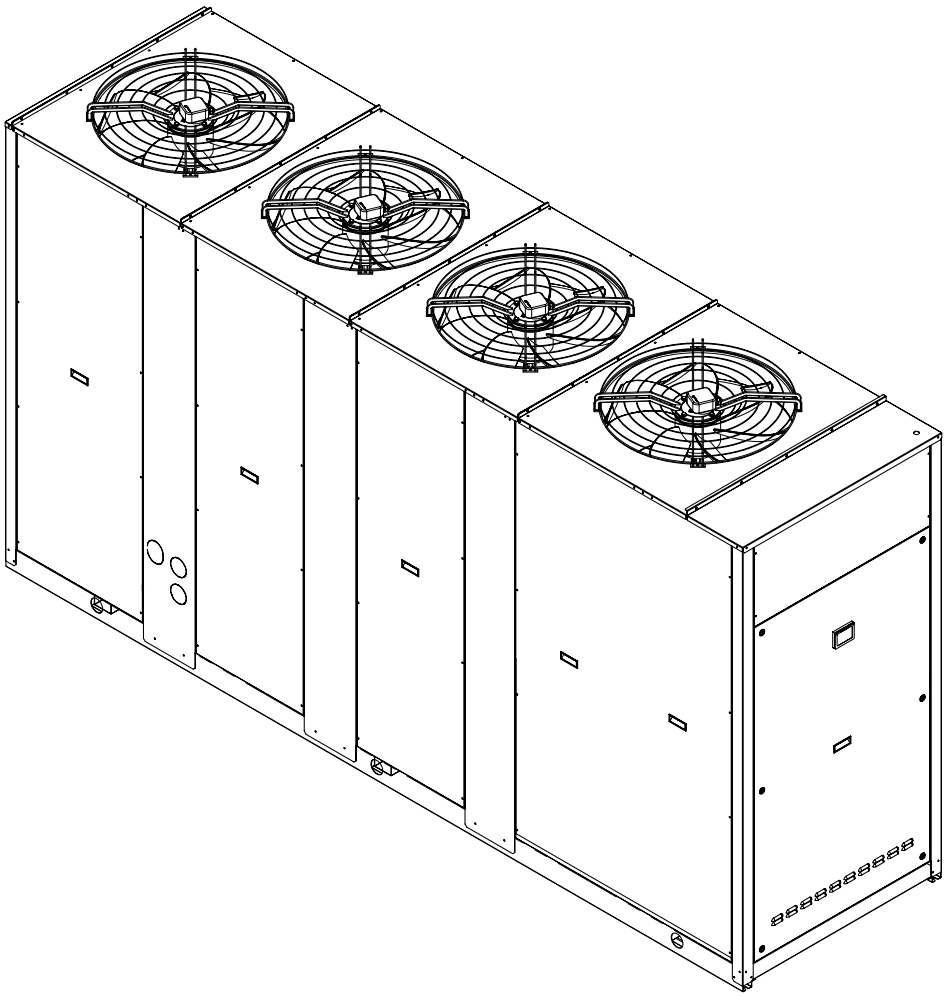
Ferroli

RGA HE

AIR-WATER CHILLERS AND HEAT PUMPS
FOR OUTDOOR INSTALLATION



CE

INSTALLATION AND OPERATION MANUAL

Dear Customer,
Thank you for having purchased a FERROLI product. It is the result of many years of experiences and of particular research studies and has been made with top quality materials and advanced technologies. The CE mark guarantees that the products satisfy all the applicable European Directives.
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.

Thank you once again for your preference
FERROLI S.p.A

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

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 geuine 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 responsiblity of the end user.

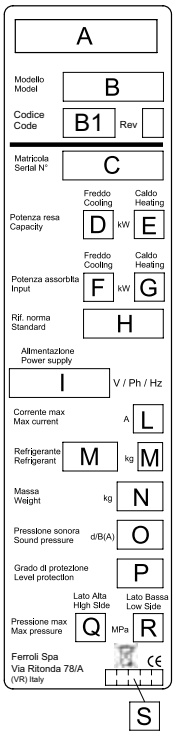
European Directives

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

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

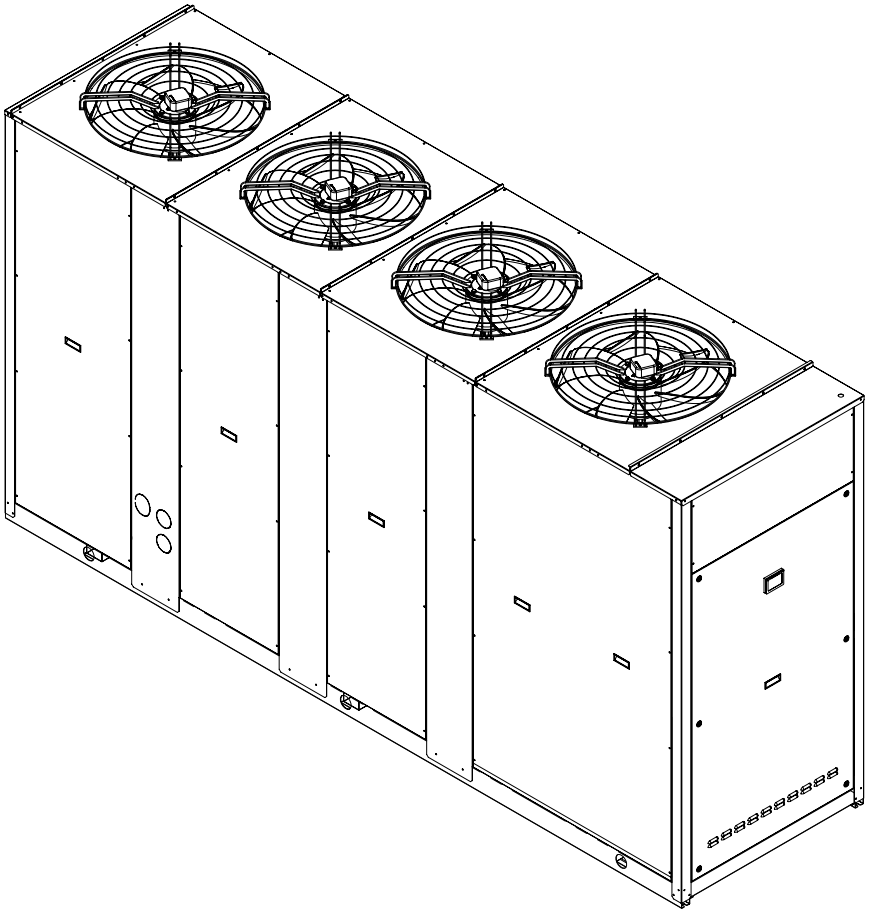
Special versions
A - Trademark
B - Model
B1- Code
C - Serial number
D - Cooling Capacity (same as Standard Version of the unit)
E - Heating Capacity
for IR unit, VD version, Recovered Heating Capacity
for IP unit, VD version, Heating Capacity / Recovered Heating Capacity
F - Power input in COOLING mode (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

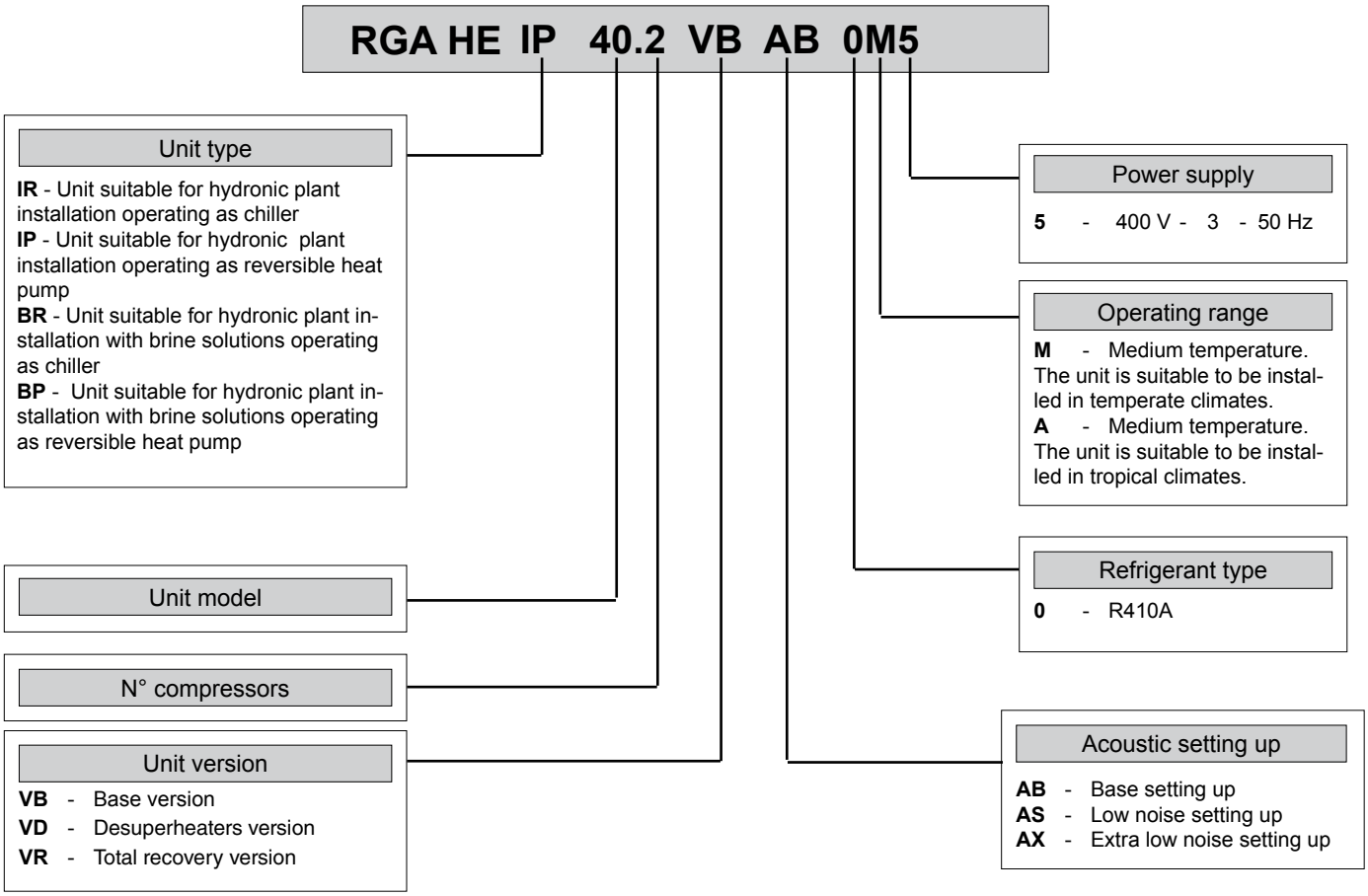
This series of air-water chillers and heat pumps satisfies the cooling and heating requirements of residential plants of medium size.
All the units are suitable for outdoor installation and can be applied to fan coil plants, radiant floor plants and high efficiency radiators plants.
The refrigerant circuit, 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 forboth 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.

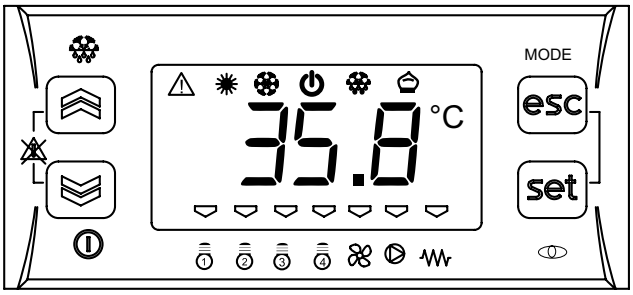
VR: Total Heat Recovery version

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 continuosly 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).
• Fuse-holder that can be isolated with protection fuse triad for fans, or thermal magnetic circuit breakers (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 dislay 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 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).

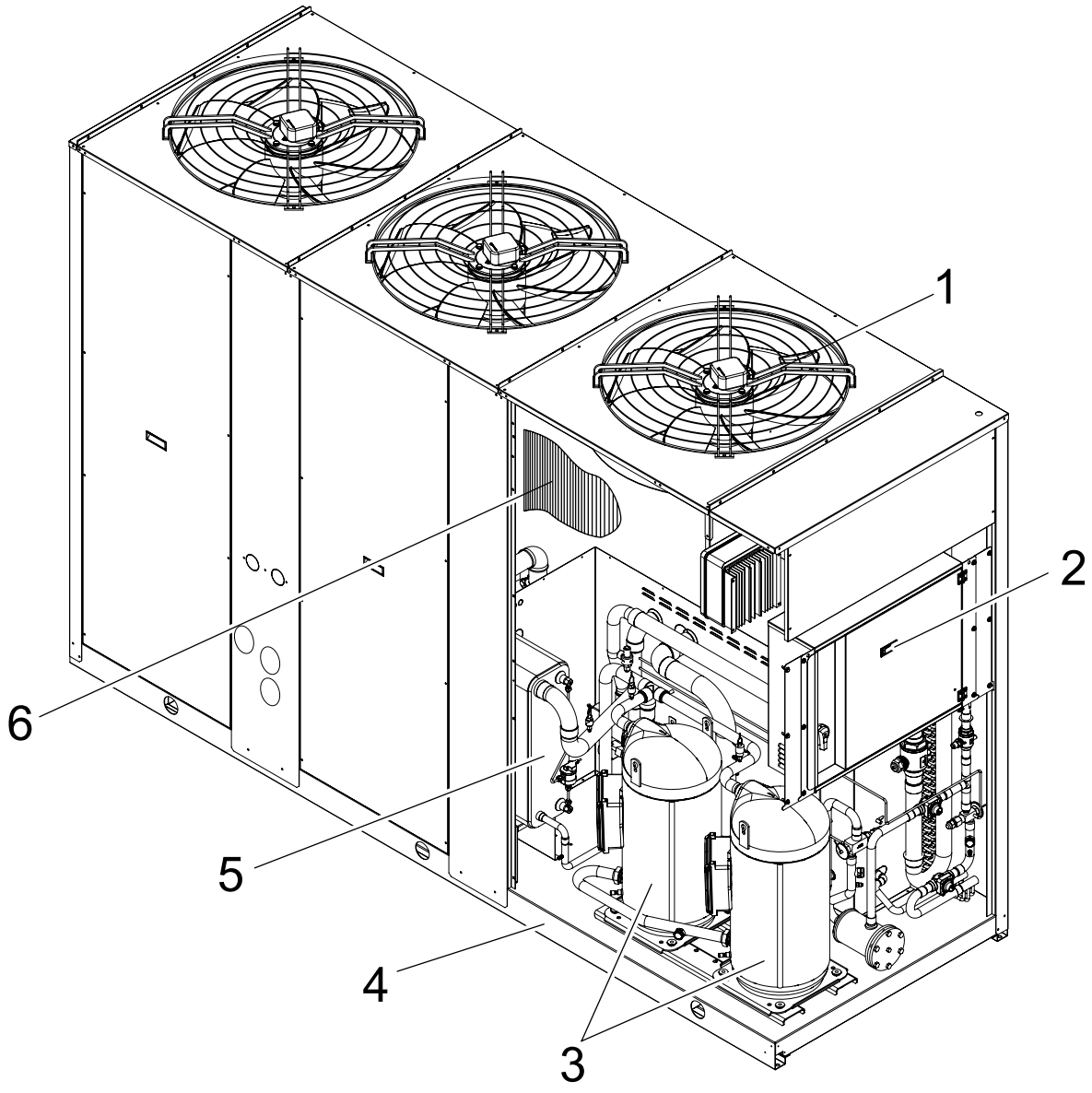
GENERAL FEATURES

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.

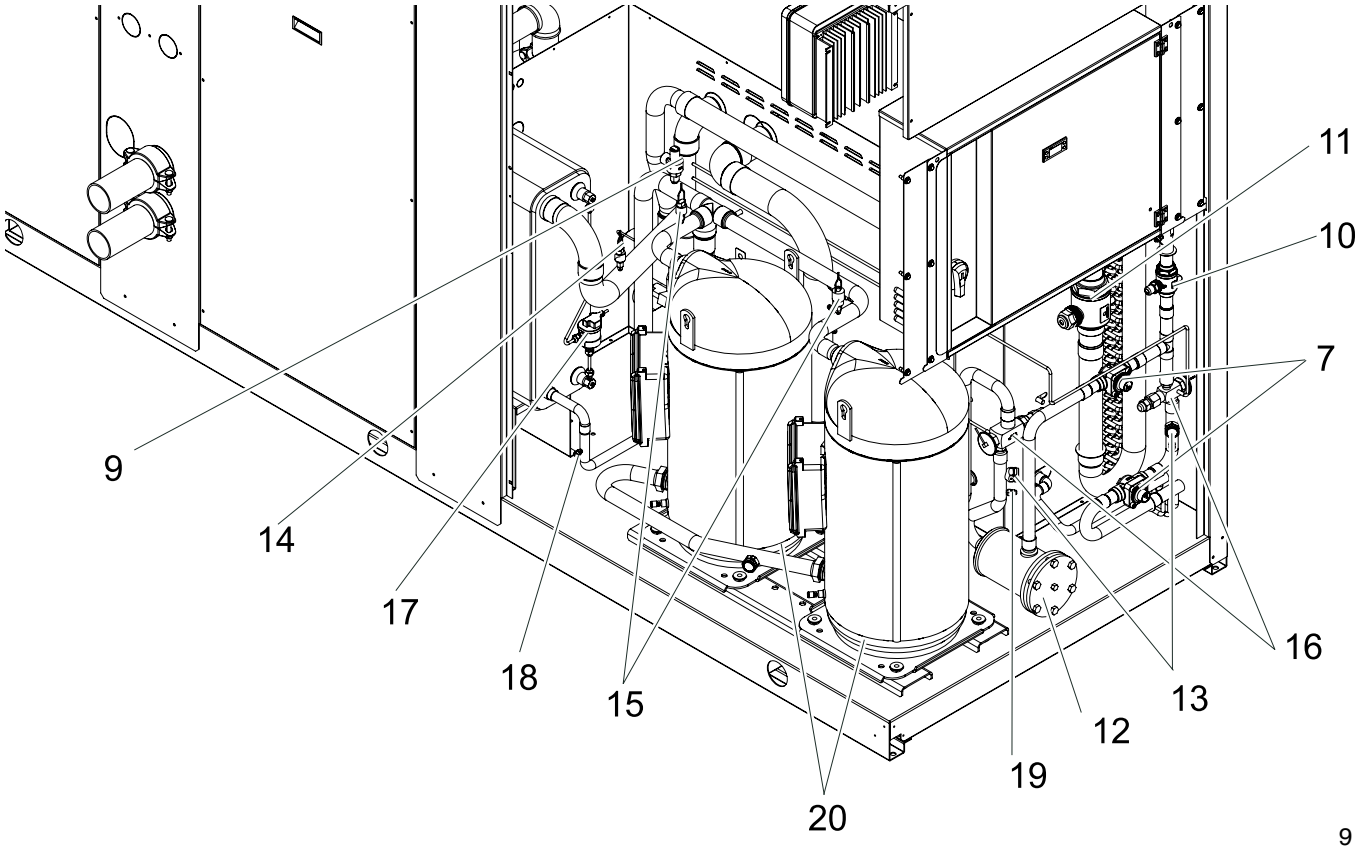
6. Condensing coils, the aluminium finned pack type with shaped profile to increase the heat exchange coefficient and with copper pipes arranged in staggered rows. A sub-cooling section is integrated into the lower part.



GENERAL FEATURES

Hydraulic and cooling circuit components

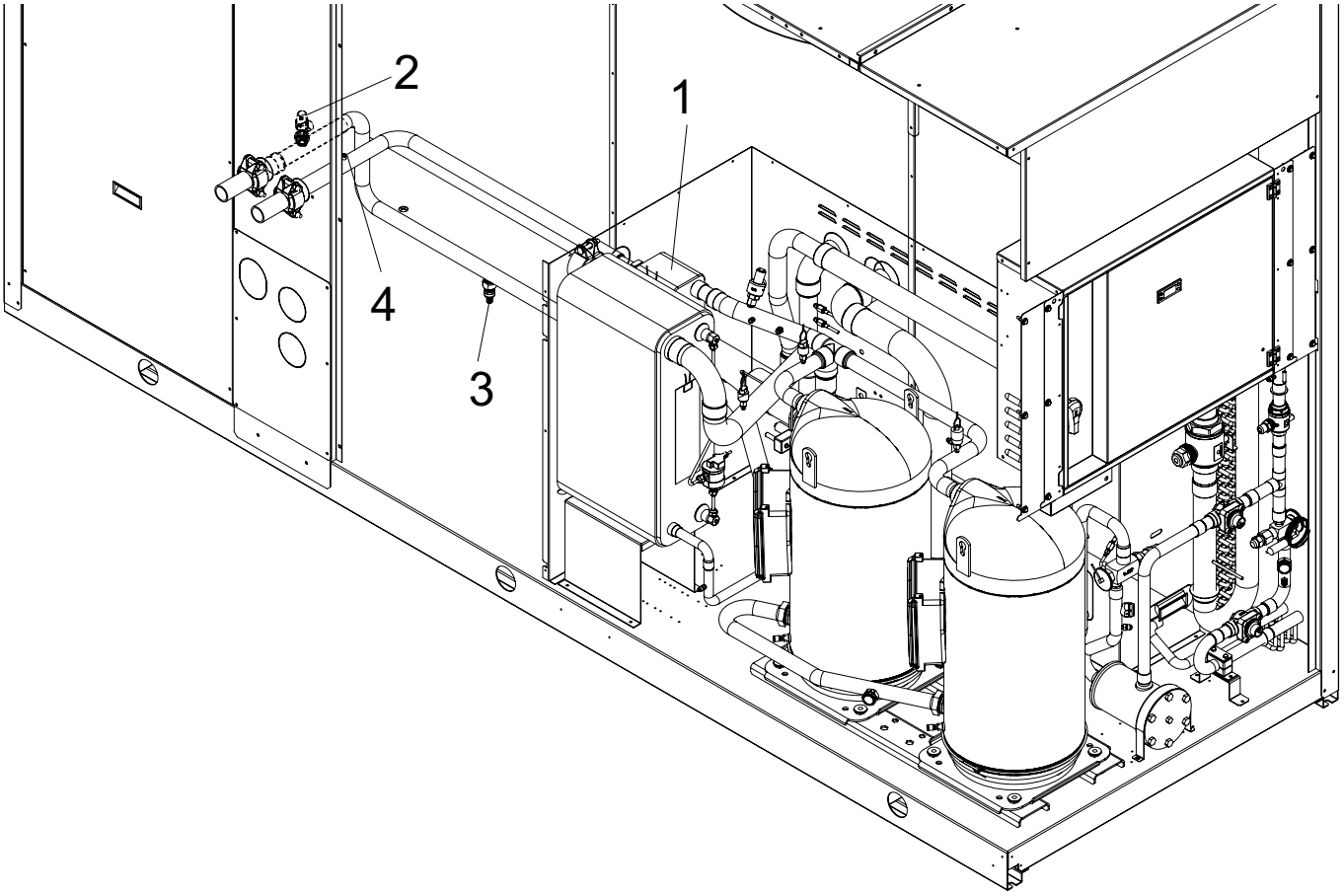
7.One-way valves (IP unit only), allowing the refrigerant gas to pass into the appropriate exchangers, depending on the operating cycle.
8. 4-way cycle reversal valve (IP unit only), reverses the flow direction of the refrigerant gas as the summer/winter operating mode is changed.
9. Safety valve. Installed 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÷180.
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 is 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.



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.



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

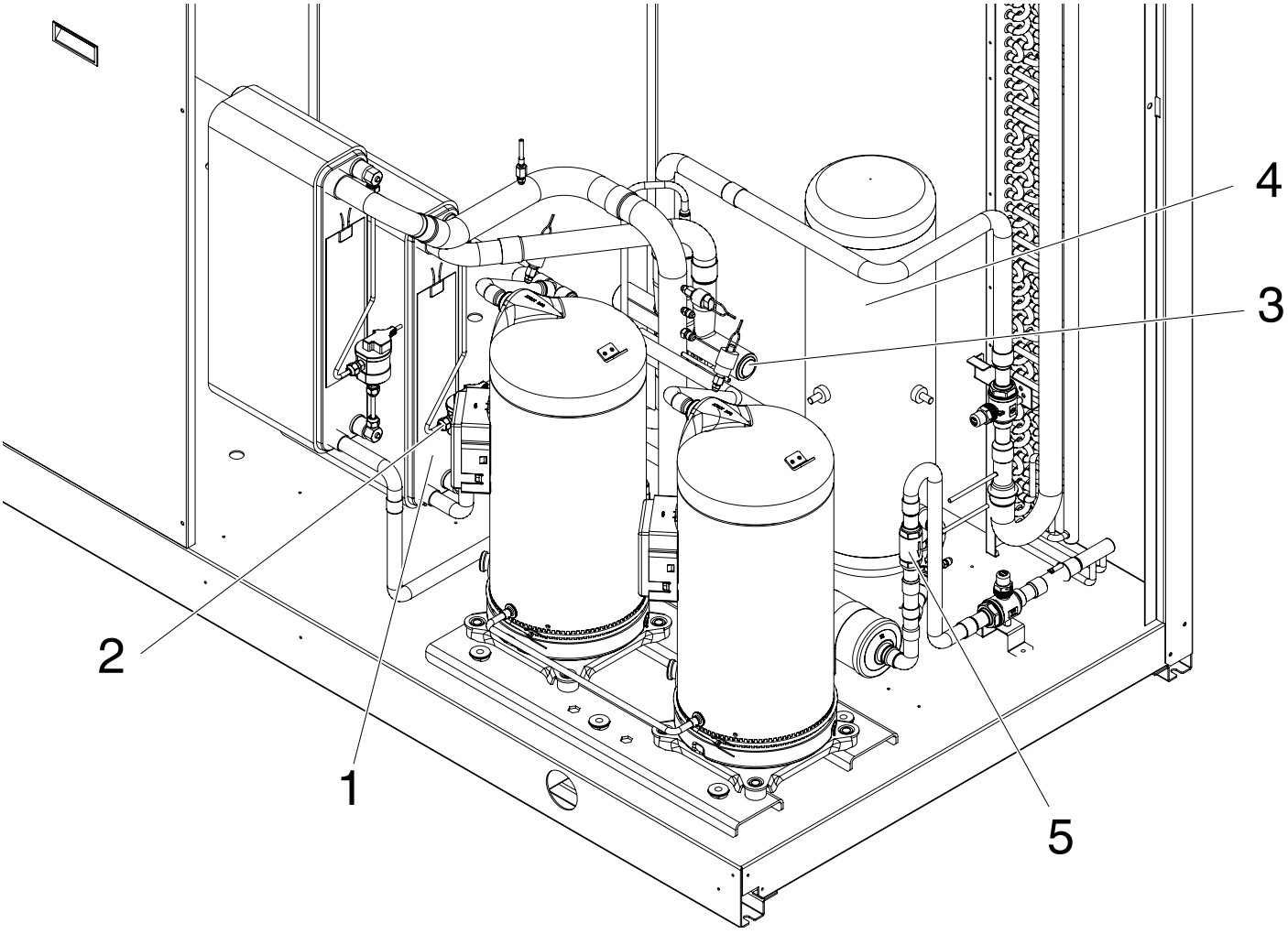
Hydraulic and cooling circuit components:
1. Heat recovery exchanger. Specially designed for the specific version. Plate type, made of stainless steel (AISI 316). It is installed within a shell of thermal barrier insulating material to prevent heat dispersion towards the outside. Standard supply also includes an electric antifreeze heater to prevent the parts from freezing during the winter, if is it 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.



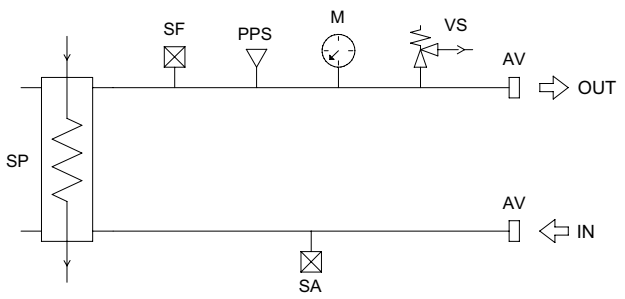
ACCESSORIES AND OPTIONAL EQUIPMENT

"Storing and hydronic kit" options

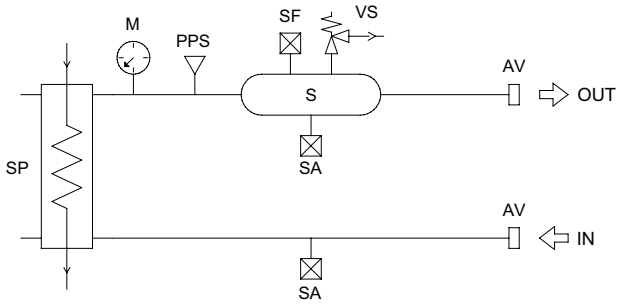
Storing and hydronic kit	**MKT SS** **Pipe kit without tank**	This accessory consists of steel pipes insulated with thermal barrier material and allows the water inlet/outlet connection to be routed outside the unit.
	M1P SS 2P STD **1 Standard pump**	Allows the circulation of the water on the plant 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

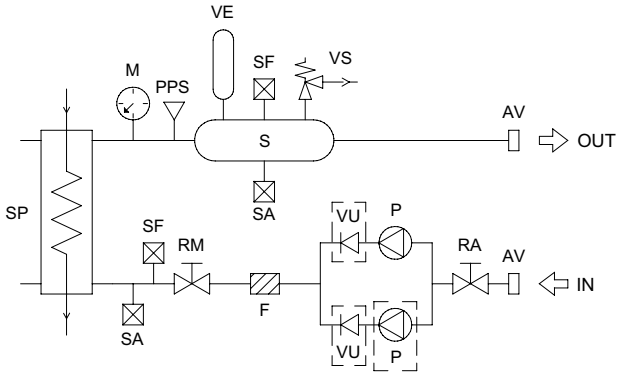
Pipe kit without tank



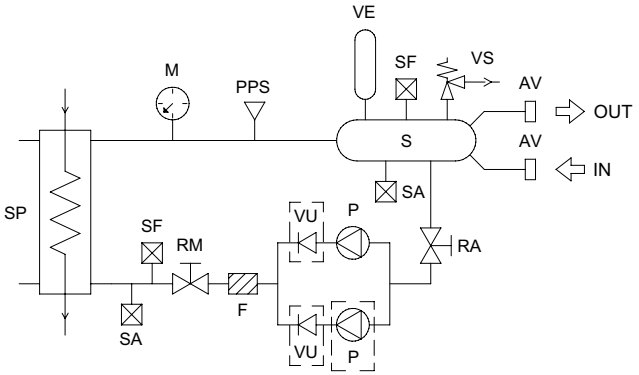
Pipe kit with tank



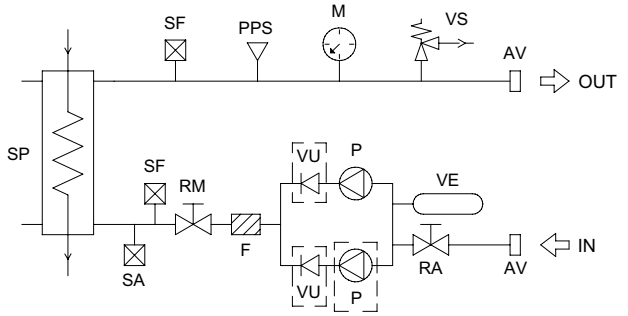
Tank and standard pump



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 continuosly 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 continuosly 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 protecion 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.
Drain pan kit		Provides a pan under the coil to drain the condensing water, fitted with 1/2" outlet connection positioned opposite to the electric control panel.

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 protecion 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**	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	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	l
Plant side heat exchanger													
Type	Brazed 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	l
Source side heat exchanger													
Type	Finned coil												-
Quantity	1												n°
Frontal surface	3,38				4,72			5,90			7,41		m^2
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	41460	41460	40100	47400	47400	62190	65300	82920	m^3/h
Nominal rotational speed AS	750												rpm
Nominal air flow rate AS	16950	16950	24210	23420	34550	34550	33420	39540	39540	51830	54422	69100	m^3/h
Nominal rotational speed AX	650												rpm
Nominal air flow rate AX	13560	13560	19370	18740	27640	27640	26740	31630	31630	41460	43533	55280	m^3/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	150												kPa
Expansion vessel maximum pressure	1000				800								kPa
Tank volume	200				400						460		l
Safety valve set	600												kPa
Standard unit													
F.L.A. Maximum total current input	40,2	45,7	53,3	58,7	69,9	75,5	90,0	97,9	106	123	136	159	A
F.L.I. Maximum total power input	21,6	24,4	28,4	31,0	38,6	44,0	55,0	60,5	66,0	75,7	83,3	95,4	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	73,6	79,2	93,7	102	110	128	142	165	A
F.L.I. Maximum total power input	23,4	26,2	30,2	32,8	40,4	45,8	56,8	62,3	67,8	78,3	86,8	98,9	kW
Units with standard pump (option)													
Type	Centrifugal pump												-
F.L.A. Maximum total current input	43,9	49,4	57,0	62,4	74,4	80,0	94,5	102	110	129	145	168	A
F.L.I. Maximum total power input	23,4	26,2	30,2	32,8	41,2	46,6	57,6	63,1	68,6	79,2	87,9	100	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	76,0	81,6	96,1	107	115	132	147	169	A
F.L.I. Maximum total power input	25,1	27,9	31,9	34,5	42,1	47,5	58,5	65,1	70,6	80,3	89,6	102	kW
Units with modulating standard pump (option)													
Type	Centrifugal pump												-
F.L.A. Maximum total current input	43,9	49,4	57,0	62,4	74,4	80,0	94,5	102	110	129	145	168	A
F.L.I. Maximum total power input	23,4	26,2	30,2	32,8	41,2	46,6	57,6	63,1	68,6	79,2	87,9	100	kW
Units with high head modulating pump (option)													
Type	Centrifugal pump												-
F.L.A. Maximum total current input	46,3	51,8	59,4	64,8	76,0	81,6	96,1	107	115	132	147	169	A
F.L.I. Maximum total power input	25,1	27,9	31,9	34,5	42,1	47,5	58,5	65,1	70,6	80,3	89,6	102	kW

TECHNICAL DATA - BASE VERSION (VB)

