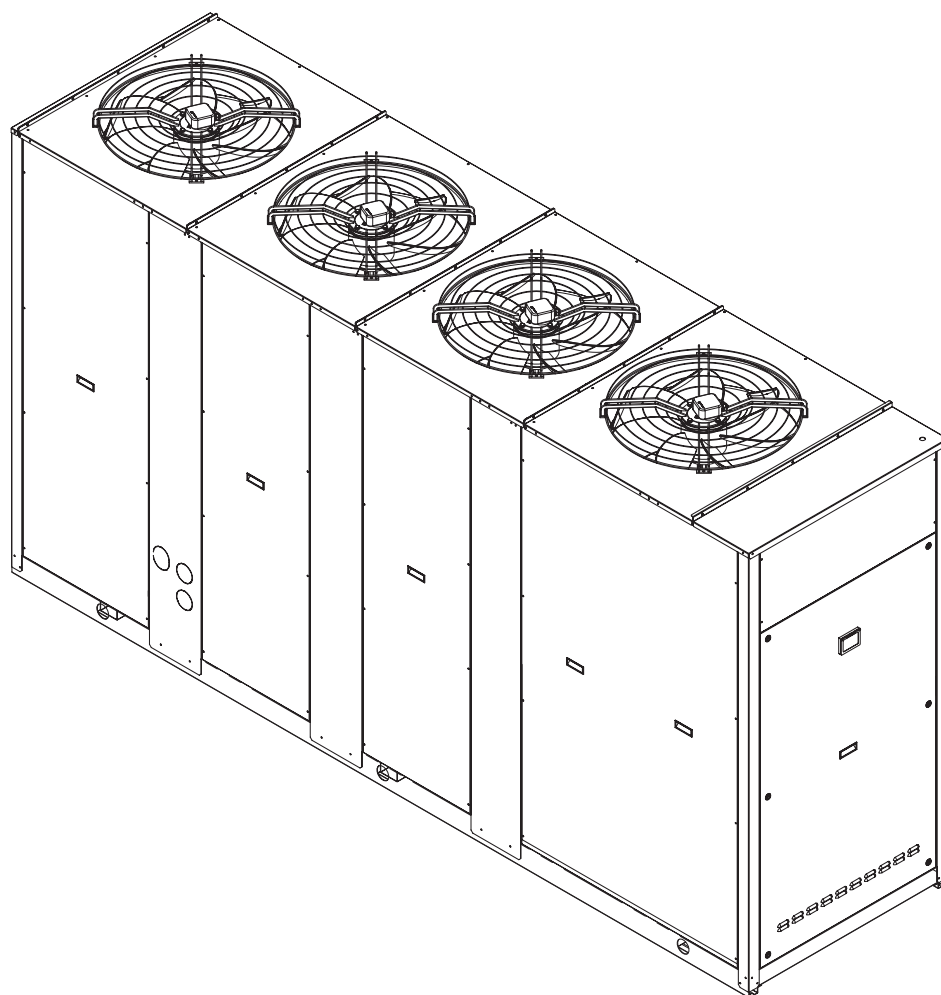




RGA

AIR-WATER CHILLERS AND HEAT PUMPS
FOR OUTDOOR INSTALLATION



INSTALLATION AND OPERATION MANUAL

Dear Customer,









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The qualitative level is kept under constant control and FERROLI products therefore offer SAFETY, QUALITY and RELIABILITY. Due to the continuous improvements in technologies and materials, the product specification as well as performances are subject to variations without prior notice.

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THIS MANUAL IS DIVIDED INTO SECTIONS. THEIR NAMES APPEAR IN THE HEADING OF EACH PAGE.

GENERAL FEATURES	4
General specifications	4
European Directives	4
Identification plate of the Unit	4
Presentation of the unit	5
Unit identification code	6
Description of the component	7
ACCESSORIES AND OPTIONAL EQUIPMENT	12
"Storing and hydronic kit" options	12
Options	13
Accessori	14
Mechanical options	14
Electrical options	14
TECHNICAL DATA - BASE VERSION (VB)	15
Technical data	15
NOMINAL performances - Base setting up (AB) - Standard plants	16
NOMINAL performances - Base setting up (AB) - Radiant plants	17
NOMINAL performances - Low noise setting up (AS) - Standard plants	18
NOMINAL performances - Low noise setting up (AS) - Radiant plants	19
NOMINAL performances - Extra low noise setting up (AX) - Standard plants	20
NOMINAL performances - Extra low noise setting up (AX) - Radiant plants	21
Standard performances in cooling mode IR - Base setting up AB	22
Standard performances in cooling mode IR - Low noise setting up (AS)	24
Standard performances in cooling mode IR - Extra low noise setting up (AX)	26
Standard performances in cooling mode IP - Base setting up (AB)	28
Standard performances in cooling mode IP - Low noise setting up (AS)	30
Standard performances in cooling mode IP - Extra low noise setting up (AX)	32
Standard performances in heating mode IP - Base setting up (AB)	34
Standard performances in heating mode IP - Low noise setting up (AS)	35
Standard performances in heating mode IP - Extra low noise setting up (AX)	36
Correction factor for the use of glycol in heating mode	37
Correction factor for the use of glycol in cooling mode	38
Fouling factors	38
TECHNICAL DATA - BR - BP UNIT	39
Mandatory requirements for BR and BP units	39
TECHNICAL DATA - IR DESUPERHEATER VERSION (VD)	40
Base setting up AB	40
Low noise setting up AS	40
Extra low noise setting up AX	40
Performances	41
TECHNICAL DATA - IP DESUPERHEATER VERSION (VD)	42
Base setting up AB	42
Low noise setting up AS	42
Extra low noise setting up AX	42
Performances	43
TECHNICAL DATA - IR RECOVERY VERSION (VR)	44
Base setting up AB	44
Low noise setting up AS	44
Extra low noise setting up AX	44
Performances	45
NOISE LEVELS	46
Base setting up AB	46
Low noise setting up AS	46
Extra low noise setting up AX	46
OPERATING RANGE	47
Operating range	47
WATER PRESSURE DROP	48
Plant side exchanger	48
Desuperheaters	49
Total recovery exchanger	50
WORKING HEAD	51
Standard working head pumps	51
High working head pumps	52
DIMENSIONAL AND PHYSICAL DATA	53
Overall dimensions	53
Description of the components	54
Minimum space required for operation	55
Position of condensate drain	55

Vibration-damper installation	55
Area of support	56
Transport weight	57
Operation weight	58
Inspections on arrival	60
Safety prescriptions	60
Handling	60
Storage	61
Packing removing	61
Positioning	62
HYDRAULIC CONNECTIONS	63
General rules	63
Protection devices	63
Tips for a successful installation	63
Water component for corrosion limit	64
Precautions for the Winter	64
Basic diagram Standard Unit VB [PLANT SIDE WATER CIRCUIT]	65
Basic diagram for units with Recovery [RECOVERY WATER CIRCUIT]	65
Air vent and water drain	66
Piping connection with Victaulic couplings and Water flow switch	66
Valve regulating diagram valve	66
MAXIMUM VOLUME OF WATER	68
Maximum volume of water in the system with wet module	68
ELECTRICAL CONNECTIONS	69
General rules	69
Structure of the electric panel	69
Composition of the system	69
Electrical connections	69
R410A PROTECTION DEVICES	73
Refrigerant flow diagram IR VB unit with thermostatic expansion valve	74
Refrigerant flow diagram IR VB unit with thermostatic expansion valve	75
Refrigerant flow diagram IP VB unit with electronic expansion valve	76
Refrigerant flow diagram IR VR unit with thermostatic expansion valve	77
USER INTERFACE	78
Keys	78
Display	79
Menu structure - Main controller	80
INPUTS AND OUTPUTS	82
Inputs and outputs	82
CONTROLLER TECHNICAL DATA	84
ALARMS	85
AVAILABLE FUNCTIONS	89
ST-BY of the unit	89
Operation mode selection	89
Remote ST-BY 	89
Working mode remote change-over cooling  /  heating	89
Set point	89
Antifreeze 	89
Supplementary electrical heating elements 	89
Dinamic setpoint	90
Plant pump on-off control 	90
Plant pump modulating control 	90
Demand limit	90
Funzione economy 	91
Recording hours of operation	91
Power failure	91
Clock	91
History alarms	91
Total recovery function (VR unit only)	91
Automatic change-over	92
Date and time set up	92
Timer scheduling	93
PARAMETERS	95
Common parameters	95
Specific parameters for VR unit	95
CONFIGURABLE INPUTS	96
PROBE CHARACTERISTICS	97
NETWORK COMMUNICATION	98
Modbus address table	99
START-UP	100
General Rules	100
MAINTENANCE	100
General Rules	100
Routine maintenance	100
General considerations	102
SAFETY AND POLLUTION	103
Refrigerant safety card	103
First aid	104
DECLARATION OF CONFORMITY	107

The manufacturer declines all responsibility for any inaccuracies in this manual due to printing or typing errors.
The manufacturer reserves the right to modify the products contents in this catalogue without previous notice.

GENERAL FEATURES

General specifications

- This manual and the wiring diagram supplied with the unit must be kept in a dry place and ready to hand for future consultation when required.
- This manual has been compiled to ensure that the unit is installed in the correct way and to supply comprehensive information about how to correctly use and service the appliance. **Before proceeding with the installation phase, please carefully read all the information in this manual, which describes the procedures required to correctly install and use the unit.**
- Strictly comply with the instructions in this manual and conform to the current safety standards.
- The appliance must be installed in accordance with the laws in force in the country in which the unit is installed.
- Unauthorized tampering with the electrical and mechanical equipment will **VOID THE WARRANTY**.
- Check the electrical specifications on the identification plate before making the electrical connections. Read the instructions in the specific section where the electrical connections are described.
- If the unit must be repaired for any reason, this must only be done by a specialized assistance center recognized by the manufacturer and using genuine spare parts.
- The manufacturer also declines all liability for any damage to persons or property deriving from failure of the information in this manual to correspond to the actual unit in your possession.
- **Proper uses: this series of chillers is designed to produce cold or hot water for use in hydronic systems for conditioning/heating purposes. The units are not suitable for the production of domestic hot water.**
- **Any use differing from this proper use or beyond the operating limits indicated in this manual is forbidden unless previously agreed with the manufacturer.**
- **The prevention of the risk of fire at the installation site is the responsibility of the end user.**

European Directives

The company hereby declares that the unit in question complies with the matters prescribed by the following Directives:

- | | |
|---|--------------------|
| • Unit Directive | 2006/42/CE |
| • Directive governing pressurized vessels (PED) | 97/23/CE |
| • Electromagnetic compatibility Directive (EMC) | 2004/108/CE |
| • Low voltage Directive (LVD) | 2006/95/CE |

Any other Directives have to be considered not applicable.

Identification plate of the Unit

The figure on the left depicts the identification plate of the unit, affixed to the outer left-hand side of the Electric Panel.

A description of the data is given below:

Standard versions

- A** - Trademark
- B** - Model
- B1**- Code
- C** - Serial number
- D** - Cooling Capacity
- E** - Heating Capacity

Special versions

- A** - Trademark
- B** - Model
- B1**- Code
- C** - Serial number
- D** - Cooling Capacity (same as Standard Version of the unit)
- E** - Heating Capacity

for IR unit, VD version, Recovered Heating Capacity

for IP unit, VD version, Heating Capacity / Recovered Heating Capacity

- F** - Power input in COOLING mode
- G** - Power input in HEATING mode
- H** - Reference standard
- I** - Electric power supply
- L** - Maximum load current
- M** - Type of refrigerant and charge
- N** - Shipping weight of the unit
- O** - Sound pressure level at 1m
- P** - IP Level Protection
- Q** - Maximum pressure - High Side
- R** - Maximum pressure - Low Side
- S** - PED certification authority

- F** - Power input in COOLING mode (same as Standard version of the unit)
- G** - Power input in HEATING mode
- H** - Reference standard
- I** - Electric power supply
- L** - Maximum load current
- M** - Type of refrigerant and charge
- N** - Shipping weight of the unit
- O** - Sound pressure level at 1m
- P** - IP Level Protection
- Q** - Maximum pressure - High Side
- R** - Maximum pressure - Low Side
- S** - PED certification authority

NOTE: The identification plate of the Brine Unit (BR - BP) is filled out as shown in the diagram for the Basic Version of the unit (VB).

GENERAL FEATURES

Presentation of the unit

This series of air-water chillers and heat pumps satisfies the cooling and heating requirements of residential plants of medium 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 refrigerant circuit, contained in a compartment protected from the air flow to simplify the maintenance operations, is equipped with scroll compressors mounted on damper supports, brazed plate heat exchanger, thermostatic expansion valve (standard for IR) or electronic expansion valve (standard for IP / option for IR), reverse cycle valve, dehydrator filter, axial fans with safety protection grilles, finned coil made of copper pipes and aluminium louvered fins with subcooling section. The circuit is protected by a safety gas valve, high and low pressure switches and differential pressure switch on the plate heat exchanger. The plate heat exchanger and all the hydraulic pipes are thermally insulated in order to avoid condensate generation and to reduce thermal losses.

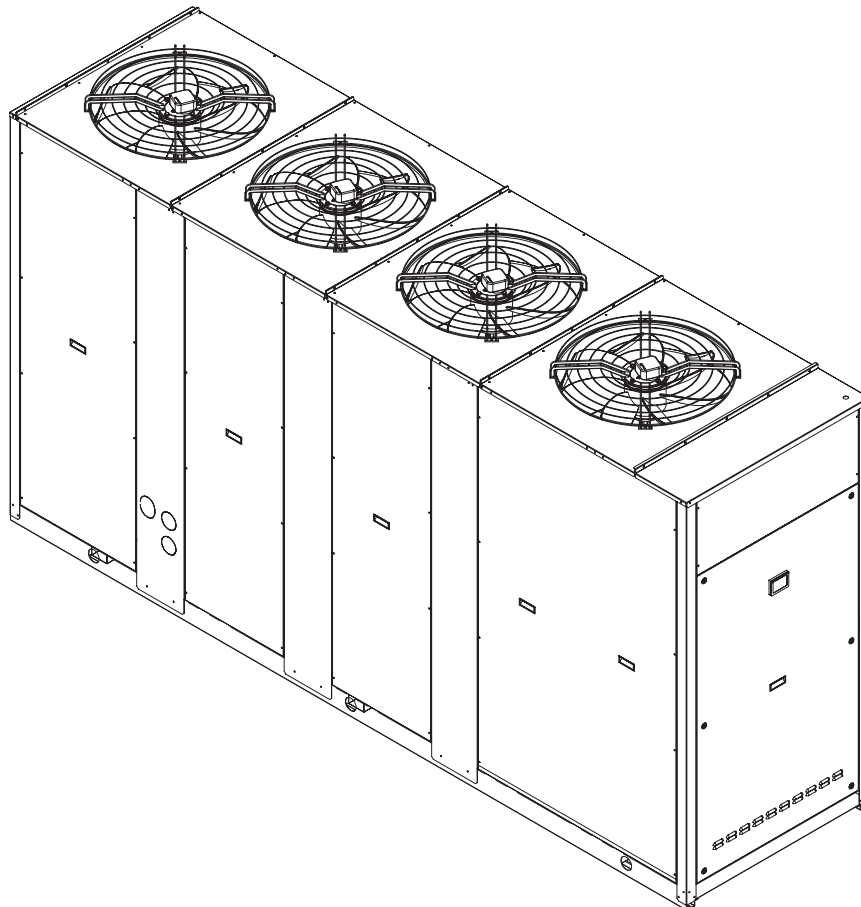
All the units can be equipped with variable speed fans control that allows the units to operate with low outdoor temperatures in cooling and high outdoor temperature in heating and permits to reduce noise emissions in such operating conditions.

The low noise acoustic setting up (AS) is obtained, starting from the base setting up (AB), reducing the rotational speed of the fans and mounting sound jackets on the compressors and the technical compartment is clad with soundproofing material of suitable thickness.

The eXtra low noise acoustic setting up (AX) is obtained, starting from the low noise setting up (AS), further reducing the rotational speed of the fans and using finned coil with bigger surface.

All the units are supplied with a management and control electrical panel containing general switch, phase presence and correct sequence controller, microprocessor controller with display and all the other electrical components with IP54 minimum protection degree.

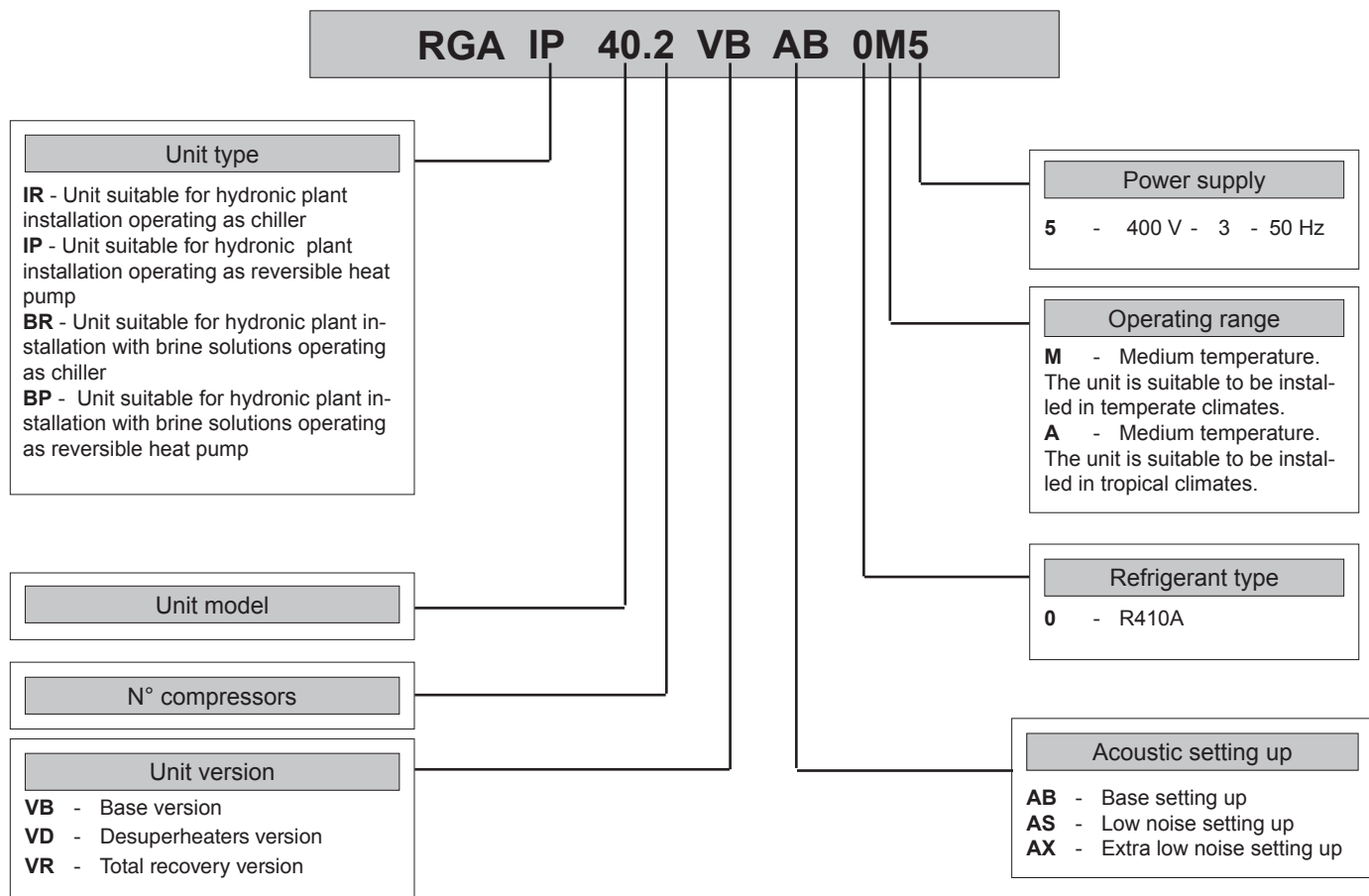
All the units are accurately built and individually tested in the factory. Only electric and hydraulic connections are required for installation.



GENERAL FEATURES

Unit identification code

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



The available special versions are described below:

VB: Standard unit.

VD: Version with Desuperheater (available for both IR units and IP units)

Produces cold water in the same way as the standard version plus hot water from 30 to 70°C at the same time. This is achieved by installing a water-refrigerant gas heat exchanger between the compressor and coils in order to recover 25 to 30% of the heating capacity that would otherwise be dispersed in the air. It helps to remind that hot water production is possible only in combination with cold-hot water production in the main heat exchanger and it is subordinated by it.

VR: Total Heat Recovery version

Produces cold water as in the standard version plus hot water at a temperature of 30 to 55°C at the same time. This is achieved thanks to a water-refrigerant gas heat exchanger that totally recovers the heating capacity that would otherwise be dispersed in the air. The total heat recovery function is enabled and disabled by means of a valve on the compressor delivery of each circuit: when the temperature of the water that enters the recuperator drops, the valve switches the hot gas flow from the condensing coils to the recovery heat exchanger. On the other hand, when the temperature of the water reaches the set-point, the valve shuts off the heat recuperator and switches the hot gas flow to the condensing coils. It helps to remind that hot water production is possible only in combination with cold water production in the main heat exchanger and it is subordinated by it.

GENERAL FEATURES

Description of the component

1. Fans. Axial type, they are contained in a sheet nozzle and are equipped with a safety grille, scythe-shaped blades increase the efficiency and reduce the noise level. The fans are directly coupled to the single-phase motor by means of an external rotor. Thermal protection against operating faults is installed inside the winding. The fans rotational speed can be modulated continuously by an analogue device or an inverter (option) to control the condensation pressure (in cooling) and the evaporation pressure (in heating) in order to extend the operating limits of the unit and to reduce noise emissions. Optionally are available Electronically Commutated (EC) fans, which ensure maximum energy efficiency at reduced speed of rotation.

2. Electric control and monitoring 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, placed on the frontal panel, allows to view and to modify, if necessary, all the parameters of the unit. This is housed in a metal casing in which the various electrical components are positioned on one metal plate.

2a. The power section includes:

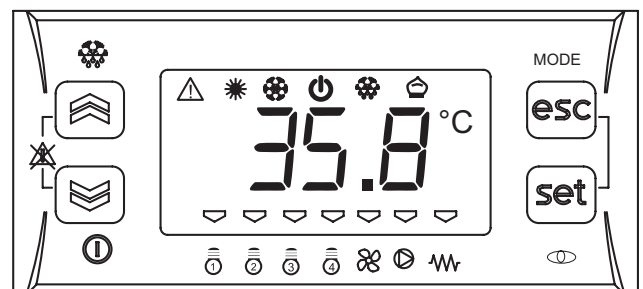
- Main door-locking circuit-breaker.
- Fuse-holder that can be isolated with protection fuse triad for each compressor, or thermal magnetic circuit breakers (option).
- Fuse-holder that can be isolated with protection fuse for compressor oil heaters and antifreeze (if installed), or thermal magnetic circuit breakers (option).
- Control contactor for each compressor or soft starters (option).
- Protection fuse for the fans, or thermal magnetic circuit breakers (option).
- Thermal magnetic contactor switch to protect the pump (if the Hydronic Kit is installed).
- Phase presence and sequence monitoring device on power supply, or voltage monitor and sequence meter (accessory).

2b. The auxiliary section includes:

- Fuses on the auxiliary transformer, or thermal magnetic circuit breakers (option).
- Electromagnetic noise filter
- Adjusting fan speed board (option)
- Insulating and safety transformer to power the auxiliary circuit.

2c. The microprocessor monitoring section includes:

- User interfacing terminal with display.
- On-off key.
- Operating mode selector key.
- Compressor on-off display LED.
- Operational mode LED
- Antifreeze heaters activated indicator LED.
- Fans on-off display LED
- Pumps on-off display LED
- Check-control with fault code display
- Defrosting, alarm, economy, stand-by LED.



Control system main functions:

temperature control of the water produced by the unit, compressor and pump operating hour counter, timing and cycling of start-ups, input parameters by keyboard, alarms management, smart defrosting control and operating mode change (only IP unit), dynamic set-point (climatic control), scheduling and integrative heaters control.

If you installed the hydronic kit these functions are enabled: antifreeze with pump, start-up cycle after prolonged inactivity (anti-sticking), if the hydronic kit installed has 2 pumps there is a cycling between each pump to ensure an equivalent lifetime, with inverter modulating hydronic kit the water flow of the plant can be adjusted.

Digital input functions: low pressure, high pressure, high temperature on compressor supply, phase presence and sequence monitoring device on power supply, differential water pressure control, compressors thermal protection, fans thermal protection, pumps thermal protection (only if installed MP accessory), ON/OFF and remote operating mode change, demand limit and Economy function, recovery enabling (only for the VR Version), recovery Pump Thermal Protective (only for the VR Version), recovery differential water pressure control (only for the VR Version).

Digital output functions: compressor start-up, pump start-up (only with MP accessory), plate heat exchanger electrical heater, remote general alarm, 4-way valve (only IP unit), integrative heaters and clean contact on compressors start-up, recovery valve management (only for the VR Version), recovery pump management (only for the VR Version).

Analogic input functions: in and out water temperature, coil temperature probe, external air temperature probe (if present), in and out recovery water temperature (only for the VR Version).

Analogic output functions: continuous adjustment of axial fans rotating speed (option for AB and standard for AS and AX acoustic setting up), continuous adjustment of pump rotating speed (only if hydronic kit with modulating pump is installed).

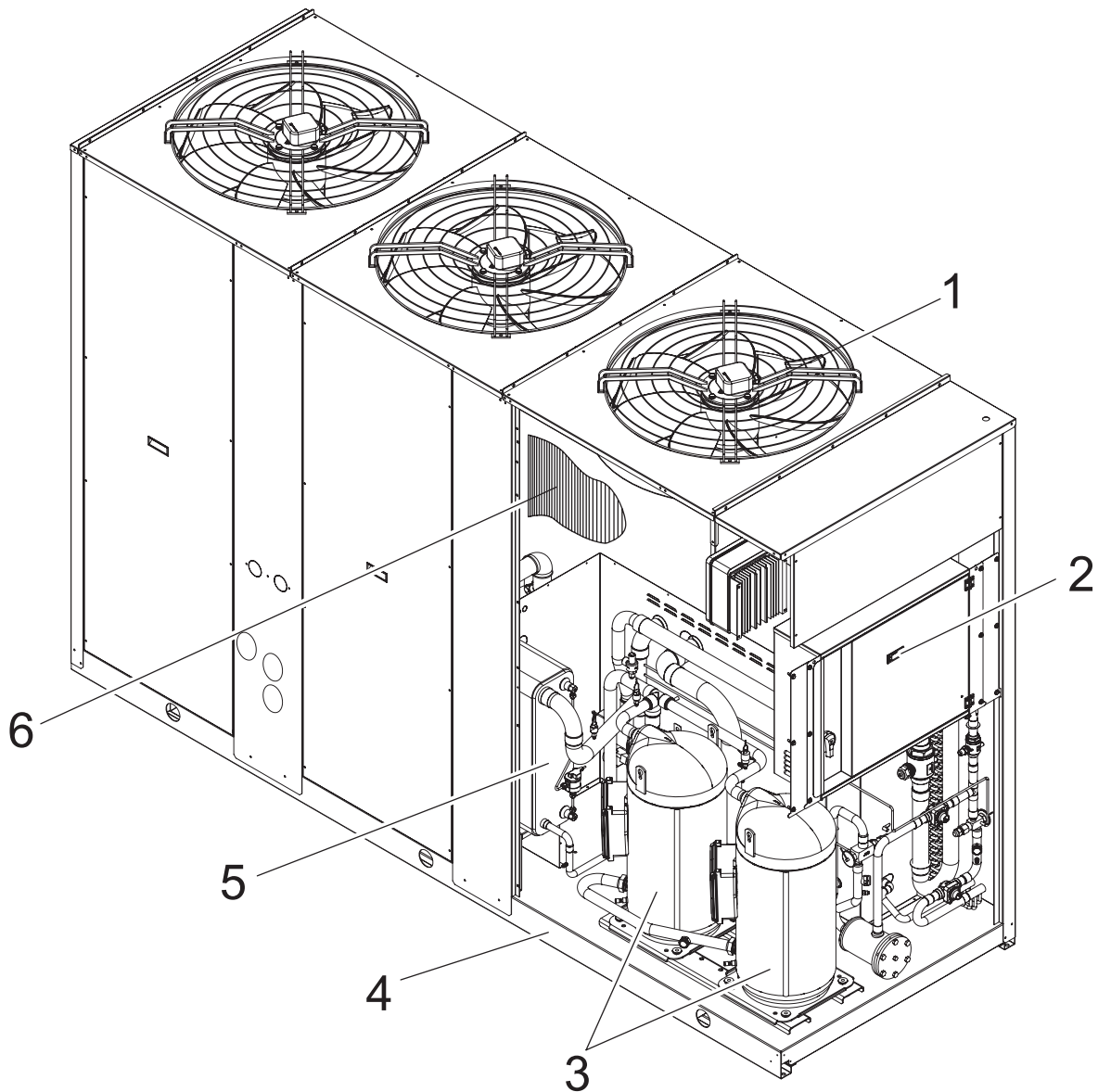
GENERAL FEATURES

3. Compressors. They are the SCROLL type with orbiting coil equipped with built-in thermal protection and oil heater (accessory for IR, as standard for IP). The AS unit includes: a soundproofing jacket for the compressors, to reduce noise level. All units are equipped with two compressors connected in parallel (1 single cooling circuit) which can operate at the same time (100% cooling power) or individually (50% of the cooling power), thus adapting to the different thermal loads of the system supplied.

4. Frame, supporting structure and lateral panels are made of galvanized and painted sheet-steel (colour RAL 7035) to guarantee good resistance to the weather. Accessibility to internal parts is possible removing the frontal panel, for other manteinances also the lateral panel can be removed.

5. Evaporator made of brazed stainless steel plates (AISI 316). It is installed in a shell of heat-insulating material to prevent the formation of condensation and heat exchanges towards the outside. Standard supply also includes antifreeze heater a differential pressure switch on the water circuit to avoid the risk of freezing if the water flow is shut off for some reason.

6. Condensing coils, the aluminium finned pack type with shaped profile to increase the heat exchange coefficient and with copper pipes arranged in staggered rows. A sub-cooling section is integrated into the lower part.



GENERAL FEATURES

Hydraulic and cooling circuit components

7. One-way valves (IP unit only), allowing the refrigerant gas to pass into the appropriate exchangers, depending on the operating cycle.

8. 4-way cycle reversal valve (IP unit only), reverses the flow direction of the refrigerant gas as the summer/winter operating mode is changed.

9. Safety valve. Installed on the delivery pipe of the compressors, this operates if extreme faults should occur in the plant.

10. Fluid valve (accessory). Ball type, this allows the gas flow on the fluid line to be turned on and off. Along with the cock on the compressor delivery, it allows the components of the fluid line to be subjected to extraordinary maintenance work and the compressors to be replaced if necessary (without discharging the refrigerant gas from the unit).

11. Compressor delivery valve (accessory). Ball type, allows the gas delivered to the compressors to be turned on and off.

12. Dehydrator filter. Mechanical type. Retains impurities and traces of moisture in the circuit.

Hermetic type for mod. 40÷100 or a cartridge type for mod. 115÷200.

13. Fluid and humidity indicator. Signals when fluid passes through the circuit, indicating that the refrigerant gas charge is correct. The fluid indicator light also indicates the amount of moisture in the refrigerant gas by changing colour.

14. Low pressure switch (N°1 of series IR version, N°2 of series IP version). With fixed setting. It is installed on the suction pipe and blocks the compressors if the operating pressures drop below the tolerated values. Automatically resets as the pressure increases. If it activates frequently, the unit will block and can only be restarted by resetting via the user interface terminal.

15. High pressure switch (n°2). With fixed setting. Are installed on the delivery pipe and blocks the compressors if the operating pressures exceed the tolerated values. If it activates, the unit will block and can only be restarted by resetting via the user interface terminal.

16. Expansion valve:

- **Thermostatic valve** (standard for IR and BR unit) with external equalizer, this supplies the evaporator correctly, keeping the selected overheating degree at a steady level.

- **Electronic valve** (standard for IP and BP unit, optional for IR and BR unit) supplies the evaporator correctly, keeping the selected overheating degree at a more steady level; ensures a faster response to load changes and superior stability which translates into increased efficiency at partial loads.

17. Water differential pressure switch. This is standard supply and is installed on the connections between the water inlet and outlet of the exchanger. It stops the unit if it activates.

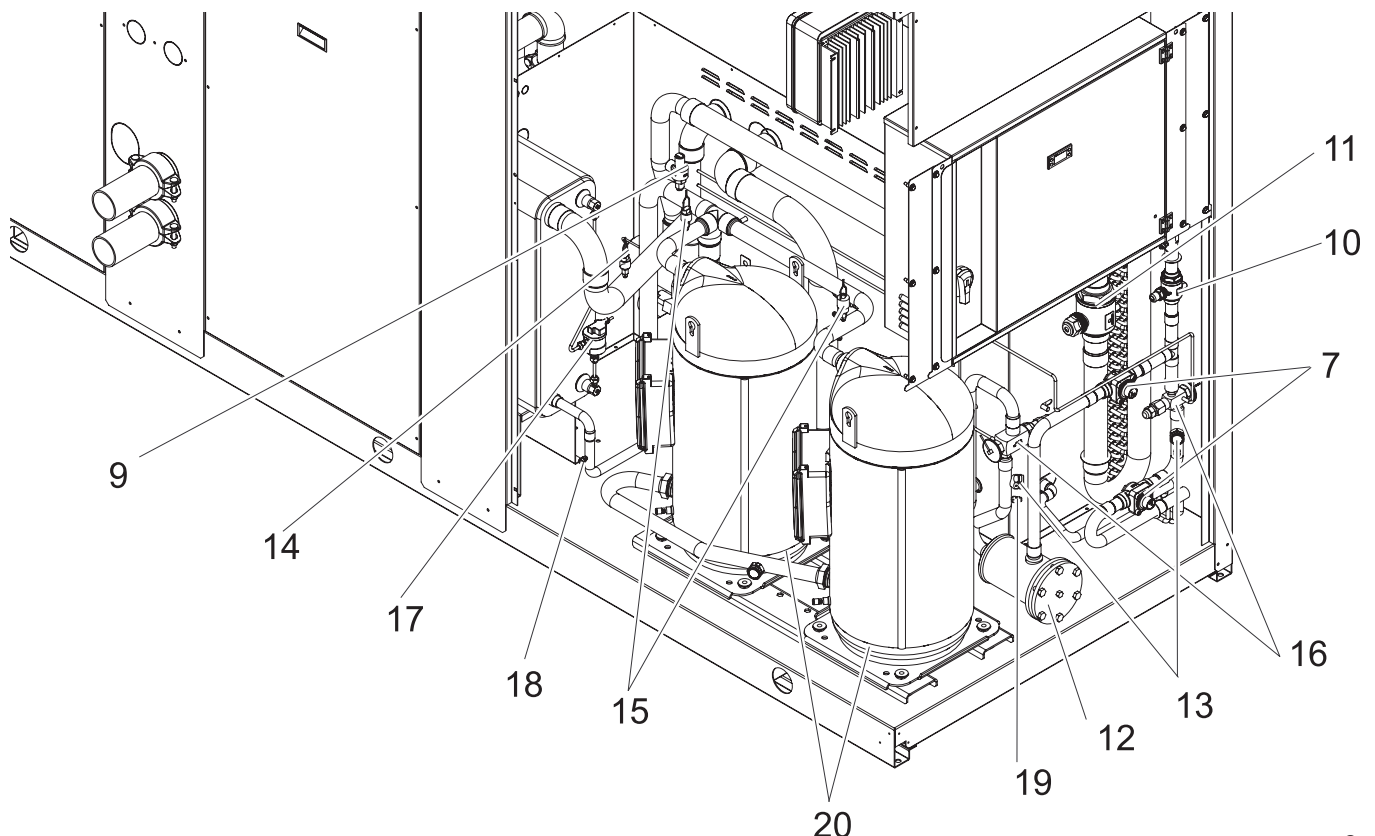
18. Pressure taps: 1/4 " SAE (7/16" UNF) type with flow regulator. Allow the operating pressure of the system to be measured: compressor delivery, lamination component inlet, compressor intake.

19. Pressure taps: 5/16 " SAE type with flow regulator. Allow the charge/discharge of the gas from the system, precisely from compressor outlet an expansion valve inlet.

20. Electrical heating elements to heat the compressor oil. "Belt" type (accessory for IR, as standard for IP). These activate when the compressor turns off and keep the temperature of the oil sufficiently high so as to prevent refrigerant gas from migrating during these pauses.

Fluid receiver (IP unit only), this is a plenum tank that accounts for variations to the refrigerant gas charge the unit must supply as the summer/winter operating mode varies.

Fluid separator (IP unit only), on the compressor intake to protect against possible fluid back-flows.

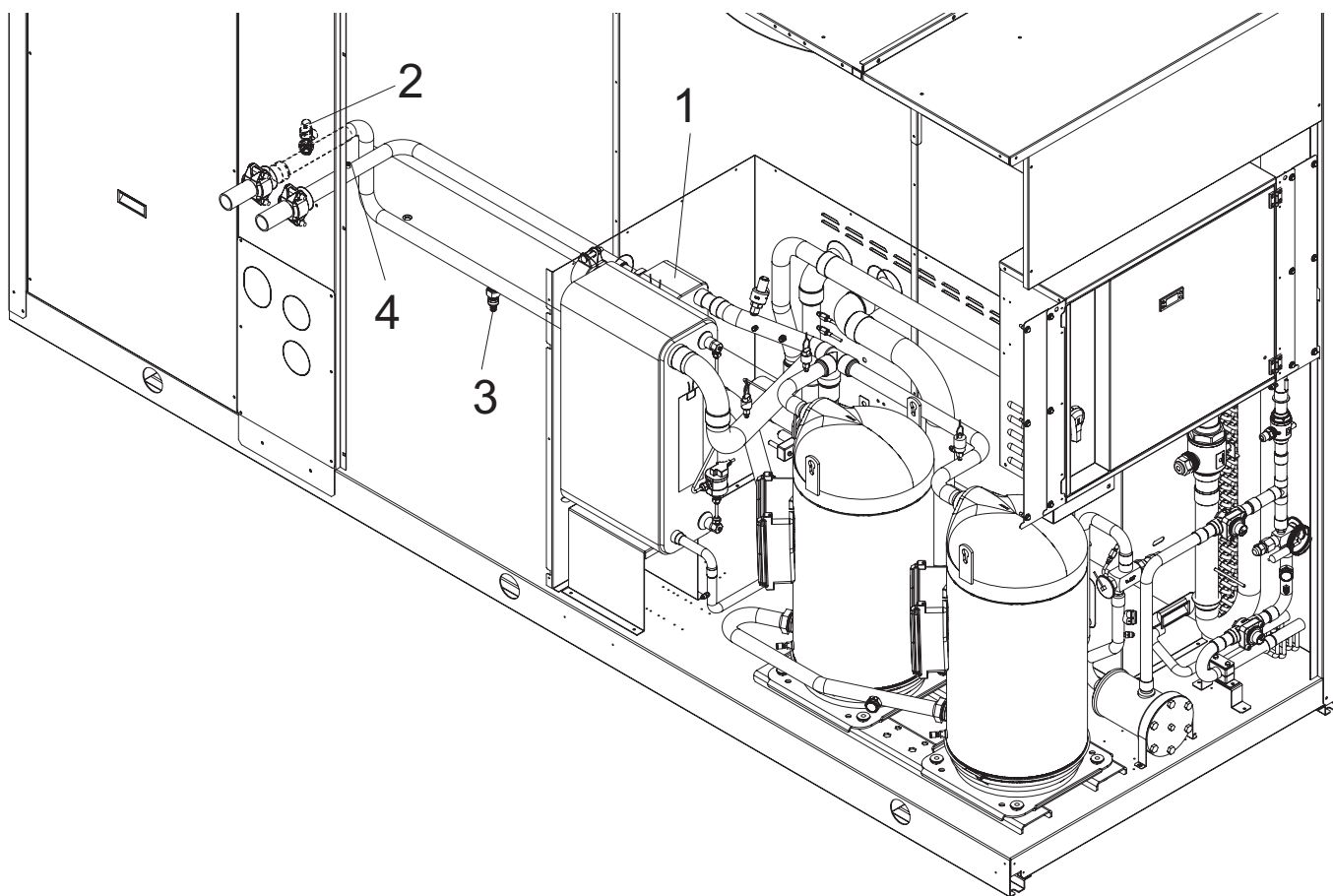


GENERAL FEATURES

Desuperheater unit VD (available for both IR units and IP units)

Hydraulic and chilling circuit components:

- 1. Desuperheater.** Specially designed for the specific version. Plate type, made of stainless steel (AISI 316). It is installed within a shell of thermal barrier insulating material to prevent heat exchanges towards the outside. Standard supply also includes an electric antifreeze heater to prevent the parts from freezing during the winter, when the system remains at a standstill (if not drained).
- 2. Water safety valve.** On the heat recovery inlet pipe. It acts whenever faulty service leads to an operating pressure in the plumbing system that exceeds the valve opening value (Fig.1).
- 3. Water drain taps** for emptying the exchangers and pipes of the unit dedicated to heat recovery (Fig. 1).
- 4. Air vent.** Accessed by removing the front panels. It consists of a manually operated valve installed in the highest part of the water pipes. To use in conjunction with the water drain cocks situated in the rear part of the unit, for emptying the exchangers and pipes dedicated to heat recovery.

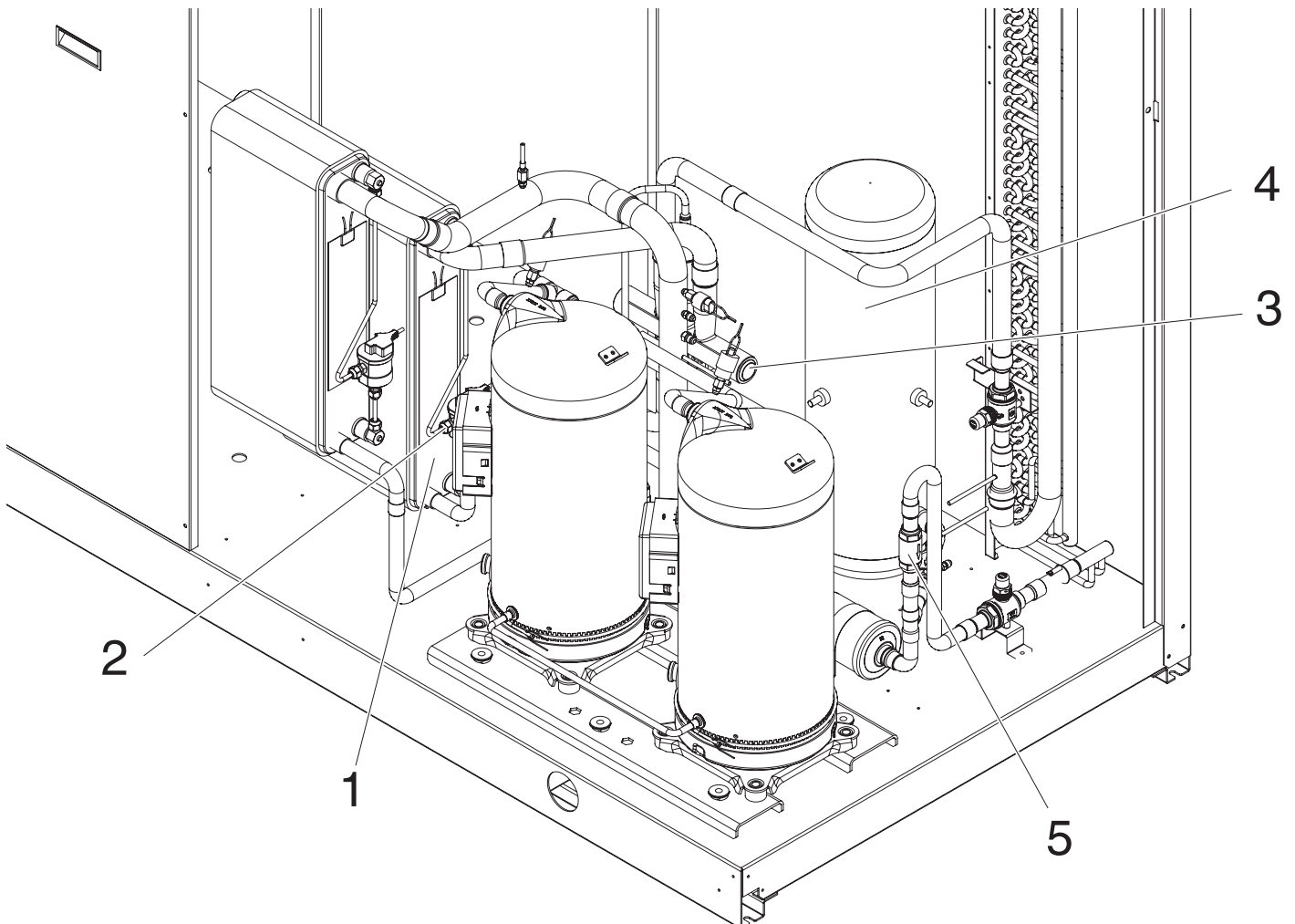


GENERAL FEATURES

Total Heat Recovery unit VR (only available for IR units)

Hydraulic and cooling circuit components:

- 1. Heat recovery exchanger.** Specially designed for the specific version. Plate type, made of stainless steel (AISI 316). It is installed within a shell of thermal barrier insulating material to prevent heat dispersion towards the outside. Standard supply also includes an electric antifreeze heater to prevent the parts from freezing during the winter, if it is not drained.
- 2. Differential water pressure switch.** Installed on exchanger. It disables the heat recovery version if activated owing to lack of water flowing through the recovery exchangers.
- 3. Heat recovery management valve.** This delivers refrigerant to the condensing coils or heat recovery exchanger, depending on demands for hot water, and into the appropriate exchangers depending on whether hot water is required or not.
- 4. Fluid receiver.** This is a plenum tank that accounts for the refrigerant charge variations required by the unit as the operating modes change (condensing in air or in water).
- 5. One-way valves.** Make the refrigerant obligatorily pass through the appropriate heat exchangers (coils / heat exchanger), depending on the operating mode.



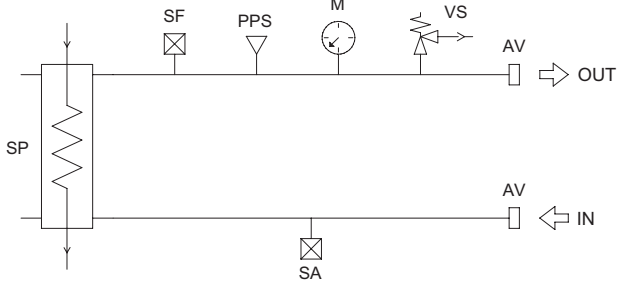
ACCESSORIES AND OPTIONAL EQUIPMENT

"Storing and hydronic kit" options

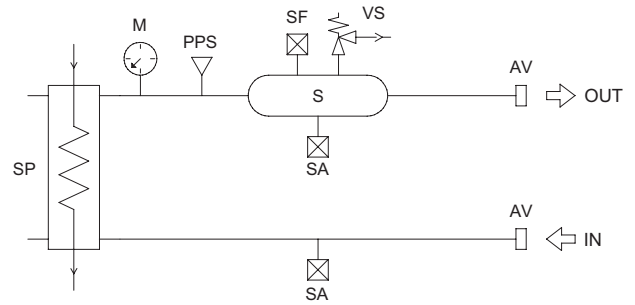
Storing and hydronic kit	MKT SS Pipe kit without tank	This accessory consists of steel pipes insulated with thermal barrier material and allows the water inlet/outlet connection to be routed outside the unit.
	M1P SS 2P STD 1 Standard pump	Allows the circulation of the water on the plant side.
	M1P SS 2P HP1 1 High head pump	Allows the circulation of the water on the plant side and guarantees a higher available static head, suitable for high pressure drop plants.
	M1PM SS 2P STD 1 Standard modulating pump	Allows the circulation of the water on the plant side with the possibility to set the rotational speed of the pump in order to get the requested flow rate without the necessity to install other setting devices.
	M1PM SS 2P HP1 1 Standard modulating high head pump	Allows the circulation of the water on the plant side, ensuring a higher available static head, suitable for high pressure drop plants, with the possibility to set the rotational speed of the pump in order to get the requested flow rate without the necessity to install other setting devices.
	M2P SS 2P STD 2 Standard pumps	Allows the circulation of the water on the plant side and includes a second pump installed as a backup to the first.
	M2P SS 2P HP1 2 High head pumps	Allows the circulation of the water on the plant side, ensuring a higher available static head, suitable for high pressure drop plants, and includes a second pump installed as a backup to the first.
	MKT AM Pipe kit with tank	This accessory consists of steel pipes insulated with thermal barrier material and allows the water inlet/outlet connection to be routed outside the unit. The thermal inertia of the buffer tank allows to reduce the number of compressor starts and to guarantee a more stable flow temperature.
	M1P AM 2P STD Tank and 1 standard pump	Allows the circulation of the water on the plant side. The thermal inertia of the buffer tank allows to reduce the number of compressor starts and to guarantee a more stable flow temperature.
	M1P AM 2P HP1 Tank and 1 high head pump	Allows the circulation of the water on the plant side and guarantees a higher available static head, suitable for high pressure drop plants. The thermal inertia of the buffer tank allows to reduce the number of compressor starts and to guarantee a more stable flow temperature.
	M1PM AM 2P STD Tank and 1 modulating standard pump	Allows the circulation of the water on the plant side with the possibility to set the rotational speed of the pump in order to get the requested flow rate without the necessity to install other setting devices. The thermal inertia of the buffer tank allows to reduce the number of compressor starts and to guarantee a more stable flow temperature.
	M1PM AM 2P HP1 Tank and 1 modulating high head pump	Allows the circulation of the water on the plant side, ensuring a higher available static head, suitable for high pressure drop plants, with the possibility to set the rotational speed of the pump in order to get the requested flow rate without the necessity to install other setting devices. The thermal inertia of the buffer tank allows to reduce the number of compressor starts and to guarantee a more stable flow temperature.
	M2P AM 2P STD Tank and 2 standard pumps	Allows the circulation of the water on the plant side and includes a second pump installed as a backup to the first. The thermal inertia of the buffer tank allows to reduce the number of compressor starts and to guarantee a more stable flow temperature.
	M2P AM 2P HP1 Tank and 2 high head pumps	Allows the circulation of the water on the plant side, ensuring a higher available static head, suitable for high pressure drop plants, and includes a second pump installed as a backup to the first. The thermal inertia of the buffer tank allows to reduce the number of compressor starts and to guarantee a more stable flow temperature.
	M1P PS 2P STD Tank and 1 standard pump (primary and secondary configuration)	Allows the circulation of the water on the primary between the tank and the heat exchanger. The thermal inertia of the buffer tank allows to reduce the number of compressor starts and to guarantee a more stable flow temperature.
	M2P PS 2P STD Tank and 2 standard pumps (primary and secondary configuration)	Allows the circulation of the water on the primary between the tank and the heat exchanger and includes a second pump installed as a backup to the first. The thermal inertia of the buffer tank allows to reduce the number of compressor starts and to guarantee a more stable flow temperature.

ACCESSORIES AND OPTIONAL EQUIPMENT

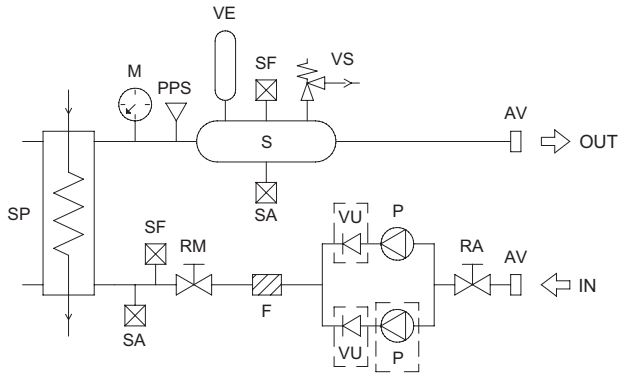
Pipe kit without tank



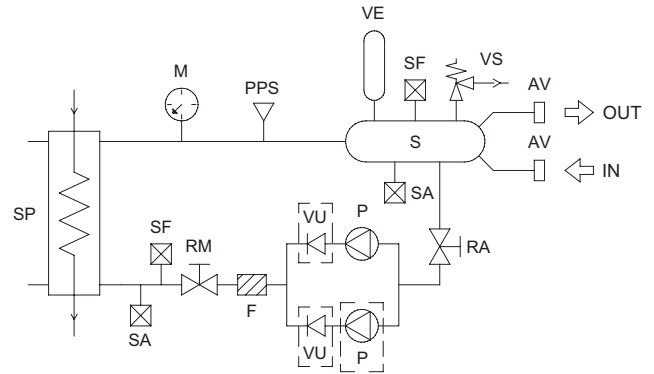
Pipe kit with tank



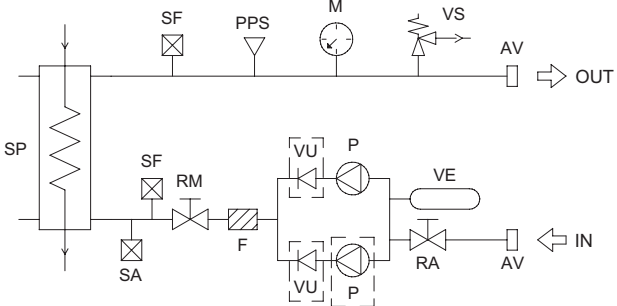
Tank and standard pump



Tank and standard pump (primary and secondary configuration)



Standard pump



ITEM	DESCRIPTION
AV	VICTAULIC CONNECTIONS
F	FILTER
M	GAUGE
P	PUMP
PPS	PRESSURE SOCKET 1/4" SAE WITH CORE
RA	SUCTION BALL VALVE
RM	DISCHARGE BALL VALVE
S	TANK
SA	DRAIN WATER VALVE
SF	AIR VENT VALVE
SP	HEAT EXCHANGER
VE	EXPANSION VESSEL
VS	SAFETY VALVE
VU	CHECK VALVE

--- only in case of 2 pumps

Options

Expansion valve	Thermostatic	(standard for IR and BR unit) with external equalizer, this supplies the evaporator correctly, keeping the selected overheating degree at a steady level.
	Electronic	(standard for IP and BP unit, optional for IR and BR unit) supplies the evaporator correctly, keeping the selected overheating degree at a more steady level; ensures a faster response to load changes and superior stability which translates into increased efficiency at partial loads.
Soft starter		Reduces the compressor start current of about 40%.
Compressor power factor correction		Allows to reduce the phase shift between the absorbed current and the power supply voltage keeping it above the value of 0,91.
Fans control	On-off	(standard for AB unit) the condensation pressure (in cooling) and the evaporation pressure (in heating) is regulated by on-off cycles.
	Modulating control (condensation / evaporation control)	(standard for AS and AX unit, optional for AB unit) The fans rotational speed can be modulated continuously by an adjusting fan speed device to control the condensation pressure (in cooling) and the evaporation pressure (in heating) in order to extend the operating limits of the unit, to reduce noise emissions and improve energy efficiency.
	Modulating control (condensation / evaporation control) with EC fans	(optional for AB, AS and AX unit) The fans rotational speed can be modulated continuously by EC fans (Electronic Commutation) to control the condensation pressure (in cooling) and the evaporation pressure (in heating) in order to extend the operating limits of the unit, to reduce noise emissions and maximize energy efficiency.
Electrical protection load	Fuses	Allows to protect the electrical loads with fuses.
	Thermal magnetic	Allows to protect the electrical loads with thermal magnetic circuit breakers simplifying the maintenance and reload operations.

ACCESSORIES AND OPTIONAL EQUIPMENT

Accessories

Supplied 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, the degree of isolation is about 85%
Spring 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, the degree of isolation is about 90%
Water paddle flow switch	Allows to detect the water flow lack through the plate heat exchanger and operates as an integration of the protection offered by the differential pressure switch (standard).
Tank antifreeze electrical heater	Activated together with the antifreeze electrical heater of the plate heat exchanger, it has the task to keep the still water in the buffer tank at a temperature high enough to avoid ice generation during winter.
Remote control	It is suitable for wall mounting and reports all the control and visualization functions available on the user interface placed on the unit. It therefore allows the complete remote control of the unit.
Programmer clock	It allows the unit to be turned on and off according to a set program, through the digital input available on the unit wiring board (remote stand by).
Modbus serial interface on RS485	It allows to communicate with the unit controller and to view the operating conditions of the unit through Modbus communication protocol. The RS485 serial line ensures the signal quality up to distances of about 1200 meters (that can be extended by means of proper repeaters).
Phase sequence and voltage controller	It checks not only the presence and correct order of the power supply phases but also the voltage level on each phase and avoid the unit to operate with voltage levels outside the permitted limits.

Factory mounted accessories

Victaulic connections	This accessory consists of steel pipes that allows the water inlet/outlet to be connected straight inside the unit.
Coil protection grilles	Protects the external surface of the finned coil.
High and low pressure gauges	2 pressure gauges allow visualization of high and low refrigerant gas pressure.
Coil shut off valves	It consists of two ball valves installed before and after the coil that allow for the pump-down maintenance.
Outdoor air sensor	External air probe mounted near coil allows smart defrosting, climatic variation of setpoint and enables heat pump stop reducing the external air temperature below a setpoint.
High temperature thermostat	Two thermostats in series on compressors outlet pipes preserve operation not allowing temperature to rise up than a specified non adjustable value.
Low temperature kit	(di serie per unità IP e BP, optional per unità IR e BR) sono costituite da resistenze carter di riscaldamento olio compressori.
Tank antifreeze electrical heater	Activated together with the antifreeze electrical heater of the plate heat exchanger, it has the task to keep the still water in the buffer tank at a temperature high enough to avoid ice generation during winter.
Modbus serial interface on RS485	It allows to communicate with the unit controller and to view the operating conditions of the unit through Modbus communication protocol. The RS485 serial line ensures the signal quality up to distances of about 1200 meters (that can be extended by means of proper repeaters).
Phase sequence and voltage controller	It checks not only the presence and correct order of the power supply phases but also the voltage level on each phase and avoid the unit to operate with voltage levels outside the permitted limits.
ATC Advanced temperature control	It consists of a properly calibrated pressure switch that partializes the unit preventing the high pressure alarm.
Pressure transducer	It consists of a transducer, which allows operation of the control condensation, evaporation and defrost by reading the pressure.

Mechanical options

For finned coils with special treatment (copper fins, tin-copper plated, acrylic, epoxy or hydrophilic painting) please contact our technical department.

