 31 | 31 | 32 | 32 | 35 | 35 | kg |
| | | High efficiency pump | 35 | 35 | 36 | 36 | 39 | 39 | kg |
| | Domestic hot water production : 3 way valve | | 21 | 21 | 22 | 22 | 25 | 25 | kg |

Components weights

| **Unit without options** | | | 635 | 670 | 785 | 795 | 905 | 920 | kg |
|---|---|---|---|---|---|---|---|---|---|
| Options | Version | Desuperheater version (VD) | 15 | 15 | 18 | 21 | 24 | 24 | kg |
| | Acoustic setting up | Low noise setting up (AS) | 65 | 65 | 75 | 75 | 85 | 85 | kg |
| | Plant side flow rate management | Standard pump | 25 | 25 | 26 | 26 | 29 | 29 | kg |
| | | High head pump | 31 | 31 | 32 | 32 | 35 | 35 | kg |
| | | High efficiency pump | 35 | 35 | 36 | 36 | 39 | 39 | kg |
| | Domestic hot water production : 3 way valve | | 21 | 21 | 22 | 22 | 25 | 25 | kg |

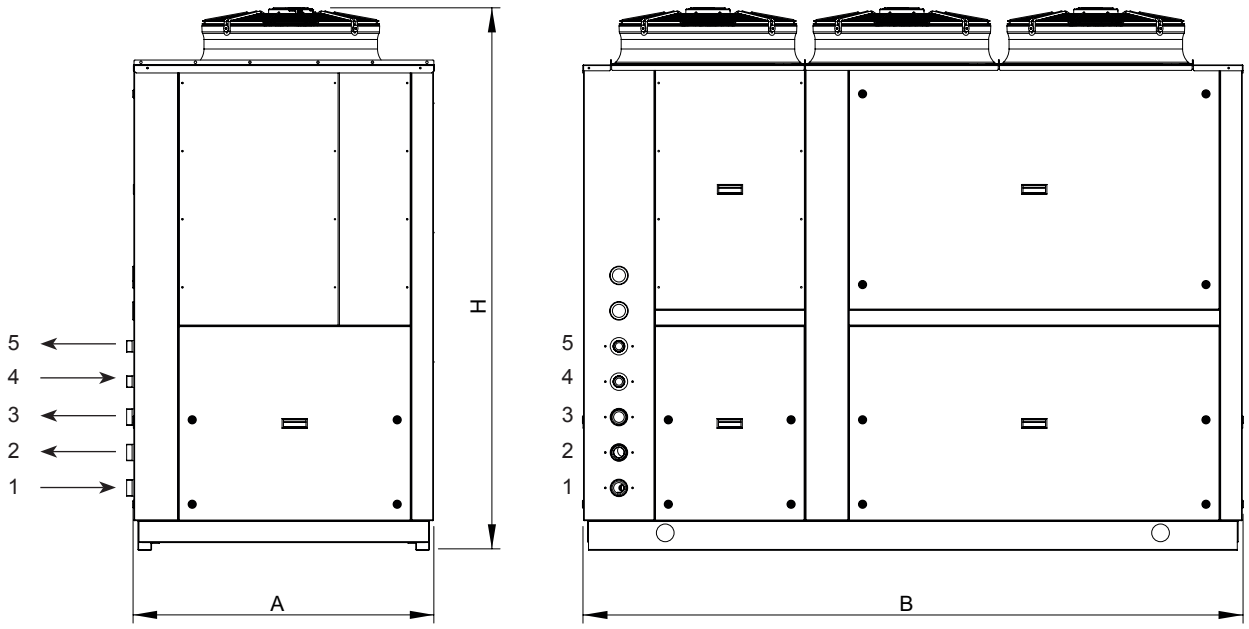
Transport weights

| **Unit without options** | | | 646 | 681 | 797 | 807 | 918 | 933 | kg |
|---|---|---|---|---|---|---|---|---|---|
| Options | Version | Desuperheater version (VD) | 15 | 15 | 18 | 21 | 24 | 24 | kg |
| | Acoustic setting up | Low noise setting up (AS) | 65 | 65 | 75 | 75 | 85 | 85 | kg |
| | Plant side flow rate management | Standard pump | 25 | 25 | 26 | 26 | 29 | 29 | kg |
| | | High head pump | 31 | 31 | 32 | 32 | 35 | 35 | kg |
| | | High efficiency pump | 35 | 35 | 36 | 36 | 39 | 39 | kg |
| | Domestic hot water production : 3 way valve | | 21 | 21 | 22 | 22 | 25 | 25 | kg |

Operating weights

| **Unit without options** | | | 647 | 684 | 800 | 812 | 925 | 944 | kg |
|---|---|---|---|---|---|---|---|---|---|
| Options | Version | Desuperheater version (VD) | 19 | 19 | 23 | 27 | 31 | 31 | kg |
| | Acoustic setting up | Low noise setting up (AS) | 65 | 65 | 75 | 75 | 85 | 85 | kg |
| | Plant side flow rate management | Standard pump | 35 | 35 | 37 | 37 | 42 | 42 | kg |
| | | High head pump | 41 | 41 | 43 | 43 | 48 | 48 | kg |
| | | High efficiency pump | 45 | 45 | 47 | 47 | 52 | 52 | kg |
| | Domestic hot water production : 3 way valve | | 27 | 27 | 29 | 29 | 34 | 34 | kg |