NOMINAL performances - Base setting up (AB) - 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**	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	47,2	55,9	63,1	70,5	83,4	94,9	106	120	133	153	173	197	kW
	Power input	14,9	17,2	19,8	22,1	27,2	31,2	34,6	38,6	42,7	50,0	55,5	64,6	kW
	EER	3,17	3,25	3,19	3,19	3,07	3,04	3,06	3,11	3,11	3,06	3,12	3,05	-
	Water flow rate plant side	2,26	2,69	3,03	3,39	4,00	4,56	5,11	5,78	6,40	7,36	8,31	9,46	l/s
	Pressure drops plant side	24	34	33	41	31	32	34	33	35	35	38	39	kPa
IP	**Cooling A35W7** (source : air in 35°C d.b. / plant : water in 12°C out 7°C)													
	Cooling capacity	45,3	53,6	60,7	67,8	81,3	92,4	103	115	128	147	166	191	kW
	Power input	14,6	17,1	19,4	21,7	26,7	30,2	33,8	37,8	41,8	48,5	54,3	62,8	kW
	EER	3,10	3,13	3,13	3,12	3,04	3,06	3,05	3,04	3,06	3,03	3,06	3,04	-
	Water flow rate plant side	2,17	2,58	2,91	3,26	3,90	4,43	4,97	5,54	6,16	7,07	7,98	9,17	l/s
	Pressure drops plant side	22	31	30	38	29	30	32	30	32	32	35	37	kPa
	Heating A7W45 (source : air in 7°C d.b. 6°C w.b. / plant : water in 40°C out 45°C)													
	Heating capacity	49,4	58,3	66,0	74,1	88,4	100	113	126	141	161	181	207	kW
	Power input	15,5	18,1	20,8	23,4	27,9	31,6	35,5	39,7	44,3	51,0	57,1	65,6	kW
	COP	3,19	3,22	3,17	3,17	3,17	3,16	3,18	3,17	3,18	3,16	3,17	3,16	-
	Water flow rate plant side	2,35	2,77	3,13	3,52	4,20	4,77	5,35	5,97	6,69	7,64	8,60	9,84	l/s
	Pressure drops plant side	26	36	35	44	34	35	37	35	38	38	41	42	kPa
	Heating A2W45 (source : air in 2°C d.b. 1°C w.b. / plant : water in 40°C out 45°C)													
	Heating capacity	42,2	49,9	56,4	63,4	75,6	85,8	96,3	108	120	138	155	177	kW
	Power input	15,4	17,9	20,5	23,1	27,6	31,2	35,1	39,2	43,8	50,4	56,4	64,8	kW
	COP	2,74	2,79	2,75	2,74	2,74	2,75	2,74	2,76	2,74	2,74	2,75	2,73	-
	Water flow rate plant side	2,23	2,63	2,98	3,34	3,99	4,53	5,08	5,68	6,35	7,26	8,17	9,35	l/s
	Pressure drops plant side	23	33	32	40	31	32	34	32	34	34	37	38	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		
	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**	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	47,4	56,2	63,4	71,0	83,8	95,4	107	121	134	154	174	198	kW
	EER	3,22	3,33	3,25	3,29	3,13	3,11	3,15	3,18	3,19	3,14	3,20	3,12	-
	Water flow rate plant side	24	34	33	41	31	32	34	33	35	35	38	39	kPa
	ESEER	4,58	4,72	4,62	4,67	4,44	4,54	4,47	4,65	4,53	4,58	4,54	4,43	-
IP	**Cooling A35W7** (source : air in 35°C d.b. / plant : water in 12°C out 7°C)													
	Cooling capacity	45,5	53,9	61,0	68,2	81,7	92,8	104	116	129	148	167	192	kW
	EER	3,16	3,21	3,19	3,20	3,11	3,11	3,12	3,12	3,14	3,10	3,13	3,11	-
	Water flow rate plant side	22	31	30	38	29	30	32	30	32	32	35	37	kPa
	ESEER	4,49	4,56	4,54	4,55	4,41	4,55	4,43	4,55	4,46	4,53	4,44	4,42	-
	Heating A7W45 (source : air in 7°C d.b. 6°C w.b. / plant : water in 40°C out 45°C)													
	Heating capacity	49,2	58,0	65,6	73,6	87,9	99,8	112	125	140	160	180	206	kW
	COP	3,22	3,26	3,22	3,21	3,21	3,22	3,22	3,21	3,22	3,20	3,22	3,21	-
	Water flow rate plant side	26	36	35	44	34	35	37	35	38	38	41	42	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**	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	61,2	72,4	81,7	91,3	108	123	138	156	172	198	224	254	kW
	Power input	16,2	18,9	21,6	24,2	29,6	34,0	37,7	42,2	46,7	54,5	60,6	70,6	kW
	EER	3,78	3,83	3,78	3,77	3,65	3,62	3,66	3,70	3,68	3,63	3,70	3,60	-
	Water flow rate plant side	2,94	3,49	3,94	4,41	5,21	5,92	6,64	7,50	8,31	9,56	10,8	12,3	l/s
	Pressure drops plant side	41	57	56	69	53	54	57	56	59	59	64	66	kPa
IP	**Cooling A35W18** (source : air in 35°C d.b. / plant : water in 23°C out 18°C)													
	Cooling capacity	58,8	69,5	78,6	87,8	105	120	134	150	167	190	215	248	kW
	Power input	15,9	18,6	21,2	23,8	28,9	32,9	36,9	41,1	45,6	52,8	59,3	68,6	kW
	EER	3,70	3,74	3,71	3,69	3,63	3,65	3,63	3,65	3,66	3,60	3,63	3,62	-
	Water flow rate plant side	2,83	3,35	3,79	4,24	5,06	5,78	6,45	7,21	8,03	9,17	10,40	11,9	l/s
	Pressure drops plant side	38	53	52	64	50	51	54	51	55	54	60	62	kPa
	Heating A7W35 (source : air in 7°C d.b. 6°C w.b. / plant : water in 30°C out 35°C)													
	Heating capacity	52,4	61,9	69,9	78,6	93,8	107	120	134	149	171	192	220	kW
	Power input	12,7	14,9	17,1	19,3	23,2	26,2	29,4	32,7	36,5	42,3	47,2	54,4	kW
	COP	4,13	4,15	4,09	4,07	4,04	4,08	4,08	4,10	4,08	4,04	4,07	4,04	-
	Water flow rate plant side	2,49	2,94	3,32	3,73	4,45	5,06	5,69	6,35	7,07	8,12	9,13	10,4	l/s
	Pressure drops plant side	29	41	40	50	38	39	42	40	43	43	46	47	kPa
	Heating A2W35 (source : air in 2°C d.b. 1°C w.b. / plant : water in 30°C out 35°C)													
	Heating capacity	44,8	52,9	59,9	67,2	80,1	90,6	102	114	128	146	164	188	kW
	Power input	12,6	14,6	16,9	19,0	22,9	25,9	29,0	32,3	36,1	41,7	46,6	53,7	kW
	COP	3,56	3,62	3,54	3,54	3,50	3,50	3,52	3,53	3,55	3,50	3,52	3,50	-
	Water flow rate plant side	2,37	2,79	3,16	3,54	4,23	4,78	5,40	6,02	6,74	7,69	8,65	9,89	l/s
	Pressure drops plant side	26	37	36	45	35	35	38	36	39	38	41	43	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		
	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**	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	53,3	60,1	67,3	79,5	90,5	101	114	127	146	165	188	kW
	Power input	15,5	17,9	20,6	22,9	27,7	31,9	35,6	39,8	44,3	51,3	57,2	66,3	kW
	EER	2,90	2,98	2,92	2,94	2,87	2,84	2,84	2,86	2,87	2,85	2,88	2,84	-
	Water flow rate plant side	2,16	2,56	2,89	3,23	3,82	4,34	4,87	5,49	6,12	7,02	7,93	9,03	l/s
	Pressure drops plant side	22	31	30	37	28	29	31	30	32	32	35	36	kPa
IP	**Cooling A35W7** (source : air in 35°C d.b. / plant : water in 12°C out 7°C)													
	Cooling capacity	43,2	51,1	57,8	64,6	77,5	88,0	98,6	110	122	140	158	182	kW
	Power input	15,1	17,7	20,1	22,6	27,1	31,0	34,8	39,0	43,3	49,8	56,1	64,4	kW
	EER	2,86	2,89	2,88	2,86	2,86	2,84	2,83	2,82	2,82	2,81	2,82	2,83	-
	Water flow rate plant side	2,07	2,45	2,78	3,11	3,72	4,22	4,73	5,26	5,88	6,74	7,60	8,74	l/s
	Pressure drops plant side	20	28	28	35	27	27	29	27	30	29	32	33	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	56,8	64,2	72,2	86,0	97,7	110	123	137	157	176	202	kW
	Power input	14,9	17,5	20,0	22,7	26,4	30,1	34,0	38,2	42,8	48,8	54,8	62,7	kW
	COP	3,23	3,25	3,21	3,18	3,26	3,25	3,24	3,22	3,20	3,22	3,21	3,22	-
	Water flow rate plant side	2,29	2,70	3,05	3,43	4,09	4,64	5,21	5,83	6,50	7,45	8,36	9,60	l/s
	Pressure drops plant side	25	34	33	42	32	33	35	34	36	36	38	40	kPa
	Heating A2W45 (source : air in 2°C d.b. 1°C w.b. / plant : water in 40°C out 45°C)													
	Heating capacity	42,2	49,9	56,4	63,4	75,6	85,8	96,0	108	120	138	155	178	kW
	Power input	15,0	17,6	20,0	22,5	26,5	30,1	34,0	38,2	42,7	48,7	54,8	62,7	kW
	COP	2,81	2,84	2,82	2,82	2,85	2,85	2,82	2,83	2,81	2,83	2,83	2,84	-
	Water flow rate plant side	2,23	2,63	2,98	3,34	3,99	4,53	5,06	5,69	6,35	7,26	8,17	9,36	l/s
	Pressure drops plant side	23	33	32	40	31	32	33	32	34	34	37	38	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		
	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**	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	45,2	53,6	60,4	67,7	79,9	90,9	102	115	128	147	166	189	kW
	EER	2,95	3,05	2,98	3,01	2,93	2,89	2,91	2,93	2,94	2,91	2,95	2,90	-
	Water flow rate plant side	22	31	30	37	28	29	31	30	32	32	35	36	kPa
	ESEER	4,36	4,50	4,39	4,44	4,32	4,38	4,29	4,44	4,34	4,41	4,35	4,28	-
IP	**Cooling A35W7** (source : air in 35°C d.b. / plant : water in 12°C out 7°C)													
	Cooling capacity	43,3	51,3	58,1	65,0	77,8	88,4	99,1	110	123	141	159	183	kW
	EER	2,89	2,93	2,93	2,93	2,90	2,89	2,89	2,86	2,88	2,87	2,88	2,89	-
	Water flow rate plant side	20	28	28	35	27	27	29	27	30	29	32	33	kPa
	ESEER	4,26	4,33	4,33	4,32	4,29	4,39	4,27	4,34	4,25	4,36	4,25	4,26	-
	Heating A7W45 (source : air in 7°C d.b. 6°C w.b. / plant : water in 40°C out 45°C)													
	Heating capacity	47,9	56,5	63,9	71,7	85,6	97,2	109	122	136	156	175	201	kW
	COP	3,26	3,28	3,24	3,23	3,29	3,28	3,26	3,25	3,24	3,26	3,26	3,27	-
	Water flow rate plant side	25	34	33	42	32	33	35	34	36	36	38	40	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**	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	58,5	69,1	77,9	87,1	103	117	132	149	165	189	214	244	kW
	Power input	16,8	19,6	22,4	25,1	30,1	34,7	38,8	43,5	48,3	55,9	62,5	72,5	kW
	EER	3,48	3,53	3,48	3,47	3,42	3,37	3,40	3,43	3,42	3,38	3,42	3,37	-
	Water flow rate plant side	2,81	3,33	3,75	4,20	4,97	5,64	6,35	7,17	7,93	9,13	10,32	11,8	l/s
	Pressure drops plant side	37	52	51	63	48	49	53	51	54	54	59	61	kPa
IP	**Cooling A35W18** (source : air in 35°C d.b. / plant : water in 23°C out 18°C)													
	Cooling capacity	56,0	66,2	74,9	83,7	100	114	128	142	159	182	205	236	kW
	Power input	16,5	19,4	21,8	24,6	29,5	33,7	37,9	42,4	47,2	54,1	61,2	70,3	kW
	EER	3,39	3,41	3,44	3,40	3,39	3,38	3,38	3,35	3,37	3,36	3,35	3,36	-
	Water flow rate plant side	2,69	3,19	3,61	4,04	4,83	5,49	6,16	6,83	7,64	8,74	9,89	11,4	l/s
	Pressure drops plant side	34	48	47	58	45	46	49	46	50	49	54	57	kPa
	Heating A7W35 (source : air in 7°C d.b. 6°C w.b. / plant : water in 30°C out 35°C)													
	Heating capacity	51,0	60,3	68,1	76,6	91,2	104	117	130	145	166	187	215	kW
	Power input	12,2	14,4	16,4	18,6	21,8	24,8	27,9	31,3	35,0	40,2	45,0	51,7	kW
	COP	4,18	4,19	4,15	4,12	4,18	4,19	4,19	4,15	4,14	4,13	4,16	4,16	-
	Water flow rate plant side	2,43	2,86	3,23	3,63	4,33	4,92	5,54	6,16	6,88	7,88	8,89	10,2	l/s
	Pressure drops plant side	28	38	38	47	36	37	40	37	40	40	43	45	kPa
	Heating A2W35 (source : air in 2°C d.b. 1°C w.b. / plant : water in 30°C out 35°C)													
	Heating capacity	44,8	52,9	59,9	67,2	80,1	90,6	102	114	128	146	164	188	kW
	Power input	12,2	14,3	16,4	18,5	21,9	24,8	27,9	31,3	35,0	40,1	45,0	51,6	kW
	COP	3,67	3,70	3,65	3,63	3,66	3,65	3,66	3,64	3,66	3,64	3,64	3,64	-
	Water flow rate plant side	2,37	2,79	3,16	3,54	4,23	4,78	5,40	6,02	6,74	7,69	8,65	9,89	l/s
	Pressure drops plant side	26	37	36	45	35	35	38	36	39	38	41	43	kPa

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

TECHNICAL DATA - BASE VERSION (VB)

NOMINAL performances - Exta 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**	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	44,3	52,4	59,1	66,1	78,2	89,0	100	112	125	143	162	184	kW
	Power input	15,6	18,1	20,8	23,2	27,9	32,3	36,0	40,4	44,9	51,8	57,8	66,9	kW
	EER	2,84	2,90	2,84	2,85	2,80	2,76	2,76	2,77	2,78	2,76	2,80	2,75	-
	Water flow rate plant side	2,12	2,51	2,84	3,18	3,75	4,27	4,78	5,40	6,02	6,88	7,79	8,84	l/s
	Pressure drops plant side	21	30	29	36	27	28	30	29	31	31	33	34	kPa
IP	**Cooling A35W7** (source : air in 35°C d.b. / plant : water in 12°C out 7°C)													
	Cooling capacity	42,5	50,3	56,9	63,6	76,2	86,5	97,0	109	120	138	155	179	kW
	Power input	15,3	18,0	20,3	22,8	27,4	31,4	35,2	39,6	44,0	50,2	56,7	65,0	kW
	EER	2,78	2,79	2,80	2,79	2,78	2,75	2,76	2,75	2,73	2,75	2,73	2,75	-
	Water flow rate plant side	2,04	2,41	2,73	3,05	3,66	4,15	4,65	5,21	5,78	6,64	7,45	8,60	l/s
	Pressure drops plant side	20	27	27	33	26	27	28	27	29	28	31	32	kPa
	Heating A7W45 (source : air in 7°C d.b. 6°C w.b. / plant : water in 40°C out 45°C)													
	Heating capacity	47,6	56,1	63,4	71,3	85,0	96,5	109	121	136	155	174	199	kW
	Power input	14,7	17,2	19,6	22,2	25,9	29,5	33,3	37,4	42,0	47,7	53,6	61,3	kW
	COP	3,24	3,26	3,23	3,21	3,28	3,27	3,27	3,24	3,24	3,25	3,25	3,25	-
	Water flow rate plant side	2,26	2,67	3,01	3,38	4,04	4,59	5,16	5,73	6,45	7,36	8,27	9,46	l/s
	Pressure drops plant side	24	33	33	41	32	32	35	32	36	35	38	39	kPa
	Heating A2W45 (source : air in 2°C d.b. 1°C w.b. / plant : water in 40°C out 45°C)													
	Heating capacity	43,5	51,4	58,1	65,3	77,8	88,5	99,6	110	124	142	159	183	kW
	Power input	15,0	17,6	20,0	22,7	26,4	30,1	34,0	38,3	42,9	48,7	54,8	62,6	kW
	COP	2,90	2,92	2,91	2,88	2,95	2,94	2,93	2,87	2,89	2,92	2,90	2,92	-
	Water flow rate plant side	2,30	2,71	3,07	3,44	4,11	4,67	5,26	5,83	6,55	7,50	8,41	9,65	l/s
	Pressure drops plant side	25	35	34	42	33	34	36	34	37	36	39	41	kPa

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

NOMINAL performances - Exta 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**	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	44,4	52,6	59,4	66,5	78,5	89,4	100	113	126	144	163	185	kW
	EER	2,86	2,94	2,90	2,92	2,84	2,80	2,82	2,83	2,84	2,82	2,86	2,81	-
	Water flow rate plant side	21	30	29	36	27	28	30	29	31	31	33	34	kPa
	ESEER	4,53	4,64	4,58	4,61	4,49	4,55	4,45	4,60	4,49	4,58	4,53	4,44	-
IP	**Cooling A35W7** (source : air in 35°C d.b. / plant : water in 12°C out 7°C)													
	Cooling capacity	42,6	50,5	57,1	63,9	76,5	86,9	97,4	109	121	139	156	180	kW
	EER	2,80	2,84	2,84	2,84	2,82	2,80	2,80	2,79	2,79	2,80	2,79	2,81	-
	Water flow rate plant side	20	27	27	33	26	27	28	27	29	28	31	32	kPa
	ESEER	4,43	4,48	4,49	4,49	4,46	4,55	4,42	4,53	4,41	4,55	4,41	4,44	-
	Riscaldamento A7W45 (sorgente : aria in 7°C b.s. 6°C b.u. / impianto : acqua in 40°C out 45°C)													
	Heating capacity	47,4	55,8	63,1	70,8	84,6	96,0	108	120	135	154	173	198	kW
	COP	3,27	3,30	3,27	3,26	3,32	3,31	3,30	3,26	3,28	3,29	3,29	3,29	-
	Water flow rate plant side	24	33	33	41	32	32	35	32	36	35	38	39	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**	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	57,4	67,9	76,6	85,7	101	115	129	146	163	185	210	239	kW
	Power input	17,0	19,8	22,6	25,3	30,3	35,1	39,1	44,0	49,0	56,5	63,1	73,0	kW
	EER	3,38	3,43	3,39	3,39	3,33	3,28	3,30	3,32	3,33	3,27	3,33	3,27	-
	Water flow rate plant side	2,76	3,27	3,69	4,13	4,87	5,54	6,21	7,02	7,84	8,93	10,13	11,5	l/s
	Pressure drops plant side	36	50	49	61	46	47	50	49	53	52	56	58	kPa
IP	**Cooling A35W18** (source : air in 35°C d.b. / plant : water in 23°C out 18°C)													
	Cooling capacity	55,1	65,2	73,7	82,4	98,8	112	126	141	156	180	201	232	kW
	Power input	16,7	19,7	22,1	24,9	29,8	34,1	38,4	43,0	47,9	54,8	61,9	70,9	kW
	EER	3,30	3,31	3,33	3,31	3,32	3,28	3,28	3,28	3,26	3,28	3,25	3,27	-
	Water flow rate plant side	2,65	3,14	3,55	3,97	4,75	5,40	6,07	6,78	7,50	8,65	9,70	11,2	l/s
	Pressure drops plant side	33	46	45	56	44	45	48	45	48	48	52	55	kPa
	Heating A7W35 (source : air in 7°C d.b. 6°C w.b. / plant : water in 30°C out 35°C)													
	Heating capacity	50,4	59,5	67,3	75,5	90,2	103	115	128	144	164	184	211	kW
	Power input	12,0	14,1	16,0	18,1	21,3	24,2	27,3	30,5	34,3	39,1	44,0	50,5	kW
	COP	4,20	4,22	4,21	4,17	4,23	4,26	4,21	4,20	4,20	4,19	4,18	4,18	-
	Water flow rate plant side	2,40	2,82	3,20	3,58	4,29	4,87	5,45	6,07	6,83	7,79	8,74	10,03	l/s
	Pressure drops plant side	27	37	37	46	36	36	39	36	40	39	42	44	kPa
	Heating A2W35 (source : air in 2°C d.b. 1°C w.b. / plant : water in 30°C out 35°C)													
	Heating capacity	46,1	54,6	61,6	69,2	82,6	94,2	105	118	131	150	170	194	kW
	Power input	12,2	14,4	16,4	18,6	21,7	24,7	27,8	31,3	35,0	40,0	44,9	51,4	kW
	COP	3,78	3,79	3,76	3,72	3,81	3,81	3,78	3,77	3,74	3,75	3,79	3,77	-
	Water flow rate plant side	2,44	2,88	3,25	3,65	4,36	4,97	5,54	6,21	6,93	7,93	8,93	10,2	l/s
	Pressure drops plant side	28	39	38	48	37	38	40	38	41	41	44	45	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	53,8	9,3	50,8	10,6	47,8	12,0	44,8	13,3	41,8	14,6	38,9	16,0	35,9	17,3
	6	55,3	9,4	52,2	10,7	49,2	12,1	46,1	13,4	43,0	14,7	40,0	16,1	36,9	17,4
	7	56,9	9,5	53,7	10,8	50,6	12,2	**47,4**	**13,5**	44,2	14,9	41,1	16,2	37,9	17,6
	8	58,4	9,5	55,2	10,9	52,0	12,2	48,7	13,6	45,4	15,0	42,2	16,3	-	-
	9	60,0	9,6	56,6	11,0	53,3	12,3	50,0	13,7	46,6	15,1	43,3	16,4	-	-
	10	61,5	9,7	58,1	11,0	54,7	12,4	51,3	13,8	47,8	15,2	44,5	16,6	-	-
	11	63,1	9,7	59,6	11,1	56,1	12,5	52,6	13,9	49,0	15,3	45,6	16,7	-	-
	12	64,6	9,8	61,0	11,2	57,5	12,6	53,9	14,0	50,3	15,4	46,7	16,8	-	-
50.2	5	63,8	10,8	60,2	12,4	56,7	13,9	53,1	15,5	49,6	17,0	46,1	18,6	42,5	20,1
	6	65,6	10,9	61,9	12,5	58,3	14,0	54,7	15,6	51,0	17,1	47,4	18,7	43,7	20,3
	7	67,4	11,0	63,7	12,6	60,0	14,1	**56,2**	**15,7**	52,4	17,3	48,7	18,8	45,0	20,4
	8	69,3	11,1	65,4	12,7	61,6	14,2	57,7	15,8	53,9	17,4	50,1	19,0	-	-
	9	71,1	11,1	67,1	12,7	63,2	14,3	59,3	15,9	55,3	17,5	51,4	19,1	-	-
	10	73,0	11,2	68,9	12,8	64,9	14,4	60,8	16,0	56,7	17,6	52,7	19,3	-	-
	11	74,8	11,3	70,6	12,9	66,5	14,5	62,3	16,2	58,2	17,8	54,0	19,4	-	-
	12	76,6	11,4	72,4	13,0	68,1	14,6	63,9	16,3	59,6	17,9	55,4	19,5	-	-
60.2	5	71,9	12,2	67,9	14,0	64,0	15,7	59,9	17,4	55,9	19,2	52,0	20,9	48,0	22,7
	6	74,0	12,3	69,9	14,1	65,8	15,8	61,7	17,6	57,5	19,3	53,5	21,1	49,3	22,8
	7	76,1	12,4	71,8	14,2	67,6	15,9	**63,4**	**17,7**	59,2	19,5	55,0	21,2	50,7	23,0
	8	78,2	12,5	73,8	14,3	69,5	16,0	65,1	17,8	60,8	19,6	56,5	21,4	-	-
	9	80,2	12,6	75,8	14,4	71,3	16,2	66,9	18,0	62,4	19,8	58,0	21,5	-	-
	10	82,3	12,7	77,7	14,5	73,2	16,3	68,6	18,1	64,0	19,9	59,5	21,7	-	-
	11	84,4	12,8	79,7	14,6	75,0	16,4	70,3	18,2	65,6	20,0	61,0	21,9	-	-
	12	86,5	12,8	81,6	14,7	76,9	16,5	72,0	18,3	67,2	20,2	62,5	22,0	-	-
70.2	5	80,6	13,7	76,1	15,6	71,6	17,6	67,1	19,5	62,6	21,5	58,2	23,4	53,7	25,4
	6	82,9	13,8	78,2	15,7	73,7	17,7	69,1	19,7	64,4	21,6	59,9	23,6	55,3	25,6
	7	85,2	13,9	80,4	15,8	75,8	17,8	**71,0**	**19,8**	66,2	21,8	61,6	23,8	56,8	25,7
	8	87,5	14,0	82,6	16,0	77,8	17,9	72,9	19,9	68,0	21,9	63,2	23,9	-	-
	9	89,8	14,1	84,8	16,1	79,9	18,1	74,9	20,1	69,9	22,1	64,9	24,1	-	-
	10	92,2	14,2	87,0	16,2	82,0	18,2	76,8	20,2	71,7	22,3	66,6	24,3	-	-
	11	94,5	14,3	89,2	16,3	84,0	18,3	78,7	20,4	73,5	22,4	68,3	24,5	-	-
	12	96,8	14,4	91,4	16,4	86,1	18,5	80,7	20,5	75,3	22,6	70,0	24,6	-	-
80.2	5	95,1	16,0	89,8	18,3	84,5	20,6	79,2	22,9	73,9	25,1	68,7	27,4	63,4	29,7
	6	97,8	16,1	92,4	18,4	87,0	20,7	81,5	23,0	76,1	25,3	70,7	27,6	65,2	29,9
	7	101	16,2	94,9	18,6	89,4	20,9	**83,8**	**23,2**	78,2	25,5	72,7	27,8	67,0	30,2
	8	103	16,4	97,5	18,7	91,9	21,0	86,1	23,4	80,3	25,7	74,6	28,0	-	-
	9	106	16,5	100	18,8	94,3	21,2	88,4	23,5	82,5	25,9	76,6	28,2	-	-
	10	109	16,6	103	19,0	96,7	21,3	90,7	23,7	84,6	26,1	78,6	28,4	-	-
	11	112	16,7	105	19,1	99,2	21,5	92,9	23,9	86,7	26,3	80,6	28,6	-	-
	12	114	16,8	108	19,2	102	21,6	95,2	24,0	88,8	26,4	82,6	28,9	-	-
90.2	5	108	18,7	102	21,4	96,2	24,0	90,2	26,7	84,2	29,4	78,2	32,0	72,2	34,7
	6	111	18,8	105	21,5	99,0	24,2	92,8	26,9	86,6	29,6	80,5	32,3	74,2	35,0
	7	114	19,0	108	21,7	102	24,4	**95,4**	**27,1**	89,0	29,8	82,7	32,5	76,3	35,2
	8	118	19,1	111	21,8	105	24,6	98,0	27,3	91,4	30,0	85,0	32,8	-	-
	9	121	19,2	114	22,0	107	24,7	101	27,5	93,9	30,2	87,2	33,0	-	-
	10	124	19,4	117	22,2	110	24,9	103	27,7	96,3	30,5	89,5	33,2	-	-
	11	127	19,5	120	22,3	113	25,1	106	27,9	98,7	30,7	91,7	33,5	-	-
	12	130	19,7	123	22,5	116	25,3	108	28,1	101	30,9	94,0	33,7	-	-
100.2	5	121	21,0	115	24,0	108	27,0	101	30,0	94,4	33,0	87,7	35,9	80,9	38,9
	6	125	21,1	118	24,1	111	27,2	104	30,2	97,1	33,2	90,2	36,2	83,3	39,2
	7	128	21,3	121	24,3	114	27,4	**107**	**30,4**	99,8	33,4	92,8	36,5	85,6	39,5
	8	132	21,4	125	24,5	117	27,6	110	30,6	103	33,7	95,3	36,7	-	-
	9	135	21,6	128	24,7	120	27,8	113	30,8	105	33,9	97,8	37,0	-	-
	10	139	21,7	131	24,9	124	28,0	116	31,1	108	34,2	100	37,3	-	-
	11	142	21,9	134	25,0	127	28,2	119	31,3	111	34,4	103	37,5	-	-
	12	146	22,1	138	25,2	130	28,4	122	31,5	113	34,7	105	37,8	-	-

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 x 10^{-4} m^2 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	137	23,7	130	27,1	122	30,5	114	33,9	107	37,3	99,2	40,7	91,5	44,1
	6	141	23,9	133	27,3	126	30,7	118	34,1	110	37,6	102	41,0	94,2	44,4
	7	145	24,1	137	27,5	129	31,0	**121**	**34,4**	113	37,8	105	41,3	96,8	44,7
	8	149	24,3	141	27,7	133	31,2	124	34,7	116	38,1	108	41,6	-	-
	9	153	24,4	145	27,9	136	31,4	128	34,9	119	38,4	111	41,9	-	-
	10	157	24,6	148	28,1	140	31,6	131	35,2	122	38,7	113	42,2	-	-
	11	161	24,8	152	28,3	143	31,9	134	35,4	125	38,9	116	42,5	-	-
	12	165	25,0	156	28,5	147	32,1	138	35,7	128	39,2	119	42,8	-	-
130.2	5	152	26,5	144	30,3	135	34,1	127	37,8	118	41,6	110	45,4	101	49,2
	6	156	26,7	148	30,5	139	34,3	130	38,1	122	41,9	113	45,7	104	49,6
	7	161	26,9	152	30,7	143	34,6	**134**	**38,4**	125	42,2	116	46,1	107	49,9
	8	165	27,1	156	30,9	147	34,8	138	38,7	128	42,5	119	46,4	-	-
	9	170	27,3	160	31,2	151	35,1	141	39,0	132	42,9	123	46,8	-	-
	10	174	27,5	164	31,4	155	35,3	145	39,2	135	43,2	126	47,1	-	-
	11	178	27,7	168	31,6	159	35,6	149	39,5	139	43,5	129	47,4	-	-
	12	183	27,9	173	31,8	162	35,8	152	39,8	142	43,8	132	47,8	-	-
145.2	5	175	30,1	165	34,5	155	38,8	146	43,1	136	47,4	126	51,7	116	56,0
	6	180	30,4	170	34,7	160	39,0	150	43,4	140	47,7	130	52,1	120	56,4
	7	185	30,6	174	35,0	164	39,3	**154**	**43,7**	144	48,1	134	52,4	123	56,8
	8	190	30,8	179	35,2	169	39,6	158	44,0	148	48,4	137	52,8	-	-
	9	195	31,0	184	35,5	173	39,9	162	44,3	152	48,8	141	53,2	-	-
	10	200	31,3	189	35,7	178	40,2	167	44,7	155	49,1	144	53,6	-	-
	11	205	31,5	194	36,0	182	40,5	171	45,0	159	49,5	148	54,0	-	-
	12	210	31,7	198	36,2	187	40,8	175	45,3	163	49,8	152	54,3	-	-
160.2	5	197	33,8	186	38,6	176	43,5	165	48,3	153	53,1	143	57,9	132	62,8
	6	203	34,1	192	38,9	181	43,8	169	48,6	158	53,5	147	58,4	135	63,2
	7	209	34,3	197	39,2	186	44,1	**174**	**49,0**	162	53,9	151	58,8	139	63,7
	8	214	34,5	203	39,5	191	44,4	179	49,4	167	54,3	155	59,2	-	-
	9	220	34,8	208	39,8	196	44,7	183	49,7	171	54,7	159	59,7	-	-
	10	226	35,0	213	40,1	201	45,1	188	50,1	176	55,1	163	60,1	-	-
	11	232	35,3	219	40,3	206	45,4	193	50,4	180	55,5	167	60,5	-	-
	12	237	35,5	224	40,6	211	45,7	198	50,8	184	55,9	171	60,9	-	-
180.2	5	225	38,8	212	44,3	200	49,8	187	55,4	175	60,9	162	66,5	150	72,0
	6	231	39,1	218	44,6	206	50,2	193	55,8	180	61,4	167	66,9	154	72,5
	7	238	39,3	224	45,0	211	50,6	**198**	**56,2**	185	61,8	172	67,4	158	73,1
	8	244	39,6	230	45,3	217	50,9	203	56,6	190	62,3	176	67,9	-	-
	9	251	39,9	237	45,6	223	51,3	209	57,0	195	62,7	181	68,4	-	-
	10	257	40,2	243	45,9	229	51,7	214	57,4	200	63,2	186	68,9	-	-
	11	264	40,5	249	46,3	234	52,1	220	57,8	205	63,6	190	69,4	-	-
	12	270	40,8	255	46,6	240	52,4	225	58,2	210	64,1	195	69,9	-	-

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} m^2 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	51,3	10,0	48,4	11,4	45,6	12,9	42,7	14,3	39,9	15,7	38,9	16,0	35,9	17,3
	6	52,8	10,1	49,8	11,5	46,9	13,0	44,0	14,4	41,0	15,8	40,0	16,1	36,9	17,4
	7	54,2	10,2	51,2	11,6	48,2	13,1	**45,2**	**14,5**	42,2	16,0	41,1	16,2	37,9	17,6
	8	55,7	10,2	52,6	11,7	49,5	13,1	46,4	14,6	43,3	16,1	42,2	16,3	-	-
	9	57,2	10,3	54,0	11,8	50,9	13,2	47,7	14,7	44,5	16,2	43,3	16,4	-	-
	10	58,7	10,4	55,4	11,9	52,2	13,3	48,9	14,8	45,6	16,3	44,5	16,6	-	-
	11	60,2	10,4	56,8	11,9	53,5	13,4	50,1	14,9	46,8	16,4	45,6	16,7	-	-
	12	61,6	10,5	58,2	12,0	54,8	13,5	51,4	15,0	47,9	16,5	46,7	16,8	-	-
50.2	5	60,8	11,6	57,4	13,2	54,1	14,9	50,7	16,6	47,3	18,2	46,1	18,6	42,5	20,1
	6	62,6	11,7	59,1	13,3	55,6	15,0	52,1	16,7	48,6	18,3	47,4	18,7	43,7	20,3
	7	64,3	11,8	60,7	13,4	57,2	15,1	**53,6**	**16,8**	50,0	18,5	48,7	18,8	45,0	20,4
	8	66,1	11,8	62,4	13,5	58,8	15,2	55,1	16,9	51,4	18,6	50,1	19,0	-	-
	9	67,8	11,9	64,0	13,6	60,3	15,3	56,5	17,0	52,7	18,7	51,4	19,1	-	-
	10	69,6	12,0	65,7	13,7	61,9	15,4	58,0	17,2	54,1	18,9	52,7	19,3	-	-
	11	71,3	12,1	67,4	13,8	63,4	15,6	59,4	17,3	55,5	19,0	54,0	19,4	-	-
	12	73,1	12,2	69,0	13,9	65,0	15,7	60,9	17,4	56,8	19,2	55,4	19,5	-	-
60.2	5	68,5	13,1	64,7	15,0	60,9	16,9	57,1	18,7	53,3	20,6	52,0	20,9	48,0	22,7
	6	70,5	13,2	66,6	15,1	62,7	17,0	58,8	18,9	54,8	20,7	53,5	21,1	49,3	22,8
	7	72,5	13,3	68,4	15,2	64,4	17,1	**60,4**	**19,0**	56,4	20,9	55,0	21,2	50,7	23,0
	8	74,5	13,4	70,3	15,3	66,2	17,2	62,0	19,1	57,9	21,1	56,5	21,4	-	-
	9	76,4	13,5	72,2	15,4	68,0	17,3	63,7	19,3	59,4	21,2	58,0	21,5	-	-
	10	78,4	13,6	74,0	15,5	69,7	17,5	65,3	19,4	61,0	21,4	59,5	21,7	-	-
	11	80,4	13,7	75,9	15,6	71,5	17,6	67,0	19,6	62,5	21,5	61,0	21,9	-	-
	12	82,4	13,8	77,8	15,8	73,2	17,7	68,6	19,7	64,0	21,7	62,5	22,0	-	-
70.2	5	76,8	14,6	72,5	16,7	68,3	18,8	64,0	20,9	59,7	23,0	58,2	23,4	53,7	25,4
	6	79,0	14,7	74,6	16,8	70,3	18,9	65,9	21,0	61,4	23,2	59,9	23,6	55,3	25,6
	7	81,2	14,8	76,7	17,0	72,2	19,1	**67,7**	**21,2**	63,2	23,3	61,6	23,8	56,8	25,7
	8	83,5	14,9	78,8	17,1	74,2	19,2	69,5	21,4	64,9	23,5	63,2	23,9	-	-
	9	85,7	15,1	80,9	17,2	76,2	19,4	71,4	21,5	66,6	23,7	64,9	24,1	-	-
	10	87,9	15,2	83,0	17,3	78,1	19,5	73,2	21,7	68,3	23,8	66,6	24,3	-	-
	11	90,1	15,3	85,1	17,5	80,1	19,6	75,1	21,8	70,1	24,0	68,3	24,5	-	-
	12	92,3	15,4	87,2	17,6	82,1	19,8	76,9	22,0	71,8	24,2	70,0	24,6	-	-
80.2	5	90,7	17,1	85,6	19,6	80,6	22,0	75,5	24,4	70,5	26,9	68,7	27,4	63,4	29,7
	6	93,3	17,2	88,1	19,7	82,9	22,2	77,7	24,6	72,5	27,1	70,7	27,6	65,2	29,9
	7	95,9	17,4	90,5	19,8	85,3	22,3	**79,9**	**24,8**	74,5	27,3	72,7	27,8	67,0	30,2
	8	98,5	17,5	93,0	20,0	87,6	22,5	82,1	25,0	76,6	27,5	74,6	28,0	-	-
	9	101	17,6	95,5	20,1	89,9	22,6	84,3	25,2	78,6	27,7	76,6	28,2	-	-
	10	104	17,7	97,9	20,3	92,2	22,8	86,4	25,3	80,6	27,9	78,6	28,4	-	-
	11	106	17,9	100	20,4	94,6	23,0	88,6	25,5	82,7	28,1	80,6	28,6	-	-
	12	109	18,0	103	20,6	96,9	23,1	90,8	25,7	84,7	28,3	82,6	28,9	-	-
90.2	5	103	20,0	97,4	22,9	91,7	25,7	85,9	28,6	80,2	31,4	78,2	32,0	72,2	34,7
	6	106	20,2	100	23,0	94,3	25,9	88,4	28,8	82,5	31,7	80,5	32,3	74,2	35,0
	7	109	20,3	103	23,2	97,0	26,1	**90,9**	**29,0**	84,8	31,9	82,7	32,5	76,3	35,2
	8	112	20,4	106	23,4	99,6	26,3	93,4	29,2	87,1	32,1	85,0	32,8	-	-
	9	115	20,6	109	23,5	102	26,5	95,9	29,4	89,4	32,4	87,2	33,0	-	-
	10	118	20,7	111	23,7	105	26,7	98,3	29,6	91,7	32,6	89,5	33,2	-	-
	11	121	20,9	114	23,9	108	26,9	101	29,8	94,1	32,8	91,7	33,5	-	-
	12	124	21,0	117	24,0	110	27,0	103	30,1	96,4	33,1	94,0	33,7	-	-
100.2	5	116	22,5	109	25,7	103	28,9	96,4	32,1	90,0	35,3	87,7	35,9	80,9	38,9
	6	119	22,7	112	25,9	106	29,1	99	32,4	92,6	35,6	90,2	36,2	83,3	39,2
	7	122	22,8	116	26,1	109	29,3	**102**	**32,6**	95,2	35,9	92,8	36,5	85,6	39,5
	8	126	23,0	119	26,3	112	29,6	105	32,8	97,8	36,1	95,3	36,7	-	-
	9	129	23,2	122	26,5	115	29,8	108	33,1	100	36,4	97,8	37,0	-	-
	10	132	23,3	125	26,6	118	30,0	110	33,3	103	36,6	100	37,3	-	-
	11	136	23,5	128	26,8	121	30,2	113	33,5	106	36,9	103	37,5	-	-
	12	139	23,6	131	27,0	124	30,4	116	33,8	108	37,2	105	37,8	-	-