Electrical options

For other voltages, please contact our technical department

TECHNICAL DATA - BASE VERSION (VB)

Technical data

Frame	1					2			3			4				
Model	40.2	50.2	60.2	70.2	80.2	90.2	100.2	115.2	130.2	145.2	160.2	180.2	200.2	U.M.		
Power supply	400 - 3+N - 50					400 - 3 - 50									V-ph-Hz	
Refrigerant																
Type	R410A													-		
Refrigerant circuit																
Quantity	1													-		
Compressor																
Type	scroll													-		
Quantity	2													n°		
Power steps	0 - 50 - 100													%		
Oil charge CP1A	3,3	3,3	3,3	3,3	3,3	3,3	5,3	5,3	5,3	5,3	5,3	5,3	5,3	5,3	l	
Oil charge CP1B	3,3	3,3	3,3	3,3	3,3	4,7	5,3	5,3	5,3	5,3	5,3	5,3	5,3	5,3	l	
Plant side heat exchanger																
Type	Braze plates													-		
Quantity	1													n°		
Water volume	3,2	3,2	3,6	4,6	5,4	4,2	4,8	5,5	5,9	6,9	7,5	8,7	9,7	l		
Source side heat exchanger																
Type	Finned coil													-		
Quantity	1													n°		
Frontal surface	3,38					4,72			5,90			7,41		m²		
Fans																
Type	axial													-		
Quantity	2		3			2			3		4		n°			
Diameter	630					800								mm		
Nominal rotational speed	AB		900										rpm			
Nominal air flow rate	AB		20330	20330	29050	28100	27680	41460	40100	38790	47400	62190	59820	82920	79760	m³/h
Nominal rotational speed	AS		750										rpm			
Nominal air flow rate	AS		16950	16950	24210	23420	23070	34550	33420	32330	39540	51830	49850	69100	66470	m³/h
Nominal rotational speed	AX		650										rpm			
Nominal air flow rate	AX		13560	13560	19370	18740	18460	27640	26740	25870	31630	41460	39880	55280	53180	m³/h
Total installed power	1,2		1,8			3,6			5,4		7,2		kW			
Plant side hydraulic circuit																
Expansion vessel volume	12					24								l		
Expansion vessel precharge	1000					150								kPa		
Expansion vessel maximum pressure	200					400								460	kPa	
Tank volume	200					600								l		
Safety valve set	200					600								kPa		
Standard unit																
F.L.A. Maximum total current input	40,2	45,7	53,3	58,7	69,6	75,5	90,0	97,9	106	123	136	159	170	A		
F.L.I. Maximum total power input	21,6	24,4	28,4	31,0	36,2	44,0	55,0	60,5	66,0	75,7	83,3	95,4	103	kW		
Units with primary-secondary pump (option)																
Type	Centrifugal pump													-		
F.L.A. Maximum total current input	43,4	48,9	56,5	61,9	72,8	79,2	93,7	102	110	128	141	165	176	A		
F.L.I. Maximum total power input	23,4	26,2	30,2	32,8	38,0	45,8	56,8	62,3	67,8	78,3	85,9	98,9	106	kW		
Units with standard pump (option)																
Type	Centrifugal pump													-		
F.L.A. Maximum total current input	43,9	49,4	57,0	62,4	73,3	80,0	94,5	102	110	129	142	168	179	A		
F.L.I. Maximum total power input	23,4	26,2	30,2	32,8	38,0	46,6	57,6	63,1	68,6	79,2	86,8	100	107	kW		
Units with high head pump (option)																
Type	Centrifugal pump													-		
F.L.A. Maximum total current input	46,3	51,8	59,4	64,8	75,7	81,6	96,1	107	115	132	145	169	180	A		
F.L.I. Maximum total power input	25,1	27,9	31,9	34,5	39,7	47,5	58,5	65,1	70,6	80,3	87,9	102	109	kW		
Units with modulating standard pump (option)																
Type	Centrifugal pump with inverter													-		
F.L.A. Maximum total current input	43,9	49,4	57,0	62,4	73,3	80,0	94,5	102	110	129	142	168	179	A		
F.L.I. Maximum total power input	23,4	26,2	30,2	32,8	38,0	46,6	57,6	63,1	68,6	79,2	86,8	100	107	kW		
Units with high head modulating pump (option)																
Type	Centrifugal pump with inverter													-		
F.L.A. Maximum total current input	46,3	51,8	59,4	64,8	75,7	81,6	96,1	107	115	132	145	169	180	A		
F.L.I. Maximum total power input	25,1	27,9	31,9	34,5	39,7	47,5	58,5	65,1	70,6	80,3	87,9	102	109	kW		

TECHNICAL DATA - BASE VERSION (VB)

NOMINAL performances - Base setting up (AB) - Standard plants

Frame		1					2			3			4		U.M.	
Model		40.2	50.2	60.2	70.2	80.2	90.2	100.2	115.2	130.2	145.2	160.2	180.2	200.2	U.M.	
Power supply		400 - 3+N - 50					400 - 3 - 50									V-ph-Hz
IR	Cooling A35W7 (source : air in 35°C d.b. / plant : water in 12°C out 7°C)															
	Cooling capacity	45,0	53,0	58,1	68,2	78,1	90,3	101	111	125	142	157	179	198	kW	
	Power input	15,7	18,8	20,8	24,1	28,0	32,5	35,9	39,9	45,1	51,5	57,1	64,6	71,6	kW	
	EER	2,87	2,82	2,79	2,83	2,79	2,78	2,81	2,78	2,77	2,76	2,75	2,77	2,77	-	
	Water flow rate plant side	2,16	2,56	2,80	3,29	3,76	4,35	4,87	5,35	6,02	6,83	7,55	8,60	9,56	l/h	
	Pressure drops plant side	40	56	55	51	50	48	46	44	48	47	48	48	50	kPa	
IP	Cooling A35W7 (source : air in 35°C d.b. / plant : water in 12°C out 7°C)															
	Cooling capacity	43,5	52,4	57,0	66,7	73,6	88,5	98	109	121	137	153	177	196	kW	
	Power input	15,5	19,0	20,7	24,1	27,0	32,3	35,7	39,8	44,5	50,3	56,3	63,5	71,2	kW	
	EER	2,81	2,76	2,75	2,77	2,73	2,74	2,75	2,74	2,72	2,72	2,72	2,79	2,75	-	
	Water flow rate plant side	2,09	2,53	2,75	3,21	3,54	4,26	4,73	5,26	5,83	6,59	7,36	8,50	9,46	l/h	
	Pressure drops plant side	37	55	53	49	44	46	43	43	45	44	46	47	49	kPa	
	Heating A7W45 (source : air in 7°C d.b. 6°C w.b. / plant : water in 40°C out 45°C)															
	Heating capacity	48,1	58,1	63,2	74,5	83,0	99,6	110	125	136	154	173	197	216	kW	
	Power input	15,6	19,1	20,9	24,4	27,6	33,5	35,9	41,1	44,9	51,8	56,9	65,1	71,7	kW	
	COP	3,08	3,04	3,02	3,05	3,01	2,97	3,06	3,04	3,03	2,97	3,04	3,03	3,01	-	
	Water flow rate plant side	2,28	2,75	2,99	3,53	3,93	4,72	5,21	5,92	6,45	7,31	8,17	9,32	10,2	l/h	
	Pressure drops plant side	45	65	63	59	55	57	53	54	55	54	56	56	57	kPa	
	Heating A2W45 (source : air in 2°C d.b. 1°C w.b. / plant : water in 40°C out 45°C)															
	Heating capacity	41,2	49,6	54,1	63,7	71,0	85,2	94,0	107	116	132	148	168	185	kW	
	Power input	15,5	18,8	20,6	24,1	27,2	33,1	35,5	40,5	44,3	51,1	56,2	64,3	70,9	kW	
COP	2,66	2,64	2,63	2,64	2,61	2,57	2,65	2,64	2,62	2,58	2,63	2,61	2,61	-		
Water flow rate plant side	2,17	2,61	2,84	3,35	3,74	4,48	4,95	5,63	6,13	6,95	7,76	8,85	9,71	l/h		
Pressure drops plant side	40	58	57	53	49	51	48	49	50	49	51	51	52	kPa		

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

NOMINAL performances - Base setting up (AB) - Standard plants - Data certified by EUROVENT

Frame		1					2			3			4		U.M.	
Model		40.2	50.2	60.2	70.2	80.2	90.2	100.2	115.2	130.2	145.2	160.2	180.2	200.2	U.M.	
Power supply		400 - 3+N - 50					400 - 3 - 50									V-ph-Hz
IR	Cooling A35W7 (source : air in 35°C d.b. / plant : water in 12°C out 7°C)															
	Cooling capacity	45,3	53,5	58,6	68,8	78,7	91,0	102	112	126	143	158	180	200	kW	
	EER	2,94	2,92	2,89	2,93	2,87	2,86	2,90	2,86	2,86	2,84	2,83	2,85	2,86	-	
	Water flow rate plant side	40	56	55	51	50	48	46	44	48	47	48	48	50	kPa	
ESEER		4,18	4,15	4,10	4,16	4,08	4,18	4,11	4,18	4,06	4,14	4,01	4,04	4,06	-	
IP	Cooling A35W7 (source : air in 35°C d.b. / plant : water in 12°C out 7°C)															
	Cooling capacity	43,8	52,9	57,5	67,2	74,1	89,2	99,0	110	122	138	154	178	198	kW	
	EER	2,88	2,86	2,85	2,85	2,80	2,82	2,83	2,82	2,80	2,80	2,79	2,86	2,84	-	
	Water flow rate plant side	37	55	53	49	44	46	43	43	45	44	46	47	49	kPa	
	ESEER		4,09	4,06	4,04	4,04	3,97	4,12	4,02	4,12	3,97	4,09	3,96	4,06	4,03	-
	Heating A7W45 (source : air in 7°C d.b. 6°C w.b. / plant : water in 40°C out 45°C)															
Heating capacity	47,8	57,5	62,6	73,8	82,3	98,7	109	124	135	153	171	195	214	kW		
COP	3,12	3,11	3,08	3,11	3,06	3,03	3,11	3,10	3,09	3,03	3,09	3,08	3,07	-		
Water flow rate plant side	45	65	63	59	55	57	53	54	55	54	56	56	57	kPa		

TECHNICAL DATA - BASE VERSION (VB)

NOMINAL performances - Base setting up (AB) - Radiant plants

Frame	1					2			3			4			
Model	40.2	50.2	60.2	70.2	80.2	90.2	100.2	115.2	130.2	145.2	160.2	180.2	200.2	U.M.	
Power supply	400 - 3+N - 50					400 - 3 - 50									V-ph-Hz
IR	Cooling A35W18 (source : air in 35°C d.b. / plant : water in 23°C out 18°C)														
	Cooling capacity	58,3	68,5	75,1	88,2	100,6	116	131	144	162	184	202	231	257	kW
	Power input	17,1	20,8	22,9	26,4	30,8	35,6	39,4	43,6	49,4	56,4	62,5	70,7	78,5	kW
	EER	3,41	3,29	3,28	3,34	3,27	3,26	3,32	3,30	3,28	3,26	3,23	3,27	3,27	-
	Water flow rate plant side	2,81	3,33	3,64	4,27	4,87	5,64	6,35	6,98	7,84	8,89	9,8	11,2	12,4	l/h
	Pressure drops plant side	68	95	93	86	84	81	78	75	81	80	81	81	84	kPa
IP	Cooling A35W18 (source : air in 35°C d.b. / plant : water in 23°C out 18°C)														
	Cooling capacity	56,3	67,8	73,7	86,3	95,2	115	127	141	157	177	198	228	254	kW
	Power input	16,9	20,9	22,8	26,4	29,7	35,2	39,0	43,4	48,8	54,9	61,7	69,5	78,1	kW
	EER	3,33	3,24	3,23	3,27	3,21	3,27	3,26	3,25	3,22	3,22	3,21	3,28	3,25	-
	Water flow rate plant side	2,72	3,29	3,57	4,18	4,60	5,54	6,16	6,83	7,60	8,55	9,56	11,0	12,3	l/h
	Pressure drops plant side	63	92	89	82	75	78	74	72	77	74	77	79	83	kPa
	Heating A7W35 (source : air in 7°C d.b. 6°C w.b. / plant : water in 30°C out 35°C)														
	Heating capacity	51,1	61,7	67,1	79,0	88,0	106	117	132	144	164	183	209	229	kW
	Power input	12,9	15,7	17,3	20,1	22,7	27,9	29,8	34,0	37,1	43,0	47,2	54,3	59,6	kW
	COP	3,96	3,93	3,88	3,93	3,88	3,80	3,93	3,88	3,88	3,81	3,88	3,85	3,84	-
	Water flow rate plant side	2,42	2,91	3,17	3,74	4,17	5,02	5,54	6,26	6,83	7,74	8,65	9,89	10,8	l/h
	Pressure drops plant side	50	72	70	66	61	64	60	60	62	60	63	63	64	kPa
	Heating A2W35 (source : air in 2°C d.b. 1°C w.b. / plant : water in 30°C out 35°C)														
	Heating capacity	43,6	52,7	57,3	67,6	75,3	90,4	100	114	124	140	156	178	195	kW
	Power input	12,7	15,5	17,1	19,8	22,4	27,5	29,4	33,5	36,6	42,4	46,6	53,5	58,8	kW
COP	3,43	3,40	3,35	3,41	3,36	3,29	3,40	3,40	3,39	3,30	3,35	3,33	3,32	-	
Water flow rate plant side	2,30	2,77	3,01	3,55	3,96	4,75	5,26	5,97	6,50	7,36	8,22	9,36	10,3	l/h	
Pressure drops plant side	45	66	64	59	55	57	54	55	56	55	57	57	58	kPa	

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

TECHNICAL DATA - BASE VERSION (VB)

NOMINAL performances - Low noise setting up (AS) - Standard plants

Frame	1					2			3			4		U.M.	
Model	40.2	50.2	60.2	70.2	80.2	90.2	100.2	115.2	130.2	145.2	160.2	180.2	200.2		
Power supply	400 - 3+N - 50					400 - 3 - 50									V-ph-Hz
Cooling A35W7 (source : air in 35°C d.b. / plant : water in 12°C out 7°C)															
IR	Cooling capacity	43,6	51,5	56,3	66,2	75,7	87,6	97,8	108	121	138	152	174	193	kW
	Power input	16,3	19,4	21,6	24,9	29,2	33,7	37,3	41,4	46,8	53,4	59,2	67,0	74,3	kW
	EER	2,67	2,65	2,61	2,66	2,59	2,60	2,62	2,61	2,59	2,58	2,57	2,60	2,60	-
	Water flow rate plant side	2,10	2,48	2,71	3,19	3,65	4,21	4,71	5,21	5,83	6,64	7,31	8,36	9,27	l/h
	Pressure drops plant side	38	53	52	48	47	45	43	42	45	44	45	45	47	kPa
Cooling A35W7 (source : air in 35°C d.b. / plant : water in 12°C out 7°C)															
IP	Cooling capacity	41,8	50,4	54,8	64,0	70,6	85,0	94,4	105	116	131	147	170	189	kW
	Power input	16,0	20,0	21,8	25,5	28,6	34,1	37,7	42,0	47,0	53,1	59,5	67,1	75,3	kW
	EER	2,61	2,52	2,51	2,51	2,47	2,49	2,50	2,50	2,47	2,47	2,47	2,53	2,51	-
	Water flow rate plant side	2,01	2,43	2,64	3,08	3,40	4,09	4,54	5,06	5,59	6,31	7,07	8,17	9,08	l/h
	Pressure drops plant side	35	50	49	45	41	42	40	39	41	40	42	43	45	kPa
	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	56,5	61,7	72,5	80,9	97,0	107	122	133	150	168	192	211	kW
	Power input	14,9	18,2	20,0	23,2	26,4	31,9	34,2	39,2	42,8	49,4	54,3	62,1	68,5	kW
	COP	3,15	3,10	3,09	3,13	3,06	3,04	3,13	3,11	3,11	3,04	3,09	3,09	3,08	-
	Water flow rate plant side	2,23	2,68	2,92	3,44	3,83	4,60	5,06	5,78	6,31	7,12	7,98	9,08	9,99	l/h
Pressure drops plant side	43	61	60	56	52	54	50	51	53	51	54	54	55	kPa	
Heating A2W45 (source : air in 2°C d.b. 1°C w.b. / plant : water in 40°C out 45°C)															
Heating capacity	41,2	49,6	54,1	63,7	71,0	85,2	94,4	107	116	132	147	168	184	kW	
Power input	15,1	18,5	20,1	23,5	26,7	32,0	34,4	39,5	43,2	49,5	54,6	62,2	68,7	kW	
COP	2,73	2,68	2,69	2,71	2,66	2,66	2,74	2,71	2,69	2,67	2,69	2,70	2,68	-	
Water flow rate plant side	2,17	2,61	2,84	3,35	3,74	4,48	4,97	5,64	6,12	6,93	7,74	8,84	9,70	l/h	
Pressure drops plant side	40	58	57	53	49	51	48	49	50	48	50	51	51	kPa	

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

NOMINAL performances - Low noise setting up (AS) - Standard plants - Data certified by EUROVENT

Frame	1					2			3			4		U.M.	
Model	40.2	50.2	60.2	70.2	80.2	90.2	100.2	115.2	130.2	145.2	160.2	180.2	200.2		
Power supply	400 - 3+N - 50					400 - 3 - 50									V-ph-Hz
Cooling A35W7 (source : air in 35°C d.b. / plant : water in 12°C out 7°C)															
IR	Cooling capacity	43,9	51,9	56,8	66,7	76,3	88,2	98,5	109	122	139	153	175	194	kW
	EER	2,74	2,73	2,69	2,73	2,67	2,66	2,69	2,68	2,66	2,65	2,63	2,66	2,66	-
	Water flow rate plant side	38	53	52	48	47	45	43	42	45	44	45	45	47	kPa
	ESEER	4,05	4,03	3,98	4,04	3,94	4,05	3,97	4,07	3,93	4,03	3,89	3,93	3,94	-
Cooling A35W7 (source : air in 35°C d.b. / plant : water in 12°C out 7°C)															
IP	Cooling capacity	42,0	50,8	55,2	64,5	71,1	85,6	95,0	106	117	132	148	171	190	kW
	EER	2,66	2,59	2,58	2,58	2,53	2,56	2,56	2,57	2,53	2,52	2,53	2,59	2,57	-
	Water flow rate plant side	35	50	49	45	41	42	40	39	41	40	42	43	45	kPa
	ESEER	3,93	3,83	3,81	3,81	3,74	3,88	3,78	3,90	3,74	3,83	3,74	3,83	3,80	-
	Heating A7W45 (source : air in 7°C d.b. 6°C w.b. / plant : water in 40°C out 45°C)														
Heating capacity	46,6	56,0	61,1	71,9	80,2	96,2	106	121	132	149	167	190	209	kW	
COP	3,19	3,16	3,15	3,18	3,12	3,09	3,17	3,17	3,17	3,09	3,16	3,14	3,13	-	
Water flow rate plant side	43	61	60	56	52	54	50	51	53	51	54	54	55	kPa	

TECHNICAL DATA - BASE VERSION (VB)

NOMINAL performances - Low noise setting up (AS) - Radiant plants

Frame	1					2			3			4			
Model	40.2	50.2	60.2	70.2	80.2	90.2	100.2	115.2	130.2	145.2	160.2	180.2	200.2	U.M.	
Power supply	400 - 3+N - 50					400 - 3 - 50									V-ph-Hz
IR	Cooling A35W18 (source : air in 35°C d.b. / plant : water in 23°C out 18°C)														
	Cooling capacity	56,5	66,5	72,8	85,6	97,9	114	127	140	157	179	197	225	249	kW
	Power input	17,9	21,5	23,6	27,3	32,0	37,0	40,8	45,4	51,3	58,5	64,8	73,4	81,5	kW
	EER	3,16	3,09	3,08	3,14	3,06	3,08	3,11	3,08	3,06	3,06	3,04	3,07	3,06	-
	Water flow rate plant side	2,73	3,23	3,53	4,14	4,74	5,49	6,12	6,78	7,60	8,65	9,51	10,9	12,0	l/h
	Pressure drops plant side	64	89	87	81	79	76	73	71	77	75	76	77	79	kPa
IP	Cooling A35W18 (source : air in 35°C d.b. / plant : water in 23°C out 18°C)														
	Cooling capacity	54,1	65,1	70,9	82,9	91,4	110	123	137	150	170	190	219	244	kW
	Power input	17,5	22,0	23,9	27,9	31,2	37,3	41,2	45,9	51,4	58,1	65,1	73,4	82,5	kW
	EER	3,09	2,96	2,97	2,97	2,93	2,95	2,99	2,98	2,92	2,93	2,92	2,98	2,96	-
	Water flow rate plant side	2,61	3,15	3,43	4,01	4,41	5,30	5,92	6,59	7,26	8,22	9,17	10,6	11,8	l/h
	Pressure drops plant side	58	85	83	76	69	71	68	67	70	68	71	73	76	kPa
	Heating A7W35 (source : air in 7°C d.b. 6°C w.b. / plant : water in 30°C out 35°C)														
	Heating capacity	49,8	60,1	65,5	77,0	85,8	103	113	129	141	159	179	203	224	kW
	Power input	12,3	15,1	16,4	19,1	21,6	26,4	28,2	32,3	35,2	40,7	44,8	51,3	56,6	kW
	COP	4,05	3,98	3,99	4,03	3,97	3,90	4,01	3,99	4,01	3,91	4,00	3,96	3,96	-
	Water flow rate plant side	2,36	2,84	3,10	3,64	4,06	4,87	5,35	6,12	6,69	7,55	8,46	9,60	10,6	l/h
	Pressure drops plant side	48	69	67	62	58	60	56	58	59	57	60	60	61	kPa
	Heating A2W35 (source : air in 2°C d.b. 1°C w.b. / plant : water in 30°C out 35°C)														
	Heating capacity	43,6	52,7	57,3	67,6	75,3	90,4	99,9	114	124	140	156	178	195	kW
	Power input	12,3	15,1	16,5	19,3	21,8	26,4	28,3	32,4	35,5	40,8	45,0	51,4	56,6	kW
COP	3,54	3,49	3,47	3,50	3,45	3,42	3,53	3,52	3,49	3,43	3,47	3,46	3,45	-	
Water flow rate plant side	2,30	2,77	3,01	3,55	3,96	4,75	5,26	5,97	6,50	7,36	8,22	9,36	10,3	l/h	
Pressure drops plant side	45	66	64	59	55	57	54	55	56	55	57	57	58	kPa	

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

TECHNICAL DATA - BASE VERSION (VB)

NOMINAL performances - Extra low noise setting up (AX) - Standard plants

Frame	1					2			3			4			
Model	40.2	50.2	60.2	70.2	80.2	90.2	100.2	115.2	130.2	145.2	160.2	180.2	200.2	U.M.	
Power supply	400 - 3+N - 50					400 - 3 - 50									V-ph-Hz
Cooling A35W7 (source : air in 35°C d.b. / plant : water in 12°C out 7°C)															
IR	Cooling capacity	42,7	50,3	55,1	64,7	74,0	85,6	95,6	105	118	134	149	169	188	kW
	Power input	16,3	19,8	22,1	25,4	29,9	32,8	38,3	42,6	48,1	54,3	60,3	68,8	76,2	kW
	EER	2,62	2,54	2,49	2,55	2,47	2,61	2,50	2,46	2,45	2,47	2,47	2,46	2,47	-
	Water flow rate plant side	2,05	2,42	2,65	3,12	3,56	4,12	4,60	5,06	5,69	6,45	7,17	8,12	9,03	l/h
	Pressure drops plant side	36	50	49	46	45	43	41	39	43	42	43	43	45	kPa
Cooling A35W7 (source : air in 35°C d.b. / plant : water in 12°C out 7°C)															
IP	Cooling capacity	41,0	49,3	53,7	62,8	69,3	83,3	92,5	102	114	129	144	166	185	kW
	Power input	17,1	21,1	23,0	26,8	30,1	35,9	39,8	44,3	49,5	56,0	62,7	70,8	79,4	kW
	EER	2,40	2,34	2,33	2,34	2,30	2,32	2,32	2,30	2,30	2,30	2,30	2,34	2,33	-
	Water flow rate plant side	1,97	2,37	2,58	3,02	3,33	4,00	4,45	4,92	5,49	6,21	6,93	7,98	8,89	l/h
	Pressure drops plant side	33	48	47	43	39	41	38	37	40	39	40	41	43	kPa
Heating A7W45 (source : air in 7°C d.b. 6°C w.b. / plant : water in 40°C out 45°C)															
IP	Heating capacity	45,2	54,5	59,4	70,0	78,0	93,5	104	118	128	145	162	184	203	kW
	Power input	14,2	17,3	19,0	22,2	25,1	30,4	32,7	37,3	40,8	47,1	51,7	59,1	65,1	kW
	COP	3,18	3,15	3,13	3,15	3,11	3,08	3,18	3,16	3,14	3,08	3,13	3,11	3,12	-
	Water flow rate plant side	2,15	2,58	2,81	3,32	3,70	4,43	4,92	5,59	6,07	6,88	7,69	8,74	9,60	l/h
	Pressure drops plant side	40	57	55	52	48	50	47	48	49	48	50	50	50	kPa
Heating A2W45 (source : air in 2°C d.b. 1°C w.b. / plant : water in 40°C out 45°C)															
IP	Heating capacity	42,4	51,2	55,8	65,6	73,1	87,8	97,2	110	120	136	152	174	190	kW
	Power input	15,1	18,6	20,2	23,6	26,9	32,0	34,5	39,6	43,4	49,5	54,6	62,1	68,7	kW
	COP	2,81	2,75	2,76	2,78	2,72	2,74	2,82	2,78	2,76	2,75	2,78	2,80	2,77	-
	Water flow rate plant side	2,24	2,69	2,93	3,45	3,85	4,62	5,11	5,78	6,31	7,17	7,98	9,13	9,99	l/h
	Pressure drops plant side	43	62	60	56	52	54	51	51	53	52	54	54	55	kPa

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

NOMINAL performances - Extra low noise setting up (AX) - Standard plants - Data certified by EUROVENT

Frame	1					2			3			4			
Model	40.2	50.2	60.2	70.2	80.2	90.2	100.2	115.2	130.2	145.2	160.2	180.2	200.2	U.M.	
Power supply	400 - 3+N - 50					400 - 3 - 50									V-ph-Hz
Cooling A35W7 (source : air in 35°C d.b. / plant : water in 12°C out 7°C)															
IR	Cooling capacity	42,9	50,7	55,5	65,2	74,5	86,2	96,2	106	119	135	150	170	189	kW
	EER	2,66	2,61	2,56	2,62	2,53	2,68	2,55	2,53	2,52	2,53	2,53	2,51	2,52	-
	Water flow rate plant side	36	50	49	46	45	43	41	39	43	42	43	43	45	kPa
	ESEER	4,21	4,13	4,04	4,14	4,00	4,35	4,03	4,11	3,98	4,11	4,00	3,97	3,99	-
Cooling A35W7 (source : air in 35°C d.b. / plant : water in 12°C out 7°C)															
IP	Cooling capacity	41,2	49,7	54,1	63,2	69,7	83,8	93,1	103	115	130	145	167	186	kW
	EER	2,44	2,40	2,39	2,39	2,35	2,37	2,38	2,36	2,36	2,36	2,35	2,40	2,38	-
	Water flow rate plant side	33	48	47	43	39	41	38	37	40	39	40	41	43	kPa
	ESEER	3,85	3,79	3,78	3,78	3,71	3,85	3,75	3,83	3,72	3,83	3,71	3,79	3,76	-
Heating A7W45 (source : air in 7°C d.b. 6°C w.b. / plant : water in 40°C out 45°C)															
IP	Heating capacity	44,9	54,0	58,9	69,4	77,4	92,8	103	117	127	144	161	183	201	kW
	COP	3,23	3,21	3,18	3,21	3,16	3,12	3,23	3,21	3,19	3,13	3,19	3,17	3,17	-
	Water flow rate plant side	40	57	55	52	48	50	47	48	49	48	50	50	50	kPa

TECHNICAL DATA - BASE VERSION (VB)

NOMINAL performances - Extra low noise setting up (AX) - Radiant plants

Frame	1					2			3			4			
Model	40.2	50.2	60.2	70.2	80.2	90.2	100.2	115.2	130.2	145.2	160.2	180.2	200.2	U.M.	
Power supply	400 - 3+N - 50					400 - 3 - 50									V-ph-Hz
IR	Cooling A35W18 (source : air in 35°C d.b. / plant : water in 23°C out 18°C)														
	Cooling capacity	55,3	65,0	71,2	83,8	95,7	111	124	137	153	174	193	218	243	kW
	Power input	17,9	21,8	24,3	27,8	32,8	35,9	41,9	46,5	52,7	59,5	66,1	75,3	83,6	kW
	EER	3,09	2,98	2,93	3,01	2,92	3,09	2,96	2,95	2,90	2,92	2,92	2,90	2,91	-
	Water flow rate plant side	2,67	3,15	3,45	4,05	4,63	5,35	5,97	6,59	7,41	8,41	9,32	10,6	11,8	l/h
	Pressure drops plant side	61	85	83	77	76	73	69	67	73	71	73	73	76	kPa
IP	Cooling A35W18 (source : air in 35°C d.b. / plant : water in 23°C out 18°C)														
	Cooling capacity	53,1	63,8	69,4	81,2	89,6	108	120	133	148	167	187	215	239	kW
	Power input	18,7	23,1	25,2	29,4	33,0	39,2	43,3	48,3	54,1	61,2	68,6	77,4	86,8	kW
	EER	2,84	2,76	2,75	2,76	2,72	2,76	2,77	2,75	2,74	2,73	2,73	2,78	2,75	-
	Water flow rate plant side	2,56	3,09	3,36	3,93	4,33	5,21	5,78	6,40	7,17	8,07	9,03	10,4	11,6	l/h
	Pressure drops plant side	56	82	79	73	66	69	65	63	68	66	69	70	74	kPa
	Heating A7W35 (source : air in 7°C d.b. 6°C w.b. / plant : water in 30°C out 35°C)														
	Heating capacity	47,9	57,8	63,0	74,3	82,7	99,3	110	125	136	154	173	196	215	kW
	Power input	11,6	14,2	15,6	18,2	20,5	25,1	26,8	30,6	33,4	38,8	42,5	48,7	53,6	kW
	COP	4,13	4,07	4,04	4,08	4,03	3,96	4,10	4,08	4,07	3,97	4,07	4,02	4,01	-
	Water flow rate plant side	2,27	2,73	2,98	3,52	3,92	4,70	5,21	5,92	6,45	7,31	8,17	9,27	10,2	l/h
	Pressure drops plant side	44	64	62	58	54	56	53	54	55	54	56	56	57	kPa
	Heating A2W35 (source : air in 2°C d.b. 1°C w.b. / plant : water in 30°C out 35°C)														
	Heating capacity	45,0	54,3	59,1	69,6	77,7	92,8	103	117	127	145	161	184	202	kW
	Power input	12,4	15,3	16,6	19,4	22,0	26,4	28,3	32,5	35,5	40,8	44,9	51,2	56,6	kW
COP	3,63	3,55	3,56	3,59	3,53	3,52	3,64	3,60	3,58	3,55	3,59	3,59	3,57	-	
Water flow rate plant side	2,37	2,85	3,10	3,66	4,08	4,87	5,40	6,16	6,69	7,60	8,46	9,65	10,6	l/h	
Pressure drops plant side	48	69	67	63	59	60	57	58	59	58	60	60	61	kPa	

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

TECHNICAL DATA - BASE VERSION (VB)

Standard performances in cooling mode IR - Base setting up AB

Mod. 40.2 ÷ 100.2

MOD.	TW	OUTDOOR AIR TEMPERATURE (°C D.B.)													
		20		25		30		35		40		45		50 (2)	
		kWf	kWa	kWf	kWa	kWf	kWa	kWf	kWa	kWf	kWa	kWf	kWa	kWf	kWa
40.2	5	51,4	9,8	48,5	11,2	45,7	12,6	42,8	14,0	40,0	15,4	37,1	16,8	34,3	18,2
	6	52,9	9,9	49,9	11,3	47,0	12,7	44,1	14,1	41,1	15,5	38,2	16,9	35,3	18,3
	7	54,4	9,9	51,3	11,4	48,3	12,8	45,3	14,2	42,3	15,6	39,3	17,0	36,2	18,5
	8	55,8	10,0	52,7	11,4	49,7	12,9	46,5	14,3	43,4	15,7	40,3	17,2	-	-
	9	57,3	10,1	54,1	11,5	51,0	13,0	47,8	14,4	44,6	15,8	41,4	17,3	-	-
	10	58,8	10,2	55,5	11,6	52,3	13,1	49,0	14,5	45,7	16,0	42,5	17,4	-	-
	11	60,3	10,2	56,9	11,7	53,6	13,2	50,2	14,6	46,9	16,1	43,6	17,5	-	-
50.2	12	61,8	10,3	58,3	11,8	54,9	13,2	51,5	14,7	48,0	16,2	44,6	17,7	-	-
	5	60,7	11,8	57,3	13,5	54,0	15,2	50,6	16,9	47,2	18,5	43,9	20,2	40,5	21,9
	6	62,4	11,9	59,0	13,6	55,5	15,3	52,0	17,0	48,6	18,7	45,1	20,4	41,6	22,1
	7	64,2	12,0	60,6	13,7	57,1	15,4	53,5	17,1	49,9	18,8	46,4	20,5	42,8	22,2
	8	66,0	12,1	62,3	13,8	58,6	15,5	55,0	17,2	51,3	18,9	47,6	20,7	-	-
	9	67,7	12,1	63,9	13,9	60,2	15,6	56,4	17,3	52,6	19,1	48,9	20,8	-	-
	10	69,5	12,2	65,6	14,0	61,8	15,7	57,9	17,5	54,0	19,2	50,2	21,0	-	-
60.2	11	71,2	12,3	67,2	14,1	63,3	15,8	59,3	17,6	55,4	19,4	51,4	21,1	-	-
	12	73,0	12,4	68,9	14,2	64,9	15,9	60,8	17,7	56,7	19,5	52,7	21,3	-	-
	5	66,5	12,8	62,8	14,6	59,1	16,4	55,4	18,2	51,7	20,1	48,0	21,9	44,3	23,7
	6	68,4	12,9	64,6	14,7	60,8	16,5	57,0	18,4	53,2	20,2	49,4	22,0	45,6	23,9
	7	70,3	13,0	66,4	14,8	62,5	16,7	58,6	18,5	54,7	20,4	50,8	22,2	46,9	24,1
	8	72,2	13,0	68,2	14,9	64,2	16,8	60,2	18,6	56,2	20,5	52,2	22,4	-	-
	9	74,2	13,1	70,0	15,0	65,9	16,9	61,8	18,8	57,7	20,6	53,6	22,5	-	-
70.2	10	76,1	13,2	71,8	15,1	67,6	17,0	63,4	18,9	59,1	20,8	55,0	22,7	-	-
	11	78,0	13,3	73,6	15,2	69,3	17,1	65,0	19,0	60,6	20,9	56,3	22,8	-	-
	12	79,9	13,4	75,4	15,3	71,1	17,3	66,6	19,2	62,1	21,1	57,7	23,0	-	-
	5	78,1	15,0	73,7	17,1	69,4	19,2	65,0	21,4	60,7	23,5	56,4	25,7	52,0	27,8
	6	80,3	15,1	75,8	17,2	71,4	19,4	66,9	21,5	62,4	23,7	58,0	25,9	53,5	28,0
	7	82,6	15,2	78,0	17,4	73,4	19,5	68,8	21,7	64,2	23,9	59,6	26,0	55,0	28,2
	8	84,8	15,3	80,1	17,5	75,4	19,7	70,7	21,9	65,9	24,0	61,3	26,2	-	-
80.2	9	87,1	15,4	82,2	17,6	77,4	19,8	72,6	22,0	67,7	24,2	62,9	26,4	-	-
	10	89,3	15,5	84,3	17,7	79,4	20,0	74,4	22,2	69,4	24,4	64,5	26,6	-	-
	11	91,6	15,6	86,5	17,9	81,4	20,1	76,3	22,3	71,2	24,6	66,2	26,8	-	-
	12	93,8	15,7	88,6	18,0	83,4	20,2	78,2	22,5	72,9	24,7	67,8	27,0	-	-
	5	89,3	17,7	84,3	20,2	79,4	22,7	74,4	25,2	69,4	27,8	64,5	30,3	59,5	32,8
	6	91,9	17,8	86,7	20,3	81,7	22,9	76,6	25,4	71,4	28,0	66,4	30,5	61,2	33,0
	7	94,4	17,9	89,2	20,5	84,0	23,0	78,7	25,6	73,4	28,2	68,2	30,7	63,0	33,3
90.2	8	97,0	18,1	91,6	20,6	86,3	23,2	80,8	25,8	75,4	28,4	70,1	30,9	-	-
	9	99,6	18,2	94,0	20,8	88,6	23,4	83,0	26,0	77,4	28,6	72,0	31,2	-	-
	10	102	18,3	96,5	20,9	90,8	23,5	85,1	26,2	79,4	28,8	73,8	31,4	-	-
	11	105	18,4	98,9	21,1	93,1	23,7	87,3	26,3	81,4	29,0	75,7	31,6	-	-
	12	107	18,6	101	21,2	95,4	23,9	89,4	26,5	83,4	29,2	77,5	31,8	-	-
	5	103	19,5	97,5	22,2	91,8	25,0	86,0	27,8	80,3	30,6	74,6	33,3	68,8	36,1
	6	106	19,6	100	22,4	94,4	25,2	88,5	28,0	82,6	30,8	76,7	33,6	70,8	36,4
100.2	7	109	19,7	103	22,6	97,1	25,4	91,0	28,2	84,9	31,0	78,9	33,8	72,8	36,7
	8	112	19,9	106	22,7	99,7	25,6	93,5	28,4	87,2	31,2	81,0	34,1	-	-
	9	115	20,0	109	22,9	102	25,7	96,0	28,6	89,5	31,5	83,2	34,3	-	-
	10	118	20,2	112	23,1	105	25,9	98,4	28,8	91,8	31,7	85,4	34,6	-	-
	11	121	20,3	114	23,2	108	26,1	101	29,0	94,2	31,9	87,5	34,8	-	-
	12	124	20,5	117	23,4	110	26,3	103	29,2	96,5	32,1	89,7	35,1	-	-
	5	116	21,8	109	24,9	103	28,0	96,4	31,1	90,0	34,3	83,6	37,4	77,1	40,5
6	119	22,0	112	25,1	106	28,2	99,2	31,4	92,6	34,5	86,0	37,6	79,4	40,8	
7	122	22,1	116	25,3	109	28,4	102	31,6	95,2	34,8	88,4	37,9	81,6	41,1	
8	126	22,3	119	25,5	112	28,6	105	31,8	97,8	35,0	90,8	38,2	-	-	
9	129	22,4	122	25,6	115	28,9	108	32,1	100	35,3	93,3	38,5	-	-	
10	132	22,6	125	25,8	118	29,1	110	32,3	103	35,5	95,7	38,7	-	-	
11	136	22,8	128	26,0	121	29,3	113	32,5	106	35,8	98,1	39,0	-	-	
12	139	22,9	131	26,2	124	29,5	116	32,7	108	36,0	100	39,3	-	-	

TW= Outlet water temperature °C
kWf = Cooling capacity (kW)

kWa = Compressor power input (kW)
kWt = Heating capacity (kW)

The standard performances refer to a 5°C temperature difference between the water entering and leaving the heat exchanger and to operation of the unit with all fans at nominal or maximum speed. A 0.44×10^{-4} m² K/W fouling factor has also been considered with the unit installed at zero meters above sea level (Pb = 1013mbar).

The performances are declared no considering any correction due to water flow rate and water side pressure drop (gross performance).

(1) : at these temperatures the fans are at maximum speed.

(2) : ATC (Advanced Temperature Control) function may occur, if present.

TECHNICAL DATA - BASE VERSION (VB)

Mod. 115.2 ÷ 200.2

MOD.	TW	OUTDOOR AIR TEMPERATURE (°C D.B.)													
		20		25		30		35		40		45		50 (2)	
		kWf	kWa	kWf	kWa	kWf	kWa	kWf	kWa	kWf	kWa	kWf	kWa	kWf	kWa
115.2	5	127	24,5	120	28,0	113	31,5	106	35,0	98,8	38,5	91,8	42,0	84,7	45,5
	6	131	24,7	123	28,2	116	31,7	109	35,2	102	38,8	94,5	42,3	87,2	45,8
	7	134	24,9	127	28,4	120	32,0	112	35,5	104	39,1	97,1	42,6	89,6	46,2
	8	138	25,0	130	28,6	123	32,2	115	35,8	107	39,3	99,8	42,9	-	-
	9	142	25,2	134	28,8	126	32,4	118	36,0	110	39,6	102	43,2	-	-
	10	145	25,4	137	29,0	129	32,6	121	36,3	113	39,9	105	43,5	-	-
	12	153	25,8	144	29,4	136	33,1	127	36,8	119	40,5	110	44,1	-	-
130.2	5	143	27,9	135	31,9	127	35,9	119	39,9	111	43,9	103	47,9	95,3	51,9
	6	147	28,1	139	32,2	131	36,2	123	40,2	114	44,2	106	48,2	98,1	52,3
	7	151	28,4	143	32,4	134	36,5	126	40,5	118	44,6	109	48,6	101	52,7
	8	155	28,6	147	32,6	138	36,7	129	40,8	121	44,9	112	49,0	-	-
	9	159	28,8	151	32,9	142	37,0	133	41,1	124	45,2	115	49,3	-	-
	10	164	29,0	154	33,1	145	37,2	136	41,4	127	45,5	118	49,7	-	-
	12	172	29,4	162	33,6	153	37,8	143	42,0	134	46,2	124	50,4	-	-
145.2	5	162	31,0	153	35,5	144	39,9	135	44,3	126	48,8	117	53,2	108	57,6
	6	167	31,3	158	35,7	148	40,2	139	44,7	130	49,1	121	53,6	111	58,1
	7	172	31,5	162	36,0	153	40,5	143	45,0	133	49,5	124	54,0	114	58,5
	8	176	31,7	166	36,3	157	40,8	147	45,3	137	49,9	127	54,4	-	-
	9	181	32,0	171	36,5	161	41,1	151	45,7	141	50,2	131	54,8	-	-
	10	186	32,2	175	36,8	165	41,4	155	46,0	144	50,6	134	55,2	-	-
	12	195	32,6	184	37,3	173	42,0	163	46,6	152	51,3	141	56,0	-	-
160.2	5	179	34,8	169	39,8	159	44,8	149	49,8	139	54,7	130	59,7	120	64,7
	6	184	35,1	174	40,1	164	45,1	154	50,1	143	55,1	133	60,2	123	65,2
	7	190	35,4	179	40,4	169	45,5	158	50,5	147	55,6	137	60,6	126	65,7
	8	195	35,6	184	40,7	173	45,8	162	50,9	151	56,0	141	61,0	-	-
	9	200	35,9	189	41,0	178	46,1	167	51,2	155	56,4	144	61,5	-	-
	10	205	36,1	194	41,3	182	46,4	171	51,6	159	56,8	148	61,9	-	-
	12	215	36,6	203	41,9	192	47,1	180	52,3	168	57,6	156	62,8	-	-
180.2	5	204	38,6	193	44,1	182	49,7	170	55,2	159	60,7	148	66,2	136	71,7
	6	210	38,9	198	44,5	187	50,0	175	55,6	163	61,2	152	66,7	140	72,3
	7	216	39,2	204	44,8	192	50,4	180	56,0	168	61,6	156	67,2	144	72,8
	8	222	39,5	210	45,1	197	50,8	185	56,4	173	62,0	160	67,7	-	-
	9	228	39,8	215	45,5	203	51,1	190	56,8	177	62,5	165	68,2	-	-
	10	234	40,1	221	45,8	208	51,5	195	57,2	182	62,9	169	68,7	-	-
	12	245	40,6	232	46,4	218	52,2	205	58,0	191	63,8	177	69,6	-	-
200.2	5	227	43,3	214	49,5	202	55,7	189	61,9	176	68,1	164	74,3	151	80,5
	6	233	43,6	220	49,9	208	56,1	195	62,3	182	68,6	169	74,8	156	81,0
	7	240	44,0	227	50,2	213	56,5	200	62,8	187	69,1	173	75,4	160	81,6
	8	247	44,3	233	50,6	219	56,9	205	63,3	192	69,6	178	75,9	-	-
	9	253	44,6	239	51,0	225	57,3	211	63,7	197	70,1	183	76,5	-	-
	10	260	44,9	245	51,3	231	57,8	216	64,2	202	70,6	188	77,0	-	-
	12	273	45,6	258	52,1	243	58,6	227	65,1	212	71,6	197	78,1	-	-

Tw= Outlet water temperature °C
kWf = Cooling capacity (kW)

kWa = Compressor power input (kW)
kWt = Heating capacity (kW)

The standard performances refer to a 5°C temperature difference between the water entering and leaving the heat exchanger and to operation of the unit with all fans at nominal or maximum speed. A $0.44 \times 10^{-4} \text{ m}^2 \text{ K/W}$ fouling factor has also been considered with the unit installed at zero meters above sea level (Pb = 1013mbar).

The performances are declared no considering any correction due to water flow rate and water side pressure drop (gross performance).

(1) : at these temperatures the fans are at maximum speed.

(2) : ATC (Advanced Temperature Control) function may occur, if present.

TECHNICAL DATA - BASE VERSION (VB)

Standard performances in cooling mode IR - Low noise setting up (AS)

Mod. 40.2 ÷ 100.2

MOD.	TW	OUTDOOR AIR TEMPERATURE (°C D.B.)													
		20		25		30		35		40		45 (1)		50 (1) (2)	
		kWf	kWa	kWf	kWa	kWf	kWa	kWf	kWa	kWf	kWa	kWf	kWa	kWf	kWa
40.2	5	49,8	10,5	47,0	12,0	44,3	13,5	41,5	15,0	38,7	16,5	37,1	16,8	34,3	18,2
	6	51,2	10,6	48,4	12,1	45,6	13,6	42,7	15,1	39,8	16,6	38,2	16,9	35,3	18,3
	7	52,7	10,6	49,7	12,2	46,8	13,7	43,9	15,2	41,0	16,7	39,3	17,0	36,2	18,5
	8	54,1	10,7	51,1	12,2	48,1	13,8	45,1	15,3	42,1	16,8	40,3	17,2	-	-
	9	55,6	10,8	52,5	12,3	49,4	13,9	46,3	15,4	43,2	17,0	41,4	17,3	-	-
	10	57,0	10,9	53,8	12,4	50,7	14,0	47,5	15,5	44,3	17,1	42,5	17,4	-	-
	11	58,4	10,9	55,2	12,5	52,0	14,1	48,7	15,6	45,4	17,2	43,6	17,5	-	-
12	59,9	11,0	56,5	12,6	53,2	14,2	49,9	15,8	46,5	17,3	44,6	17,7	-	-	
50.2	5	58,9	12,6	55,6	14,3	52,4	16,1	49,1	17,9	45,8	19,7	43,9	20,2	40,5	21,9
	6	60,6	12,6	57,2	14,5	53,9	16,3	50,5	18,1	47,1	19,9	45,1	20,4	41,6	22,1
	7	62,3	12,7	58,8	14,6	55,4	16,4	51,9	18,2	48,4	20,0	46,4	20,5	42,8	22,2
	8	64,0	12,8	60,4	14,7	56,9	16,5	53,3	18,3	49,7	20,2	47,6	20,7	-	-
	9	65,7	12,9	62,0	14,8	58,4	16,6	54,7	18,5	51,1	20,3	48,9	20,8	-	-
	10	67,4	13,0	63,6	14,9	59,9	16,7	56,1	18,6	52,4	20,5	50,2	21,0	-	-
	11	69,1	13,1	65,2	15,0	61,4	16,9	57,6	18,7	53,7	20,6	51,4	21,1	-	-
12	70,8	13,2	66,8	15,1	62,9	17,0	59,0	18,9	55,0	20,7	52,7	21,3	-	-	
60.2	5	64,4	13,7	60,8	15,6	57,3	17,6	53,7	19,5	50,1	21,5	48,0	21,9	44,3	23,7
	6	66,3	13,8	62,6	15,7	59,0	17,7	55,3	19,7	51,5	21,6	49,4	22,0	45,6	23,9
	7	68,2	13,9	64,4	15,8	60,6	17,8	56,8	19,8	53,0	21,8	50,8	22,2	46,9	24,1
	8	70,0	14,0	66,1	16,0	62,3	17,9	58,3	19,9	54,4	21,9	52,2	22,4	-	-
	9	71,9	14,1	67,9	16,1	63,9	18,1	59,9	20,1	55,9	22,1	53,6	22,5	-	-
	10	73,7	14,2	69,6	16,2	65,6	18,2	61,4	20,2	57,3	22,3	55,0	22,7	-	-
	11	75,6	14,3	71,4	16,3	67,2	18,3	63,0	20,4	58,8	22,4	56,3	22,8	-	-
12	77,5	14,4	73,1	16,4	68,9	18,5	64,5	20,5	60,2	22,6	57,7	23,0	-	-	
70.2	5	75,7	15,9	71,4	18,2	67,3	20,5	63,1	22,8	58,8	25,0	56,4	25,7	52,0	27,8
	6	77,9	16,1	73,5	18,3	69,2	20,6	64,9	22,9	60,5	25,2	58,0	25,9	53,5	28,0
	7	80,0	16,2	75,6	18,5	71,2	20,8	66,7	23,1	62,2	25,4	59,6	26,0	55,0	28,2
	8	82,2	16,3	77,6	18,6	73,1	20,9	68,5	23,3	63,9	25,6	61,3	26,2	-	-
	9	84,4	16,4	79,7	18,7	75,1	21,1	70,3	23,4	65,6	25,8	62,9	26,4	-	-
	10	86,6	16,5	81,8	18,9	77,0	21,2	72,2	23,6	67,3	26,0	64,5	26,6	-	-
	11	88,8	16,6	83,8	19,0	78,9	21,4	74,0	23,8	69,0	26,1	66,2	26,8	-	-
12	91,0	16,8	85,9	19,2	80,9	21,5	75,8	23,9	70,7	26,3	67,8	27,0	-	-	
80.2	5	86,6	18,8	81,7	21,5	77,0	24,2	72,1	26,9	67,3	29,6	64,5	30,3	59,5	32,8
	6	89,1	19,0	84,1	21,7	79,2	24,4	74,2	27,1	69,2	29,8	66,4	30,5	61,2	33,0
	7	91,6	19,1	86,4	21,8	81,4	24,6	76,3	27,3	71,2	30,0	68,2	30,7	63,0	33,3
	8	94,1	19,2	88,8	22,0	83,6	24,7	78,4	27,5	73,1	30,2	70,1	30,9	-	-
	9	96,6	19,4	91,2	22,2	85,9	24,9	80,5	27,7	75,1	30,5	72,0	31,2	-	-
	10	99,1	19,5	93,5	22,3	88,1	25,1	82,5	27,9	77,0	30,7	73,8	31,4	-	-
	11	102	19,7	95,9	22,5	90,3	25,3	84,6	28,1	79,0	30,9	75,7	31,6	-	-
12	104	19,8	98,2	22,6	92,5	25,5	86,7	28,3	80,9	31,1	77,5	31,8	-	-	
90.2	5	100	21,1	94,5	24,1	89,0	27,1	83,4	30,2	77,8	33,2	74,6	33,3	68,8	36,1
	6	103	21,3	97,2	24,3	91,5	27,3	85,8	30,4	80,0	33,4	76,7	33,6	70,8	36,4
	7	106	21,4	99,9	24,5	94,1	27,5	88,2	30,6	82,3	33,7	78,9	33,8	72,8	36,7
	8	109	21,6	103	24,7	96,7	27,7	90,6	30,8	84,5	33,9	81,0	34,1	-	-
	9	112	21,7	105	24,8	99,2	27,9	93,0	31,0	86,8	34,1	83,2	34,3	-	-
	10	114	21,9	108	25,0	102	28,1	95,4	31,3	89,0	34,4	85,4	34,6	-	-
	11	117	22,0	111	25,2	104	28,3	97,8	31,5	91,3	34,6	87,5	34,8	-	-
12	120	22,2	114	25,4	107	28,5	100	31,7	93,5	34,9	89,7	35,1	-	-	
100.2	5	112	23,5	106	26,9	99,4	30,2	93,1	33,6	86,9	37,0	83,6	37,4	77,1	40,5
	6	115	23,7	109	27,1	102	30,5	95,8	33,9	89,4	37,2	86,0	37,6	79,4	40,8
	7	118	23,9	112	27,3	105	30,7	98,5	34,1	91,9	37,5	88,4	37,9	81,6	41,1
	8	121	24,0	115	27,5	108	30,9	101	34,3	94,4	37,8	90,8	38,2	-	-
	9	125	24,2	118	27,7	111	31,1	104	34,6	96,9	38,1	93,3	38,5	-	-
	10	128	24,4	121	27,9	114	31,4	107	34,8	99,4	38,3	95,7	38,7	-	-
	11	131	24,6	124	28,1	117	31,6	109	35,1	102	38,6	98,1	39,0	-	-
12	134	24,7	127	28,3	119	31,8	112	35,3	104	38,9	100	39,3	-	-	

TW= Outlet water temperature °C

kWa = Compressor power input (kW)

kWf = Cooling capacity (kW)

kWt = Heating capacity (kW)

The standard performances refer to a 5°C temperature difference between the water entering and leaving the heat exchanger and to operation of the unit with all fans at nominal or maximum speed. A 0.44 x 10⁻⁴ m² K/W fouling factor has also been considered with the unit installed at zero meters above sea level (Pb = 1013mbar).

The performances are declared no considering any correction due to water flow rate and water side pressure drop (gross performance).

(1) : at these temperatures the fans are at maximum speed.

(2) : ATC (Advanced Temperature Control) function may occur, if present.

TECHNICAL DATA - BASE VERSION (VB)

Mod. 115.2 ÷ 200.2

MOD.	TW	OUTDOOR AIR TEMPERATURE (°C D.B.)													
		20		25		30		35		40		45 (1)		50 (1) (2)	
		kWf	kWa	kWf	kWa	kWf	kWa	kWf	kWa	kWf	kWa	kWf	kWa	kWf	kWa
115.2	5	124	26,4	117	30,1	110	33,9	103	37,6	96,1	41,4	91,8	42,0	84,7	45,5
	6	127	26,5	120	30,3	113	34,1	106	37,9	98,9	41,7	94,5	42,3	87,2	45,8
	7	131	26,7	123	30,6	116	34,4	109	38,2	102	42,0	97,1	42,6	89,6	46,2
	8	134	26,9	127	30,8	119	34,6	112	38,5	104	42,3	99,8	42,9	-	-
	9	138	27,1	130	31,0	123	34,9	115	38,8	107	42,6	102	43,2	-	-
	10	142	27,3	134	31,2	126	35,1	118	39,0	110	42,9	105	43,5	-	-
	11	145	27,5	137	31,4	129	35,4	121	39,3	113	43,2	108	43,8	-	-
130.2	5	138	29,9	131	34,2	123	38,5	115	42,8	108	47,0	103	47,9	95,3	51,9
	6	142	30,2	134	34,5	127	38,8	119	43,1	111	47,4	106	48,2	98,1	52,3
	7	146	30,4	138	34,7	130	39,1	122	43,4	114	47,7	109	48,6	101	52,7
	8	150	30,6	142	35,0	134	39,3	125	43,7	117	48,1	112	49,0	-	-
	9	154	30,8	146	35,2	137	39,6	129	44,0	120	48,4	115	49,3	-	-
	10	158	31,0	150	35,5	141	39,9	132	44,3	123	48,8	118	49,7	-	-
	11	162	31,3	153	35,7	144	40,2	135	44,7	126	49,1	121	50,0	-	-
145.2	5	158	33,5	149	38,3	140	43,1	131	47,9	123	52,7	117	53,2	108	57,6
	6	162	33,8	153	38,6	144	43,4	135	48,2	126	53,1	121	53,6	111	58,1
	7	167	34,0	157	38,9	148	43,7	139	48,6	130	53,5	124	54,0	114	58,5
	8	171	34,3	162	39,2	152	44,1	143	49,0	133	53,8	127	54,4	-	-
	9	176	34,5	166	39,4	156	44,4	147	49,3	137	54,2	131	54,8	-	-
	10	180	34,8	170	39,7	160	44,7	150	49,7	140	54,6	134	55,2	-	-
	11	185	35,0	175	40,0	164	45,0	154	50,0	144	55,0	138	55,6	-	-
160.2	5	174	37,5	164	42,8	154	48,2	145	53,5	135	58,9	130	59,7	120	64,7
	6	179	37,7	169	43,1	159	48,5	149	53,9	139	59,3	133	60,2	123	65,2
	7	184	38,0	173	43,4	163	48,9	153	54,3	143	59,7	137	60,6	126	65,7
	8	189	38,3	178	43,8	168	49,2	157	54,7	147	60,2	141	61,0	-	-
	9	194	38,6	183	44,1	172	49,6	161	55,1	151	60,6	144	61,5	-	-
	10	199	38,8	188	44,4	177	49,9	166	55,5	154	61,0	148	61,9	-	-
	11	204	39,1	192	44,7	181	50,3	170	55,9	158	61,5	152	62,4	-	-
180.2	5	199	41,9	187	47,9	177	53,8	165	59,8	154	65,8	148	66,2	136	71,7
	6	204	42,2	193	48,2	182	54,2	170	60,3	159	66,3	152	66,7	140	72,3
	7	210	42,5	198	48,6	187	54,6	175	60,7	163	66,8	156	67,2	144	72,8
	8	216	42,8	204	48,9	192	55,0	180	61,1	168	67,3	160	67,7	-	-
	9	221	43,1	209	49,3	197	55,4	185	61,6	172	67,7	165	68,2	-	-
	10	227	43,4	214	49,6	202	55,8	189	62,0	177	68,2	169	68,7	-	-
	11	233	43,7	220	50,0	207	56,2	194	62,5	181	68,7	173	69,2	-	-
200.2	5	220	46,8	208	53,5	196	60,1	183	66,8	171	73,5	164	74,3	151	80,5
	6	226	47,1	214	53,8	201	60,6	189	67,3	176	74,0	169	74,8	156	81,0
	7	233	47,5	220	54,2	207	61,0	194	67,8	181	74,6	173	75,4	160	81,6
	8	239	47,8	226	54,6	213	61,5	199	68,3	186	75,1	178	75,9	-	-
	9	245	48,2	232	55,0	218	61,9	205	68,8	191	75,7	183	76,5	-	-
	10	252	48,5	238	55,4	224	62,4	210	69,3	196	76,2	188	77,0	-	-
	11	258	48,8	244	55,8	230	62,8	215	69,8	201	76,7	192	77,6	-	-
12	265	49,2	250	56,2	235	63,2	220	70,3	206	77,3	197	78,1	-	-	

TW= Outlet water temperature °C
kWf = Cooling capacity (kW)

kWa = Compressor power input (kW)
kWt = Heating capacity (kW)

The standard performances refer to a 5°C temperature difference between the water entering and leaving the heat exchanger and to operation of the unit with all fans at nominal or maximum speed. A 0.44 x 10⁻⁴ m² K/W fouling factor has also been considered with the unit installed at zero meters above sea level (Pb = 1013mbar).

The performances are declared no considering any correction due to water flow rate and water side pressure drop (gross performance).

(1) : at these temperatures the fans are at maximum speed.

(2) : ATC (Advanced Temperature Control) function may occur, if present.