## Overall dimensions



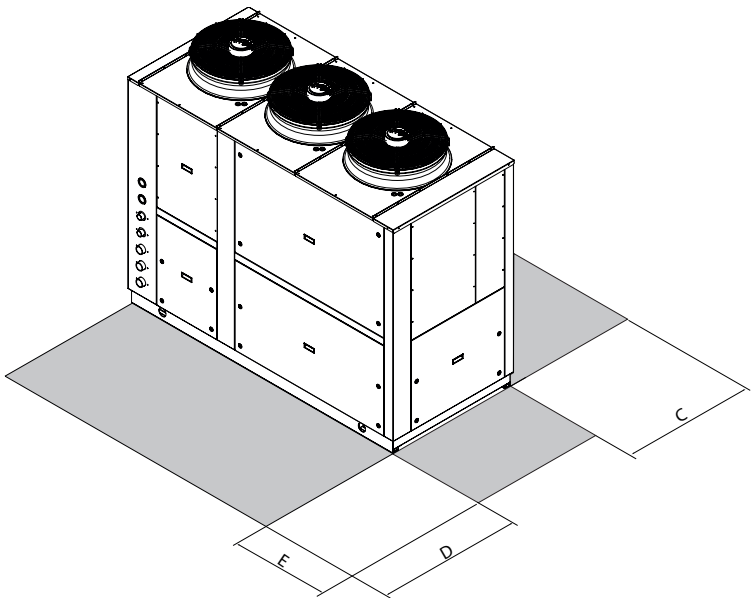

| | | |
|---|---|---|
| 1 | Plant return | 2" M |
| 2 | Plant flow | 2" M |
| 3 | Domestic hot water flow | 2" M |
| 4 | Desuperheater inlet | 1" 1/4 M |
| 5 | Desuperheater outlet | 1" 1/4 M |

| | Frame 1 | Frame 2 | Frame 3 |
|---|---|---|---|
| A | 1130 mm | 1130 mm | 1130 mm |
| B | 1710 mm | 2430 mm | 3130 mm |
| H | 1980 mm | 1980 mm | 1980 mm |

## 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.

| | |
|---|---|
| C | 1200 mm |
| D | 1000 mm |
| E | 1000 mm |



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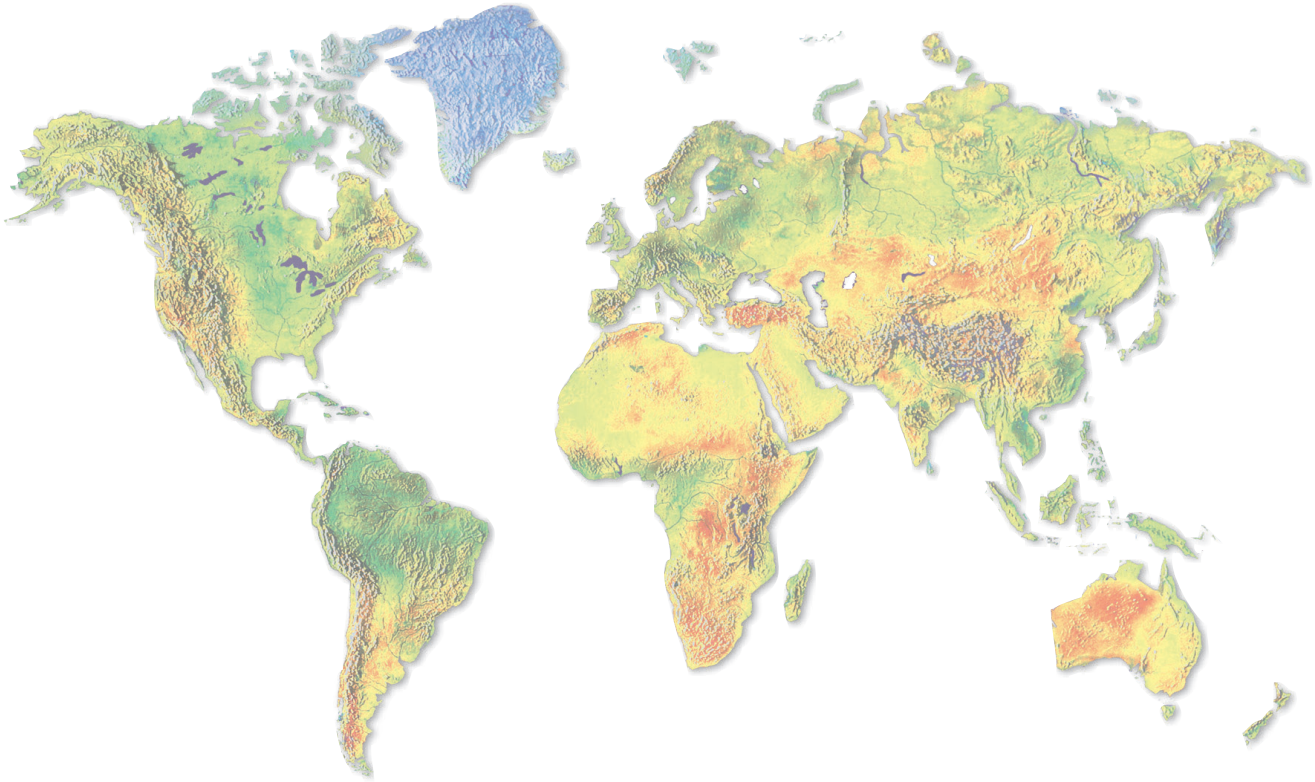

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