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 x 10^{-4} m^2 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	130	25,4	123	29,0	116	32,6	109	36,3	101	39,9	99,2	40,7	91,5	44,1
	6	134	25,6	127	29,2	119	32,9	112	36,5	104	40,2	102	41,0	94,2	44,4
	7	138	25,8	130	29,4	123	33,1	**115**	**36,8**	107	40,5	105	41,3	96,8	44,7
	8	142	25,9	134	29,7	126	33,4	118	37,1	110	40,8	108	41,6	-	-
	9	146	26,1	137	29,9	129	33,6	121	37,3	113	41,1	111	41,9	-	-
	10	149	26,3	141	30,1	133	33,8	124	37,6	116	41,4	113	42,2	-	-
	11	153	26,5	145	30,3	136	34,1	128	37,9	119	41,7	116	42,5	-	-
	12	157	26,7	148	30,5	139	34,3	131	38,1	122	42,0	119	42,8	-	-
130.2	5	145	28,4	137	32,4	129	36,5	121	40,5	113	44,6	110	45,4	101	49,2
	6	149	28,6	141	32,6	133	36,7	125	40,8	116	44,9	113	45,7	104	49,6
	7	154	28,8	145	32,9	137	37,0	**128**	**41,1**	119	45,2	116	46,1	107	49,9
	8	158	29,0	149	33,1	140	37,3	131	41,4	123	45,5	119	46,4	-	-
	9	162	29,2	153	33,4	144	37,5	135	41,7	126	45,9	123	46,8	-	-
	10	166	29,4	157	33,6	148	37,8	138	42,0	129	46,2	126	47,1	-	-
	11	170	29,6	161	33,8	151	38,1	142	42,3	132	46,5	129	47,4	-	-
	12	175	29,8	165	34,1	155	38,3	145	42,6	136	46,9	132	47,8	-	-
145.2	5	167	32,3	157	36,9	148	41,5	139	46,1	130	50,7	126	51,7	116	56,0
	6	172	32,5	162	37,2	153	41,8	143	46,5	133	51,1	130	52,1	120	56,4
	7	176	32,8	167	37,4	157	42,1	**147**	**46,8**	137	51,5	134	52,4	123	56,8
	8	181	33,0	171	37,7	161	42,4	151	47,1	141	51,9	137	52,8	-	-
	9	186	33,2	176	38,0	165	42,7	155	47,5	145	52,2	141	53,2	-	-
	10	191	33,5	180	38,3	170	43,0	159	47,8	148	52,6	144	53,6	-	-
	11	196	33,7	185	38,5	174	43,3	163	48,2	152	53,0	148	54,0	-	-
	12	200	34,0	189	38,8	178	43,7	167	48,5	156	53,4	152	54,3	-	-
160.2	5	188	36,2	178	41,4	167	46,6	157	51,7	146	56,9	143	57,9	132	62,8
	6	194	36,5	183	41,7	172	46,9	161	52,1	151	57,3	147	58,4	135	63,2
	7	199	36,8	188	42,0	177	47,3	**166**	**52,5**	155	57,8	151	58,8	139	63,7
	8	205	37,0	193	42,3	182	47,6	171	52,9	159	58,2	155	59,2	-	-
	9	210	37,3	198	42,6	187	47,9	175	53,3	163	58,6	159	59,7	-	-
	10	215	37,6	203	42,9	192	48,3	180	53,6	168	59,0	163	60,1	-	-
	11	221	37,8	209	43,2	196	48,6	184	54,0	172	59,4	167	60,5	-	-
	12	226	38,1	214	43,5	201	49,0	189	54,4	176	59,9	171	60,9	-	-
180.2	5	214	41,5	202	47,5	191	53,4	179	59,3	167	65,3	162	66,5	150	72,0
	6	221	41,8	208	47,8	196	53,8	184	59,8	172	65,7	167	66,9	154	72,5
	7	227	42,1	214	48,2	202	54,2	**189**	**60,2**	176	66,2	172	67,4	158	73,1
	8	233	42,4	220	48,5	207	54,6	194	60,6	181	66,7	176	67,9	-	-
	9	239	42,8	226	48,9	213	55,0	199	61,1	186	67,2	181	68,4	-	-
	10	245	43,1	232	49,2	218	55,4	204	61,5	191	67,7	186	68,9	-	-
	11	252	43,4	237	49,6	224	55,8	210	62,0	196	68,1	190	69,4	-	-
	12	258	43,7	243	49,9	229	56,2	215	62,4	200	68,6	195	69,9	-	-

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} m^2 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	50,4	10,2	47,6	11,7	44,8	13,1	42,0	14,6	39,2	16,0	40,0	15,5	36,9	16,8
	6	51,8	10,3	48,9	11,8	46,1	13,2	43,2	14,7	40,3	16,2	41,2	15,6	38,0	16,9
	7	53,3	10,4	50,3	11,8	47,4	13,3	**44,4**	**14,8**	41,4	16,3	42,3	15,7	39,1	17,0
	8	54,7	10,4	51,7	11,9	48,7	13,4	45,6	14,9	42,6	16,4	43,5	15,8	-	-
	9	56,2	10,5	53,0	12,0	50,0	13,5	46,8	15,0	43,7	16,5	44,6	15,9	-	-
	10	57,6	10,6	54,4	12,1	51,3	13,6	48,0	15,1	44,8	16,6	45,8	16,1	-	-
	11	59,1	10,7	55,8	12,2	52,5	13,7	49,2	15,2	45,9	16,8	46,9	16,2	-	-
	12	60,5	10,7	57,2	12,3	53,8	13,8	50,5	15,3	47,1	16,9	48,1	16,3	-	-
50.2	5	59,7	11,9	56,3	13,6	53,1	15,3	49,7	16,9	46,4	18,6	47,4	18,0	43,8	19,5
	6	61,4	12,0	58,0	13,7	54,6	15,4	51,2	17,1	47,7	18,8	48,8	18,1	45,0	19,7
	7	63,1	12,0	59,6	13,8	56,1	15,5	**52,6**	**17,2**	49,1	18,9	50,2	18,3	46,3	19,8
	8	64,8	12,1	61,2	13,9	57,7	15,6	54,0	17,3	50,4	19,1	51,6	18,4	-	-
	9	66,6	12,2	62,8	14,0	59,2	15,7	55,5	17,5	51,8	19,2	52,9	18,5	-	-
	10	68,3	12,3	64,5	14,1	60,7	15,8	56,9	17,6	53,1	19,3	54,3	18,7	-	-
	11	70,0	12,4	66,1	14,2	62,2	15,9	58,3	17,7	54,4	19,5	55,7	18,8	-	-
	12	71,7	12,5	67,7	14,3	63,8	16,0	59,8	17,8	55,8	19,6	57,0	18,9	-	-
60.2	5	67,4	13,4	63,6	15,3	59,9	17,2	56,2	19,1	52,4	21,0	53,5	20,3	49,4	22,0
	6	69,3	13,5	65,5	15,4	61,7	17,3	57,8	19,3	53,9	21,2	55,1	20,5	50,8	22,2
	7	71,3	13,6	67,3	15,5	63,4	17,5	**59,4**	**19,4**	55,4	21,3	56,6	20,6	52,2	22,3
	8	73,2	13,7	69,1	15,6	65,1	17,6	61,0	19,5	56,9	21,5	58,2	20,8	-	-
	9	75,2	13,8	71,0	15,7	66,8	17,7	62,6	19,7	58,4	21,7	59,7	20,9	-	-
	10	77,1	13,9	72,8	15,9	68,6	17,8	64,3	19,8	60,0	21,8	61,2	21,1	-	-
	11	79,1	14,0	74,6	16,0	70,3	18,0	65,9	20,0	61,5	22,0	62,8	21,2	-	-
	12	81,0	14,1	76,5	16,1	72,0	18,1	67,5	20,1	63,0	22,1	64,3	21,4	-	-
70.2	5	75,4	15,0	71,2	17,1	67,1	19,2	62,9	21,4	58,7	23,5	59,9	22,7	55,3	24,6
	6	77,6	15,1	73,3	17,2	69,0	19,4	64,7	21,5	60,4	23,7	61,7	22,9	56,9	24,8
	7	79,8	15,2	75,3	17,4	71,0	19,5	**66,5**	**21,7**	62,0	23,9	63,4	23,0	58,5	25,0
	8	82,0	15,3	77,4	17,5	72,9	19,7	68,3	21,9	63,7	24,0	65,1	23,2	-	-
	9	84,2	15,4	79,5	17,6	74,8	19,8	70,1	22,0	65,4	24,2	66,9	23,4	-	-
	10	86,3	15,5	81,5	17,7	76,8	20,0	71,9	22,2	67,1	24,4	68,6	23,6	-	-
	11	88,5	15,6	83,6	17,9	78,7	20,1	73,8	22,3	68,8	24,6	70,3	23,7	-	-
	12	90,7	15,7	85,6	18,0	80,6	20,2	75,6	22,5	70,5	24,7	72,0	23,9	-	-
80.2	5	89,1	17,5	84,1	20,0	79,2	22,5	74,2	25,0	69,2	27,5	70,8	26,6	65,3	28,8
	6	91,6	17,7	86,5	20,2	81,5	22,7	76,4	25,2	71,2	27,7	72,8	26,8	67,2	29,0
	7	94,2	17,8	88,9	20,3	83,8	22,9	**78,5**	**25,4**	73,2	27,9	74,8	27,0	69,1	29,3
	8	96,8	17,9	91,4	20,5	86,0	23,0	80,6	25,6	75,2	28,1	76,9	27,2	-	-
	9	99,3	18,0	93,8	20,6	88,3	23,2	82,8	25,8	77,2	28,3	78,9	27,4	-	-
	10	102	18,2	96,2	20,8	90,6	23,4	84,9	26,0	79,2	28,5	81,0	27,6	-	-
	11	104	18,3	98,6	20,9	92,9	23,5	87,1	26,1	81,2	28,8	83,0	27,8	-	-
	12	107	18,4	101	21,1	95,2	23,7	89,2	26,3	83,2	29,0	85,0	28,0	-	-
90.2	5	101	20,5	95,8	23,4	90,2	26,3	84,5	29,3	78,9	32,2	80,5	31,1	74,3	33,7
	6	104	20,6	98,5	23,6	92,8	26,5	87,0	29,5	81,1	32,4	82,9	31,3	76,5	33,9
	7	107	20,8	101	23,8	95,4	26,7	**89,4**	**29,7**	83,4	32,7	85,2	31,5	78,6	34,2
	8	110	20,9	104	23,9	98,0	26,9	91,8	29,9	85,7	32,9	87,5	31,8	-	-
	9	113	21,1	107	24,1	101	27,1	94,3	30,1	88,0	33,1	89,8	32,0	-	-
	10	116	21,2	110	24,3	103	27,3	96,7	30,3	90,2	33,4	92,2	32,2	-	-
	11	119	21,4	112	24,5	106	27,5	99,2	30,6	92,5	33,6	94,5	32,5	-	-
	12	122	21,5	115	24,6	108	27,7	102	30,8	94,8	33,9	96,8	32,7	-	-
100.2	5	113	23,0	107	26,3	101	29,5	94,5	32,8	88,2	36,1	90,3	34,9	83,4	37,8
	6	117	23,1	110	26,4	104	29,8	97,3	33,1	90,8	36,4	92,9	35,1	85,8	38,1
	7	120	23,3	113	26,6	107	30,0	**100**	**33,3**	93,3	36,6	95,6	35,4	88,2	38,3
	8	123	23,5	116	26,8	110	30,2	103	33,5	95,8	36,9	98,2	35,6	-	-
	9	127	23,6	119	27,0	113	30,4	105	33,8	98,4	37,2	101	35,9	-	-
	10	130	23,8	123	27,2	115	30,6	108	34,0	101	37,4	103	36,2	-	-
	11	133	24,0	126	27,4	118	30,8	111	34,3	103	37,7	106	36,4	-	-
	12	136	24,2	129	27,6	121	31,1	114	34,5	106	38,0	109	36,7	-	-

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 x 10^{-4} m^2 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	128	26,0	121	29,7	114	33,4	107	37,2	100	40,9	102	39,5	94,3	42,7
	6	132	26,2	125	29,9	117	33,7	110	37,4	103	41,2	105	39,8	97,0	43,1
	7	136	26,4	128	30,2	121	33,9	**113**	**37,7**	105	41,5	108	40,0	99,7	43,4
	8	139	26,6	132	30,4	124	34,2	116	38,0	108	41,8	111	40,3	-	-
	9	143	26,8	135	30,6	127	34,4	119	38,2	111	42,1	114	40,6	-	-
	10	147	27,0	139	30,8	130	34,7	122	38,5	114	42,4	117	40,9	-	-
	11	150	27,2	142	31,0	134	34,9	125	38,8	117	42,7	120	41,2	-	-
	12	154	27,3	145	31,3	137	35,2	128	39,1	120	43,0	123	41,5	-	-
130.2	5	143	29,0	135	33,2	127	37,3	119	41,5	111	45,6	113	44,0	104	47,7
	6	147	29,3	139	33,4	131	37,6	123	41,8	114	46,0	116	44,4	107	48,1
	7	151	29,5	143	33,7	134	37,9	**126**	**42,1**	118	46,3	120	44,7	110	48,4
	8	155	29,7	147	33,9	138	38,2	129	42,4	121	46,6	123	45,0	-	-
	9	159	29,9	151	34,2	142	38,4	133	42,7	124	47,0	126	45,3	-	-
	10	164	30,1	154	34,4	145	38,7	136	43,0	127	47,3	129	45,7	-	-
	11	168	30,3	158	34,7	149	39,0	140	43,3	130	47,7	133	46,0	-	-
	12	172	30,5	162	34,9	153	39,3	143	43,6	134	48,0	136	46,3	-	-
145.2	5	163	33,0	154	37,8	145	42,5	136	47,2	127	51,9	130	50,1	120	54,3
	6	168	33,3	159	38,0	149	42,8	140	47,6	131	52,3	134	50,5	123	54,7
	7	173	33,5	163	38,3	154	43,1	**144**	**47,9**	134	52,7	138	50,9	127	55,1
	8	178	33,8	168	38,6	158	43,4	148	48,2	138	53,1	141	51,2	-	-
	9	182	34,0	172	38,9	162	43,7	152	48,6	142	53,5	145	51,6	-	-
	10	187	34,3	177	39,2	166	44,1	156	48,9	145	53,8	149	52,0	-	-
	11	192	34,5	181	39,4	170	44,4	160	49,3	149	54,2	153	52,3	-	-
	12	196	34,7	185	39,7	175	44,7	164	49,6	153	54,6	156	52,7	-	-
160.2	5	185	37,0	175	42,3	164	47,6	154	52,9	144	58,2	147	56,2	136	60,9
	6	190	37,3	180	42,6	169	48,0	159	53,3	148	58,6	151	56,6	139	61,3
	7	196	37,6	185	43,0	174	48,3	**163**	**53,7**	152	59,1	155	57,0	143	61,8
	8	201	37,9	190	43,3	179	48,7	167	54,1	156	59,5	160	57,5	-	-
	9	206	38,1	195	43,6	183	49,0	172	54,5	160	59,9	164	57,9	-	-
	10	212	38,4	200	43,9	188	49,4	176	54,9	165	60,4	168	58,3	-	-
	11	217	38,7	205	44,2	193	49,7	181	55,3	169	60,8	172	58,7	-	-
	12	222	39,0	210	44,5	198	50,1	185	55,7	173	61,2	177	59,1	-	-
180.2	5	210	42,5	198	48,6	187	54,6	175	60,7	163	66,8	167	64,5	154	69,8
	6	216	42,8	204	48,9	192	55,0	180	61,2	168	67,3	172	64,9	159	70,4
	7	222	43,1	210	49,3	197	55,4	**185**	**61,6**	173	67,8	177	65,4	163	70,9
	8	228	43,4	215	49,6	203	55,8	190	62,0	177	68,3	182	65,9	-	-
	9	234	43,7	221	50,0	208	56,2	195	62,5	182	68,7	186	66,4	-	-
	10	240	44,1	227	50,4	214	56,6	200	62,9	187	69,2	191	66,8	-	-
	11	246	44,4	232	50,7	219	57,1	205	63,4	191	69,7	196	67,3	-	-
	12	252	44,7	238	51,1	224	57,5	210	63,8	196	70,2	201	67,8	-	-

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 x 10^{-4} m^2 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	51,6	9,1	48,7	10,4	45,9	11,7	43,0	13,0	40,1	14,3	37,3	15,6	34,4	16,9
	6	53,1	9,2	50,1	10,5	47,2	11,8	44,3	13,1	41,3	14,4	38,4	15,7	35,4	17,0
	7	54,6	9,2	51,6	10,6	48,5	11,9	**45,5**	**13,2**	42,5	14,5	39,4	15,8	36,4	17,2
	8	56,1	9,3	53,0	10,6	49,9	12,0	46,7	13,3	43,6	14,6	40,5	16,0	-	-
	9	57,6	9,4	54,4	10,7	51,2	12,1	48,0	13,4	44,8	14,7	41,6	16,1	-	-
	10	59,1	9,4	55,8	10,8	52,5	12,1	49,2	13,5	45,9	14,8	42,7	16,2	-	-
	11	60,6	9,5	57,2	10,9	53,8	12,2	50,5	13,6	47,1	14,9	43,8	16,3	-	-
	12	62,0	9,6	58,6	10,9	55,2	12,3	51,7	13,7	48,2	15,0	44,8	16,4	-	-
50.2	5	61,2	10,8	57,7	12,3	54,4	13,8	51,0	15,4	47,5	16,9	44,2	18,4	40,8	20,0
	6	62,9	10,8	59,4	12,4	55,9	13,9	52,4	15,5	48,9	17,0	45,5	18,6	41,9	20,1
	7	64,7	10,9	61,1	12,5	57,5	14,0	**53,9**	**15,6**	50,3	17,2	46,7	18,7	43,1	20,3
	8	66,4	11,0	62,7	12,6	59,1	14,1	55,4	15,7	51,7	17,3	48,0	18,9	-	-
	9	68,2	11,1	64,4	12,7	60,6	14,2	56,8	15,8	53,0	17,4	49,3	19,0	-	-
	10	70,0	11,2	66,1	12,8	62,2	14,3	58,3	15,9	54,4	17,5	50,6	19,1	-	-
	11	71,7	11,2	67,7	12,8	63,8	14,4	59,8	16,1	55,8	17,7	51,8	19,3	-	-
	12	73,5	11,3	69,4	12,9	65,4	14,6	61,3	16,2	57,1	17,8	53,1	19,4	-	-
60.2	5	69,2	11,9	65,3	13,6	61,5	15,3	57,7	17,0	53,8	18,8	50,0	20,5	46,1	22,2
	6	71,2	12,0	67,2	13,7	63,3	15,5	59,3	17,2	55,4	18,9	51,4	20,6	47,5	22,3
	7	73,2	12,1	69,1	13,8	65,1	15,6	**61,0**	**17,3**	56,9	19,0	52,9	20,8	48,8	22,5
	8	75,2	12,2	71,0	13,9	66,9	15,7	62,7	17,4	58,5	19,2	54,3	20,9	-	-
	9	77,2	12,3	72,9	14,0	68,6	15,8	64,3	17,6	60,0	19,3	55,8	21,1	-	-
	10	79,2	12,4	74,8	14,1	70,4	15,9	66,0	17,7	61,6	19,4	57,2	21,2	-	-
	11	81,2	12,5	76,7	14,2	72,2	16,0	67,7	17,8	63,1	19,6	58,7	21,4	-	-
	12	83,2	12,6	78,5	14,3	74,0	16,1	69,3	17,9	64,7	19,7	60,1	21,5	-	-
70.2	5	77,4	13,5	73,1	15,4	68,8	17,3	64,5	19,2	60,2	21,1	55,9	23,1	51,6	25,0
	6	79,6	13,6	75,2	15,5	70,8	17,4	66,3	19,4	61,9	21,3	57,5	23,2	53,1	25,2
	7	81,8	13,7	77,3	15,6	72,8	17,6	**68,2**	**19,5**	63,6	21,5	59,1	23,4	54,6	25,4
	8	84,1	13,7	79,4	15,7	74,8	17,7	70,1	19,6	65,4	21,6	60,7	23,6	-	-
	9	86,3	13,8	81,5	15,8	76,7	17,8	71,9	19,8	67,1	21,8	62,4	23,7	-	-
	10	88,5	13,9	83,6	15,9	78,7	17,9	73,8	19,9	68,8	21,9	64,0	23,9	-	-
	11	90,8	14,0	85,7	16,1	80,7	18,1	75,6	20,1	70,6	22,1	65,6	24,1	-	-
	12	93,0	14,1	87,8	16,2	82,7	18,2	77,5	20,2	72,3	22,2	67,2	24,3	-	-
80.2	5	92,7	15,7	87,5	17,9	82,4	20,1	77,2	22,4	72,1	24,6	67,0	26,8	61,8	29,1
	6	95,4	15,8	90,0	18,0	84,8	20,3	79,5	22,5	74,1	24,8	68,9	27,0	63,6	29,3
	7	98,0	15,9	92,6	18,2	87,2	20,4	**81,7**	**22,7**	76,2	25,0	70,8	27,2	65,4	29,5
	8	101	16,0	95,1	18,3	89,6	20,6	83,9	22,9	78,3	25,2	72,8	27,4	-	-
	9	103	16,1	97,6	18,4	91,9	20,7	86,2	23,0	80,4	25,3	74,7	27,6	-	-
	10	106	16,2	100	18,6	94,3	20,9	88,4	23,2	82,5	25,5	76,6	27,8	-	-
	11	109	16,4	103	18,7	96,7	21,0	90,6	23,4	84,5	25,7	78,6	28,0	-	-
	12	111	16,5	105	18,8	99,1	21,2	92,8	23,5	86,6	25,9	80,5	28,2	-	-
90.2	5	105	18,1	99,4	20,7	93,6	23,2	87,7	25,8	81,9	28,4	76,1	31,0	70,2	33,6
	6	108	18,2	102	20,8	96,3	23,4	90,3	26,0	84,2	28,6	78,3	31,2	72,2	33,8
	7	111	18,3	105	21,0	99,0	23,6	**92,8**	**26,2**	86,6	28,8	80,5	31,4	74,2	34,1
	8	114	18,5	108	21,1	102	23,8	95,3	26,4	88,9	29,0	82,7	31,7	-	-
	9	117	18,6	111	21,3	104	23,9	97,9	26,6	91,3	29,2	84,8	31,9	-	-
	10	120	18,7	114	21,4	107	24,1	100	26,8	93,7	29,4	87,0	32,1	-	-
	11	124	18,9	117	21,6	110	24,3	103	27,0	96,0	29,7	89,2	32,4	-	-
	12	127	19,0	119	21,7	113	24,4	105	27,2	98,4	29,9	91,4	32,6	-	-
100.2	5	118	20,5	111	23,4	105	26,3	98,3	29,3	91,7	32,2	85,2	35,1	78,7	38,0
	6	121	20,6	115	23,6	108	26,5	101	29,5	94,4	32,4	87,7	35,4	80,9	38,3
	7	125	20,8	118	23,8	111	26,7	**104**	**29,7**	97,0	32,7	90,2	35,6	83,2	38,6
	8	128	20,9	121	23,9	114	26,9	107	29,9	99,7	32,9	92,6	35,9	-	-
	9	132	21,1	124	24,1	117	27,1	110	30,1	102	33,1	95,1	36,2	-	-
	10	135	21,2	127	24,3	120	27,3	113	30,3	105	33,4	97,5	36,4	-	-
	11	138	21,4	131	24,5	123	27,5	115	30,6	108	33,6	100	36,7	-	-
	12	142	21,5	134	24,6	126	27,7	118	30,8	110	33,9	102	36,9	-	-

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} m^2 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	132	23,2	124	26,5	117	29,8	110	33,1	102	36,4	95,1	39,7	87,7	43,0
	6	135	23,3	128	26,7	120	30,0	113	33,4	105	36,7	97,8	40,0	90,3	43,4
	7	139	23,5	131	26,9	124	30,2	**116**	**33,6**	108	37,0	101	40,3	92,8	43,7
	8	143	23,7	135	27,1	127	30,5	119	33,8	111	37,2	103	40,6	-	-
	9	147	23,9	139	27,3	131	30,7	122	34,1	114	37,5	106	40,9	-	-
	10	151	24,0	142	27,5	134	30,9	125	34,3	117	37,8	109	41,2	-	-
	11	154	24,2	146	27,7	137	31,1	129	34,6	120	38,0	112	41,5	-	-
	12	158	24,4	149	27,9	141	31,3	132	34,8	123	38,3	114	41,8	-	-
130.2	5	146	25,9	138	29,6	130	33,3	122	37,0	114	40,7	106	44,3	97,6	48,0
	6	151	26,1	142	29,8	134	33,5	125	37,2	117	41,0	109	44,7	100	48,4
	7	155	26,3	146	30,0	138	33,8	**129**	**37,5**	120	41,3	112	45,0	103	48,8
	8	159	26,4	150	30,2	141	34,0	133	37,8	124	41,6	115	45,3	-	-
	9	163	26,6	154	30,4	145	34,2	136	38,0	127	41,9	118	45,7	-	-
	10	167	26,8	158	30,7	149	34,5	140	38,3	130	42,2	121	46,0	-	-
	11	172	27,0	162	30,9	153	34,7	143	38,6	133	42,5	124	46,3	-	-
	12	176	27,2	166	31,1	156	35,0	147	38,9	137	42,8	127	46,6	-	-
145.2	5	168	29,2	159	33,3	149	37,5	140	41,7	131	45,9	121	50,0	112	54,2
	6	173	29,4	163	33,6	154	37,8	144	42,0	134	46,2	125	50,4	115	54,6
	7	178	29,6	168	33,8	158	38,1	**148**	**42,3**	138	46,5	128	50,8	118	55,0
	8	182	29,8	172	34,1	162	38,3	152	42,6	142	46,9	132	51,1	-	-
	9	187	30,0	177	34,3	167	38,6	156	42,9	146	47,2	135	51,5	-	-
	10	192	30,3	181	34,6	171	38,9	160	43,2	149	47,5	139	51,9	-	-
	11	197	30,5	186	34,8	175	39,2	164	43,5	153	47,9	142	52,2	-	-
	12	202	30,7	191	35,1	179	39,5	168	43,8	157	48,2	146	52,6	-	-
160.2	5	189	33,1	179	37,8	168	42,6	158	47,3	147	52,0	137	56,8	126	61,5
	6	195	33,4	184	38,1	173	42,9	162	47,7	152	52,4	141	57,2	130	61,9
	7	200	33,6	189	38,4	178	43,2	**167**	**48,0**	156	52,8	145	57,6	134	62,4
	8	206	33,8	194	38,7	183	43,5	172	48,3	160	53,2	149	58,0	-	-
	9	211	34,1	200	39,0	188	43,8	176	48,7	164	53,6	153	58,4	-	-
	10	217	34,3	205	39,2	193	44,1	181	49,0	169	54,0	157	58,9	-	-
	11	222	34,6	210	39,5	198	44,5	185	49,4	173	54,3	161	59,3	-	-
	12	228	34,8	215	39,8	202	44,8	190	49,7	177	54,7	165	59,7	-	-
180.2	5	218	37,6	206	43,0	194	48,3	182	53,7	169	59,1	157	64,4	145	69,8
	6	224	37,9	212	43,3	199	48,7	187	54,1	174	59,5	162	64,9	149	70,3
	7	230	38,2	218	43,6	205	49,1	**192**	**54,5**	179	60,0	166	65,4	154	70,9
	8	237	38,4	223	43,9	210	49,4	197	54,9	184	60,4	171	65,9	-	-
	9	243	38,7	229	44,2	216	49,8	202	55,3	189	60,8	176	66,4	-	-
	10	249	39,0	235	44,6	222	50,1	208	55,7	194	61,3	180	66,8	-	-
	11	256	39,3	241	44,9	227	50,5	213	56,1	199	61,7	185	67,3	-	-
	12	262	39,5	247	45,2	233	50,8	218	56,5	204	62,1	189	67,8	-	-

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 x 10^{-4} m^2 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	49,1	9,8	46,4	11,2	43,7	12,6	40,9	14,0	38,2	15,4	37,3	15,6	34,4	16,9
	6	50,5	9,9	47,7	11,3	44,9	12,7	42,1	14,1	39,3	15,5	38,4	15,7	35,4	17,0
	7	52,0	9,9	49,1	11,4	46,2	12,8	**43,3**	**14,2**	40,4	15,6	39,4	15,8	36,4	17,2
	8	53,4	10,0	50,4	11,4	47,5	12,9	44,5	14,3	41,5	15,7	40,5	16,0	-	-
	9	54,8	10,1	51,7	11,5	48,7	13,0	45,7	14,4	42,6	15,8	41,6	16,1	-	-
	10	56,2	10,2	53,1	11,6	50,0	13,1	46,8	14,5	43,7	16,0	42,7	16,2	-	-
	11	57,6	10,2	54,4	11,7	51,2	13,2	48,0	14,6	44,8	16,1	43,8	16,3	-	-
	12	59,0	10,3	55,7	11,8	52,5	13,2	49,2	14,7	45,9	16,2	44,8	16,4	-	-
50.2	5	58,2	11,5	55,0	13,2	51,8	14,8	48,5	16,5	45,3	18,1	44,2	18,4	40,8	20,0
	6	59,9	11,6	56,5	13,3	53,2	14,9	49,9	16,6	46,6	18,2	45,5	18,6	41,9	20,1
	7	61,6	11,7	58,1	13,4	54,7	15,0	**51,3**	**16,7**	47,9	18,4	46,7	18,7	43,1	20,3
	8	63,2	11,8	59,7	13,5	56,2	15,1	52,7	16,8	49,2	18,5	48,0	18,9	-	-
	9	64,9	11,9	61,3	13,6	57,7	15,2	54,1	16,9	50,5	18,6	49,3	19,0	-	-
	10	66,6	11,9	62,9	13,7	59,2	15,4	55,5	17,1	51,8	18,8	50,6	19,1	-	-
	11	68,3	12,0	64,5	13,7	60,7	15,5	56,9	17,2	53,1	18,9	51,8	19,3	-	-
	12	70,0	12,1	66,0	13,8	62,2	15,6	58,3	17,3	54,4	19,0	53,1	19,4	-	-
60.2	5	65,9	12,8	62,2	14,6	58,6	16,4	54,9	18,2	51,3	20,1	50,0	20,5	46,1	22,2
	6	67,8	12,9	64,0	14,7	60,3	16,5	56,5	18,4	52,7	20,2	51,4	20,6	47,5	22,3
	7	69,7	13,0	65,8	14,8	62,0	16,7	**58,1**	**18,5**	54,2	20,4	52,9	20,8	48,8	22,5
	8	71,6	13,0	67,6	14,9	63,7	16,8	59,7	18,6	55,7	20,5	54,3	20,9	-	-
	9	73,5	13,1	69,4	15,0	65,4	16,9	61,3	18,8	57,2	20,6	55,8	21,1	-	-
	10	75,4	13,2	71,2	15,1	67,1	17,0	62,9	18,9	58,6	20,8	57,2	21,2	-	-
	11	77,3	13,3	73,0	15,2	68,8	17,1	64,4	19,0	60,1	20,9	58,7	21,4	-	-
	12	79,2	13,4	74,8	15,3	70,4	17,3	66,0	19,2	61,6	21,1	60,1	21,5	-	-
70.2	5	73,7	14,4	69,6	16,5	65,6	18,5	61,5	20,6	57,3	22,7	55,9	23,1	51,6	25,0
	6	75,9	14,5	71,6	16,6	67,5	18,7	63,2	20,7	59,0	22,8	57,5	23,2	53,1	25,2
	7	78,0	14,6	73,6	16,7	69,4	18,8	**65,0**	**20,9**	60,6	23,0	59,1	23,4	54,6	25,4
	8	80,1	14,7	75,7	16,8	71,2	18,9	66,8	21,1	62,3	23,2	60,7	23,6	-	-
	9	82,3	14,8	77,7	17,0	73,1	19,1	68,5	21,2	64,0	23,3	62,4	23,7	-	-
	10	84,4	14,9	79,7	17,1	75,0	19,2	70,3	21,4	65,6	23,5	64,0	23,9	-	-
	11	86,5	15,1	81,7	17,2	76,9	19,4	72,1	21,5	67,3	23,7	65,6	24,1	-	-
	12	88,6	15,2	83,7	17,3	78,8	19,5	73,9	21,7	68,9	23,8	67,2	24,3	-	-
80.2	5	88,3	16,8	83,3	19,2	78,5	21,6	73,6	23,9	68,6	26,3	67,0	26,8	61,8	29,1
	6	90,8	16,9	85,7	19,3	80,7	21,7	75,7	24,1	70,6	26,5	68,9	27,0	63,6	29,3
	7	93,4	17,0	88,1	19,4	83,0	21,9	**77,8**	**24,3**	72,6	26,7	70,8	27,2	65,4	29,5
	8	95,9	17,1	90,6	19,6	85,3	22,0	79,9	24,5	74,6	26,9	72,8	27,4	-	-
	9	98,5	17,3	93,0	19,7	87,5	22,2	82,0	24,7	76,5	27,1	74,7	27,6	-	-
	10	101	17,4	95,4	19,9	89,8	22,3	84,2	24,8	78,5	27,3	76,6	27,8	-	-
	11	104	17,5	97,8	20,0	92,1	22,5	86,3	25,0	80,5	27,5	78,6	28,0	-	-
	12	106	17,6	100	20,1	94,3	22,7	88,4	25,2	82,5	27,7	80,5	28,2	-	-
90.2	5	100	19,4	94,7	22,2	89,2	24,9	83,6	27,7	78,0	30,5	76,1	31,0	70,2	33,6
	6	103	19,5	97,4	22,3	91,8	25,1	86,0	27,9	80,2	30,7	78,3	31,2	72,2	33,8
	7	106	19,7	100	22,5	94,3	25,3	**88,4**	**28,1**	82,5	30,9	80,5	31,4	74,2	34,1
	8	109	19,8	103	22,6	96,9	25,5	90,8	28,3	84,7	31,1	82,7	31,7	-	-
	9	112	20,0	106	22,8	99,5	25,7	93,2	28,5	87,0	31,4	84,8	31,9	-	-
	10	115	20,1	108	23,0	102	25,8	95,6	28,7	89,2	31,6	87,0	32,1	-	-
	11	118	20,2	111	23,1	105	26,0	98,0	28,9	91,5	31,8	89,2	32,4	-	-
	12	121	20,4	114	23,3	107	26,2	100	29,1	93,7	32,0	91,4	32,6	-	-
100.2	5	112	21,9	106	25,1	100	28,2	93,7	31,3	87,4	34,5	85,2	35,1	78,7	38,0
	6	116	22,1	109	25,3	103	28,4	96,4	31,6	89,9	34,7	87,7	35,4	80,9	38,3
	7	119	22,3	112	25,4	106	28,6	**99,1**	**31,8**	92,5	35,0	90,2	35,6	83,2	38,6
	8	122	22,4	115	25,6	109	28,8	102	32,0	95,0	35,2	92,6	35,9	-	-
	9	125	22,6	118	25,8	112	29,0	105	32,3	97,5	35,5	95,1	36,2	-	-
	10	129	22,7	121	26,0	114	29,2	107	32,5	100	35,7	97,5	36,4	-	-
	11	132	22,9	125	26,2	117	29,5	110	32,7	103	36,0	100	36,7	-	-
	12	135	23,1	128	26,4	120	29,7	113	33,0	105	36,3	102	36,9	-	-

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} m^2 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	125	24,8	118	28,4	111	31,9	104	35,5	97,0	39,0	95,1	39,7	87,7	43,0
	6	128	25,0	121	28,6	114	32,2	107	35,7	99,8	39,3	97,8	40,0	90,3	43,4
	7	132	25,2	125	28,8	117	32,4	**110**	**36,0**	103	39,6	101	40,3	92,8	43,7
	8	136	25,4	128	29,0	121	32,6	113	36,3	105	39,9	103	40,6	-	-
	9	139	25,6	131	29,2	124	32,9	116	36,5	108	40,2	106	40,9	-	-
	10	143	25,7	135	29,4	127	33,1	119	36,8	111	40,5	109	41,2	-	-
	11	146	25,9	138	29,6	130	33,3	122	37,0	114	40,8	112	41,5	-	-
	12	150	26,1	142	29,8	133	33,6	125	37,3	117	41,0	114	41,8	-	-
130.2	5	140	27,7	132	31,7	124	35,7	116	39,6	108	43,6	106	44,3	97,6	48,0
	6	144	27,9	136	31,9	128	35,9	120	39,9	112	43,9	109	44,7	100	48,4
	7	148	28,1	139	32,2	131	36,2	**123**	**40,2**	115	44,2	112	45,0	103	48,8
	8	152	28,3	143	32,4	135	36,4	126	40,5	118	44,5	115	45,3	-	-
	9	156	28,5	147	32,6	138	36,7	130	40,8	121	44,9	118	45,7	-	-
	10	160	28,8	151	32,9	142	37,0	133	41,1	124	45,2	121	46,0	-	-
	11	164	29,0	155	33,1	146	37,2	136	41,4	127	45,5	124	46,3	-	-
	12	168	29,2	158	33,3	149	37,5	140	41,7	130	45,8	127	46,6	-	-
145.2	5	160	31,2	151	35,7	142	40,2	133	44,6	124	49,1	121	50,0	112	54,2
	6	165	31,5	155	36,0	146	40,5	137	45,0	128	49,5	125	50,4	115	54,6
	7	169	31,7	160	36,2	150	40,8	**141**	**45,3**	132	49,8	128	50,8	118	55,0
	8	174	31,9	164	36,5	155	41,1	145	45,6	135	50,2	132	51,1	-	-
	9	178	32,2	168	36,8	159	41,4	149	46,0	139	50,6	135	51,5	-	-
	10	183	32,4	173	37,0	163	41,7	153	46,3	142	50,9	139	51,9	-	-
	11	188	32,6	177	37,3	167	42,0	156	46,6	146	51,3	142	52,2	-	-
	12	192	32,9	182	37,6	171	42,3	160	46,9	149	51,6	146	52,6	-	-
160.2	5	180	35,5	170	40,6	160	45,7	150	50,8	140	55,8	137	56,8	126	61,5
	6	186	35,8	175	40,9	165	46,0	155	51,1	144	56,2	141	57,2	130	61,9
	7	191	36,1	180	41,2	170	46,4	**159**	**51,5**	148	56,7	145	57,6	134	62,4
	8	196	36,3	185	41,5	174	46,7	163	51,9	152	57,1	149	58,0	-	-
	9	201	36,6	190	41,8	179	47,0	168	52,2	156	57,5	153	58,4	-	-
	10	206	36,8	195	42,1	184	47,4	172	52,6	160	57,9	157	58,9	-	-
	11	212	37,1	200	42,4	188	47,7	176	53,0	165	58,3	161	59,3	-	-
	12	217	37,4	205	42,7	193	48,0	181	53,4	169	58,7	165	59,7	-	-
180.2	5	208	40,3	196	46,0	185	51,8	173	57,6	161	63,3	157	64,4	145	69,8
	6	214	40,6	202	46,4	190	52,2	178	58,0	166	63,8	162	64,9	149	70,3
	7	220	40,9	207	46,7	195	52,6	**183**	**58,4**	171	64,2	166	65,4	154	70,9
	8	226	41,2	213	47,1	201	52,9	188	58,8	175	64,7	171	65,9	-	-
	9	232	41,5	219	47,4	206	53,3	193	59,2	180	65,2	176	66,4	-	-
	10	238	41,8	224	47,7	211	53,7	198	59,7	185	65,6	180	66,8	-	-
	11	244	42,1	230	48,1	217	54,1	203	60,1	189	66,1	185	67,3	-	-
	12	250	42,4	236	48,4	222	54,5	208	60,5	194	66,6	189	67,8	-	-