TECHNICAL DATA - BASE VERSION (VB)

Standard performances in cooling mode IR - Extra low noise setting up (AX)

Mod. 40.2 ÷ 100.2

MOD.	TW	OUTDOOR AIR TEMPERATURE (°C D.B.)													
		20		25		30		35		40		45 (1)		50 (1) (2)	
		kWf	kWa	kWf	kWa	kWf	kWa	kWf	kWa	kWf	kWa	kWf	kWa	kWf	kWa
40.2	5	48,7	10,6	46,0	12,1	43,3	13,7	40,6	15,2	37,8	16,7	38,2	16,3	35,3	17,6
	6	50,1	10,7	47,3	12,2	44,5	13,8	41,7	15,3	38,9	16,8	39,4	16,4	36,3	17,8
	7	51,5	10,8	48,6	12,3	45,8	13,9	42,9	15,4	40,0	16,9	40,5	16,5	37,3	17,9
	8	52,9	10,9	49,9	12,4	47,0	14,0	44,1	15,5	41,1	17,1	41,6	16,6	-	-
	9	54,3	10,9	51,3	12,5	48,3	14,1	45,2	15,6	42,2	17,2	42,7	16,8	-	-
	10	55,7	11,0	52,6	12,6	49,5	14,2	46,4	15,7	43,3	17,3	43,8	16,9	-	-
	11	57,1	11,1	53,9	12,7	50,8	14,3	47,6	15,8	44,4	17,4	44,9	17,0	-	-
12	58,5	11,2	55,2	12,8	52,0	14,4	48,8	16,0	45,5	17,6	46,0	17,1	-	-	
50.2	5	57,5	12,9	54,3	14,7	51,1	16,6	47,9	18,4	44,7	20,3	45,2	19,6	41,7	21,2
	6	59,2	13,0	55,9	14,9	52,6	16,7	49,3	18,6	46,0	20,4	46,5	19,8	42,9	21,4
	7	60,8	13,1	57,4	15,0	54,1	16,8	50,7	18,7	47,3	20,6	47,8	19,9	44,1	21,6
	8	62,5	13,2	59,0	15,1	55,6	17,0	52,1	18,8	48,6	20,7	49,1	20,0	-	-
	9	64,2	13,3	60,6	15,2	57,0	17,1	53,5	19,0	49,9	20,9	50,4	20,2	-	-
	10	65,8	13,4	62,1	15,3	58,5	17,2	54,8	19,1	51,2	21,0	51,7	20,3	-	-
	11	67,5	13,5	63,7	15,4	60,0	17,3	56,2	19,2	52,5	21,2	53,0	20,5	-	-
12	69,1	13,6	65,3	15,5	61,5	17,4	57,6	19,4	53,8	21,3	54,3	20,6	-	-	
60.2	5	63,0	14,2	59,5	16,2	56,0	18,3	52,5	20,3	49,0	22,3	49,5	21,2	45,7	23,0
	6	64,8	14,3	61,2	16,4	57,6	18,4	54,0	20,5	50,4	22,5	50,9	21,4	47,0	23,2
	7	66,6	14,4	62,9	16,5	59,2	18,5	55,5	20,6	51,8	22,7	52,3	21,5	48,3	23,3
	8	68,4	14,5	64,6	16,6	60,8	18,7	57,0	20,7	53,2	22,8	53,8	21,7	-	-
	9	70,2	14,6	66,3	16,7	62,4	18,8	58,5	20,9	54,6	23,0	55,2	21,8	-	-
	10	72,0	14,7	68,0	16,8	64,1	18,9	60,0	21,0	56,0	23,2	56,6	22,0	-	-
	11	73,9	14,8	69,7	17,0	65,7	19,1	61,6	21,2	57,4	23,3	58,0	22,2	-	-
12	75,7	14,9	71,5	17,1	67,3	19,2	63,1	21,3	58,8	23,5	59,5	22,3	-	-	
70.2	5	74,0	16,4	69,8	18,8	65,8	21,1	61,6	23,5	57,5	25,8	58,1	24,9	53,6	27,0
	6	76,1	16,5	71,9	18,9	67,7	21,3	63,4	23,6	59,2	26,0	59,8	25,1	55,1	27,2
	7	78,2	16,7	73,9	19,0	69,6	21,4	65,2	23,8	60,8	26,2	61,4	25,3	56,7	27,4
	8	80,4	16,8	75,9	19,2	71,5	21,6	67,0	24,0	62,5	26,4	63,1	25,4	-	-
	9	82,5	16,9	77,9	19,3	73,4	21,7	68,8	24,1	64,1	26,6	64,8	25,6	-	-
	10	84,6	17,0	79,9	19,5	75,3	21,9	70,5	24,3	65,8	26,8	66,5	25,8	-	-
	11	86,8	17,1	81,9	19,6	77,2	22,0	72,3	24,5	67,5	26,9	68,1	26,0	-	-
12	88,9	17,3	83,9	19,7	79,1	22,2	74,1	24,7	69,1	27,1	69,8	26,2	-	-	
80.2	5	84,5	19,5	79,8	22,3	75,2	25,1	70,4	27,9	65,7	30,7	66,4	29,4	61,3	31,8
	6	87,0	19,7	82,1	22,5	77,3	25,3	72,5	28,1	67,6	30,9	68,4	29,6	63,1	32,0
	7	89,4	19,8	84,4	22,6	79,5	25,5	74,5	28,3	69,5	31,1	70,3	29,8	64,8	32,3
	8	91,8	20,0	86,7	22,8	81,7	25,7	76,5	28,5	71,4	31,4	72,2	30,0	-	-
	9	94,3	20,1	89,0	23,0	83,8	25,8	78,6	28,7	73,3	31,6	74,1	30,2	-	-
	10	96,7	20,2	91,3	23,1	86,0	26,0	80,6	28,9	75,2	31,8	76,0	30,4	-	-
	11	99,2	20,4	93,6	23,3	88,2	26,2	82,6	29,1	77,1	32,0	77,9	30,7	-	-
12	102	20,5	95,9	23,5	90,3	26,4	84,7	29,3	79,0	32,3	79,9	30,9	-	-	
90.2	5	97,8	20,7	92,3	23,7	87,0	26,6	81,5	29,6	76,0	32,5	76,8	32,3	70,9	35,0
	6	101	20,8	95,0	23,8	89,5	26,8	83,8	29,8	78,2	32,8	79,0	32,6	72,9	35,3
	7	103	21,0	97,7	24,0	92,0	27,0	86,2	30,0	80,4	33,0	81,3	32,8	75,0	35,6
	8	106	21,2	100	24,2	94,5	27,2	88,6	30,2	82,6	33,2	83,5	33,1	-	-
	9	109	21,3	103	24,3	97,0	27,4	90,9	30,4	84,8	33,5	85,7	33,3	-	-
	10	112	21,5	106	24,5	99,5	27,6	93,3	30,7	87,0	33,7	87,9	33,5	-	-
	11	115	21,6	108	24,7	102	27,8	95,6	30,9	89,2	34,0	90,1	33,8	-	-
12	118	21,8	111	24,9	105	28,0	98,0	31,1	91,4	34,2	92,3	34,0	-	-	
100.2	5	109	24,5	103	28,0	97,0	31,5	91,0	35,0	84,9	38,5	86,1	36,2	79,5	39,3
	6	112	24,7	106	28,2	99,8	31,7	93,6	35,2	87,3	38,8	88,6	36,5	81,8	39,6
	7	115	24,9	109	28,4	103	32,0	96,2	35,5	89,8	39,1	91,1	36,8	84,0	39,8
	8	119	25,0	112	28,6	105	32,2	98,8	35,8	92,2	39,3	93,6	37,0	-	-
	9	122	25,2	115	28,8	108	32,4	101	36,0	94,7	39,6	96,1	37,3	-	-
	10	125	25,4	118	29,0	111	32,6	104	36,3	97,1	39,9	98,5	37,6	-	-
	11	128	25,6	121	29,2	114	32,9	107	36,5	99,5	40,2	101	37,9	-	-
12	131	25,8	124	29,4	117	33,1	109	36,8	102	40,5	104	38,1	-	-	

TW= Outlet water temperature °C

kWf = Cooling capacity (kW)

kWa = Compressor power input (kW)

kWt = Heating capacity (kW)

The standard performances refer to a 5°C temperature difference between the water entering and leaving the heat exchanger and to operation of the unit with all fans at nominal or maximum speed. A $0.44 \times 10^{-4} \text{ m}^2 \text{ K/W}$ fouling factor has also been considered with the unit installed at zero meters above sea level (Pb = 1013mbar).

The performances are declared no considering any correction due to water flow rate and water side pressure drop (gross performance).

(1) : at these temperatures the fans are at maximum speed.

(2) : ATC (Advanced Temperature Control) function may occur, if present.

TECHNICAL DATA - BASE VERSION (VB)

Mod. 115.2 ÷ 200.2

MOD.	TW	OUTDOOR AIR TEMPERATURE (°C D.B.)													
		20		25		30		35		40		45 (1)		50 (1) (2)	
		kWf	kWa	kWf	kWa	kWf	kWa	kWf	kWa	kWf	kWa	kWf	kWa	kWf	kWa
115.2	5	120	27,4	114	31,3	107	35,2	100	39,1	93,5	43,0	94,6	40,7	87,3	44,1
	6	124	27,6	117	31,5	110	35,5	103	39,4	96,2	43,4	97,3	41,0	89,8	44,4
	7	127	27,8	120	31,8	113	35,7	106	39,7	98,9	43,7	100	41,3	92,3	44,8
	8	131	28,0	123	32,0	116	36,0	109	40,0	102	44,0	103	41,6	-	-
	9	134	28,2	127	32,2	119	36,2	112	40,3	104	44,3	105	41,9	-	-
	10	138	28,4	130	32,5	122	36,5	115	40,6	107	44,6	108	42,2	-	-
	12	145	28,8	136	32,9	129	37,0	120	41,1	112	45,3	114	42,8	-	-
130.2	5	135	31,1	127	35,6	120	40,0	113	44,4	105	48,9	106	46,5	98,2	50,3
	6	139	31,3	131	35,8	124	40,3	116	44,8	108	49,2	109	46,8	101	50,7
	7	143	31,6	135	36,1	127	40,6	119	45,1	111	49,6	113	47,1	104	51,1
	8	147	31,8	139	36,3	130	40,9	122	45,4	114	50,0	116	47,5	-	-
	9	151	32,0	142	36,6	134	41,2	125	45,8	117	50,3	119	47,8	-	-
	10	154	32,3	146	36,9	137	41,5	129	46,1	120	50,7	122	48,2	-	-
	12	162	32,7	153	37,4	144	42,1	135	46,7	126	51,4	128	48,9	-	-
145.2	5	153	34,6	145	39,6	136	44,5	128	49,5	119	54,4	121	51,6	111	55,9
	6	158	34,9	149	39,9	140	44,9	131	49,8	123	54,8	124	52,0	115	56,3
	7	162	35,1	153	40,2	144	45,2	135	50,2	126	55,2	128	52,4	118	56,7
	8	166	35,4	157	40,5	148	45,5	139	50,6	129	55,6	131	52,8	-	-
	9	171	35,7	161	40,7	152	45,8	142	50,9	133	56,0	135	53,1	-	-
	10	175	35,9	165	41,0	156	46,2	146	51,3	136	56,4	138	53,5	-	-
	12	184	36,4	174	41,6	164	46,8	153	52,0	143	57,2	145	54,3	-	-
160.2	5	170	38,7	161	44,2	151	49,8	142	55,3	132	60,8	133	57,9	123	62,8
	6	175	39,0	165	44,6	156	50,1	146	55,7	136	61,3	137	58,4	127	63,2
	7	180	39,3	170	44,9	160	50,5	150	56,1	140	61,7	141	58,8	130	63,7
	8	185	39,6	175	45,2	164	50,9	154	56,5	144	62,2	145	59,2	-	-
	9	190	39,8	179	45,5	169	51,2	158	56,9	148	62,6	149	59,6	-	-
	10	195	40,1	184	45,9	173	51,6	162	57,3	151	63,1	153	60,1	-	-
	12	205	40,7	193	46,5	182	52,3	170	58,1	159	64,0	160	60,9	-	-
180.2	5	193	43,7	182	49,9	171	56,1	161	62,4	150	68,6	152	64,2	140	69,6
	6	198	44,0	187	50,3	176	56,6	165	62,8	154	69,1	156	64,7	144	70,1
	7	204	44,3	193	50,6	181	57,0	170	63,3	159	69,6	161	65,2	148	70,6
	8	210	44,6	198	51,0	186	57,4	175	63,8	163	70,1	165	65,7	-	-
	9	215	45,0	203	51,4	191	57,8	179	64,2	167	70,6	170	66,1	-	-
	10	221	45,3	208	51,7	196	58,2	184	64,7	172	71,1	174	66,6	-	-
	12	226	45,6	214	52,1	201	58,6	189	65,1	176	71,7	178	67,1	-	-
200.2	5	214	48,7	202	55,7	191	62,6	179	69,6	167	76,5	169	72,0	156	78,0
	6	221	49,1	208	56,1	196	63,1	184	70,1	172	77,1	174	72,6	160	78,6
	7	227	49,4	214	56,5	202	63,5	189	70,6	176	77,7	179	73,1	165	79,2
	8	233	49,8	220	56,9	207	64,0	194	71,1	181	78,2	183	73,6	-	-
	9	239	50,1	226	57,3	213	64,5	199	71,6	186	78,8	188	74,2	-	-
	10	245	50,5	232	57,7	218	64,9	204	72,1	191	79,4	193	74,7	-	-
	12	252	50,9	237	58,1	224	65,4	210	72,7	196	79,9	198	75,2	-	-
12	258	51,2	243	58,5	229	65,9	215	73,2	200	80,5	203	75,8	-	-	

Tw= Outlet water temperature °C
kWf = Cooling capacity (kW)

kWa = Compressor power input (kW)
kWt = Heating capacity (kW)

The standard performances refer to a 5°C temperature difference between the water entering and leaving the heat exchanger and to operation of the unit with all fans at nominal or maximum speed. A $0.44 \times 10^{-4} \text{ m}^2 \text{ K/W}$ fouling factor has also been considered with the unit installed at zero meters above sea level (Pb = 1013mbar).

The performances are declared no considering any correction due to water flow rate and water side pressure drop (gross performance).

(1) : at these temperatures the fans are at maximum speed.

(2) : ATC (Advanced Temperature Control) function may occur, if present.

TECHNICAL DATA - BASE VERSION (VB)

Standard performances in cooling mode IP - Base setting up (AB)

Mod. 40.2 ÷ 100.2

MOD.	TW	OUTDOOR AIR TEMPERATURE (°C D.B.)													
		20		25		30		35		40		45		50 (2)	
		kWf	kWa	kWf	kWa	kWf	kWa	kWf	kWa	kWf	kWa	kWf	kWa	kWf	kWa
40.2	5	49,7	9,7	46,9	11,0	44,2	12,4	41,4	13,8	38,6	15,2	35,9	16,6	33,1	17,9
	6	51,1	9,7	48,3	11,1	45,5	12,5	42,6	13,9	39,8	15,3	36,9	16,7	34,1	18,1
	7	52,6	9,8	49,6	11,2	46,7	12,6	43,8	14,0	40,9	15,4	38,0	16,8	35,0	18,2
	8	54,0	9,9	51,0	11,3	48,0	12,7	45,0	14,1	42,0	15,5	39,0	16,9	-	-
	9	55,4	9,9	52,3	11,4	49,3	12,8	46,2	14,2	43,1	15,6	40,0	17,0	-	-
	10	56,9	10,0	53,7	11,4	50,6	12,9	47,4	14,3	44,2	15,7	41,1	17,2	-	-
	11	58,3	10,1	55,0	11,5	51,8	13,0	48,6	14,4	45,3	15,8	42,1	17,3	-	-
50.2	5	60,0	11,9	56,7	13,6	53,4	15,3	50,0	17,0	46,7	18,8	43,4	20,5	40,0	22,2
	6	61,7	12,0	58,3	13,7	54,9	15,5	51,5	17,2	48,0	18,9	44,6	20,6	41,2	22,3
	7	63,5	12,1	59,9	13,8	56,4	15,6	52,9	17,3	49,4	19,0	45,9	20,8	42,3	22,5
	8	65,2	12,2	61,6	13,9	58,0	15,7	54,3	17,4	50,7	19,2	47,1	20,9	-	-
	9	66,9	12,3	63,2	14,0	59,5	15,8	55,8	17,6	52,0	19,3	48,4	21,1	-	-
	10	68,7	12,4	64,8	14,1	61,1	15,9	57,2	17,7	53,4	19,4	49,6	21,2	-	-
	11	70,4	12,5	66,5	14,2	62,6	16,0	58,7	17,8	54,7	19,6	50,9	21,4	-	-
60.2	5	65,2	12,7	61,6	14,5	58,0	16,3	54,4	18,1	50,7	19,9	47,1	21,8	43,5	23,6
	6	67,1	12,8	63,4	14,6	59,7	16,4	55,9	18,3	52,2	20,1	48,5	21,9	44,7	23,7
	7	69,0	12,9	65,1	14,7	61,4	16,6	57,5	18,4	53,6	20,2	49,9	22,1	46,0	23,9
	8	70,9	13,0	66,9	14,8	63,0	16,7	59,1	18,5	55,1	20,4	51,2	22,2	-	-
	9	72,8	13,1	68,7	14,9	64,7	16,8	60,6	18,7	56,6	20,5	52,6	22,4	-	-
	10	74,6	13,2	70,5	15,0	66,4	16,9	62,2	18,8	58,0	20,7	53,9	22,6	-	-
	11	76,5	13,3	72,3	15,1	68,0	17,0	63,8	18,9	59,5	20,8	55,3	22,7	-	-
70.2	5	76,2	15,0	72,0	17,2	67,8	19,3	63,5	21,5	59,3	23,6	55,1	25,8	50,8	27,9
	6	78,4	15,1	74,1	17,3	69,7	19,5	65,4	21,6	61,0	23,8	56,7	26,0	52,3	28,1
	7	80,6	15,3	76,1	17,4	71,7	19,6	67,2	21,8	62,7	24,0	58,3	26,2	53,8	28,3
	8	82,8	15,4	78,2	17,6	73,7	19,8	69,0	22,0	64,4	24,2	59,9	26,4	-	-
	9	85,0	15,5	80,3	17,7	75,6	19,9	70,9	22,1	66,1	24,3	61,4	26,5	-	-
	10	87,2	15,6	82,4	17,8	77,6	20,0	72,7	22,3	67,8	24,5	63,0	26,7	-	-
	11	89,4	15,7	84,4	17,9	79,5	20,2	74,5	22,4	69,5	24,7	64,6	26,9	-	-
80.2	5	84,1	17,0	79,4	19,5	74,8	21,9	70,1	24,3	65,4	26,8	60,7	29,2	56,0	31,6
	6	86,5	17,2	81,7	19,6	76,9	22,1	72,1	24,5	67,2	27,0	62,5	29,4	57,7	31,9
	7	88,9	17,3	84,0	19,8	79,1	22,2	74,1	24,7	69,1	27,2	64,2	29,6	59,3	32,1
	8	91,3	17,4	86,2	19,9	81,2	22,4	76,1	24,9	71,0	27,4	66,0	29,9	-	-
	9	93,8	17,5	88,5	20,0	83,4	22,6	78,1	25,1	72,9	27,6	67,7	30,1	-	-
	10	96,2	17,7	90,8	20,2	85,5	22,7	80,2	25,2	74,8	27,8	69,5	30,3	-	-
	11	98,6	17,8	93,1	20,3	87,7	22,9	82,2	25,4	76,7	28,0	71,3	30,5	-	-
90.2	5	101	19,3	95,6	22,1	90,0	24,8	84,3	27,6	78,7	30,4	73,1	33,1	67,5	35,9
	6	104	19,5	98,3	22,2	92,6	25,0	86,8	27,8	81,0	30,6	75,2	33,4	69,4	36,1
	7	107	19,6	101	22,4	95,2	25,2	89,2	28,0	83,2	30,8	77,3	33,6	71,4	36,4
	8	110	19,7	104	22,6	97,8	25,4	91,6	28,2	85,5	31,0	79,4	33,8	-	-
	9	113	19,9	107	22,7	100	25,6	94,1	28,4	87,8	31,2	81,6	34,1	-	-
	10	116	20,0	109	22,9	103	25,7	96,5	28,6	90,0	31,5	83,7	34,3	-	-
	11	119	20,2	112	23,1	106	25,9	98,9	28,8	92,3	31,7	85,8	34,6	-	-
100.2	5	112	21,7	106	24,8	100	27,8	93,6	30,9	87,3	34,0	81,2	37,1	74,9	40,2
	6	116	21,8	109	24,9	103	28,1	96,3	31,2	89,8	34,3	83,5	37,4	77,0	40,5
	7	119	22,0	112	25,1	106	28,3	99,0	31,4	92,4	34,5	85,8	37,7	79,2	40,8
	8	122	22,1	115	25,3	109	28,5	102	31,6	94,9	34,8	88,2	38,0	-	-
	9	125	22,3	118	25,5	111	28,7	104	31,9	97,4	35,0	90,5	38,2	-	-
	10	129	22,5	121	25,7	114	28,9	107	32,1	99,9	35,3	92,9	38,5	-	-
	11	132	22,6	124	25,9	117	29,1	110	32,3	102	35,5	95,2	38,8	-	-
	12	135	22,8	127	26,0	120	29,3	113	32,5	105	35,8	97,5	39,1	-	-

TW= Outlet water temperature °C
kWf = Cooling capacity (kW)

kWa = Compressor power input (kW)
kWt = Heating capacity (kW)

The standard performances refer to a 5°C temperature difference between the water entering and leaving the heat exchanger and to operation of the unit with all fans at nominal or maximum speed. A 0.44×10^{-4} m² K/W fouling factor has also been considered with the unit installed at zero meters above sea level (Pb = 1013mbar).

The performances are declared no considering any correction due to water flow rate and water side pressure drop (gross performance).

(1) : at these temperatures the fans are at maximum speed.

(2) : ATC (Advanced Temperature Control) function may occur, if present.

TECHNICAL DATA - BASE VERSION (VB)

Mod. 115.2 ÷ 200.2

MOD.	TW	OUTDOOR AIR TEMPERATURE (°C D.B.)													
		20		25		30		35		40		45		50 (2)	
		kWf	kWa	kWf	kWa	kWf	kWa	kWf	kWa	kWf	kWa	kWf	kWa	kWf	kWa
115.2	5	125	24,4	118	27,9	111	31,4	104	34,9	97,0	38,4	90,2	41,9	83,2	45,4
	6	128	24,6	121	28,1	114	31,6	107	35,1	99,8	38,7	92,8	42,2	85,6	45,7
	7	132	24,8	125	28,3	117	31,9	110	35,4	103	38,9	95,4	42,5	88,0	46,0
	8	136	25,0	128	28,5	121	32,1	113	35,7	105	39,2	98,0	42,8	-	-
	9	139	25,1	131	28,7	124	32,3	116	35,9	108	39,5	101	43,1	-	-
	10	143	25,3	135	28,9	127	32,6	119	36,2	111	39,8	103	43,4	-	-
	12	150	25,7	142	29,3	133	33,0	125	36,7	117	40,4	108	44,0	-	-
130.2	5	138	27,6	131	31,5	123	35,5	115	39,4	108	43,4	100	47,3	92,3	51,2
	6	142	27,8	134	31,8	127	35,7	119	39,7	111	43,7	103	47,7	94,9	51,6
	7	146	28,0	138	32,0	130	36,0	122	40,0	114	44,0	106	48,0	97,6	52,0
	8	150	28,2	142	32,2	134	36,3	125	40,3	117	44,3	109	48,3	-	-
	9	154	28,4	146	32,5	137	36,5	129	40,6	120	44,6	112	48,7	-	-
	10	158	28,6	150	32,7	141	36,8	132	40,9	123	45,0	114	49,0	-	-
	12	162	28,8	153	32,9	144	37,0	135	41,2	126	45,3	117	49,4	-	-
145.2	5	157	30,3	148	34,6	139	38,9	130	43,3	122	47,6	113	51,9	104	56,2
	6	161	30,5	152	34,9	143	39,2	134	43,6	125	47,9	116	52,3	107	56,7
	7	166	30,7	156	35,1	147	39,5	138	43,9	129	48,3	120	52,7	110	57,1
	8	170	31,0	161	35,4	151	39,8	142	44,2	132	48,6	123	53,1	-	-
	9	175	31,2	165	35,6	155	40,1	146	44,5	136	49,0	126	53,4	-	-
	10	179	31,4	169	35,9	159	40,4	149	44,9	139	49,3	129	53,8	-	-
	12	188	31,8	178	36,4	167	40,9	157	45,5	146	50,0	136	54,6	-	-
160.2	5	175	34,4	165	39,3	155	44,2	146	49,1	136	54,0	126	58,9	116	63,8
	6	180	34,6	170	39,6	160	44,5	150	49,4	140	54,4	130	59,3	120	64,3
	7	185	34,9	174	39,8	164	44,8	154	49,8	144	54,8	134	59,8	123	64,7
	8	190	35,1	179	40,1	169	45,1	158	50,2	148	55,2	137	60,2	-	-
	9	195	35,4	184	40,4	173	45,5	162	50,5	152	55,6	141	60,6	-	-
	10	200	35,6	189	40,7	178	45,8	167	50,9	155	56,0	144	61,1	-	-
	12	205	35,9	194	41,0	182	46,1	171	51,2	159	56,4	148	61,5	-	-
180.2	5	202	37,9	191	43,4	180	48,8	168	54,2	157	59,6	146	65,0	135	70,5
	6	208	38,2	196	43,7	185	49,1	173	54,6	162	60,1	150	65,5	139	71,0
	7	214	38,5	202	44,0	190	49,5	178	55,0	166	60,5	154	66,0	142	71,5
	8	219	38,8	207	44,3	195	49,9	183	55,4	171	60,9	159	66,5	-	-
	9	225	39,1	213	44,6	200	50,2	188	55,8	175	61,4	163	67,0	-	-
	10	231	39,3	218	45,0	205	50,6	193	56,2	180	61,8	167	67,4	-	-
	12	237	39,6	224	45,3	211	50,9	197	56,6	184	62,3	171	67,9	-	-
200.2	5	225	43,1	212	49,3	200	55,4	187	61,6	175	67,8	162	73,9	150	80,1
	6	231	43,4	218	49,6	206	55,8	193	62,0	180	68,3	167	74,5	154	80,7
	7	238	43,8	224	50,0	211	56,3	198	62,5	185	68,8	172	75,0	158	81,3
	8	244	44,1	230	50,4	217	56,7	203	63,0	190	69,3	176	75,5	-	-
	9	251	44,4	237	50,7	223	57,1	209	63,4	195	69,8	181	76,1	-	-
	10	257	44,7	243	51,1	229	57,5	214	63,9	200	70,3	186	76,6	-	-
	12	264	45,0	249	51,5	234	57,9	220	64,3	205	70,8	190	77,2	-	-
	12	270	45,3	255	51,8	240	58,3	225	64,8	210	71,3	195	77,7	-	-

TW= Outlet water temperature °C

kWf = Cooling capacity (kW)

kWa = Compressor power input (kW)

kWt = Heating capacity (kW)

The standard performances refer to a 5°C temperature difference between the water entering and leaving the heat exchanger and to operation of the unit with all fans at nominal or maximum speed. A 0.44×10^{-4} m² K/W fouling factor has also been considered with the unit installed at zero meters above sea level (Pb = 1013mbar).

The performances are declared no considering any correction due to water flow rate and water side pressure drop (gross performance).

(1) : at these temperatures the fans are at maximum speed.

(2) : ATC (Advanced Temperature Control) function may occur, if present.

TECHNICAL DATA - BASE VERSION (VB)

Standard performances in cooling mode IP - Low noise setting up (AS)

Mod. 40.2 ÷ 100.2

MOD.	TW	OUTDOOR AIR TEMPERATURE (°C D.B.)													
		20		25		30		35		40		45 (1)		50 (1) (2)	
		kWf	kWa	kWf	kWa	kWf	kWa	kWf	kWa	kWf	kWa	kWf	kWa	kWf	kWa
40.2	5	47,7	10,3	45,0	11,8	42,4	13,3	39,7	14,8	37,0	16,3	35,9	16,6	33,1	17,9
	6	49,0	10,4	46,3	11,9	43,6	13,4	40,9	14,9	38,1	16,4	36,9	16,7	34,1	18,1
	7	50,4	10,5	47,6	12,0	44,8	13,5	42,0	15,0	39,2	16,5	38,0	16,8	35,0	18,2
	8	51,8	10,6	48,9	12,1	46,0	13,6	43,1	15,1	40,3	16,6	39,0	16,9	-	-
	9	53,1	10,7	50,2	12,2	47,3	13,7	44,3	15,2	41,3	16,7	40,0	17,0	-	-
	10	54,5	10,7	51,5	12,3	48,5	13,8	45,4	15,3	42,4	16,9	41,1	17,2	-	-
	11	55,9	10,8	52,8	12,3	49,7	13,9	46,6	15,4	43,5	17,0	42,1	17,3	-	-
50.2	12	57,3	10,9	54,1	12,4	50,9	14,0	47,7	15,5	44,5	17,1	43,2	17,4	-	-
	5	57,6	13,0	54,4	14,8	51,2	16,7	48,0	18,5	44,8	20,4	43,4	20,5	40,0	22,2
	6	59,3	13,1	56,0	14,9	52,7	16,8	49,4	18,7	46,1	20,5	44,6	20,6	41,2	22,3
	7	61,0	13,2	57,6	15,0	54,2	16,9	50,8	18,8	47,4	20,7	45,9	20,8	42,3	22,5
	8	62,6	13,3	59,1	15,1	55,7	17,0	52,2	18,9	48,7	20,8	47,1	20,9	-	-
	9	64,3	13,4	60,7	15,3	57,2	17,2	53,6	19,1	50,0	21,0	48,4	21,1	-	-
	10	65,9	13,4	62,3	15,4	58,6	17,3	55,0	19,2	51,3	21,1	49,6	21,2	-	-
60.2	11	67,6	13,5	63,8	15,5	60,1	17,4	56,3	19,3	52,6	21,3	50,9	21,4	-	-
	12	69,3	13,6	65,4	15,6	61,6	17,5	57,7	19,5	53,9	21,4	52,1	21,5	-	-
	5	62,6	13,9	59,1	15,8	55,7	17,8	52,2	19,8	48,7	21,8	47,1	21,8	43,5	23,6
	6	64,4	14,0	60,8	16,0	57,3	18,0	53,7	20,0	50,1	21,9	48,5	21,9	44,7	23,7
	7	66,2	14,1	62,5	16,1	58,9	18,1	55,2	20,1	51,5	22,1	49,9	22,1	46,0	23,9
	8	68,0	14,2	64,2	16,2	60,5	18,2	56,7	20,2	52,9	22,3	51,2	22,2	-	-
	9	69,9	14,3	66,0	16,3	62,1	18,4	58,2	20,4	54,3	22,4	52,6	22,4	-	-
70.2	10	71,7	14,4	67,7	16,4	63,7	18,5	59,7	20,5	55,7	22,6	53,9	22,6	-	-
	11	73,5	14,5	69,4	16,5	65,3	18,6	61,2	20,7	57,1	22,8	55,3	22,7	-	-
	12	75,3	14,6	71,1	16,7	66,9	18,7	62,7	20,8	58,5	22,9	56,7	22,9	-	-
	5	73,2	16,3	69,1	18,7	65,1	21,0	61,0	23,4	56,9	25,7	55,1	25,8	50,8	27,9
	6	75,3	16,5	71,1	18,8	66,9	21,2	62,7	23,5	58,5	25,9	56,7	26,0	52,3	28,1
	7	77,4	16,6	73,1	19,0	68,8	21,3	64,5	23,7	60,2	26,1	58,3	26,2	53,8	28,3
	8	79,5	16,7	75,1	19,1	70,7	21,5	66,3	23,9	61,8	26,3	59,9	26,4	-	-
80.2	9	81,6	16,8	77,1	19,2	72,6	21,6	68,0	24,0	63,5	26,4	61,4	26,5	-	-
	10	83,7	17,0	79,1	19,4	74,5	21,8	69,8	24,2	65,1	26,6	63,0	26,7	-	-
	11	85,8	17,1	81,1	19,5	76,3	22,0	71,5	24,4	66,7	26,8	64,6	26,9	-	-
	12	88,0	17,2	83,0	19,6	78,2	22,1	73,3	24,6	68,4	27,0	66,2	27,1	-	-
	5	80,7	18,5	76,2	21,1	71,7	23,8	67,2	26,4	62,7	29,1	60,7	29,2	56,0	31,6
	6	83,0	18,6	78,4	21,3	73,8	23,9	69,2	26,6	64,5	29,3	62,5	29,4	57,7	31,9
	7	85,3	18,8	80,6	21,4	75,9	24,1	71,1	26,8	66,3	29,5	64,2	29,6	59,3	32,1
90.2	8	87,6	18,9	82,8	21,6	77,9	24,3	73,0	27,0	68,1	29,7	66,0	29,9	-	-
	9	90,0	19,0	85,0	21,8	80,0	24,5	75,0	27,2	70,0	29,9	67,7	30,1	-	-
	10	92,3	19,2	87,1	21,9	82,1	24,6	76,9	27,4	71,8	30,1	69,5	30,3	-	-
	11	94,6	19,3	89,3	22,1	84,1	24,8	78,9	27,6	73,6	30,3	71,3	30,5	-	-
	12	97,0	19,4	91,5	22,2	86,2	25,0	80,8	27,8	75,4	30,6	73,0	30,7	-	-
	5	97,1	21,4	91,7	24,4	86,4	27,5	80,9	30,5	75,5	33,6	73,1	33,1	67,5	35,9
	6	99,9	21,5	94,3	24,6	88,8	27,7	83,3	30,8	77,7	33,9	75,2	33,4	69,4	36,1
100.2	7	103	21,7	97,0	24,8	91,3	27,9	85,6	31,0	79,9	34,1	77,3	33,6	71,4	36,4
	8	106	21,9	99,6	25,0	93,8	28,1	87,9	31,2	82,0	34,3	79,4	33,8	-	-
	9	108	22,0	102	25,2	96,3	28,3	90,3	31,5	84,2	34,6	81,6	34,1	-	-
	10	111	22,2	105	25,3	98,8	28,5	92,6	31,7	86,4	34,8	83,7	34,3	-	-
	11	114	22,3	108	25,5	101	28,7	94,9	31,9	88,6	35,1	85,8	34,6	-	-
	12	117	22,5	110	25,7	104	28,9	97,3	32,1	90,8	35,3	87,9	34,8	-	-
	5	108	23,9	102	27,3	95,8	30,7	89,8	34,1	83,8	37,5	81,2	37,1	74,9	40,2
100.2	6	111	24,0	105	27,5	98,6	30,9	92,4	34,3	86,2	37,8	83,5	37,4	77,0	40,5
	7	114	24,2	108	27,7	101	31,1	95,0	34,6	88,6	38,1	85,8	37,7	79,2	40,8
	8	117	24,4	111	27,9	104	31,4	97,6	34,9	91,1	38,3	88,2	38,0	-	-
	9	120	24,6	114	28,1	107	31,6	100	35,1	93,5	38,6	90,5	38,2	-	-
	10	123	24,7	116	28,3	110	31,8	103	35,4	95,9	38,9	92,9	38,5	-	-
	11	126	24,9	119	28,5	112	32,0	105	35,6	98,3	39,2	95,2	38,8	-	-
	12	130	25,1	122	28,7	115	32,3	108	35,9	101	39,4	97,5	39,1	-	-

TW= Outlet water temperature °C

kWf = Cooling capacity (kW)

kWa = Compressor power input (kW)

kWt = Heating capacity (kW)

The standard performances refer to a 5°C temperature difference between the water entering and leaving the heat exchanger and to operation of the unit with all fans at nominal or maximum speed. A 0.44×10^{-4} m² K/W fouling factor has also been considered with the unit installed at zero meters above sea level (Pb = 1013mbar).

The performances are declared no considering any correction due to water flow rate and water side pressure drop (gross performance).

(1) : at these temperatures the fans are at maximum speed.

(2) : ATC (Advanced Temperature Control) function may occur, if present.

TECHNICAL DATA - BASE VERSION (VB)

Mod. 115.2 ÷ 200.2

MOD.	TW	OUTDOOR AIR TEMPERATURE (°C D.B.)													
		20		25		30		35		40		45 (1)		50 (1) (2)	
		kWf	kWa	kWf	kWa	kWf	kWa	kWf	kWa	kWf	kWa	kWf	kWa	kWf	kWa
115.2	5	120	26,8	114	30,6	107	34,4	100	38,2	93,5	42,1	90,2	41,9	83,2	45,4
	6	124	27,0	117	30,8	110	34,7	103	38,5	96,2	42,4	92,8	42,2	85,6	45,7
	7	127	27,2	120	31,0	113	34,9	106	38,8	98,9	42,7	95,4	42,5	88,0	46,0
	8	131	27,4	123	31,3	116	35,2	109	39,1	102	43,0	98,0	42,8	-	-
	9	134	27,6	127	31,5	119	35,4	112	39,4	104	43,3	101	43,1	-	-
	10	138	27,8	130	31,7	122	35,7	115	39,6	107	43,6	103	43,4	-	-
	12	145	28,1	136	32,2	129	36,2	120	40,2	112	44,2	108	44,0	-	-
130.2	5	133	30,1	125	34,5	118	38,8	111	43,1	103	47,4	100	47,3	92,3	51,2
	6	137	30,4	129	34,7	121	39,0	114	43,4	106	47,7	103	47,7	94,9	51,6
	7	140	30,6	133	35,0	125	39,3	117	43,7	109	48,1	106	48,0	97,6	52,0
	8	144	30,8	136	35,2	128	39,6	120	44,0	112	48,4	109	48,3	-	-
	9	148	31,0	140	35,5	132	39,9	123	44,3	115	48,8	112	48,7	-	-
	10	152	31,3	143	35,7	135	40,2	127	44,7	118	49,1	114	49,0	-	-
	11	156	31,5	147	36,0	138	40,5	130	45,0	121	49,5	117	49,4	-	-
145.2	5	150	33,5	141	38,2	133	43,0	125	47,8	116	52,6	113	51,9	104	56,2
	6	154	33,7	145	38,5	137	43,3	128	48,1	120	53,0	116	52,3	107	56,7
	7	158	34,0	150	38,8	141	43,7	132	48,5	123	53,4	120	52,7	110	57,1
	8	163	34,2	154	39,1	145	44,0	136	48,9	127	53,7	123	53,1	-	-
	9	167	34,4	158	39,4	149	44,3	139	49,2	130	54,1	126	53,4	-	-
	10	171	34,7	162	39,6	152	44,6	143	49,6	133	54,5	129	53,8	-	-
	12	180	35,2	170	40,2	160	45,2	150	50,3	140	55,3	136	54,6	-	-
160.2	5	168	37,7	159	43,1	149	48,5	140	53,9	131	59,3	126	58,9	116	63,8
	6	173	38,0	163	43,4	154	48,9	144	54,3	134	59,7	130	59,3	120	64,3
	7	178	38,3	168	43,8	158	49,2	148	54,7	138	60,2	134	59,8	123	64,7
	8	182	38,6	172	44,1	162	49,6	152	55,1	142	60,6	137	60,2	-	-
	9	187	38,8	177	44,4	167	49,9	156	55,5	146	61,0	141	60,6	-	-
	10	192	39,1	181	44,7	171	50,3	160	55,9	149	61,5	144	61,1	-	-
	12	197	39,4	186	45,0	175	50,7	164	56,3	153	61,9	148	61,5	-	-
180.2	5	194	42,0	183	48,0	173	54,0	162	60,0	151	66,0	146	65,0	135	70,5
	6	200	42,3	188	48,4	177	54,4	166	60,5	155	66,5	150	65,5	139	71,0
	7	205	42,6	194	48,7	182	54,8	171	60,9	160	67,0	154	66,0	142	71,5
	8	211	42,9	199	49,1	187	55,2	176	61,3	164	67,5	159	66,5	-	-
	9	216	43,3	204	49,4	192	55,6	180	61,8	168	68,0	163	67,0	-	-
	10	222	43,6	210	49,8	197	56,0	185	62,2	173	68,5	167	67,4	-	-
	12	228	43,9	215	50,1	202	56,4	190	62,7	177	68,9	171	67,9	-	-
200.2	5	216	47,5	204	54,3	192	61,1	180	67,9	168	74,7	162	73,9	150	80,1
	6	222	47,9	209	54,7	197	61,6	185	68,4	172	75,2	167	74,5	154	80,7
	7	228	48,2	215	55,1	203	62,0	190	68,9	177	75,8	172	75,0	158	81,3
	8	234	48,6	221	55,5	208	62,5	195	69,4	182	76,3	176	75,5	-	-
	9	240	48,9	227	55,9	214	62,9	200	69,9	187	76,9	181	76,1	-	-
	10	247	49,3	233	56,3	219	63,4	206	70,4	192	77,4	186	76,6	-	-
	12	253	49,6	239	56,7	225	63,8	211	70,9	197	78,0	190	77,2	-	-
		259	50,0	245	57,1	230	64,3	216	71,4	201	78,5	195	77,7	-	-

Tw= Outlet water temperature °C
kWf = Cooling capacity (kW)

kWa = Compressor power input (kW)
kWt = Heating capacity (kW)

The standard performances refer to a 5°C temperature difference between the water entering and leaving the heat exchanger and to operation of the unit with all fans at nominal or maximum speed. A 0.44×10^{-4} m² K/W fouling factor has also been considered with the unit installed at zero meters above sea level (Pb = 1013mbar).

The performances are declared no considering any correction due to water flow rate and water side pressure drop (gross performance).

(1) : at these temperatures the fans are at maximum speed.

(2) : ATC (Advanced Temperature Control) function may occur, if present.

TECHNICAL DATA - BASE VERSION (VB)

Standard performances in cooling mode IP - Extra low noise setting up (AX)

Mod. 40.2 ÷ 100.2

MOD.	TW	OUTDOOR AIR TEMPERATURE (°C D.B.)													
		20		25		30		35		40		45 (1)		50 (1) (2)	
		kWf	kWa	kWf	kWa	kWf	kWa	kWf	kWa	kWf	kWa	kWf	kWa	kWf	kWa
40.2	5	46,7	11,2	44,1	12,8	41,6	14,4	39,0	16,0	36,3	17,6	37,0	16,1	34,1	17,4
	6	48,1	11,3	45,4	12,9	42,8	14,5	40,1	16,1	37,4	17,7	38,0	16,2	35,1	17,5
	7	49,4	11,3	46,7	13,0	44,0	14,6	41,2	16,2	38,4	17,8	39,1	16,3	36,1	17,7
	8	50,8	11,4	48,0	13,1	45,2	14,7	42,3	16,3	39,5	17,9	40,2	16,4	-	-
	9	52,1	11,5	49,2	13,1	46,4	14,8	43,4	16,4	40,5	18,1	41,2	16,5	-	-
	10	53,5	11,6	50,5	13,2	47,6	14,9	44,6	16,6	41,6	18,2	42,3	16,7	-	-
	11	54,8	11,7	51,8	13,3	48,8	15,0	45,7	16,7	42,6	18,3	43,4	16,8	-	-
50.2	5	56,4	13,8	53,2	15,8	50,1	17,7	47,0	19,7	43,8	21,7	44,7	19,8	41,2	21,5
	6	58,0	13,9	54,8	15,9	51,6	17,9	48,3	19,9	45,1	21,8	46,0	20,0	42,4	21,7
	7	59,6	14,0	56,3	16,0	53,0	18,0	49,7	20,0	46,4	22,0	47,2	20,1	43,6	21,8
	8	61,3	14,1	57,8	16,1	54,5	18,1	51,1	20,1	47,6	22,2	48,5	20,3	-	-
	9	62,9	14,2	59,4	16,2	55,9	18,3	52,4	20,3	48,9	22,3	49,8	20,4	-	-
	10	64,5	14,3	60,9	16,3	57,4	18,4	53,8	20,4	50,2	22,5	51,1	20,6	-	-
	11	66,1	14,4	62,5	16,5	58,8	18,5	55,1	20,6	51,4	22,6	52,4	20,7	-	-
60.2	5	61,4	14,8	58,0	16,9	54,6	19,1	51,1	21,2	47,7	23,3	48,5	21,1	44,8	22,9
	6	63,1	14,9	59,6	17,1	56,2	19,2	52,6	21,3	49,1	23,5	49,9	21,3	46,1	23,0
	7	64,9	15,1	61,3	17,2	57,7	19,4	54,1	21,5	50,5	23,7	51,3	21,4	47,4	23,2
	8	66,7	15,2	63,0	17,3	59,3	19,5	55,6	21,7	51,9	23,8	52,7	21,6	-	-
	9	68,5	15,3	64,6	17,5	60,9	19,6	57,1	21,8	53,2	24,0	54,1	21,7	-	-
	10	70,2	15,4	66,3	17,6	62,4	19,8	58,5	22,0	54,6	24,2	55,5	21,9	-	-
	11	72,0	15,5	68,0	17,7	64,0	19,9	60,0	22,1	56,0	24,3	56,9	22,0	-	-
70.2	5	71,7	17,5	67,7	19,9	63,8	22,4	59,8	24,9	55,7	27,4	56,7	25,0	52,4	27,1
	6	73,8	17,6	69,7	20,1	65,6	22,6	61,5	25,1	57,4	27,6	58,4	25,2	53,9	27,3
	7	75,8	17,7	71,6	20,2	67,4	22,8	63,2	25,3	59,0	27,8	60,0	25,4	55,4	27,5
	8	77,9	17,8	73,6	20,4	69,3	22,9	64,9	25,5	60,6	28,0	61,6	25,6	-	-
	9	80,0	18,0	75,5	20,5	71,1	23,1	66,6	25,7	62,2	28,2	63,3	25,7	-	-
	10	82,0	18,1	77,5	20,7	73,0	23,3	68,4	25,9	63,8	28,4	64,9	25,9	-	-
	11	84,1	18,2	79,4	20,8	74,8	23,4	70,1	26,0	65,4	28,6	66,6	26,1	-	-
80.2	5	79,1	19,7	74,7	22,5	70,3	25,4	65,9	28,2	61,5	31,0	62,6	28,3	57,7	30,7
	6	81,4	19,9	76,8	22,7	72,3	25,6	67,8	28,4	63,3	31,2	64,4	28,5	59,4	30,9
	7	83,6	20,0	79,0	22,9	74,4	25,7	69,7	28,6	65,0	31,5	66,2	28,8	61,1	31,1
	8	85,9	20,2	81,1	23,0	76,4	25,9	71,6	28,8	66,8	31,7	68,0	29,0	-	-
	9	88,2	20,3	83,3	23,2	78,4	26,1	73,5	29,0	68,6	31,9	69,8	29,2	-	-
	10	90,5	20,5	85,4	23,4	80,5	26,3	75,4	29,2	70,4	32,1	71,6	29,4	-	-
	11	92,8	20,6	87,6	23,5	82,5	26,5	77,3	29,4	72,1	32,4	73,4	29,6	-	-
90.2	5	95,1	22,9	89,8	26,2	84,5	29,4	79,2	32,7	73,9	36,0	75,3	32,1	69,5	34,8
	6	97,8	23,1	92,4	26,4	87,0	29,7	81,5	33,0	76,1	36,3	77,5	32,4	71,5	35,1
	7	101	23,2	94,9	26,6	89,4	29,9	83,8	33,2	78,2	36,5	79,7	32,6	73,5	35,3
	8	103	23,4	97,5	26,8	91,9	30,1	86,1	33,4	80,3	36,8	81,8	32,8	-	-
	9	106	23,6	100	26,9	94,3	30,3	88,4	33,7	82,5	37,1	84,0	33,1	-	-
	10	109	23,7	103	27,1	96,7	30,5	90,7	33,9	84,6	37,3	86,2	33,3	-	-
	11	112	23,9	105	27,3	99,2	30,7	92,9	34,2	86,7	37,6	88,3	33,5	-	-
100.2	5	106	25,5	99,7	29,2	93,9	32,8	88,0	36,5	82,1	40,1	83,6	36,0	77,1	39,0
	6	109	25,7	103	29,4	96,6	33,1	90,6	36,7	84,5	40,4	86,0	36,3	79,4	39,3
	7	112	25,9	105	29,6	99,3	33,3	93,1	37,0	86,9	40,7	88,4	36,5	81,6	39,6
	8	115	26,1	108	29,8	102	33,5	95,6	37,3	89,2	41,0	90,8	36,8	-	-
	9	118	26,3	111	30,0	105	33,8	98,2	37,5	91,6	41,3	93,2	37,1	-	-
	10	121	26,5	114	30,2	107	34,0	101	37,8	94,0	41,6	95,6	37,3	-	-
	11	124	26,7	117	30,5	110	34,3	103	38,1	96,3	41,9	98,1	37,6	-	-
	12	127	26,8	120	30,7	113	34,5	106	38,3	98,7	42,2	100	37,9	-	-

TW= Outlet water temperature °C

kWa = Compressor power input (kW)

kWf = Cooling capacity (kW)

kWt = Heating capacity (kW)

The standard performances refer to a 5°C temperature difference between the water entering and leaving the heat exchanger and to operation of the unit with all fans at nominal or maximum speed. A 0.44 x 10⁻⁴ m² K/W fouling factor has also been considered with the unit installed at zero meters above sea level (Pb = 1013mbar).

The performances are declared no considering any correction due to water flow rate and water side pressure drop (gross performance).

(1) : at these temperatures the fans are at maximum speed.

(2) : ATC (Advanced Temperature Control) function may occur, if present.

TECHNICAL DATA - BASE VERSION (VB)

Mod. 115.2 ÷ 200.2

MOD.	TW	OUTDOOR AIR TEMPERATURE (°C D.B.)													
		20		25		30		35		40		45 (1)		50 (1) (2)	
		kWf	kWa	kWf	kWa	kWf	kWa	kWf	kWa	kWf	kWa	kWf	kWa	kWf	kWa
115.2	5	117	28,6	110	32,7	104	36,8	97,4	40,9	90,9	45,0	92,9	40,6	85,7	44,0
	6	120	28,8	114	33,0	107	37,1	100	41,2	93,5	45,3	95,6	40,9	88,2	44,3
	7	124	29,1	117	33,2	110	37,4	103	41,5	96,1	45,7	98,2	41,2	90,6	44,6
	8	127	29,3	120	33,4	113	37,6	106	41,8	98,7	46,0	101	41,5	-	-
	9	130	29,5	123	33,7	116	37,9	109	42,1	101	46,3	104	41,8	-	-
	10	134	29,7	126	33,9	119	38,2	111	42,4	104	46,6	106	42,1	-	-
	11	137	29,9	129	34,2	122	38,4	114	42,7	107	47,0	109	42,4	-	-
12	140	30,1	133	34,4	125	38,7	117	43,0	109	47,3	112	42,7	-	-	
130.2	5	130	32,1	123	36,7	116	41,3	109	45,9	101	50,5	103	45,9	95,0	49,7
	6	134	32,4	127	37,0	119	41,6	112	46,3	104	50,9	106	46,2	97,8	50,1
	7	138	32,6	130	37,3	123	41,9	115	46,6	107	51,3	109	46,6	101	50,4
	8	142	32,9	134	37,6	126	42,2	118	46,9	110	51,6	112	46,9	-	-
	9	146	33,1	137	37,8	129	42,6	121	47,3	113	52,0	115	47,2	-	-
	10	149	33,3	141	38,1	133	42,9	124	47,6	116	52,4	118	47,6	-	-
	11	153	33,6	145	38,4	136	43,2	128	48,0	119	52,8	121	47,9	-	-
12	157	33,8	148	38,6	139	43,5	131	48,3	122	53,1	124	48,3	-	-	
145.2	5	147	35,9	139	41,0	131	46,1	123	51,2	115	56,4	117	50,4	108	54,6
	6	152	36,1	143	41,3	135	46,5	126	51,6	118	56,8	120	50,7	111	55,0
	7	156	36,4	147	41,6	139	46,8	130	52,0	121	57,2	123	51,1	114	55,4
	8	160	36,7	151	41,9	142	47,1	134	52,4	125	57,6	127	51,5	-	-
	9	165	36,9	155	42,2	146	47,5	137	52,8	128	58,0	130	51,8	-	-
	10	169	37,2	159	42,5	150	47,8	141	53,1	131	58,4	133	52,2	-	-
	11	173	37,5	163	42,8	154	48,2	144	53,5	135	58,9	137	52,6	-	-
12	177	37,7	167	43,1	158	48,5	148	53,9	138	59,3	140	53,0	-	-	
160.2	5	165	40,4	155	46,2	146	52,0	137	57,7	128	63,5	130	57,1	120	61,9
	6	169	40,7	160	46,5	150	52,4	141	58,2	132	64,0	134	57,5	123	62,3
	7	174	41,0	164	46,9	155	52,7	145	58,6	135	64,5	138	58,0	127	62,8
	8	179	41,3	169	47,2	159	53,1	149	59,0	139	64,9	141	58,4	-	-
	9	183	41,6	173	47,6	163	53,5	153	59,5	143	65,4	145	58,8	-	-
	10	188	41,9	178	47,9	167	53,9	157	59,9	146	65,9	149	59,2	-	-
	11	193	42,2	182	48,2	172	54,3	161	60,3	150	66,3	153	59,7	-	-
12	198	42,5	187	48,6	176	54,7	165	60,7	154	66,8	156	60,1	-	-	
180.2	5	189	45,1	179	51,6	168	58,0	158	64,4	147	70,9	150	63,1	139	68,3
	6	195	45,4	184	51,9	173	58,4	162	64,9	152	71,4	155	63,6	143	68,9
	7	200	45,8	189	52,3	178	58,9	167	65,4	156	71,9	159	64,0	147	69,4
	8	206	46,1	194	52,7	183	59,3	172	65,9	160	72,5	163	64,5	-	-
	9	211	46,4	200	53,1	188	59,7	176	66,4	164	73,0	168	65,0	-	-
	10	217	46,8	205	53,5	193	60,1	181	66,8	169	73,5	172	65,4	-	-
	11	222	47,1	210	53,8	198	60,6	185	67,3	173	74,0	176	65,9	-	-
12	228	47,4	215	54,2	202	61,0	190	67,8	177	74,6	181	66,3	-	-	
200.2	5	211	50,9	199	58,2	188	65,5	176	72,7	164	80,0	167	71,7	154	77,7
	6	217	51,3	205	58,6	193	65,9	181	73,3	169	80,6	172	72,2	159	78,2
	7	223	51,7	211	59,0	198	66,4	186	73,8	174	81,2	177	72,8	163	78,8
	8	229	52,0	216	59,5	204	66,9	191	74,3	178	81,8	182	73,3	-	-
	9	235	52,4	222	59,9	209	67,4	196	74,9	183	82,4	186	73,8	-	-
	10	241	52,8	228	60,3	215	67,9	201	75,4	188	83,0	191	74,3	-	-
	11	248	53,2	234	60,8	220	68,4	206	75,9	192	83,5	196	74,9	-	-
12	254	53,5	239	61,2	226	68,8	211	76,5	197	84,1	201	75,4	-	-	

TW= Outlet water temperature °C
kWf = Cooling capacity (kW)

kWa = Compressor power input (kW)
kWt = Heating capacity (kW)

The standard performances refer to a 5°C temperature difference between the water entering and leaving the heat exchanger and to operation of the unit with all fans at nominal or maximum speed. A 0.44×10^{-4} m² K/W fouling factor has also been considered with the unit installed at zero meters above sea level (Pb = 1013mbar).

The performances are declared no considering any correction due to water flow rate and water side pressure drop (gross performance).

(1) : at these temperatures the fans are at maximum speed.

(2) : ATC (Advanced Temperature Control) function may occur, if present.

TECHNICAL DATA - BASE VERSION (VB)

Standard performances in heating mode IP - Base setting up (AB)

MOD.	TW	OUTDOOR AIR TEMPERATURE (°C W.B.)													
		-6		-2		2		6		9		12		15	
		kWt	kWa	kWt	kWa	kWt	kWa	kWt	kWa	kWt	kWa	kWt	kWa	kWt	kWa
40.2	30	38,7	9,57	44,4	9,67	49,0	9,77	51,6	9,87	56,1	10,0	60,9	10,1	66,1	10,2
	35	38,0	10,9	43,6	11,1	48,1	11,2	50,7	11,3	55,1	11,4	59,8	11,5	64,9	11,6
	40	36,7	12,2	42,1	12,3	46,5	12,4	49,0	12,5	53,3	12,7	57,8	12,8	62,7	12,9
	45	35,9	13,7	41,1	13,8	45,4	14,0	47,8	14,1	52,0	14,2	56,4	14,4	61,2	14,5
	50	34,8	15,3	39,9	15,5	44,0	15,6	46,4	15,8	50,4	15,9	54,7	16,1	59,3	16,3
50.2	30	46,6	11,7	53,4	11,9	59,0	12,0	62,1	12,1	67,5	12,2	73,3	12,4	79,5	12,5
	35	45,7	13,4	52,4	13,6	57,9	13,7	61,0	13,8	66,3	14,0	71,9	14,1	78,0	14,3
	40	44,2	14,9	50,7	15,1	56,0	15,2	58,9	15,4	64,1	15,6	69,5	15,7	75,4	15,9
	45	43,1	16,8	49,5	17,0	54,6	17,1	57,5	17,3	62,5	17,5	67,9	17,6	73,6	17,8
	50	41,8	18,8	48,0	19,0	53,0	19,2	55,8	19,4	60,6	19,6	65,8	19,8	71,4	20,0
60.2	30	50,7	12,6	58,1	12,7	64,2	12,8	67,6	13,0	73,5	13,1	79,8	13,2	86,5	13,3
	35	49,8	14,4	57,1	14,5	63,0	14,7	66,4	14,8	72,1	14,9	78,3	15,1	84,9	15,2
	40	48,1	16,0	55,2	16,1	61,0	16,3	64,2	16,5	69,7	16,6	75,7	16,8	82,1	17,0
	45	47,0	17,9	53,8	18,1	59,5	18,3	62,6	18,5	68,0	18,7	73,9	18,9	80,1	19,1
	50	45,5	20,1	52,2	20,3	57,7	20,5	60,7	20,7	66,0	20,9	71,7	21,1	77,7	21,3
70.2	30	59,8	14,9	68,5	15,0	75,7	15,2	79,7	15,3	86,6	15,5	94,1	15,6	102	15,8
	35	58,7	17,0	67,3	17,2	74,3	17,3	78,2	17,5	85,0	17,7	92,3	17,9	100	18,0
	40	56,7	18,9	65,1	19,1	71,9	19,3	75,6	19,5	82,2	19,7	89,3	19,9	96,8	20,1
	45	55,4	21,2	63,5	21,5	70,1	21,7	73,8	21,9	80,2	22,1	87,1	22,3	94,5	22,6
	50	53,7	23,8	61,6	24,0	68,0	24,3	71,6	24,5	77,8	24,8	84,5	25,0	91,6	25,3
80.2	30	66,7	17,0	76,4	17,2	84,4	17,4	88,9	17,6	96,6	17,7	105	17,9	114	18,1
	35	65,4	19,5	75,0	19,7	82,9	19,9	87,2	20,1	94,8	20,3	103	20,5	112	20,7
	40	63,3	21,7	72,5	21,9	80,1	22,1	84,4	22,3	91,7	22,6	99,5	22,8	108	23,0
	45	61,7	24,3	70,8	24,6	78,2	24,8	82,3	25,1	89,5	25,4	97,1	25,6	105	25,9
	50	59,9	27,3	68,7	27,5	75,8	27,8	79,8	28,1	86,8	28,4	94,2	28,7	102	29,0
90.2	30	79,9	19,7	91,7	19,9	101	20,1	107	20,3	116	20,5	126	20,7	136	20,9
	35	78,5	22,5	90,0	22,7	99,4	23,0	105	23,2	114	23,4	123	23,7	134	23,9
	40	75,9	25,0	87,0	25,3	96,1	25,6	101	25,8	110	26,1	119	26,3	129	26,6
	45	74,0	28,1	84,9	28,4	93,8	28,7	98,7	29,0	107	29,3	116	29,6	126	29,9
	50	71,8	31,5	82,3	31,8	91,0	32,2	95,7	32,5	104	32,8	113	33,1	123	33,5
100.2	30	88,3	21,3	101	21,5	112	21,8	118	22,0	128	22,2	139	22,4	151	22,6
	35	86,7	24,4	99,4	24,6	110	24,9	116	25,1	126	25,4	136	25,6	148	25,9
	40	83,8	27,1	96,1	27,4	106	27,7	112	27,9	121	28,2	132	28,5	143	28,8
	45	81,8	30,5	93,7	30,8	104	31,1	109	31,4	118	31,7	129	32,0	140	32,3
	50	79,3	34,1	90,9	34,5	100	34,8	106	35,2	115	35,5	125	35,9	135	36,2
115.2	30	100	24,7	115	25,0	127	25,2	134	25,5	146	25,7	158	26,0	171	26,2
	35	98,6	28,2	113	28,5	125	28,8	131	29,1	143	29,4	155	29,7	168	30,0
	40	95,3	31,4	109	31,7	121	32,1	127	32,4	138	32,7	150	33,0	163	33,4
	45	93,0	35,3	107	35,7	118	36,0	124	36,4	135	36,8	146	37,1	159	37,5
	50	90,2	39,5	103	40,0	114	40,4	120	40,8	131	41,2	142	41,6	154	42,0
130.2	30	109	27,2	125	27,5	139	27,8	146	28,1	158	28,4	172	28,6	187	28,9
	35	107	31,1	123	31,4	136	31,8	143	32,1	156	32,4	169	32,7	183	33,0
	40	104	34,6	119	35,0	131	35,3	138	35,7	150	36,0	163	36,4	177	36,8
	45	101	38,9	116	39,3	128	39,7	135	40,1	147	40,5	159	40,9	173	41,3
	50	98,2	43,6	113	44,0	124	44,5	131	44,9	142	45,4	155	45,8	168	46,3
145.2	30	124	30,6	142	30,9	157	31,3	165	31,6	180	31,9	195	32,2	212	32,5
	35	122	35,0	139	35,4	154	35,7	162	36,1	176	36,4	191	36,8	208	37,2
	40	118	38,9	135	39,3	149	39,7	157	40,1	170	40,5	185	40,9	201	41,3
	45	115	43,7	132	44,2	145	44,6	153	45,1	166	45,6	181	46,0	196	46,5
	50	111	49,0	128	49,5	141	50,0	148	50,5	161	51,0	175	51,5	190	52,0
160.2	30	139	34,0	159	34,3	175	34,7	185	35,0	201	35,4	218	35,7	236	36,1
	35	136	38,8	156	39,2	172	39,6	181	40,0	197	40,4	214	40,8	232	41,2
	40	131	43,2	151	43,6	167	44,1	175	44,5	191	44,9	207	45,4	224	45,8
	45	128	48,5	147	49,0	162	49,5	171	50,0	186	50,5	202	51,0	219	51,5
	50	124	54,3	143	54,9	158	55,4	166	56,0	180	56,6	196	57,1	212	57,7
180.2	30	158	38,2	181	38,6	200	38,9	211	39,3	229	39,7	249	40,1	270	40,5
	35	155	43,6	178	44,1	196	44,5	207	45,0	225	45,4	244	45,9	265	46,3
	40	150	48,5	172	49,0	190	49,5	200	50,0	217	50,5	236	51,0	256	51,5
	45	146	54,5	168	55,1	185	55,6	195	56,2	212	56,8	230	57,3	250	57,9
	50	142	61,1	163	61,7	180	62,3	189	62,9	206	63,6	223	64,2	242	64,8
200.2	30	173	42,5	199	42,9	220	43,4	231	43,8	251	44,3	273	44,7	296	45,1
	35	170	48,6	195	49,1	215	49,6	227	50,1	247	50,6	268	51,1	290	51,6
	40	165	54,0	189	54,6	208	55,2	219	55,7	238	56,3	259	56,8	281	57,4
	45	161	60,7	184	61,3	203	62,0	214	62,6	233	63,2	253	63,9	274	64,5
	50	156	68,0	179	68,7	197	69,4	208	70,1	226	70,8	245	71,5	266	72,2

TW= Outlet water temperature °C

kWf = Cooling capacity (kW)

kWa = Compressor power input (kW)

kWt = Heating capacity (kW)

The standard performances refer to a 5°C temperature difference between the water entering and leaving the heat exchanger and to operation of the unit with all fans at nominal or maximum speed. A 0.44 x 10⁻⁴ m² K/W fouling factor has also been considered with the unit installed at zero meters above sea level (Pb = 1013mbar).