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 x 10^{-4} m^2 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	48,3	10,0	45,6	11,4	43,0	12,9	40,3	14,3	37,6	15,7	38,4	15,1	35,4	16,4
	6	49,7	10,1	46,9	11,5	44,2	13,0	41,4	14,4	38,7	15,8	39,5	15,3	36,5	16,5
	7	51,1	10,2	48,3	11,6	45,5	13,1	**42,6**	**14,5**	39,7	16,0	40,6	15,4	37,5	16,6
	8	52,5	10,2	49,6	11,7	46,7	13,1	43,8	14,6	40,8	16,1	41,7	15,5	-	-
	9	53,9	10,3	50,9	11,8	47,9	13,2	44,9	14,7	41,9	16,2	42,8	15,6	-	-
	10	55,3	10,4	52,2	11,9	49,2	13,3	46,1	14,8	43,0	16,3	44,0	15,7	-	-
	11	56,7	10,4	53,5	11,9	50,4	13,4	47,2	14,9	44,1	16,4	45,1	15,8	-	-
	12	58,1	10,5	54,8	12,0	51,7	13,5	48,4	15,0	45,2	16,5	46,2	15,9	-	-
50.2	5	57,3	11,8	54,1	13,5	50,9	15,2	47,7	16,9	44,5	18,5	45,5	17,9	42,0	19,4
	6	58,9	11,9	55,7	13,6	52,4	15,3	49,1	17,0	45,8	18,7	46,8	18,0	43,2	19,5
	7	60,6	12,0	57,2	13,7	53,9	15,4	**50,5**	**17,1**	47,1	18,8	48,1	18,2	44,4	19,7
	8	62,3	12,1	58,8	13,8	55,4	15,5	51,9	17,2	48,4	18,9	49,4	18,3	-	-
	9	63,9	12,1	60,3	13,9	56,8	15,6	53,3	17,3	49,7	19,1	50,8	18,4	-	-
	10	65,6	12,2	61,9	14,0	58,3	15,7	54,6	17,5	51,0	19,2	52,1	18,6	-	-
	11	67,2	12,3	63,5	14,1	59,8	15,8	56,0	17,6	52,3	19,4	53,4	18,7	-	-
	12	68,9	12,4	65,0	14,2	61,2	15,9	57,4	17,7	53,5	19,5	54,7	18,8	-	-
60.2	5	64,8	13,1	61,2	15,0	57,6	16,9	54,0	18,7	50,4	20,6	51,5	19,8	47,5	21,5
	6	66,7	13,2	62,9	15,1	59,3	17,0	55,5	18,9	51,8	20,7	53,0	20,0	48,9	21,7
	7	68,5	13,3	64,7	15,2	60,9	17,1	**57,1**	**19,0**	53,3	20,9	54,5	20,1	50,3	21,8
	8	70,4	13,4	66,5	15,3	62,6	17,2	58,7	19,1	54,7	21,1	56,0	20,3	-	-
	9	72,3	13,5	68,2	15,4	64,2	17,3	60,2	19,3	56,2	21,2	57,4	20,4	-	-
	10	74,1	13,6	70,0	15,5	65,9	17,5	61,8	19,4	57,6	21,4	58,9	20,6	-	-
	11	76,0	13,7	71,8	15,6	67,6	17,6	63,3	19,6	59,1	21,5	60,4	20,7	-	-
	12	77,9	13,8	73,5	15,8	69,2	17,7	64,9	19,7	60,5	21,7	61,9	20,9	-	-
70.2	5	72,5	14,8	68,4	16,9	64,5	19,0	60,4	21,1	56,4	23,2	57,6	22,4	53,1	24,2
	6	74,6	14,9	70,4	17,0	66,3	19,1	62,2	21,2	58,0	23,4	59,2	22,5	54,7	24,4
	7	76,7	15,0	72,4	17,1	68,2	19,3	**63,9**	**21,4**	59,6	23,5	60,9	22,7	56,2	24,6
	8	78,8	15,1	74,4	17,2	70,0	19,4	65,6	21,6	61,2	23,7	62,6	22,9	-	-
	9	80,9	15,2	76,3	17,4	71,9	19,5	67,4	21,7	62,9	23,9	64,2	23,0	-	-
	10	83,0	15,3	78,3	17,5	73,8	19,7	69,1	21,9	64,5	24,1	65,9	23,2	-	-
	11	85,0	15,4	80,3	17,6	75,6	19,8	70,9	22,0	66,1	24,2	67,5	23,4	-	-
	12	87,1	15,5	82,3	17,7	77,5	20,0	72,6	22,2	67,7	24,4	69,2	23,5	-	-
80.2	5	86,8	17,2	81,9	19,6	77,2	22,1	72,3	24,5	67,5	27,0	69,0	26,0	63,6	28,2
	6	89,3	17,3	84,3	19,8	79,4	22,2	74,4	24,7	69,4	27,2	71,0	26,2	65,5	28,4
	7	91,8	17,4	86,7	19,9	81,6	22,4	**76,5**	**24,9**	71,4	27,4	73,0	26,4	67,3	28,6
	8	94,3	17,6	89,0	20,1	83,9	22,6	78,6	25,1	73,3	27,6	74,9	26,6	-	-
	9	96,8	17,7	91,4	20,2	86,1	22,7	80,7	25,3	75,3	27,8	76,9	26,8	-	-
	10	99,3	17,8	93,8	20,4	88,3	22,9	82,8	25,4	77,2	28,0	78,9	27,0	-	-
	11	102	17,9	96,1	20,5	90,5	23,1	84,8	25,6	79,2	28,2	80,9	27,2	-	-
	12	104	18,1	98,5	20,6	92,8	23,2	86,9	25,8	81,1	28,4	82,9	27,4	-	-
90.2	5	98,6	19,9	93,1	22,7	87,7	25,5	82,2	28,4	76,7	31,2	78,4	30,1	72,3	32,6
	6	101	20,0	95,8	22,9	90,2	25,7	84,5	28,6	78,9	31,4	80,6	30,3	74,4	32,8
	7	104	20,2	98,5	23,0	92,7	25,9	**86,9**	**28,8**	81,1	31,7	82,9	30,5	76,5	33,0
	8	107	20,3	101	23,2	95,3	26,1	89,3	29,0	83,3	31,9	85,1	30,7	-	-
	9	110	20,5	104	23,4	97,8	26,3	91,6	29,2	85,5	32,1	87,4	30,9	-	-
	10	113	20,6	107	23,5	100	26,5	94,0	29,4	87,7	32,4	89,7	31,2	-	-
	11	116	20,7	109	23,7	103	26,7	96,4	29,6	89,9	32,6	91,9	31,4	-	-
	12	119	20,9	112	23,9	105	26,9	98,8	29,8	92,1	32,8	94,2	31,6	-	-
100.2	5	111	22,5	104	25,7	98,3	28,9	92,1	32,1	85,9	35,3	87,8	34,1	81,0	36,9
	6	114	22,7	107	25,9	101	29,1	94,7	32,4	88,4	35,6	90,3	34,3	83,4	37,2
	7	117	22,8	110	26,1	104	29,3	**97,4**	**32,6**	90,9	35,9	92,9	34,6	85,7	37,5
	8	120	23,0	113	26,3	107	29,6	100	32,8	93,4	36,1	95,4	34,8	-	-
	9	123	23,2	116	26,5	110	29,8	103	33,1	95,8	36,4	97,9	35,1	-	-
	10	126	23,3	119	26,6	112	30,0	105	33,3	98,3	36,6	100	35,3	-	-
	11	130	23,5	122	26,8	115	30,2	108	33,5	101	36,9	103	35,6	-	-
	12	133	23,6	125	27,0	118	30,4	111	33,8	103	37,2	106	35,8	-	-

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 x 10^{-4} m^2 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	25,5	117	29,1	110	32,7	103,1	36,4	96,1	40,0	97,9	38,5	90,4	41,8
	6	127	25,6	120	29,3	113	33,0	106	36,6	98,9	40,3	101	38,8	93,0	42,1
	7	131	25,8	123	29,5	116	33,2	**109**	**36,9**	102	40,6	104	39,1	95,6	42,4
	8	134	26,0	127	29,7	119	33,5	112	37,2	104	40,9	106	39,4	-	-
	9	138	26,2	130	29,9	123	33,7	115	37,4	107	41,2	109	39,7	-	-
	10	142	26,4	134	30,2	126	33,9	118	37,7	110	41,5	112	40,0	-	-
	11	145	26,6	137	30,4	129	34,2	121	38,0	113	41,8	115	40,2	-	-
	12	149	26,8	140	30,6	132	34,4	124	38,2	116	42,1	118	40,5	-	-
130.2	5	137	28,4	130	32,5	122	36,5	114	40,6	107	44,7	109	43,0	100	46,6
	6	141	28,6	133	32,7	126	36,8	118	40,9	110	45,0	112	43,3	103	46,9
	7	145	28,8	137	33,0	129	37,1	**121**	**41,2**	113	45,3	115	43,7	106	47,3
	8	149	29,0	141	33,2	133	37,3	124	41,5	116	45,6	118	44,0	-	-
	9	153	29,3	145	33,4	136	37,6	128	41,8	119	46,0	121	44,3	-	-
	10	157	29,5	148	33,7	140	37,9	131	42,1	122	46,3	125	44,6	-	-
	11	161	29,7	152	33,9	143	38,2	134	42,4	125	46,6	128	44,9	-	-
	12	165	29,9	156	34,2	147	38,4	138	42,7	128	47,0	131	45,2	-	-
145.2	5	158	32,0	149	36,6	140	41,2	131	45,7	123	50,3	125	48,5	115	52,6
	6	162	32,2	153	36,9	144	41,5	135	46,1	126	50,7	129	48,9	119	53,0
	7	167	32,5	157	37,1	148	41,8	**139**	**46,4**	130	51,0	132	49,2	122	53,3
	8	171	32,7	162	37,4	152	42,1	143	46,7	133	51,4	136	49,6	-	-
	9	176	33,0	166	37,7	156	42,4	147	47,1	137	51,8	139	50,0	-	-
	10	180	33,2	170	37,9	160	42,7	150	47,4	140	52,2	143	50,3	-	-
	11	185	33,4	175	38,2	164	43,0	154	47,7	144	52,5	147	50,7	-	-
	12	190	33,7	179	38,5	169	43,3	158	48,1	147	52,9	150	51,0	-	-
160.2	5	177	36,4	167	41,5	157	46,7	147	51,9	138	57,1	141	55,1	130	59,6
	6	182	36,6	172	41,9	162	47,1	152	52,3	142	57,5	145	55,5	134	60,1
	7	187	36,9	177	42,2	166	47,4	**156**	**52,7**	146	58,0	149	55,9	138	60,5
	8	192	37,2	182	42,5	171	47,8	160	53,1	150	58,4	153	56,3	-	-
	9	197	37,4	186	42,8	176	48,1	165	53,5	153	58,8	157	56,7	-	-
	10	203	37,7	191	43,1	180	48,5	169	53,8	157	59,2	161	57,1	-	-
	11	208	38,0	196	43,4	185	48,8	173	54,2	161	59,7	165	57,5	-	-
	12	213	38,2	201	43,7	189	49,2	177	54,6	165	60,1	169	57,9	-	-
180.2	5	204	41,3	193	47,1	182	53,0	170	58,9	159	64,8	162	62,5	150	67,7
	6	210	41,6	198	47,5	187	53,4	175	59,4	163	65,3	167	63,0	154	68,2
	7	216	41,9	204	47,8	192	53,8	**180**	**59,8**	168	65,8	171	63,4	158	68,7
	8	222	42,2	210	48,2	197	54,2	185	60,2	173	66,3	176	63,9	-	-
	9	228	42,5	215	48,5	203	54,6	190	60,7	177	66,7	181	64,4	-	-
	10	234	42,8	221	48,9	208	55,0	195	61,1	182	67,2	185	64,8	-	-
	11	240	43,1	226	49,2	213	55,4	200	61,5	186	67,7	190	65,3	-	-
	12	245	43,4	232	49,6	218	55,8	205	62,0	191	68,2	195	65,7	-	-

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 x 10^{-4} m^2 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	39,9	9,57	45,7	9,67	50,5	9,77	53,1	9,87	57,8	10,0	62,7	10,1	68,0	10,2
	35	39,1	10,9	44,9	11,1	49,5	11,2	52,2	11,3	56,7	11,4	61,5	11,5	66,8	11,6
	40	37,8	12,2	43,4	12,3	47,9	12,4	50,4	12,5	54,8	12,7	59,5	12,8	64,6	12,9
	45	36,9	13,7	42,3	13,8	46,7	14,0	**49,2**	**14,1**	53,5	14,2	58,1	14,4	63,0	14,5
	50	35,8	15,3	41,0	15,5	45,3	15,6	47,7	15,8	51,9	15,9	56,3	16,1	61,1	16,3
50.2	30	47,0	11,3	53,9	11,4	59,5	11,5	62,6	11,6	68,1	11,7	73,9	11,9	80,2	12,0
	35	46,1	12,9	52,9	13,0	58,4	13,1	61,5	13,3	66,8	13,4	72,5	13,5	78,7	13,7
	40	44,6	14,3	51,1	14,5	56,5	14,6	59,5	14,8	64,6	14,9	70,2	15,1	76,1	15,2
	45	43,5	16,1	49,9	16,3	55,1	16,4	**58,0**	**16,6**	63,0	16,8	68,4	16,9	74,2	17,1
	50	42,2	18,0	48,4	18,2	53,4	18,4	56,3	18,6	61,2	18,8	66,4	19,0	72,0	19,1
60.2	30	53,1	12,6	60,9	12,8	67,3	12,9	70,8	13,0	77,0	13,2	83,6	13,3	90,7	13,4
	35	52,2	14,4	59,8	14,6	66,1	14,7	69,5	14,9	75,6	15,0	82,1	15,2	89,0	15,3
	40	50,4	16,1	57,8	16,2	63,9	16,4	67,2	16,6	73,1	16,7	79,3	16,9	86,1	17,1
	45	49,2	18,0	56,4	18,2	62,3	18,4	**65,6**	**18,6**	71,3	18,8	77,4	19,0	84,0	19,2
	50	47,7	20,2	54,7	20,4	60,5	20,6	63,6	20,8	69,2	21,0	75,1	21,2	81,4	21,5
70.2	30	59,6	14,3	68,4	14,5	75,5	14,6	79,5	14,8	86,4	14,9	93,8	15,1	102	15,2
	35	58,5	16,4	67,1	16,5	74,1	16,7	78,0	16,9	84,8	17,0	92,1	17,2	99,9	17,4
	40	56,6	18,2	64,9	18,4	71,7	18,6	75,4	18,8	82,0	19,0	89,0	19,2	96,6	19,3
	45	55,2	20,5	63,3	20,7	69,9	20,9	**73,6**	**21,1**	80,0	21,3	86,8	21,5	94,2	21,7
	50	53,5	22,9	61,4	23,2	67,8	23,4	71,4	23,6	77,6	23,9	84,2	24,1	91,4	24,3
80.2	30	71,2	16,2	81,6	16,3	90,2	16,5	94,9	16,7	103	16,8	112	17,0	122	17,2
	35	69,9	18,5	80,1	18,7	88,5	18,8	93,2	19,0	101	19,2	110	19,4	119	19,6
	40	67,6	20,5	77,5	20,8	85,6	21,0	90,1	21,2	97,9	21,4	106	21,6	115	21,8
	45	65,9	23,1	75,6	23,3	83,5	23,6	**87,9**	**23,8**	95,5	24,0	104	24,3	113	24,5
	50	63,9	25,9	73,3	26,1	81,0	26,4	85,3	26,7	92,7	26,9	101	27,2	109	27,5
90.2	30	80,8	18,6	92,7	18,8	102	19,0	108	19,2	117	19,4	127	19,6	138	19,8
	35	79,3	21,3	91,0	21,5	100	21,7	106	21,9	115	22,1	125	22,4	135	22,6
	40	76,7	23,7	88,0	23,9	97,2	24,1	102	24,4	111	24,6	121	24,9	131	25,1
	45	74,9	26,6	85,8	26,9	94,8	27,1	**99,8**	**27,4**	108	27,7	118	27,9	128	28,2
	50	72,6	29,8	83,3	30,1	92,0	30,4	96,8	30,7	105	31,0	114	31,3	124	31,6
100.2	30	90,7	21,2	104	21,4	115	21,6	121	21,8	131	22,1	143	22,3	155	22,5
	35	89,0	24,2	102	24,5	113	24,7	119	25,0	129	25,2	140	25,5	152	25,7
	40	86,1	26,9	98,7	27,2	109	27,5	115	27,8	125	28,0	135	28,3	147	28,6
	45	84,0	30,3	96,3	30,6	106	30,9	**112**	**31,2**	122	31,5	132	31,8	143	32,1
	50	81,5	33,9	93,4	34,2	103	34,6	109	34,9	118	35,3	128	35,6	139	36,0
115.2	30	101	24,0	116	24,3	128	24,5	135	24,8	147	25,0	159	25,3	173	25,5
	35	99,4	27,5	114	27,8	126	28,0	133	28,3	144	28,6	156	28,9	170	29,2
	40	96,1	30,6	110	30,9	122	31,2	128	31,5	139	31,8	151	32,1	164	32,5
	45	93,8	34,3	108	34,7	119	35,0	**125**	**35,4**	136	35,8	148	36,1	160	36,5
	50	90,9	38,5	104	38,9	115	39,3	121	39,6	132	40,0	143	40,4	155	40,8
130.2	30	113	27,1	130	27,4	144	27,7	151	27,9	164	28,2	178	28,5	194	28,8
	35	111	31,0	128	31,3	141	31,6	148	31,9	161	32,2	175	32,6	190	32,9
	40	108	34,4	123	34,8	136	35,2	144	35,5	156	35,9	169	36,2	184	36,6
	45	105	38,7	120	39,1	133	39,5	**140**	**39,9**	152	40,3	165	40,7	179	41,1
	50	102	43,3	117	43,8	129	44,2	136	44,7	148	45,1	160	45,6	174	46,0
145.2	30	130	30,3	149	30,6	164	30,9	173	31,2	188	31,5	204	31,8	221	32,2
	35	127	34,6	146	35,0	161	35,3	170	35,7	184	36,0	200	36,4	217	36,8
	40	123	38,5	141	38,9	156	39,3	164	39,7	178	40,1	194	40,5	210	40,9
	45	120	43,3	138	43,7	152	44,2	**160**	**44,6**	174	45,0	189	45,5	205	45,9
	50	116	48,5	133	49,0	147	49,5	155	50,0	169	50,5	183	51,0	199	51,5
160.2	30	146	34,3	167	34,6	185	35,0	194	35,4	211	35,7	229	36,1	249	36,4
	35	143	39,2	164	39,6	181	40,0	191	40,4	207	40,8	225	41,2	244	41,6
	40	138	43,6	159	44,0	175	44,5	185	44,9	201	45,4	218	45,8	236	46,3
	45	135	49,0	155	49,5	171	50,0	**180**	**50,5**	196	51,0	212	51,5	230	52,0
	50	131	54,9	150	55,4	166	56,0	175	56,6	190	57,1	206	57,7	223	58,3
180.2	30	167	38,7	191	39,1	211	39,5	222	39,9	242	40,3	263	40,7	285	41,1
	35	164	44,2	188	44,7	207	45,1	218	45,6	237	46,1	258	46,5	280	47,0
	40	158	49,2	182	49,7	201	50,2	211	50,7	230	51,2	249	51,7	270	52,3
	45	155	55,3	177	55,9	196	56,4	**206**	**57,0**	224	57,6	243	58,1	264	58,7
	50	150	61,9	172	62,6	190	63,2	200	63,8	217	64,5	236	65,1	256	65,8

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 x 10^{-4} m^2 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	39,9	9,57	45,7	9,67	50,5	9,77	51,7	9,73	56,2	9,83	61,0	9,92	66,2	10,02
	35	39,1	10,9	44,9	11,1	49,5	11,2	50,8	11,1	55,2	11,2	59,9	11,3	65,0	11,5
	40	37,8	12,2	43,4	12,3	47,9	12,4	49,1	12,4	53,4	12,5	57,9	12,6	62,8	12,7
	45	36,9	13,7	42,3	13,8	46,7	14,0	**47,9**	**13,9**	52,1	14,0	56,5	14,2	61,3	14,3
	50	35,8	15,3	41,0	15,5	45,3	15,6	46,5	15,6	50,5	15,7	54,8	15,9	59,5	16,0
50.2	30	47,0	11,3	53,9	11,4	59,5	11,5	61,0	11,5	66,3	11,6	72,0	11,7	78,1	11,8
	35	46,1	12,9	52,9	13,0	58,4	13,1	59,9	13,1	65,1	13,3	70,7	13,4	76,7	13,5
	40	44,6	14,3	51,1	14,5	56,5	14,6	57,9	14,6	63,0	14,7	68,3	14,9	74,1	15,0
	45	43,5	16,1	49,9	16,3	55,1	16,4	**56,5**	**16,4**	61,4	16,6	66,7	16,7	72,3	16,9
	50	42,2	18,0	48,4	18,2	53,4	18,4	54,8	18,4	59,6	18,6	64,7	18,7	70,2	18,9
60.2	30	53,1	12,6	60,9	12,8	67,3	12,9	69,0	12,9	75,0	13,0	81,4	13,1	88,3	13,3
	35	52,2	14,4	59,8	14,6	66,1	14,7	67,7	14,7	73,6	14,9	79,9	15,0	86,7	15,2
	40	50,4	16,1	57,8	16,2	63,9	16,4	65,5	16,4	71,2	16,5	77,3	16,7	83,8	16,9
	45	49,2	18,0	56,4	18,2	62,3	18,4	**63,9**	**18,4**	69,5	18,6	75,4	18,8	81,8	19,0
	50	47,7	20,2	54,7	20,4	60,5	20,6	62,0	20,6	67,4	20,8	73,1	21,0	79,3	21,2
70.2	30	59,6	14,3	68,4	14,5	75,5	14,6	77,4	14,6	84,2	14,8	91,4	14,9	99,1	15,1
	35	58,5	16,4	67,1	16,5	74,1	16,7	76,0	16,7	82,6	16,9	89,7	17,1	97,3	17,2
	40	56,6	18,2	64,9	18,4	71,7	18,6	73,5	18,6	79,9	18,8	86,7	19,0	94,1	19,2
	45	55,2	20,5	63,3	20,7	69,9	20,9	**71,7**	**20,9**	77,9	21,1	84,6	21,3	91,8	21,5
	50	53,5	22,9	61,4	23,2	67,8	23,4	69,5	23,4	75,6	23,6	82,1	23,9	89,0	24,1
80.2	30	71,2	16,2	81,6	16,3	90,2	16,5	92,4	16,5	100	16,6	109	16,8	118	16,9
	35	69,9	18,5	80,1	18,7	88,5	18,8	90,7	18,8	98,6	19,0	107	19,2	116	19,4
	40	67,6	20,5	77,5	20,8	85,6	21,0	87,7	20,9	95,4	21,1	104	21,3	112	21,5
	45	65,9	23,1	75,6	23,3	83,5	23,6	**85,6**	**23,5**	93,0	23,7	101	24,0	110	24,2
	50	63,9	25,9	73,3	26,1	81,0	26,4	83,0	26,3	90,3	26,6	98,0	26,8	106	27,1
90.2	30	80,8	18,6	92,7	18,8	102	19,0	105	19,0	114	19,2	124	19,3	134	19,5
	35	79,3	21,3	91,0	21,5	100	21,7	103	21,7	112	21,9	122	22,1	132	22,3
	40	76,7	23,7	88,0	23,9	97,2	24,1	99,6	24,1	108	24,4	118	24,6	128	24,8
	45	74,9	26,6	85,8	26,9	94,8	27,1	**97,2**	**27,1**	106	27,4	115	27,6	124	27,9
	50	72,6	29,8	83,3	30,1	92,0	30,4	94,3	30,4	102	30,7	111	31,0	121	31,3
100.2	30	90,7	21,2	104	21,4	115	21,6	118	21,6	128	21,8	139	22,1	151	22,3
	35	89,0	24,2	102	24,5	113	24,7	116	24,7	126	25,0	136	25,2	148	25,5
	40	86,1	26,9	98,7	27,2	109	27,5	112	27,5	121	27,8	132	28,1	143	28,3
	45	84,0	30,3	96,3	30,6	106	30,9	**109**	**30,9**	118	31,2	129	31,5	140	31,8
	50	81,5	33,9	93,4	34,2	103	34,6	106	34,6	115	35,0	125	35,3	135	35,6
115.2	30	101	24,0	116	24,3	128	24,5	132	24,5	143	24,7	155	25,0	169	25,2
	35	99,4	27,5	114	27,8	126	28,0	129	28,0	141	28,3	153	28,6	166	28,8
	40	96,1	30,6	110	30,9	122	31,2	125	31,2	136	31,5	148	31,8	160	32,1
	45	93,8	34,3	108	34,7	119	35,0	**122**	**35,0**	133	35,4	144	35,7	156	36,1
	50	90,9	38,5	104	38,9	115	39,3	118	39,2	129	39,6	140	40,0	151	40,4
130.2	30	113	27,1	130	27,4	144	27,7	147	27,7	160	27,9	173	28,2	188	28,5
	35	111	31,0	128	31,3	141	31,6	144	31,6	157	31,9	170	32,2	185	32,5
	40	108	34,4	123	34,8	136	35,2	139	35,2	152	35,5	164	35,9	178	36,2
	45	105	38,7	120	39,1	133	39,5	**136**	**39,5**	148	39,9	160	40,3	174	40,7
	50	102	43,3	117	43,8	129	44,2	132	44,2	143	44,7	156	45,1	169	45,6
145.2	30	130	30,3	149	30,6	164	30,9	168	30,9	183	31,2	199	31,5	216	31,8
	35	127	34,6	146	35,0	161	35,3	165	35,3	180	35,6	195	36,0	212	36,3
	40	123	38,5	141	38,9	156	39,3	160	39,2	174	39,6	189	40,0	205	40,4
	45	120	43,3	138	43,7	152	44,2	**156**	**44,1**	170	44,5	184	45,0	200	45,4
	50	116	48,5	133	49,0	147	49,5	151	49,4	164	49,9	179	50,4	194	50,9
160.2	30	146	34,3	167	34,6	185	35,0	189	34,9	205	35,3	223	35,6	242	36,0
	35	143	39,2	164	39,6	181	40,0	186	39,9	202	40,3	219	40,7	237	41,1
	40	138	43,6	159	44,0	175	44,5	179	44,4	195	44,9	212	45,3	230	45,7
	45	135	49,0	155	49,5	171	50,0	**175**	**49,9**	190	50,4	207	50,9	224	51,4
	50	131	54,9	150	55,4	166	56,0	170	55,9	185	56,4	200	57,0	217	57,6
180.2	30	167	38,7	191	39,1	211	39,5	217	39,5	236	39,9	256	40,3	278	40,7
	35	164	44,2	188	44,7	207	45,1	213	45,1	232	45,6	251	46,0	273	46,5
	40	158	49,2	182	49,7	201	50,2	206	50,2	224	50,7	243	51,2	264	51,7
	45	155	55,3	177	55,9	196	56,4	**201**	**56,4**	218	57,0	237	57,5	257	58,1
	50	150	61,9	172	62,6	190	63,2	195	63,2	212	63,8	230	64,4	250	65,1

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} m^2 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	kWa	kWt	kWa	kWt	kWa	kWt	kWa	kWt	kWa	kWt	kWa	kWt	kWa
40.2	30	41,0	9,67	47,1	9,77	52,0	9,87	51,2	9,66	55,6	9,76	60,4	9,85	65,5	9,95
	35	40,3	11,1	46,2	11,2	51,0	11,3	50,2	11,0	54,6	11,2	59,3	11,3	64,3	11,4
	40	39,0	12,3	44,7	12,4	49,3	12,5	48,6	12,3	52,8	12,4	57,3	12,5	62,2	12,7
	45	38,0	13,8	43,6	14,0	48,1	14,1	**47,4**	**13,8**	51,5	13,9	55,9	14,1	60,7	14,2
	50	36,9	15,5	42,3	15,6	46,7	15,8	46,0	15,5	50,0	15,6	54,3	15,8	58,9	15,9
50.2	30	48,4	11,4	55,5	11,5	61,3	11,6	60,3	11,3	65,5	11,5	71,1	11,6	77,1	11,7
	35	47,5	13,0	54,5	13,1	60,2	13,3	59,1	13,0	64,3	13,1	69,8	13,2	75,7	13,3
	40	45,9	14,5	52,7	14,6	58,2	14,8	57,2	14,4	62,2	14,6	67,5	14,7	73,2	14,9
	45	44,8	16,3	51,4	16,4	56,8	16,6	**55,8**	**16,2**	60,7	16,4	65,8	16,5	71,4	16,7
	50	43,5	18,2	49,8	18,4	55,1	18,6	54,1	18,1	58,8	18,3	63,9	18,5	69,3	18,7
60.2	30	54,7	12,8	62,8	12,9	69,3	13,0	68,1	12,7	74,1	12,9	80,4	13,0	87,2	13,1
	35	53,7	14,6	61,6	14,7	68,0	14,9	66,9	14,6	72,7	14,7	78,9	14,9	85,6	15,0
	40	51,9	16,2	59,6	16,4	65,8	16,6	64,7	16,2	70,3	16,4	76,3	16,5	82,8	16,7
	45	50,7	18,2	58,1	18,4	64,2	18,6	**63,1**	**18,2**	68,6	18,4	74,5	18,6	80,8	18,7
	50	49,2	20,4	56,4	20,6	62,3	20,8	61,2	20,4	66,5	20,6	72,2	20,8	78,3	21,0
70.2	30	61,4	14,5	70,4	14,6	77,8	14,8	76,5	14,4	83,1	14,6	90,2	14,7	97,9	14,9
	35	60,3	16,5	69,1	16,7	76,3	16,9	75,0	16,5	81,6	16,6	88,6	16,8	96,1	17,0
	40	58,3	18,4	66,8	18,6	73,8	18,8	72,6	18,3	78,9	18,5	85,6	18,7	92,9	18,9
	45	56,9	20,7	65,2	20,9	72,0	21,1	**70,8**	**20,6**	77,0	20,8	83,5	21,0	90,6	21,2
	50	55,2	23,2	63,2	23,4	69,9	23,6	68,7	23,1	74,7	23,3	81,0	23,5	87,9	23,8
80.2	30	73,3	16,3	84,1	16,5	92,9	16,7	91,4	16,3	99,3	16,5	108	16,6	117	16,8
	35	72,0	18,7	82,5	18,8	91,2	19,0	89,7	18,6	97,5	18,8	106	19,0	115	19,2
	40	69,6	20,8	79,8	21,0	88,2	21,2	86,7	20,7	94,3	20,9	102	21,2	111	21,4
	45	67,9	23,3	77,9	23,6	86,0	23,8	**84,6**	**23,3**	92,0	23,5	99,8	23,8	108	24,0
	50	65,9	26,1	75,5	26,4	83,4	26,7	82,1	26,1	89,2	26,4	96,8	26,6	105	26,9
90.2	30	83,3	18,8	95,5	19,0	105	19,2	104	18,8	113	18,9	122	19,1	133	19,3
	35	81,7	21,5	93,7	21,7	104	21,9	102	21,4	111	21,7	120	21,9	130	22,1
	40	79,0	23,9	90,6	24,1	100	24,4	98,4	23,9	107	24,1	116	24,3	126	24,6
	45	77,1	26,8	88,4	27,1	97,7	27,4	**96,0**	**26,8**	104	27,1	113	27,3	123	27,6
	50	74,8	30,1	85,8	30,4	94,7	30,7	93,1	30,0	101	30,3	110	30,6	119	30,9
100.2	30	93,4	21,4	107	21,6	118	21,8	117	21,4	127	21,6	138	21,8	149	22,0
	35	91,7	24,5	105	24,7	116	25,0	114	24,4	124	24,6	135	24,9	147	25,1
	40	88,7	27,2	102	27,5	112	27,8	111	27,1	120	27,4	131	27,7	142	28,0
	45	86,5	30,6	99,2	30,9	110	31,2	**108**	**30,5**	117	30,8	127	31,1	138	31,4
	50	83,9	34,2	96,2	34,6	106	34,9	105	34,2	114	34,5	124	34,8	134	35,2
115.2	30	104	24,3	120	24,5	132	24,8	130	24,2	141	24,5	153	24,7	166	24,9
	35	102	27,7	117	28,0	130	28,3	127	27,7	138	28,0	150	28,2	163	28,5
	40	99,0	30,9	113	31,2	125	31,5	123	30,8	134	31,1	145	31,4	157	31,7
	45	96,6	34,7	111	35,0	122	35,4	**120**	**34,6**	130	34,9	142	35,3	154	35,6
	50	93,7	38,8	107	39,2	119	39,6	116	38,8	127	39,1	137	39,5	149	39,9
130.2	30	117	27,4	134	27,6	148	27,9	146	27,3	158	27,6	172	27,8	187	28,1
	35	115	31,3	131	31,6	145	31,9	143	31,2	156	31,5	169	31,8	183	32,1
	40	111	34,8	127	35,1	140	35,5	138	34,7	150	35,1	163	35,4	177	35,8
	45	108	39,1	124	39,5	137	39,9	**135**	**39,0**	147	39,4	159	39,8	173	40,2
	50	105	43,8	120	44,2	133	44,7	131	43,7	142	44,1	155	44,6	168	45,0
145.2	30	133	30,6	153	30,9	169	31,2	166	30,5	181	30,8	196	31,1	213	31,4
	35	131	35,0	150	35,3	166	35,7	163	34,9	177	35,2	193	35,6	209	35,9
	40	127	38,9	145	39,3	160	39,7	158	38,8	172	39,2	186	39,6	202	40,0
	45	124	43,7	142	44,1	157	44,6	**154**	**43,6**	167	44,0	182	44,5	197	44,9
	50	120	48,9	137	49,4	152	49,9	149	48,8	162	49,3	176	49,8	191	50,3
160.2	30	150	34,6	172	35,0	190	35,3	187	34,6	203	34,9	220	35,3	239	35,6
	35	147	39,6	169	40,0	187	40,4	183	39,5	199	39,9	216	40,3	235	40,7
	40	143	44,0	163	44,5	181	44,9	177	44,0	193	44,4	209	44,8	227	45,3
	45	139	49,5	159	50,0	176	50,5	**173**	**49,4**	188	49,9	204	50,4	221	50,9
	50	135	55,4	155	56,0	171	56,6	168	55,3	182	55,9	198	56,4	215	57,0
180.2	30	172	39,1	197	39,5	218	39,9	214	39,1	232	39,5	252	39,8	274	40,2
	35	169	44,7	193	45,1	214	45,6	210	44,6	228	45,1	248	45,5	269	46,0
	40	163	49,7	187	50,2	207	50,7	203	49,7	221	50,2	239	50,7	260	51,2
	45	159	55,8	182	56,4	202	57,0	**198**	**55,8**	215	56,4	234	56,9	253	57,5
	50	154	62,5	177	63,2	196	63,8	192	62,5	209	63,1	227	63,7	246	64,4

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} m^2 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.

Correction factor for the use of glycol in heating mode

ETHYLENE GLYCOL with water produced between 30 ÷ 55 º 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 ÷ 55ºC.

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_r).
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:

$Q\_brine\ [l/s] = CCQA \times (Pt\_brine\ [kW] * 0.86 / \Delta T\_brine) / 3.6$

where ΔT_brine is the temperature difference outlet-intlet heat recovery exchanger:

$\Delta T\_brine = Twout\_brine - Twin\_brine$

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:

$Dp\_brine = CCDP \times Dp\_app$

Correction factor for the use of glycol in cooling mode

ETHYLENE GLYCOL with water produced between 5 ÷ 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 ÷ 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 (kWa).
Based on type and percentage of glycol extract CCPF, CCPA, CCQA, CCDP.
Then calculate.

Pf_brine = kWf x CCPF

Pass_CP_brine = kWa x CCPA

Then calculate brine flow rate of the evaporator:

*Q_brine_evap [l/s]=CCQA x (Pf_brine [kW]*0.86/∆T_brine)/3.6*

where ∆T_brine is the difference inlet-outlet evaporator water temperature:

∆T_brine=Twin_evap_brine-Twout_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 x Dp_app

Fouling factors

The performances supplied with the tables are referred to a fouling factory = $0.44x10^{-4}$ 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
(m² K / W)	**$0,44 \times 10^{-4}$**	**1,00**	**1,00**
(m² K / W)	$0,86 \times 10^{-4}$	0,98	0,99
(m² 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 enought 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: →

Parameter to set	Default value	How to calculate the value to set	Example with TWE = 0°C	Example with TWE = -5°C
AL5 1	3 °C	TWE -4 °C	-4 °C	-9 °C
tr 10	9 °C	TWE +2 °C	+2 °C	-3 °C
tr 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				

Correction factors to apply to the basic version data.

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 (kWa).

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

Then calculate.

Pf_brine = kWf x CCPF

Pass_CP_brine = kWa x CCPA

Then calculate brine flow rate:

*Q_brine_evap [l/s]=CCQA x (Pf_brine [kW]*0.86/∆T_brine)/3.6*

where ∆T_brine is the difference between inlet-outlet evaporator water temperature:

∆T_brine=Twin_evap_brine-Twout_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 x Dp_app

TECHNICAL DATA - DESUPERHEATER VERSION (VD)

Base setting up AB - IR unit

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**	U.M.
Type of recovery exchanger	Brazed 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	0,75	1,20	1,20	1,20	1,50	l
Unit specification													
Cooling capacity VD(1)	49,3	58,4	65,9	73,8	87,2	99,2	111	126	139	160	181	206	kW
Power input compressor VD (1)	13,1	15,2	17,2	19,2	22,5	26,3	29,5	33,4	37,2	42,4	47,5	54,5	kW
Total power input VD (1)	14,3	16,4	19,0	21,0	26,1	29,9	33,1	37,0	40,8	47,8	52,9	61,7	kW
EER VD (1)	3,45	3,56	3,47	3,51	3,34	3,32	3,35	3,41	3,41	3,35	3,42	3,34	-
Water flow rate VD (1)	2,36	2,79	3,15	3,53	4,17	4,74	5,30	6,02	6,64	7,64	8,65	9,84	l/s
Water pressure drop VD (1)	26	37	36	44	34	35	37	36	38	38	41	42	kPa
Recovered heating capacity (1)	14,2	16,9	19,0	21,3	25,1	28,6	32,1	36,2	40,3	46,3	52,3	59,4	kW
Recovered water flow rate (1)	0,68	0,81	0,91	1,02	1,20	1,37	1,53	1,73	1,93	2,21	2,50	2,84	l/s
Recovered water pressure drop (1)	7	10	13	16	21	16	20	12	15	20	25	20	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 - IR unit

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**	U.M.
Type of recovery exchanger	Brazed 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	0,75	1,20	1,20	1,20	1,50	l
Unit specification													
Cooling capacity VD(1)	47,0	55,7	62,8	70,4	83,1	94,5	106	120	133	153	173	197	kW
Power input compressor VD (1)	14,1	16,3	18,4	20,6	24,1	28,1	31,6	35,7	39,9	45,4	50,9	58,4	kW
Total power input VD (1)	14,9	17,1	19,7	21,8	26,6	30,7	34,1	38,2	42,4	49,2	54,7	63,4	kW
EER VD (1)	3,15	3,26	3,19	3,23	3,12	3,08	3,11	3,14	3,14	3,11	3,16	3,11	-
Water flow rate VD (1)	2,25	2,66	3,00	3,36	3,97	4,52	5,06	5,73	6,35	7,31	8,27	9,41	l/s
Water pressure drop VD (1)	24	33	32	40	31	31	33	32	34	35	38	39	kPa
Recovered heating capacity (1)	14,2	16,9	19,0	21,3	25,1	28,6	32,1	36,2	40,3	46,3	52,3	59,4	kW
Recovered water flow rate (1)	0,68	0,81	0,91	1,02	1,20	1,37	1,53	1,73	1,93	2,21	2,50	2,84	l/s
Recovered water pressure drop (1)	7	10	13	16	21	16	20	12	15	20	25	20	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 - IR unit

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**	U.M.
Type of recovery exchanger	Brazed 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	0,75	1,20	1,20	1,20	1,50	l
Unit specification													
Cooling capacity VD(1)	46,2	54,7	61,8	69,2	81,6	93,0	104	118	131	150	170	192	kW
Power input compressor VD (1)	14,4	16,7	18,8	21,0	24,6	28,8	32,3	36,6	40,8	46,5	52,1	59,8	kW
Total power input VD (1)	15,1	17,4	19,9	22,1	26,8	31,0	34,5	38,7	43,0	49,7	55,3	64,1	kW
EER VD (1)	3,06	3,14	3,11	3,13	3,04	3,00	3,01	3,05	3,05	3,02	3,07	3,00	-
Water flow rate VD (1)	2,21	2,61	2,95	3,31	3,90	4,44	4,97	5,64	6,26	7,17	8,12	9,17	l/s
Water pressure drop VD (1)	23	32	31	39	29	30	32	31	33	33	36	37	kPa
Recovered heating capacity (1)	14,2	16,9	19,0	21,3	25,1	28,6	32,1	36,2	40,3	46,3	52,3	59,4	kW
Recovered water flow rate (1)	0,68	0,81	0,91	1,02	1,20	1,37	1,53	1,73	1,93	2,21	2,50	2,84	l/s
Recovered water pressure drop (1)	7	10	13	16	21	16	20	12	15	20	25	20	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 - DESUPERHEATER VERSION (VD)

Performances - IR unit

MOD.	TWR (°C)	OUTDOOR AIR TEMPERATURE (°C D.B.)				
		25	30	35	40	45
		kWtr = Recovered HEATING CAPACITY [kW]				
40.2	30	12,0	13,6	15,4	17,5	19,8
	35	11,9	13,5	15,3	17,4	19,7
	40	11,6	13,1	14,9	16,9	19,1
	45	11,0	12,5	**14,2**	16,1	18,2
	50	10,2	11,6	13,1	14,9	16,9
	55	9,16	10,4	11,8	13,3	15,1
	60	7,84	8,88	10,1	11,4	12,9
	65	-	7,12	8,08	9,16	10,4
	70	-	5,07	5,75	6,52	7,38
50.2	30	14,3	16,2	18,4	20,8	23,5
	35	14,2	16,1	18,3	20,7	23,4
	40	13,8	15,6	17,8	20,1	22,8
	45	13,1	14,9	**16,9**	19,2	21,7
	50	12,2	13,8	15,7	17,7	20,1
	55	10,9	12,3	14,0	15,9	18,0
	60	9,33	10,6	12,0	13,6	15,4
	65	-	8,47	9,62	10,9	12,3
	70	-	6,03	6,85	7,76	8,78
60.2	30	16,0	18,2	20,6	23,4	26,5
	35	16,0	18,1	20,5	23,3	26,3
	40	15,5	17,6	20,0	22,6	25,6
	45	14,8	16,7	**19,0**	21,5	24,4
	50	13,7	15,5	17,6	19,9	22,6
	55	12,2	13,9	15,8	17,9	20,2
	60	10,5	11,9	13,5	15,3	17,3
	65	-	9,52	10,8	12,3	13,9
	70	-	6,78	7,70	8,72	9,87
70.2	30	18,0	20,4	23,1	26,2	29,7
	35	17,9	20,3	23,0	26,1	29,5
	40	17,4	19,7	22,4	25,4	28,7
	45	16,6	18,8	**21,3**	24,1	27,3
	50	15,3	17,4	19,7	22,4	25,3
	55	13,7	15,6	17,7	20,0	22,7
	60	11,8	13,3	15,1	17,2	19,4
	65	-	10,7	12,1	13,7	15,5
	70	-	7,60	8,63	9,78	11,1
80.2	30	21,2	24,0	27,3	30,9	35,0
	35	21,1	23,9	27,1	30,7	34,8
	40	20,5	23,2	26,4	29,9	33,8
	45	19,5	22,1	**25,1**	28,4	32,2
	50	18,1	20,5	23,2	26,3	29,8
	55	16,2	18,3	20,8	23,6	26,7
	60	13,9	15,7	17,8	20,2	22,9
	65	-	12,6	14,3	16,2	18,3
	70	-	8,95	10,2	11,5	13,0
90.2	30	24,2	27,4	31,1	35,2	39,8
	35	24,0	27,2	30,9	35,0	39,6
	40	23,4	26,5	30,1	34,1	38,5
	45	22,2	25,2	**28,6**	32,4	36,7
	50	20,6	23,3	26,5	30,0	34,0
	55	18,4	20,9	23,7	26,9	30,4
	60	15,8	17,9	20,3	23,0	26,1
	65	-	14,3	16,3	18,4	20,9
	70	-	10,2	11,6	13,1	14,9
100.2	30	27,1	30,7	34,9	39,5	44,7
	35	27,0	30,5	34,7	39,3	44,5
	40	26,2	29,7	33,8	38,2	43,3
	45	24,9	28,3	**32,1**	36,4	41,1
	50	23,1	26,2	29,7	33,7	38,1
	55	20,7	23,4	26,6	30,2	34,1
	60	17,7	20,1	22,8	25,8	29,2
	65	-	16,1	18,3	20,7	23,4
	70	-	11,5	13,0	14,7	16,7

MOD.	TWR (°C)	OUTDOOR AIR TEMPERATURE (°C D.B.)				
		25	30	35	40	45
		kWtr = Recovered HEATING CAPACITY [kW]				
115.2	30	30,6	34,6	39,3	44,6	50,4
	35	30,4	34,4	39,1	44,3	50,1
	40	29,6	33,5	38,1	43,1	48,8
	45	28,1	31,9	**36,2**	41,0	46,4
	50	26,1	29,5	33,5	38,0	43,0
	55	23,3	26,4	30,0	34,0	38,5
	60	20,0	22,6	25,7	29,1	33,0
	65	-	18,1	20,6	23,3	26,4
	70	-	12,9	14,7	16,6	18,8
130.2	30	34,0	38,6	43,8	49,6	56,1
	35	33,8	38,3	43,5	49,3	55,8
	40	32,9	37,3	42,4	48,0	54,3
	45	31,3	35,5	**40,3**	45,7	51,7
	50	29,0	32,9	37,3	42,3	47,8
	55	26,0	29,4	33,4	37,9	42,9
	60	22,3	25,2	28,6	32,5	36,7
	65	-	20,2	22,9	26,0	29,4
	70	-	14,4	16,3	18,5	20,9
145.2	30	39,1	44,3	50,3	57,0	64,5
	35	38,9	44,0	50,0	56,7	64,1
	40	37,8	42,9	48,7	55,2	62,4
	45	36,0	40,8	**46,3**	52,5	59,4
	50	33,3	37,7	42,9	48,6	55,0
	55	29,9	33,8	38,4	43,5	49,2
	60	25,6	29,0	32,9	37,3	42,2
	65	-	23,2	26,4	29,9	33,8
	70	-	16,5	18,8	21,3	24,0
160.2	30	44,2	50,0	56,8	64,4	72,9
	35	43,9	49,7	56,5	64,0	72,4
	40	42,7	48,4	55,0	62,3	70,5
	45	40,6	46,0	**52,3**	59,3	67,0
	50	37,6	42,6	48,4	54,9	62,1
	55	33,7	38,2	43,4	49,2	55,6
	60	28,9	32,7	37,2	42,1	47,6
	65	-	26,2	29,8	33,7	38,2
	70	-	18,7	21,2	24,0	27,2
180.2	30	50,2	56,8	64,6	73,2	82,8
	35	49,9	56,5	64,2	72,7	82,3
	40	48,5	55,0	62,5	70,8	80,1
	45	46,2	52,3	**59,4**	67,3	76,1
	50	42,8	48,4	55,0	62,3	70,5
	55	38,3	43,4	49,3	55,8	63,2
	60	32,8	37,2	42,2	47,8	54,1
	65	-	29,8	33,8	38,3	43,3
	70	-	21,2	24,1	27,3	30,9

kWtr = Recovery heat capacity

TWR = Desuperheater outlet waterl temperature, Δtin-out= 5°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 x 10^{-4} m^2 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 - DESUPERHEATER VERSION (VD)

Base setting up AB - IP unit

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**	U.M.
Type of recovery exchanger	Brazed 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	0,75	1,20	1,20	1,20	1,50	l
Unit specification													
Cooling capacity VD(1)	47,3	56,1	63,4	70,9	85,0	96,5	108	121	134	154	174	200	kW
Power input compressor VD (1)	12,8	15,1	16,8	18,9	22,0	25,4	28,8	32,6	36,4	41,0	46,6	52,9	kW
Total power input VD (1)	14,0	16,3	18,6	20,7	25,6	29,0	32,4	36,2	40,0	46,4	52,0	60,1	kW
EER VD (1)	3,38	3,44	3,41	3,43	3,32	3,33	3,33	3,34	3,35	3,32	3,35	3,33	-
Water flow rate VD (1)	2,26	2,68	3,03	3,39	4,06	4,61	5,16	5,78	6,40	7,36	8,31	9,56	l/s
Water pressure drop VD (1)	24	34	33	41	32	33	35	33	35	35	38	40	kPa
Recovered heating capacity (1)	13,6	16,2	18,3	20,5	24,5	27,9	31,1	34,7	38,6	44,4	50,1	57,5	kW
Recovered water flow rate (1)	0,65	0,77	0,87	0,98	1,17	1,33	1,49	1,66	1,84	2,12	2,39	2,75	l/s
Recovered water pressure drop (1)	7	9	12	14	20	16	19	11	14	18	23	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 - IP unit

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**	U.M.
Type of recovery exchanger	Brazed 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	0,75	1,20	1,20	1,20	1,50	l
Unit specification													
Cooling capacity VD(1)	45,0	53,4	60,4	67,6	80,9	91,9	103	114	128	147	165	190	kW
Power input compressor VD (1)	13,8	16,2	17,9	20,3	23,6	27,3	30,8	34,9	39,0	43,9	50,0	56,6	kW
Total power input VD (1)	14,6	17,0	19,2	21,5	26,1	29,8	33,4	37,4	41,5	47,7	53,7	61,7	kW
EER VD (1)	3,08	3,14	3,15	3,14	3,10	3,08	3,08	3,05	3,08	3,08	3,07	3,08	-
Water flow rate VD (1)	2,15	2,55	2,89	3,23	3,87	4,39	4,92	5,45	6,12	7,02	7,88	9,08	l/s
Water pressure drop VD (1)	22	31	30	37	29	30	32	29	32	32	34	36	kPa
Recovered heating capacity (1)	13,6	16,2	18,3	20,5	24,5	27,9	31,1	34,7	38,6	44,4	50,1	57,5	kW
Recovered water flow rate (1)	0,65	0,77	0,87	0,98	1,17	1,33	1,49	1,66	1,84	2,12	2,39	2,75	l/s
Recovered water pressure drop (1)	7	9	12	14	20	16	19	11	14	18	23	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 - IP unit

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**	U.M.
Type of recovery exchanger	Brazed 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	0,75	1,20	1,20	1,20	1,50	l
Unit specification													
Cooling capacity VD(1)	44,3	52,5	59,4	66,5	79,6	90,4	101	113	126	145	162	187	kW
Power input compressor VD (1)	14,1	16,6	18,4	20,8	24,2	27,9	31,6	35,8	40,0	45,0	51,1	58,0	kW
Total power input VD (1)	14,8	17,3	19,5	21,8	26,3	30,1	33,8	38,0	42,1	48,2	54,4	62,3	kW
EER VD (1)	2,99	3,03	3,05	3,05	3,03	3,00	2,99	2,97	2,99	3,01	2,98	3,00	-
Water flow rate VD (1)	2,12	2,51	2,84	3,18	3,80	4,32	4,83	5,40	6,02	6,93	7,74	8,93	l/s
Water pressure drop VD (1)	21	30	29	36	28	29	30	29	31	31	33	35	kPa
Recovered heating capacity (1)	13,6	16,2	18,3	20,5	24,5	27,9	31,1	34,7	38,6	44,4	50,1	57,5	kW
Recovered water flow rate (1)	0,65	0,77	0,87	0,98	1,17	1,33	1,49	1,66	1,84	2,12	2,39	2,75	l/s
Recovered water pressure drop (1)	7	9	12	14	20	16	19	11	14	18	23	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 - DESUPERHEATER VERSION (VD)

Performances - IP unit

MOD.	TWR (°C)	OUTDOOR AIR TEMPERATURE (°C D.B.)				
		25	30	35	40	45
		kWtr = Recovered HEATING CAPACITY [kW]				
40.2	30	11,5	13,0	14,8	16,7	18,9
	35	11,4	12,9	14,7	16,6	18,8
	40	11,1	12,6	14,3	16,2	18,3
	45	10,6	12,0	**13,6**	15,4	17,4
	50	9,79	11,1	12,6	14,3	16,1
	55	8,77	9,93	11,3	12,8	14,5
	60	7,51	8,51	9,66	11,0	12,4
	65	-	6,81	7,74	8,77	9,92
	70	-	4,85	5,51	6,24	7,06
50.2	30	13,7	15,5	17,6	20,0	22,6
	35	13,6	15,4	17,5	19,8	22,4
	40	13,2	15,0	17,0	19,3	21,8
	45	12,6	14,3	**16,2**	18,4	20,8
	50	11,7	13,2	15,0	17,0	19,2
	55	10,4	11,8	13,4	15,2	17,2
	60	8,95	10,1	11,5	13,0	14,8
	65	-	8,12	9,22	10,4	11,8
	70	-	5,78	6,56	7,44	8,41
60.2	30	15,5	17,5	19,9	22,5	25,5
	35	15,4	17,4	19,8	22,4	25,3
	40	15,0	16,9	19,2	21,8	24,7
	45	14,2	16,1	**18,3**	20,7	23,5
	50	13,2	14,9	16,9	19,2	21,7
	55	11,8	13,4	15,2	17,2	19,5
	60	10,1	11,4	13,0	14,7	16,7
	65	-	9,17	10,4	11,8	13,4
	70	-	6,53	7,41	8,40	9,50
70.2	30	17,3	19,6	22,3	25,2	28,6
	35	17,2	19,5	22,1	25,1	28,4
	40	16,8	19,0	21,6	24,4	27,6
	45	15,9	18,0	**20,5**	23,2	26,3
	50	14,8	16,7	19,0	21,5	24,3
	55	13,2	15,0	17,0	19,3	21,8
	60	11,3	12,8	14,6	16,5	18,7
	65	-	10,3	11,7	13,2	15,0
	70	-	7,31	8,31	9,41	10,6
80.2	30	20,7	23,4	26,6	30,2	34,1
	35	20,6	23,3	26,5	30,0	33,9
	40	20,0	22,7	25,8	29,2	33,0
	45	19,0	21,6	**24,5**	27,8	31,4
	50	17,6	20,0	22,7	25,7	29,1
	55	15,8	17,9	20,3	23,0	26,1
	60	13,5	15,3	17,4	19,7	22,3
	65	-	12,3	13,9	15,8	17,9
	70	-	8,74	9,93	11,2	12,7
90.2	30	23,6	26,7	30,3	34,4	38,9
	35	23,4	26,5	30,1	34,2	38,6
	40	22,8	25,8	29,3	33,2	37,6
	45	21,7	24,6	**27,9**	31,6	35,8
	50	20,1	22,7	25,8	29,3	33,1
	55	18,0	20,4	23,1	26,2	29,7
	60	15,4	17,5	19,8	22,5	25,4
	65	-	14,0	15,9	18,0	20,4
	70	-	9,95	11,3	12,8	14,5
100.2	30	26,3	29,8	33,8	38,3	43,3
	35	26,1	29,6	33,6	38,1	43,1
	40	25,4	28,8	32,7	37,1	41,9
	45	24,2	27,4	**31,1**	35,2	39,9
	50	22,4	25,4	28,8	32,6	36,9
	55	20,1	22,7	25,8	29,2	33,1
	60	17,2	19,5	22,1	25,0	28,3
	65	-	15,6	17,7	20,1	22,7
	70	-	11,1	12,6	14,3	16,2

MOD.	TWR (°C)	OUTDOOR AIR TEMPERATURE (°C D.B.)				
		25	30	35	40	45
		kWtr = Recovered HEATING CAPACITY [kW]				
115.2	30	29,3	33,2	37,7	42,7	48,3
	35	29,1	33,0	37,5	42,5	48,1
	40	28,4	32,1	36,5	41,3	46,8
	45	27,0	30,6	**34,7**	39,3	44,5
	50	25,0	28,3	32,1	36,4	41,2
	55	22,4	25,3	28,8	32,6	36,9
	60	19,2	21,7	24,7	27,9	31,6
	65	-	17,4	19,7	22,4	25,3
	70	-	12,4	14,1	15,9	18,0
130.2	30	32,6	36,9	42,0	47,5	53,8
	35	32,4	36,7	41,7	47,3	53,5
	40	31,5	35,7	40,6	46,0	52,0
	45	30,0	34,0	**38,6**	43,7	49,5
	50	27,8	31,5	35,7	40,5	45,8
	55	24,9	28,2	32,0	36,3	41,0
	60	21,3	24,1	27,4	31,1	35,2
	65	-	19,3	22,0	24,9	28,2
	70	-	13,8	15,6	17,7	20,0
145.2	30	37,5	42,5	48,3	54,7	61,9
	35	37,3	42,2	48,0	54,4	61,5
	40	36,3	41,1	46,7	52,9	59,8
	45	34,5	39,1	**44,4**	50,3	56,9
	50	32,0	36,2	41,1	46,6	52,7
	55	28,6	32,4	36,8	41,7	47,2
	60	24,5	27,8	31,6	35,8	40,4
	65	-	22,2	25,3	28,6	32,4
	70	-	15,8	18,0	20,4	23,1
160.2	30	42,3	47,9	54,4	61,7	69,8
	35	42,1	47,7	54,1	61,3	69,4
	40	40,9	46,4	52,7	59,7	67,5
	45	38,9	44,1	**50,1**	56,8	64,2
	50	36,1	40,8	46,4	52,6	59,5
	55	32,3	36,6	41,6	47,1	53,3
	60	27,7	31,3	35,6	40,3	45,6
	65	-	25,1	28,5	32,3	36,6
	70	-	17,9	20,3	23,0	26,0
180.2	30	48,6	55,0	62,5	70,8	80,1
	35	48,3	54,7	62,1	70,4	79,6
	40	47,0	53,2	60,5	68,5	77,5
	45	44,7	50,6	**57,5**	65,2	73,7
	50	41,4	46,9	53,2	60,3	68,3
	55	37,1	42,0	47,7	54,1	61,1
	60	31,8	36,0	40,9	46,3	52,4
	65	-	28,8	32,7	37,1	42,0
	70	-	20,5	23,3	26,4	29,9

kWtr = Recovery heat capacity

TWR = Desuperheater outlet waterl temperature, Δtin-out= 5°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 x 10^{-4} m^2 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 - DESUPERHEATER VERSION (VD)

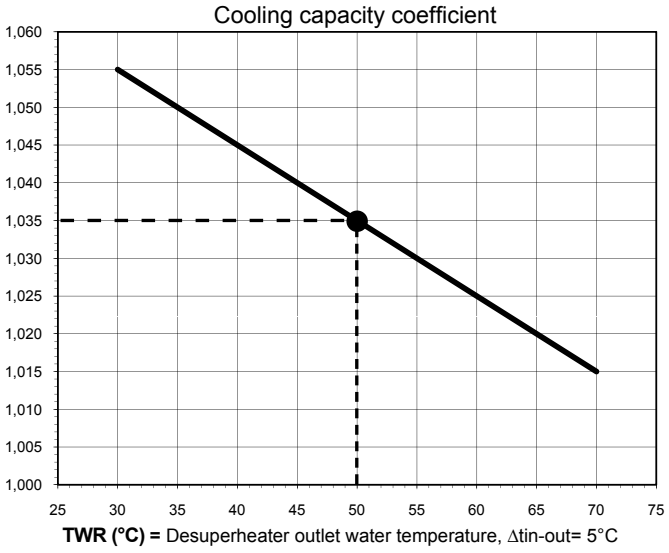
Corrective factors

For condition different than nominal (A35W7-W45), multiply cooling capacity and compressor power input in choosen condition (see paragraph "Standard performances") with corrective factors reported in the following graphs.

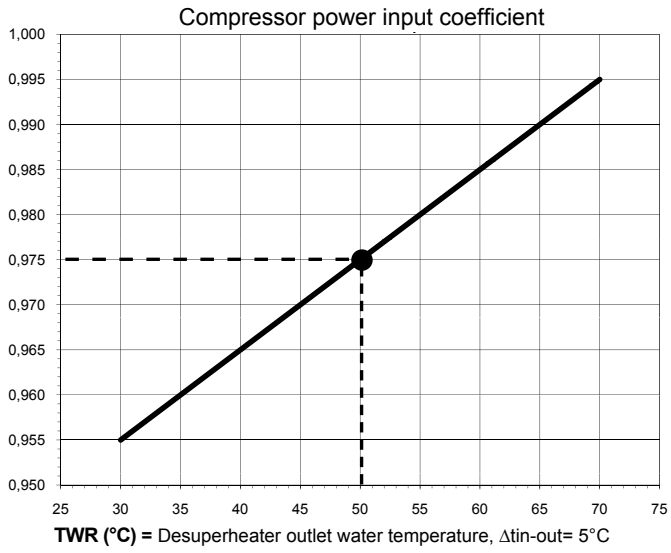
Ex. IR 200.2 VD AB 0M5 condition A30W10-W50
(source : air in 35°C d.b. / plant : water in 12°C out 7°C, superheater water outlet 50°C)

Cooling capacity $Pf_{VD} = Pf_{A30W10} \times CPf_{VD} \rightarrow Pf_{VD} = 231 \times 1{,}035 = 239$ kW

Compressor power input $Pa_{VD} = Pa_{A30W10} \times CPa_{VD} \rightarrow Pa_{VD} = 57{,}8 \times 0{,}975 = 56{,}4$ kW



TWR (°C) = Desuperheater outlet water temperature, Δtin-out= 5°C

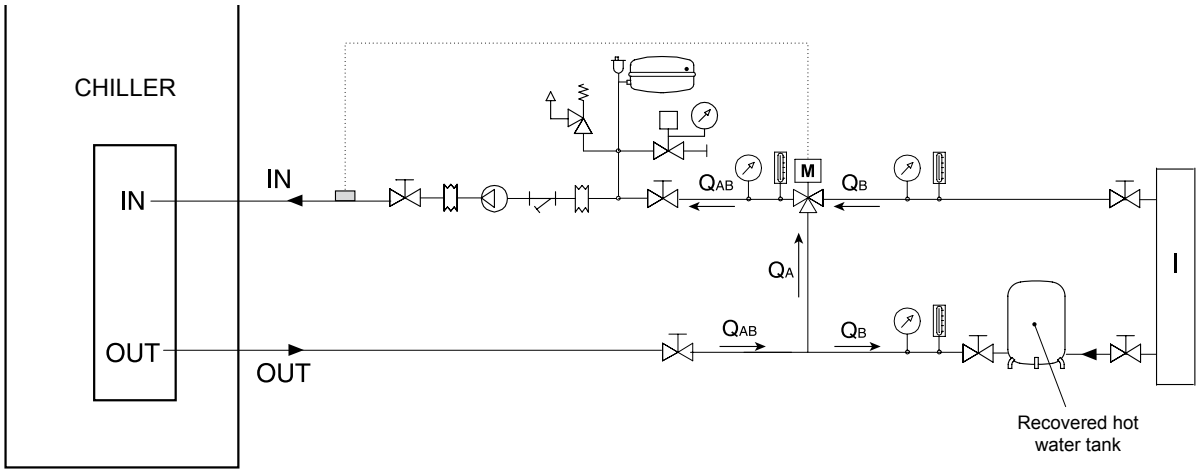


TWR (°C) = Desuperheater outlet water temperature, Δtin-out= 5°C

Basic diagram [RECOVERY WATER CIRCUIT]

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 to avoid heavy heat transfer loss.



I = User system

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

TECHNICAL DATA - RECOVERY VERSION (VR)

Base setting up AB - IR unit

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**	U.M.
Type of recovery exchanger	Brazed 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	l
Unit specification													
Cooling capacity VR (1)	49,3	58,4	65,9	73,8	87,2	99,2	111	126	139	160	181	206	kW
Total power input VR (1)	13,0	15,1	17,0	19,0	22,3	26,0	29,2	33,0	36,9	42,0	47,0	54,0	kW
EER VR (1)	3,79	3,87	3,88	3,88	3,91	3,82	3,80	3,82	3,77	3,81	3,85	3,81	-
Water flow rate VR (1)	2,36	2,79	3,15	3,53	4,17	4,74	5,30	6,02	6,64	7,64	8,65	9,84	l/s
Water pressure drop VR (1)	26	37	36	44	34	35	37	36	38	38	41	42	kPa
Recovered heating capacity (1)	61,7	72,7	82,1	91,9	108	124	139	157	174	200	226	257	kW
Recovered water flow rate (1)	2,95	3,47	3,92	4,39	5,16	5,92	6,64	7,50	8,31	9,56	10,8	12,3	l/s
Recovered water pressure drop (1)	34	47	42	41	48	47	52	49	51	50	54	53	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 - IR unit

Recovery 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**	U.M.
Type of recovery exchanger	Brazed 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	l
Unit specification													
Cooling capacity VR (1)	49,3	58,4	65,9	73,8	87,2	99,2	111	126	139	160	181	206	kW
Total power input VR (1)	13,0	15,1	17,0	19,0	22,3	26,0	29,2	33,0	36,9	42,0	47,0	54,0	kW
EER VR (1)	3,79	3,87	3,88	3,88	3,91	3,82	3,80	3,82	3,77	3,81	3,85	3,81	-
Water flow rate VR (1)	2,36	2,79	3,15	3,53	4,17	4,74	5,30	6,02	6,64	7,64	8,65	9,84	l/s
Water pressure drop VR (1)	26	37	36	44	34	35	37	36	38	38	41	42	kPa
Recovered heating capacity (1)	61,7	72,7	82,1	91,9	108	124	139	157	174	200	226	257	kW
Recovered water flow rate (1)	2,95	3,47	3,92	4,39	5,16	5,92	6,64	7,50	8,31	9,56	10,8	12,3	l/s
Recovered water pressure drop (1)	34	47	42	41	48	47	52	49	51	50	54	53	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 - IR unit

Recovery 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**	U.M.
Type of recovery exchanger	Brazed 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	l
Unit specification													
Cooling capacity VR (1)	49,3	58,4	65,9	73,8	87,2	99,2	111	126	139	160	181	206	kW
Total power input VR (1)	13,0	15,1	17,0	19,0	22,3	26,0	29,2	33,0	36,9	42,0	47,0	54,0	kW
EER VR (1)	3,79	3,87	3,88	3,88	3,91	3,82	3,80	3,82	3,77	3,81	3,85	3,81	-
Water flow rate VR (1)	2,36	2,79	3,15	3,53	4,17	4,74	5,30	6,02	6,64	7,64	8,65	9,84	l/s
Water pressure drop VR (1)	26	37	36	44	34	35	37	36	38	38	41	42	kPa
Recovered heating capacity (1)	61,7	72,7	82,1	91,9	108	124	139	157	174	200	226	257	kW
Recovered water flow rate (1)	2,95	3,47	3,92	4,39	5,16	5,92	6,64	7,50	8,31	9,56	10,8	12,3	l/s
Recovered water pressure drop (1)	34	47	42	41	48	47	52	49	51	50	54	53	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 - RECOVERY VERSION (VR)

Performances - IR unit

MOD.	TWE (°C)	TWR - RECOVERY TEMPERATURE (°C)				
		35	40	45	50	55
		kWtr = Recovered HEATING CAPACITY [kW]				
40.2	5	62,5	60,6	58,7	56,8	55,0
	6	64,1	62,2	60,2	58,2	56,2
	7	65,7	63,7	**61,7**	59,5	57,5
	8	67,3	65,2	63,0	60,9	58,8
	9	68,9	66,7	64,5	62,2	60,1
	10	70,5	68,2	65,9	63,6	61,3
	11	72,1	69,7	67,3	64,9	62,6
	12	73,7	71,3	68,8	66,3	63,9
50.2	5	73,9	71,7	69,4	67,1	64,8
	6	75,8	73,5	71,1	68,7	66,3
	7	77,7	75,3	**72,7**	70,3	67,9
	8	79,6	77,0	74,5	71,9	69,4
	9	81,5	78,8	76,2	73,5	70,9
	10	83,3	80,6	77,9	75,1	72,4
	11	85,2	82,4	79,6	76,7	73,9
	12	87,1	84,2	81,3	78,3	75,4
60.2	5	83,4	80,8	78,2	75,7	73,1
	6	85,5	82,9	80,2	77,5	74,8
	7	87,6	84,9	**82,1**	79,3	76,5
	8	89,8	86,9	84,0	81,1	78,2
	9	91,9	88,9	85,9	82,9	79,9
	10	94,0	91,0	87,8	84,7	81,6
	11	96,1	93,0	89,7	86,5	83,3
	12	98,3	95,0	91,7	88,3	85,0
70.2	5	93,3	90,5	87,6	84,7	81,9
	6	95,7	92,8	89,8	86,7	83,8
	7	98,1	95,0	**91,9**	88,8	85,7
	8	100	97,3	94,0	90,8	87,6
	9	103	99,6	96,2	92,8	89,5
	10	105	102	98,3	94,8	91,4
	11	108	104	100	96,8	93,3
	12	110	106	103	98,9	95,2
80.2	5	110	107	103	99,8	96,5
	6	113	109	106	102	98,7
	7	116	112	**108**	105	101
	8	118	115	111	107	103
	9	121	117	113	109	105
	10	124	120	116	112	108
	11	127	123	118	114	110
	12	130	125	121	117	112
90.2	5	126	122	118	114	111
	6	129	125	121	117	113
	7	132	128	**124**	120	116
	8	135	131	127	122	118
	9	139	134	130	125	121
	10	142	137	133	128	123
	11	145	140	135	131	126
	12	148	143	138	133	128
100.2	5	141	137	133	128	124
	6	145	140	136	131	127
	7	148	144	**139**	134	130
	8	152	147	142	137	133
	9	155	151	145	140	135
	10	159	154	149	143	138
	11	163	157	152	147	141
	12	166	161	155	150	144

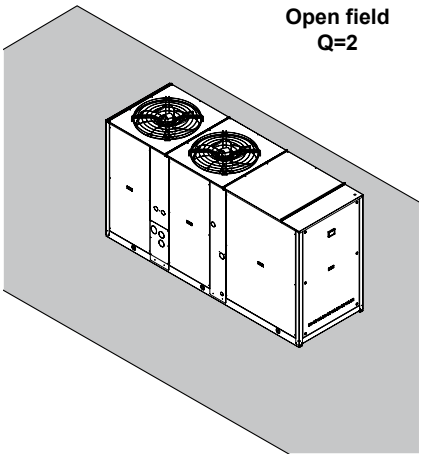
MOD.	TWE (°C)	TWR - RECOVERY TEMPERATURE (°C)				
		35	40	45	50	55
		kWtr = Recovered HEATING CAPACITY [kW]				
115.2	5	160	155	150	145	140
	6	164	159	154	148	144
	7	168	163	**157**	152	147
	8	172	166	161	155	150
	9	176	170	165	159	153
	10	180	174	168	162	156
	11	184	178	172	166	160
	12	188	182	176	169	163
130.2	5	177	172	166	161	156
	6	181	176	170	165	159
	7	186	180	**174**	169	163
	8	190	185	178	172	166
	9	195	189	182	176	170
	10	199	193	187	180	174
	11	204	197	191	184	177
	12	208	202	195	188	181
145.2	5	203	197	191	184	178
	6	208	202	195	189	183
	7	213	207	**200**	193	187
	8	219	212	205	198	191
	9	224	217	209	202	195
	10	229	222	214	206	199
	11	234	226	219	211	203
	12	239	231	223	215	207
160.2	5	229	222	215	208	201
	6	235	228	220	213	206
	7	241	233	**226**	218	211
	8	247	239	231	223	215
	9	252	244	236	228	220
	10	258	250	241	233	225
	11	264	256	247	238	229
	12	270	261	252	243	234
180.2	5	261	253	245	237	229
	6	268	260	251	243	235
	7	274	266	**257**	249	240
	8	281	272	263	254	245
	9	288	279	269	260	251
	10	294	285	275	265	256
	11	301	291	281	271	261
	12	308	297	287	277	267

kWtr = Recovery heat capacity **TWE=** Evaporator outlet water temperature °C **TWR =** Desuperheater outlet waterl temperature, Δtin-out= 5°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 x 10^{-4} m^2 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 1x10^{-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 2x10^{-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	92,2	89,9	87,4	83,3	79,0	72,6	65,0	56,6	**95**	**85**	67	58	53
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**	68	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

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	85,4	88,3	84,6	79,8	76,3	69,8	61,2	52,3	**92**	**82**	64	55	50
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**	65	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

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	83,4	86,3	82,6	77,8	74,3	67,8	59,2	50,3	**90**	**80**	62	53	48
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**	63	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

(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.