The performances are declared no considering any correction due to water flow rate and water side pressure drop (gross performance).

TECHNICAL DATA - BASE VERSION (VB)

Standard performances in heating mode IP - Low noise setting up (AS)

MOD.	TW	OUTDOOR AIR TEMPERATURE (°C W.B.)													
		-6 (1)		-2 (1)		2 (1)		6		9		12		15	
		kWt	kWa	kWt	kWa	kWt	kWa	kWt	kWa	kWt	kWa	kWt	kWa	kWt	kWa
40.2	30	38,7	9,57	44,4	9,67	49,0	9,77	50,3	9,66	54,7	9,76	59,4	9,85	64,4	9,95
	35	38,0	10,9	43,6	11,1	48,1	11,2	49,4	11,0	53,7	11,2	58,3	11,3	63,2	11,4
	40	36,7	12,2	42,1	12,3	46,5	12,4	47,8	12,3	51,9	12,4	56,4	12,5	61,1	12,7
	45	35,9	13,7	41,1	13,8	45,4	14,0	46,6	13,8	50,7	13,9	55,0	14,1	59,6	14,2
	50	34,8	15,3	39,9	15,5	44,0	15,6	45,2	15,5	49,1	15,6	53,3	15,8	57,9	15,9
50.2	30	46,6	11,7	53,4	11,9	59,0	12,0	60,5	11,8	65,7	11,9	71,4	12,1	77,4	12,2
	35	45,7	13,4	52,4	13,6	57,9	13,7	59,4	13,5	64,5	13,7	70,0	13,8	76,0	13,9
	40	44,2	14,9	50,7	15,1	56,0	15,2	57,4	15,0	62,4	15,2	67,7	15,3	73,5	15,5
	45	43,1	16,8	49,5	17,0	54,6	17,1	56,0	16,9	60,9	17,1	66,1	17,2	71,7	17,4
	50	41,8	18,8	48,0	19,0	53,0	19,2	54,3	18,9	59,0	19,1	64,1	19,3	69,5	19,5
60.2	30	50,7	12,6	58,1	12,7	64,2	12,8	66,0	12,7	71,7	12,8	77,9	12,9	84,5	13,1
	35	49,8	14,4	57,1	14,5	63,0	14,7	64,8	14,5	70,4	14,6	76,4	14,8	82,9	14,9
	40	48,1	16,0	55,2	16,1	61,0	16,3	62,6	16,1	68,1	16,3	73,9	16,4	80,2	16,6
	45	47,0	17,9	53,8	18,1	59,5	18,3	61,1	18,1	66,4	18,3	72,1	18,5	78,2	18,6
	50	45,5	20,1	52,2	20,3	57,7	20,5	59,3	20,3	64,4	20,5	69,9	20,7	75,9	20,9
70.2	30	59,8	14,9	68,5	15,0	75,7	15,2	77,7	14,9	84,4	15,1	91,6	15,2	99,4	15,4
	35	58,7	17,0	67,3	17,2	74,3	17,3	76,2	17,0	82,8	17,2	89,9	17,4	97,6	17,6
	40	56,7	18,9	65,1	19,1	71,9	19,3	73,7	19,0	80,1	19,1	87,0	19,3	94,3	19,5
	45	55,4	21,2	63,5	21,5	70,1	21,7	71,9	21,3	78,2	21,5	84,8	21,7	92,0	21,9
	50	53,7	23,8	61,6	24,0	68,0	24,3	69,7	23,9	75,8	24,1	82,3	24,3	89,3	24,6
80.2	30	66,7	17,0	76,4	17,2	84,4	17,4	86,6	17,1	94,2	17,3	102	17,4	111	17,6
	35	65,4	19,5	75,0	19,7	82,9	19,9	85,0	19,5	92,4	19,7	100	19,9	109	20,1
	40	63,3	21,7	72,5	21,9	80,1	22,1	82,2	21,7	89,4	21,9	97,0	22,2	105	22,4
	45	61,7	24,3	70,8	24,6	78,2	24,8	80,2	24,4	87,2	24,6	94,6	24,9	103	25,1
	50	59,9	27,3	68,7	27,5	75,8	27,8	77,8	27,3	84,6	27,6	91,8	27,9	99,6	28,1
90.2	30	79,9	19,7	91,7	19,9	101	20,1	104	20,0	113	20,2	123	20,4	133	20,6
	35	78,5	22,5	90,0	22,7	99,4	23,0	102	22,9	111	23,1	120	23,3	131	23,6
	40	75,9	25,0	87,0	25,3	96,1	25,6	98,6	25,5	107	25,7	116	26,0	126	26,2
	45	74,0	28,1	84,9	28,4	93,8	28,7	96,2	28,6	105	28,9	114	29,2	123	29,5
	50	71,8	31,5	82,3	31,8	91,0	32,2	93,3	32,0	101	32,4	110	32,7	119	33,0
100.2	30	88,3	21,3	101	21,5	112	21,8	114	21,6	124	21,8	135	22,1	147	22,3
	35	86,7	24,4	99,4	24,6	110	24,9	112	24,7	122	25,0	133	25,2	144	25,5
	40	83,8	27,1	96,1	27,4	106	27,7	109	27,5	118	27,8	128	28,1	139	28,3
	45	81,8	30,5	93,7	30,8	104	31,1	106	30,9	115	31,2	125	31,5	136	31,8
	50	79,3	34,1	90,9	34,5	100	34,8	103	34,6	112	35,0	121	35,3	132	35,6
115.2	30	100	24,7	115	25,0	127	25,2	131	25,0	142	25,2	154	25,5	167	25,7
	35	98,6	28,2	113	28,5	125	28,8	128	28,6	139	28,8	151	29,1	164	29,4
	40	95,3	31,4	109	31,7	121	32,1	124	31,8	135	32,1	146	32,4	159	32,7
	45	93,0	35,3	107	35,7	118	36,0	121	35,7	132	36,1	143	36,4	155	36,8
	50	90,2	39,5	103	40,0	114	40,4	117	40,0	128	40,4	138	40,8	150	41,2
130.2	30	109	27,2	125	27,5	139	27,8	143	27,4	155	27,7	168	28,0	182	28,3
	35	107	31,1	123	31,4	136	31,8	140	31,4	152	31,7	165	32,0	179	32,3
	40	104	34,6	119	35,0	131	35,3	135	34,9	147	35,2	160	35,6	173	35,9
	45	101	38,9	116	39,3	128	39,7	132	39,2	143	39,6	156	40,0	169	40,4
	50	98,2	43,6	113	44,0	124	44,5	128	43,9	139	44,3	151	44,8	164	45,2
145.2	30	124	30,6	142	30,9	157	31,3	161	31,1	175	31,4	190	31,7	206	32,0
	35	122	35,0	139	35,4	154	35,7	158	35,5	172	35,9	186	36,2	202	36,6
	40	118	38,9	135	39,3	149	39,7	153	39,5	166	39,9	180	40,3	195	40,7
	45	115	43,7	132	44,2	145	44,6	149	44,4	162	44,8	176	45,3	191	45,7
	50	111	49,0	128	49,5	141	50,0	145	49,7	157	50,2	171	50,7	185	51,2
160.2	30	139	34,0	159	34,3	175	34,7	180	34,4	196	34,7	213	35,1	231	35,4
	35	136	38,8	156	39,2	172	39,6	177	39,3	192	39,7	209	40,1	227	40,5
	40	131	43,2	151	43,6	167	44,1	171	43,7	186	44,1	202	44,6	219	45,0
	45	128	48,5	147	49,0	162	49,5	167	49,1	182	49,6	197	50,1	214	50,6
	50	124	54,3	143	54,9	158	55,4	162	55,0	176	55,5	191	56,1	207	56,6
180.2	30	158	38,2	181	38,6	200	38,9	205	38,9	223	39,2	242	39,6	263	40,0
	35	155	43,6	178	44,1	196	44,5	201	44,4	219	44,8	238	45,3	258	45,7
	40	150	48,5	172	49,0	190	49,5	195	49,4	212	49,9	230	50,4	249	50,9
	45	146	54,5	168	55,1	185	55,6	190	55,5	207	56,1	224	56,6	243	57,2
	50	142	61,1	163	61,7	180	62,3	184	62,2	200	62,8	217	63,4	236	64,0
200.2	30	173	42,5	199	42,9	220	43,4	226	43,2	245	43,6	266	44,1	289	44,5
	35	170	48,6	195	49,1	215	49,6	222	49,4	241	49,9	261	50,3	284	50,8
	40	165	54,0	189	54,6	208	55,2	214	54,9	233	55,5	253	56,0	274	56,6
	45	161	60,7	184	61,3	203	62,0	209	61,7	227	62,3	247	62,9	268	63,6
	50	156	68,0	179	68,7	197	69,4	203	69,1	220	69,8	239	70,5	259	71,2

TW= Outlet water temperature °C

kWt = Compressor power input (kW)

kWf = Cooling capacity (kW)

kWa = Heating capacity (kW)

The standard performances refer to a 5°C temperature difference between the water entering and leaving the heat exchanger and to operation of the unit with all fans at nominal or maximum speed. A 0.44 x 10⁻⁴ m² K/W fouling factor has also been considered with the unit installed at zero meters above sea level (Pb = 1013mbar).

The performances are declared no considering any correction due to water flow rate and water side pressure drop (gross performance).

(1) : at these temperatures the fans are at maximum speed.

TECHNICAL DATA - BASE VERSION (VB)

Standard performances in heating mode IP - Extra low noise setting up (AX)

MOD.	TW	OUTDOOR AIR TEMPERATURE (°C W.B.)													
		-6 (1)		-2 (1)		2 (1)		6		9		12		15	
		kWt	kW _a	kWt	kW _a	kWt	kW _a	kWt	kW _a	kWt	kW _a	kWt	kW _a	kWt	kW _a
40.2	30	39,9	9,67	45,7	9,77	50,5	9,87	48,5	9,24	52,7	9,33	57,2	9,42	62,1	9,52
	35	39,1	11,1	44,9	11,2	49,6	11,3	47,6	10,6	51,7	10,7	56,2	10,8	60,9	10,9
	40	37,8	12,3	43,4	12,4	47,9	12,5	46,0	11,7	50,0	11,9	54,3	12,0	58,9	12,1
	45	36,9	13,8	42,3	14,0	46,8	14,1	44,9	13,2	48,8	13,3	53,0	13,5	57,5	13,6
	50	35,8	15,5	41,1	15,6	45,4	15,8	43,6	14,8	47,3	14,9	51,4	15,1	55,7	15,2
50.2	30	48,0	11,9	55,0	12,0	60,8	12,1	58,3	11,3	63,4	11,4	68,8	11,5	74,6	11,6
	35	47,1	13,6	54,0	13,7	59,6	13,8	57,2	12,9	62,2	13,0	67,5	13,1	73,3	13,3
	40	45,5	15,1	52,2	15,2	57,7	15,4	55,4	14,3	60,2	14,5	65,3	14,6	70,8	14,8
	45	44,4	16,9	50,9	17,1	56,3	17,3	54,0	16,1	58,7	16,3	63,7	16,4	69,1	16,6
	50	43,1	19,0	49,4	19,2	54,6	19,4	52,4	18,0	56,9	18,2	61,8	18,4	67,0	18,6
60.2	30	52,2	12,7	59,9	12,8	66,2	12,9	63,6	12,2	69,1	12,3	75,1	12,4	81,4	12,5
	35	51,3	14,5	58,8	14,6	64,9	14,8	62,4	13,9	67,9	14,1	73,7	14,2	79,9	14,3
	40	49,6	16,1	56,8	16,3	62,8	16,5	60,4	15,5	65,6	15,6	71,2	15,8	77,3	16,0
	45	48,4	18,1	55,5	18,3	61,3	18,5	58,9	17,4	64,0	17,6	69,5	17,7	75,4	17,9
	50	46,9	20,3	53,8	20,5	59,4	20,7	57,1	19,5	62,1	19,7	67,4	19,9	73,1	20,1
70.2	30	61,6	15,0	70,6	15,2	78,0	15,3	75,0	14,4	81,5	14,5	88,4	14,6	95,9	14,8
	35	60,4	17,2	69,3	17,3	76,5	17,5	73,6	16,4	80,0	16,6	86,8	16,7	94,2	16,9
	40	58,4	19,1	67,0	19,3	74,0	19,5	71,1	18,2	77,3	18,4	83,9	18,6	91,1	18,8
	45	57,0	21,5	65,4	21,7	72,2	21,9	69,4	20,5	75,4	20,7	81,9	20,9	88,8	21,1
	50	55,3	24,0	63,4	24,3	70,0	24,5	67,3	23,0	73,2	23,2	79,4	23,4	86,2	23,6
80.2	30	68,7	17,2	78,7	17,4	87,0	17,6	83,6	16,4	90,9	16,5	98,6	16,7	107	16,9
	35	67,4	19,7	77,3	19,9	85,4	20,1	82,0	18,7	89,2	18,9	96,8	19,1	105	19,3
	40	65,2	21,9	74,7	22,1	82,5	22,3	79,3	20,8	86,2	21,0	93,6	21,2	102	21,5
	45	63,6	24,6	72,9	24,8	80,5	25,1	77,4	23,4	84,1	23,6	91,3	23,9	99,1	24,1
	50	61,7	27,5	70,7	27,8	78,1	28,1	75,1	26,2	81,6	26,5	88,6	26,7	96,1	27,0
90.2	30	82,3	19,9	94,4	20,1	104	20,3	100	19,3	109	19,4	118	19,6	128	19,8
	35	80,8	22,7	92,7	23,0	102	23,2	98,4	22,0	107	22,2	116	22,4	126	22,7
	40	78,2	25,3	89,6	25,5	99,0	25,8	95,1	24,5	103	24,7	112	25,0	122	25,2
	45	76,2	28,4	87,4	28,7	96,6	29,0	92,8	27,5	101	27,8	110	28,1	119	28,3
	50	74,0	31,8	84,8	32,1	93,7	32,5	90,0	30,8	97,8	31,1	106	31,4	115	31,7
100.2	30	90,9	21,5	104	21,8	115	22,0	111	20,8	121	21,0	131	21,2	142	21,4
	35	89,3	24,6	102	24,9	113	25,1	109	23,8	119	24,0	129	24,2	140	24,5
	40	86,3	27,4	99,0	27,7	109	27,9	106	26,4	115	26,7	125	27,0	135	27,2
	45	84,2	30,8	96,6	31,1	107	31,4	103	29,7	112	30,0	122	30,3	132	30,6
	50	81,7	34,5	93,7	34,8	103	35,2	99,9	33,3	109	33,6	118	33,9	128	34,3
115.2	30	103	25,0	119	25,2	131	25,5	126	23,9	137	24,2	149	24,4	162	24,7
	35	102	28,5	116	28,8	129	29,1	124	27,4	135	27,6	146	27,9	159	28,2
	40	98,2	31,7	113	32,1	124	32,4	120	30,4	130	30,7	142	31,0	154	31,4
	45	95,8	35,7	110	36,0	121	36,4	117	34,2	127	34,5	138	34,9	150	35,2
	50	92,9	39,9	107	40,4	118	40,8	113	38,3	123	38,7	134	39,1	145	39,5
130.2	30	113	27,5	129	27,8	143	28,1	137	26,3	149	26,6	162	26,8	176	27,1
	35	111	31,4	127	31,8	140	32,1	135	30,1	146	30,4	159	30,7	172	31,0
	40	107	35,0	123	35,3	135	35,7	130	33,5	142	33,8	154	34,1	167	34,5
	45	104	39,3	120	39,7	132	40,1	127	37,6	138	38,0	150	38,4	163	38,7
	50	101	44,0	116	44,5	128	44,9	123	42,1	134	42,5	145	43,0	158	43,4
145.2	30	128	30,9	146	31,2	162	31,6	156	30,0	169	30,3	184	30,6	199	30,9
	35	125	35,3	144	35,7	159	36,1	153	34,2	166	34,6	180	34,9	195	35,3
	40	121	39,3	139	39,7	153	40,1	148	38,1	160	38,5	174	38,9	189	39,2
	45	118	44,2	136	44,6	150	45,1	144	42,8	157	43,2	170	43,7	184	44,1
	50	115	49,5	131	50,0	145	50,5	140	47,9	152	48,4	165	48,9	179	49,4
160.2	30	143	34,3	164	34,6	181	35,0	174	33,0	189	33,4	205	33,7	223	34,0
	35	140	39,2	161	39,6	177	40,0	171	37,8	186	38,1	201	38,5	218	38,9
	40	135	43,6	155	44,0	172	44,5	165	42,0	179	42,4	195	42,8	211	43,3
	45	132	49,0	151	49,5	167	50,0	161	47,2	175	47,7	190	48,1	206	48,6
	50	128	54,9	147	55,4	162	56,0	156	52,9	170	53,4	184	53,9	200	54,4
180.2	30	163	38,5	187	38,9	206	39,3	198	37,4	215	37,8	233	38,1	253	38,5
	35	160	44,0	183	44,5	202	45,0	194	42,7	211	43,1	229	43,6	248	44,0
	40	154	49,0	177	49,5	196	50,0	188	47,5	204	48,0	221	48,5	240	49,0
	45	151	55,1	173	55,6	191	56,2	183	53,4	199	53,9	216	54,5	234	55,0
	50	146	61,7	168	62,3	185	62,9	178	59,8	193	60,4	209	61,0	227	61,6
200.2	30	179	42,9	205	43,4	226	43,8	217	41,4	236	41,9	256	42,3	278	42,7
	35	175	49,1	201	49,6	222	50,1	213	47,4	232	47,8	251	48,3	273	48,8
	40	169	54,6	194	55,1	215	55,7	206	52,7	224	53,2	243	53,7	264	54,3
	45	165	61,3	190	62,0	209	62,6	201	59,2	218	59,8	237	60,4	257	61,0
	50	160	68,7	184	69,4	203	70,1	195	66,3	212	67,0	230	67,6	250	68,3

TW= Outlet water temperature °C

kW_a = Compressor power input (kW)

kWf = Cooling capacity (kW)

kWt = Heating capacity (kW)

The standard performances refer to a 5°C temperature difference between the water entering and leaving the heat exchanger and to operation of the unit with all fans at nominal or maximum speed. A 0.44 x 10⁻⁴ m² K/W fouling factor has also been considered with the unit installed at zero meters above sea level (Pb = 1013mbar).

The performances are declared no considering any correction due to water flow rate and water side pressure drop (gross performance).

(1) : at these temperatures the fans are at maximum speed.

TECHNICAL DATA - BASE VERSION (VB)

Correction factor for the use of glycol in heating mode

ETHYLENE GLYCOL with water produced between 30 ÷ 55 ° C.

Percentage Of glycol in mass / volume	0 / 0	10 / 8,9	20 / 18,1	30 / 27,7	40 / 37,5
Freezing point [°C]	0	-3,2	-8	-14	-22
CCPT - Heating capacity	1,000	0,995	0,985	0,975	0,970
CCPA - Power input	1,000	1,010	1,015	1,020	1,030
CCQA - Water flow rate	1,000	1,038	1,062	1,091	1,127
CCDP - Water pressure drop	1,000	1,026	1,051	1,077	1,103

PROPYLENE GLYCOL with water produced between 30 ÷ 55°C.

Percentage Of glycol in mass / volume	0 / 0	10 / 9,6	20 / 19,4	30 / 29,4	40 / 39,6
Freezing point [°C]	0	-3,3	-7	-13	-21
CCPT - Heating capacity	1,000	0,990	0,975	0,965	0,955
CCPA - Power input	1,000	1,010	1,020	1,030	1,040
CCQA - Water flow rate	1,000	1,018	1,032	1,053	1,082
CCDP - Water pressure drop	1,000	1,026	1,051	1,077	1,103

Based on DESIGN CONDITIONS from the table "performances" extract Heating Capacity (kWt).

Based on type and percentage of glycol extract CCPT, CCQA, CCDP.

Then calculate.

$$Pt_{brine} = kWt_r \times CCPT$$

$$Pass_{CP_{brine}} = kWa \times CCPA$$

Then calculate brine flow rate to the heat recovery exchanger:

$$Q_{brine} [l/s] = CCQA \times (Pt_{brine} [kW] \times 0.86 / \Delta T_{brine}) / 3.6$$

where ΔT_{brine} is the temperature difference outlet-intlet heat recovery exchanger:

$$\Delta T_{brine} = Tw_{out_{brine}} - Tw_{in_{brine}}$$

With this brine flow rate enter in abscissa on the water pressure drop of the heat recovery then you have Dp_{app} .

Finally you can calculate the actual pressure drop of the brine on heat recovery:

$$Dp_{brine} = CCDP \times Dp_{app}$$

TECHNICAL DATA - BASE VERSION (VB)

Correction factor for the use of glycol in cooling mode

ETHYLENE GLYCOL with water produced between $5 \div 20$ ° C.

Percentage Of glycol in mass / volume	0 / 0	10 / 8,9	20 / 18,1	30 / 27,7	40 / 37,5
Freezing point [°C]	0	-3,2	-8	-14	-22
CCPF - Cooling capacity	1,00	0,99	0,98	0,97	0,95
CCPA - Power input	1,00	1,00	0,99	0,99	0,98
CCQA - Water flow rate	1,00	1,04	1,08	1,12	1,16
CCDP - Water pressure drop	1,00	1,08	1,16	1,25	1,35

PROPYLENE GLYCOL with water produced between $5 \div 20$ ° C.

Percentage Of glycol in mass / volume	0 / 0	10 / 9,6	20 / 19,4	30 / 29,4	40 / 39,6
Freezing point [°C]	0	-3,3	-7	-13	-21
CCPF - Cooling capacity	1,00	0,98	0,96	0,94	0,92
CCPA - Power input	1,00	0,99	0,98	0,95	0,93
CCQA - Water flow rate	1,00	1,01	1,03	1,06	1,09
CCDP - Water pressure drop	1,00	1,05	1,11	1,22	1,38

Based on outdoor air temperature and leaving water temperature of the evaporator (DESIGN CONDITIONS) from the table "performances" extract Cooling Capacity (kWf) and Compressors Power Input (kW_a).

Based on type and percentage of glycol extract CCPF, CCPA, CCQA, CCDP.

Then calculate.

$$Pf_{brine} = kWf \times CCPF$$

$$Pass_{CP_{brine}} = kW_a \times CCPA$$

Then calculate brine flow rate of the evaporator:

$$Q_{brine_evap} [l/s] = CCQA \times (Pf_{brine} [kW]) \times 0.86 / \Delta T_{brine} / 3.6$$

where ΔT_{brine} is the difference inlet-outlet evaporator water temperature:

$$\Delta T_{brine} = T_{win_evap_brine} - T_{wout_evap_brine}$$

With this brine flow rate enter in abscissa on the water pressure drop of the evaporator then you have Dp_{app} .

Finally you can calculate the actual pressure drop of the brine on evaporator side:

$$Dp_{evap_brine} = CCDP \times Dp_{app}$$

Fouling factors

The performances supplied with the tables are referred to a fouling factory = 0.44×10^{-4} m² K/W . For different values of the fouling factory, use the reduction coefficients reported in the following table.

Fouling factory		Evaporator	
		F.c. PF	F.c. PA
(m ² K / W)	$0,44 \times 10^{-4}$	1,00	1,00
(m ² K / W)	$0,86 \times 10^{-4}$	0,98	0,99
(m ² K / W)	$1,72 \times 10^{-4}$	0,93	0,98

F.c. PF: Correction Factor for Cooling capacity

F.c. PA: Correction Factor for compressor power Input

TECHNICAL DATA - BR - BP UNIT

Mandatory requirements for BR and BP units

BR and BP units must be used with a mixture of water and antifreeze fluid (eg glycol) in a percentage enough to prevent freezing of the mixture under all possible conditions, otherwise it will **VOID THE WARRANTY**.

Please contact our customer service to set the following parameters: →

Correction factors to apply to the basic version data.

Parameter to set	Default value	How to calculate the value to set	Example with TWE = 0°C	Example with TWE = -5°C
RL5 I	3 °C	TWE -4 °C	-4 °C	-9 °C
Er 10	9 °C	TWE +2 °C	+2 °C	-3 °C
Er 11	7 °C	TWE +2 °C	+2 °C	-3 °C
Hi 12	4 °C	TWE -3 °C	-3 °C	-8 °C
Hi 14	4 °C	TWE -3 °C	-3 °C	-8 °C

TWE= Evaporator outlet desired water temperature

ETHYLENE GLYCOL

Percentage Of glycol in mass / volume	20 / 18,1								
Freezing point [°C]	-8								
Produced water temperature	4	2	0	-2	-4	-6	-8	-10	-12
CCPF - Cooling capacity	0,912	0,855	0,798	0,738	0,683	-	-	-	-
CCPA - Power input	0,967	0,957	0,947	0,927	0,897	-	-	-	-
CCQA - Water flow rate	1,071	1,072	1,073	1,075	1,076	-	-	-	-
CCDP - Pressure drop	1,090	1,095	1,100	1,110	1,120	-	-	-	-

Percentage Of glycol in mass / volume	30 / 27,7								
Freezing point [°C]	-14								
Produced water temperature	4	2	0	-2	-4	-6	-8	-10	-12
CCPF - Cooling capacity	0,899	0,842	0,785	0,725	0,670	0,613	0,562	-	-
CCPA - Power input	0,960	0,950	0,940	0,920	0,890	0,870	0,840	-	-
CCQA - Water flow rate	1,106	1,107	1,108	1,109	1,110	1,111	1,112	-	-
CCDP - Pressure drop	1,140	1,145	1,150	1,155	1,160	1,175	1,190	-	-

Percentage Of glycol in mass / volume	40 / 37,5								
Freezing point [°C]	-22								
Produced water temperature	4	2	0	-2	-4	-6	-8	-10	-12
CCPF - Cooling capacity	0,884	0,827	0,770	0,710	0,655	0,598	0,547	0,490	0,437
CCPA - Power input	0,880	0,870	0,860	0,840	0,810	0,790	0,760	0,724	0,686
CCQA - Water flow rate	1,150	1,151	1,153	1,154	1,155	1,157	1,158	1,159	1,161
CCDP - Pressure drop	1,190	1,195	1,200	1,210	1,220	1,235	1,250	1,269	1,290

PROPYLENE GLYCOL

Percentage Of glycol in mass / volume	20 / 19,4								
Freezing point [°C]	-7								
Produced water temperature	4	2	0	-2	-4	-6	-8	-10	-12
CCPF - Cooling capacity	0,874	0,807	0,740	0,690	0,641	-	-	-	-
CCPA - Power input	0,945	0,935	0,925	0,900	0,875	-	-	-	-
CCQA - Water flow rate	1,037	1,038	1,039	1,039	1,040	-	-	-	-
CCDP - Pressure drop	1,110	1,115	1,120	1,130	1,140	-	-	-	-

Percentage Of glycol in mass / volume	30 / 29,4								
Freezing point [°C]	-13								
Produced water temperature	4	2	0	-2	-4	-6	-8	-10	-12
CCPF - Cooling capacity	0,869	0,799	0,729	0,680	0,630	0,583	0,536	-	-
CCPA - Power input	0,935	0,923	0,910	0,888	0,865	0,838	0,810	-	-
CCQA - Water flow rate	1,072	1,071	1,070	1,069	1,069	1,068	1,067	-	-
CCDP - Pressure drop	1,160	1,175	1,190	1,200	1,210	1,255	1,300	-	-

Percentage Of glycol in mass / volume	40 / 39,6								
Freezing point [°C]	-21								
Produced water temperature	4	2	0	-2	-4	-6	-8	-10	-12
CCPF - Cooling capacity	0,848	0,784	0,719	0,670	0,620	0,570	0,520	0,478	0,438
CCPA - Power input	0,865	0,855	0,845	0,820	0,795	0,773	0,750	0,714	0,680
CCQA - Water flow rate	1,116	1,114	1,112	1,110	1,108	1,107	1,105	1,103	1,101
CCDP - Pressure drop	1,230	1,275	1,320	1,375	1,430	1,500	1,570	1,642	1,724

Based on leaving water temperature of the evaporator and condensing temperature = 7°C from the table "performances" extract Cooling Capacity (kWf) and Compressors Power Input (kWw).

Based on type and percentage of glycol extract CCPF, CCPA, CCQA, CCDP.

Then calculate.

$$Pf_{brine} = kWf \times CCPF$$

$$Pass_{CP_{brine}} = kWw \times CCPA$$

Then calculate brine flow rate:

$$Q_{brine_evap} [l/s] = CCQA \times (Pf_{brine} [kW] \times 0,86 / \Delta T_{brine}) / 3,6$$

where ΔT_{brine} is the difference between inlet-outlet evaporator water temperature:

$$\Delta T_{brine} = T_{in_evap_brine} - T_{out_evap_brine}$$

With this brine flow rate enter in abscissa on the water pressure drop of the evaporator then you have Dp_{app} .

Finally you can calculate the actual pressure drop of the brine on evaporator side:

$$Dp_{evap_brine} = CCDP \times Dp_{app}$$

TECHNICAL DATA - IR DESUPERHEATER VERSION (VD)

Base setting up AB

Heat exchanger specifications

Frame	1					2			3			4		
Model	40.2	50.2	60.2	70.2	80.2	90.2	100.2	115.2	130.2	145.2	160.2	180.2	200.2	U.M.
Type of recovery exchanger	Braze plates													-
Quantity	1													N°
Max. operating pressure on wet side	600													kPa
Total water content of recovery exchangers	0,55	0,55	0,55	0,55	0,55	0,75	0,75	1,20	1,20	1,20	1,20	1,50	1,50	l
Unit specification														
Cooling capacity VD(1)	47,1	55,6	60,9	71,6	81,8	94,6	106	116	131	149	164	187	208	kW
Power input compressor VD (1)	13,8	16,6	17,9	21,0	24,8	27,4	30,7	34,4	39,3	43,7	49,0	54,3	60,9	kW
Total power input VD (1)	15,0	17,8	19,7	22,8	26,6	31,0	34,3	38,0	42,9	49,1	54,4	61,5	68,1	kW
EER VD (1)	3,14	3,12	3,09	3,14	3,08	3,05	3,09	3,05	3,05	3,03	3,01	3,04	3,05	-
Water flow rate VD (1)	2,25	2,66	2,91	3,42	3,91	4,52	5,06	5,54	6,26	7,12	7,84	8,93	9,94	l/s
Water pressure drop VD (1)	43	60	59	55	54	52	50	47	52	51	52	52	54	kPa
Recovered heating capacity (1)	13,5	15,7	17,6	20,0	23,6	27,1	30,4	34,4	38,4	44,0	49,3	55,4	61,3	kW
Recovered water flow rate (1)	0,65	0,75	0,84	0,96	1,13	1,29	1,45	1,64	1,83	2,10	2,36	2,65	2,93	l/s
Recovered water pressure drop (1)	6	9	11	14	19	15	18	11	14	18	22	18	21	kPa

(1): The data refer to: Water temperature: evaporator inlet :12°C - evaporator outlet: 7°C, Outdoor air temperature 35°C.
The data refer to: Water temperature: recovery inlet :40°C - recovery outlet: 45°C.

Low noise setting up AS

Heat exchanger specifications

Frame	1					2			3			4		
Model	40.2	50.2	60.2	70.2	80.2	90.2	100.2	115.2	130.2	145.2	160.2	180.2	200.2	U.M.
Type of recovery exchanger	Braze plates													-
Quantity	1													N°
Max. operating pressure on wet side	600													kPa
Total water content of recovery exchangers	0,55	0,55	0,55	0,55	0,55	0,75	0,75	1,20	1,20	1,20	1,20	1,50	1,50	l
Unit specification														
Cooling capacity VD(1)	45,7	54,0	59,1	69,4	79,4	91,7	102	113	127	145	159	182	202	kW
Power input compressor VD (1)	14,7	17,7	19,2	22,4	26,5	29,7	33,1	37,1	42,1	47,1	52,7	58,9	65,8	kW
Total power input VD (1)	15,6	18,5	20,5	23,7	27,7	32,2	35,6	39,6	44,6	50,9	56,5	63,9	70,8	kW
EER VD (1)	2,93	2,92	2,88	2,93	2,87	2,85	2,87	2,85	2,85	2,85	2,81	2,85	2,85	-
Water flow rate VD (1)	2,18	2,58	2,82	3,32	3,79	4,38	4,87	5,40	6,07	6,93	7,60	8,70	9,65	l/s
Water pressure drop VD (1)	41	57	56	52	51	49	46	45	49	48	49	49	51	kPa
Recovered heating capacity (1)	13,5	15,7	17,6	20,0	23,6	27,1	30,4	34,4	38,4	44,0	49,3	55,4	61,3	kW
Recovered water flow rate (1)	0,65	0,75	0,84	0,96	1,13	1,29	1,45	1,64	1,83	2,10	2,36	2,65	2,93	l/s
Recovered water pressure drop (1)	6	9	11	14	19	15	18	11	14	18	22	18	21	kPa

(1): The data refer to: Water temperature: evaporator inlet :12°C - evaporator outlet: 7°C, Outdoor air temperature 35°C.
The data refer to: Water temperature: recovery inlet :40°C - recovery outlet: 45°C.

Extra low noise setting up AX

Heat exchanger specifications

Frame	1					2			3			4		
Model	40.2	50.2	60.2	70.2	80.2	90.2	100.2	115.2	130.2	145.2	160.2	180.2	200.2	U.M.
Type of recovery exchanger	Braze plates													-
Quantity	1													N°
Max. operating pressure on wet side	600													kPa
Total water content of recovery exchangers	0,55	0,55	0,55	0,55	0,55	0,75	0,75	1,20	1,20	1,20	1,20	1,50	1,50	l
Unit specification														
Cooling capacity VD(1)	44,6	52,7	57,7	67,8	77,5	89,6	100	110	124	140	156	177	197	kW
Power input compressor VD (1)	14,9	18,1	20,0	23,1	27,5	29,1	34,4	38,5	43,7	48,7	54,4	61,4	68,5	kW
Total power input VD (1)	15,7	18,9	21,1	24,2	28,5	31,3	36,6	40,7	45,9	51,9	57,7	65,7	72,8	kW
EER VD (1)	2,84	2,79	2,73	2,80	2,72	2,86	2,73	2,70	2,70	2,70	2,70	2,69	2,71	-
Water flow rate VD (1)	2,13	2,52	2,76	3,24	3,70	4,28	4,78	5,26	5,92	6,69	7,45	8,46	9,41	l/s
Water pressure drop VD (1)	39	54	53	49	48	46	44	43	46	45	47	46	48	kPa
Recovered heating capacity (1)	13,5	15,7	17,6	20,0	23,6	27,1	30,4	34,4	38,4	44,0	49,3	55,4	61,3	kW
Recovered water flow rate (1)	0,65	0,75	0,84	0,96	1,13	1,29	1,45	1,64	1,83	2,10	2,36	2,65	2,93	l/s
Recovered water pressure drop (1)	6	9	11	14	19	15	18	11	14	18	22	18	21	kPa

(1): The data refer to: Water temperature: evaporator inlet :12°C - evaporator outlet: 7°C, Outdoor air temperature 35°C.
The data refer to: Water temperature: recovery inlet :40°C - recovery outlet: 45°C.

TECHNICAL DATA - IR DESUPERHEATER VERSION (VD)

Performances

MOD.	TWR	OUTDOOR AIR TEMPERATURE (°C D.B.)				
		25	30	35	40	45
		kWtr = Recovered HEATING CAPACITY [kW]				
40.2	30	11,4	12,9	14,7	16,6	18,8
	35	11,3	12,8	14,6	16,5	18,7
	40	11,0	12,5	14,2	16,1	18,2
	45	10,5	11,9	13,5	15,3	17,3
	50	9,72	11,0	12,5	14,2	16,0
	55	8,70	9,86	11,2	12,7	14,4
	60	7,46	8,45	9,59	10,9	12,3
	65	5,97	6,76	7,68	8,71	9,85
70	4,25	4,82	5,47	6,20	7,01	
50.2	30	13,3	15,0	17,1	19,3	21,9
	35	13,2	14,9	17,0	19,2	21,7
	40	12,8	14,5	16,5	18,7	21,2
	45	12,2	13,8	15,7	17,8	20,1
	50	11,3	12,8	14,5	16,5	18,6
	55	10,1	11,5	13,0	14,8	16,7
	60	8,67	9,82	11,2	12,6	14,3
	65	6,94	7,87	8,94	10,1	11,5
70	4,94	5,60	6,36	7,21	8,15	
60.2	30	14,9	16,8	19,1	21,7	24,5
	35	14,8	16,7	19,0	21,5	24,4
	40	14,4	16,3	18,5	21,0	23,7
	45	13,7	15,5	17,6	19,9	22,6
	50	12,7	14,3	16,3	18,5	20,9
	55	11,3	12,9	14,6	16,5	18,7
	60	9,72	11,0	12,5	14,2	16,0
	65	7,78	8,82	10,0	11,4	12,8
70	5,54	6,28	7,13	8,08	9,14	
70.2	30	16,9	19,1	21,7	24,6	27,9
	35	16,8	19,0	21,6	24,5	27,7
	40	16,3	18,5	21,0	23,8	27,0
	45	15,5	17,6	20,0	22,7	25,6
	50	14,4	16,3	18,5	21,0	23,7
	55	12,9	14,6	16,6	18,8	21,3
	60	11,0	12,5	14,2	16,1	18,2
	65	8,85	10,0	11,4	12,9	14,6
70	6,30	7,13	8,10	9,18	10,4	
80.2	30	19,9	22,6	25,6	29,1	32,9
	35	19,8	22,4	25,5	28,9	32,7
	40	19,3	21,8	24,8	28,1	31,8
	45	18,3	20,8	23,6	26,7	30,3
	50	17,0	19,2	21,9	24,8	28,0
	55	15,2	17,2	19,6	22,2	25,1
	60	13,0	14,8	16,8	19,0	21,5
	65	10,4	11,8	13,4	15,2	17,2
70	7,43	8,42	9,56	10,8	12,3	
90.2	30	22,9	25,9	29,5	33,4	37,8
	35	22,8	25,8	29,3	33,2	37,5
	40	22,1	25,1	28,5	32,3	36,5
	45	21,1	23,9	27,1	30,7	34,7
	50	19,5	22,1	25,1	28,4	32,2
	55	17,5	19,8	22,5	25,5	28,8
	60	15,0	17,0	19,3	21,8	24,7
	65	12,0	13,6	15,4	17,5	19,8
70	8,53	9,67	11,0	12,4	14,1	
100.2	30	25,7	29,1	33,0	37,4	42,4
	35	25,5	28,9	32,8	37,2	42,1
	40	24,8	28,1	32,0	36,2	41,0
	45	23,6	26,8	30,4	34,4	39,0
	50	21,9	24,8	28,2	31,9	36,1
	55	19,6	22,2	25,2	28,6	32,3
	60	16,8	19,0	21,6	24,5	27,7
	65	13,4	15,2	17,3	19,6	22,2
70	9,57	10,8	12,3	14,0	15,8	

MOD.	TWR	OUTDOOR AIR TEMPERATURE (°C D.B.)				
		25	30	35	40	45
		kWtr = Recovered HEATING CAPACITY [kW]				
115.2	30	29,1	32,9	37,4	42,4	47,9
	35	28,9	32,7	37,2	42,1	47,6
	40	28,1	31,8	36,2	41,0	46,4
	45	26,7	30,3	34,4	39,0	44,1
	50	24,8	28,0	31,9	36,1	40,8
	55	22,2	25,1	28,5	32,3	36,6
	60	19,0	21,5	24,4	27,7	31,3
	65	15,2	17,2	19,6	22,2	25,1
70	10,8	12,3	13,9	15,8	17,9	
130.2	30	32,4	36,7	41,7	47,3	53,5
	35	32,2	36,5	41,5	47,0	53,2
	40	31,4	35,5	40,4	45,8	51,8
	45	29,8	33,8	38,4	43,5	49,2
	50	27,6	31,3	35,6	40,3	45,6
	55	24,8	28,0	31,9	36,1	40,8
	60	21,2	24,0	27,3	30,9	35,0
	65	17,0	19,2	21,9	24,8	28,0
70	12,1	13,7	15,6	17,6	19,9	
145.2	30	37,2	42,1	47,8	54,2	61,3
	35	36,9	41,9	47,5	53,9	60,9
	40	36,0	40,7	46,3	52,4	59,3
	45	34,2	38,7	44,0	49,9	56,4
	50	31,7	35,9	40,7	46,2	52,2
	55	28,4	32,1	36,5	41,4	46,8
	60	24,3	27,5	31,3	35,4	40,1
	65	19,5	22,0	25,0	28,4	32,1
70	13,9	15,7	17,8	20,2	22,9	
160.2	30	41,6	47,2	53,6	60,7	68,7
	35	41,4	46,9	53,3	60,4	68,3
	40	40,3	45,6	51,8	58,7	66,5
	45	38,3	43,4	49,3	55,9	63,2
	50	35,5	40,2	45,7	51,7	58,5
	55	31,8	36,0	40,9	46,3	52,4
	60	27,2	30,8	35,0	39,7	44,9
	65	21,8	24,7	28,1	31,8	36,0
70	15,5	17,6	20,0	22,6	25,6	
180.2	30	46,8	53,0	60,2	68,2	77,2
	35	46,5	52,7	59,9	67,8	76,7
	40	45,3	51,3	58,3	66,0	74,7
	45	43,1	48,8	55,4	62,8	71,0
	50	39,9	45,2	51,3	58,1	65,8
	55	35,7	40,5	46,0	52,1	58,9
	60	30,6	34,7	39,4	44,6	50,5
	65	24,5	27,8	31,5	35,7	40,4
70	17,4	19,8	22,4	25,4	28,8	
200.2	30	51,8	58,7	66,6	75,5	85,4
	35	51,5	58,3	66,2	75,0	84,9
	40	50,1	56,7	64,5	73,0	82,6
	45	47,6	54,0	61,3	69,5	78,6
	50	44,1	50,0	56,8	64,3	72,8
	55	39,5	44,8	50,9	57,6	65,2
	60	33,9	38,4	43,6	49,4	55,8
	65	27,1	30,7	34,9	39,5	44,7
70	19,3	21,9	24,8	28,1	31,8	

kWtr = Recovery heat capacity

TWR = Desuperheater outlet water temperature, $\Delta t_{in-out} = 5^{\circ}\text{C}$

The standard performances refer to a 5°C temperature difference between the water entering and leaving the heat exchanger and to operation of the unit with all fans at nominal or maximum speed. A $0.44 \times 10^{-4} \text{ m}^2 \text{ K/W}$ fouling factor has also been considered with the unit installed at zero meters above sea level ($P_b = 1013 \text{ mbar}$).

The performances are declared *no considering any correction due to water flow rate and water side pressure drop (gross performance)*.

TECHNICAL DATA - IP DESUPERHEATER VERSION (VD)

Base setting up AB

Heat exchanger specifications

Frame Model	1					2			3			4		U.M.
	40.2	50.2	60.2	70.2	80.2	90.2	100.2	115.2	130.2	145.2	160.2	180.2	200.2	
Type of recovery exchanger	Braze plates													-
Quantity	1													N°
Max. operating pressure on wet side	600													kPa
Total water content of recovery exchangers	0,55	0,55	0,55	0,55	0,55	0,75	0,75	1,20	1,20	1,20	1,20	1,50	1,50	l
Unit specification														
Cooling capacity VD(1)	45,6	55,0	59,8	69,9	77,1	92,8	103	114	127	144	160	185	206	kW
Power input compressor VD (1)	13,6	16,8	17,8	21,1	24,0	27,2	30,5	34,3	38,8	42,6	48,3	53,4	60,6	kW
Total power input VD (1)	14,8	18,0	19,6	22,9	25,8	30,8	34,1	37,9	42,4	48,0	53,7	60,6	67,8	kW
EER VD (1)	3,08	3,06	3,05	3,05	2,99	3,01	3,02	3,01	3,00	3,00	2,98	3,05	3,04	-
Water flow rate VD (1)	2,18	2,63	2,86	3,34	3,68	4,43	4,92	5,45	6,07	6,88	7,64	8,84	9,84	l/s
Water pressure drop VD (1)	41	59	57	53	48	50	47	46	49	48	49	51	53	kPa
Recovered heating capacity (1)	13,0	15,2	17,0	19,4	22,9	26,2	29,2	33,2	37,1	42,4	47,5	52,4	58,1	kW
Recovered water flow rate (1)	0,62	0,73	0,81	0,93	1,09	1,25	1,40	1,59	1,77	2,03	2,27	2,50	2,78	l/s
Recovered water pressure drop (1)	6	8	10	13	18	14	17	10	13	17	21	16	19	kPa

(1): The data refer to: Water temperature: evaporator inlet :12°C - evaporator outlet: 7°C, Outdoor air temperature 35°C.

The data refer to: Water temperature: recovery inlet :40°C - recovery outlet: 45°C.



NOTE : THE HEATING CAPACITY RECOVERED BY THE DESUPERHEATER EXCLUSIVELY REFERS TO UNITS OPERATING IN THE COOLING MODE.

Low noise setting up AS

Heat exchanger specifications

Frame Model	1					2			3			4		U.M.
	40.2	50.2	60.2	70.2	80.2	90.2	100.2	115.2	130.2	145.2	160.2	180.2	200.2	
Type of recovery exchanger	Braze plates													-
Quantity	1													N°
Max. operating pressure on wet side	600													kPa
Total water content of recovery exchangers	0,55	0,55	0,55	0,55	0,55	0,75	0,75	1,20	1,20	1,20	1,20	1,50	1,50	l
Unit specification														
Cooling capacity VD(1)	43,7	52,8	57,4	67,1	73,9	89,0	98,8	110	122	137	154	178	198	kW
Power input compressor VD (1)	14,6	18,2	19,5	23,0	26,0	30,1	33,6	37,6	42,4	47,0	53,1	59,1	66,8	kW
Total power input VD (1)	15,4	19,1	20,8	24,2	27,3	32,6	36,1	40,2	44,9	50,8	56,8	64,1	71,9	kW
EER VD (1)	2,84	2,76	2,76	2,77	2,71	2,73	2,74	2,74	2,72	2,70	2,71	2,78	2,75	-
Water flow rate VD (1)	2,09	2,52	2,74	3,21	3,53	4,25	4,72	5,26	5,83	6,55	7,36	8,50	9,46	l/s
Water pressure drop VD (1)	37	54	53	49	44	46	43	43	45	43	46	47	49	kPa
Recovered heating capacity (1)	13,0	15,2	17,0	19,4	22,9	26,2	29,2	33,2	37,1	42,4	47,5	52,4	58,1	kW
Recovered water flow rate (1)	0,62	0,73	0,81	0,93	1,09	1,25	1,40	1,59	1,77	2,03	2,27	2,50	2,78	l/s
Recovered water pressure drop (1)	6	8	10	13	18	14	17	10	13	17	21	16	19	kPa

(1): The data refer to: Water temperature: evaporator inlet :12°C - evaporator outlet: 7°C, Outdoor air temperature 35°C.

The data refer to: Water temperature: recovery inlet :40°C - recovery outlet: 45°C.



NOTE : THE HEATING CAPACITY RECOVERED BY THE DESUPERHEATER EXCLUSIVELY REFERS TO UNITS OPERATING IN THE COOLING MODE.

Extra low noise setting up AX

Heat exchanger specifications

Frame Model	1					2			3			4		U.M.
	40.2	50.2	60.2	70.2	80.2	90.2	100.2	115.2	130.2	145.2	160.2	180.2	200.2	
Type of recovery exchanger	Braze plates													-
Quantity	1													N°
Max. operating pressure on wet side	600													kPa
Total water content of recovery exchangers	0,55	0,55	0,55	0,55	0,55	0,75	0,75	1,20	1,20	1,20	1,20	1,50	1,50	l
Unit specification														
Cooling capacity VD(1)	42,8	51,7	56,3	65,7	72,5	87,2	96,8	107	120	135	151	174	193	kW
Power input compressor VD (1)	15,7	19,4	20,9	24,5	27,7	32,2	35,9	40,3	45,2	50,4	56,8	63,4	71,6	kW
Total power input VD (1)	16,4	20,1	21,9	25,6	28,8	34,4	38,1	42,4	47,4	53,7	60,1	67,8	75,9	kW
EER VD (1)	2,61	2,57	2,57	2,57	2,52	2,53	2,54	2,52	2,53	2,51	2,51	2,57	2,54	-
Water flow rate VD (1)	2,04	2,47	2,69	3,14	3,46	4,17	4,62	5,11	5,73	6,45	7,21	8,31	9,22	l/s
Water pressure drop VD (1)	36	52	51	46	42	44	41	40	43	42	44	45	47	kPa
Recovered heating capacity (1)	13,0	15,2	17,0	19,4	22,9	26,2	29,2	33,2	37,1	42,4	47,5	52,4	58,1	kW
Recovered water flow rate (1)	0,62	0,73	0,81	0,93	1,09	1,25	1,40	1,59	1,77	2,03	2,27	2,50	2,78	l/s
Recovered water pressure drop (1)	6	8	10	13	18	14	17	10	13	17	21	16	19	kPa

(1): The data refer to: Water temperature: evaporator inlet :12°C - evaporator outlet: 7°C, Outdoor air temperature 35°C.

The data refer to: Water temperature: recovery inlet :40°C - recovery outlet: 45°C.



NOTE : THE HEATING CAPACITY RECOVERED BY THE DESUPERHEATER EXCLUSIVELY REFERS TO UNITS OPERATING IN THE COOLING MODE.

TECHNICAL DATA - IP DESUPERHEATER VERSION (VD)

Performances

MOD.	TWR	OUTDOOR AIR TEMPERATURE (°C D.B.)				
		25	30	35	40	45
		kWtr = Recovered HEATING CAPACITY [kW]				
40.2	30	11,0	12,4	14,1	16,0	18,1
	35	10,9	12,4	14,0	15,9	18,0
	40	10,6	12,0	13,7	15,5	17,5
	45	10,1	11,4	13,0	14,7	16,7
	50	9,36	10,6	12,0	13,6	15,4
	55	8,38	9,50	10,8	12,2	13,8
	60	7,18	8,13	9,24	10,5	11,8
	65	5,75	6,51	7,40	8,38	9,48
70	4,09	4,64	5,27	5,97	6,75	
50.2	30	12,8	14,5	16,5	18,7	21,2
	35	12,8	14,5	16,4	18,6	21,1
	40	12,4	14,1	16,0	18,1	20,5
	45	11,8	13,4	15,2	17,2	19,5
	50	10,9	12,4	14,1	16,0	18,0
	55	9,80	11,1	12,6	14,3	16,2
	60	8,39	9,51	10,8	12,2	13,8
	65	6,72	7,62	8,65	9,80	11,1
70	4,79	5,42	6,16	6,98	7,89	
60.2	30	14,4	16,3	18,5	20,9	23,7
	35	14,3	16,2	18,4	20,8	23,5
	40	13,9	15,7	17,9	20,3	22,9
	45	13,2	15,0	17,0	19,3	21,8
	50	12,2	13,9	15,7	17,8	20,2
	55	11,0	12,4	14,1	16,0	18,1
	60	9,39	10,6	12,1	13,7	15,5
	65	7,52	8,52	9,68	11,0	12,4
70	5,35	6,06	6,89	7,80	8,83	
70.2	30	16,4	18,6	21,1	23,9	27,0
	35	16,3	18,5	21,0	23,8	26,9
	40	15,9	18,0	20,4	23,1	26,1
	45	15,1	17,1	19,4	22,0	24,9
	50	14,0	15,8	18,0	20,4	23,0
	55	12,5	14,2	16,1	18,2	20,6
	60	10,7	12,1	13,8	15,6	17,7
	65	8,58	9,72	11,0	12,5	14,2
70	6,11	6,92	7,86	8,91	10,1	
80.2	30	19,3	21,9	24,9	28,2	31,9
	35	19,2	21,8	24,7	28,0	31,7
	40	18,7	21,2	24,1	27,3	30,9
	45	17,8	20,2	22,9	25,9	29,4
	50	16,5	18,7	21,2	24,0	27,2
	55	14,8	16,7	19,0	21,5	24,4
	60	12,6	14,3	16,3	18,4	20,9
	65	10,1	11,5	13,0	14,8	16,7
70	7,21	8,17	9,28	10,5	11,9	
90.2	30	22,1	25,1	28,5	32,3	36,5
	35	22,0	24,9	28,3	32,1	36,3
	40	21,4	24,3	27,5	31,2	35,3
	45	20,4	23,1	26,2	29,7	33,6
	50	18,9	21,4	24,3	27,5	31,1
	55	16,9	19,1	21,7	24,6	27,9
	60	14,5	16,4	18,6	21,1	23,9
	65	11,6	13,1	14,9	16,9	19,1
70	8,25	9,35	10,6	12,0	13,6	
100.2	30	24,7	27,9	31,7	36,0	40,7
	35	24,5	27,8	31,5	35,7	40,4
	40	23,9	27,0	30,7	34,8	39,4
	45	22,7	25,7	29,2	33,1	37,4
	50	21,0	23,8	27,0	30,6	34,7
	55	18,8	21,3	24,2	27,4	31,1
	60	16,1	18,3	20,7	23,5	26,6
	65	12,9	14,6	16,6	18,8	21,3
70	9,19	10,4	11,8	13,4	15,2	

MOD.	TWR	OUTDOOR AIR TEMPERATURE (°C D.B.)				
		25	30	35	40	45
		kWtr = Recovered HEATING CAPACITY [kW]				
115.2	30	28,0	31,8	36,1	40,9	46,3
	35	27,9	31,6	35,9	40,6	46,0
	40	27,1	30,7	34,9	39,6	44,7
	45	25,8	29,2	33,2	37,6	42,6
	50	23,9	27,1	30,7	34,8	39,4
	55	21,4	24,2	27,5	31,2	35,3
	60	18,3	20,8	23,6	26,7	30,2
	65	14,7	16,6	18,9	21,4	24,2
70	10,5	11,8	13,5	15,2	17,2	
130.2	30	31,3	35,5	40,3	45,7	51,7
	35	31,2	35,3	40,1	45,4	51,4
	40	30,3	34,3	39,0	44,2	50,0
	45	28,8	32,7	37,1	42,0	47,6
	50	26,7	30,2	34,4	38,9	44,0
	55	23,9	27,1	30,8	34,9	39,5
	60	20,5	23,2	26,4	29,9	33,8
	65	16,4	18,6	21,1	23,9	27,1
70	11,7	13,2	15,0	17,0	19,3	
145.2	30	35,8	40,6	46,1	52,2	59,1
	35	35,6	40,3	45,8	51,9	58,7
	40	34,6	39,3	44,6	50,5	57,2
	45	33,0	37,3	42,4	48,0	54,4
	50	30,5	34,6	39,3	44,5	50,3
	55	27,3	31,0	35,2	39,9	45,1
	60	23,4	26,5	30,1	34,1	38,6
	65	18,8	21,2	24,1	27,3	30,9
70	13,4	15,1	17,2	19,5	22,0	
160.2	30	40,1	45,5	51,6	58,5	66,2
	35	39,9	45,2	51,3	58,2	65,8
	40	38,8	44,0	49,9	56,6	64,0
	45	36,9	41,8	47,5	53,8	60,9
	50	34,2	38,7	44,0	49,8	56,4
	55	30,6	34,7	39,4	44,7	50,5
	60	26,2	29,7	33,8	38,2	43,3
	65	21,0	23,8	27,0	30,6	34,7
70	15,0	16,9	19,2	21,8	24,7	
180.2	30	44,3	50,1	56,9	64,5	73,0
	35	44,0	49,8	56,6	64,2	72,6
	40	42,8	48,5	55,1	62,4	70,6
	45	40,7	46,1	52,4	59,4	67,2
	50	37,7	42,7	48,5	55,0	62,2
	55	33,8	38,3	43,5	49,3	55,7
	60	28,9	32,8	37,2	42,2	47,7
	65	23,2	26,3	29,8	33,8	38,2
70	16,5	18,7	21,2	24,1	27,2	
200.2	30	49,1	55,6	63,1	71,6	80,9
	35	48,8	55,3	62,8	71,1	80,5
	40	47,5	53,8	61,1	69,2	78,3
	45	45,2	51,2	58,1	65,8	74,5
	50	41,8	47,4	53,8	61,0	69,0
	55	37,5	42,4	48,2	54,6	61,8
	60	32,1	36,4	41,3	46,8	52,9
	65	25,7	29,1	33,1	37,5	42,4
70	18,3	20,7	23,5	26,7	30,2	

kWtr = Recovery heat capacity

TWR = Desuperheater outlet water temperature, $\Delta t_{in-out} = 5^\circ C$

The standard performances refer to a 5°C temperature difference between the water entering and leaving the heat exchanger and to operation of the unit with all fans at nominal or maximum speed. A $0.44 \times 10^{-4} \text{ m}^2 \text{ K/W}$ fouling factor has also been considered with the unit installed at zero meters above sea level ($P_b = 1013 \text{ mbar}$).

The performances are declared no considering any correction due to water flow rate and water side pressure drop (gross performance).

TECHNICAL DATA - IR RECOVERY VERSION (VR)

Base setting up AB

Heat exchanger specifications

Frame Model	1					2			3			4		U.M.
	40.2	50.2	60.2	70.2	80.2	90.2	100.2	115.2	130.2	145.2	160.2	180.2	200.2	
Type of recovery exchanger	Braze plates													-
Quantity	1													N°
Max. operating pressure on wet side	600													kPa
Total water content of recovery exchangers	3,61	3,61	4,56	5,42	6,27	5,46	5,93	6,86	7,49	8,74	9,67	10,9	12,6	l
Unit specification														
Cooling capacity VR (1)	47,1	55,6	60,9	71,6	81,8	94,6	106	116	131	149	164	187	208	kW
Total power input VR (1)	13,6	16,4	17,8	20,8	24,6	27,1	30,3	34,1	38,9	43,2	48,5	53,8	60,3	kW
EER VR (1)	3,46	3,39	3,42	3,44	3,33	3,49	3,50	3,40	3,37	3,45	3,38	3,48	3,45	-
Water flow rate VR (1)	2,25	2,66	2,91	3,42	3,91	4,52	5,06	5,54	6,26	7,12	7,84	8,93	9,94	l/s
Water pressure drop VR (1)	43	60	59	55	54	52	50	47	52	51	52	52	54	kPa
Recovered heating capacity (1)	60,0	71,2	77,8	91,4	105	120	135	148	168	190	210	238	265	kW
Recovered water flow rate (1)	2,87	3,40	3,72	4,37	5,02	5,73	6,45	7,07	8,03	9,08	10,0	11,4	12,7	l/s
Recovered water pressure drop (1)	35	49	41	45	50	48	52	47	52	51	52	55	55	kPa

(1): The data refer to: Water temperature: evaporator inlet :12°C - evaporator outlet: 7°C, Outdoor air temperature 35°C.
The data refer to: Water temperature: recovery inlet :40°C - recovery outlet: 45°C.