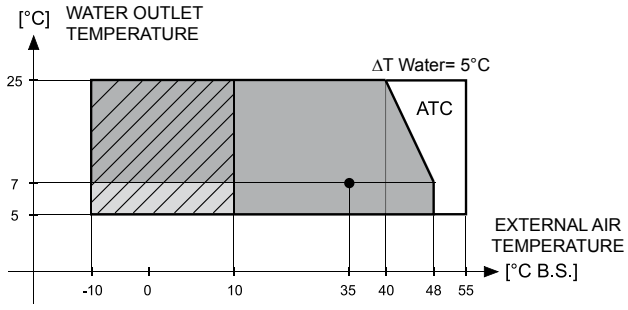
NOTE: the admissible limits for water flow rate on heat exchangers are indicated under the related pressure drop graph (see section "water pressure drop"). If the unit is equipped with pumping module the admissible limits are indicated under the related working head graph (see section "working head").

Operating range of Base version

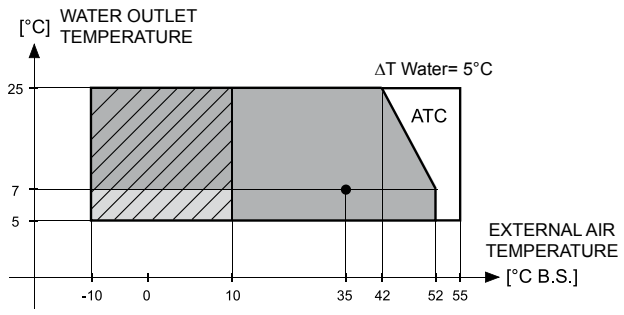
Thermal gradient of the water		Limit value
Minimum	°C	3
Maximum	°C	8
		Verify that water flow rate is inside the admissible limits.

IN COOLING MODE

UNIT MEDIUM TEMPERATURE - 0 M 5



UNIT HIGH TEMPERATURE - 0 A 5

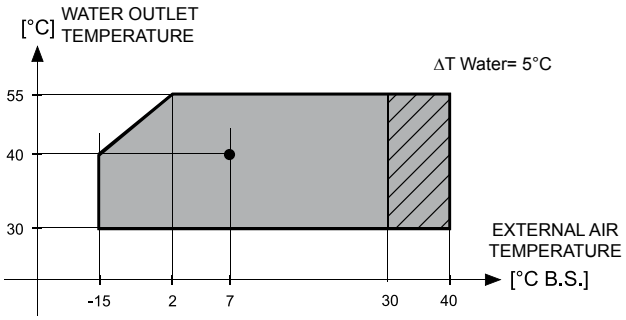


With accessory fans modulating control

With accessory fans modulating control (brine is recommended)

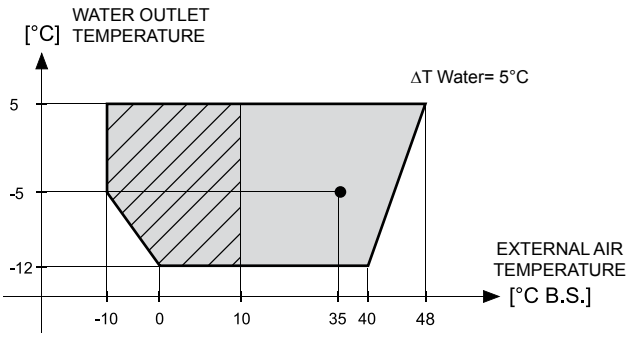
ATC — ATC (Advanced Temperature Control) function may occur, if present

IN HEATING MODE



With accessory fans modulating control

BRINE UNIT BR - BP - IN COOLING MODE

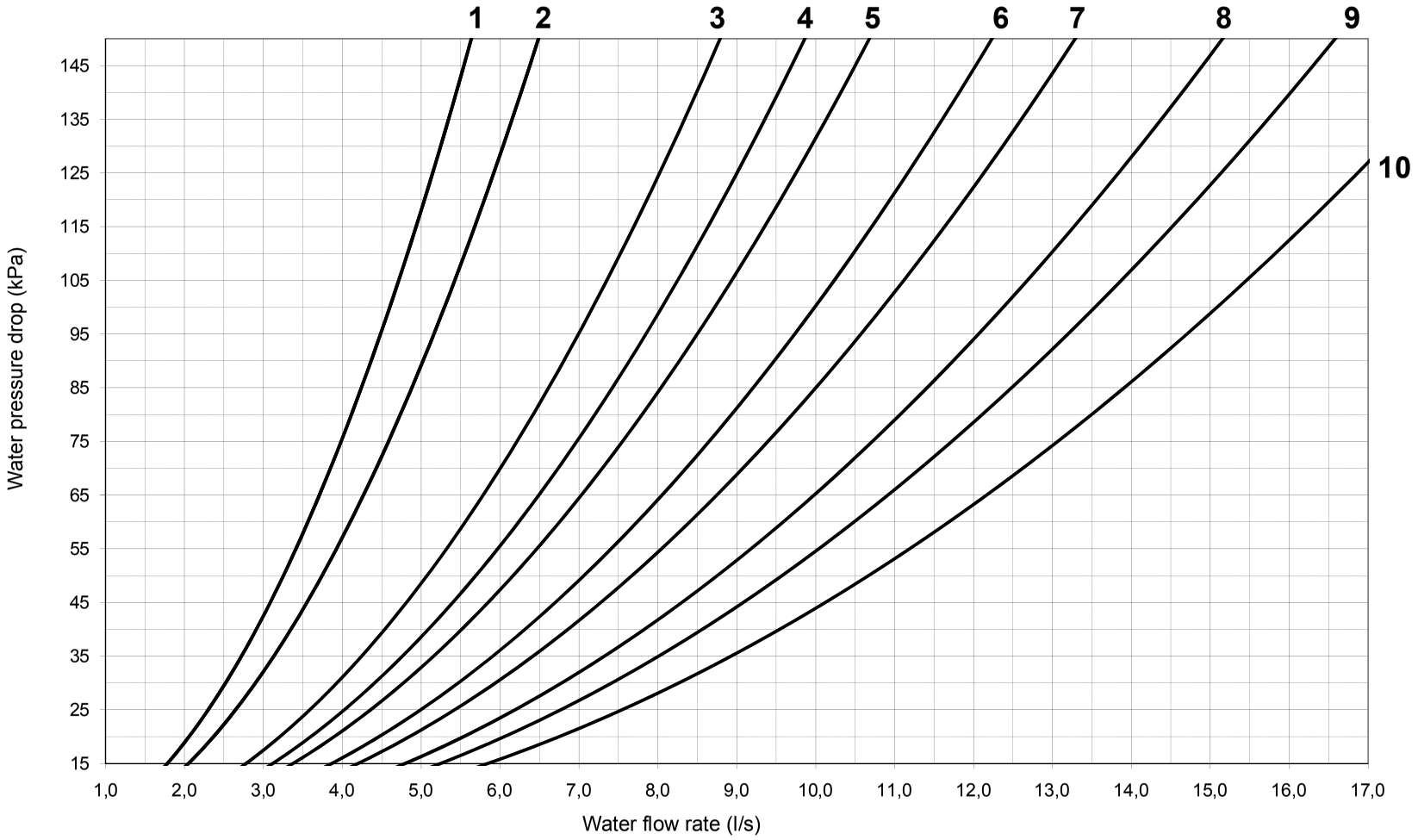


With accessory fans modulating control (brine is mandatory)

Brine is mandatory

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/m^3).

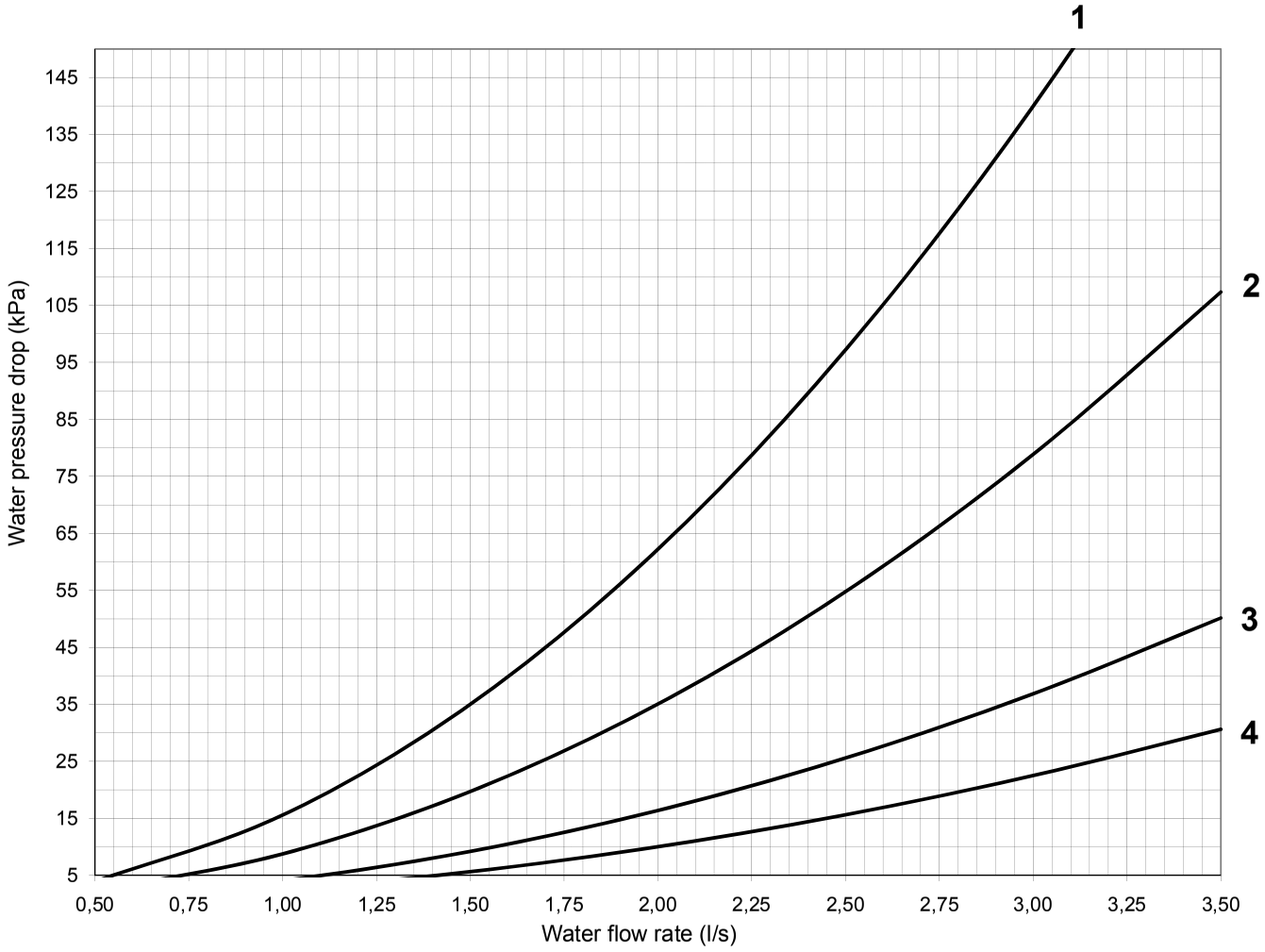


Operating range

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	UM	NOTE
Graphic refer		1	1	2	2	3	4	5	6	7	8	9	10	-	**Q**= Water flow rate **ΔP**= Water pressure drop
Lower limit value	Q	1,78	1,78	2,05	2,05	2,78	3,12	3,38	3,87	4,20	4,79	5,24	5,84	l\s	
	Δp	15												kPa	
Upper limit value	Q	5,64	5,64	6,49	6,49	8,79	9,86	10,68	12,23	13,3	15,2	16,6	17,0	l\s	
	Δp	150												kPa	

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/m^3).

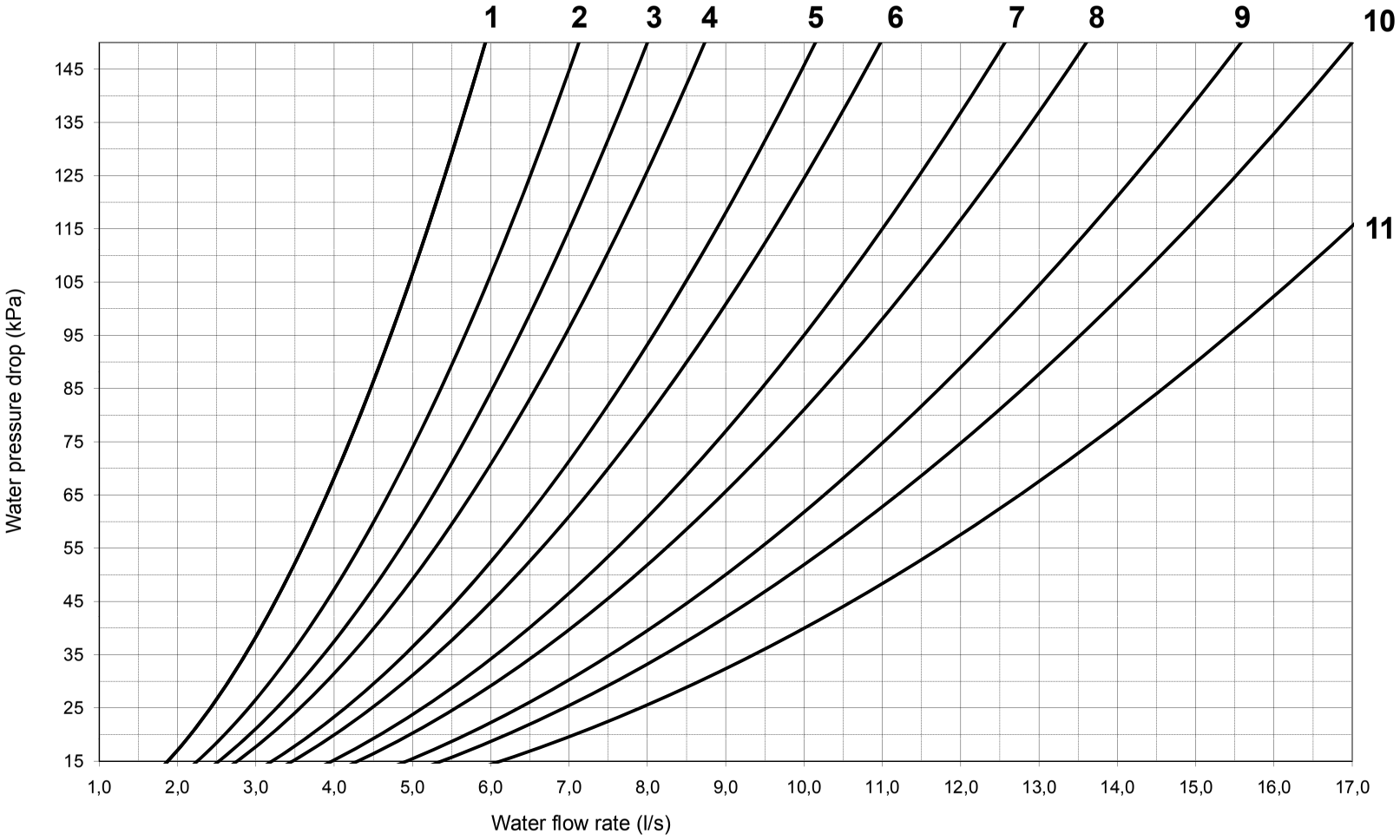


Operating range

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	UM	NOTE
Graphic refer		1	1	1	1	1	2	2	2	3	3	3	4	-	**Q**= Water flow rate **ΔP**= Water pressure drop
Lower limit value	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	l\s	
	Δp	5												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	l\s	
	Δp	150												kPa	

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/m^3).

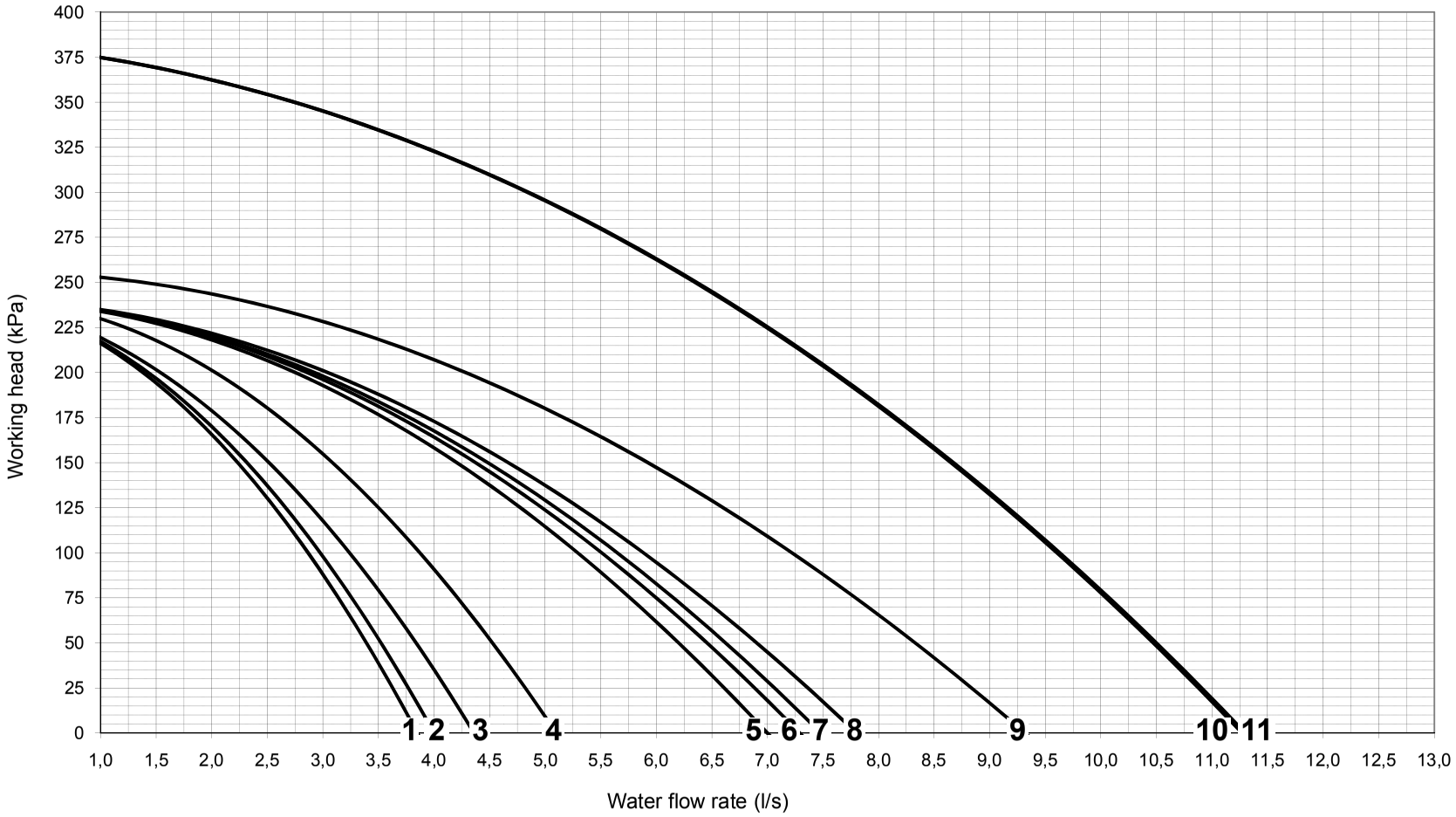


Operating range

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	UM	NOTE
Graphic refer		1	1	2	3	4	5	6	7	8	9	10	11	-	**Q**= Water flow rate **ΔP**= Water pressure drop
Lower limit value	Q	1,95	1,95	2,35	2,64	2,89	3,35	3,58	4,14	4,52	5,21	5,71	6,53	l\s	
	Δp	15												kPa	
Upper limit value	Q	6,18	6,18	7,44	8,35	9,13	10,6	11,3	13,1	14,3	16,5	17,0	17,0	l\s	
	Δp	150												kPa	

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/m^3).

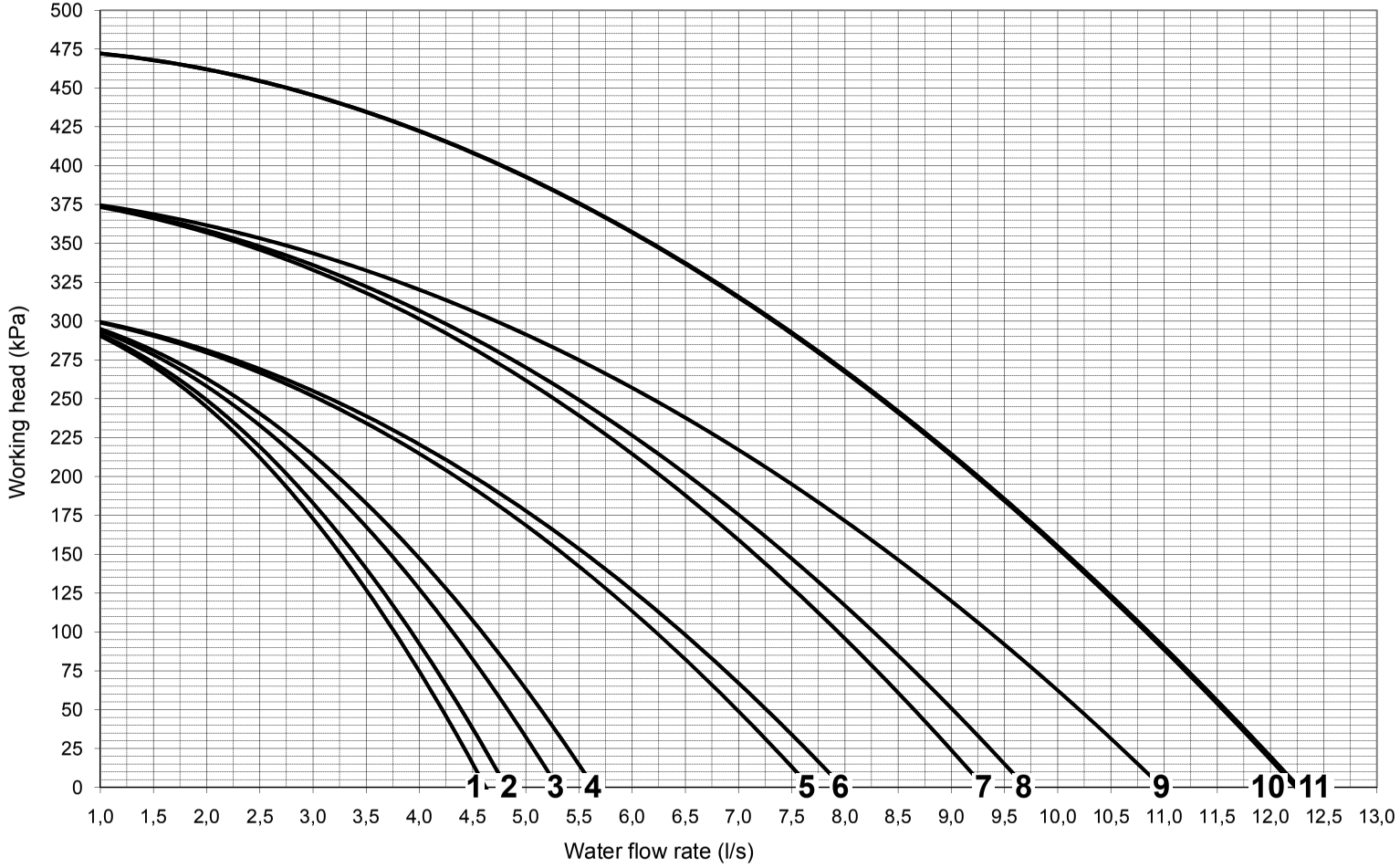


Operating range

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	UM	NOTE
Graphic refer		1	1	2	3	4	5	6	7	8	9	10	11	-	
Lower limit value	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	l\s	**Q**= Water flow rate
Upper limit value	Q	3,85	3,85	4,00	4,36	4,61	7,00	7,29	7,48	7,80	9,32	9,58	11,0	l\s	

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/m^3).



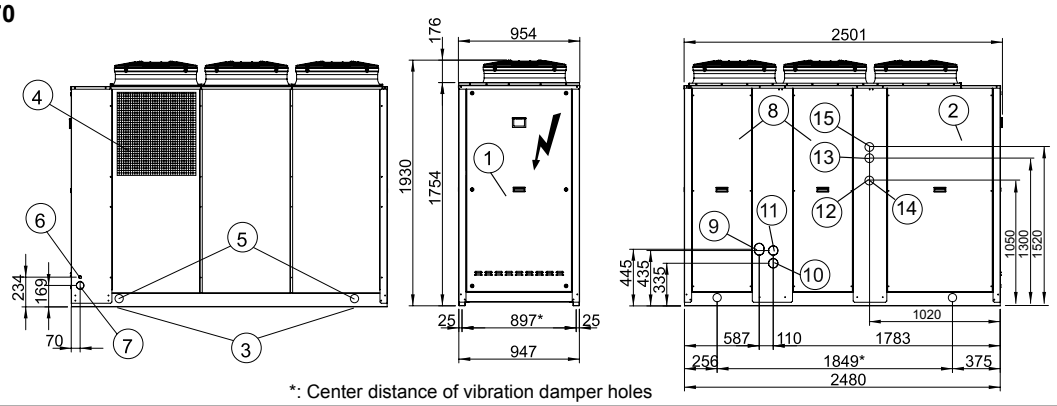
Operating range

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	UM	NOTE
Graphic refer		1	1	2	3	4	5	6	7	8	9	10	11	-	
Lower limit value	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	l\s	**Q**= Water flow rate
Upper limit value	Q	4,70	4,70	4,82	5,31	5,65	7,67	7,96	9,29	9,65	11,0	11,3	11,9	l\s	

DIMENSIONAL AND PHYSICAL DATA

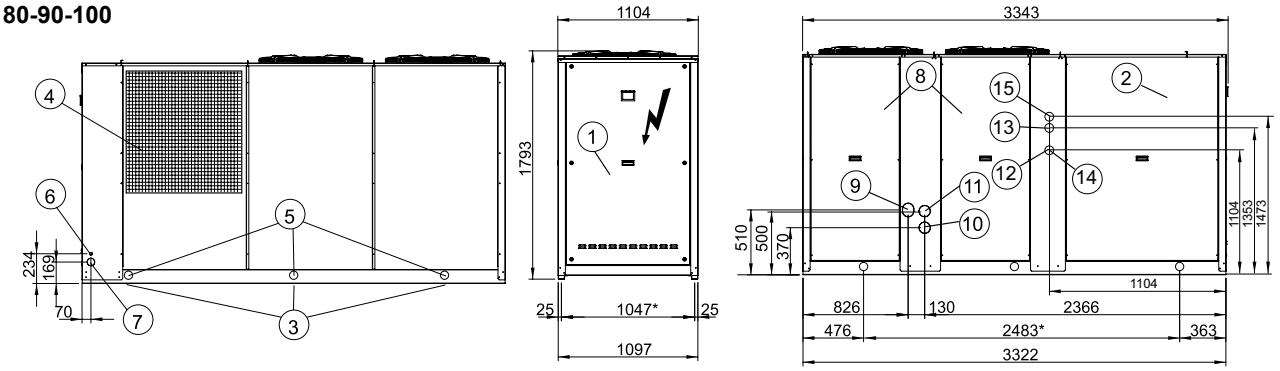
Overall dimensions

Mod. 40-50-60-70



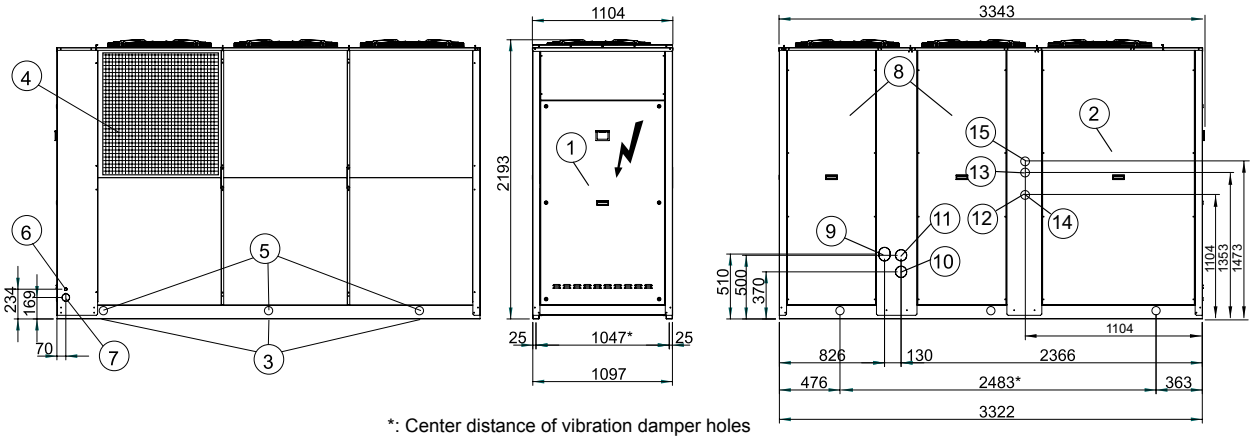
*: Center distance of vibration damper holes

Mod. 80-90-100



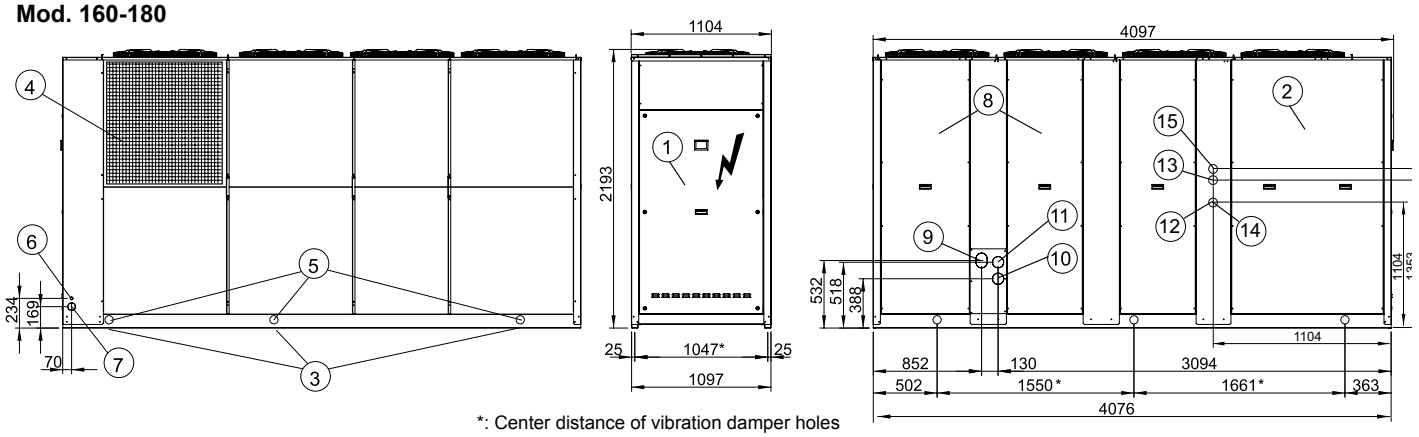
*: Center distance of vibration damper holes

Mod. 115-130-145



*: Center distance of vibration damper holes

Mod. 160-180

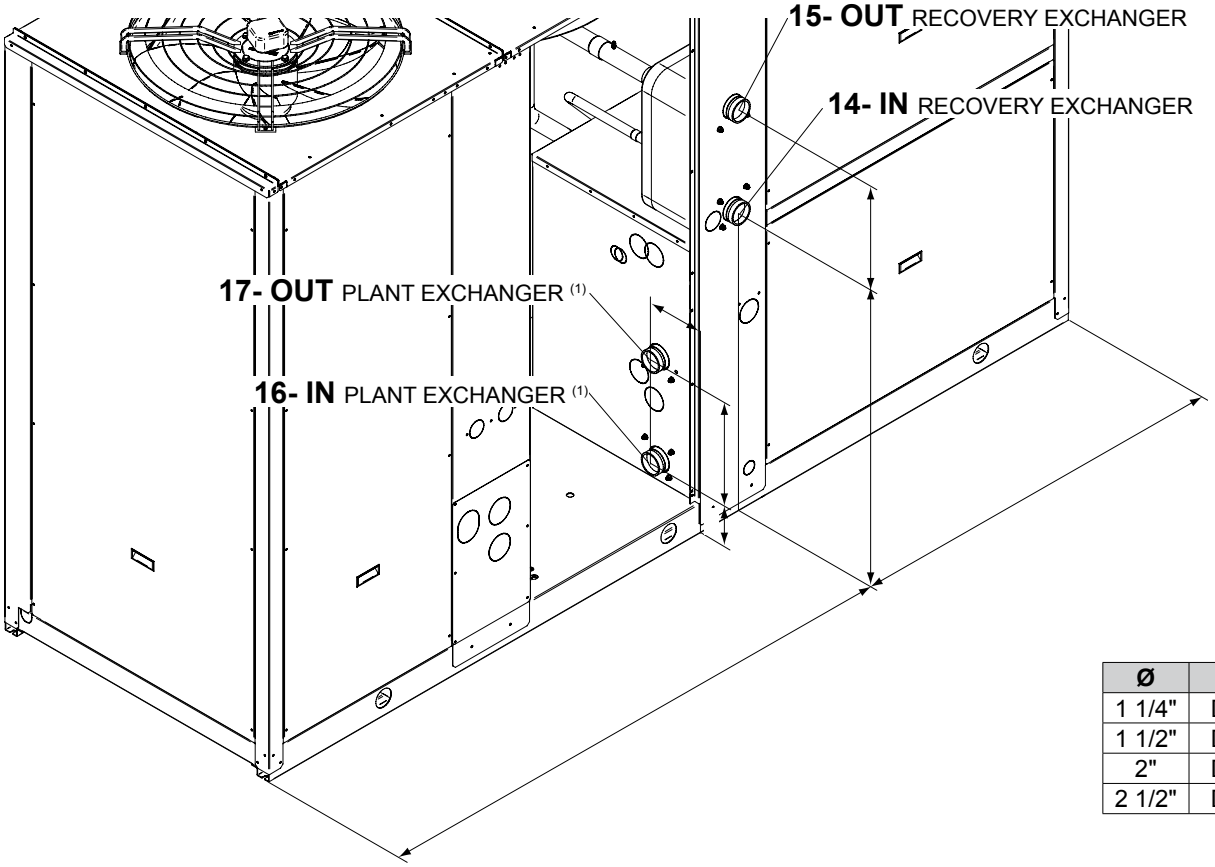


*: Center distance of vibration damper holes

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 - ø 65 mm lifting holes
6 - ø 22 mm input hole for accessory cables
7- ø 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



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

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

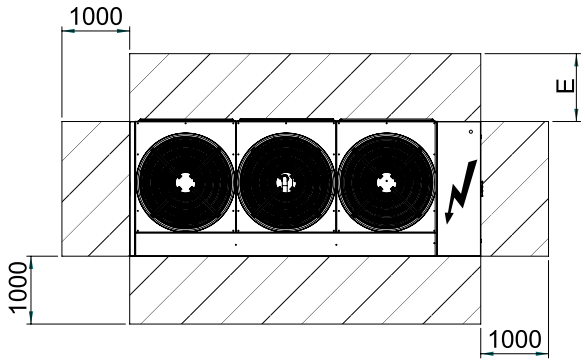
	STANDARD UNIT				VICTAULIC CONNECTIONS				PIPE KIT WITHOUT TANK MKT SS / PIPE KIT WITH TANK MKT AM				MP AM MP SS				MP PS				VD				VR			
	IN		OUT		IN		OUT		IN		OUT		IN		OUT		IN		OUT		IN		OUT		IN		OUT	
Mod.	Ø	Rif.	Ø	Rif.	Ø	Rif.	Ø	Rif.	Ø	Rif.	Ø	Rif.	Ø	Rif.	Ø	Rif.	Ø	Rif.	Ø	Rif.	Ø	Rif.	Ø	Rif.	Ø	Rif.	Ø	Rif.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

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.

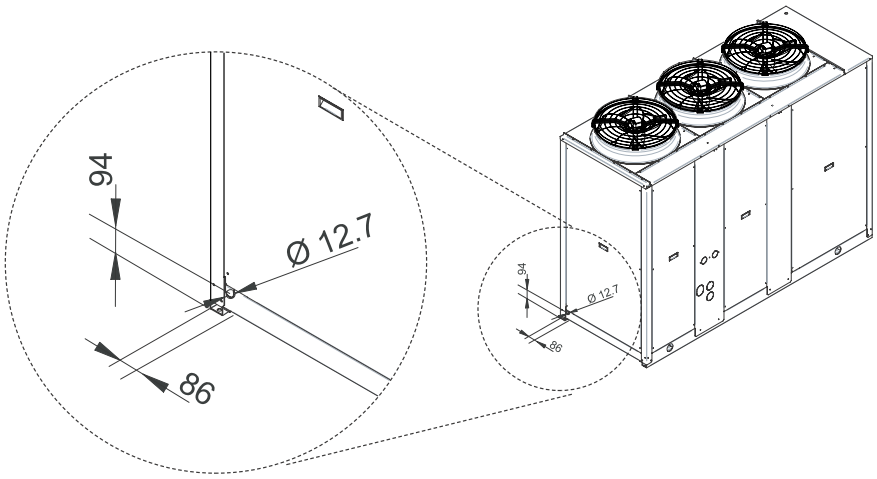
NOTE. Allow for an uncluttered area of not less than 2.5 meters above the unit.