Low noise setting up AS

Recovery heat exchanger specifications

Frame Model	1					2			3			4		U.M.
	40.2	50.2	60.2	70.2	80.2	90.2	100.2	115.2	130.2	145.2	160.2	180.2	200.2	
Type of recovery exchanger	Braze plates													-
Quantity	1													N°
Max. operating pressure on wet side	600													kPa
Total water content of recovery exchangers	3,61	3,61	4,56	5,42	6,27	5,46	5,93	6,86	7,49	8,74	9,67	10,9	12,6	l
Unit specification														
Cooling capacity VR (1)	47,1	55,6	60,9	71,6	81,8	94,6	106	116	131	149	164	187	208	kW
Total power input VR (1)	13,6	16,4	17,8	20,8	24,6	27,1	30,3	34,1	38,9	43,2	48,5	53,8	60,3	kW
EER VR (1)	3,46	3,39	3,42	3,44	3,33	3,49	3,50	3,40	3,37	3,45	3,38	3,48	3,45	-
Water flow rate VR (1)	2,25	2,66	2,91	3,42	3,91	4,52	5,06	5,54	6,26	7,12	7,84	8,93	9,94	l/s
Water pressure drop VR (1)	43	60	59	55	54	52	50	47	52	51	52	52	54	kPa
Recovered heating capacity (1)	60,0	71,2	77,8	91,4	105	120	135	148	168	190	210	238	265	kW
Recovered water flow rate (1)	2,87	3,40	3,72	4,37	5,02	5,73	6,45	7,07	8,03	9,08	10,0	11,4	12,7	l/s
Recovered water pressure drop (1)	35	49	41	45	50	48	52	47	52	51	52	55	55	kPa

(1): The data refer to: Water temperature: evaporator inlet :12°C - evaporator outlet: 7°C, Outdoor air temperature 35°C.
The data refer to: Water temperature: recovery inlet :40°C - recovery outlet: 45°C.

Extra low noise setting up AX

Recovery heat exchanger specifications

Frame Model	1					2			3			4		U.M.
	40.2	50.2	60.2	70.2	80.2	90.2	100.2	115.2	130.2	145.2	160.2	180.2	200.2	
Type of recovery exchanger	Braze plates													-
Quantity	1													N°
Max. operating pressure on wet side	600													kPa
Total water content of recovery exchangers	3,61	3,61	4,56	5,42	6,27	5,46	5,93	6,86	7,49	8,74	9,67	10,9	12,6	l
Unit specification														
Cooling capacity VR (1)	47,1	55,6	60,9	71,6	81,8	94,6	106	116	131	149	164	187	208	kW
Total power input VR (1)	13,6	16,4	17,8	20,8	24,6	27,1	30,3	34,1	38,9	43,2	48,5	53,8	60,3	kW
EER VR (1)	3,46	3,39	3,42	3,44	3,33	3,49	3,50	3,40	3,37	3,45	3,38	3,48	3,45	-
Water flow rate VR (1)	2,25	2,66	2,91	3,42	3,91	4,52	5,06	5,54	6,26	7,12	7,84	8,93	9,94	l/s
Water pressure drop VR (1)	43	60	59	55	54	52	50	47	52	51	52	52	54	kPa
Recovered heating capacity (1)	60,0	71,2	77,8	91,4	105	120	135	148	168	190	210	238	265	kW
Recovered water flow rate (1)	2,87	3,40	3,72	4,37	5,02	5,73	6,45	7,07	8,03	9,08	10,0	11,4	12,7	l/s
Recovered water pressure drop (1)	35	49	41	45	50	48	52	47	52	51	52	55	55	kPa

(1): The data refer to: Water temperature: evaporator inlet :12°C - evaporator outlet: 7°C, Outdoor air temperature 35°C.
The data refer to: Water temperature: recovery inlet :40°C - recovery outlet: 45°C.

TECHNICAL DATA - IR RECOVERY VERSION (VR)

Performances

MOD.	TWE	TWR - RECOVERY TEMPERATURE (°C)				
		35	40	45	50	55
		kWtr = Recovered HEATING CAPACITY [kW]				
40.2	5	60,7	59,0	57,3	55,6	53,9
	6	62,2	60,5	58,7	56,9	55,2
	7	63,7	61,9	60,0	58,2	56,4
	8	65,3	63,4	61,4	59,5	57,6
	9	66,8	64,8	62,8	60,8	58,8
	10	68,3	66,3	64,2	62,1	60,1
	11	69,9	67,7	65,6	63,4	61,3
50.2	12	71,4	69,2	67,0	64,7	62,5
	5	71,9	70,0	68,0	66,0	64,1
	6	73,7	71,7	69,6	67,5	65,5
	7	75,5	73,4	71,2	69,1	67,0
	8	77,3	75,1	72,9	70,6	68,4
	9	79,1	76,8	74,5	72,1	69,9
	10	80,9	78,6	76,1	73,7	71,3
60.2	11	82,8	80,3	77,8	75,2	72,8
	12	84,6	82,0	79,4	76,8	74,2
	5	78,6	76,4	74,2	72,0	69,9
	6	80,6	78,3	76,0	73,7	71,5
	7	82,5	80,2	77,8	75,4	73,1
	8	84,5	82,1	79,6	77,1	74,7
	9	86,5	84,0	81,4	78,8	76,3
70.2	10	88,5	85,9	83,2	80,5	77,8
	11	90,5	87,7	85,0	82,2	79,4
	12	92,5	89,6	86,7	83,8	81,0
	5	92,2	89,7	87,2	84,6	82,1
	6	94,6	91,9	89,2	86,5	83,9
	7	96,9	94,2	91,4	88,5	85,8
	8	99,2	96,4	93,4	90,5	87,6
80.2	9	102	98,6	95,5	92,5	89,5
	10	104	101	97,6	94,5	91,4
	11	106	103	99,7	96,4	93,2
	12	109	105	102	98,4	95,1
	5	106	103	100	97,5	94,7
	6	109	106	103	100	96,8
	7	111	108	105	102	99,0
90.2	8	114	111	108	104	101
	9	117	113	110	107	103
	10	119	116	112	109	105
	11	122	118	115	111	108
	12	125	121	117	113	110
	5	122	118	115	111	108
	6	125	121	118	114	110
100.2	7	128	124	120	117	113
	8	131	127	123	119	115
	9	134	130	126	122	118
	10	137	133	129	124	120
	11	140	136	131	127	123
	12	143	139	134	130	125
	5	136	133	129	125	121
115.2	6	140	136	132	128	124
	7	143	139	135	131	127
	8	147	142	138	134	129
	9	150	146	141	137	132
	10	154	149	144	139	135
	11	157	152	147	142	138
	12	160	156	150	145	140

MOD.	TWE	TWR - RECOVERY TEMPERATURE (°C)					
		35	40	45	50	55	
		kWtr = Recovered HEATING CAPACITY [kW]					
115.2	5	150	146	142	138	134	
	6	154	150	145	141	137	
	7	158	153	148	144	140	
	8	162	157	152	148	143	
	9	165	161	156	151	146	
	10	169	164	159	154	149	
	11	173	168	163	157	152	
	12	177	171	166	160	155	
	130.2	5	169	165	160	156	151
		6	174	169	164	159	155
		7	178	173	168	163	158
		8	182	177	172	167	161
9		187	181	176	170	165	
10		191	185	180	174	168	
11		195	189	183	177	172	
12		199	193	187	181	175	
145.2		5	192	186	181	176	170
		6	196	191	185	180	174
		7	201	196	190	184	178
		8	206	200	194	188	182
	9	211	205	198	192	186	
	10	216	209	203	196	190	
	11	221	214	207	200	194	
	12	226	219	212	204	198	
	160.2	5	212	207	201	195	189
		6	218	212	206	199	193
		7	223	217	210	204	198
		8	228	222	215	209	202
9		234	227	220	213	206	
10		239	232	225	218	211	
11		244	237	230	222	215	
12		250	242	234	227	219	
180.2		5	241	234	227	220	214
		6	247	240	233	226	219
		7	253	246	238	231	224
		8	259	251	244	236	228
	9	265	257	249	241	233	
	10	271	263	255	246	238	
	11	277	269	260	252	243	
	12	283	275	266	257	248	
	200.2	5	268	261	253	246	238
		6	275	267	259	251	244
		7	281	273	265	257	249
		8	288	280	271	263	254
9		295	286	277	269	260	
10		302	293	284	274	265	
11		309	299	290	280	271	
12		315	306	296	286	276	

kWtr = Recovery heat capacity

TWE= Evaporator outlet water temperature °C

TWR = Desuperheater outlet water temperature, $\Delta t_{in-out} = 5^\circ\text{C}$

The standard performances refer to a 5°C temperature difference between the water entering and leaving the heat exchanger and to operation of the unit with all fans at nominal or maximum speed. A $0.44 \times 10^{-4} \text{ m}^2 \text{ K/W}$ fouling factor has also been considered with the unit installed at zero meters above sea level (Pb = 1013mbar).

The performances are declared no considering any correction due to water flow rate and water side pressure drop (gross performance).

NOISE LEVELS

The noise levels refer to units operating in the nominal conditions (A35W7), due to a change of external air temperature noise levels may change to ensure proper functioning of the unit within operating range.

The acoustic pressure levels are calculated 1/ 5 / 10 meters away from the outer surface of the unit operating in the free field and resting on a reflecting surface (directional factor of 2).

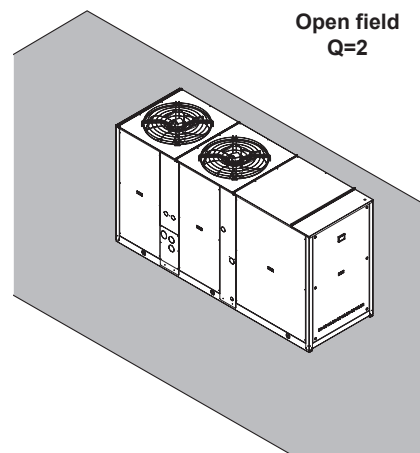
SWL = Sound power levels, with reference to 1×10^{-12} W.

The Total sound power level in dB(A) measured in compliance with ISO 9614 standards, is certified according to the Eurovent certification program.

Eurovent certification (E) exclusively refers to the Total Sound Power in dB(A), which is therefore the only binding acoustic specification (the values of the Octave bands in the table are indicative).

SPL = Sound pressure levels, with reference to 2×10^{-5} Pa.

The sound pressure levels are values calculated by applying the ISO-3744 relation (Eurovent 8/1).



Base setting up AB

MOD.	SWL (dB) Octave bands (Hz)								SWL		SPL dB(A)		
	63	125	250	500	1000	2000	4000	8000	dB	dB(A)(E)	1 m	5 m	10 m
40.2	85,4	88,3	84,6	79,8	76,3	69,8	61,2	52,3	92	82	64	55	50
50.2	85,4	88,3	84,6	79,8	76,3	69,8	61,2	52,3	92	82	64	55	50
60.2	89,4	87,0	84,8	80,3	77,4	73,8	65,3	56,0	93	83	65	56	51
70.2	91,2	88,9	86,4	82,3	78,0	71,6	64,0	55,6	94	84	66	57	52
80.2	91,2	88,9	86,4	82,3	78,0	71,6	64,0	55,6	94	84	66	57	52
90.2	92,2	89,9	87,4	83,3	79,0	72,6	65,0	56,6	95	85	67	58	53
100.2	92,2	89,9	87,4	83,3	79,0	72,6	65,0	56,6	95	85	67	58	53
115.2	92,2	89,9	87,4	83,3	79,0	72,6	65,0	56,6	95	85	67	58	53
130.2	92,4	90,0	87,8	83,3	80,4	76,8	68,3	59,0	96	86	68	59	54
145.2	94,2	91,9	89,4	85,3	81,0	74,6	67,0	58,6	97	87	69	60	55
160.2	94,2	91,9	89,4	85,3	81,0	74,6	67,0	58,6	97	87	69	60	55
180.2	92,4	90,1	88,6	86,0	83,2	77,8	71,2	62,8	96	88	69	61	56
200.2	92,4	90,1	88,6	86,0	83,2	77,8	71,2	62,8	96	88	69	61	56

Low noise setting up AS

MOD.	SWL (dB) Octave bands (Hz)								SWL		SPL dB(A)		
	63	125	250	500	1000	2000	4000	8000	dB	dB(A)(E)	1 m	5 m	10 m
40.2	90,0	82,0	81,0	77,0	73,5	67,0	64,0	52,0	91	79	61	52	47
50.2	90,0	82,0	81,0	77,0	73,5	67,0	64,0	52,0	91	79	61	52	47
60.2	83,4	86,3	82,6	77,8	74,3	67,8	59,2	50,3	90	80	62	53	48
70.2	84,4	87,3	83,6	78,8	75,3	68,8	60,2	51,3	91	81	63	54	49
80.2	84,4	87,3	83,6	78,8	75,3	68,8	60,2	51,3	91	81	63	54	49
90.2	85,4	88,3	84,6	79,8	76,3	69,8	61,2	52,3	92	82	64	55	50
100.2	85,4	88,3	84,6	79,8	76,3	69,8	61,2	52,3	92	82	64	55	50
115.2	85,4	88,3	84,6	79,8	76,3	69,8	61,2	52,3	92	82	64	55	50
130.2	89,4	87,0	84,8	80,3	77,4	73,8	65,3	56,0	93	83	65	56	51
145.2	91,2	88,9	86,4	82,3	78,0	71,6	64,0	55,6	94	84	66	57	52
160.2	91,2	88,9	86,4	82,3	78,0	71,6	64,0	55,6	94	84	66	57	52
180.2	92,2	89,9	87,4	83,3	79,0	72,6	65,0	56,6	95	85	66	58	53
200.2	92,2	89,9	87,4	83,3	79,0	72,6	65,0	56,6	95	85	66	58	53

Extra low noise setting up AX

MOD.	SWL (dB) Octave bands (Hz)								SWL		SPL dB(A)		
	63	125	250	500	1000	2000	4000	8000	dB	dB(A)(E)	1 m	5 m	10 m
40.2	82,6	83,6	80,2	74,8	71,0	65,5	59,4	53,6	88	77	59	50	45
50.2	82,6	83,6	80,2	74,8	71,0	65,5	59,4	53,6	88	77	59	50	45
60.2	89,0	81,0	80,0	76,0	72,0	67,0	62,0	52,0	90	78	60	51	46
70.2	90,0	82,0	81,0	77,0	73,5	67,0	64,0	52,0	91	79	61	52	47
80.2	90,0	82,0	81,0	77,0	73,5	67,0	64,0	52,0	91	79	61	52	47
90.2	83,4	86,3	82,6	77,8	74,3	67,8	59,2	50,3	90	80	62	53	48
100.2	83,4	86,3	82,6	77,8	74,3	67,8	59,2	50,3	90	80	62	53	48
115.2	83,4	86,3	82,6	77,8	74,3	67,8	59,2	50,3	90	80	62	53	48
130.2	84,4	87,3	83,6	78,8	75,3	68,8	60,2	51,3	91	81	63	54	49
145.2	85,4	88,3	84,6	79,8	76,3	69,8	61,2	52,3	92	82	64	55	50
160.2	85,4	88,3	84,6	79,8	76,3	69,8	61,2	52,3	92	82	64	55	50
180.2	89,4	87,0	84,8	80,3	77,4	73,8	65,3	56,0	93	83	64	56	51
200.2	89,4	87,0	84,8	80,3	77,4	73,8	65,3	56,0	93	83	64	56	51

(E): Data declared according to EUROVENT LCP certification programme. The values are for units without options and accessories.

OPERATING RANGE

Operating range

The table below lists the operating ranges within which correct operation of the units is guaranteed, depending on the Version and Operating Mode available for each type of unit.
Remember that in Heat Pump units, heat recovery only takes place during operation in the cooling mode.

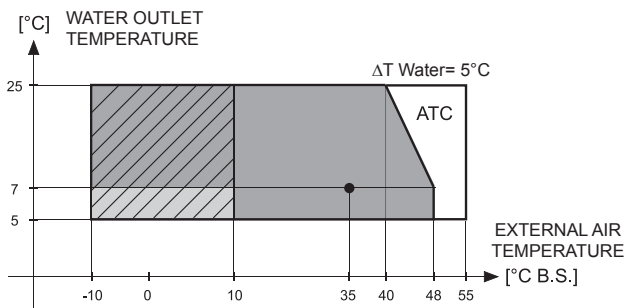
NOTE: the admissible limits for water flow rate on heat exchangers are indicated under the related pressure drop graph (see section "water pressure drop"). If the unit is equipped with pumping module the admissible limits are indicated under the related working head graph (see section "working head").

Operating range of Base version

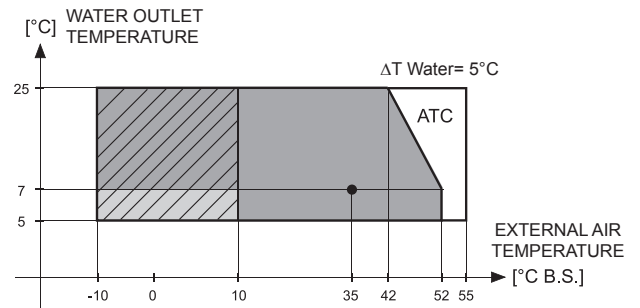
Thermal gradient of the water		Limit value
Minimum	°C	3
Maximum	°C	8
Verify that water flow rate is inside the admissible limits.		

IN COOLING MODE

UNIT MEDIUM TEMPERATURE - 0 M 5

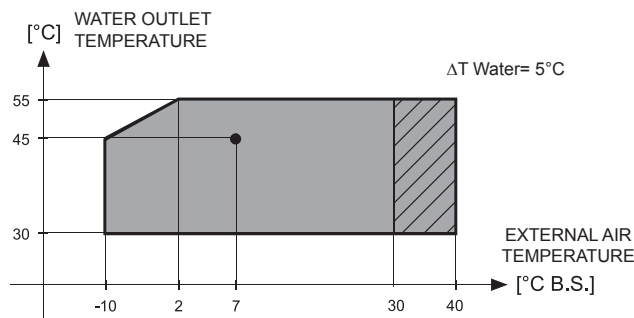


UNIT HIGH TEMPERATURE - 0 A 5



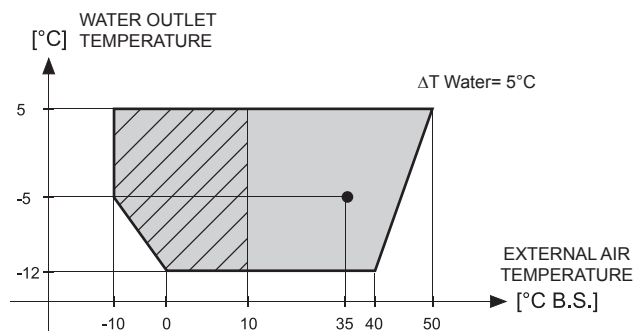
- With accessory fans modulating control
- With accessory fans modulating control (brine is recommended)
- ATC (Advanced Temperature Control) function may occur, if present

IN HEATING MODE



- With accessory fans modulating control

BRINE UNIT BR - BP - IN COOLING MODE

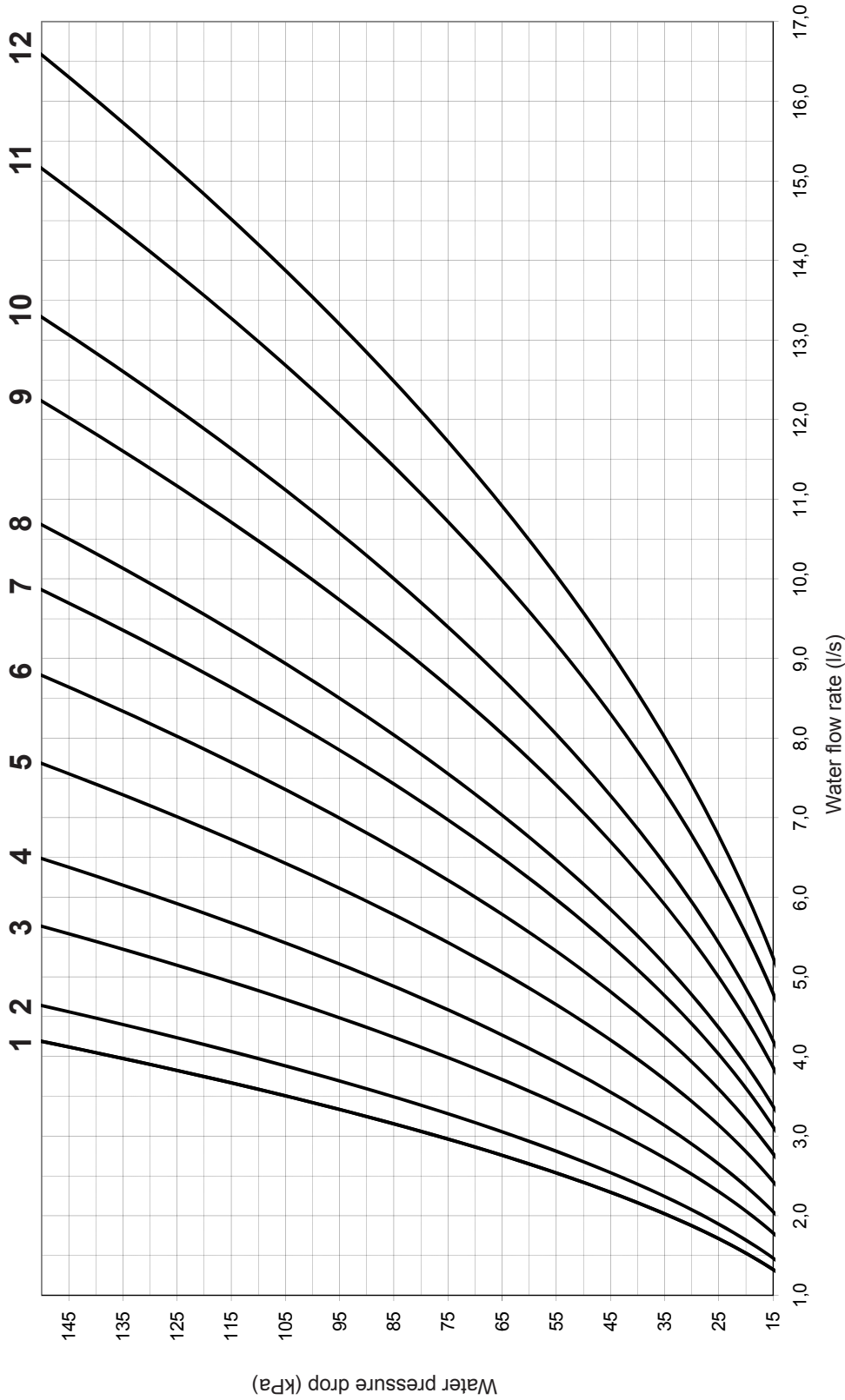


- With accessory fans modulating control (brine is mandatory)
- Brine is mandatory

WATER PRESSURE DROP

Plant side exchanger

The graph below illustrates the water pressure drop values in kPa depending on the flow rate in liters/second. The operating range is delimited by the minimum and maximum values given in the next table.
The graphs are referred to units operating with water at the temperature of 10°C (density 1000 kg/m³).



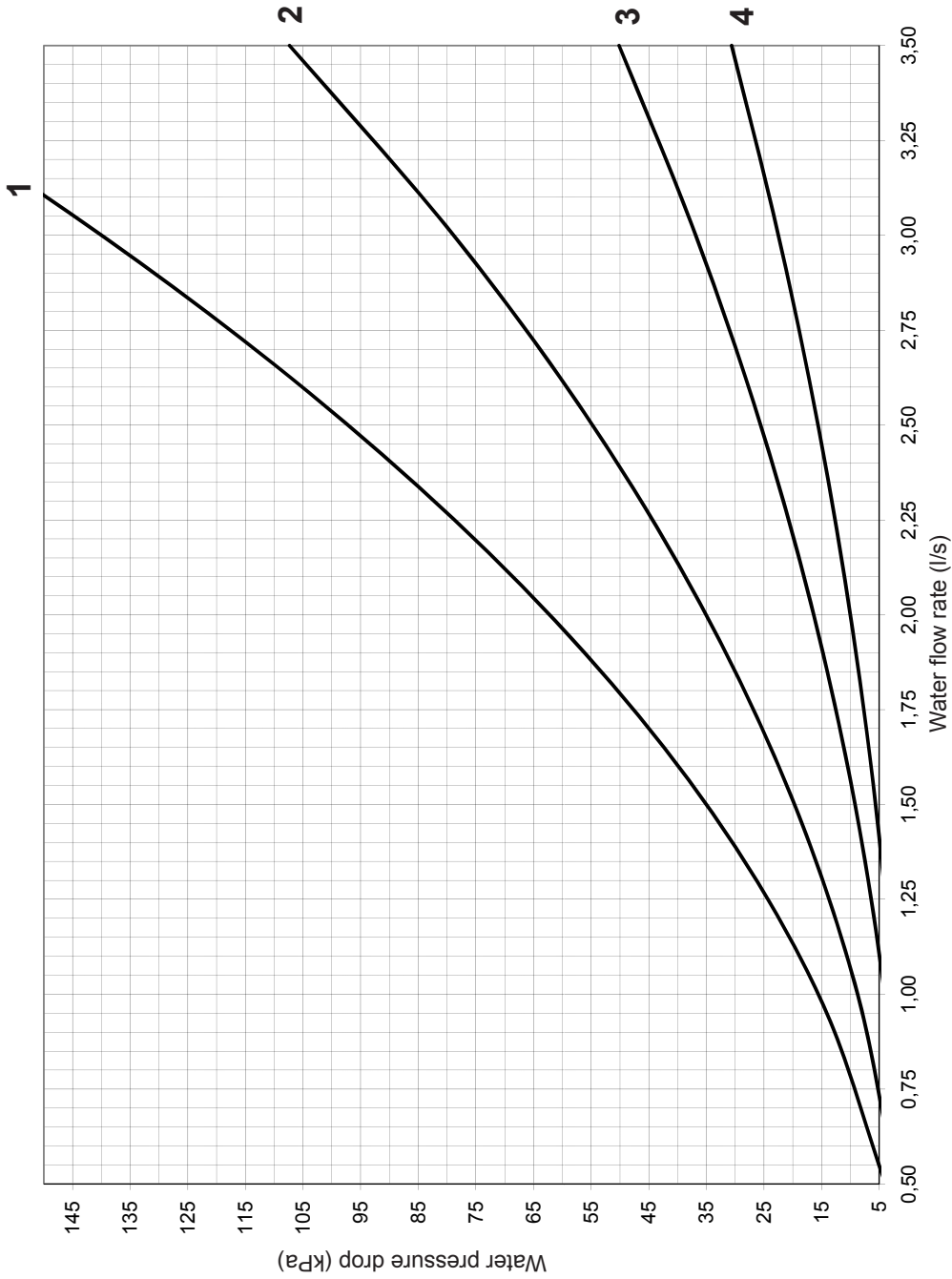
Operating range

MODELS	40.2	50.2	60.2	70.2	80.2	90.2	100.2	115.2	130.2	145.2	160.2	180.2	200.2	UM	NOTE
Graphic refer	1	1	2	3	4	5	6	7	8	9	10	11	12	-	Q= Water flow rate ΔP= Water pressure drop
	Q	1,33	1,33	1,47	1,78	2,05	2,43	2,78	3,12	3,38	3,87	4,20	4,79	5,24	
Lower limit value	Δp	15												kPa	
Upper limit value	Q	4,19	4,19	4,64	5,64	6,49	7,68	8,79	9,86	10,7	12,2	13,3	15,2	16,6	l/s
	Δp	150												kPa	

WATER PRESSURE DROP

Desuperheaters

The graph below illustrates the water pressure drop values in kPa depending on the flow rate in liters/second. The operating range is delimited by the minimum and maximum values given in the next table.
The graphs are referred to units operating with water at the temperature of 10°C (density 1000 kg/m³).



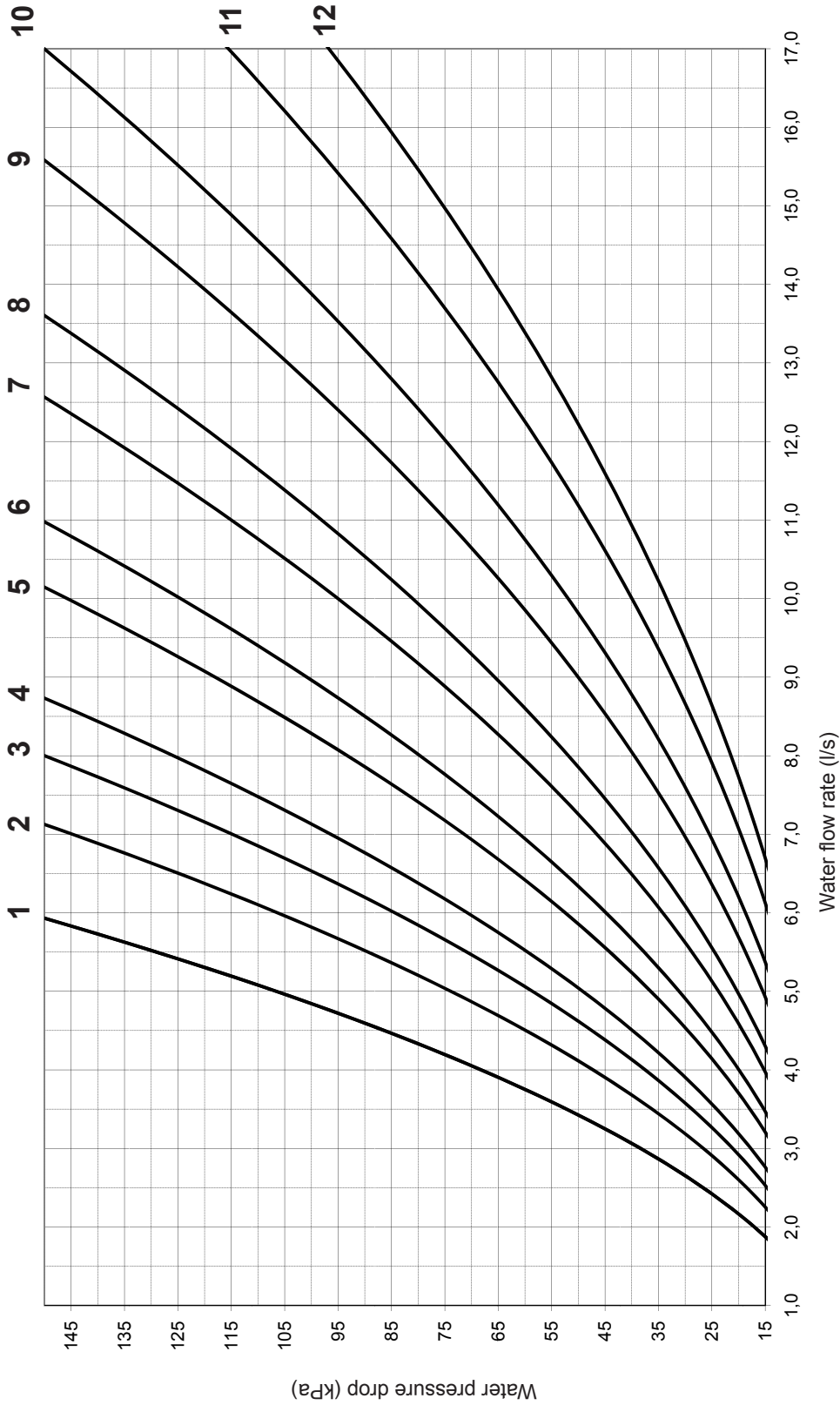
Operating range

MODELS	40.2	50.2	60.2	70.2	80.2	80.2	90.2	100.2	115.2	130.2	145.2	160.2	180.2	200.2	UM	NOTE
Graphic refer	1	1	1	1	1	1	2	2	2	3	3	3	4	4	-	Q= Water flow rate ΔP= Water pressure drop
	Q	0,57	0,57	0,57	0,57	0,57	0,76	0,76	0,76	1,11	1,11	1,11	1,41	1,41	l/s	
Lower limit value	Δp	3,11	3,11	3,11	3,11	3,11	3,50	3,50	3,50	3,50	3,50	3,50	3,50	3,50	kPa	
Upper limit value	Q	3,11	3,11	3,11	3,11	3,11	3,50	3,50	3,50	3,50	3,50	3,50	3,50	3,50	l/s	
	Δp	150	150	150	150	150	150	150	150	150	150	150	150	150	kPa	

WATER PRESSURE DROP

Total recovery exchanger

The graph below illustrates the water pressure drop values in kPa depending on the flow rate in liters/second. The operating range is delimited by the minimum and maximum values given in the next table.
The graphs are referred to units operating with water at the temperature of 10°C (density 1000 kg/m³).



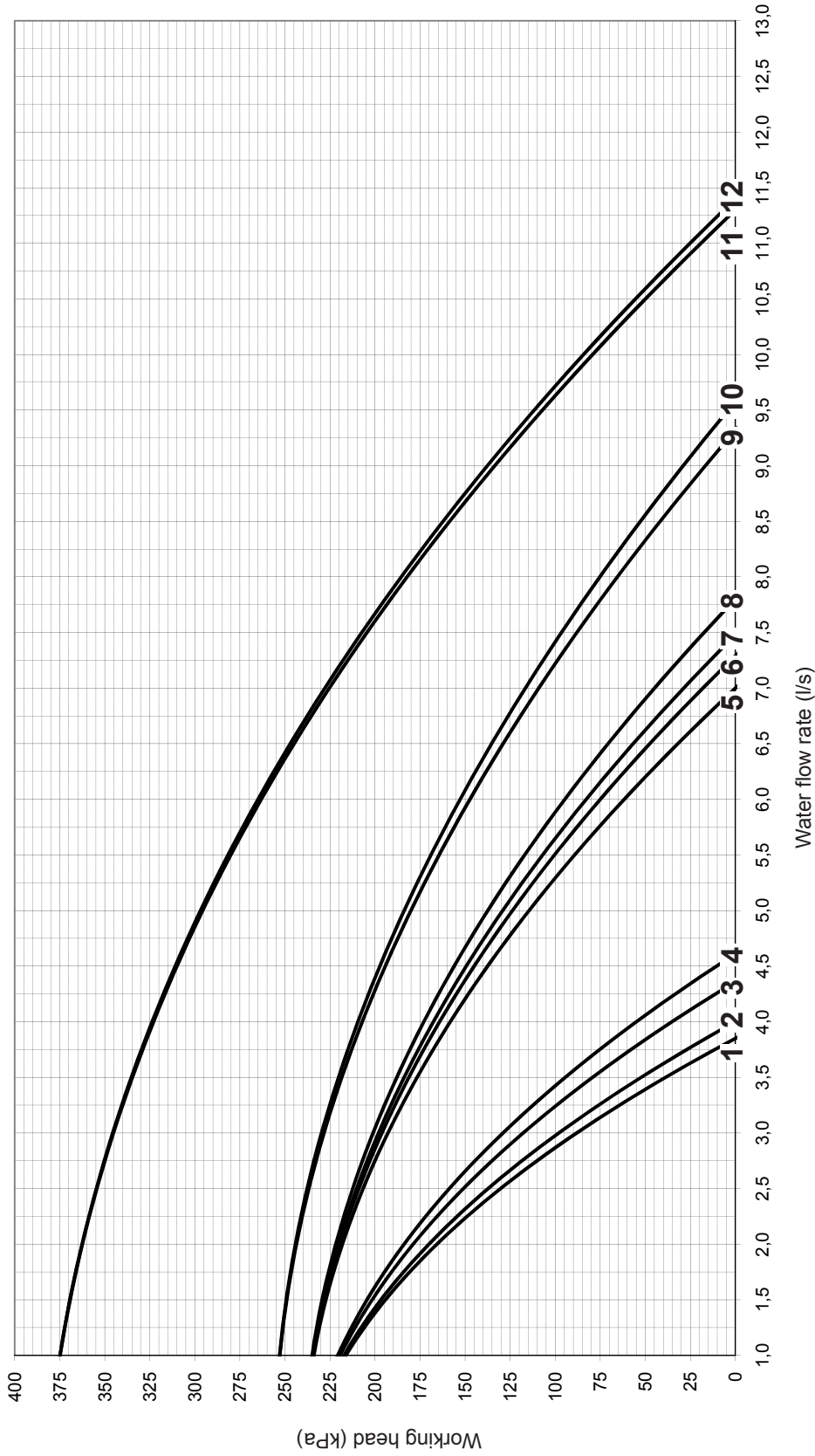
Operating range

MODELS	40.2	50.2	60.2	70.2	80.2	90.2	100.2	115.2	130.2	145.2	160.2	180.2	200.2	UM	NOTE
Graphic refer	1	1	2	3	4	5	6	7	8	9	10	11	12	-	Q= Water flow rate ΔP= Water pressure drop
	1,88	1,89	2,25	2,53	2,76	3,21	3,47	3,97	4,30	4,93	5,38	6,13	6,69	l/s	
Lower limit value	15													kPa	
Upper limit value	Q	5,93	7,13	8,00	8,73	10,1	11,0	12,6	13,6	15,6	17,0	17,0	17,0	l/s	kPa
	Δp	150													

WORKING HEAD

Standard working head pumps

Working head is that at the pumping module outlet reduced by all pressure losses inside the unit. The graph below illustrates for the pumping module the working head values in kPa depending on the flow rate in liters/second. The operating range is delimited by the minimum and maximum values given in the next table. The graphs are referred to units operating with water at the temperature of 10°C (density 1000 kg/m³).



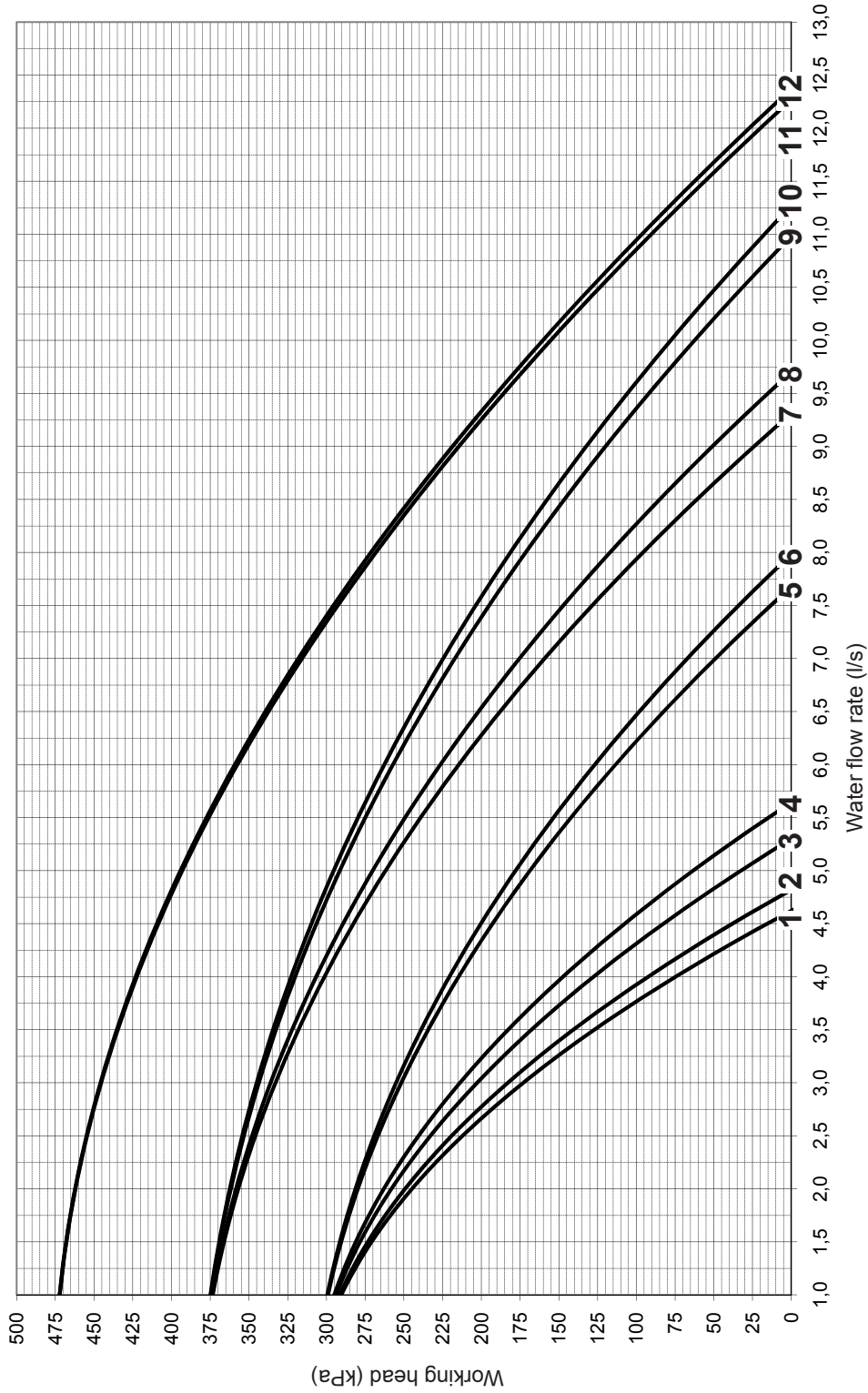
Operating range

MODELS	40.2	50.2	60.2	70.2	80.2	90.2	100.2	115.2	130.2	145.2	160.2	180.2	200.2	UM	NOTE
Graphic refer	1	1	2	3	4	5	6	7	8	9	10	11	12	-	Q= Water flow rate
Lower limit value	1,33	1,33	1,47	1,78	2,05	2,43	2,78	3,12	3,38	3,87	4,20	4,79	5,24	l/s	
Upper limit value	3,85	3,85	4,00	4,36	4,61	7,00	7,29	7,48	7,80	9,32	9,58	11,3	11,4	l/s	

WORKING HEAD

High working head pumps

Working head is that at the pumping module outlet reduced by all pressure losses inside the unit. The graph below illustrates for the pumping module the working head values in kPa depending on the flow rate in liters/second. The operating range is delimited by the minimum and maximum values given in the next table. The graphs are referred to units operating with water at the temperature of 10°C (density 1000 kg/m³).



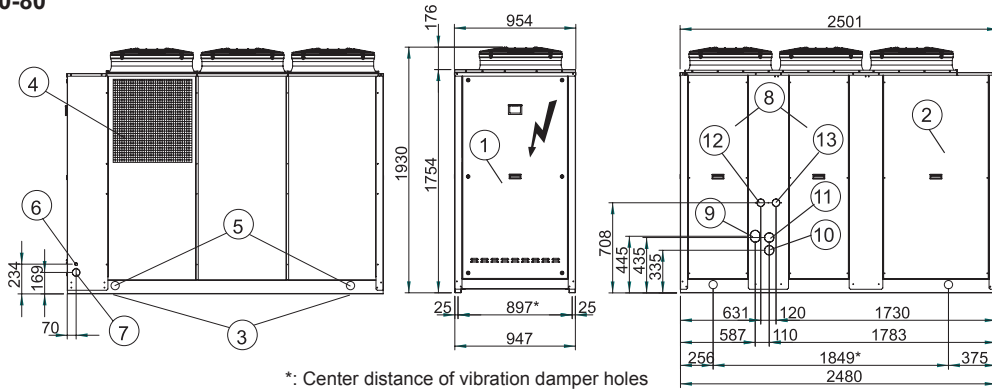
Operating range

MODELS	40.2	50.2	60.2	70.2	80.2	90.2	100.2	115.2	130.2	145.2	160.2	180.2	200.2	UM	NOTE
Graphic refer	1	1	2	3	4	5	6	7	8	9	10	11	12	-	Q= Water flow rate
Lower limit value	1,33	1,33	1,47	1,78	2,05	2,43	2,78	3,12	3,38	3,87	4,20	4,79	5,24	l/s	
Upper limit value	4,62	4,62	4,82	5,30	5,64	7,68	7,98	9,31	9,70	11,0	11,3	12,3	12,4	l/s	

DIMENSIONAL AND PHYSICAL DATA

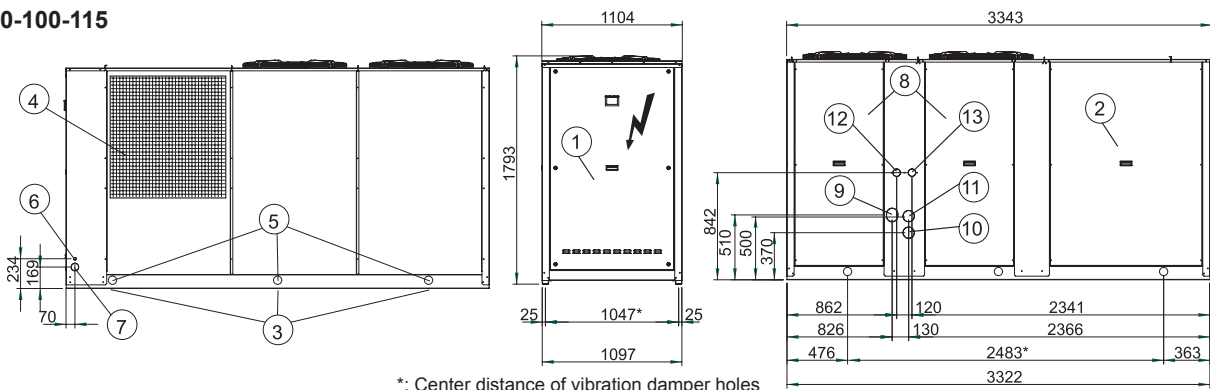
Overall dimensions

Mod. 40-50-60-70-80



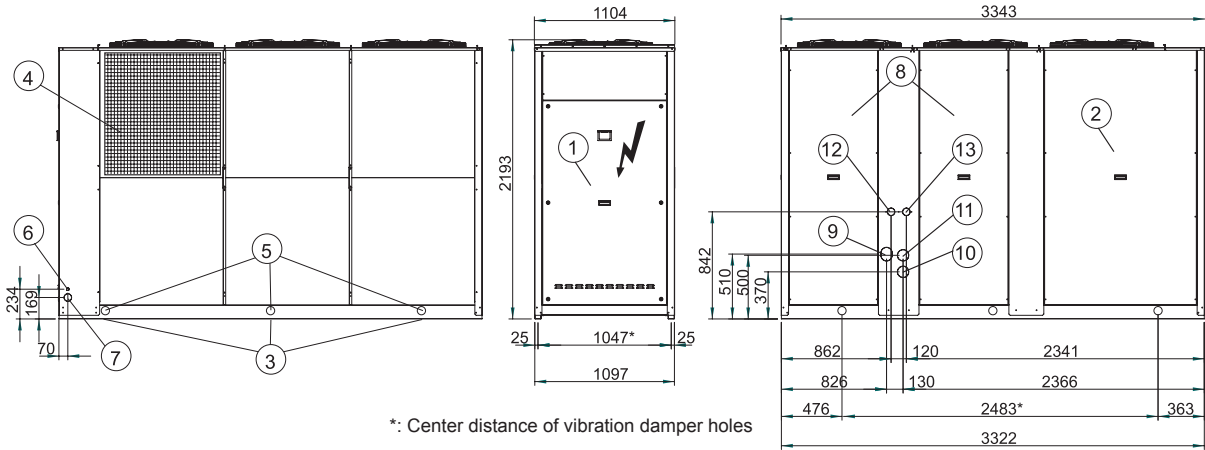
*: Center distance of vibration damper holes

Mod. 90-100-115



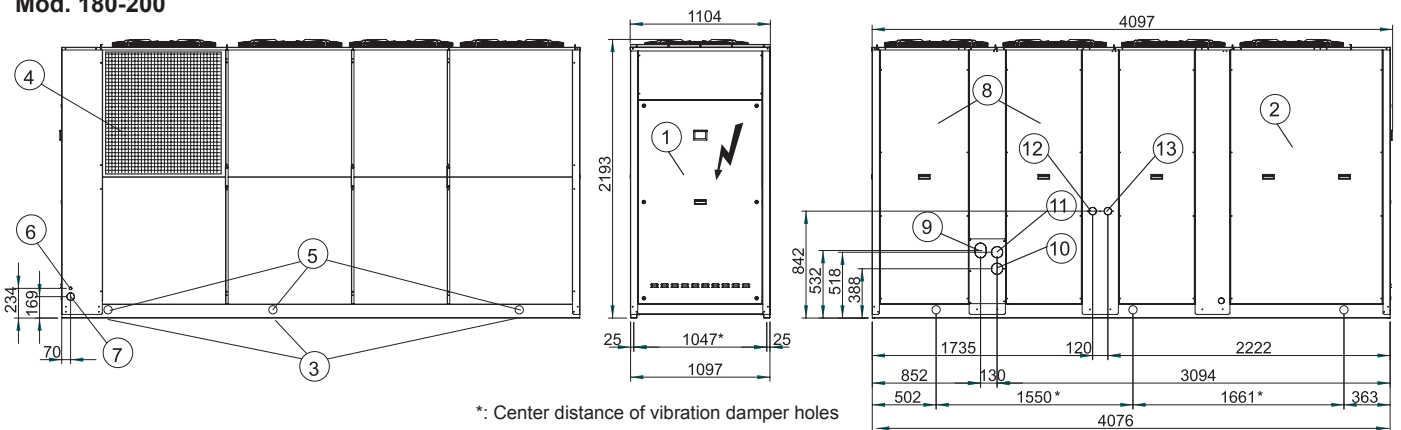
*: Center distance of vibration damper holes

Mod. 130-145-160



*: Center distance of vibration damper holes

Mod. 180-200



*: Center distance of vibration damper holes

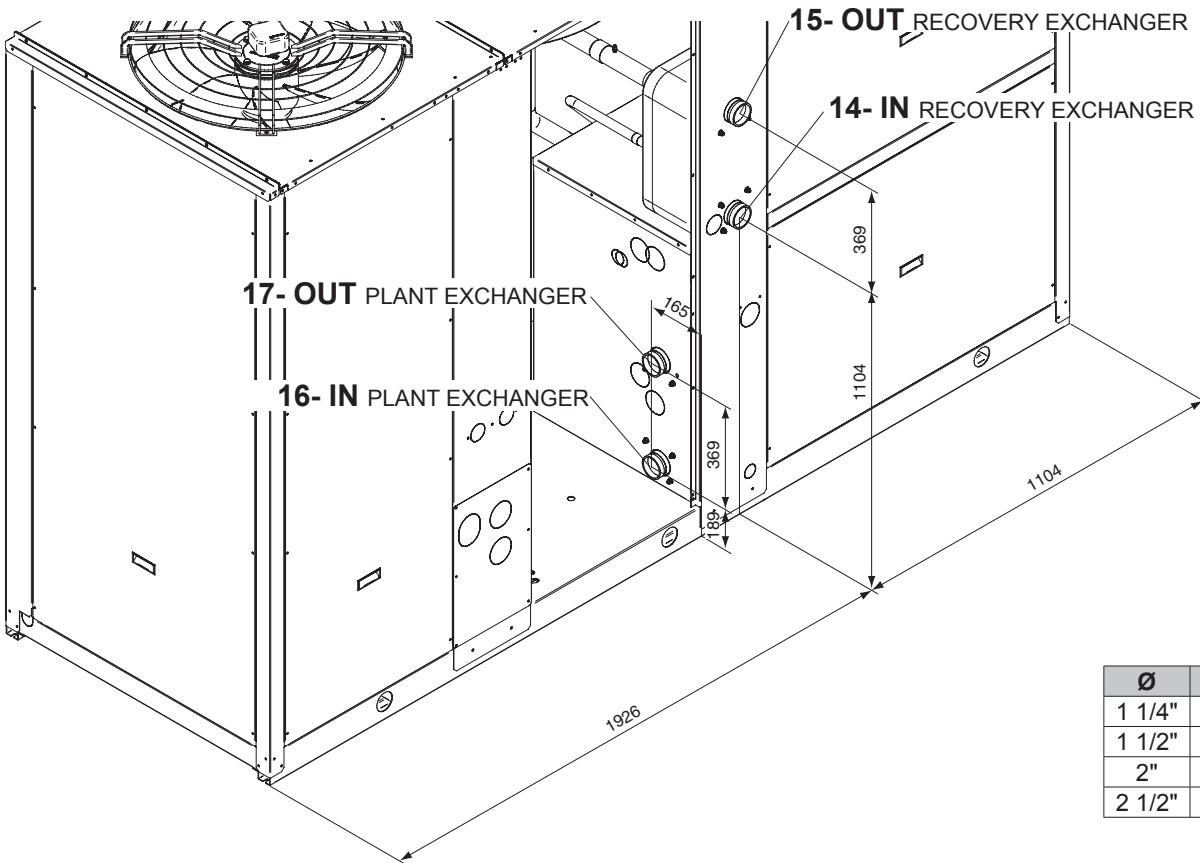
DIMENSIONAL AND PHYSICAL DATA

Description of the components

- 1 - Access panel to electric panel's power section
- 2 - Access panel to compressor compartment
- 3 - Vibration damper fixing holes (4 pcs)
- 4 - Coil protection grilles (accessory)
- 5 - \varnothing 65 mm lifting holes
- 6 - \varnothing 22 mm input hole for accessory cables
- 7- \varnothing 60 mm hole for electric power supply input
- 8 - Access panel to pump compartment
- 9 - Water inlet for AM SS
- 10 - Water inlet for PS

- 11 - Water outlet
- 12 - Water inlet for Desuperheater (VD)
- 13 - Water outlet for Desuperheater (VD)
- 14 - Water inlet for Total recovery (VR)
- 15 - Water outlet for Total recovery (VR)
- 16 - Water inlet for plant exchanger
- 17 - Water outlet for plant exchanger

Note (1): Victaulic connections Kit do not allow external connections.



\varnothing	DN	Type
1 1/4"	DN32	Victaulic
1 1/2"	DN40	Victaulic
2"	DN50	Victaulic
2 1/2"	DN65	Victaulic

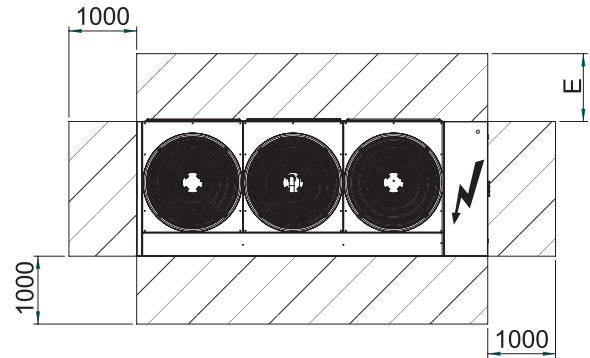
Mod.	STANDARD UNIT				VICTAULIC CONNECTIONS				PIPE KIT WITHOUT TANK MKT SS				MP AM MP SS				MP PS				VD				VR				
	IN		OUT		IN		OUT		IN		OUT		IN		OUT		IN		OUT		IN		OUT		IN		OUT		
	\varnothing	Rif.	\varnothing	Rif.	\varnothing	Rif.	\varnothing	Rif.	\varnothing	Rif.	\varnothing	Rif.	\varnothing	Rif.	\varnothing	Rif.	\varnothing	Rif.	\varnothing	Rif.	\varnothing	Rif.	\varnothing	Rif.	\varnothing	Rif.	\varnothing	Rif.	
40																													
50																													
60	1		1		2"		2"		2"		2"		2"		2"		2"		2"		2"		2"		2"		2"		2"
70	1/4"		1/4"		2"		2"		2"		2"		2"		2"		2"		2"		2"		2"		2"		2"		2"
80																													
90																													
100		16		17		16		17		10		11		9		11		10		11		12		13		14		15	
115																													
130	2		2		2		2		2		2		2		2		2		2		2		2		2		2		2
145	1/2"		1/2"		1/2"		1/2"		1/2"		1/2"		1/2"		1/2"		1/2"		1/2"		1/2"		1/2"		1/2"		1/2"		1/2"
160																													
180																													
200																													

DIMENSIONAL AND PHYSICAL DATA

Minimum space required for operation

To correctly install the unit, comply with the measurements for the free area that must be left around the unit, as shown in the figure. This will ensure good air circulation, allow the unit to operate correctly and facilitate future maintenance work. The distances must be doubled if the unit is to be installed in a pit.

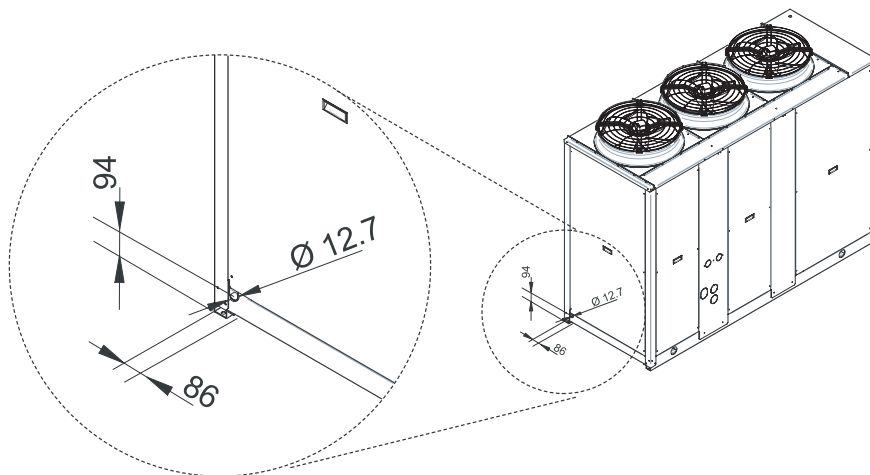
NOTE. Allow for an uncluttered area of not less than 2.5 meters above the unit.



Mod.	40÷115	130÷200	UM
E	1600	2000	mm

Position of condensate drain

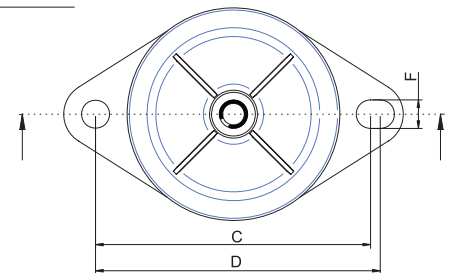
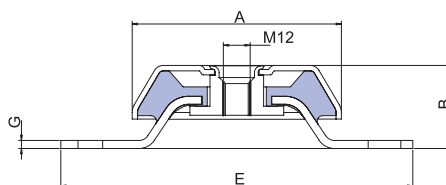
The condensate tray (if present) must have a suitable drain trap to prevent spilling of water during operation.



Vibration-damper installation

To prevent the operating unit from transmitting vibrations to the bearing structure, vibration dampening materials should be inserted under the bearing points.

The unit can be supplied with the rubber or spring vibration dampening accessory. This must be mounted by the installer.

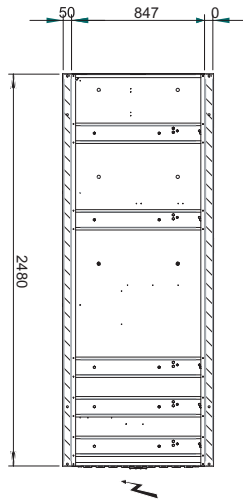


Unit	Mod.	A	B	C	D	E	F	G	UM
Unit without tank	40-80	95	35	122	124	150	10	3	mm
	90-160	106	37	136	150	170	12,5	3,5	mm
	180-200	95	35	122	124	150	10	3	mm
Unit with tank	40-80	95	35	122	124	150	10	3	mm
	90-200	106	37	136	150	170	12,5	3,5	mm

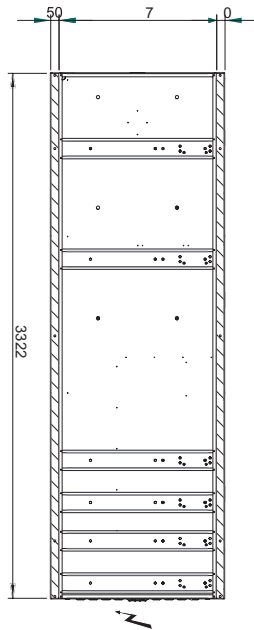
DIMENSIONAL AND PHYSICAL DATA

Area of support

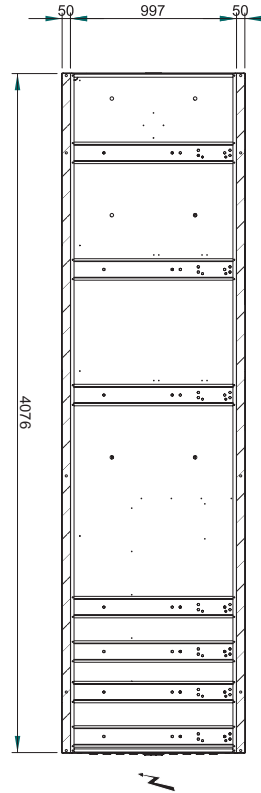
Mod. 40-50-60-70-80



Mod. 90-100-115-130-145-160

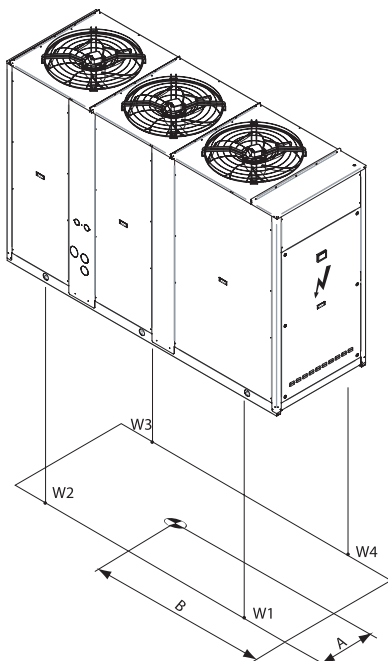


Mod. 180-200

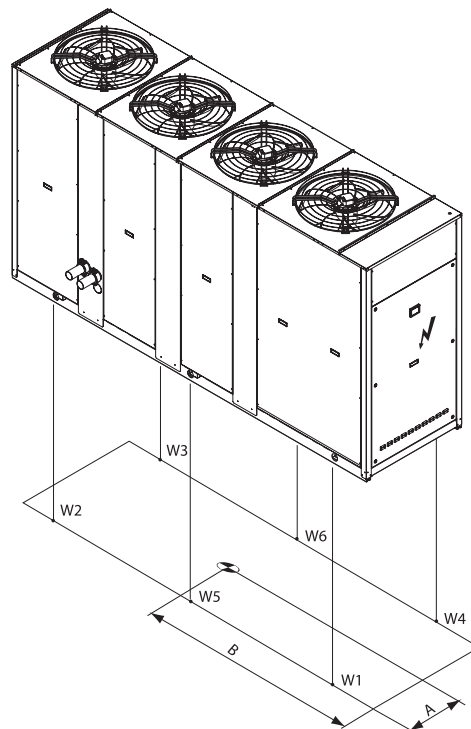


To correctly install the unit, comply with the measurements for the free area that must be left around the unit, as shown in the drawing.

Mod. 40-50-60-70-80-90-100-115-130-145-160



Mod. 180-200



DIMENSIONAL AND PHYSICAL DATA

Transport weight

UNIT WITHOUT WATER STORAGE TANK

Unit WITHOUT Hydronic kit

IR version

Acoustic version	AB-AS			AX		
	Center of gravity position [mm]		Weight [Kg]	Center of gravity position [mm]		Weight [Kg]
	A	B		A	B	
40.2	401	890	565	419	906	587
50.2	401	888	567	419	904	589
60.2	403	878	592	421	894	614
70.2	414	883	630	424	894	646
80.2	419	887	656	419	887	663
90.2	467	1199	893	484	1213	913
100.2	449	1146	973	465	1160	993
115.2	455	1158	1023	482	1180	1112
130.2	458	1152	1110	476	1168	1138
145.2	457	1141	1163	475	1156	1191
160.2	470	1150	1211	470	1150	1223
180.2	465	1389	1356	480	1407	1389
200.2	477	1399	1400	477	1399	1414

IP version

Acoustic version	AB-AS			AX		
	Center of gravity position [mm]		Weight [Kg]	Center of gravity position [mm]		Weight [Kg]
	A	B		A	B	
40.2	414	872	597	430	888	619
50.2	414	870	599	430	886	621
60.2	416	860	624	432	876	646
70.2	424	865	663	434	875	679
80.2	430	871	688	430	871	695
90.2	478	1180	932	494	1194	952
100.2	460	1130	1012	475	1144	1032
115.2	466	1142	1062	492	1165	1155
130.2	469	1138	1153	486	1153	1182
145.2	468	1128	1210	485	1143	1238
160.2	480	1137	1260	480	1137	1273
180.2	474	1368	1407	488	1386	1440
200.2	486	1378	1451	486	1378	1466

Unit WITH Hydronic kit

IR version

Acoustic version	AB-AS			AX		
	Center of gravity position [mm]		Weight [Kg]	Center of gravity position [mm]		Weight [Kg]
	A	B		A	B	
40.2	364	1048	680	380	1057	702
50.2	364	1046	682	380	1055	704
60.2	366	1036	707	382	1045	729
70.2	377	1032	745	386	1038	761
80.2	383	1031	770	383	1031	778
90.2	432	1375	1037	446	1384	1057
100.2	419	1316	1117	432	1325	1137
115.2	425	1328	1167	448	1338	1267
130.2	427	1314	1266	444	1324	1294
145.2	428	1297	1318	444	1308	1347
160.2	440	1300	1367	440	1300	1381
180.2	432	1615	1555	445	1626	1588
200.2	444	1617	1599	444	1617	1615

IP version

Acoustic version	AB-AS			AX		
	Center of gravity position [mm]		Weight [Kg]	Center of gravity position [mm]		Weight [Kg]
	A	B		A	B	
40.2	376	1026	712	391	1035	734
50.2	376	1024	714	391	1033	736
60.2	378	1014	739	393	1023	761
70.2	387	1011	778	397	1017	794
80.2	393	1011	803	393	1011	811
90.2	443	1352	1076	456	1361	1096
100.2	429	1296	1156	442	1305	1176
115.2	435	1308	1206	458	1319	1311
130.2	438	1296	1309	454	1306	1338
145.2	439	1281	1366	454	1291	1394
160.2	450	1283	1416	450	1283	1430
180.2	441	1589	1606	454	1601	1639
200.2	452	1592	1650	452	1592	1667

UNIT WITH WATER STORAGE TANK

Unit WITHOUT Hydronic kit

R version

Acoustic version	AB-AS			AX		
	Center of gravity position [mm]		Weight [Kg]	Center of gravity position [mm]		Weight [Kg]
	A	B		A	B	
40.2	409	993	639	424	1004	661
50.2	409	991	641	424	1002	663
60.2	411	981	666	426	992	688
70.2	420	980	704	429	988	720
80.2	424	981	729	424	981	736
90.2	475	1323	997	490	1333	1018
100.2	458	1266	1077	472	1276	1098
115.2	464	1278	1127	487	1283	1216
130.2	465	1257	1214	482	1270	1243
145.2	464	1243	1267	480	1255	1296
160.2	476	1247	1315	476	1247	1328
180.2	476	1519	1497	489	1533	1530
200.2	487	1524	1541	487	1524	1556

IP version

Acoustic version	AB-AS			AX		
	Center of gravity position [mm]		Weight [Kg]	Center of gravity position [mm]		Weight [Kg]
	A	B		A	B	
40.2	420	973	671	434	984	693
50.2	420	971	673	434	982	695
60.2	422	961	698	436	972	720
70.2	429	960	737	438	967	753
80.2	434	962	761	434	962	769
90.2	485	1301	1036	499	1311	1056
100.2	468	1247	1116	481	1257	1136
115.2	474	1259	1166	496	1265	1259
130.2	475	1241	1258	491	1253	1286
145.2	474	1227	1314	489	1239	1343
160.2	485	1232	1364	485	1232	1378
180.2	484	1496	1548	496	1509	1581
200.2	4994	1501	1592	4994	1501	1608

Unit WITH Hydronic kit

IR version

Acoustic version	AB-AS			AX		
	Center of gravity position [mm]		Weight [Kg]	Center of gravity position [mm]		Weight [Kg]
	A	B		A	B	
40.2	377	1108	744	391	1115	767
50.2	377	1106	746	391	1113	769
60.2	379	1096	771	393	1103	794
70.2	388	1090	810	397	1095	825
80.2	393	1087	835	393	1087	843
90.2	446	1452	1127	460	1458	1147
100.2	433	1392	1207	446	1399	1227
115.2	439	1404	1257	459	1404	1357
130.2	440	1381	1355	455	1390	1384
145.2	440	1364	1408	455	1372	1437
160.2	451	1364	1457	451	1364	1472
180.2	448	1700	1675	460	1708	1708
200.2	459	1699	1719	459	1699	1736

IP version

Acoustic version	AB-AS			AX		
	Center of gravity position [mm]		Weight [Kg]	Center of gravity position [mm]		Weight [Kg]
	A	B		A	B	
40.2	388	1086	776	401	1093	799
50.2	388	1084	778	401	1091	801
60.2	390	1074	803	403	1081	826
70.2	398	1068	843	406	1073	858
80.2	403	1067	867	403	1067	876
90.2	456	1428	1165	468	1435	1186
100.2	442	1372	1245	454	1379	1266
115.2	448	1384	1295	468	1385	1401
130.2	449	1363	1399	464	1371	1427
145.2	449	1346	1456	464	1354	1484
160.2	460	1346	1506	460	1346	1521
180.2	456	1673	1726	468	1682	1759
200.2	466	1674	1770	466	1674	1788

NOTA: For Desuperheater versions VD the total weight increases of 4%. For Heat recovery versions VR the total weight increases of 10%.

DIMENSIONAL AND PHYSICAL DATA

Operation weight

UNIT WITHOUT WATER STORAGE TANK

IR version

Unit WITHOUT Hydronic kit

Acoustic version	AB-AS									AX								
	Center of gravity position [mm]		Load on the supports [Kg]						Weight [Kg]	Center of gravity position [mm]		Load on the supports [Kg]						Weight [Kg]
	A	B	W1	W2	W3	W4	W5	W6		A	B	W1	W2	W3	W4	W5	W6	
40.2	399	890	241	90	65	174	-	-	569	417	906	238	93	73	186	-	-	590
50.2	399	888	241	90	65	174	-	-	571	417	904	239	93	73	187	-	-	592
60.2	401	878	252	94	68	182	-	-	596	419	894	249	97	76	195	-	-	617
70.2	411	884	262	99	75	198	-	-	634	422	894	261	102	81	207	-	-	651
80.2	417	888	269	103	80	209	-	-	661	417	888	272	104	81	211	-	-	668
90.2	465	1201	346	176	128	250	-	-	900	481	1215	342	178	138	263	-	-	921
100.2	447	1148	401	185	125	270	-	-	981	462	1162	396	188	134	283	-	-	1001
115.2	461	1166	432	206	147	308	-	-	1093	479	1181	426	209	160	326	-	-	1121
130.2	455	1154	450	210	147	314	-	-	1121	473	1170	444	214	160	332	-	-	1150
145.2	453	1143	477	219	151	330	-	-	1177	471	1159	470	222	164	349	-	-	1205
160.2	466	1152	484	225	164	352	-	-	1225	466	1152	489	227	166	356	-	-	1237
180.2	463	1389	412	114	40	338	269	194	1367	477	1407	407	113	50	344	265	202	1381
200.2	475	1399	419	115	49	352	272	206	1413	475	1399	423	116	49	356	275	208	1427

Unit WITH Hydronic kit

Acoustic version	AB-AS									AX								
	Center of gravity position [mm]		Load on the supports [Kg]						Weight [Kg]	Center of gravity position [mm]		Load on the supports [Kg]						Weight [Kg]
	A	B	W1	W2	W3	W4	W5	W6		A	B	W1	W2	W3	W4	W5	W6	
40.2	358	1067	275	160	95	164	-	-	701	373	1075	274	162	104	176	-	-	723
50.2	358	1065	276	161	96	165	-	-	703	373	1073	275	163	104	176	-	-	725
60.2	360	1055	288	168	100	172	-	-	728	375	1063	287	170	109	184	-	-	750
70.2	370	1050	299	172	108	187	-	-	766	380	1056	299	174	114	196	-	-	783
80.2	376	1048	307	176	113	197	-	-	793	376	1048	310	178	114	199	-	-	801
90.2	425	1397	384	274	170	238	-	-	1066	440	1405	381	275	181	250	-	-	1087
100.2	413	1338	438	284	167	258	-	-	1147	426	1347	435	285	177	270	-	-	1167
115.2	425	1349	474	312	193	293	-	-	1272	442	1358	469	314	208	310	-	-	1301
130.2	421	1335	492	316	192	299	-	-	1299	437	1345	487	318	207	316	-	-	1328
145.2	421	1318	519	324	197	316	-	-	1356	437	1328	514	326	212	333	-	-	1385
160.2	433	1320	527	330	211	337	-	-	1405	433	1320	532	333	213	340	-	-	1419
180.2	426	1642	438	216	92	314	331	206	1597	439	1653	438	216	103	324	331	217	1629
200.2	437	1643	445	217	100	328	334	218	1642	437	1643	449	219	101	331	337	220	1658

UNIT WITH WATER STORAGE TANK

IR version

Unit WITHOUT Hydronic kit

Acoustic version	AB-AS									AX								
	Center of gravity position [mm]		Load on the supports [Kg]						Weight [Kg]	Center of gravity position [mm]		Load on the supports [Kg]						Weight [Kg]
	A	B	W1	W2	W3	W4	W5	W6		A	B	W1	W2	W3	W4	W5	W6	
40.2	434	1194	256	199	167	216	-	-	850	445	1197	256	200	177	227	-	-	873
50.2	434	1192	257	199	168	217	-	-	852	445	1195	257	200	177	228	-	-	875
60.2	436	1182	268	208	175	226	-	-	877	447	1185	268	209	185	238	-	-	900
70.2	441	1173	280	212	183	242	-	-	917	448	1175	280	213	190	249	-	-	932
80.2	444	1167	287	215	189	252	-	-	943	444	1167	290	217	191	255	-	-	952
90.2	510	1624	364	376	324	314	-	-	1378	520	1626	362	375	336	325	-	-	1398
100.2	495	1565	415	389	317	338	-	-	1459	505	1568	412	389	329	349	-	-	1479
115.2	502	1547	448	408	341	374	-	-	1571	514	1551	445	408	357	389	-	-	1599
130.2	497	1532	465	413	339	381	-	-	1598	509	1537	461	414	356	397	-	-	1628
145.2	495	1512	491	422	343	399	-	-	1655	506	1516	487	423	359	414	-	-	1683
160.2	502	1508	500	427	358	419	-	-	1704	502	1508	505	431	362	423	-	-	1721
180.2	513	1821	432	268	223	387	353	308	1971	522	1827	432	268	234	398	353	319	2004
200.2	520	1818	439	268	231	402	356	320	2016	520	1818	443	271	233	406	360	323	2036

Unit WITH Hydronic kit

Acoustic version	AB-AS									AX								
	Center of gravity position [mm]		Load on the supports [Kg]						Weight [Kg]	Center of gravity position [mm]		Load on the supports [Kg]						Weight [Kg]
	A	B	W1	W2	W3	W4	W5	W6		A	B	W1	W2	W3	W4	W5	W6	
40.2	402	1272	286	263	193	210	-	-	971	413	1273	287	264	203	221	-	-	995
50.2	402	1270	287	264	194	211	-	-	973	413	1271	288	265	204	221	-	-	997
60.2	404	1260	300	276	202	220	-	-	998	415	1261	301	277	213	231	-	-	1022
70.2	410	1249	312	280	211	235	-	-	1038	417	1250	313	281	218	243	-	-	1055
80.2	414	1242	320	283	216	245	-	-	1064	414	1242	323	286	218	247	-	-	1075
90.2	482	1704	396	465	360	307	-	-	1528	491	1705	394	464	373	317	-	-	1548
100.2	470	1646	447	478	353	330	-	-	1608	479	1648	445	477	366	341	-	-	1629
115.2	475	1631	483	505	381	365	-	-	1734	487	1634	481	504	398	379	-	-	1762
130.2	471	1617	500	510	379	372	-	-	1761	483	1619	498	510	396	387	-	-	1791
145.2	470	1595	526	519	383	389	-	-	1817	481	1598	524	518	400	404	-	-	1846
160.2	478	1590	536	523	399	408	-	-	1866	478	1590	541	528	403	412	-	-	1885
180.2	485	1953	452	360	272	364	408	320	2176	494	1955	452	360	283	376	408	331	2210
200.2	492	1947	459	361	281	379	411	331	2222	492	1947	464	365	284	383	415	334	2244

NOTA: For Desuperheater versions VD the total weight increases of 4%. For Heat recovery versions VR the total weight

DIMENSIONAL AND PHYSICAL DATA

UNIT WITHOUT WATER STORAGE TANK

IP version

Unit WITHOUT Hydronic kit

Acoustic version	AB-AS									AX								
	Center of gravity position [mm]		Load on the supports [Kg]						Weight [Kg]	Center of gravity position [mm]		Load on the supports [Kg]						Weight [Kg]
	A	B	W1	W2	W3	W4	W5	W6		A	B	W1	W2	W3	W4	W5	W6	
40.2	412	873	250	89	68	192	-	-	600	428	889	248	93	76	204	-	-	624
50.2	412	871	251	89	68	193	-	-	602	428	887	249	93	77	205	-	-	626
60.2	414	861	262	93	71	201	-	-	627	430	877	260	97	80	214	-	-	651
70.2	422	866	273	99	78	217	-	-	667	432	876	272	101	84	226	-	-	683
80.2	427	871	280	103	83	227	-	-	693	427	871	283	104	84	229	-	-	700
90.2	476	1182	358	176	133	271	-	-	938	491	1196	354	179	143	284	-	-	960
100.2	457	1133	413	186	131	291	-	-	1021	472	1146	408	188	140	304	-	-	1040
115.2	471	1151	445	207	154	331	-	-	1137	489	1166	439	210	167	349	-	-	1165
130.2	466	1140	463	211	153	337	-	-	1164	483	1155	457	214	166	355	-	-	1192
145.2	465	1130	490	219	159	355	-	-	1223	481	1145	484	222	172	373	-	-	1251
160.2	476	1139	499	227	172	377	-	-	1275	476	1139	504	229	174	381	-	-	1288
180.2	471	1368	429	110	40	359	275	205	1418	485	1386	428	111	52	369	275	216	1451
200.2	483	1378	435	111	50	373	278	217	1464	483	1378	439	112	51	377	281	219	1479

Unit WITH Hydronic kit

Acoustic version	AB-AS									AX								
	Center of gravity position [mm]		Load on the supports [Kg]						Weight [Kg]	Center of gravity position [mm]		Load on the supports [Kg]						Weight [Kg]
	A	B	W1	W2	W3	W4	W5	W6		A	B	W1	W2	W3	W4	W5	W6	
40.2	370	1045	286	158	100	180	-	-	733	385	1053	285	160	109	193	-	-	755
50.2	370	1043	287	159	101	181	-	-	735	385	1051	286	161	109	194	-	-	757
60.2	372	1033	300	166	105	189	-	-	760	387	1041	298	168	114	202	-	-	782
70.2	381	1029	312	171	112	205	-	-	800	390	1034	311	172	118	214	-	-	815
80.2	387	1028	318	174	118	215	-	-	825	387	1028	321	176	119	217	-	-	833
90.2	436	1374	398	273	177	257	-	-	1105	450	1382	394	275	187	269	-	-	1125
100.2	423	1319	452	283	173	277	-	-	1185	436	1327	448	284	184	290	-	-	1206
115.2	436	1330	488	311	201	315	-	-	1315	452	1340	483	313	215	332	-	-	1343
130.2	431	1317	506	316	200	321	-	-	1343	447	1327	501	318	215	338	-	-	1372
145.2	432	1301	533	324	206	339	-	-	1402	447	1311	528	326	220	356	-	-	1430
160.2	443	1303	543	330	220	361	-	-	1454	443	1303	548	333	222	365	-	-	1469
180.2	435	1617	453	211	93	334	337	218	1646	447	1627	454	212	103	345	337	229	1680
200.2	445	1618	460	212	101	349	341	229	1692	445	1618	465	214	102	352	344	231	1709

UNIT WITH WATER STORAGE TANK

IP version

Unit WITHOUT Hydronic kit

Acoustic version	AB-AS									AX								
	Center of gravity position [mm]		Load on the supports [Kg]						Weight [Kg]	Center of gravity position [mm]		Load on the supports [Kg]						Weight [Kg]
	A	B	W1	W2	W3	W4	W5	W6		A	B	W1	W2	W3	W4	W5	W6	
40.2	441	1171	267	197	172	233	-	-	883	452	1175	266	198	181	244	-	-	905
50.2	441	1169	268	197	172	234	-	-	885	452	1173	267	198	182	245	-	-	907
60.2	443	1159	280	206	180	244	-	-	910	454	1163	279	207	190	256	-	-	932
70.2	448	1150	292	211	188	260	-	-	951	454	1153	292	212	194	268	-	-	966
80.2	451	1147	299	214	193	270	-	-	976	451	1147	302	216	195	273	-	-	986
90.2	516	1599	378	375	331	334	-	-	1418	526	1602	376	374	343	344	-	-	1437
100.2	502	1543	428	388	324	358	-	-	1498	511	1547	426	388	336	369	-	-	1519
115.2	508	1526	462	407	349	396	-	-	1614	520	1531	459	407	365	411	-	-	1642
130.2	503	1512	479	413	347	403	-	-	1642	515	1517	476	413	363	419	-	-	1671
145.2	501	1493	505	422	352	422	-	-	1701	513	1497	502	422	368	437	-	-	1729
160.2	509	1488	516	427	367	443	-	-	1753	509	1488	521	431	371	447	-	-	1771
180.2	518	1796	448	263	224	408	359	319	2021	527	1802	448	264	236	419	359	330	2056
200.2	525	1793	454	264	233	423	362	331	2067	525	1793	459	267	235	427	366	334	2088

Unit WITH Hydronic kit

Acoustic version	AB-AS									AX								
	Center of gravity position [mm]		Load on the supports [Kg]						Weight [Kg]	Center of gravity position [mm]		Load on the supports [Kg]						Weight [Kg]
	A	B	W1	W2	W3	W4	W5	W6		A	B	W1	W2	W3	W4	W5	W6	
40.2	410	1249	299	261	198	226	-	-	1003	420	1251	299	262	208	237	-	-	1026
50.2	410	1247	300	262	198	227	-	-	1005	420	1249	300	263	209	238	-	-	1028
60.2	412	1237	313	273	207	237	-	-	1030	422	1239	313	274	218	248	-	-	1053
70.2	417	1226	325	278	216	253	-	-	1072	424	1228	326	279	223	260	-	-	1088
80.2	421	1222	332	281	221	262	-	-	1096	421	1222	335	284	223	265	-	-	1107
90.2	488	1679	410	463	367	326	-	-	1566	497	1681	409	462	380	336	-	-	1587
100.2	476	1625	461	476	361	349	-	-	1647	485	1627	459	476	373	360	-	-	1668
115.2	482	1610	498	503	389	386	-	-	1776	493	1613	496	503	406	400	-	-	1805
130.2	478	1596	515	509	388	393	-	-	1805	489	1599	513	508	404	408	-	-	1833
145.2	477	1576	542	517	393	411	-	-	1863	488	1579	539	517	409	426	-	-	1891
160.2	484	1570	553	523	408	432	-	-	1916	484	1570	559	528	412	436	-	-	1935
180.2	490	1927	468	356	273	385	414	331	2227	499	1930	468	356	284	396	414	342	2260
200.2	497	1922	475	356	282	400	417	343	2273	497	1922	480	360	285	404	421	346	2296

NOTA: For Desuperheater versions VD the total weight increases of 4%. For Heat recovery versions VR the total weight increases of 10%.

RECEPTION AND POSITIONING

Inspections on arrival

As soon as the appliance is consigned, it is essential to make sure that all the ordered items have been received and that the shipment is complete. Carefully check that the equipment has not been damaged. If visible damage is discovered, immediately inform the haulage contractor and write "Collected with reserves owing to evident damage" on the consignment note.

Delivery ex works means that, as established by law, reimbursement of any damages is at the insurance company's charge.

Safety prescriptions

Comply with the current safety regulations concerning the equipment to use when handling the unit or the required ways of operating. Use single protection devices as goggles, gloves, helmets... when handling the unit to avoid risk of injuries.

Check the weight of the appliance before proceeding with the moving and handling operations.

Handling

Plan the handling activity verifying:

- Weight of the unit indicated on the data plate of the appliance and in the section "**DIMENSIONAL and PHYSICAL DATA**" of this manual
- Lifting capacity of the equipment that has to be used appropriate to the weight of the unit
- Type and dimensions of the unit
- Center of Gravity position and the availability of straps / ropes or other devices able of positioning the lifting hook exactly at the unit center of gravity: For the CG position in transport and operation, ref. section "**DIMENSIONAL and PHYSICAL DATA**". Also refer to the labels (Part.3) identification of transport the center of gravity, applied on all 4 sides of the base.
- State and physical characteristics of the place where the unit has been handled (yard dirt, asphalted square, etc.).
- State and physical characteristics of the destination place (roof, yard, terrace, etc.).
- Length and type of the handling route with particular attention to critical points of transition such as ramps, stairs, uneven or slippery steps, doors, etc..

Note that the handling examples shown in the drawings are indications, the choice of handling mean and method should be done considering all the factors above mentioned.

Comply with the following instructions when lifting and positioning the appliance:

• Handling with a lift truck or similar

1) The unit has four wooden bases so that it can be transported in a longitudinal direction (**not sideways**).

Place something suitable in between to separate the truck from the unit in order to prevent the surfaces of the bank or electric panel from being damaged if the unit has to be moved sideways. Do not allow the unit or any of its parts to drop on to the ground. Remember that the heaviest part is the one where the compressor is installed (electric panel side Fig.1-2).

Refer to the data plates (Fig.5) that identify the center of gravity position, applied to the 4 sides of the base.

2) Position metal pipes (Part 1 Fig.3) of adequate thickness in the holes in the base of the unit for lifting.

- The end portions of the pipes must stand out by an adequate extent to permit inserting the safety devices and housing the belts for lifting.
- Use spacer bars in the top of the unit to prevent crushing and damaging the batteries and the parts intended to cover the assembly.
- Consult the WEIGHTS AND CENTERS OF GRAVITY DURING TRASPOT AND OPERATION section for the center of gravity position. Use corner protectors (Part.2 Fig.3) to avoid damaging the unit.

Fig. 1

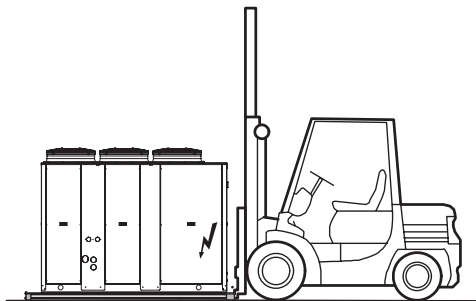


Fig. 2



Fig. 5

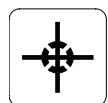
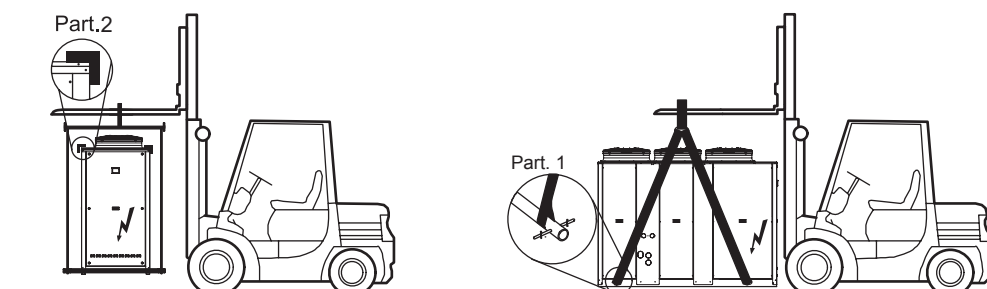


Fig. 3



RECEPTION AND POSITIONING

• Handling and lifting with a crane or similar

Using the brackets (Part 1 Fig.4) located by the lifting holes (refer to the "**DIMENSIONAL and PHYSICAL DATA**" section).

• Consult the WEIGHTS AND CENTERS OF GRAVITY DURING TRASPORT AND OPERATION section for the center of gravity position.

NOTE: To correctly lift the machine, the belts used must be longer than 3.5 meters.

Refer to the data plates (**Fig.5**) that identify the center of gravity position, applied to the 4 sides of the base.

Use corner protectors (Part.2 Fig.4) to avoid damaging the unit.

Fig. 4

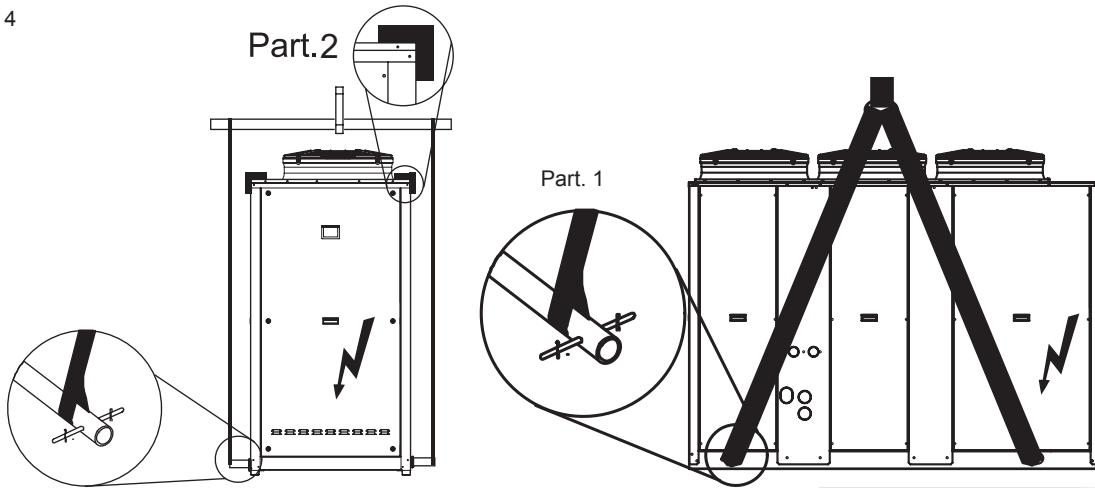
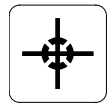


Fig. 5



Make sure that the appliance is handled with care and without jolting as rough treatment could damage the functional parts of the unit.

WARNING:

To safeguard persons and property, read the information on the packing that covers the unit before handling. Also make sure to:

- Handle the unit with care
- Do not stack other objects on top of the unit

Storage

The units must be stored in a dry place, sheltered from the sun, rain, sand and wind.

Comply with the storage conditions given below:

- Do not stack the units
- Maximum temperature = 60°C
- Minimum temperature = -10°C
- Humidity = 90%
- Avoid placing the units packaged with thermoretractable protection under the sun since the pressure inside the refrigerant circuits can increase up to values such as to open the safety valve.

Packing removing

Recycle and dispose of packing material in conformity with local regulations, be extremely careful not to damage the unit.

RECEPTION AND POSITIONING

Positioning

Before positioning please consider the overall dimensions and the technical requirements of the system and the unit, electric and hydraulic connections and any air pipes/ducts or free passages.

Neglecting these aspects may decrease performance and operational life of the unit and therefore increase the operating costs and maintenance.

Units are designed to be installed **OUTSIDE** and in fixed positions.

The unit is designed to be installed outside and in a fixed location and accessible only by qualified and authorized personnel.

Safety valve (if present): the installer is required to evaluate (according to EN378-2) the need and type of pipe to piped outlet in accordance with local regulations.

To prevent the transmission of vibrations evaluate the need for vibration dampers mounting

Before placing the unit be sure that:

- the location is in a safe accessible place
- the framework or the floor is adequate to support the weight of the unit **WORKING** (tank filled with water, etc...), please refer to weight paragraph
- support points are leveled and aligned
- the place can not be subject to flooding
- the maximum level of the snow does not obstruct the airflow to the unit

To ensure the best air circulation to the unit and thus ensure a smooth operation it is recommended to:

- avoid obstructions to air flow near or above the unit
- protect the unit from high winds that can favor or not the airflow
- protect the unit from heat sources or pollutants (chimneys, extractors...)
- protect the unit from air stratification or recirculation (avoid ducting of the fans, containment structure, high walls or corners next to the unit)

These advises if not respected can lead to a lower efficiency of the unit or to high pressure stops (in summer) or low pressure stops (in winter).

HYDRAULIC CONNECTIONS

General rules

A mesh filter (hole $\varnothing < 1\text{mm}$ for plates heat exchanger $\varnothing < 1.5\text{mm}$ for shell and tubes heat exchanger) must be installed on the unit's water inlet otherwise warranty is immediately forfeited. The filter

The filter performs the function of blocking any foreign matter in the system's plumbing circuit (shavings, machining debris, etc.) limiting or avoiding possible problems of fouling (that decreases the heat exchange coefficient), erosion, and clogging

The clogging and fouling of the exchanger can lead to a reduction of the water flow rate and. In the case that the exchanger works as evaporator- of the evaporation temperature: these 2 factors can cause the icing of the exchanger

The icing event leads to the bursting of the exchanger, the inlet of water into the refrigerant circuit and so the necessity of a replacement of the main components (compressors, filters, expansion valves,. Etc.) and an accurate washing of components as refrigerant pipes, coils, etc., practically the rebuilding nearly complete of the refrigerant circuit.

The filter must be maintained clean: this is so necessary verify the cleanness after the unit installation and checking periodically the state.

Protection devices

Standard supply includes a differential pressure switch situated between the water inlet and outlet of the heat exchanger to avoid freezing if the water flow stops for any reason.

Activation is calibrated for a $80\text{ mbar} \pm 5\Delta p$, while resetting occurs with a Δp of $105\text{ mbar} \pm 5$.

The differential pressure switch opens the contact and shuts down the compressors when the water flow rate decreases and $\Delta p \leq 80\text{ mbar} \pm 5$.

The differential pressure switch closes and therefore the unit can restart when the water flow rate increases and $\Delta p \geq 105\text{ mbar} \pm 5$.

• Standard supply includes an antifreeze heater placed between the external thermal insulation and the shell of the exchanger and controlled by the main electronic controller of the unit in order to protect the evaporator full of water (but not the pipes) from the winter icing when the unit is in stand-by mode. The exchanger is protected down to an outdoor air temperature of -20°C .

NOTE the antifreeze protection only work if the unit is electrically connected the standby period.

It is recommended to install a water paddle flow switch at the water inlet of the unit (it can be supplied as accessory or option): the water paddle flow switch has to be electrically wired in series with the differential pressure switch.

It is mandatory to calibrate the trip out of the water paddle flow switch at a water flow rate value higher than the minimum water flow rate admissible for the exchanger (re. section Pressure Drop).

Tips for a successful installation

For a correct design and installation of the hydraulic plant comply the local laws governing safety matters and sound...

The following information is suggestion for a correct installation of the unit:

- Before connecting the unit to the system wash adequately the pipes using clean water, filling and emptying and cleaning the filters. Only after that proceed connecting the unit to the system; this operation is crucial to ensure proper start-up without the need to have repeated stops to clean the filter, with the possible risk of damage to heat exchangers and other components.
- Check by qualified personnel the quality of the water or of the mixture used; avoid the presence of inorganic salts, biological load (seaweeds, etc.) suspended solids, dissolved oxygen and the pH. Water with inadequate characteristics can cause a pressure drop increase due to a rapid fouling of the filter, energy efficiency decrease and corrosive symptom increase that can damage the unit.
- The pipes must have the least possible number of bends to minimize load losses and must be adequately supported in order to prevent the connections of the unit from being excessively stressed.
- Install on-off valves near components that need to be serviced to isolate them when maintenance work needs to be done and to allow them to be replaced without having to discharge the system.
- Before isolating the pipes and charging the system, carry out preliminary inspections to make sure that there are no leaks.
- Isolate all the chilled water pipes to prevent condensation from forming along the pipes themselves. Make sure that the material used is the steam barrier type, failing this, cover the insulation with an appropriate protection. Also make sure that the air venting valves can be accessed through the insulation.
- Do not forget to install or at least allow for the installation of pressure and temperature reading instruments on the inlet and outlet parts of the hydraulic circuit. These instruments will allow you to monitor the operation of the system.
- The circuit can be kept under pressure by means of an expansion tank and a pressure reducer. A plant filling unit can also be used in order to automatically charge the system and keep it at the desired pressure if it drops below a certain pressure value. Install manual or automatic valves in the highest point of the system to eliminate air from the circuit.

Fit manual or automatic valves at the highest point in the circuit in order to vent air from the circuit.

- the water connections are Victaulic-type joints for hooking up to the unit.

The joints allow the pipes to expand due to changes in temperature and in addition the elastomer gasket and the specified play help insulate and absorb noise and vibration.

- If vibrations dampers are installed under the unit, it is recommended to use flexible couplings before and after the water circulation pump and near the unit.
- Install on the outlet of the unit a suitable valve able to regulate the water flow.
- Avoid that the weight of the connection pipes pushes on the hydraulic connections of the unit using approved supports.

Check that plant components are suitable to bear the maximum static pressure (it depends on the height of the building).

HYDRAULIC CONNECTIONS

Water component for corrosion limit

pH	7.5 ÷ 9.0	-
SO ₄ --	< 100	ppm
HCO ₃ -/ SO ₄ --	>1.0	
Total hardness	8.0 ÷ 15.2	°F
Cl-	< 50	ppm
PO ₄ 3-	< 2.0	ppm
NH ₃	< 0.5	ppm
Free Chlorine	< 0.5	ppm
Fe ³⁺	< 0.5	ppm
Mn ⁺⁺	< 0.05	ppm
CO ₂	< 50	ppm
H ₂ S	< 50	ppb
Temperature	< 65	°C
Oxygen content	< 0.1	ppm

Precautions for the Winter

The water could freeze and damage the exchanger of the unit and other parts of the system during the winter period, if the system was to remain at a standstill. This problem can be obviated in 3 different ways:

1. Drain the system completely, taking care to drain the plate exchanger (in order to drain the unit's piping system completely, open the water drain ball valves and the air vent valves, open any valves closed).
2. Operate with glycol water taking account, depending on the % of glycol, of the factor of correction of the refrigerating capacity, power input, water flow rate and losses of head (see table on following page)
3. If it is certain that the unit will always be powered throughout the winter, the unit is able to protect itself from freezing, down to a temperature of -20°C: this is possible thanks to an antifreeze electric heating element installed on the plate exchanger and intelligent control of the water pump that must be governed by the microprocessor board (see the "Electric Connections" section).
If the unit is fitted with a Storage tank, solution no. 3 requires installing the tank antifreeze heating element accessor.

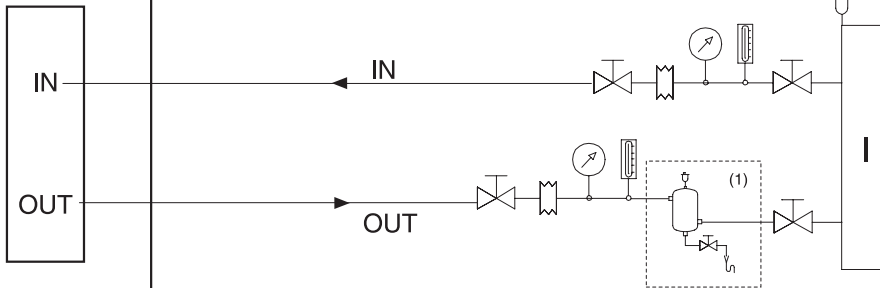
HYDRAULIC CONNECTIONS

Basic diagram Standard Unit VB [PLANT SIDE WATER CIRCUIT]

The following figures represent connections to the plant side exchanger.

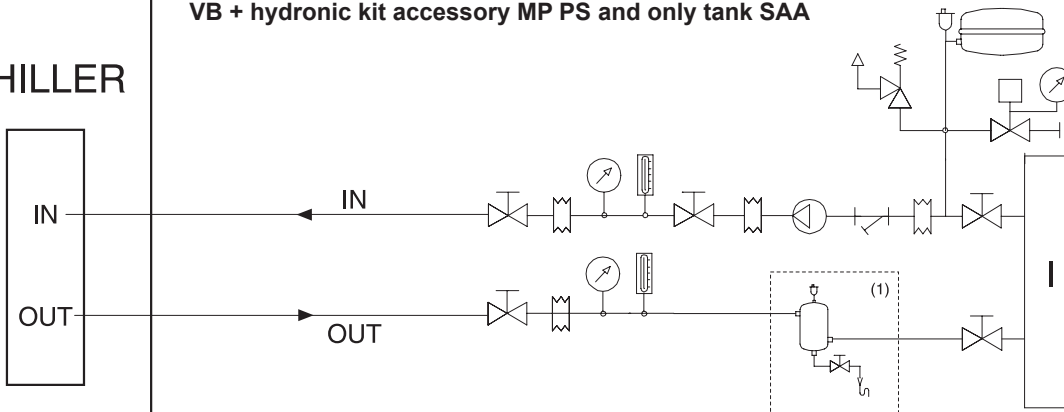
IMPORTANT: There must be a constant flow of water to the exchanger. With accessory primary-secondary pumping module MP PS STD is mandatory to install a water filter in the secondary circuit immediately after of the water tank.

VB + hydronic kit accessory MP AM and MP SS



VB + hydronic kit accessory MP PS and only tank SAA

CHILLER

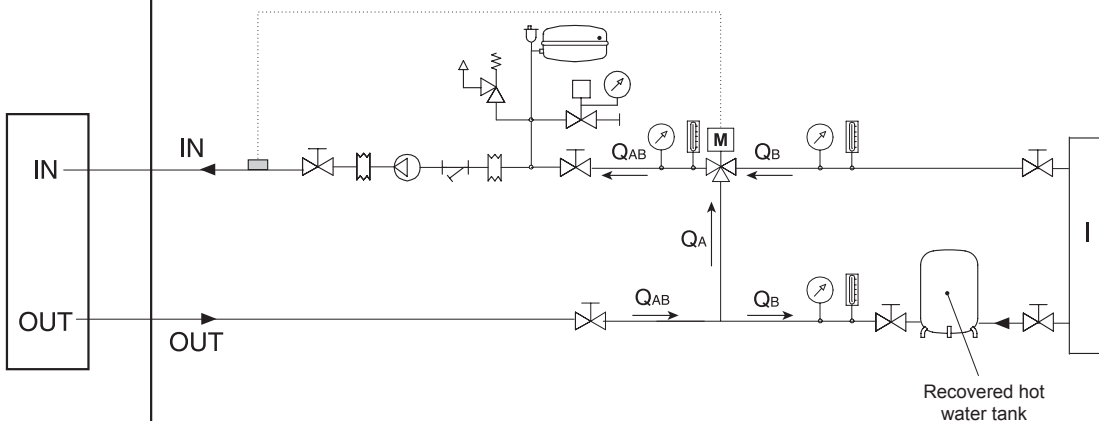


Basic diagram for units with Recovery [RECOVERY WATER CIRCUIT]

The basic diagram given is valid for VD-VR version

The figure below shows the basic diagram of the portion of the system with the heat exchanger used for recovering partially heating power that would otherwise be disposed of in the air.

IMPORTANT: The water flow to the heat exchanger must be constant, it is required to install a water filter upstream of the exchanger.



(1): Component not required if the unit is equipped with the "Water storage tank" accessory. Installation of this accessory is recommended if the unit is without it.

I = User system

	Pressure gauge		Pump		Air vent valve		Water filling unit
	Thermometer		Filter		Safety valve		Three-way driven valve
	On-off and/or water flow rate regulating valve		Tank		Coupling		Recovery water flow inlet probe
	Monitoring electronics (governor)		Expansion tank				

HYDRAULIC CONNECTIONS

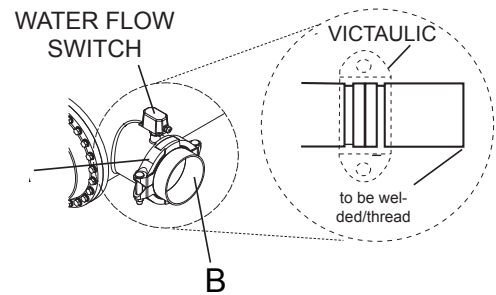
Air vent and water drain

On the plumbing circuit feeding the unit, especially when equipped with the standard pipe kit, the installer must fit an appropriate number of valves (manual or automatic) at the top of the circuit in order to vent any air in the plumbing system. In the same way, he must install a water drain valve in order, when necessary, to drain the unit's plate exchanger completely (especially during the winter in order to prevent freezing that would seriously jeopardize the operation of the unit). For units with the complete pipe kit there is an air vent valve on the top pipe (water inlet) and a water drain valve on the bottom pipe (water outlet). See "Accessories and options" section.

Piping connection with Victaulic couplings and Water flow switch

It is composed of two Victaulic type quick couplers (Fig. 1-A) comprehensive of union (Fig. 1-B) and seal not installed (supplied with the unit). The unions are supplied to be welded on the end. Here we give the instructions to follow for installing the quick couplers. Do not weld the pipe with Victaulic connection joint attached since the gasket may be damaged irreparably.

Note:
Supplied as optional (see "ACCESSORIES AND OPTIONAL EQUIPMENT").



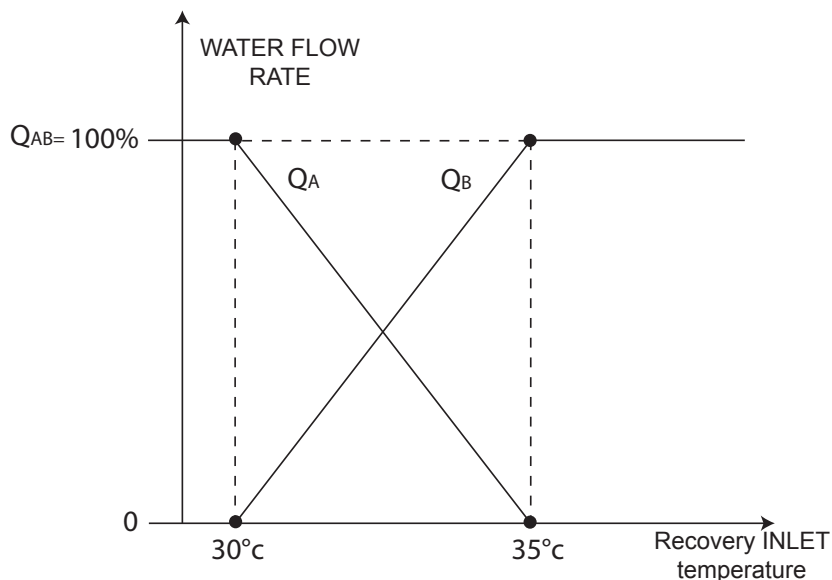
Valve regulating diagram valve

To prevent problems from occurring when the unit is started with very cold water, you are strongly advised to install a mixer valve as shown in the diagram. The valve must be regulated to suit the temperature at which the water flows into the desuperheater (see diagram): the graph on the right shows the type of adjustment to use.

Water connections must be performed carefully as for the evaporator (filter, circuit washing, etc.) Perform all necessary interventions to avoid RISK OF FREEZING (tubes insulation, emptying of circuit, addition of glycol, anti-freeze resistances).

Water temperature can reach high temperatures (up to 100°C for VD unit, up to 65°C for VR unit), therefore:

- avoid RISK OF BURNS by adopting the necessary precautions (insulations of tubes, temperature detecting station on water if the sanitary use is foreseen, etc.).
- install safety valves and specifically dimensioned expansion tanks in the hydraulic circuit.

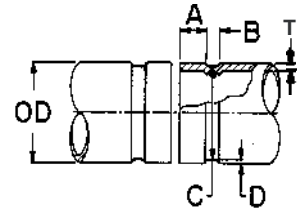


HYDRAULIC CONNECTIONS

ISO-G	DN(mm)	EXTERNAL DIAMETER OD(mm)	A	B	O	D	T
1"	25	33.7	15.875	7.137	30.226	1.600	1.651
1 1/4"	32	42.4	15.875	7.137	38.989	1.600	1.651
1 1/2"	40	48.3	15.875	7.137	45.085	1.600	1.651
2"	50	60.3	15.875	8.738	57.150	1.600	1.651
2 1/2"	65	76.1	15.875	8.738	72.260	1.981	2.108
3"	80	88.9	15.875	8.738	84.938	1.981	2.108
4"	100	114.3	15.875	8.738	110.084	2.108	2.108
5"	125	139.7	15.875	8.738	135.500	2.134	2.769
6"	150	168.3	15.875	8.738	163.957	2.159	2.769
8"	200	219.1	19.050	11.913	214.401	2.337	2.769

1) Pipe groove inspections

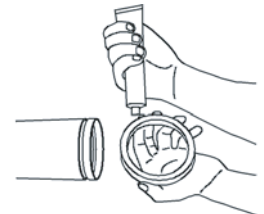
Check the depth and diameter of the grooves and their distance from the pipe ends. Make sure that the work has been carried out with care and that the end surface of the pipes is smooth and not ovalized. Make sure that there are no notches, burrs or other imperfections that could impair the tightness. Groove dimensions in mm A=16-B=8-C=57.2-D=1.6



2) Checking the seal and relative lubrication

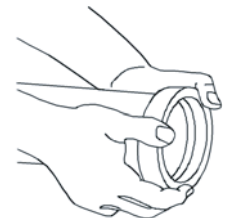
Make sure that the type of seal is compatible with the nature and temperature of the fluid. Signal green **EPDM** seals are used.

Apply a film of grease to the seal: on the back, on the side flanks and on the inner lips that contact the pipe. Work in conditions of the utmost cleanliness as particles of dirt could damage the seal. Always and only use synthetic grease. Greasing makes it easier to fit the seal on the pipe and improves the tightness. It also allows the seal to slide within the connection, avoiding tensions and projections near the bolts.



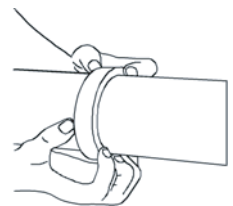
3) How to fit the seal

Fully insert the seal into the end of a pipe. Make sure that the seal lips adhere to the pipe itself.



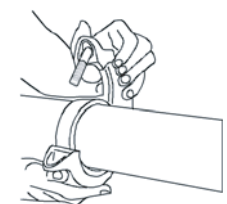
4) Alignment

Align the pipes and move their ends near to each other. Now push the seal, centering it on the two pipe ends. The seal must remain inside the grooves.



5) Joint assembly

Remove one bolt and loosen (without removing) the other one. Seat part of the body of the joint at the bottom, between the pipe ends, inserting and edges of the grooves. Now seat the other part of the body at the top, on the two ends, and close the joint. Make sure that the parts of the body of the joint touch each other.

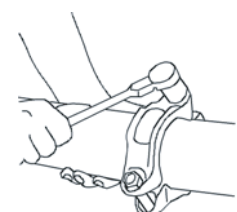


6) Nut torquing

Fit the previously removed bolt back in place and tighten both nuts by hand. Now torque them with the relative wrench, tightening them alternately a few turns.

WARNING:

If one nut is fully tightened at a time, the seal could slip between the jaws of the opposite side of the joint.



MAXIMUM VOLUME OF WATER

Maximum volume of water in the system with wet module

Before filling the water system, it is advisable to consider the type of installation in question, i.e. check the difference in level between the wet module and user. The following table gives the maximum water content of the water supply system in liters, depending on the capacity of the standard expansion vessel supplied and the pressure at which it should be charged. The expansion vessel setting must be regulated to suit the maximum positive difference in level of the user.

Maximum setting value 600 kPa.

With a positive H of more than 12.25 meters, calculate the expansion vessel precharge value in kPa using the formula below:

$$\text{Expansion vessel precharge} = [H/10.2 + 0.3] \times 100 = [\text{kPa}]$$

NOTE. In case A, make sure that the user's lowest point is able to withstand the global pressure.

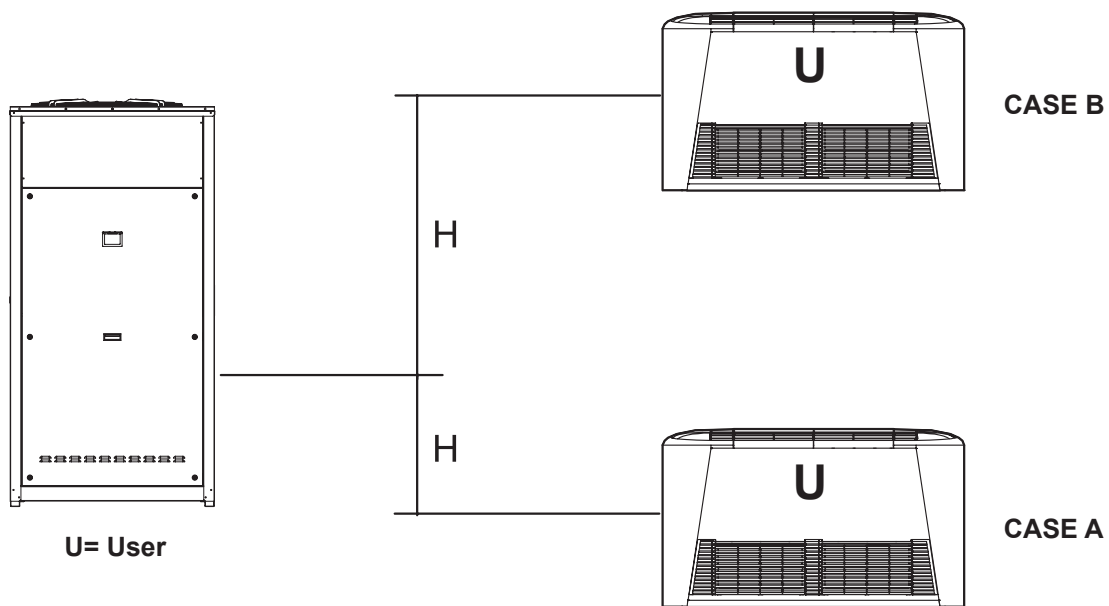
Tab.1

Model		40-50-60-70-80		90-100-110-115-130-145-160-180-200		
Expansion vessel volume (liters)		12		24		
Thermal expansion of water (10-40°C)		0.0074		0.0167		
Thermal expansion of water (10-60°C)		0.0167		0.0167		
H (metri)		IR	IP	IR	IP	
Case A	H < 0	150 (standard)	1043	461	2085	921
	0 < H < 12.25	150 (standard)	1043	461	2085	921
Case B	15	177	980	435	1960	870
	20	226	866	384	1732	768
	25	275	753	334	1505	667
	30	324	640	283	1279	566

NOTE: If the unit operates with brine, calculate the real volume of the system by taking into account the corrective factors for the volume of the system given in the table below.

Corrective factors per total maximum volume of the system with brine

% of brine	0%	10%	20%	30%	40%
Cooling Mode	1,000	0,738	0,693	0,652	0,615
Heating Mode	1,000	0,855	0,811	0,769	0,731



ELECTRICAL CONNECTIONS

General rules

The appliance must be wired in compliance with the laws in force in the country in which it is installed. The units are supplied fully wired in the factory and pre-engineered for connection to the electricity main. The electric panel is made in compliance with the technical standards in force in the European Union.

Structure of the electric panel

All the electrical components are contained in a closed casing protected against the atmospheric agents and inspectionable by opening the front door after removing the front panel. The door for accessing the power section is locked by the mechanism. Access for the supply cables and earth cable (PE) is permitted through the opening on the bottom of the electric panel.

Composition of the system

The system comprises an electromechanical part consisting of the power circuit, with disconnecting device, contactors, fuses or thermal cutouts, transformer, and another part comprising the Microprocessor control system.

NOTES: REFER TO THE WIRING DIAGRAM SUPPLIED WITH THE UNIT FOR THE LAYOUT OF THE ELECTRIC PANEL.

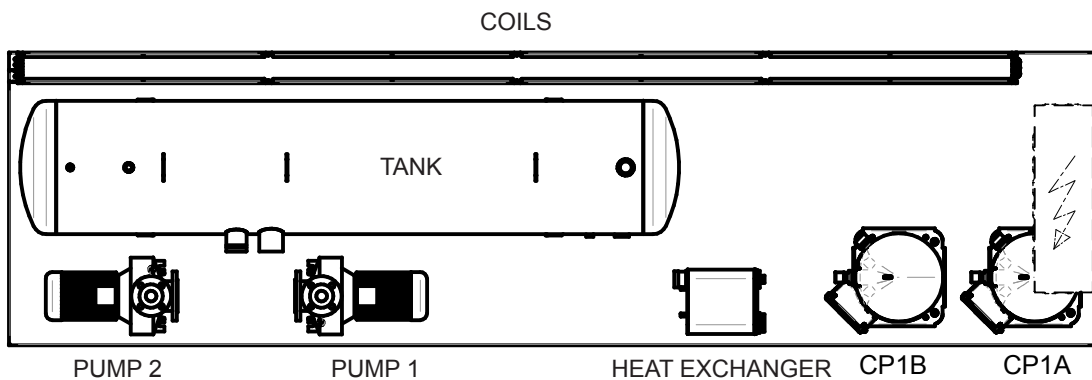
Electrical connections

All electrical connections must be carried out by qualified personnel in the absence of electric power. The table below gives the electrical specifications of the different constructional configurations of the units.