Mod.	40÷100	115÷180	UM
E	1600	2000	mm

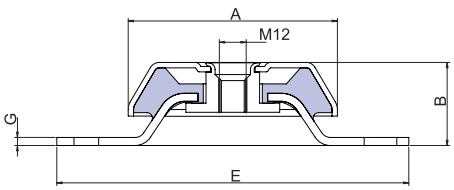
Position of condensate drain

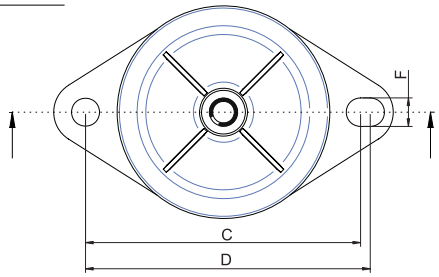
The condensate tray (if present) must have a suitable drain trap to prevent spilling of water during operation.



Rubber 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.

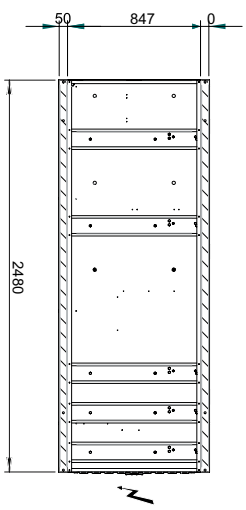




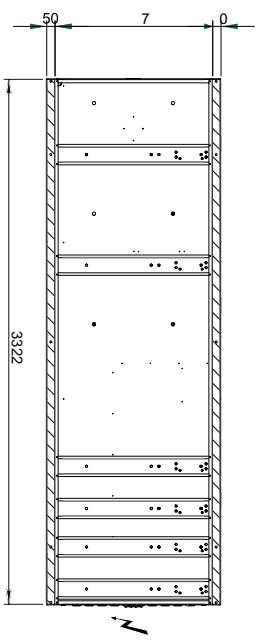
Unit	Mod.	A	B	C	D	E	F	G	UM
Unit without tank	40-70	95	35	122	124	150	10	3	mm
	80-145	106	37	136	150	170	12,5	3,5	mm
	160-180	95	35	122	124	150	10	3	mm
Unit with tank	40-70	95	35	122	124	150	10	3	mm
	80-180	106	37	136	150	170	12,5	3,5	mm

Area of support

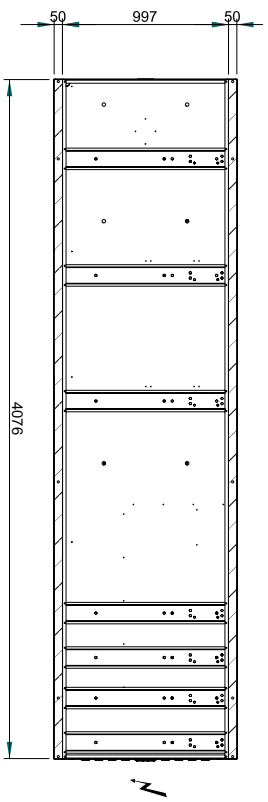
Mod. 40-50-60-70



Mod. 80-90-100-115-130-145

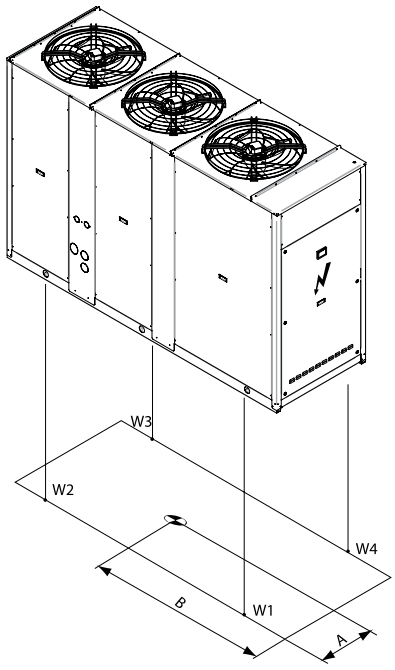


Mod. 160-180

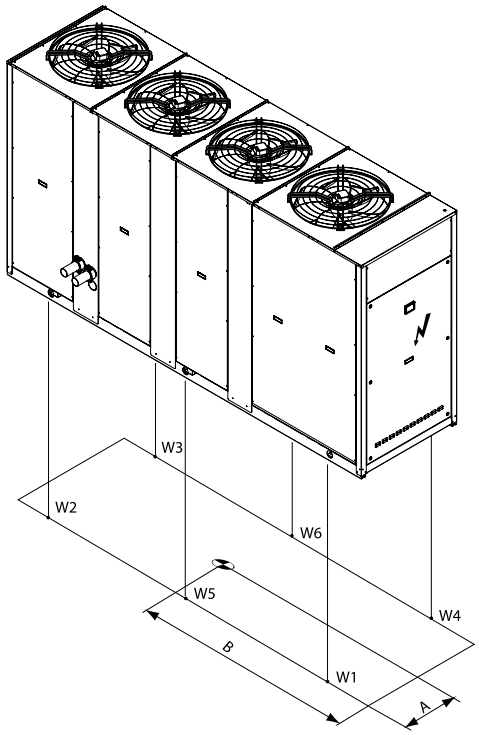


To correctly install the unit, comply with the measurements for the free area that must be left around the unit, as shown in the drawing.

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



Mod. 160-180



Transport weight

UNIT **WITHOUT** WATER STORAGE TANK

Unit WITHOUT Hydronic kit

IR version

Acustic version	AB-AS			AX		
Models	Center of gravity position [mm]		Weight [Kg]	Center of gravity position [mm]		Weight [Kg]
	A	B		A	B	
40.2	413	917	582	425	920	596
50.2	413	915	584	425	918	598
60.2	415	904	610	427	907	623
70.2	426	909	649	430	907	656
80.2	486	1265	830	496	1261	837
90.2	481	1235	920	491	1231	927
100.2	462	1180	1002	472	1177	1008
115.2	476	1199	1116	487	1198	1155
130.2	472	1187	1143	483	1186	1155
145.2	471	1175	1198	482	1173	1209
160.2	473	1441	1337	481	1438	1350
180.2	479	1431	1397	487	1428	1410

IP version

Acustic version	AB-AS			AX		
Models	Center of gravity position [mm]		Weight [Kg]	Center of gravity position [mm]		Weight [Kg]
	A	B		A	B	
40.2	426	898	615	436	901	628
50.2	426	896	617	436	899	630
60.2	428	886	643	438	889	656
70.2	437	891	683	441	888	689
80.2	497	1245	870	506	1242	876
90.2	492	1215	960	501	1212	966
100.2	474	1164	1042	482	1161	1047
115.2	487	1184	1161	497	1182	1173
130.2	483	1172	1188	493	1170	1200
145.2	482	1162	1246	492	1160	1257
160.2	482	1419	1389	489	1417	1402
180.2	488	1409	1449	495	1407	1462

Unit WITH Hydronic kit

IR version

Acustic version	AB-AS			AX		
Models	Center of gravity position [mm]		Weight [Kg]	Center of gravity position [mm]		Weight [Kg]
	A	B		A	B	
40.2	375	1079	700	386	1073	713
50.2	375	1077	702	386	1071	715
60.2	377	1067	728	388	1061	740
70.2	388	1063	767	392	1054	772
80.2	450	1446	978	458	1435	983
90.2	445	1416	1068	453	1405	1073
100.2	432	1355	1151	438	1345	1154
115.2	444	1365	1277	455	1356	1286
130.2	440	1353	1304	451	1344	1313
145.2	441	1336	1358	451	1328	1367
160.2	439	1673	1542	446	1660	1552
180.2	445	1663	1602	452	1650	1612

IP version

Acustic version	AB-AS			AX		
Models	Center of gravity position [mm]		Weight [Kg]	Center of gravity position [mm]		Weight [Kg]
	A	B		A	B	
40.2	387	1057	733	397	1051	745
50.2	387	1055	735	397	1048	747
60.2	389	1044	761	399	1038	772
70.2	399	1041	801	403	1032	806
80.2	461	1423	1018	468	1411	1022
90.2	456	1393	1108	463	1381	1112
100.2	442	1335	1191	449	1325	1194
115.2	455	1347	1321	465	1338	1331
130.2	451	1335	1348	461	1326	1358
145.2	452	1319	1407	461	1310	1415
160.2	448	1647	1594	455	1635	1604
180.2	454	1637	1654	461	1625	1664

UNIT **WITH** WATER STORAGE TANK

Unit WITHOUT Hydronic kit

R version

Acustic version	AB-AS			AX		
Models	Center of gravity position [mm]		Weight [Kg]	Center of gravity position [mm]		Weight [Kg]
	A	B		A	B	
40.2	421	1023	658	430	1019	671
50.2	421	1021	660	430	1017	673
60.2	423	1010	686	432	1007	698
70.2	433	1009	725	435	1003	731
80.2	494	1393	937	502	1383	943
90.2	489	1363	1027	497	1353	1033
100.2	472	1304	1109	479	1295	1114
115.2	483	1307	1223	493	1301	1235
130.2	479	1295	1250	489	1289	1262
145.2	478	1280	1305	487	1274	1315
160.2	484	1575	1482	490	1566	1493
180.2	490	1565	1542	496	1556	1553

IP version

Acustic version	AB-AS			AX		
Models	Center of gravity position [mm]		Weight [Kg]	Center of gravity position [mm]		Weight [Kg]
	A	B		A	B	
40.2	433	1002	691	441	999	703
50.2	433	1000	693	441	997	705
60.2	435	990	719	443	987	731
70.2	442	989	759	445	982	764
80.2	505	1370	977	511	1361	982
90.2	500	1340	1067	506	1331	1072
100.2	482	1284	1149	488	1276	1153
115.2	493	1290	1269	502	1284	1278
130.2	489	1278	1296	498	1272	1305
145.2	488	1264	1353	496	1258	1363
160.2	493	1551	1534	497	1542	1545
180.2	499	1541	1594	503	1532	1605

Unit WITH Hydronic kit

IR version

Acustic version	AB-AS			AX		
Models	Center of gravity position [mm]		Weight [Kg]	Center of gravity position [mm]		Weight [Kg]
	A	B		A	B	
40.2	388	1141	766	397	1132	779
50.2	388	1139	768	397	1130	781
60.2	390	1129	794	399	1120	806
70.2	400	1123	834	403	1111	837
80.2	464	1526	1071	472	1510	1074
90.2	459	1496	1161	467	1480	1164
100.2	446	1434	1243	453	1420	1245
115.2	457	1434	1369	466	1423	1378
130.2	453	1422	1396	462	1411	1405
145.2	453	1405	1450	462	4438	1459
160.2	455	1761	1665	461	1744	1674
180.2	461	1751	1725	467	1734	1734

IP version

Acustic version	AB-AS			AX		
Models	Center of gravity position [mm]		Weight [Kg]	Center of gravity position [mm]		Weight [Kg]
	A	B		A	B	
40.2	400	1119	799	407	1109	811
50.2	400	1117	801	407	1107	813
60.2	402	1106	827	409	1097	838
70.2	410	1100	868	412	1089	871
80.2	475	1501	1110	480	1487	1114
90.2	470	1471	1200	475	1457	1204
100.2	455	1413	1282	461	1400	1285
115.2	466	1416	1414	475	1404	1421
130.2	462	1404	1441	471	1392	1448
145.2	462	1386	1500	471	1374	1506
160.2	464	1733	1718	469	1717	1725
180.2	470	1723	1778	475	1707	1785

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

Acustic version	AB-AS									AX								
Models	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	411	917	248	93	67	179	-	-	586	423	920	242	94	74	189	-	-	599
50.2	411	914	248	93	67	179	-	-	588	423	917	243	94	74	190	-	-	601
60.2	413	904	260	97	70	187	-	-	614	425	907	253	98	77	198	-	-	626
70.2	423	910	270	102	77	204	-	-	653	428	907	265	104	82	210	-	-	661
80.2	484	1267	321	163	119	232	-	-	835	493	1263	343	131	102	266	-	-	842
90.2	479	1237	356	181	132	257	-	-	927	488	1233	347	181	140	267	-	-	935
100.2	460	1182	413	191	129	278	-	-	1010	469	1179	402	191	136	287	-	-	1016
115.2	473	1200	474	221	155	331	-	-	1181	484	1199	454	223	170	347	-	-	1194
130.2	469	1188	463	216	151	323	-	-	1154	480	1187	451	217	162	337	-	-	1167
145.2	466	1177	491	225	155	340	-	-	1212	478	1176	477	225	166	354	-	-	1223
160.2	471	1440	407	113	40	334	266	192	1351	478	1438	397	110	49	335	258	197	1364
180.2	477	1430	424	117	41	348	277	200	1408	484	1428	413	115	51	349	269	205	1421

Unit WITH Hydronic kit

Acustic version	AB-AS									AX								
Models	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	368	1098	283	165	98	169	-	-	721	378	1091	278	164	106	179	-	-	734
50.2	368	1096	284	166	99	170	-	-	723	378	1089	279	165	106	179	-	-	736
60.2	370	1086	296	173	103	177	-	-	749	380	1078	291	172	111	187	-	-	761
70.2	381	1081	308	177	111	192	-	-	788	386	1071	303	177	116	199	-	-	794
80.2	442	1468	361	257	160	224	-	-	1001	451	1455	389	223	143	250	-	-	1006
90.2	437	1438	395	282	175	245	-	-	1097	446	1425	387	279	184	254	-	-	1103
100.2	425	1377	451	292	172	266	-	-	1181	432	1367	441	289	180	274	-	-	1184
115.2	437	1386	517	332	202	314	-	-	1364	447	1377	495	332	220	327	-	-	1374
130.2	433	1374	506	325	198	308	-	-	1337	443	1365	494	323	210	321	-	-	1347
145.2	433	1356	534	333	203	325	-	-	1396	443	1347	521	331	215	338	-	-	1405
160.2	432	1700	434	214	91	311	328	204	1584	439	1687	428	211	101	316	323	212	1590
180.2	438	1690	451	222	95	323	341	212	1644	445	1677	444	219	105	329	336	220	1653

UNIT **WITH** WATER STORAGE TANK

IR version

Unit WITHOUT Hydronic kit

Acustic version	AB-AS									AX								
Models	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	444	1221	262	203	171	221	-	-	869	450	1211	259	202	179	230	-	-	883
50.2	444	1219	263	203	172	222	-	-	871	450	1209	260	202	179	231	-	-	885
60.2	446	1209	274	213	179	231	-	-	897	452	1199	271	211	187	241	-	-	910
70.2	451	1200	286	217	187	248	-	-	938	453	1189	283	215	192	252	-	-	943
80.2	526	1689	304	314	271	262	-	-	1151	531	1674	353	264	232	310	-	-	1159
90.2	521	1659	372	384	331	321	-	-	1408	526	1644	366	379	340	329	-	-	1413
100.2	506	1600	424	398	324	345	-	-	1491	511	1585	417	393	333	353	-	-	1495
115.2	512	1579	483	429	352	396	-	-	1661	519	1567	466	427	374	407	-	-	1674
130.2	508	1567	476	422	347	390	-	-	1634	515	1555	466	419	360	402	-	-	1647
145.2	506	1547	502	432	351	408	-	-	1693	512	1534	493	428	363	419	-	-	1702
160.2	519	1872	429	266	221	384	350	306	1956	522	1858	407	252	220	375	332	300	1886
180.2	525	1862	442	274	228	396	361	315	2016	528	1848	437	271	237	403	357	323	2027

Unit WITH Hydronic kit

Acustic version	AB-AS									AX								
Models	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	411	1301	293	269	197	215	-	-	993	418	1288	290	267	205	224	-	-	1007
50.2	411	1299	294	270	198	216	-	-	995	418	1286	291	268	206	224	-	-	1009
60.2	413	1289	307	282	207	225	-	-	1021	420	1276	305	280	215	234	-	-	1034
70.2	420	1278	319	287	216	241	-	-	1062	422	1265	317	284	221	246	-	-	1067
80.2	498	1772	337	396	306	261	-	-	1300	501	1754	393	347	265	301	-	-	1305
90.2	493	1742	405	475	368	314	-	-	1562	496	1724	398	469	377	321	-	-	1565
100.2	481	1683	457	489	361	337	-	-	1644	484	1667	450	482	370	345	-	-	1647
115.2	486	1666	519	530	394	386	-	-	1829	493	1650	502	526	415	396	-	-	1839
130.2	482	1654	512	522	388	381	-	-	1802	489	1638	504	516	401	391	-	-	1812
145.2	481	1632	538	531	392	398	-	-	1859	487	1617	530	524	405	409	-	-	1868
160.2	490	2008	450	358	271	362	406	319	2166	494	1988	427	340	267	355	385	313	2087
180.2	496	1998	462	368	278	372	417	327	2226	500	1978	457	364	286	380	413	335	2236

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

UNIT **WITHOUT** WATER STORAGE TANK

IP version

Unit WITHOUT Hydronic kit

Acustic version	AB-AS									AX								
Models	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	424	899	257	92	70	198	-	-	618	434	902	252	94	77	207	-	-	633
50.2	424	897	258	92	70	199	-	-	620	434	900	253	94	78	208	-	-	635
60.2	426	887	270	96	73	207	-	-	646	436	890	264	98	81	217	-	-	661
70.2	435	892	281	102	80	223	-	-	687	438	889	276	103	85	229	-	-	693
80.2	495	1247	354	130	105	287	-	-	875	503	1244	356	131	106	289	-	-	881
90.2	490	1217	369	181	137	279	-	-	966	498	1214	359	182	145	288	-	-	974
100.2	471	1167	425	192	135	300	-	-	1051	479	1163	414	191	142	309	-	-	1055
115.2	484	1186	484	225	167	360	-	-	1236	494	1184	446	213	170	354	-	-	1183
130.2	480	1174	477	217	158	347	-	-	1199	490	1172	464	217	168	360	-	-	1210
145.2	479	1164	505	226	164	366	-	-	1259	488	1162	491	225	175	379	-	-	1270
160.2	479	1419	425	109	40	356	272	203	1404	486	1417	418	108	51	360	269	211	1417
180.2	485	1409	442	113	41	370	283	211	1460	492	1407	434	113	53	374	279	219	1473

Unit WITH Hydronic kit

Acustic version	AB-AS									AX								
Models	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	381	1075	294	163	103	185	-	-	754	391	1068	289	162	111	196	-	-	766
50.2	381	1073	295	164	104	186	-	-	756	391	1066	290	163	111	197	-	-	768
60.2	383	1063	309	171	108	195	-	-	782	393	1056	302	170	116	205	-	-	793
70.2	392	1059	321	176	115	211	-	-	823	396	1049	316	175	120	217	-	-	827
80.2	454	1444	401	219	149	271	-	-	1040	462	1432	403	220	149	272	-	-	1045
90.2	449	1414	410	281	182	265	-	-	1137	457	1402	400	279	190	273	-	-	1141
100.2	435	1358	465	291	178	285	-	-	1220	442	1346	455	288	187	294	-	-	1224
115.2	448	1368	531	338	219	343	-	-	1430	458	1358	490	318	218	337	-	-	1363
130.2	444	1356	521	325	206	330	-	-	1382	454	1346	508	323	218	343	-	-	1392
145.2	445	1339	549	333	212	349	-	-	1443	454	1330	536	331	223	361	-	-	1451
160.2	442	1674	449	209	92	331	334	216	1632	448	1661	444	207	101	337	329	224	1642
180.2	448	1664	466	217	96	344	347	224	1694	454	1651	461	215	105	350	342	232	1705

UNIT **WITH** WATER STORAGE TANK

IP version

Unit WITHOUT Hydronic kit

Acustic version	AB-AS									AX								
Models	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	451	1198	273	201	176	238	-	-	903	457	1188	269	200	183	247	-	-	915
50.2	451	1196	274	201	176	239	-	-	905	457	1186	270	200	184	248	-	-	917
60.2	453	1186	286	211	184	250	-	-	931	459	1176	282	209	192	259	-	-	943
70.2	458	1177	299	216	192	266	-	-	973	459	1166	295	214	196	271	-	-	977
80.2	532	1664	365	261	236	330	-	-	1192	537	1650	367	263	237	332	-	-	1199
90.2	527	1634	386	383	338	341	-	-	1449	532	1620	380	378	347	348	-	-	1453
100.2	513	1577	438	397	331	366	-	-	1531	517	1564	431	392	340	373	-	-	1536
115.2	519	1559	491	433	371	421	-	-	1717	525	1547	464	412	369	416	-	-	1661
130.2	515	1547	490	422	355	412	-	-	1680	521	1535	481	418	367	424	-	-	1690
145.2	513	1528	517	432	360	432	-	-	1740	519	1514	508	427	372	442	-	-	1749
160.2	524	1847	426	250	213	388	342	304	1923	527	1833	422	249	222	395	338	311	1938
180.2	530	1837	458	269	229	417	367	326	2067	533	1823	453	267	239	424	363	334	2080

Unit WITH Hydronic kit

Acustic version	AB-AS									AX								
Models	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	420	1278	306	267	203	231	-	-	1026	425	1266	302	265	210	240	-	-	1038
50.2	420	1276	307	268	203	232	-	-	1028	425	1264	304	266	211	241	-	-	1040
60.2	422	1266	320	279	212	243	-	-	1054	427	1254	317	277	221	251	-	-	1065
70.2	427	1255	333	285	221	259	-	-	1097	429	1243	330	282	226	263	-	-	1101
80.2	504	1746	406	343	270	320	-	-	1339	508	1730	407	345	271	322	-	-	1345
90.2	499	1716	419	473	375	333	-	-	1601	503	1700	414	467	384	340	-	-	1605
100.2	487	1662	471	487	369	357	-	-	1684	491	1646	464	481	377	364	-	-	1687
115.2	493	1645	531	537	415	412	-	-	1895	499	1630	502	509	411	405	-	-	1825
130.2	489	1633	527	521	397	402	-	-	1847	495	1618	519	514	409	413	-	-	1854
145.2	488	1613	555	529	402	421	-	-	1907	494	1598	545	523	414	431	-	-	1913
160.2	495	1982	447	340	261	368	396	316	2128	499	1963	443	337	269	375	392	324	2139
180.2	501	1972	479	364	279	394	424	339	2279	505	1953	473	360	287	401	419	346	2286

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 been 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 TRASPORT AND OPERATION section for the center of gravity position.
Use corner protectors (Part.2 Fig.3) to avoid damaging the unit.

Fig. 1

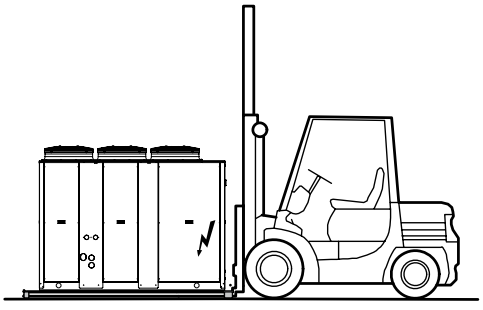


Fig. 2

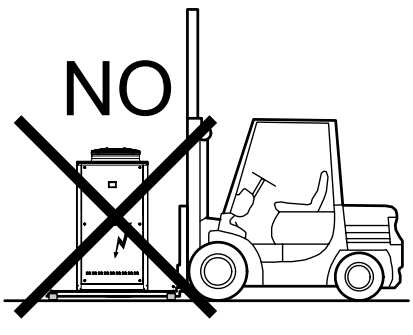


Fig. 5

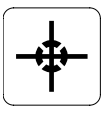
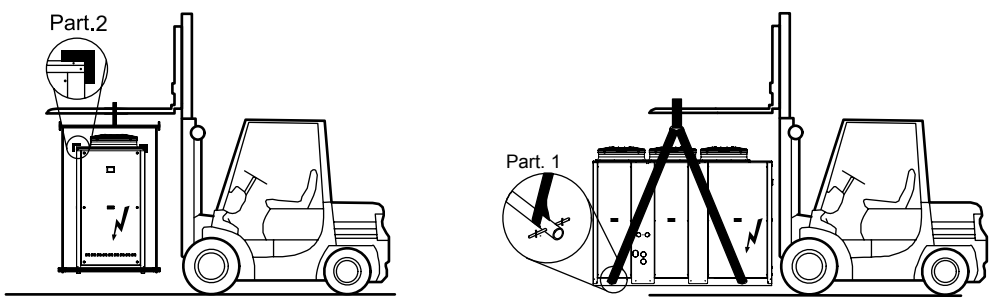


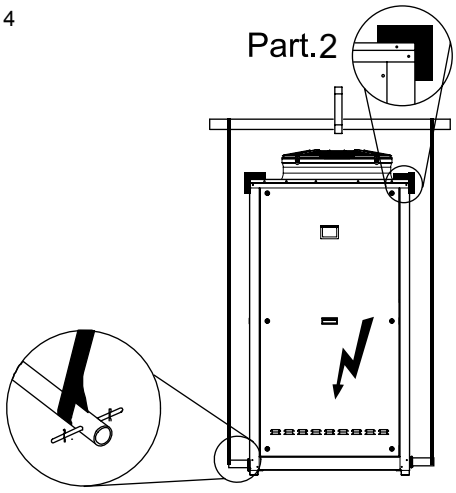
Fig. 3



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



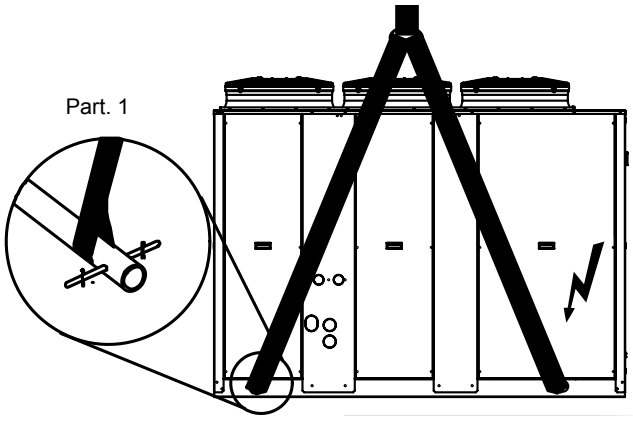
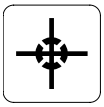


Fig. 5



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 Ø<1mm for plates heat exchanger Ø<1.5mm 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 mbar ±5 Δp, while resetting occurs with a Δp of 105 mbar ±5.
The differential pressure switch opens the contact and shuts down the compressors when the water flow ratey decreases and Δp ≤ 80 mbar ±5.
The differential pressure switch closes and therefore the unit can restart when the water flow rate increases and Δp ≥ 105 mbar ±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 worlk 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 values 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).

Water component for corrosion limit

pH	7.5 ÷ 9.0	-
SO4 --	< 100	ppm
HCO3 -/ SO4 --	>1.0	
Total hardness	8.0 ÷ 15.2	°F
Cl-	< 50	ppm
PO4 3-	< 2.0	ppm
NH3	< 0.5	ppm
Free Chlorine	< 0.5	ppm
Fe3+	< 0.5	ppm
Mn++	< 0.05	ppm
CO2	< 50	ppm
H2S	< 50	ppb
Temperature	< 65	°C
Oxygen content	< 0.1	ppm

Precautions for the Winter

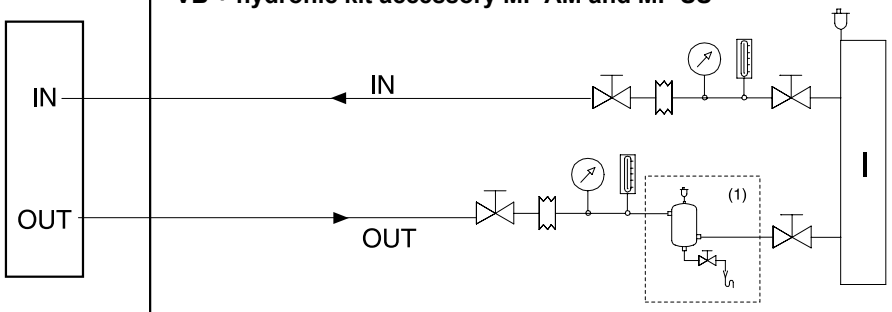
The water could freeze and damage the exchanger of the unit and other parts of the system during the winter period, if the system was to remain at a standstill. This problem can be obviated in 3 different ways:
1. Drain the system completely, taking care to drain the plate exchanger (in order to drain 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

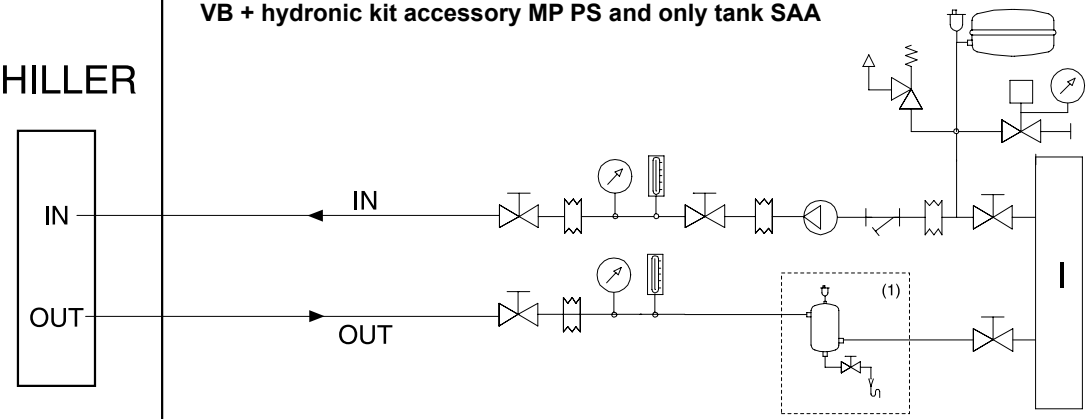
Basic diagram Standard Unit VB [PLANT SIDE WATER CIRCUIT]

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

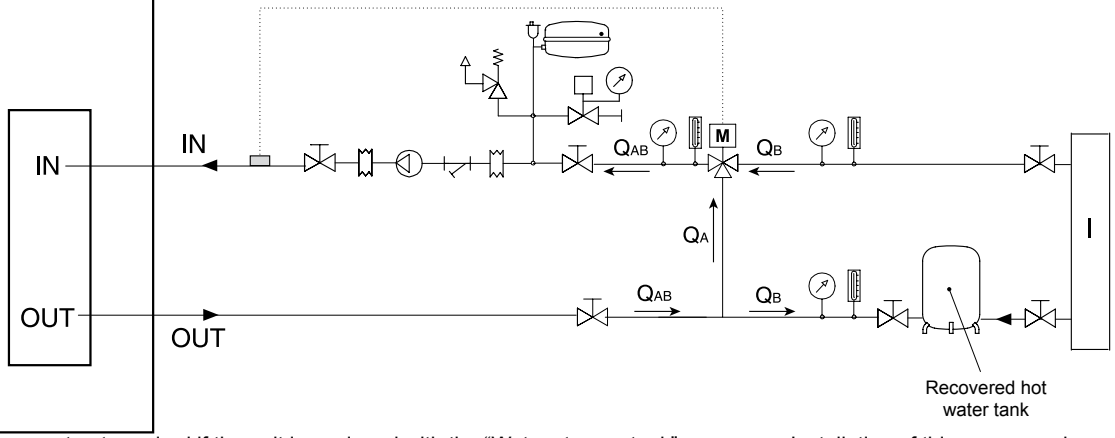


VB + hydronic kit accessory MP PS and only tank SAA



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

HYDRAULIC CONNECTIONS

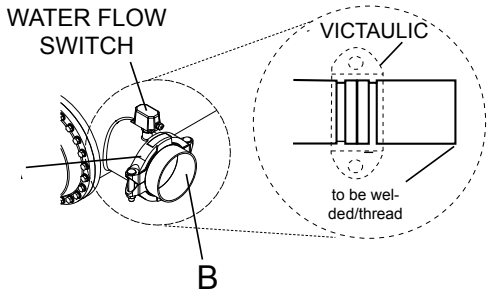
Air vent and water drain

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 attacked since the gasket may be damaged irreparably.

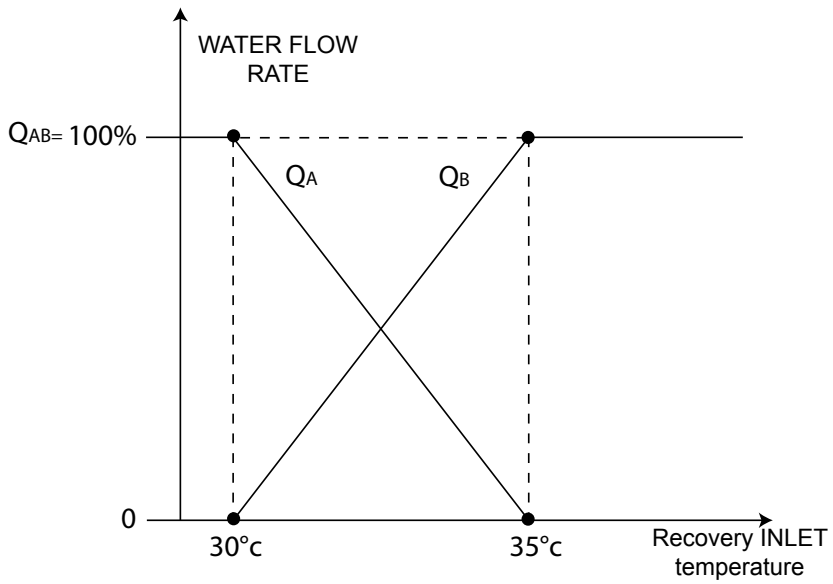
Note:
Supplied as optional (see “ACCESSORIES AND OPTIONAL EQUIPMENT “).



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.

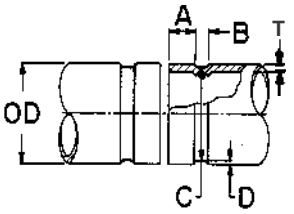


HYDRAULIC CONNECTIONS

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
11/4”	32	42.4	15.875	7.137	38.989	1.600	1.651
11/2”	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
21/2”	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

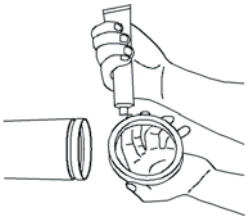
Check the depth and diameter of the grooves and their distance from the pipe ends. Make sure that the work has been carried out with care and that the end surface of the pipes is smooth and not ovalized. Make sure that there are no notches, burrs or other imperfections that could impair the tightness.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



2) Checking the seal and relative lubrication

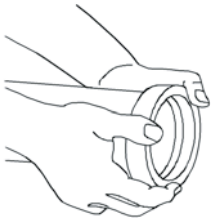
Make sure that the type of seal used is compatible with the nature and temperature of the fluid. Signal green **EPDM** seals are used.

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.



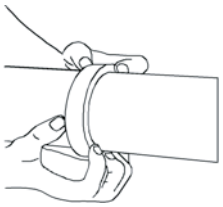
3) How to fit the seal

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



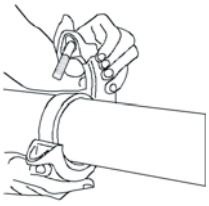
4) Alignment

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.

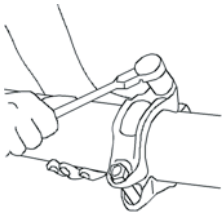


6) Nut torquing

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:

Expansion vessel precharge= [H/10.2+0.3] x100 = [kPa]

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

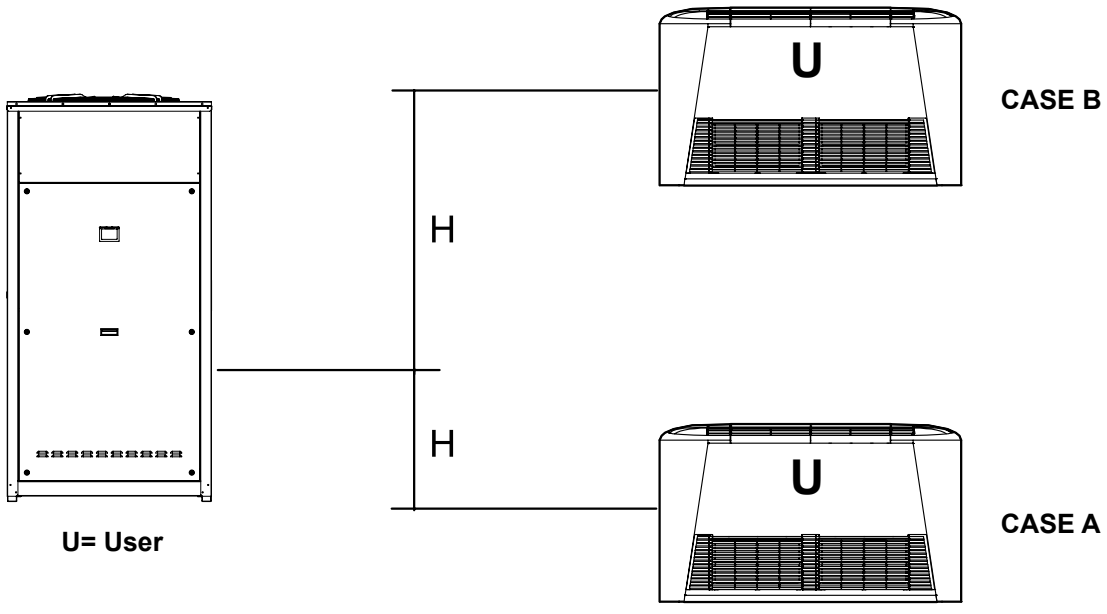
Tab.1

Model			40-50-60-70		80-90-100-110-115-130-145-160-180	
Expansion vessel volume (liters)			12		24	
Thermal expansion of water (10-40°C)			0.0074			
Thermal expansion of water (10-60°C)			0.0167			
H (metri)		Expansion vessel pressure (kPa)	IR	IP	IR	IP
Case A	H <0	150 (standard)	1043	461	2085	921
Case B	0 < H < 12.25	150 (standard)	1043	461	2085	921
	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 botton 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.