Unit

UNIT	40.2	50.2	60.2	70.2	80.2	90.2	100.2	115.2	130.2	145.2	160.2	180.2	200.2	UM
Power supply	400 - 3+N - 50					400 - 3 - 50								V-ph-Hz
FLA	40,2	45,7	53,3	58,7	69,6	75,5	90,0	97,9	106	123	136	159	170	A
FLI	21,6	24,4	28,4	31,0	36,2	44,0	55,0	60,5	66,0	75,7	83,3	95,4	103	kW
MIC	134	143	149	173	213	264	259	267	267	348	361	355	391	A
MIC SS	89,3	96,3	101	117	143	174	175	183	183	200	246	248	272	A

Unit layout



Compressors

UNIT		40.2	50.2	60.2	70.2	80.2	90.2	100.2	115.2	130.2	145.2	160.2	180.2	200.2	UM
Power supply		400 - 3 - 50													V-ph-Hz
FLA	CP1A	21,0	22,0	25,0	31,0	34,0	40,0	44,0	53,0	53,0	66,0	66,0	76,0	81,0	A
	CP1B	21,0	22,0	25,0	31,0	34,0	34,0	44,0	44,0	53,0	53,0	66,0	76,0	81,0	
LRA	CP1A	111	118	118	140	174	225	210	210	210	287	287	267	298	A
	CP1B	111	118	118	140	174	174	210	210	210	287	287	267	298	
FLI	CP1A	10,2	11,6	13,3	14,6	17,2	22,6	25,4	30,9	30,9	38,5	38,5	43,5	47,1	kW
	CP1B	10,2	11,6	13,3	14,6	17,2	17,2	25,4	25,4	30,9	30,9	38,5	43,5	47,4	
Winding resistance	CP1A	1,40	1,20	1,20	1,10	0,80	0,60	0,60	0,50	0,50	0,30	0,30	0,30	0,30	Ω
	CP1B	1,40	1,20	1,20	1,10	0,80	0,80	0,60	0,60	0,50	0,50	0,30	0,30	0,30	

NOTE:

- FLA =** Full load current at maximum tolerated conditions
- LRA =** Locked rotor current
- FLI =** Full load power input at maximum tolerated conditions
- MIC =** Maximum instantaneous current of the unit
- MIC SS =** Maximum instantaneous current of the unit with soft starter options

ELECTRICAL CONNECTIONS

Single Fan AC specifications

UNIT	40.2	50.2	60.2	70.2	80.2	90.2	100.2	115.2	130.2	145.2	160.2	180.2	200.2	UM
Power supply	230 - 1 - 50					400 - 3 - 50								V-ph-Hz
FLA	2,62					4,10								A
LRA	10,5					13,5								A
FLI	0,60					2,10								kW

Single Fan EC specifications

UNIT	40.2	50.2	60.2	70.2	80.2	90.2	100.2	115.2	130.2	145.2	160.2	180.2	200.2	UM
Power supply	230 - 1 - 50					400 - 3 - 50								V-ph-Hz
FLA	3,20					2,85								A
LRA	12,8					11,4								A
FLI	0,72					1,85								kW

Summary Fan AC specifications

UNIT	40.2	50.2	60.2	70.2	80.2	90.2	100.2	115.2	130.2	145.2	160.2	180.2	200.2	UM
Power supply	230 - 1 - 50					400 - 3 - 50								V-ph-Hz
FLA	5,24		7,86			8,20			12,3		16,4			A
LRA	21,0		31,4			27,0			40,5		54,0			A
FLI	1,20		1,80			4,20			6,30		8,40			kW

Summary Fan EC specifications

UNIT	40.2	50.2	60.2	70.2	80.2	90.2	100.2	115.2	130.2	145.2	160.2	180.2	200.2	UM
Power supply	230 - 1 - 50					400 - 3 - 50								V-ph-Hz
FLA	6,40		9,60			5,70			8,55		11,4			A
LRA	25,6		38,4			22,8			34,2		45,6			A
FLI	1,44		2,16			3,70			5,55		7,40			kW

Primary-secondary pump

UNIT	40.2	50.2	60.2	70.2	80.2	90.2	100.2	115.2	130.2	145.2	160.2	180.2	200.2	UM
Power supply	400 - 3 - 50													V-ph-Hz
FLA	3,20	3,20	3,20	3,20	3,20	3,70	3,70	3,70	3,70	4,50	4,50	6,10	6,10	A
LRA	25,7	25,7	25,7	25,7	25,7	20,0	20,0	20,0	20,0	43,5	43,5	57,7	57,7	A
FLI	1,80	1,80	1,80	1,80	1,80	1,78	1,78	1,78	1,78	2,55	2,55	3,48	3,48	kW

Standard pump

UNIT	40.2	50.2	60.2	70.2	80.2	90.2	100.2	115.2	130.2	145.2	160.2	180.2	200.2	UM
Power supply	400 - 3 - 50													V-ph-Hz
FLA	3,70	3,70	3,70	3,70	3,70	4,50	4,50	4,50	4,50	6,10	6,10	8,70	8,70	A
LRA	20,0	20,0	20,0	20,0	20,0	43,5	43,5	43,5	43,5	57,7	57,7	87,0	87,0	A
FLI	1,78	1,78	1,78	1,78	1,78	2,55	2,55	2,55	2,55	3,48	3,48	4,56	4,56	kW

High head pump

UNIT	40.2	50.2	60.2	70.2	80.2	90.2	100.2	115.2	130.2	145.2	160.2	180.2	200.2	UM
Power supply	400 - 3 - 50													V-ph-Hz
FLA	6,10	6,10	6,10	6,10	6,10	6,10	6,10	8,70	8,70	8,70	8,70	10,4	10,4	A
LRA	57,7	57,7	57,7	57,7	57,7	57,7	57,7	87,0	87,0	87,0	87,0	116	116	A
FLI	3,48	3,48	3,48	3,48	3,48	3,48	3,48	4,56	4,56	4,56	4,56	6,29	6,29	kW

Standard modulating pump

UNIT	40.2	50.2	60.2	70.2	80.2	90.2	100.2	115.2	130.2	145.2	160.2	180.2	200.2	UM
Power supply	400 - 3 - 50													V-ph-Hz
FLA	3,70	3,70	3,70	3,70	3,70	4,50	4,50	4,50	4,50	6,10	6,10	8,70	8,70	A
LRA	20,0	20,0	20,0	20,0	20,0	43,5	43,5	43,5	43,5	57,7	57,7	87,0	87,0	A
FLI	1,78	1,78	1,78	1,78	1,78	2,55	2,55	2,55	2,55	3,48	3,48	4,56	4,56	kW

High head modulating pump

UNIT	40.2	50.2	60.2	70.2	80.2	90.2	100.2	115.2	130.2	145.2	160.2	180.2	200.2	UM
Power supply	400 - 3 - 50													V-ph-Hz
FLA	6,10	6,10	6,10	6,10	6,10	6,10	6,10	8,70	8,70	8,70	8,70	10,4	10,4	A
LRA	57,7	57,7	57,7	57,7	57,7	57,7	57,7	87,0	87,0	87,0	87,0	116	116	A
FLI	3,48	3,48	3,48	3,48	3,48	3,48	3,48	4,56	4,56	4,56	4,56	6,29	6,29	kW

NOTE:

- FLA** = Full load current at maximum tolerated conditions
- LRA** = Locked rotor current
- FLI** = Full load power input at maximum tolerated conditions
- MIC** = Maximum instantaneous current of the unit
- MIC SS** = Maximum instantaneous current of the unit with soft starter options

ELECTRICAL CONNECTIONS

Summary tables (total values):

Units with primary-secondary pump

UNIT	40.2	50.2	60.2	70.2	80.2	90.2	100.2	115.2	130.2	145.2	160.2	180.2	200.2	UM	
Power supply	400 - 3+N - 50					400 - 3 - 50									V-ph-Hz
FLA	43,4	48,9	56,5	61,9	72,8	79,2	93,7	102	110	128	141	165	176	A	
FLI	23,4	26,2	30,2	32,8	38,0	45,8	56,8	62,3	67,8	78,3	85,9	98,9	106	kW	
MIC	137	147	152	176	216	268	263	271	271	353	366	361	397	A	
MIC SS	92,5	99,5	105	120	146	178	179	187	187	205	251	254	278	A	

Standard unit

UNIT	40.2	50.2	60.2	70.2	80.2	90.2	100.2	115.2	130.2	145.2	160.2	180.2	200.2	UM	
Power supply	400 - 3+N - 50					400 - 3 - 50									V-ph-Hz
FLA	43,9	49,4	57,0	62,4	73,3	80,0	94,5	102	110	129	142	168	179	A	
FLI	23,4	26,2	30,2	32,8	38,0	46,6	57,6	63,1	68,6	79,2	86,8	100	107	kW	
MIC	137	147	152	177	216	269	264	272	272	354	367	363	400	A	
MIC SS	93,0	100	105	121	147	179	180	188	188	206	253	257	281	A	

Units with high head pump

UNIT	40.2	50.2	60.2	70.2	80.2	90.2	100.2	115.2	130.2	145.2	160.2	180.2	200.2	UM	
Power supply	400 - 3+N - 50					400 - 3 - 50									V-ph-Hz
FLA	46,3	51,8	59,4	64,8	75,7	81,6	96,1	107	115	132	145	169	180	A	
FLI	25,1	27,9	31,9	34,5	39,7	47,5	58,5	65,1	70,6	80,3	87,9	102	109	kW	
MIC	140	150	155	179	219	270	265	276	276	357	370	365	402	A	
MIC SS	95,4	102	107	123	149	180	181	192	192	209	255	258	282	A	

Units with standard modulating pump

UNIT	40.2	50.2	60.2	70.2	80.2	90.2	100.2	115.2	130.2	145.2	160.2	180.2	200.2	UM	
Power supply	400 - 3+N - 50					400 - 3 - 50									V-ph-Hz
FLA	43,9	49,4	57,0	62,4	73,3	80,0	94,5	102	110	129	142	168	179	A	
FLI	23,4	26,2	30,2	32,8	38,0	46,6	57,6	63,1	68,6	79,2	86,8	100	107	kW	
MIC	137	147	152	177	216	269	264	272	272	354	367	363	400	A	
MIC SS	93,0	100	105	121	147	179	180	188	188	206	253	257	281	A	

Units with high head modulating pump

UNIT	40.2	50.2	60.2	70.2	80.2	90.2	100.2	115.2	130.2	145.2	160.2	180.2	200.2	UM	
Power supply	400 - 3+N - 50					400 - 3 - 50									V-ph-Hz
FLA	46,3	51,8	59,4	64,8	75,7	81,6	96,1	107	115	132	145	169	180	A	
FLI	25,1	27,9	31,9	34,5	39,7	47,5	58,5	65,1	70,6	80,3	87,9	102	109	kW	
MIC	140	150	155	179	219	270	265	276	276	357	370	365	402	A	
MIC SS	95,4	102	107	123	149	180	181	192	192	209	255	258	282	A	

NOTE:

- FLA =** Full load current at maximum tolerated conditions
- LRA =** Locked rotor current
- FLI =** Full load power input at maximum tolerated conditions
- MIC =** Maximum instantaneous current of the unit
- MIC SS =** Maximum instantaneous current of the unit with soft starter options

ELECTRICAL CONNECTIONS

1) Connection to the electricity main

• Power supply line;

The unit's power supply line must be laid by following a clearly defined route in order to make it as correct as possible any without any breaks. Pass the line through the opening on the button of the electrical panel. Secure the line integral with the structure of the unit. Then continue inside the panel and connect the conductors directly to the input terminals of the main disconnecting device of the unit. The characteristics of the main lines should be determined by qualified personnel specialized in the design of electrical systems, according to your national regulations and standards.

• Power supply system;

The power cables of the unit's supply line must be taken from a system of symmetrical three-phase voltages (difference between voltage max 2%) and of a separate protection conductor.

$$V = 380 \div 415V$$
$$f = 50 \text{ Hz}$$

• Protection on supply side:

An automatic switch must be installed on the supply side of the side in order to protect against any overcurrents and indirect contacts that could occur when the unit is operating.

It is advisable to install an automatic current limiter switch in order to limit the effective short-circuit current in the connecting point of the unit. This allows a protection device with a lower breaking capacity than that required in the connection point to be sized like the main circuit-breaker of the unit.

The line and switch must be coordinated in compliance with the current laws governing electrical safety matters, regarding the type of installation and environmental conditions in which the unit must operate.

• Protection conductor (ground wire):

The protection conductor from the feeder line must be connected straight to the ground screw identified by code "**PE**", which ensures the equipotential connection of all metal grounding points and structural parts of the unit.

• Signals and data lines

Do not exceed the maximum allowed distance of the cable as shown in the wiring diagram. Put cables away from power lines with a different voltage or emitting electromagnetic noise, if really necessary do not to put in parallel but only cross with these cables to 90°. Do not put cables near equipment that can create electromagnetic interference (antennas, speakers, radio repeaters etc ...). Any shielding of the cable must be connected to a ground without noise, while preserving the continuity across the total length of the cable.

• Connection

Always refer to the wiring diagram supplied with the unit. Verify that the network has characteristics corresponding to the data shown on the nameplate of the unit. Before starting work, verify that the switching device at the start of the line power unit is open, locked and a warning sign shown. Make the connection to the ground first that the others phase; protect the wires using cable properly fitted. Before powering on the unit, ensure that you have restored all the protections that were removed during work on connection.

2) Electric panel

• Protection degree:

The electric panel casing is made from sheet metal and has **IP54** protection rating at the doors directly accessible from the outside. The other parts of the casing guarantee a protection degree that is at least equivalent to **IP22**, as established by the current laws in force: this has been achieved since the panel has further protection against the penetration of solid foreign bodies and atmospheric agents thanks to the unit structure in which it is housed.

• Starting and stopping function:

The red handle on the panel door directly acts on the main circuit-breaker. The handle also acts as a door lock since it ensures that the unit is only powered when the door is shut. The stopping function carried out by the main circuit-breaker is classified as type "0" since the unit is stopped by immediately cutting off the power supply.

3) Reference standards

• The provisions established by the following Directives have been complied with to ensure the safety of the electrical products placed on the European Union market:

- Low Voltage Directive **2006/95 EEC** which also includes the following harmonized standards:

CEI EN 60335-1 and 60335-2-40.

Classification: **CEI EN 60204-1**. Safety of unitry. Electrical equipment of units. Part 1: General rules.

- Directive **2004/108/EEC** concerning "**Electromagnetic compatibility**".

4) User connection

Inside the electrical panel is available a user terminal where you can have:

- pumps start-up and safety devices
- two user configurable inputs
- digital Input for water paddle flow switch
- integrative resistance output relay
- clean contact for general alarm
- external signal from the compressors running

Moreover, VR units contains the following terminals:

- pumps start-up and safety devices
- digital input for remote enable
- digital Input for water paddle flow switch

For more details refer to the wiring diagram of the unit.

R410A PROTECTION DEVICES

Protection devices HIGH PRESSURE

The unit is protected against risk of overpressure by means of 4 levels protection chain.

Each circuit is equipped with:

- 1) ATC (Advanced Temperature Control) if present
- 2) high pressure automatic switch connected to electronic controller
- 3) high pressure manual switch connected to compressor contactor command
- 4) high pressure safety valve

Protection devices technical data

LEVEL	1	2	3	4
Device	ATC (Advanced Temperature Control) if present	High pressure automatic switch	High pressure manual switch	High pressure safety valve
Trip out (barg)	-	41.0	43.0	45.0
Trip in (barg)	-	29.5	31.0	41.0
connected to	electronic controller	electronic controller	compressor contactor command	Discharge the refrigerant to atmosphere to reduce the system pressure
effect	Controls the cooling capacity shutting down compressors	stop the compressors and the fans of that circuit	stop the compressors of that circuit	Discharge the refrigerant to atmosphere to reduce the system pressure
reset *	Automatic	YES by keyboard if the high pressure switch has trip-in and after the solution of the problem that generates the alarm	Press the button present on the manual pressure switch CAUTION	Not necessary

*: For more details refers to section monitoring basic system.

CAUTION



IN CASE OF COMPRESSORS TRIP-OUT BY MANUAL RESET HIGH PRESSURE SWITCH THERE ARE NO EVIDENCES IN THE MONITORING SYSTEM, DO NOT RESET THE PRESSURE SWITCH BEFORE YOU HAVE DONE THE FOLLOWING STEPS:

- 1) SHUT DOWN THE UNIT USING THE OFF BUTTON
- 2) THEN RESET THE HIGH PRESSURE SWITCH

Protection devices LOW PRESSURE

LEVEL	1	2
Device	Low pressure transducer	Low pressure automatic switch
Trip out (barg)	2 bar	2 bar
Trip in (barg)	4 bar	4 bar
connected to	electronic controller	electronic controller
effect	stop the compressors of that circuit	stop the compressors of that circuit
reset *	YES by keyboard after the solution of the problem that generates the alarm	YES by keyboard if the low pressure switch has trip-in and after the solution of the problem that generates the alarm

Protection devices DISCHARGE TEMPERATURE (if installed)

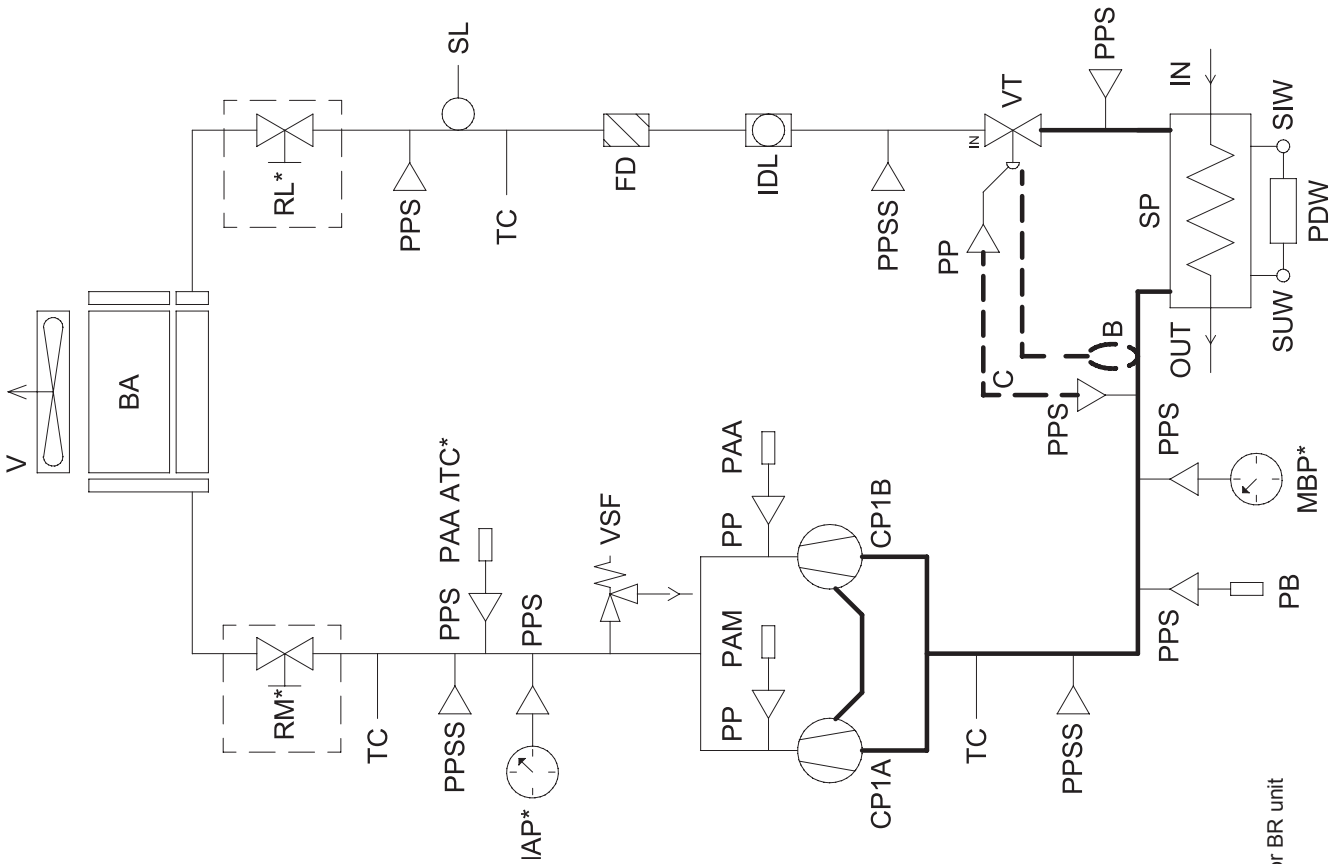
LEVEL	2
Device	Discharge Temperature
Trip out	135°C
Trip in	120°C
connected to	electronic controller
effect	stop the single compressor
reset *	YES by keyboard after the solution of the problem that generates the alarm

*: For more details refers to section monitoring basic system.

REFRIGERANT FLOW DIAGRAM

Refrigerant flow diagram IR VB unit with thermostatic expansion valve

	Description
B	EXPANSION VALVE BULB
BA	FIN AND TUBE COIL
C	EXPANSION VALVE CAPILLARY
CP	COMPRESSOR
FD	FILTER DRIER
IDL	LIQUID AND MOISTURE INDICATOR
MAP	HIGH PRESSURE GAUGE
MBP	LOW PRESSURE GAUGE
PAA	AUTO RESET HIGH PRESSURE SWITCH
PAA ATC	AUTO RESET HIGH PRESSURE SWITCH FOR ATC FUNCTION
PAM	MANUAL RESET HIGH PRESSURE SWITCH
PB	AUTO RESET LOW PRESSURE SWITCH
PDW	WATER PRESSURE SWITCH
PP	PRESSURE SOCKET 1/4" SAE WITOUT CORE
PPS	PRESSURE SOCKET 1/4" SAE WITH CORE
PPSS	PRESSURE SOCKET 5/16" SAE WITH CORE
RL	LIQUID BALL VALVE
RM	COMPRESSOR OUTLET BALL VALVE
SIW	WATER INLET PROBE
SL	LIQUID PROBE
SP	PLATE HEAT EXCHANGER
SUW	WATER OUTLET PROBE
TC	CHARGING TUBE
V	FAN
VSF	SAFETY VALVE
VT	EXPANSION VALVE

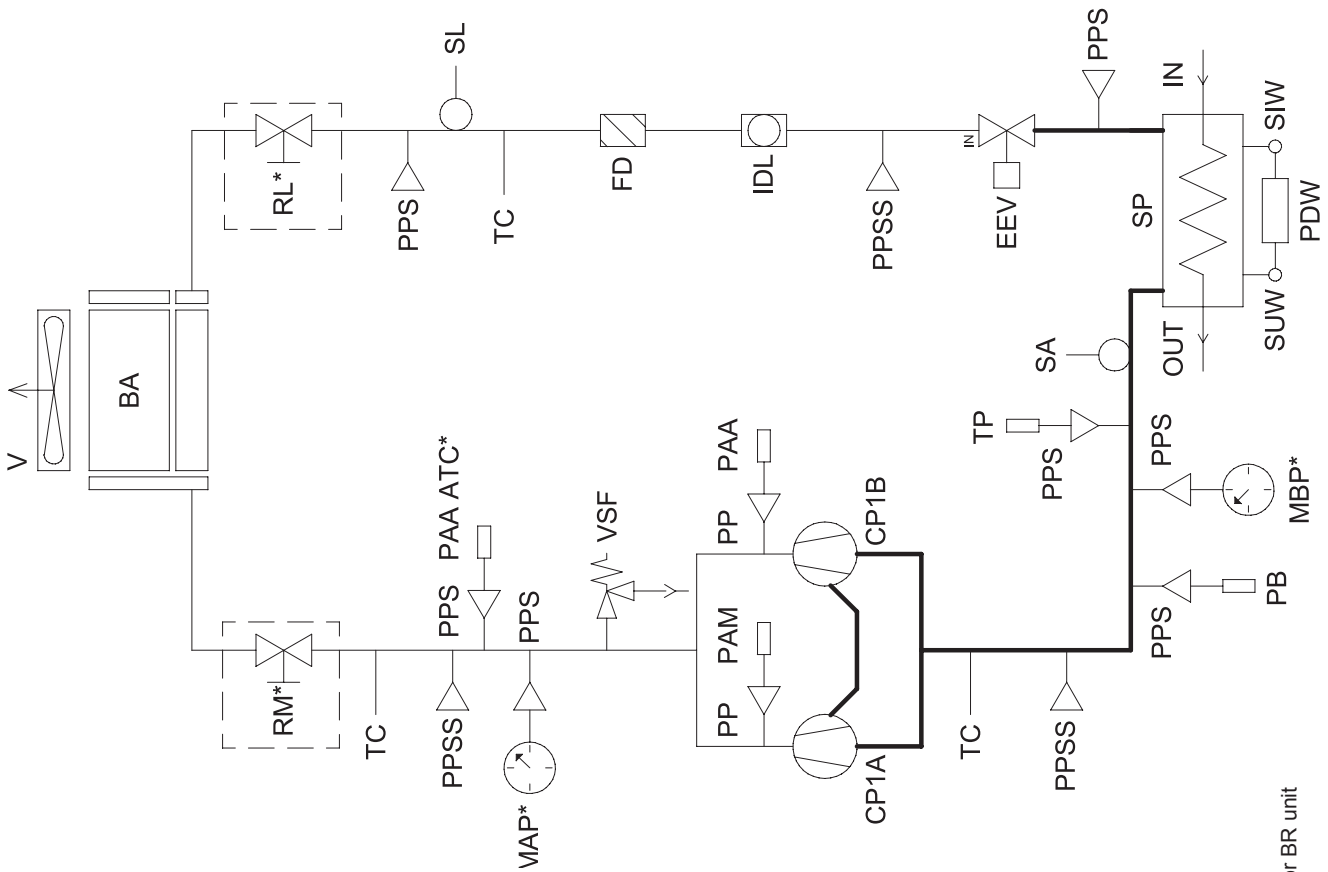


* : Optional
 — : insulated pipes for BR unit

REFRIGERANT FLOW DIAGRAM

Refrigerant flow diagram IR VB unit with thermostatic expansion valve

	Description
BA	FIN AND TUBE COIL
CP	COMPRESSOR
EEV	ELECTRONIC EXPANSION VALVE
FD	FILTER DRIER
IDL	LIQUID AND MOISTURE INDICATOR
MAP	HIGH PRESSURE GAUGE
MBP	LOW PRESSURE GAUGE
PAA	AUTO RESET HIGH PRESSURE SWITCH
PAA ATC	AUTO RESET HIGH PRESSURE SWITCH ATC FUNCTION
PAM	MANUAL RESET HIGH PRESSURE SWITCH
PB	AUTO RESET LOW PRESSURE SWITCH
PDW	WATER PRESSURE SWITCH
PP	PRESSURE SOCKET 1/4" SAE WITOUT CORE
PPS	PRESSURE SOCKET 1/4" SAE WITH CORE
PPSS	PRESSURE SOCKET 5/16" SAE WITH CORE
RL	LIQUID BALL VALVE
RM	COMPRESSOR OUTLET BALL VALVE
SIW	WATER INLET PROBE
SL	LIQUID PROBE
SP	PLATE HEAT EXCHANGER
SA	SUCTION PROBE
SUW	WATER OUTLET PROBE
TC	CHARGING TUBE
TP	PRESSURE TRANSDUCER
V	FAN
VSF	SAFETY VALVE

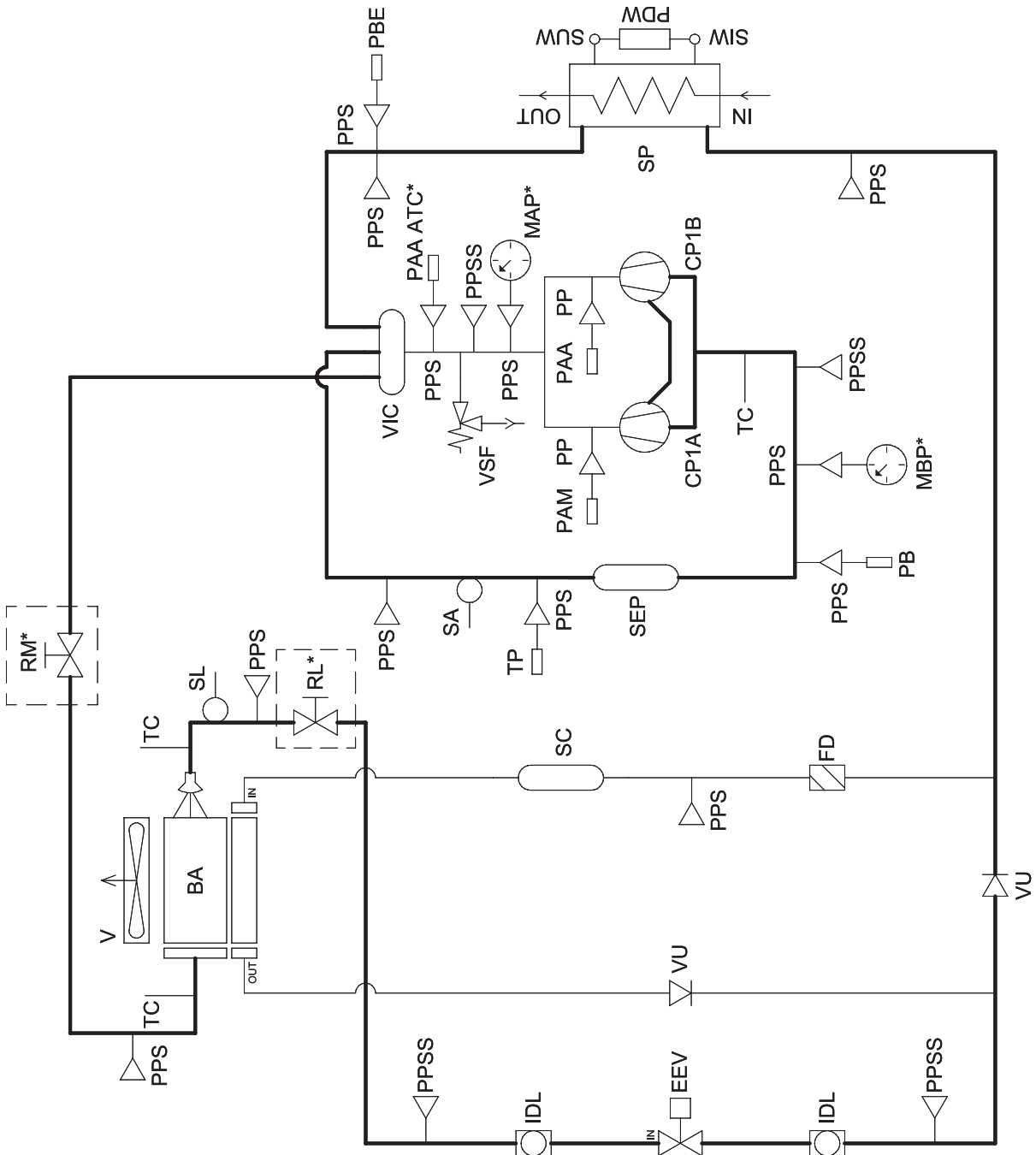


* : Optional
 — : insulated pipes for BR unit

REFRIGERANT FLOW DIAGRAM

Refrigerant flow diagram IP VB unit with electronic expansion valve

	Description
BA	FIN AND TUBE COIL
CP	COMPRESSOR
EEV	ELECTRONIC EXPANSION VALVE
FD	FILTER DRIER
IDL	LIQUID AND MOISTURE INDICATOR
MAP	HIGH PRESSURE GAUGE
MBP	LOW PRESSURE GAUGE
PAA	AUTO RESET HIGH PRESSURE SWITCH
PAA ATC	AUTO RESET HIGH PRESSURE SWITCH FOR ATC FUNCTION
PAM	MANUAL RESET HIGH PRESSURE SWITCH
PB	AUTO RESET LOW PRESSURE SWITCH
PBE	EVAPORATOR AUTO RESET LOW PRESSURE SWITCH
PDW	WATER PRESSURE SWITCH
PP	PRESSURE SOCKET 1/4" SAE WITHOUT CORE
PPS	PRESSURE SOCKET 1/4" SAE WITH CORE
PPSS	PRESSURE SOCKET 5/16" SAE WITH CORE
RL	LIQUID BALL VALVE
RM	COMPRESSOR OUTLET BALL VALVE
SC	LIQUID RECEIVER
SEP	LIQUID SEPARATOR
SIW	WATER INLET PROBE
SL	LIQUID PROBE
SP	PLATE HEAT EXCHANGER
SA	SUCTION PROBE
SUW	WATER OUTLET PROBE
TC	CHARGING TUBE
TP	PRESSURE TRANSDUCER
V	FAN
VIC	REVERSING CYCLE VALVE
VSF	SAFETY VALVE
VU	CHECK VALVE

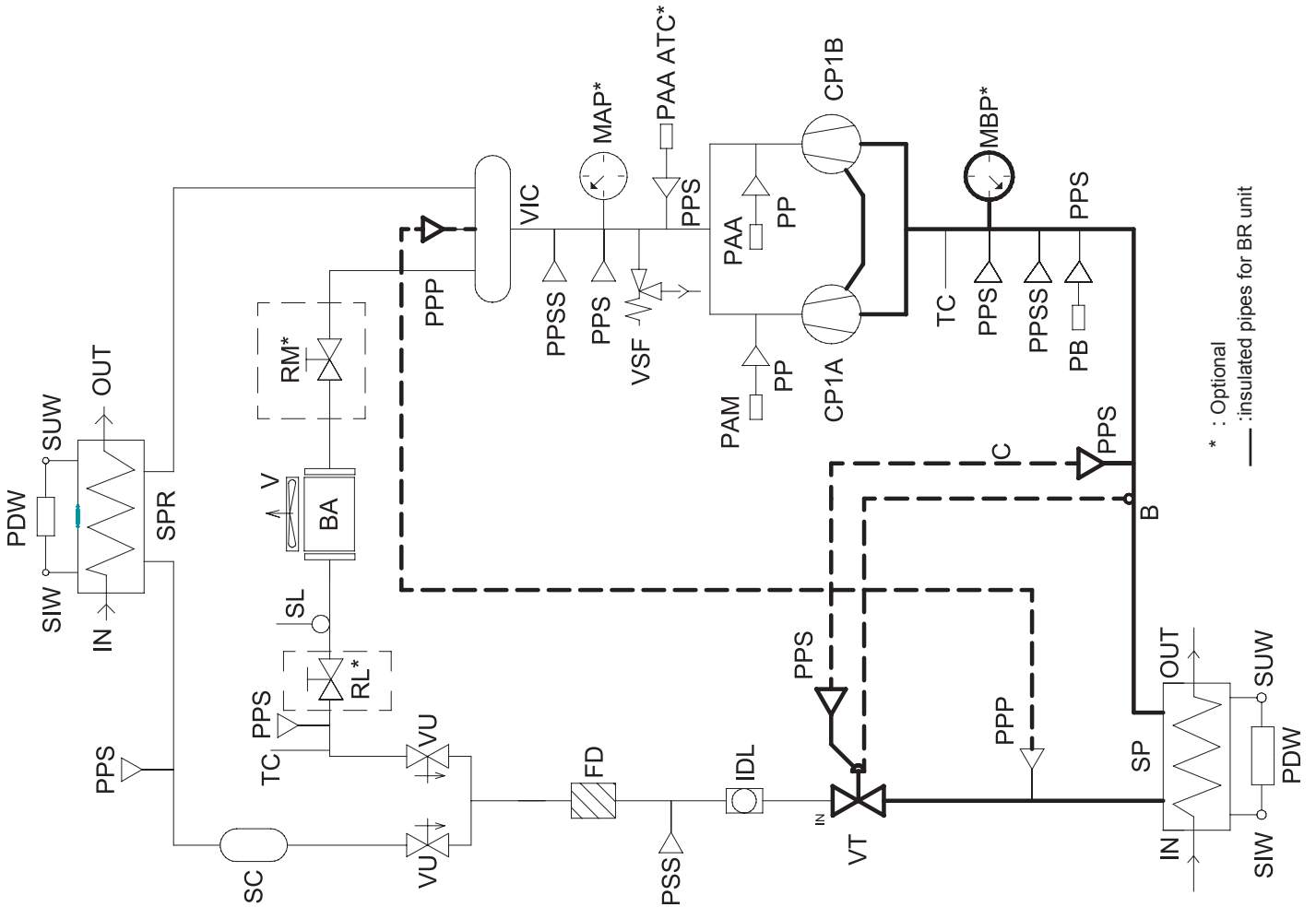


* : Optional
 — : insulated pipes for BP unit

REFRIGERANT FLOW DIAGRAM

Refrigerant flow diagram IR VR unit with thermostatic expansion valve

	Description
BA	FIN AND TUBE COIL
CP	COMPRESSOR
FD	FILTER DRIER
IDL	LIQUID AND MOISTURE INDICATOR
PAA	AUTO RESET HIGH PRESSURE SWITCH
PAA F	AUTO RESET HIGH PRESSURE SWITCH ATC FUNCTION
PAM	MANUAL RESET HIGH PRESSURE SWITCH
PB	AUTO RESET LOW PRESSURE SWITCH
PBE	EVAPORATOR AUTO RESET LOW PRESSURE SWITCH
PDW	WATER PRESSURE SWITCH
PP	PRESSURE SOCKET 1/4" SAE WITHOUT CORE
PPP	PRESSURE SOCKET 3/8" SAE WITHOUT CORE
PPS	PRESSURE SOCKET 1/4" SAE WITH CORE
PPSS	PRESSURE SOCKET 5/16" SAE WITH CORE
RL	LIQUID BALL VALVE
RM	COMPRESSOR OUTLET BALL VALVE
SC	LIQUID RECEIVER
SEP	LIQUID SEPARATOR
SIW	WATER INLET PROBE
SL	LIQUID PROBE
SP	PLATE HEAT EXCHANGER
SPR	PLATE HEAT RECOVERY EXCHANGER
SUW	WATER OUTLET PROBE
TC	CHARGING TUBE
V	FAN
VIC	REVERSING CYCLE VALVE
VSF	SAFETY VALVE
VTC	HEAT PUMP EXPANSION VALVE
VTF	COOLING EXPANSION VALVE
VU	CHECK VALVE
B	EXPANSION VALVE BULB
C	EXPANSION VALVE CAPILLARY
MAP	HIGH PRESSURE GAUGE
MBP	LOW PRESSURE GAUGE



USER INTERFACE

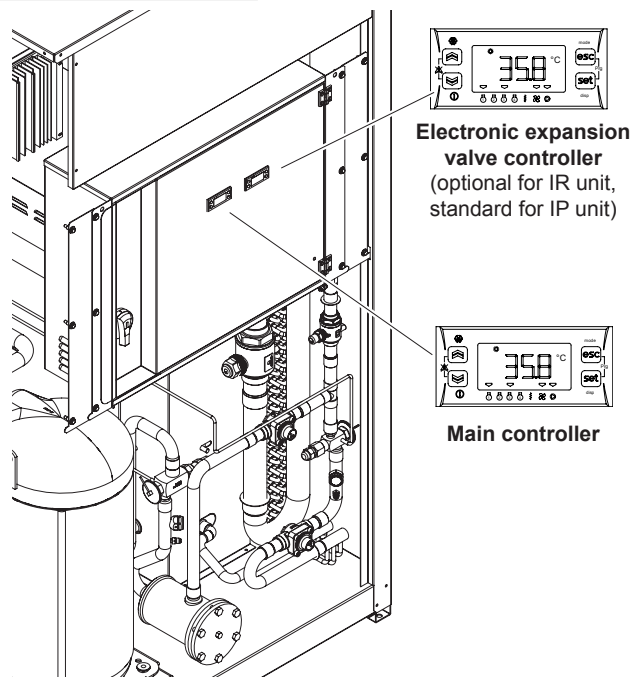
Keys

The unit is managed by a **microprocessor controller** to which all the loads and control devices are connected by means of a terminal block. The user interface comprises a display and four buttons with which it is possible to show and possibly modify all the unit's operation parameters. The interface, located in the front part of the unit and accessible from the outside, is protected by a transparent plastic door. A remote control having all the same functions as the interface fitted on the unit is available as an accessory.

Every button provides for :

- **a direct function** : indicated on the button itself and obtained by pressing the button
- **an associated function** : indicated on the front of the instrument at the corresponding button and obtained by prolonged pressing (3 seconds) of the button
- **a combined function** : obtained by pressing 2 buttons at the same time

ON/OFF - STAND-BY OF THE UNIT: see paragraph "Functions available for the user - ST-BY of the unit".



Button		Direct function	Associated function	
	UP	Increase value of selected parameter Scroll menu up		Manual defrost
	DOWN	Decrease value of selected parameter Scroll menu down	-	-
	ESC	Go to menu higher level without saving the modification	mode	Access the "Operation mode" menu ⁽¹⁾
	SET	Go to menu higher level and save the modification Go to menu lower level Access the "Status" menu	disp	Changing the display value
	TUTTI	Alarm deactivation	-	-

Button		Combined function	
	UP + DOWN		Manual reset
	ESC + SET		Access the "Programming" menu

NOTA:

1): key for unit on/off with mode selection (see paragraph "Functions available for the user - ST-BY of the unit").

USER INTERFACE

Display

The following are shown in normal display :

Main controller

- unit outlet water temperature (in degrees Celsius with decimal point)
- alarm code, if at least one is activated (in case of several alarms the code of the first according to the Table of Alarms is displayed)



Electronic expansion valve controller

- actual superheating value (in degrees Celsius with decimal point)
- alarm code, if at least one is activated (in case of several alarms the code of the first according to the Table of Alarms is displayed)

In menu mode the display depends on its position (see menu structure).

	Icon	Description	Colour	On fixed	On flashing
Operation status and modes		Alarm	Red	Alarm in progress	Alarm deactivated
		Heating	Green	Heating mode from keyboard	Heating mode from remote
		Cooling	Green	Cooling mode from keyboard	Cooling mode from remote
		Stand by	Green	Standby from keyboard	Standby from remote
		Defrost	Green	Defrost in progress	-
		Economy	Verde	non utilizzato not used	-
Unit of measure		Clock	Red	Time display format 24.00	Time setting format 24.00
	°C	Centigrade degrees	Red	Unit of measure of selected parameter	-
	Bar	Bar	Red	not used	-
	%R.H.	Relative humidity	Red	not used	-
		Menù	Red	Menu browsing	-
Users		Compressor 1	Amber	User activated	Safety timing
		Compressor 2	Amber	User activated	Safety timing
		not used	-	-	-
		not used	-	-	-
		Antifreeze heater Supplementary heating element 1st step	Amber	User activated	Safety timing
		Fans	Amber	User activated	Safety timing
		Plant pumps	Amber	User activated	Safety timing

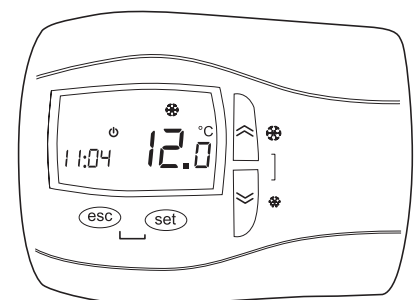
Remote control

Suitable for wall mounting, it has all the functions of the standard interface fitted on the unit.

The buttons, functions associated with the buttons and the display indications are the same as those provided for the standard interface.

All configuration and control operations are further facilitated by the double display which allows the name and value of the selected parameter to be shown at the same time.





Refer to the enclosed manual for the installation and connection procedures and operating instructions.






USER INTERFACE

Menu structure - Main controller

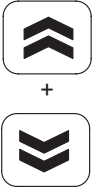

The control system is based on three menu with tree structure.

Menu	Access procedure	Submenu	Available functions
Operation mode	Press (prolonged)  (ESC button associated function)	SEbY	Change operation mode
		HEAt	
		COOL	
UP button	Press  (UP button direct function)	-	Value increases, the next label
DOWN button	Press  (DOWN button direct function)	-	Value decreases, the next label
Main view (disp)	Press (prolonged)  (SET button direct function)	RI	Analogue input display
		rEt	Clock display
		SEtP	Set point (set by customer) display
		SEt-r	Set point (actual set point) display

Menu	Access procedure	Submenu	USER	SERVICE	Available functions
Status	Pres  (SET button direct function)	RI	√	√	Analogue input display
		dI	√	√	Digital input display
		RO	√	√	Analogue output display
		dO	√	√	Digital output display
		EL	√	√	Date and hour adjustment
		SP	√	√	HEAt setpoint display
			√	√	COOL setpoint display
		Sr	√	√	HEAt actual setpoint display
			√	√	COOL actual setpoint display
Hr	√	√	Compressors and pumps working hours display		

Menu	Access procedure	Submenu	USER	SERVICE	Available functions	
Procedure	Pressure contemporary buttons  +  (combined function ESC + SET button)	PRr	EL	√	√	Electronic controller configuration parameters (base controller)
			Er	√	√	Electronic controller configuration parameters (remote controller)
			Ee	√	√	Electronic controller configuration parameters (expansion controller)
			Ef	√	√	Electronic controller configuration parameters
			U, I	√	√	LED Electronic controller configuration parameters (base + remote)
			tr	√	√	Temperature control parameters
			St	√	√	Operating states parameters
			EP		√	Compressor parameters
			Pi	√	√	Plant pump parameters
			FE		√	Fan parameters
			PE	√	√	Source pump parameters
			H, I	√	√	Plant heaters (antifreeze and integration) parameters parameters
			HE	√	√	Source heaters (antifreeze and integration) parameters parameters
			dF		√	Defrost parameters
			dS		√	Dinamic Setpoint parameters
			HP		√	Heat pump block parameters (in HEAT mode)
			PL		√	Demand limit parameters
			tE	√	√	Scheduling (time bands) parameters
AL		√	Alarms parameters			
rC		√	Heat recovery parameters			

USER INTERFACE

Menu	Access procedure	Sub-menu	USER	SERVICE	Available functions	SERVICE	Available functions	
Programming		<i>Fnc</i>	<i>dEF</i>			√	Manual defrost	
			<i>LR</i>			√	Silence alarms	
			<i>St</i>	<i>OFF</i>			√	Change in OFF state
				<i>On</i>			√	Change in status ON
			<i>CC</i>	<i>UL</i>			√	Upload program parameters
				<i>dL</i>			√	Download the program parameters
				<i>Fr</i>			√	Format Multi Function Key
			<i>EUR</i>				√	Reset historical alarms
			<i>PASS</i>			-	√	√
<i>EU</i>			-	√	√	Viewing historical alarms		
Alarm mute	Pressure contemporary buttons  (combined function ESC + SET button)	-	-	-	√	√	Alarm manual restore	
Manual defrost	Long press button  (UP button function associated)	-	-	-	√	√	Enable manual defrost	

Press SET to go from one level to that below. Press ESC to go to higher level.

Press the UP and DOWN buttons respectively to scroll the menu up and down inside the same level.

Press the UP and DOWN buttons to modify the value of the selected parameter. Press SET to confirm the modification. Press ESC to not confirm the modification.

INPUTS AND OUTPUTS

Inputs and outputs

SB655 - main controller
SE655 - expansion board
XVD420 - electronic expansion valve driver

UNIT		COMP.	SB655	SE655	XVD420
VB - VD	IR		x	-	-
	IR with electronic expansion valve (optional)		x	-	x
	IP		x	-	x
VR	IR		x	x	-
	IR with electronic expansion valve (optional)		x	x	x

x = Present
 - = Not present

Analog input

Analog inputs MAIN CONTROLLER (SB655)		
DESCRIPTION	CHARACTERISTICS	
AI1	water inlet probe plant exchanger	NTC temperature sensor (-50°C ÷ 99°C)
AI2	water outlet probe plant exchanger	NTC temperature sensor (-50°C ÷ 99°C)
AI3	liquid probe	NTC temperature sensor (-50°C ÷ 99°C)
AI4	ATC / outside air probe / remote ST-BY - S/W.- demand limit-economy	NTC temperature sensor (-50°C ÷ 99°C) / digital input
AI5	see AI5 on "digital inputs"	configured as digital input

- Input AI4 is factory-set as not enabled, if present ATC or SND accessory, input AI4 is pre-set by factory. Its configuration for specific use must be carried out at the time of installation according to the needs of the moment, modifying the configuration by parameter.
 - Input AI5 is factory-set as neutral and its configuration for specific use must be carried out at the time of installation according to the needs of the moment, modifying the configuration by parameter.

Modification and parameter configuration operations must only be carried out by an authorised service centre or by competent personnel.

Analog inputs EXPANSION BOARD (SE655)		
DESCRIPTION	CHARACTERISTICS	
AI1	Recovery water inlet probe exchanger	NTC temperature sensor (-50°C ÷ 99°C)
AI2	Recovery water outlet probe exchanger	NTC temperature sensor (-50°C ÷ 99°C)

Analog inputs ELECTRONIC EXPANION VALVE DRIVER (XVD420)		
DESCRIPTION	CHARACTERISTICS	
AI1	suction pressure transducer	electronic transducer 4-20 mA (0 barg ÷ 30 barg)
AI3	suction temperature	NTC temperature sensor (-50°C ÷ 99°C)

Digital input

Digital inputs MAIN CONTROLLER (SB655)		
DESCRIPTION	CHARACTERISTICS	
DI1	Thermal switch compressor 1 – thermostatted delivery 1 –high pressure switch	Digital input with voltage-free contact
DI2	Thermal switch compressor 2 –thermostatted delivery 2 – high pressure switch	Digital input with voltage-free contact
DI3	Low pressure switch + sequence meter + fan thermal switch + EEV driver alarm	Digital input with voltage-free contact
DI4	Thermal switch plant pump 1	Digital input with voltage-free contact
DI5	Thermal switch plant pump 2 (if present)	Digital input with voltage-free contact
DI6	Differential pressure switch + external paddle flow switch	Digital input with voltage-free contact
AI5-IN DIG	Remote ST-BY - S/W.- demand limit-economy	Analog input configured as digital

*refer to section alarms. ER10-ER11 for more details

Note for input DI5 thermal switch pump 2.

If only one pump is used and only one thermal switch is required, DI5 can be used as an additional multiconf. input for Remote ST-BY - S/W.- demand limit - economy.

In this way it is possible to have both the

- remote ST-BY, and
- S/W - demand limit – economy
- External probe

DI5 is factory-configured as pump 2 thermal switch. To modify the configuration, refer to the section "configurable inputs setting".

INPUTS AND OUTPUTS

Recovery digital inputs EXPANSION BOARD (SE655)

DESCRIPTION		CHARACTERISTICS
D11	Recovery ON-OFF Enable	Digital input with voltage-free contact
D12	Recovery differential pressure switch + paddle flow switch	Digital input with voltage-free contact
D13	Recovery thermal switch pump 1	Digital input with voltage-free contact

Digital inputs ELECTRONIC EXPANION VALVE DRIVER (XVD420)

DESCRIPTION		CHARACTERISTICS
D11	Enabling regulation	Digital input with voltage-free contact

Analog output

Analog outputs MAIN CONTROLLER (SB655)

DESCRIPTION		CHARACTERISTICS
AO1	Fans	pwm signal for control of single-phase fans in phase cut
AO4	Fans	signal 0-10V for control of three-phase fans in phase cut
AO5	Modulating plant pump	signal 4...20mA for inverter control pump

Digital output

Digital outputs MAIN CONTROLLER (SB655)

DESCRIPTION		CHARACTERISTICS
DO1	Compressor 1	2A resistive relays - 230Vac
DO2	Compressor 2	2A resistive relays - 230Vac
DO3	Reverse cycle valve	2A resistive relays - 230Vac
DO4	Antifreeze resistance – support 1st step	2A resistive relays - 230Vac
DO5	Resistance support 2nd step	Open collector - 12Vcc max 35mA
DO6	Alarm relay	2A resistive relays - 230Vac
AO2	Relay plant pump 1 (using 12Vdc external relay)	Open collector - 12Vcc max 35mA
AO3	Relay plant pump 2 (using 12Vdc external relay)	0 - 10Vdc output - max 28mA

Note: AO2 is analog output configured as digital

Digital outputs EXPANSION BOARD (SE655)

DESCRIPTION		CHARACTERISTICS
DOE1	Recovery reverse cycle valve	2A resistive relays
DOE2	Recovery relay pump 1	2A resistive relays

Digital outputs ELECTRONIC EXPANION VALVE DRIVER (XVD420)

DESCRIPTION		CHARACTERISTICS
DO1	Alarms	5A resistive relays - 250Vac

CONTROLLER TECHNICAL DATA

Main controller SB655 technical data

Description	Typical	Minimum	Maximum
Power supply voltage	12-24 V~	10,8-21,6 V~	13,2-26,4 V~
Power supply frequency	50 Hz / 60 Hz	-	-
Power	6 VA	-	-
Insulation class	2	-	-
Protection rating	Frontal IP65	-	-
Ambient operating temperature	25 °C	-10 °C	60 °C
Ambient operating humidity (non-condensing)	30 %	10 %	90 %
Ambient storage temperature	25 °C	-20 °C	85 °C
Ambient storage humidity (non-condensing)	30 %	10 %	90 %

Expansion board SE655 technical data

Description	Typical	Minimum	Maximum
Power supply voltage	12-24 V~	10,8-21,6 V~	13,2-26,4 V~
Power supply frequency	50 Hz / 60 Hz	-	-
Power	5 VA	-	-
Insulation class	2	-	-
Protection rating	Frontal IP0	-	-
Ambient operating temperature	25 °C	-10 °C	60 °C
Ambient operating humidity (non-condensing)	30 %	10 %	90 %
Ambient storage temperature	25 °C	-20 °C	85 °C
Ambient storage humidity (non-condensing)	30 %	10 %	90 %

Electronic expansion valve driver EEV - XVD420 technical data

Description	Typical	Minimum	Maximum
Power supply voltage	24 V~ / --	-	-
Power supply frequency	50 Hz / 60 Hz	-	-
Power	30 VA - 25Watt	-	-
Protection rating	2	-	-
Ambient operating temperature	25 °C	-5 °C	55 °C
Ambient operating humidity (non-condensing)	30 %	10 %	90 %
Ambient storage temperature	25 °C	-20 °C	85 °C
Ambient storage humidity (non-condensing)	30 %	10 %	90 %

ALARMS

Alarm activation and reset

The controller can perform a complete diagnosis of the unit, detecting all operation faults and signalling a number of alarms.

Activation of an alarm involves :

- blocking of users concerned
- signalling of alarm code on the display (in case of simultaneous alarms the one with the lowest index is displayed whereas the complete list of active alarms can be shown by accessing the "Status \ AL") menu
- recording of event in the alarms history

Alarms that can damage the unit or system require **manual resetting** or an action by the operator to reset the controller (pressing the UP and DOWN buttons at the same time). It is advisable to carefully check the cause of the alarm and make sure the problem is eliminated before restarting the unit. In any case the unit restarts only if the cause of the alarm has ended.

Less critical alarms are **automatic reset**. As soon as the cause is eliminated the unit starts working again and the alarm code disappears from the display. Some of these alarms become manual reset if the number events per hour exceeds a fixed limit.

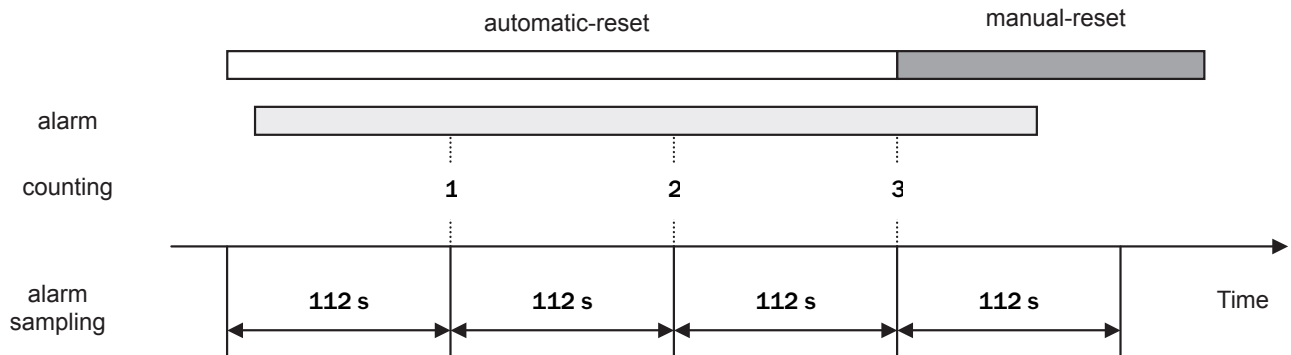
Press any button to **deactivate the alarm** : alarm signalling disappears from the display, the alarm LED starts flashing and the Alarm digital output is disabled. This operation does not affect the alarm in progress.

Number of events per hour

The counting of events per hour is provided for some alarms : if the number of events reaches a fixed limit in the last hour, the alarm goes from automatic to manual reset.

Sampling of alarms occurs every 112 seconds. If an alarm is activated several times in a sampling period (112 seconds) it is counted only once.

Example. If an number of events per hour equal to 3 is set, it must have a duration of between $2 \cdot 112$ seconds and $3 \cdot 112$ seconds so that the alarm goes from automatic to manual reset.



Alarms history

The controller enables the recording of alarms occurring during unit operation (up to a max. of 99 events). The following are memorised for each event :

- alarm code
- input time
- input date
- output time
- output date
- type of alarm (automatic or manual reset)

This information can be shown by accessing the "Programming \ EU" menu.

When the number of events memorised is more than 99, alarm E_{r90} is generated and the subsequent events are memorised overwriting the oldest alarms.

The alarms history can be cancelled by means of the E_{ur} function available inside the "Programming \ FnC" menu.

ALARMS

Alarm table

Code	Alarm	Type of alarm	input	COMPRESSORS	FANS	PLANT CIRCUIT PUMPS	EXCHANGER RESISTANCES PLANT	AUXILIARY OUTPUT
<i>Er05</i>	Low pressure + sequence meter + fans thermal switch + EEV driver alarm (if present)	A/M ⁽²⁾	DI3	OFF	OFF			
<i>Er10</i>	Compressor 1 thermal protection	High pressure	M	DI1	OFF comp.1			
<i>Er11</i>	Compressor 2 thermal protection		M	DI2	OFF comp.2			
<i>Er20</i>	Plant circuit water differential pressure switch / paddle switch	A/M	DI6	OFF	OFF if manual reset	OFF		
<i>Er21</i>	Plant circuit pump 1 thermal protection	M	DI4	OFF	OFF	OFF p.1	OFF	
<i>Er22</i>	Plant circuit pump 2 thermal protection	M	DI5	OFF	OFF	OFF p.2	OFF	
<i>Er25</i>	Recovery water differential pressure switch / paddle switch	M	DIE2	OFF	OFF	ON	OFF	
<i>Er26</i>	Recovery pump 1 thermal protection	M	DIE3	OFF	OFF	ON	OFF	
<i>Er30</i>	Plant circuit antifreeze	M	AI2	OFF				
<i>Er31</i>	Recovery circuit antifreeze	M	AIE2	OFF				
<i>Er45</i>	Clock fault error	A						
<i>Er46</i>	Clock to be set error	A						
<i>Er47</i>	Remote keyboard communication error	A						
<i>Er60</i>	Plant exchanger inlet water probe fault	A	AI1	OFF	OFF	OFF	OFF	OFF
<i>Er61</i>	Plant exchanger outlet water probe fault	A	AI2	OFF	OFF	OFF	OFF	OFF
<i>Er62</i>	Liquid temperature probe	A	AI3					
<i>Er63</i>	Recovery exchanger inlet water probe fault	A	AI1	OFF	OFF	OFF	OFF	OFF
<i>Er64</i>	Recovery exchanger outlet water probe fault	A	AI2	OFF	OFF	OFF	OFF	OFF
<i>Er68</i>	External air probe fault	A	AI4					
<i>Er80</i>	Configuration error	A		OFF	OFF	OFF	OFF	OFF
<i>Er90</i>	Recordings for alarms history exceeded signalling	M						

Notes:

(1) A = automatic reset, M = manual reset

(2) Only when the alarm becomes manual reset

***Er05* Low pressure – Sequence meter - Fans thermal protection - EEV driver alarm**

The alarm becomes manual reset when the number of events per hour is more than parameter $R_L 12$.

The alarm is bypassed for parameter $R_L 11$ seconds from activation of the compressor or the reverse cycle valve.

***Er10* Compressor 1 thermal protection**

The manual-reset alarm intervenes in the event of activation of the compressor thermal protection or the thermostat located on the outlet of the compressor .

***Er11* Compressor 2 thermal protection**

The manual-reset alarm intervenes in the event of activation of the compressor thermal protection or the thermostat located on the outlet of the compressor .

***Er10 Er11** Compressor 1 thermal protection - Compressor 2 thermal protection - High pressure switch (PAA)**

The manual-reset alarm intervenes in the event of activation of the compressor 2 thermal protection or the thermostat located on the outlet of the compressor 2 AND in the event of activation of the compressor 1 thermal protection or the thermostat located on the outlet of the compressor 1 and/or more likely it means the auto-reset high pressure switch (PAA) trips in.

***Er20 / Er25* Differential pressure switch - flow switch plant / recovery**

The alarm is activated if the associated digital input remains activated for at least 5 seconds and automatically resets if the digital input remains not activated for at least 3 seconds. The alarm becomes manual reset if the digital input remains activated for more than 10 seconds. The alarm is bypassed for 15 seconds from pump activation.

***Er21 Er22 / Er26* Pump thermal protections plant / recovery**

When thermal protection trip in the controller stop the pump and the unit; if the controller manages two pumps it involves the activation of the other, if both thermal protection trip in the controller stops the unit.

ALARMS

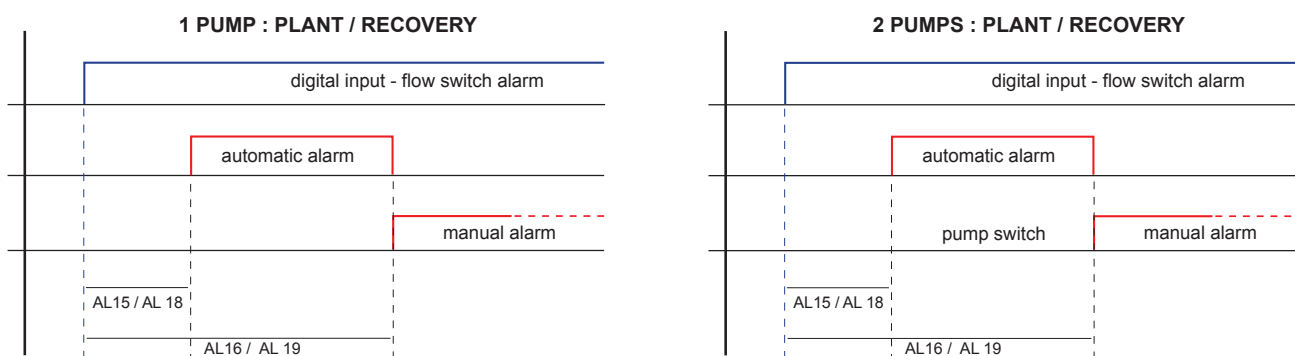
Er20 Er25 **Flow switch / water differential pressure switch alarm**

Unit with 1 pump:

The alarm is active if the input is active for at least the time *AL 15* (plant) / *AL 18* (source). It remains automatic for the time *AL 16* (plant) / *AL 19* (source): if, during this time the alarm is deactivated the unit can restart to work, instead if remains active becomes manual.

Unit with 2 pumps:

The alarm is active if the input is active for at least the time *AL 15* (plant) / *AL 18* (source). It remains automatic for the time *AL 16* (plant) / *AL 19* (source): during this time the controller stops the working pump and switch on the other one, if the alarm is deactivated the unit can restart to work, instead if remains active becomes manual.



If there is the flow switch alarm during the first startup of the unit control the cleanliness of the water plant. Particularly during the startup a lot of impurities due to the pipes installation can be present into the hydraulic plant and if the plant was not carefully washed, despite the installation of water filters with adequate mesh size impurities as sand, chips or similar could enter into the exchangers choking them and, in worst cases, lead to a serious damage or broke for freezing (if the exchanger is working as evaporator).

Er30 Er31 **Antifreeze plant / recovery**

The alarm switch off the compressors, activates the heaters and the pumps (if off).

It is a very dangerous alarm: check carefully the possible cause and eliminates it before reset the alarm.

Er45 **Clock failure**

If the clock is not working it is not possible to set time bands and the record of date and hour for the alarms present in the alarm events.

Er46 **Alarm: clock to be set**

There is this alarm if the controller is not electrically supplied for several days.

Er47 **LAN communication error between electronic controller (base, remote, expansion)**

There is this alarm if there is not communication between the devices connected through LAN.

Er60 Er61 Er63 Er64 **Failure of temperature probes (plant and recovery)**

This alarm stops the unit. It could be caused for short-circuit, breakage or out of range of the probe

Er62 **Failure of liquid temperature probe**

If the alarm is active the fans work only on-off on request (on when compressor is on). It could be caused for short-circuit, breakage or out of range of the probe. In and out defrosting are managed by the timing of compressor.

Er68 **Failure of external air temperature probe**

If the alarm is active all controls based on this probe (i.e. dynamic setpoint or defrost) are disabled: the unit can continue to work. It could be caused for short-circuit, breakage or out of range of the probe.

Er80 **Configuration fault**

Appears when the parameters are not set correctly.

Er90 **Maximum number of recordings in alarms history exceeded**

Indicates that the alarms history buffer is full. Every new alarm will be memorised, cancelling the oldest alarm.

*** Note: The manual-reset high pressure (PAM) does not have reference on the control display so you can not identify it through the internal diagnostics as it acts directly on contactors, it may happen that the control display does not signal any error but the compressors are however still, in this case switch-off the unit then rearm the manual-reset high pressure switch by pressing the button located at the top of the switch.**

ALARMS

Electrical expansion valve table alarm XVD420

Code	Driver input	Alarm	Cause	Effect	Alarm type	Alarm on main controller	Input on main controller	Troubleshooting
Er 01	AI1	Probe AI1 fault	Probe fault / shortcircuit / non connected	Valve closed	Automatic	er05	DI3	Check wiring of the probe, replace probe AI1
Er 03	AI3	Probe AI3 fault	Probe fault / shortcircuit / non connected	Valve closed	Automatic	er05	DI3	Check wiring of the probe, replace probe AI3
Er 06	AI1 - AI3	Errore uscita saturazione	Probe AI1 AI3 fault / shortcircuit / non connected	Valve closed	Automatic	er05	DI3	Check wiring of the probe, replace probe AI1 AI3
Er 07	-	MOP alarm	Saturation temperature > setpoint MOP 20°C for more than 255 s	Valve closed	Automatic	er05	DI3	Wait for saturation temperature < 20°C
Er 10	-	NO link alarm	Serial communication fault	Valve closed	Automatic	er05	DI3	Re-establish connection
Er 11	W2- W2+ W1- W1+	Motor protection alarm	Exceeded absorbed current	Valve closed	Manual *	er05	DI3	Check motor phases, motor connections
Er 12	W1- W1+	Motor protection alarm	Disconnection winding 1	Valve closed	Manual *	er05	DI3	Check winding connection 1 (terminals 6-7)
Er 13	W1- W1+	Motor protection alarm	Shortcircuit winding 1	Valve closed	Manual *	er05	DI3	Check winding connection 1 (terminals 6-7)
Er 14	W2- W2+	Motor protection alarm	Disconnection winding 2	Valve closed	Manual *	er05	DI3	Check winding connection 2 (terminals 4-5)
Er 15	W2- W2+	Motor protection alarm	Shortcircuit winding 2	Valve closed	Manual *	er05	DI3	Check winding connection 2 (terminals 4-5)

Note:

* power off and on the driver/unit to reset

AVAILABLE FUNCTIONS

ST-BY of the unit

When the unit is powered it may be in STAND BY status (the display shows the message Stby) or ON status. It is possible to switch between ON and STAND BY by pressing (prolonged) the MODE button.

When the unit is STAND BY all the users are disabled and the antifreeze function is not activated.

Operation mode selection

When the unit is ON, one of the operation modes can be selected by accessing the "Operation mode" menu.

- Cooling ❄️ COOL
- Heating ☀️ HEAT
- STAND BY ⏻ StdbY

Remote ST-BY ⏻

This function allows remote selection of the STANDBY mode. If the input is activated (contact open) the controller is in STANDBY mode and the operation mode cannot be modified from keyboard.

The function is available if one of the configurable inputs is configured for this, contact closed = unit ON (display SIW), contact open = STAND-BY (display StdbY).

Working mode remote change-over cooling ❄️ / ☀️ heating

This function allows remote selection of Cooling or Heating mode. If the input is activated (contact open) the unit is in heating mode. If the input is not activated (contact closed) the unit is in cooling mode. The operation mode cannot be modified from the keyboard (but STANDBY mode can be selected).

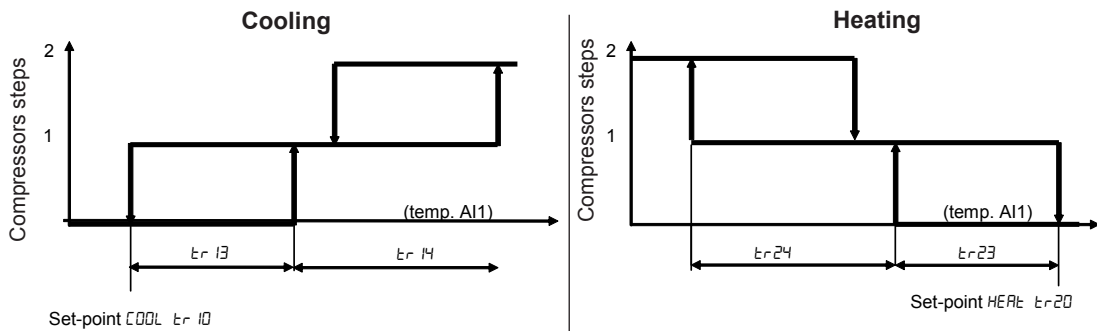
To enable this function, follow the indications in the section "configurable inputs setting".

Set point

The set point value in cooling (COOL) and heating (HEAT) can be set by accessing the "Status \ Sp" menu. The purpose of the controller is to keep the water temperature at the unit inlet as close as possible to the set value, by activating the compressor according to an on-off logic.

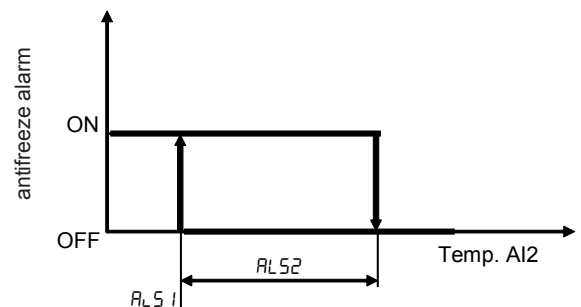
Note for heat pump mode:

It's possible to set a value for outside air temperature (parameter HP11) below which the heat pump operation is stopped (still available, if any, additional integrative heaters).



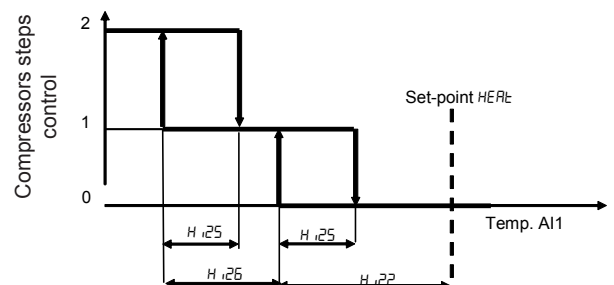
Antifreeze ~~~

The plate-type exchanger is protected by activation of an electrical heating element and activation of the antifreeze alarm, occurring in sequence when the exchanger outlet water temperature reaches dangerous values. The storage tank is protected by the antifreeze heater (accessory) activated in parallel with the plate-type exchanger heating element.



Supplementary electrical heating elements ~~~

The parameter H120 enables operation of the electrical elements supplementing the heat pump when it assumes value 1. The heating elements are activated according to a two-step logic depending on the unit inlet water temperature. When present, the heating elements also carry out a storage tank antifreeze function.



AVAILABLE FUNCTION

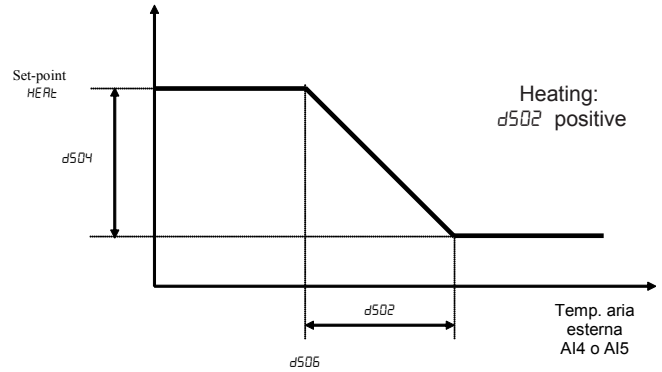
Dinamic setpoint

The parameter $d500$ allows the dynamic setpoint; if $d500=1$ the setpoint is corrected as a function of external air temperature (if present). To set the external air temp follow the indications of the section "Configurable Inputs".

The activation of the dynamic setpoint is displayed by the switch-on of the led Economy on the display (money box symbol); it is possible to display the actual setpoint by the parameter SEt_r .

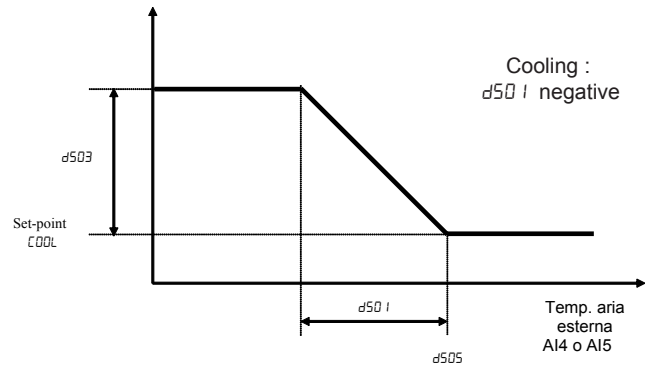
Dinamic setpoint in heating mode

It is possible to modify setpoint ($d506$ in °C), the proportional band ($d502$ in °C), and the maximum differential ($d504$ in °C)



Dinamic setpoint in cooling mode

It is possible to modify setpoint ($d505$ in °C), the proportional band ($d501$ in °C), and the maximum differential ($d503$ in °C)



Plant pump on-off control

Pre-pumping: when the unit is switched fromn STD-BY to COOL or HEAT mode firstly the pump is activated and, if there is no alarm, after the time of parameter $P1\ 20$ the first compersor can start-up.

Post-pumping: when the unit is switched from COOL or HEAt mode to STD-BY firstly the compressors are switched-off and after the time of parameter $P1\ 21$ the pump is switched off.

If the pump is ON is always working at 100%.

Plant pump modulating control

If the pump is driven by inverter (or similar modulating system) is possible to set the velocity between 30% and 100% of the maximum velocity modifying the parameters $P1\ 31$ in cooling, $P1\ 41$ in heating.

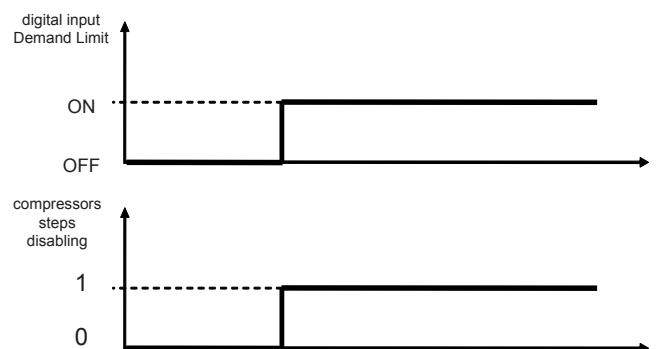
For instance with $P1\ 31=70$ and $P1\ 41=75$ the velocity will be 70% in cooling and 75% in heating

Note: When the compressors are off the pump works at minimum velocity.
Referring pre and post pumping the pump is managed as in on-off mode

Demand limit

Basing on the state of a digital input, this function allows to force the unit to work with only 1 compressor, so reducing the power input demand.

To enable this function follow the indications of the section "Configurable Inputs".



AVAILABLE FUNCTION

Funzione economy

Basing on the state of a digital input, this function allows to modify the setpoint.

In cooling mode the setpoint is increased of the value of the parameter $Er15$ (es. $Er15 + 5\text{ }^{\circ}\text{C}$).

In heating mode the setpoint is decreased of the value of the parameter $Er25$ (es. $Er25 - 6\text{ }^{\circ}\text{C}$).

To enable this function follow the indications of the section "Configurable Inputs" - "Economy".

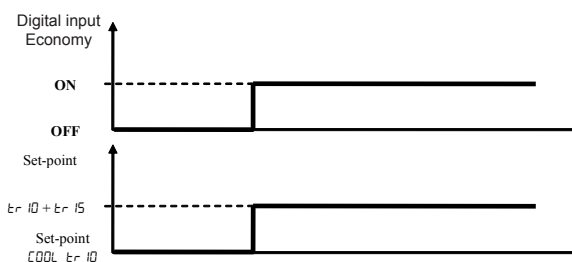
The activation of the Economy function is displayed by the switch-on of the led Economy on the display (money box symbol); it is possible to display the actual setpoint by the parameter $SEtEr$.

The enabling of the Economy function has to be done considering the following scheme:

Cooling mode $COOL$:

$Er15$ usually positive value

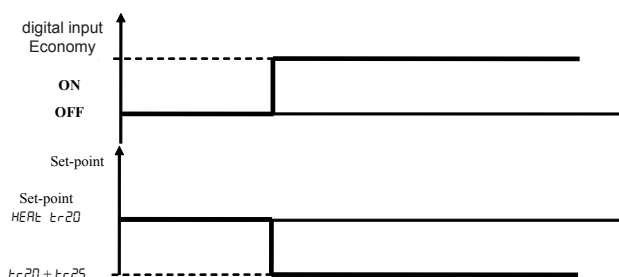
$Er10$ set-point $COOL$



Heating mode $HEAT$:

$Er25$ usually negative value

$Er20$ set-point $HEAT$



Recording hours of operation

The controller can record the hours of compressors and pumps operation. Access the "Status \ Hr" menu to show the values.

Power failure

In case of a power failure, when the power is restored the controller will go to the status prior to the power failure. The procedure is cancelled if a defrost is in progress. All timing in progress is cancelled and reinitialised.

Clock

The controller has an internal clock for memorising the date and time of each alarm occurring during unit operation (see "Alarms history"). The clock can be set by accordingly to "Date and time set up".

History alarms

The controller is able to log and save up to 90 alarm events. Alarms are visible in the menu "Par \ EU".

Push SET to display alarm $EU00$ (if present) that is always the latest, $EU01$ is the one before and so on.

Scroll to UP and DOWN keys to display all the other alarms, push SET to display more information about the event chosen: alarm code (see alarm table), start event time, start event date, stop event time, stop event date, type of alarm (automatic or manual reset).

Example of an alarm visualization:

alarm event	$EU01$	L stop event time	20:09
L alarm code	$Er01$	L stop event date	28.03
L start event time	20:01	L type of alarm	$Auto / \overline{MAN}$
L start event date	28.03		

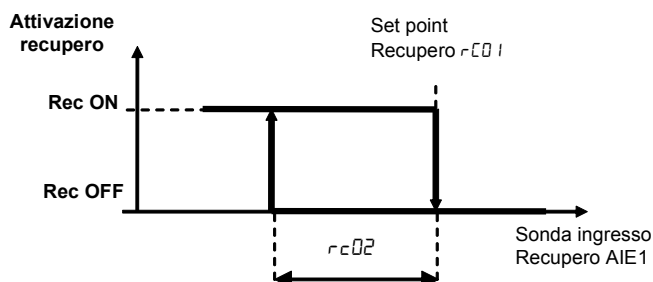
Total recovery function (VR unit only)

The recovery function thermoregulates on the inlet water AIE1 probe. If there is no demand for cooling power recovery can not be activated.

The parameters to adjust are:

$rC01$ recovery set point

$rC02$ recovery differential



AVAILABLE FUNCTION

Automatic change-over

This function is present in the heat pump unit.

The automatic change-over function is enable by $5\epsilon 01$ parameter - Enable change analogue input setting.

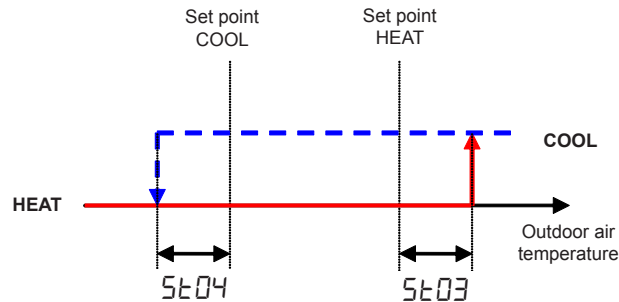
$5\epsilon 01 = 0$ automatic change-over disable
 $5\epsilon 01 = 1$ automatic change-over enable

The automatic change-over can take place from the analog signal of the probe set by parameters $5\epsilon 02$ - probe selection for automatic change-over:

$5\epsilon 02 = 0$ outdoor air temperature
 $5\epsilon 02 = 1$ inlet water temperature plant exchanger
 $5\epsilon 02 = 2$ outlet water temperature plant exchanger

The entrance in cooling and heating mode with two different differentials set by parameter $5\epsilon 03$ - Differential for automatic chan-over in heating - and $5\epsilon 04$ Differential for automatic chan-over in cooling
 In the neutral zone (between the two set-point) mode can also be set by key.

Following an example of automatic change-over based on external air temperature ($5\epsilon 02 = 0$)



Set point COOL and set point HEAT are the real set-point and can differ from set-point $\epsilon r 10$ and $\epsilon r 20$ due to climatic regulation enabled (economy function and dinamic set point)

Note:
 - $5\epsilon 04$ is summed to set point COOL; $5\epsilon 03$ is summed to set point HEAT.
 - $(5\epsilon 03 + 5\epsilon 04) < (\text{Set HEAT} - \text{Set COOL})$, otherways the sum of the absolute value of the two differential may not overcome the value of $(\text{Set HEAT} - \text{Set COOL})$.

Date and time set up

The electronic controller is equipped with internal clock (RTC) that allows to record in the alarm events date and hour of each alarm.

To modify date and hour, starting from the main view on the display, press the SET button.
 A single pressure of the button SET enter the view of different folders.
 Scroll the menu using UP and DOWN buttons until find the folder $\epsilon \epsilon$.
 Press the SET button to enter in the menu.
 Now in the display you have the label $HOUR$. You can choose to set hour, date and year scrolling the menu using UP and DOWN buttons.
 Press the SET button for 3 seconds and enter in the modification menu.
 To set hour, date and year it will be enough scroll UP and DOWN until the selected value, then press SET button.
 To exit from the clock adjustment menu press the ESC button until arrive to main view on the display.

AVAILABLE FUNCTION

Timer scheduling

The scheduling allows to set weekly time zones to obtain a reduce in energy consumption when the cooling or heating demand is lower.

There are 3 time zones each one with 4 events per hour.

For each event, you can set hours and minutes of start and stop, an operating mode (Stand-by or ON), a cooling set point and a heating set point.

ATTENTION: you can not change the operating mode via scheduling. The operating mode (cooling or heating) will be the same adopted before the enabling of time scheduling.

To enable time scheduling you must set up the date and time into the controller

The parameters for the scheduling can be accessed in the “tE” (time event) folder.

Enabling

The function can be enabled with the parameters tE00 – Enabling scheduling

Parameters		descriptions	Value
tE00	Enabling scheduling	Scheduling disabled	0
		Scheduling enabled	1

Management time

For each day of the week you can select one of the 3 time zone available

Parameters	day	Time zone		
tE01	Monday	1	2	3
tE02	Tuesday	1	2	3
tE03	Wednesday	1	2	3
tE04	Thursday	1	2	3
tE05	Friday	1	2	3
tE06	Saturday	1	2	3
tE07	Sunday	1	2	3

For each time zone you can associate 4 events.

The parameters involved in time events are described below:

Event hour start time

It determines the hour of the start of the event [0-23]

Event minute start time

It determines the minutes of the start of the event [0-59]

Operating Mode ON/Standby

It determines the operating mode during the event

- 0 = ON
- 1 = Stand-by

Set point Cool

It determines the set point in cooling mode that will be set if the unit is in cooling mode before time scheduling

Set point Heat

It determines the set point in heating mode that will be set if the unit is in heating mode before time scheduling

AVAILABLE FUNCTION

Summary parameters table for time scheduling

	Descrizione	Profilo 1	Profilo 2	Profilo 3
EVENT 1		EE 10...EE 14	EE38...EE42	EE66...EE70
	Hour / minutes	EE 10...EE 11	EE38...EE39	EE66...EE67
	Mode operating ON/Standby	EE 12	EE40	EE68
	SetPoint Cool	EE 13	EE41	EE69
	SetPoint Heat	EE 14	EE42	EE70
EVENT 2		EE 17...EE21	EE45...EE49	EE73...EE77
	Hour / minutes	EE 17...EE 18	EE45...EE46	EE73...EE74
	Mode operating ON/Standby	EE 19	EE47	EE75
	SetPoint Cool	EE20	EE48	EE76
	SetPoint Heat	EE21	EE49	EE77
EVENT 3		EE24...EE28	EE52...EE56	EE80...EE84
	Hour / minutes	EE24...EE25	EE52...EE53	EE80...EE81
	Mode operating ON/Standby	EE26	EE54	EE82
	SetPoint Cool	EE27	EE55	EE83
	SetPoint Heat	EE28	EE56	EE84
EVENT 4		EE31...EE35	EE59...EE63	EE87...EE91
	Hour / minutes	EE31...EE32	EE59...EE60	EE87...EE88
	Mode operating ON/Standby	EE33	EE61	EE89
	SetPoint Cool	EE34	EE62	EE90
	SetPoint Heat	EE35	EE63	EE91

Example of timer scheduling:

You choose to set time zone 1 from Monday to Friday with the following setup:

At 07.30 you put the unit ON with a set point of 12°C in cooling mode, and 40°C in heating mode

At 12.30 you change the set point to 14°C in cooling mode, 37°C in heating mode

At 13.30 you change the set point to 12°C in cooling mode, 40°C in heating mode

At 18.00 you put the unit in stand-by

You have to set the following parameters:

EE00=1 enabling scheduling

EE01, EE02, EE03, EE04, EE05, = 1 time zone 1

EVENT 1 – unit ON

EE 10=8 hour

EE 11=30 minutes

EE 12= 0 ON, unit is ON (pay attention: 0=ON, 1=stand-by)

EE 13= 12 set point cool 12°C

EE 14=40 set point heat 40°C

EVENT 2 – change set point

EE17=12 hour

EE18=30 minutes

EE19= 0 ON, unit is ON (pay attention: 0=ON, 1=stand-by)

EE 20= 12 set point cool 14°C

EE 21=40 set point heat 37°C

EVENT 3 – change set point

EE 24=13 hour

EE 25=30 minutes

EE 26= 0 ON, unit is ON (pay attention: 0=ON, 1=stand-by)

EE 27= 12 set point cool 12°C

EE 28=40 set point heat 40°C

EVENT 4 – unit in stand-by

EE 31=18 hour

EE 32=00 minutes

EE 33= 1 stand-by, unit is in stand-by (pay attention: 0=ON, 1=stand-by)

EE 34= 12 set point cool 12°C

EE 35=40 set point heat 40°C

The operating mode (cooling or heating) adopted is the one already active before the event happens.

For Saturday or Sunday you can choose time zone 1 or another time zone (2 or 3) and set the parameters in a similar manner as described in this example.

PARAMETERS

Common parameters

Description	Unit	Min	Max	default value	Protection
TR10 - Temperature controller setpoint in COOL	°C	7	27	9	3
TR13 - Temperature control hysteresis	°C	0.1	25.5	1	2
TR14 - Steps/compressors insertion differential	°C	0.1	25.5	2.5	2
TR15 - Setpoint differential in Cool from economy input	°C	-25.5	25.5	5	1
TR20 - Temperature controller setpoint	°C	28	53	43	3
TR23 - Temperature control hysteresis	°C	0.1	25.5	1	2
TR24 - Steps/compressors insertion differential	°C	0.1	25.5	2.5	2
TR25 - Setpoint differential in Heat from economy input	°C	-25.5	25.5	-5	1
dS01 - Temperature controller dynamic differential proportional band in Cool	°C	-50	99.9	-10	1
dS02 - Temperature controller dynamic differential proportional band in Heat	°C	-50	99.9	10	1
dS03 - Maximum temperature controller dynamic differential in Cool	°C	-50	99.9	5	1
dS04 - Maximum temperature controller dynamic differential in Heat	°C	-50	99.9	-5	1
dS05 - Temperature controller dynamic differential setpoint in Cool	°C	-50	99.9	30	1
dS06 - Temperature controller dynamic differential setpoint in Heat	°C	-50	99.9	10	1
PI30 - Minimum Plant circuit water pump speed in Cool	%	0	100	20	2
PI31 - Maximum Plant circuit water pump speed in Cool	%	0	100	100	3
PI40 - Minimum Plant circuit water pump speed in Heat	%	0	100	30	2
PI41 - Maximum Plant circuit water pump speed in Heat	%	0	100	100	3
HI22 - Plant exchangerheaters maximum dynamic differential in integration	°C	0	99.9	10	1
HI25 - Plant exchangerheaters regulator hysteresis in integration	°C	0.1	25.5	2	2
HI26 - Plant exchangerheater 2 switch-on setpoint differential in integration	°C	0	99.9	3	2
AL15 - Flow switch activation/deactivation time on Plant circuit automatic alarm	sec	0	255	2	2
AL16 - Enable flow switch time for Plant circuit manual alarm	Sec x 10	0	255	2	2
AL51 - Plant circuit anti-freeze regulator setpoint alarm	°C	-50	99.9	3	1
AL52 - Plant circuit anti-freeze regulator hysteresis alarm	°C	0.1	25.5	2	2

Specific parameters for VR unit

Description	Unit	Min	Max	default value	Protection
rC01 - Set point recovery	°C	-50	99.9	41	3
rC02 - Differential recovery	°C	0.1	25.5	2	1

Protection 3 = always accessible

Protection 1 = accessible by service

Protection 2 = not accessible

CONFIGURABLE INPUTS

The configurable inputs are AI4, AI5 and DI5.

For configuration, access the parameters \llcorner and select the required function according to the following tables.

I/O	ID	analogue / digital input	Configuration	Polarity	Offset (range) / Stato
AI4	S1	Not configured	$\llcorner 03 = 0$ $\llcorner 33 = 0$ $\llcorner 53 = 0$	----	----
		External probe sensor (provided with accessory SND3)	$\llcorner 03 = 2$ $\llcorner 33 = 9$ $\llcorner 53 = 0$	NTC probe	$\llcorner 23 (-12,0... +12,0 [^{\circ}\text{C}])$ $\llcorner 13 = \text{Start value scale AI4 } [^{\circ}\text{C}]$ $\llcorner 12 = \text{Full scale value AI4 } [^{\circ}\text{C}]$
		External probe air as analog input 4-20 mA	$\llcorner 03 = 3$ $\llcorner 33 = 9$ $\llcorner 53 = 0$	----	$\llcorner 23 (-12,0... +12,0 [^{\circ}\text{C}])$ $\llcorner 13 = \text{Start value scale AI4 } [^{\circ}\text{C}]$ $\llcorner 12 = \text{Full scale value AI4 } [^{\circ}\text{C}]$
		External probe air as analog input 0-10 V	$\llcorner 03 = 4$ $\llcorner 33 = 9$ $\llcorner 53 = 0$	----	$\llcorner 23 (-12,0... +12,0 [^{\circ}\text{C}])$ $\llcorner 13 = \text{Start value scale AI4 } [^{\circ}\text{C}]$ $\llcorner 12 = \text{Full scale value AI4 } [^{\circ}\text{C}]$
		External probe air as analog input 0-5 V	$\llcorner 03 = 5$ $\llcorner 33 = 9$ $\llcorner 53 = 0$	----	$\llcorner 23 (-12,0... +12,0 [^{\circ}\text{C}])$ $\llcorner 13 = \text{Start value scale AI4 } [^{\circ}\text{C}]$ $\llcorner 12 = \text{Full scale value AI4 } [^{\circ}\text{C}]$
		External probe air as analog input 0-1 V	$\llcorner 03 = 6$ $\llcorner 33 = 9$ $\llcorner 53 = 0$	----	$\llcorner 23 (-12,0... +12,0 [^{\circ}\text{C}])$ $\llcorner 13 = \text{Start value scale AI4 } [^{\circ}\text{C}]$ $\llcorner 12 = \text{Full scale value AI4 } [^{\circ}\text{C}]$
		ATC	$\llcorner 03 = 1$ $\llcorner 33 = 0$ $\llcorner 53 = +21$	input active open contact	open contact = ATC active close contact = ATC not active
		ON/STBY remote (digital input)	$\llcorner 03 = 1$ $\llcorner 33 = 0$ $\llcorner 53 = +1$	input active open contact	open contact = STAND-BY close contact = ON
		Summer / Winter remote (digital input)	$\llcorner 03 = 1$ $\llcorner 33 = 0$ $\llcorner 53 = +3$	input active close contact	close contact = HEAT (Winter)
		Demand Limit 50% (digital input)	$\llcorner 03 = 1$ $\llcorner 33 = 0$ $\llcorner 53 = +21$	input active close contact	close contact = Demand Limit 50%
		Economy (digital input)	$\llcorner 03 = 1$ $\llcorner 33 = 0$ $\llcorner 53 = +22$	input active close contact	close contact = economy
AI5	S2	Not configured	$\llcorner 04 = 0$ $\llcorner 34 = 0$ $\llcorner 54 = 0$	----	----
		External probe sensor (analogic input)	$\llcorner 04 = 2$ $\llcorner 34 = 9$ $\llcorner 54 = 0$	NTC probe	CL24 (-12,0... +12,0 [^{\circ}\text{C}])
		ON/STBY remote (digital input)	$\llcorner 04 = 1$ $\llcorner 34 = 0$ $\llcorner 54 = +1$	input active open contact	open contact = STAND-BY close contact = ON
		Summer / Winter remote (digital input)	$\llcorner 04 = 1$ $\llcorner 34 = 0$ $\llcorner 54 = +3$	input active open contact	close contact = HEAT (Winter)
		Demand Limit 50% (digital input)	$\llcorner 04 = 1$ $\llcorner 34 = 0$ $\llcorner 54 = +21$	input active open contact	close contact = Demand Limit 50%
		Economy (analogic input)	$\llcorner 04 = 1$ $\llcorner 34 = 0$ $\llcorner 54 = +22$	input active open contact	close contact = economy
DI5		Not configured	$\llcorner 44 = 0$	----	----
	QF2. 2	thermal pump 2	$\llcorner 44 = -48$	input active open contact	open contact = thermal pump 2
		ON/STBY remote	$\llcorner 44 = -1$	input active open contact	open contact = STAND-BY
		Summer / Winter remote	$\llcorner 44 = +3$	input active close contact	close contact = HEAT (Winter)
		Demand Limit 50%	$\llcorner 44 = +21$	input active close contact	close contact = Demand Limit 50%
	Economy	$\llcorner 44 = +22$	input active close contact	close contact = economy	

* If present the module of pumping two pumps can not get that DI5 must be configured $\llcorner 44 = -48$

The outdoor air sensor (if installed) is factory installed on input AI4; if it is necessary you can install it on input AI4 or AI5, as specified above. The input AI4 can also accept an input signal current (4-20mA) or voltage (0-10V, 0-5V, 0-1V) from a probe external air by the user.

PROBE CHARACTERISTICS

NTC10K-25°C type temperature probes are used.

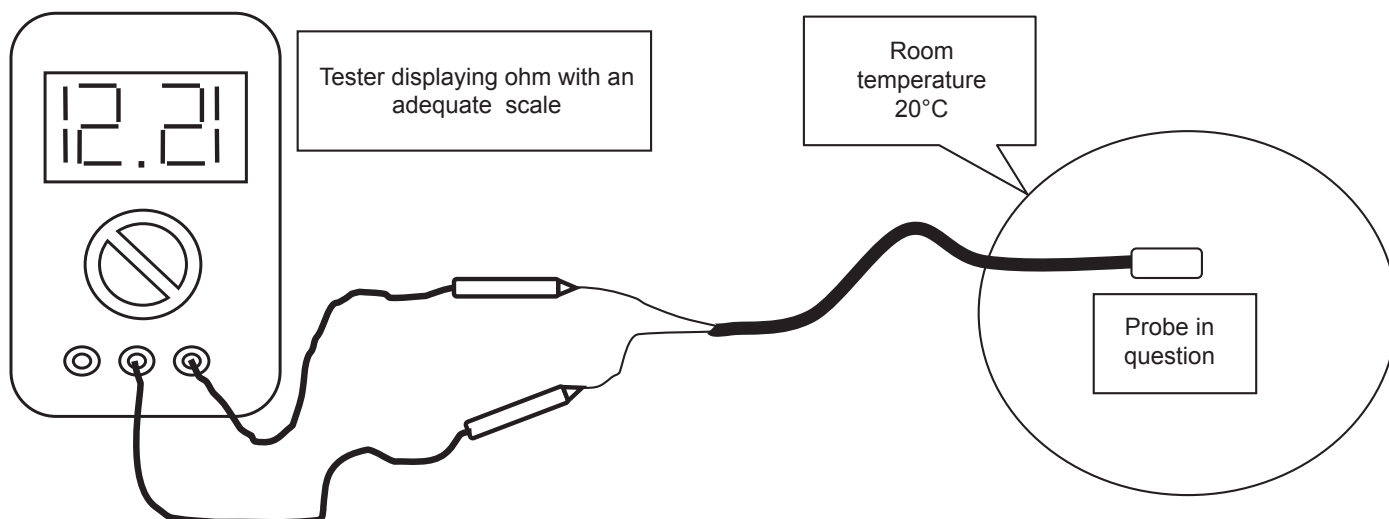
When the probe bulb is at a temperature of 25°C the electrical resistance measurable at the probe ends with a multimeter is approx. 10 kW. The thermistor of these probes has a negative temperature coefficient: the electrical resistance value decreases as the temperature increases.

To find out if a temperature probe is faulty or disconnected, check the correspondence between the resistance value in kW and the bulb temperature in °C according to the following table.

Temperature [°C]	Resistance [kΩ]	Temperature [°C]	Resistance [kΩ]	Temperature [°C]	Resistance [kΩ]
0	25,7950	20	12,2110	40	5,7805
1	24,8483	21	11,7628	41	5,5683
2	23,9363	22	11,3311	42	5,3640
3	23,0578	23	10,9152	43	5,1671
4	22,2115	24	10,5146	44	4,9774
5	21,3963	25	10,1287	45	4,7948
6	20,6110	26	9,7569	46	4,6188
7	19,8546	27	9,3988	47	4,4493
8	19,1259	28	9,0539	48	4,2860
9	18,4239	29	8,7216	49	4,1287
10	17,7477	30	8,4015	50	3,9771
11	17,0963	31	8,0931	51	3,8312
12	16,4689	32	7,7961	52	3,6906
13	15,8644	33	7,5100	53	3,5551
14	15,2822	34	7,2343	54	3,4246
15	14,7213	35	6,9688	55	3,2989
16	14,1810	36	6,7131	56	3,1779
17	13,6605	37	6,4667	57	3,0612
18	13,1592	38	6,2293	58	2,9489
19	12,6762	39	6,0007	59	2,8406

For a reliable check it is not necessary to control each single value, but just several sample values. If the instrument gives an infinite resistance, this means the probe is disconnected.

Example. With a temperature of 20°C on the probe, the ohmmeter display will indicate approx. 12.21 kΩ



NETWORK COMUNICATION

The unit can communicate on serial line using the **Modbus** communication protocol with **RTU** coding.

The unit can be connected to an RS485 network by means of the serial interface supplied as an accessory, and respond to requests from any master device connected to the network.

Serial line settings

The serial line must be set as follows :

- baud rate : **9600**
- data bits : **8**
- stop bits : **1**
- parity : **even**

All the devices connected to the same serial line **MUST** use the same settings.

Device address

To communicate correctly, each device connected to the serial network must have an univocal address ("Modbus individual address") of between 1 and 247. This address can be set by modifying the parameter CF63.

Modbus commands

The Modbus commands implemented by the controller are :

- parameter reading **3** (Hex 03 : Read Holding Registers)
- parameter writing **16** (Hex 10 : Write Multiple Registers)

Table of addresses

All the available resources are stored in the controller as WORD (2 byte) and therefore require the reading or writing of an entire Modbus register. According to the Modbus protocol, to identify a register of address X the address X-1 must appear in the message. Some registers contain more than one piece of information : in this case the bits representing the resource value are identified by means of the number of bits used ("Bit number") and by the least significant bit ("Lsb"). In the writing operation for these registers it is necessary to read the current register value, modify the bits representing the resource concerned and rewrite the entire register.

Example.

Bit number = 4
Lsb = 7
Resource value = 3

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	1	1	0	1	0	0	1	1	1	0	1	1	0	1	0

The resources can be read only (R), write only (W) or read and write (RW).

To interpret the value written in the register it is necessary to consider the value of CPL, EXP and UM :

CPL : if the register represents a number with sign (CPL = Y) carry out the following conversion :

0 = register value < 32767 : resource value = register value
32768 = register value < 65535 : resource value = register value – 65536

EXP : indicates the exponent of the power of 10 to be multiplied by the register value to obtain the resource value.

EXP	Multiplier	
-2	10 ⁻²	0,01
-1	10 ⁻¹	0,1
0	10 ⁰	1
1	10 ¹	10
2	10 ²	100

MU : indicates the unit of measure of the resource

IMPORTANT. DO NOT modify any parameter not indicated in the tables provided or indicated as a read only parameter (R), otherwise the warranty will be cancelled.

NETWORK COMUNICATION

Modbus address table

Label	Description	RW	Register address		Bit number	Lsb	CPL	EXP	UM
			Dec	Hex					
Er10	Temperature control setpoint in Cool	RW	17062	042A6	16	0	Y	-1	°C
Er20	Temperature control setpoint in Heat	RW	17074	042B2	16	0	Y	-1	°C
rC01	Recovery regulator set point (only for recovery unit)	RW	17742	0454E	WORD		Y	-1	°C
	Operation hours compressor 1	R	979	003D3	16	0	N	0	ore
	Operation hours compressor 2	R	981	003D5	16	0	N	0	ore
	Operation hours plant pump 1	R	987	003DB	16	0	N	0	ore
	Operation hours plant pump 2	R	989	003DD	16	0	N	0	ore
	Operation hours source pump 1	R	991	003DF	16	0	N	0	ore
	Operation hours source pump 2	R	993	003E1	16	0	N	0	ore
	Analogue input AIL1	R	412	0019C	16	0	Y	-1	°C
	Analogue input AIL2	R	414	0019E	16	0	Y	-1	°C
	Analogue input AIL3	R	416	001A0	16	0	Y	-1	°C/Bar
	Analogue input AIL4	R	418	001A2	16	0	Y	-1	°C/Bar
	Analogue input AIL5	R	420	001A4	16	0	Y	-1	°C
	Analogue input AIE1	R	898	00382	16	0	Y	-1	°C
	Analogue input AIE2	R	900	00384	16	0	Y	-1	°C
	Device in STAND BY	R	33028,2	08104	1 bit	2	N	0	num
	Device in STAND BY (from digital input)	R	33028,3	08104	1 bit	3	N	0	num
	Device in COOL	R	33028,4	08104	1 bit	4	N	0	num
	Device in COOL (from digital input)	R	33028,5	08104	1 bit	5	N	0	num
	Device in HEAT	R	33028,6	08104	1 bit	6	N	0	num
	Device in HEAT (from digital input)	R	33028,7	08104	1 bit	7	N	0	num
C00L	Select mode COOL	W	33552,3	08310	1 bit	3	N	0	num
HEAT	Select mode HEAT	W	33552,4	08310	1 bit	4	N	0	num
StBY	Select mode STAND BY	W	33552,5	08310	1 bit	5	N	0	num
rC00	Select recovery mode (only for recovery unit)	RW	50508	0C54C	BYTE		N	0	num
Er00	General alarm	R	33104	08150	1 bit	0	N	0	flag
Er05	Circuit 1 digital low pressure alarm -phase sequencer-fan thermal switch - EEV driver	R	33104,5	08150	1 bit	5	N	0	flag
Er10	Compressor 1 thermal switch alarm - high pressure - thermostat	R	33105,2	08151	1 bit	2	N	0	flag
Er11	Compressor 2 thermal switch alarm - high pressure - thermostat	R	33105,3	08151	1 bit	3	N	0	flag
Er20	Plant circuit flow switch alarm	R	33106,4	08152	1 bit	4	N	0	flag
Er21	Plant circuit pump1 thermal switch alarm	R	33106,5	08152	1 bit	5	N	0	flag
Er22	Plant circuit pump2 thermal switch alarm	R	33106,6	08152	1 bit	6	N	0	flag
Er25	Source circuit flowswitch alarm	R	33107,1	08153	1 bit	1	N	0	flag
Er26	source circuit pump 1 thermal switch alarm	R	33107,2	08153	1 bit	2	N	0	flag
Er27	source circuit pump 2 thermal switch alarm	R	33107,3	08153	1 bit	3	N	0	flag
Er30	Plant circuit antifreeze alarm	R	33107,6	08153	1 bit	6	N	0	flag
Er31	Recovery circuit antifreeze alarm	R	33107,7	08153	1 bit	7	N	0	flag
Er45	Faulty clock alarm	R	33109,5	08155	1 bit	5	N	0	flag
Er46	Time lost alarm	R	33109,6	08155	1 bit	6	N	0	flag
Er47	LAN communication absent alarm	R	33109,7	08155	1 bit	7	N	0	flag
Er50	Plant exchanger water input probe faulty alarm	R	33111,4	08157	1 bit	4	N	0	flag
Er61	Plant exchanger water output probe faulty alarm	R	33111,5	08157	1 bit	5	N	0	flag
Er62	liquid probe faulty alarm	R	33111,6	08157	1 bit	6	N	0	flag
Er63	source exchanger water input probe alarm	R	33111,7	08157	1 bit	7	N	0	flag
Er64	Faulty exchanger water output probe alarm	R	33112	08158	1 bit	0	N	0	flag
Er68	Faulty external temperature probe alarm	R	33112,4	08158	1 bit	4	N	0	flag
Er80	Configuration error	R	33114	0815A	1 bit	0	N	0	flag
Er90	Alarm history log full warning	R	33115,2	0815B	1 bit	2	N	0	flag

* If several operation modes are enabled by mistake:
- STAND-BY has priority over HEATING, COOLING
- HEATING has priority over COOLING

START-UP

General Rules

To validate the contractual warranty, the unit must be set at work by technicians from an authorized assistance center. Before they are called, check to make sure that all parts of the installation have been completed, the unit levelled, the wet connections made with the relative air vent and the electrical connections made.

MAINTENANCE

General Rules

Maintenance is of extreme importance if the plant is to operate in a regular way and give fade-free service. Have extraordinary maintenance work done by qualified and authorized personnel, according to EU Regulation 303/2008 of 2 April 2008 (and later) that requires companies and technicians that perform maintenance / repair, leakage checking and recovery / recycling gases must be certified as required by local regulations. Comply with the safety precautions given in the relative section of this manual and take all the necessary precautions. The following information is only a guide for the end user.

Maintenance keeps unit efficiency, reduce the speed of deterioration over time and collect information and data to understand the efficiency of the unit and prevent failures. We suggest to prepare a booklet of installation according European legislation.

Routine maintenance

The inspections described below, to which the unit must be subjected, do not require specific technical know-how.

They merely include a few simple inspections involving certain parts of the unit.

Call an authorized assistance center if actual maintenance work is required.

The table below gives a recommended list of inspections which should be carried out at the indicated intervals.

Provide controls and interventions more frequently in case of heavy (continuous or intermittent high, close to operating limits, etc ...) or critical (essential service such as data centres, hospital etc ...) use.

DESCRIPTION	WEEKLY	MONTHLY	EVERY SIX MONTHS
Visual inspection of the unit			•
Inspection of hydraulic circuit		•	
Inspection of electrical system		•	
Inspection of condensing system		•	
Inspection and adjustment of operat. parameters	•		

• Structure of the unit

When checking the condition of the parts that form the structure of the unit, pay particular attention to the parts liable to rust.

If traces of rust are noted, they must be treated with rust-inhibitor paint in order to eliminate or reduce the problem.

Check to make sure that the external panels and the fans of the unit are well fixed.

Bad fixing gives rise to noise and abnormal vibrations.

• Hydraulic circuit

Check visually to make sure that there are no leaks in the hydraulic circuit. If the pumping module accessory is installed, it is advisable to make sure that the water filter is clean.

• Electrical system

Make sure that the power cable that connects the unit to the distribution panel is not torn, cracked or damaged in a way that could impair its insulation.

MAINTENANCE

• Inspection of the condensing system

WARNING: The finned pack exchanger has fins made of aluminium or some other thin material, thus even accidental contact could cause cuts. Comply with the instructions in the relative section.

• Condensing coils

In view of the function of this component, it is very important for the surface of the exchanger to be as free as possible from clogging caused by items that could reduce the fan's air flow rate and, thus, the performances of the unit itself.

The following operations may be required:

- Remove all impurities (such as paper scraps, leaves, etc.) that could be clogging the surface of the bank either by hand or using a brush (comply with the above mentioned safety prescriptions).

- If the dirt has deposited on the fins and is difficult to remove by hand, use a flow of compressed air or pressurized water on the aluminium surface of the coils, remembering to direct the flow in a vertical and opposite to the standard flow direction to prevent the fins from being damaged.

- "Comb" the coils with the relative tool, using the appropriate comb spacing for the fins if some parts of them are bent or squashed.

• Helical electric fans

Visually inspect these parts to make sure that the electric fans are well fixed to the bearing grille and that this latter is fixed to the structure of the unit. Check the fan bearings, causing abnormal noise and vibration, and close the terminal box and cable glands.

• Water heat exchanger

The exchanger must ensure the maximum heat transfer possible so keep it clean and free from dirt that may reduce efficiency; make sure that the temperature difference between water outlet temperature and evaporation does not increase over time, if the difference exceeds 8 -10 ° C is necessary to proceed cleaning the water side of the exchanger, keeping in mind the following: water circulation must be in the opposite direction than normal, the fluid velocity does not exceed 1.5 times the nominal velocity and use just water or moderately acid products but only water for final washing.

• Water filter

Make sure to clean the filter and remove any impurities that block the proper flow of water, contributing to increase pressure drop and therefore energy consumption of the pumps.

• Water pumps (if present)

Check leakage, the state of the bearings (any anomalies are highlighted by noise and vibration), the closing of the terminal box and integrity of the cable.

• Reading and adjustment of the operating parameters

This control can be done using the pressure gauges (if installed) of the refrigerant circuits and using the pressure and temperature gauges (if installed) of the hydraulic circuits of the unit (evaporator + heat recovery - if present)

Provide a unit book that allows you to track of the actions taken on the unit, so it will be easier to cadence adequately the various interventions and will facilitate a possible troubleshooting.

Please take note of: date, type of action, description of action, measurements performed, anomalies identified, alarms registered in the alarm history, etc. ...

MAINTENANCE

General considerations

The unit has been designed with a view to reducing the risks to persons and the environment in which it is installed, to the minimum. To eliminate residue hazards, it is therefore advisable to become as familiar as possible with the unit in order to avoid accidents that could cause injuries to persons and/or damage to property.

a. Access to the unit

Only qualified persons who are familiar with this type of unit and who are equipped with the necessary safety protections (footwear, gloves, helmet, etc.) may be allowed to access the unit. Moreover, in order to operate, these persons must have been authorized by the owner of the unit and be recognized by the actual Manufacturer.

b. Elements of risk

The unit has been designed and built so as not to create any condition of risk. However, residue hazards are impossible to eliminate during the planning phase and are therefore listed in the following table along with the instructions about how to neutralize them.

Part in question	Residue hazard	Mode	Precautions
Compressor and delivery pipe	Burns	Contact with the pipes and/or compressor	Avoid contact by wearing protective gloves
Delivery pipes, heat recovery exchanger and coils	Explosion	Excessive pressure	Turn off the unit, check the high pressure switch and safety valve, the fans and condenser
Pipes in general	Ice burns	Leaking refrigerant	Do not pull on the pipes
Electrical cables, metal parts	Electrocution, serious burns	Defective cable insulation, live metal parts	Adequate electrical protection (correctly ground the unit)
Heat exchange coils	Cuts	Contact	Wear protective gloves
Fans	Cuts	Contact with the skin	Do not push the hands or objects through the fan grille

c. Pollution

The unit contains refrigerant gas and lubricating oil. When scrapping the unit these fluids must be recovered and disposed of in compliance with the regulations in force in the country where it is installed. **The unit must not be abandoned during the scrapping stage, but can be stored outside with gas, water and electrical connections closed.**

d. Disconnection and disposal

During disconnection of the unit, avoid gas leakage or liquid spillage on environment, especially if the water has additives or glycol. For dismissing and disposal, deliver the units to specialized centres according to your national laws.

SAFETY AND POLLUTION

Refrigerant safety card

1 SUPPLIER COMPANY AND PRODUCT IDENTIFICATION

Card No. FRIG 8
Product R-410A
Supplier company identification RIVOIRA SpA

2 COMPOSITION / INFORMATION ON INGREDIENTS

Substance / Preparation Preparation
Components / Impurities Contains the following components :
Difluoromethane (R32) 50 % in weight
Pentafluoroethane (R125) 50 % in weight
EEC No. Non-applicable for mixtures
Trade-name / /

3 IDENTIFICATION OF HAZARDS

Identification of hazards Liquefied gas.
The vapours are heavier than air and can cause suffocation, reducing the oxygen available for breathing.
Rapid evaporation of the fluid can cause freezing.
Can cause cardiac arrhythmia.

4 FIRST-AID MEASURES

Inhalation Do not administer anything if the person has fainted.
Take the person outdoors. Use oxygen or artificial respiration if necessary.
Do not administer adrenaline or similar substances.
Contact with eyes Rinse thoroughly with plenty of water for at least 15 minutes and see a doctor.
Contact with skin Wash immediately with plenty of water. Immediately remove all contaminated garments.
Swallowing

5 FIRE-PREVENTION MEASURES

Specific hazards Increase in pressure.
Dangerous fumes Halogen acids, traces of carbonyl halides.
Fire-extinguishing means usable All the known fire-extinguishing means can be used.
Specific methods Cool the containers/tanks with water sprays.
Special protection equipment Use self-contained breathing apparatus in confined spaces.

6 MEASURES AGAINST ACCIDENTAL SPILLING OF THE PRODUCT

Personal protection Evacuate personnel to safe areas. Provide for adequate ventilation. Use personal protection equipment
Protection for the environment It evaporates.
Product removal methods It evaporates.

7 HANDLING AND STORAGE

Handling and storage Ensure an adequate air change and/or extraction in the workplaces. Only use well-ventilated rooms.
Do not breathe vapours or aerosols. Carefully close the containers and keep them in a cool, dry and well-ventilated place. Keep in the original containers.
Explosives, flammable materials, organic peroxides.

Incompatible products

8 CONTROL OF EXPOSURE / PERSONAL PROTECTION

Personal protection Ensure adequate ventilation, especially in closed areas.
Control parameters Difluoromethane (R32): Recommended exposure limits: AEL (8h and 12h TWA) = 1000 ml/m³
Pentafluoroethane (R125): Recommended exposure limits: AEL (8h and 12h TWA) = 1000 ml/m³
Respiratory tract protection For rescue and for maintenance works in tanks, use self-contained breathing apparatus. The vapours are heavier than air and can cause suffocation, reducing the oxygen available for breathing.
Total protection glasses.
Eye protection Rubber gloves.
Hand protection Do not smoke.
Hygiene measures

9 CHEMICAL-PHYSICAL PROPERTIES

Relative density, gas (air=1) Heavier than air.
Solubility in water (mg/l) Not known, but deemed very low.
Appearance Colourless liquefied gas.
Odour Similar to ether.
Fire point Does not ignite.

10 STABILITY AND REACTIVITY

Stability and reactivity No decomposition if used according to the special instructions.
Materials to be avoided Alkali metals, alkali-earth metals, granulated metal salts, Al, Zn, Be, etc. in powder.
Hazardous products of decomposition Halogen acids, traces of carbonyl halides.

11 TOXICOLOGICAL INFORMATION

Local effects Concentrations substantially above the value TLV (1000 ppm) can cause narcotic effects. Inhalation of highly concentrated products of decomposition can cause respiratory insufficiency (pulmonary oedema).
Long-term toxicity No carcinogenic, teratogenic or mutagenic effects have been recorded in experiments on animals.
Specific effects Rapid evaporation of the fluid can cause freezing. Can cause cardiac arrhythmia.

12 ECOLOGICAL INFORMATION

Effects linked to ecotoxicity Pentafluoroethane (R125)
Potential global warming with halocarbons; HGWP (R-11 = 1) = 0.84
Potential impoverishment of the ozone; ODP (R-11 = 1) = 0

13 CONSIDERATIONS ON DISPOSAL

General Do not dispose of where accumulation can be hazardous.
Usable with reconditioning.
The depressurised containers must be returned to the supplier.
Contact the supplier if instructions for use are deemed necessary.

SAFETY AND POLLUTION

14 INFORMATION FOR TRANSPORT

Designation for transport	LIQUEFIED GAS N.A.S. (DIFLUOROMETHANE, PENTAFLUROETHANE)
UN No.	3163
Class/Div	2.2
ADR /RID No.	2, 2nd A
ADR/RID hazard no.	20
ADR label	Label 2 : non-toxic non-flammable gas.
CEPIC Groupcard	20g39 - A
Other information for transport	Avoid transport on vehicles where the loading zone is not separate from the cab. Make sure the driver is informed about the potential risk of the load and knows what to do in case of accident or emergency.
Before starting transport, make sure the load is properly secured and :	make sure the valve of the container is closed and does not leak; make sure the blind cap of the valve (when provided) is correctly fitted; make sure the cap (when provided) is correctly fitted and that there is an adequate ventilation passage;
ensure compliance with the current provisions.	

15 INFORMATION ON REGULATIONS

The product must not be labelled according to Directive 1999/45/EC.

Comply with the regulations given below, and the relevant applicable updates and amendments.

Circulars no. 46/79 and 61/81 of the Ministry of Labour : Risks related to the use of products containing aromatic amines

Leg. Decree no. 133/92 : Regulations on the discharge of hazardous substances in waters

Leg. Decree no. 277/91 : Protection of workers against noise, lead and asbestos

Law 256/74, Decree 28/1/92, Leg. Decree no. 52 dated 3/2/97, Decree dated 28/4/97 as amended : Classification, packing and labelling of hazardous substances and preparations

Decree no. 175/88, as amended : Activities with significant accident risks (Seveso Law)

Decree no. 203/88 : Emissions into the atmosphere

Decree no. 303/56 : Work hygiene

Decree no. 547/55 : Regulations on accident prevention

Leg. Decree no.152 dated 11/5/99 : Protection of waters

16 OTHER INFORMATION

Recommended uses Refrigerant

Can cause suffocation in high concentration.

Keep in a well-ventilated place.

Do not breathe the gas.

The risk of suffocation is often underestimated and must be clearly explained during the training of operators.

Ensure compliance with all the national and regional regulations.

Before using this product in any new process or trial, an in-depth study on safety and compatibility of the product with the materials must be carried out.

The above information is based on our current know-how and describes the product according to the safety requirements. It does not however represent a guarantee and assurance of the qualities in a legal sense. Each person responds personally for compliance with such regulations.

First aid

- Move the victim away from the toxic source, keep him warm and allow him to rest.
- Administer oxygen if necessary.
- Proceed with artificial respiration if necessary.
- Give heart massage in the case of heart failure.
- Immediately seek medical help.

Contact with the skin:

- Immediately thaw the affected parts under running lukewarm water.
- Remove contaminated clothing (garments may stick to the skin in the case of ice burns) if they have not adhered to the skin.
- Seek medical assistance if necessary.

Contact with the eyes:

- Immediately rinse the eyes with physiologic eyewash or clean water for at least 10 minutes with the eyelids pulled open.
- Seek medical assistance if necessary.

Swallowing:

- Do not make the victim vomit. If the victim is conscious, have him rinse his mouth out with clean water and then drink 200, 300 ml of water.
- Immediately seek medical help.
- Do not administer adrenaline or sympathomimetic drugs after exposure owing to the risk of cardiac arrhythmia.

For further information about the characteristics of the refrigerant, consult the technical briefs that can be obtained from manufacturers of refrigerant products.

DECLARATION OF CONFORMITY



GB **“CE” DECLARATION OF CONFORMITY**
We, the undersigned, hereby declare under our responsibility, that the machine in question complies with the provisions established by Directives :

DK **“CE” OVERENSSTEMMELSESERKLÆRING**
Underfegnede forsikrer under eget ansvar al den ovennævnte maskine er i overensstemmelse med vilkårene i direktivene :

DE **“EG” KONFORMITÄTSEKTLÄRUNG**
Wir, die Unterzeichner dies er Erklärung, erklären unter unseren ausschließlichen Verantwortung, daß die genannte Maschine den Bestimmungen der folgenden EG-Richtlinien entspricht :

SE **FÖRSÄKRAN OM “CE” ÖVERENSSTÄMMELSE**
Underfegnade försäkrar under eget ansvar allt ovannämnda maskinskinen er i överensstemmelse med vilkårene i direktivene :

FR **DECLARATION “CE” DE CONFORMITE**
Nous soussignés déclarons, sous notre entière responsabilité, que la machine en objet est conforme aux prescriptions des Directives :

NO **BEKREFTELSE OM ÆCEØ OVERENSSTEMMELSE**
Underfegnede forsikrer under eget ansvar al den ovennævnte maskinen er i overensstemmelse med vilkårene i direktivene :

IT **DICHIARAZIONE “CE” DI CONFORMITÀ**
Noi sottoscritti dichiariamo, sotto la nostra responsabilità, che la macchina in questione è conforme alle prescrizioni delle Direttive :

FI **“CE” VAATIMUSTENMUKAISUUSVAKUUTUS**
Allekirjoittaneet vakuutamme omalla vastuullamme että yllämainittu kone noudattaa ehtoja direktiiveissä :

ES **DECLARACION “CE” DE CONFORMIDAD**
Quienes subscribimos la presente declaración, declaramos, bajo nuestra exclusiva responsabilidad, que la maquina en objeto respeta lo prescrito par las Directivas :

GR **ΔΗΛΩΣΗ ΣΥΜΒΑΤΟΤΗΤΑΣ “EE”**
Εμετες που υπογραφουμε την παρουμεσα, δηλωνουμε υπο την αποκλειστικη μας ευθυνη, οτι το μηχανημα συμμορφουται οτα οσα ορτζουν οι Οδηγιες :

PT **DECLARAÇÃO “CE” DE CONFORMIDADE**
Nós, signatários da presente, declaramos sob a nossa exclusiva responsabilidade, que a máquina em questão está em conformidade com as prescrições das Directivas :

HR **IZJAVA O “CE” SUGLASNOSTI**
Mi niže potpisani izjavljujemo, pod našom odgovornošću, da ova Mašina odgovara zahtijevima iz Direktiva :

NL **“EG” CONFORMITEITSVERKLARING**
Wij ondergetekenden verklaren hierbij op uitsluitend eigen verantwoording dat de bovengenoemde machine conform de voorschriften is van de Richtlijnen:

PL **DEKLARACJA ZGODNOŚCI “CE”**
My niżej podpisani oświadczamy z pełną odpowiedzialnością, że niżej wymienione urządzenie w pełni odpowiada postanowieniom przyjętym w następujących Dyrektywach:

2006/42/EC
97/23/EC
2004/108/EC
2006/95/EC

Il legale rappresentante
Dante Ferrolli



**GRUPPO
FERROLI**

Ferroli spa - 37047 San Bonifacio (Verona) Italy - Via Ritonda 78/A
tel. +39.045.6139411 - fax +39.045.6100933 - www.ferroli.it