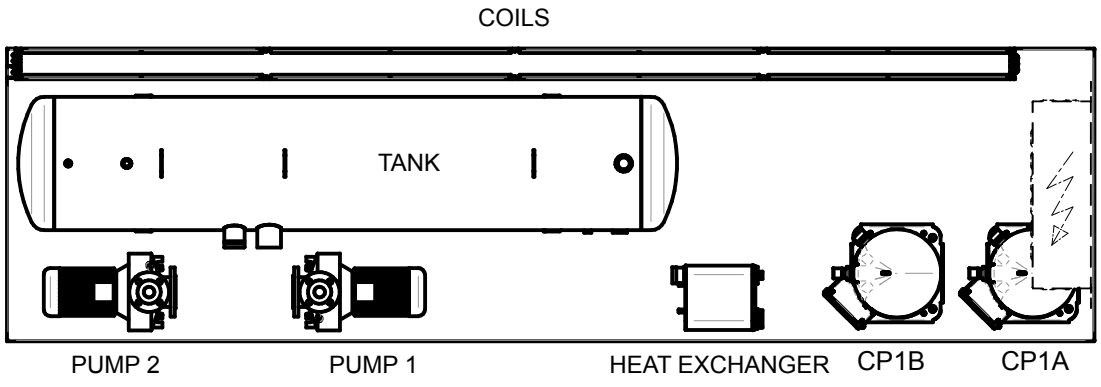
Electrical connections

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**	UM
Power supply	400 - 3+N - 50					400 - 3 - 50							V-ph-Hz
FLA	40,2	45,7	53,3	58,7	69,9	75,5	90,0	97,9	106	123	136	159	A
FLI	21,6	24,4	28,4	31,0	38,6	44,0	55,0	60,5	66,0	75,7	83,3	95,4	kW
MIC	134	143	149	173	213	264	259	267	267	348	361	355	A
MIC SS	89,3	96,3	101	117	143	174	175	183	183	200	246	248	A

Unit layout



Compressors

UNITA'		**40.2**	**50.2**	**60.2**	**70.2**	**80.2**	**90.2**	**100.2**	**115.2**	**130.2**	**145.2**	**160.2**	**180.2**	UM
Alimentazione		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	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	
LRA	CP1A	111	118	118	140	174	225	210	210	210	287	287	267	A
	CP1B	111	118	118	140	174	174	210	210	210	210	287	267	
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	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	
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	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	

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	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	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	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	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	UM
Power supply	400 - 3 - 50												V-ph-Hz
FLA	3,20	3,20	3,20	3,20	3,70	3,70	3,70	3,70	3,70	4,50	6,10	6,10	A
LRA	25,7	25,7	25,7	25,7	20,0	20,0	20,0	20,0	20,0	43,5	57,7	57,7	A
FLI	1,80	1,80	1,80	1,80	1,78	1,78	1,78	1,78	1,78	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	UM
Power supply	400 - 3 - 50												V-ph-Hz
FLA	3,70	3,70	3,70	3,70	4,50	4,50	4,50	4,50	4,50	6,10	8,70	8,70	A
LRA	20,0	20,0	20,0	20,0	43,5	43,5	43,5	43,5	43,5	57,7	87,0	87,0	A
FLI	1,78	1,78	1,78	1,78	2,55	2,55	2,55	2,55	2,55	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	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	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	116	116	A
FLI	3,48	3,48	3,48	3,48	3,48	3,48	3,48	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	UM
Power supply	400 - 3 - 50												V-ph-Hz
FLA	3,70	3,70	3,70	3,70	4,50	4,50	4,50	4,50	4,50	6,10	8,70	8,70	A
LRA	20,0	20,0	20,0	20,0	43,5	43,5	43,5	43,5	43,5	57,7	87,0	87,0	A
FLI	1,78	1,78	1,78	1,78	2,55	2,55	2,55	2,55	2,55	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	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	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	116	116	A
FLI	3,48	3,48	3,48	3,48	3,48	3,48	3,48	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	UM
Power supply	400 - 3+N - 50				400 - 3 - 50								V-ph-Hz
FLA	43,4	48,9	56,5	61,9	73,6	79,2	93,7	102	110	128	142	165	A
FLI	23,4	26,2	30,2	32,8	40,4	45,8	56,8	62,3	67,8	78,3	86,8	98,9	kW
MIC	137	147	152	176	217	268	263	271	271	353	367	361	A
MIC SS	92,5	99,5	105	120	147	178	179	187	187	205	253	254	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	UM
Power supply	400 - 3+N - 50				400 - 3 - 50								V-ph-Hz
FLA	43,9	49,4	57,0	62,4	74,4	80,0	94,5	102	110	129	145	168	A
FLI	23,4	26,2	30,2	32,8	41,2	46,6	57,6	63,1	68,6	79,2	87,9	100	kW
MIC	137	147	152	177	218	269	264	272	272	354	370	363	A
MIC SS	93,0	100	105	121	148	179	180	188	188	206	255	257	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	UM
Power supply	400 - 3+N - 50				400 - 3 - 50								V-ph-Hz
FLA	46,3	51,8	59,4	64,8	76,0	81,6	96,1	107	115	132	147	169	A
FLI	25,1	27,9	31,9	34,5	42,1	47,5	58,5	65,1	70,6	80,3	89,6	102	kW
MIC	140	150	155	179	219	270	265	276	276	357	372	365	A
MIC SS	95,4	102	107	123	150	180	181	192	192	209	257	258	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	UM
Power supply	400 - 3+N - 50				400 - 3 - 50								V-ph-Hz
FLA	43,9	49,4	57,0	62,4	74,4	80,0	94,5	102	110	129	145	168	A
FLI	23,4	26,2	30,2	32,8	41,2	46,6	57,6	63,1	68,6	79,2	87,9	100	kW
MIC	137	147	152	177	218	269	264	272	272	354	370	363	A
MIC SS	93,0	100	105	121	148	179	180	188	188	206	255	257	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	UM
Power supply	400 - 3+N - 50				400 - 3 - 50								V-ph-Hz
FLA	46,3	51,8	59,4	64,8	76,0	81,6	96,1	107	115	132	147	169	A
FLI	25,1	27,9	31,9	34,5	42,1	47,5	58,5	65,1	70,6	80,3	89,6	102	kW
MIC	140	150	155	179	219	270	265	276	276	357	372	365	A
MIC SS	95,4	102	107	123	150	180	181	192	192	209	257	258	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÷415V
f= 50 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:

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

Moreover, VR units contains the following terminals:

g) pumps start-up and safety devices
h) digital input for remote enable
i) 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)

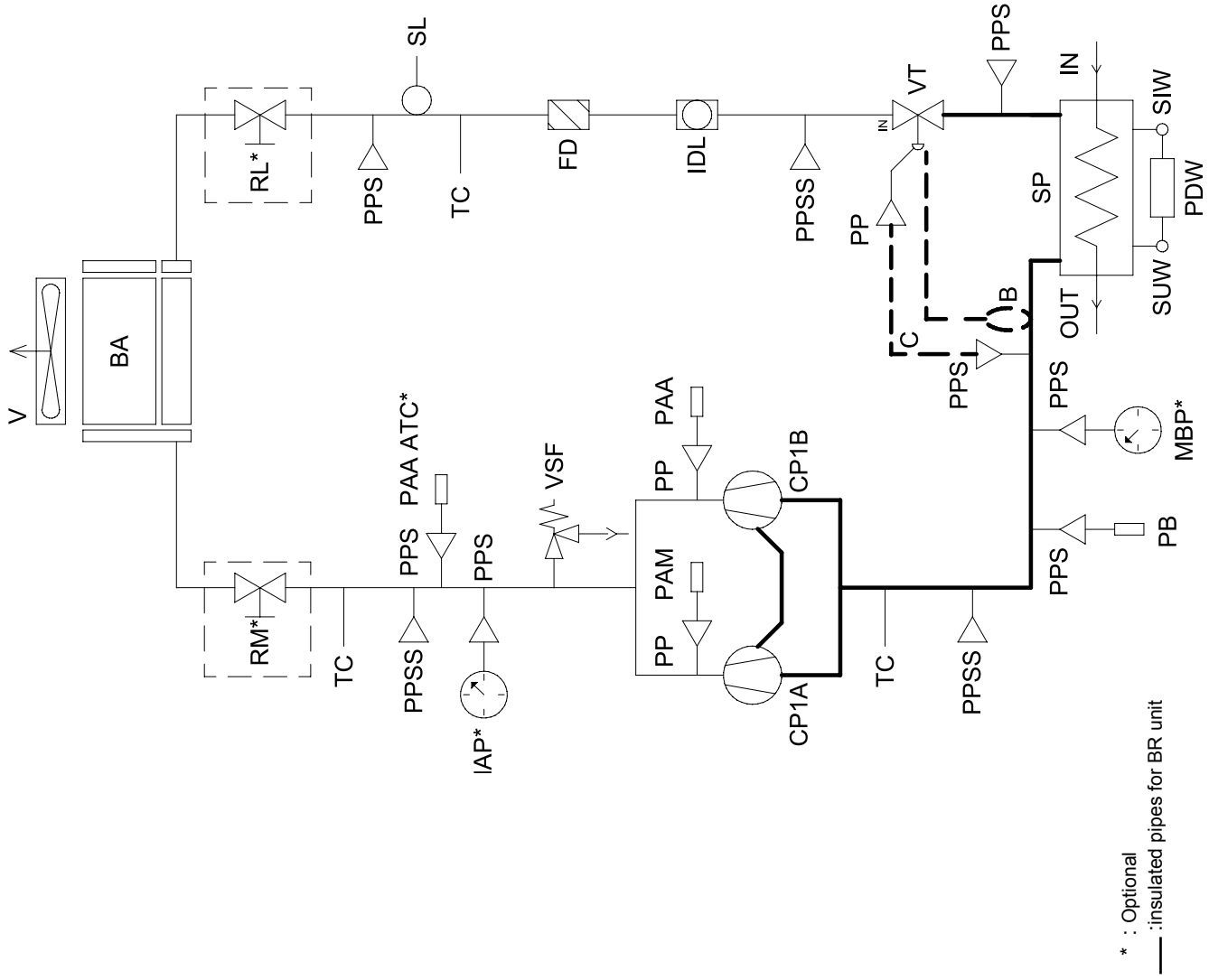
LEVEL	2
Device	Discharge Temperature
Trip out	135°C
Trip in	120°C
connected to	electronic controller
effect	stop the single compressor
reset *	YES by keyboard after the solution of the problem that generates the alarm

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

REFRIGERANT FLOW DIAGRAM

Refrigerant flow diagram IR VB unit with thermostatic expansion valve

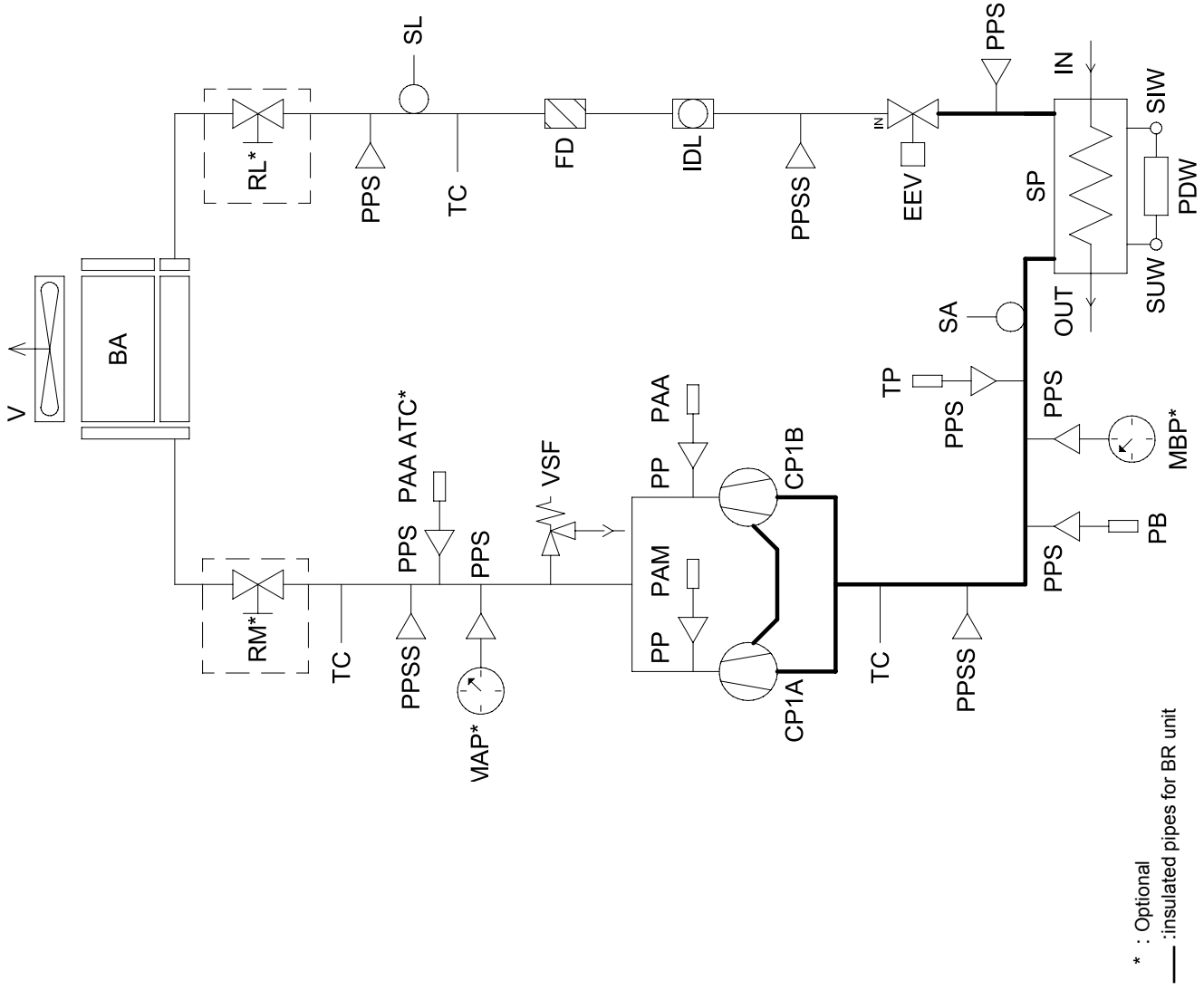
	Description
B	EXPANSION VALVE BULB
BA	FIN AND TUBE COIL
C	EXPANSION VALVE CAPILLARY
CP	COMPRESSOR
FD	FILTER DRIER
IDL	LIQUID AND MOISTURE INDICATOR
MAP	HIGH PRESSURE GAUGE
MBP	LOW PRESSURE GAUGE
PAA	AUTO RESET HIGH PRESSURE SWITCH
PAA ATC	AUTO RESET HIGH PRESSURE SWITCH FOR ATC FUNCTION
PAM	MANUAL RESET 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



REFRIGERANT FLOW DIAGRAM

Refrigerant flow diagram IR VB unit with thermostatic expansion valve

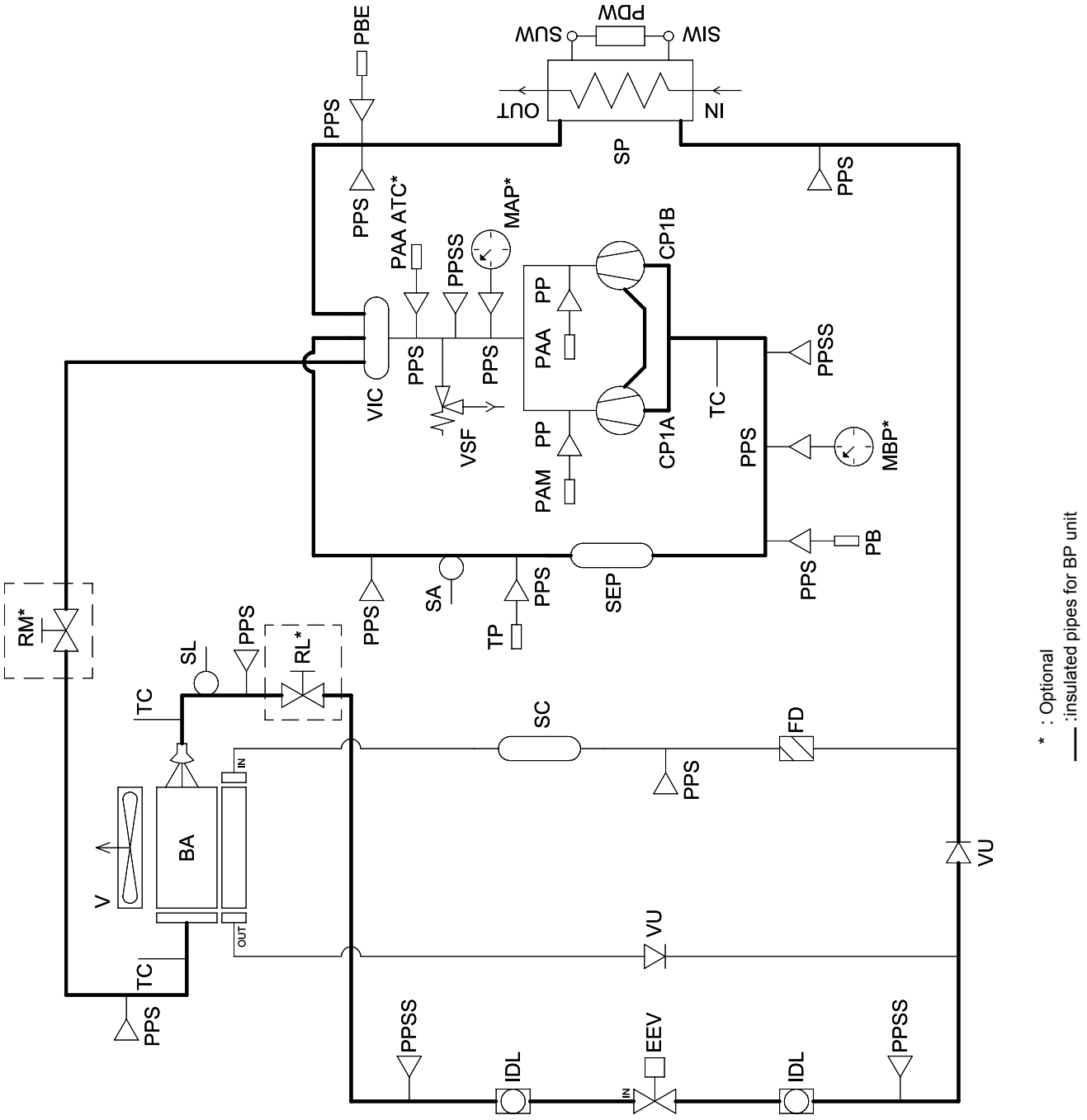
	Description
BA	FIN AND TUBE COIL
CP	COMPRESSOR
EEV	ELECTRONIC EXPANSION VALVE
FD	FILTER DRIER
IDL	LIQUID AND MOISTURE INDICATOR
MAP	HIGH PRESSURE GAUGE
MBP	LOW PRESSURE GAUGE
PAA	AUTO RESET HIGH PRESSURE SWITCH
PAA ATC	AUTO RESET HIGH PRESSURE SWITCH ATC FUNCTION
PAM	MANUAL RESET HIGH PRESSURE SWITCH
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



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



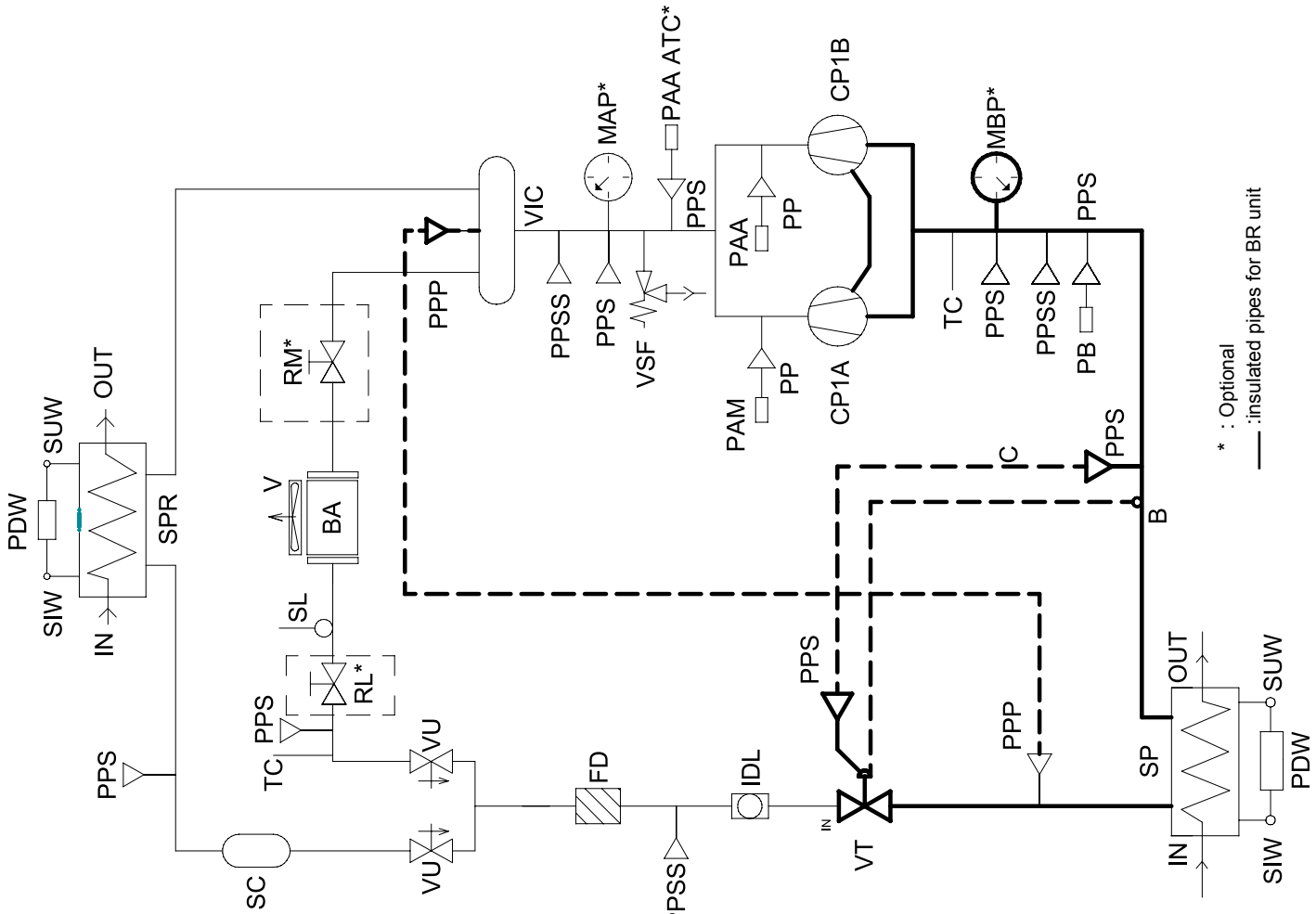
* : Optional

—— :insulated pipes for BP unit

REFRIGERANT FLOW DIAGRAM

Refrigerant flow diagram IR VR unit with thermostatic expansion valve

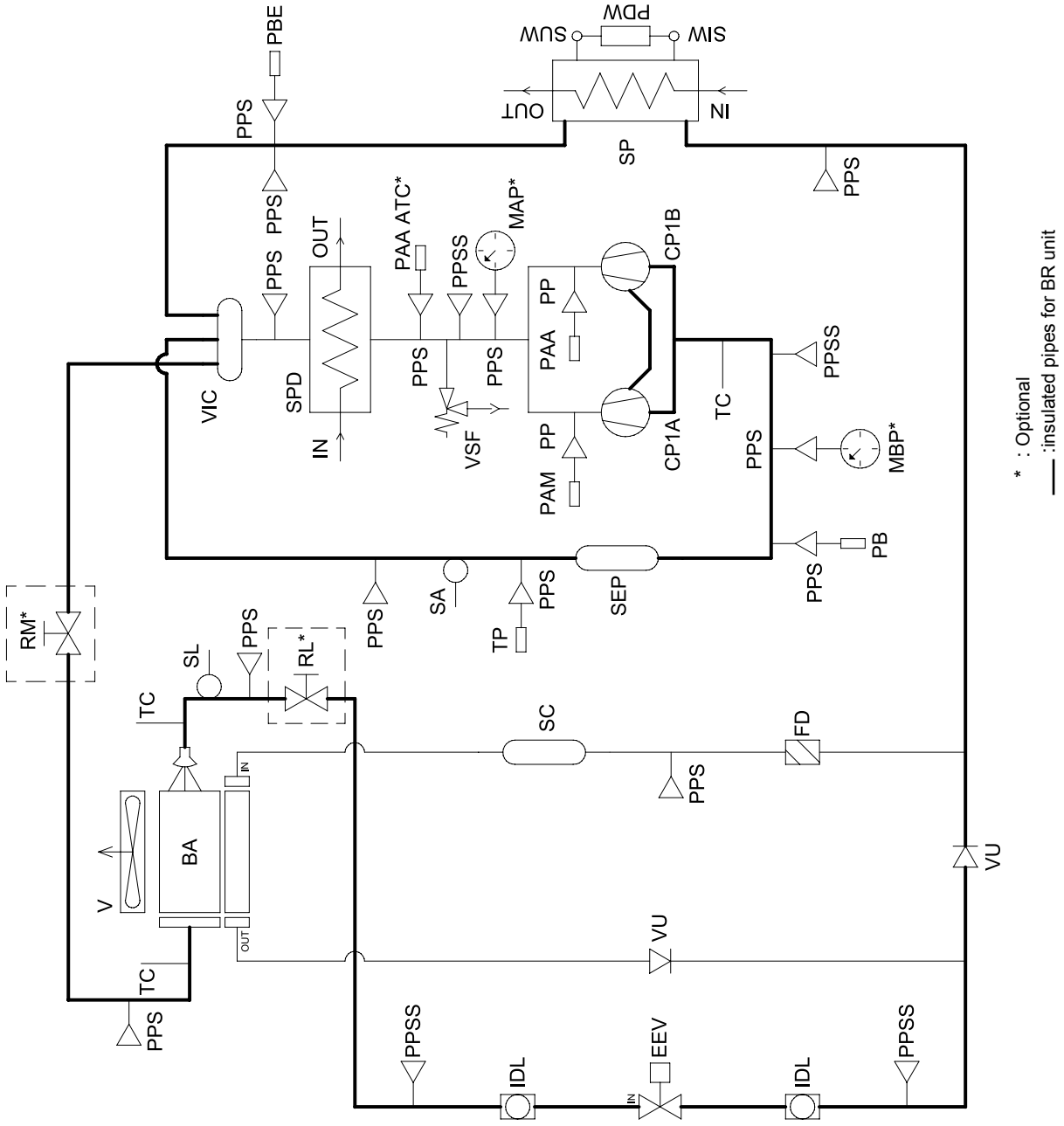
	Description
BA	FIN AND TUBE COIL
CP	COMPRESSOR
FD	FILTER DRIER
IDL	LIQUID AND MOISTURE INDICATOR
PAA	AUTO RESET HIGH PRESSURE SWITCH
PAA ATC	AUTO RESET HIGH PRESSURE SWITCH ATC FUNCTION
PAM	MANUAL RESET HIGH PRESSURE SWITCH
PB	AUTO RESET LOW PRESSURE SWITCH
PBE	EVAPORATOR AUTO RESET LOW PRESSURE SWITCH
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



REFRIGERANT FLOW DIAGRAM

Refrigerant flow diagram IP VD 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
SPD	DESUPERHEATER 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



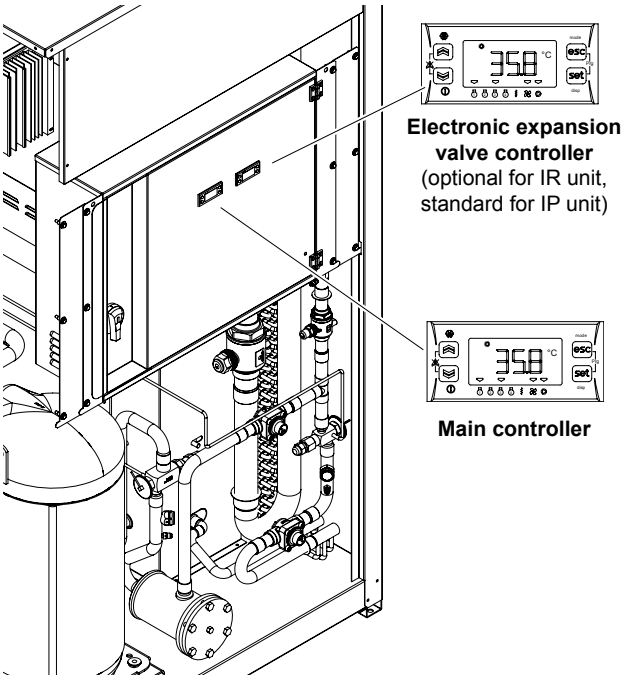
USER INTERFACE

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 paragrah "Functions available for the user - ST-BY of the unit".



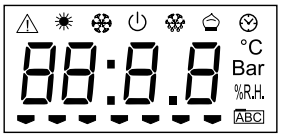
Button		Direct function	Associated function	
^^	UP	Increase value of selected parameter Scroll menu up	❄	Manual defrost
vv	DOWN	Decrease value of selected parameter Scroll menu down	-	-
esc	ESC	Go to menu higher level without saving the modification	mode	Access the "Operation mode" menu (1)
set	SET	Go 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	
^^ + vv	UP + DOWN	⚠	Manual reset
esc + set	ESC + SET		Access the "Programming" menu

NOTA:
1): key for unit on/off with mode selection (see paragrah "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

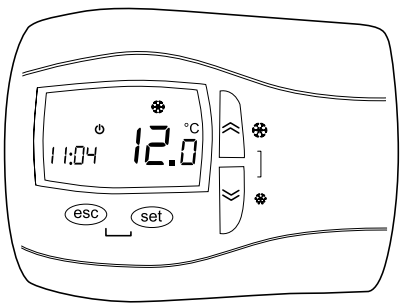
• actual superheating value (in degrees Celsius with decimal point)
• alarm code, if at least one is activated (in case of several alarms the code of the first according to the Table of Alarms is displayed)

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

	Icon	Description	Colour	On fixed	On flashing
Operation status and modes		Allarm	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	-
	ABC	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

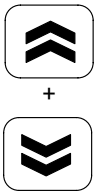
The control system is basedd on three menu with tree structure.

Menu	Access procedure	Submenu	Available functions
Operation mode	Press (prolonged) esc (ESC button associated function)	StbY	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 (SET button direct function)	A1	Analogue input display
		rtC	Clock display
		SEtP	Set point (set by customer) display
		SEtr	Set point (actual set point) display

Menu	Access procedure	Submenu	USER	SERVICE	Available functions
Status	Pres set (SET button direct function)	A1	√	√	Analogue input display
		d1	√	√	Digital input display
		AO	√	√	Analogue output display
		dO	√	√	Digital output display
		CL	√	√	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 contem-porary buttons esc + set (combined function ESC + SET button)	PAr	CL	√	√	Electronic controller configuration parameters (base controller)
			Cr	√	√	Electronic controller configuration parameters (remote controller)
			CE	√	√	Electronic controller configuration parameters (expansion controller)
			CF	√	√	Electronic controller configuration parameters
			U1	√	√	LED Electronic controller configuration parameters (base + remote)
			tr	√	√	Temperature control parameters
			St	√	√	Operating states parameters
			CP		√	Compressor parameters
			PI	√	√	Plant pump parameters
			FE		√	Fan parameters
			PE	√	√	Source pump parameters
			H1	√	√	Plant heaters (antifrezze and integration) parameters parameters
			HE	√	√	Source heaters (antifrezze 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 recoveryparameters

USER INTERFACE

Menu	Access procedure	Sub-menu	USER	SERVICE	Available functions	SERVICE	Available functions
Programmation		FnC	dEF			√	Manual defrost
			tA			√	Silence alarms
			St	OFF		√	Change in OFF state
				On		√	Change in status ON
			CC	UL		√	Upload program parameters
				dL		√	Download the program parameters
				Fr		√	Format Multi Function Key
			EUr			√	Reset historical alarms
		PASS		-	√	√	Enter password
		EU		-	√	√	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 expanion 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 theconfiguration 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 pression 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, ID5 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**
DI1	Recovery ON-OFF Enable	Digital input with voltage-free contact
DI2	Recovery differential pressure switch + paddle flow switch	Digital input with voltage-free contact
DI3	Recovery thermal switch pump 1	Digital input with voltage-free contact

Digital inputs ELECTRONIC EXPANION VALVE DRIVER (XVD420)		
DESCRIPTION		**CHARACTERISTICS**
DI1	Enabling regolation	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

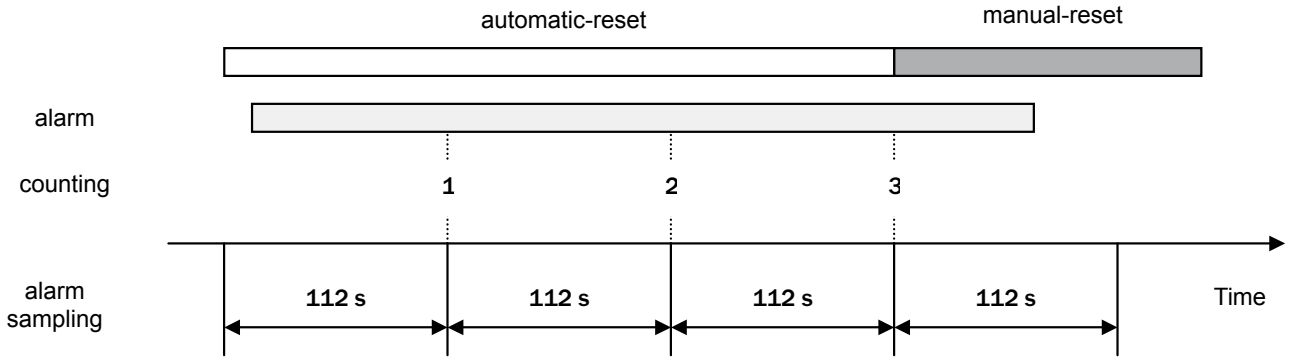
Alarms that can damage the unit or system require **manual resetting** or an action by the operator to reset the controller (pressing the UP and DOWN buttons at the same time). It is advisable to carefully check the cause of the alarm and make sure the problem is eliminated before restarting the unit. 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*112 seconds and 3*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 Er90 is generated and the subsequent events are memorised overwriting the oldest alarms.
The alarms history can be cancelled by means of the Eur 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
Er05	Low pressure + sequence meter + fans thermal switch + EEV driver alarm (if present)		A/M (2)	DI3	OFF	OFF			
Er 10	Compressor 1 thermal protection	High pressure	M	DI1	OFF comp.1				
Er 11	Compressor 2 thermal protection		M	DI2	OFF comp.2				
Er20	Plant circuit water differential pressure switch / paddle switch		A/M	DI6	OFF	OFF if manual reset	OFF		
Er21	Plant circuit pump 1 thermal protection		M	DI4	OFF	OFF	OFF p.1	OFF	
Er22	Plant circuit pump 2 thermal protection		M	DI5	OFF	OFF	OFF p.2	OFF	
Er25	Recovery water differential pressure switch / paddle switch		M	DIE2	OFF	OFF	ON	OFF	
Er26	Recovery pump 1 thermal protection		M	DIE3	OFF	OFF	ON	OFF	
Er30	Plant circuit antifreeze		M	AI2	OFF				
Er31	Recovery circuit antifreeze		M	AIE2	OFF				
Er45	Clock fault error		A						
Er46	Clock to be set error		A						
Er47	Remote keyboard communication error		A						
Er60	Plant exchanger inlet water probe fault		A	AI1	OFF	OFF	OFF	OFF	OFF
Er61	Plant exchanger outlet water probe fault		A	AI2	OFF	OFF	OFF	OFF	OFF
Er62	Liquid temperature probe		A	AI3					
Er63	Recovery exchanger inlet water probe fault		A	AI1	OFF	OFF	OFF	OFF	OFF
Er64	Recovery exchanger outlet water probe fault		A	AI2	OFF	OFF	OFF	OFF	OFF
Er68	External air probe fault		A	AI4					
Er80	Configuration error		A		OFF	OFF	OFF	OFF	OFF
Er90	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 AL 12.
The alarm is bypassed for parameter AL 11 seconds from activation of the compressor or the reverse cycle valve.

Er 10 **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 .

Er 11 **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 .

Er 10 Er 11***** **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.

Er 21 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.

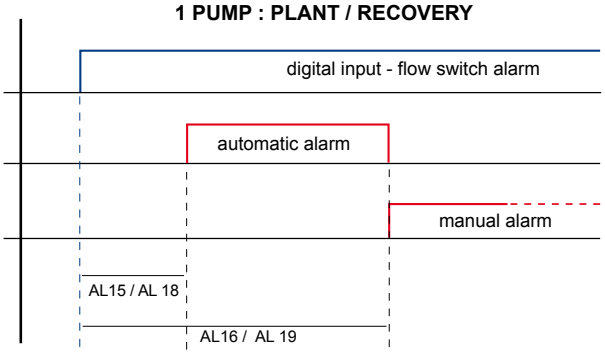
ALARMS

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

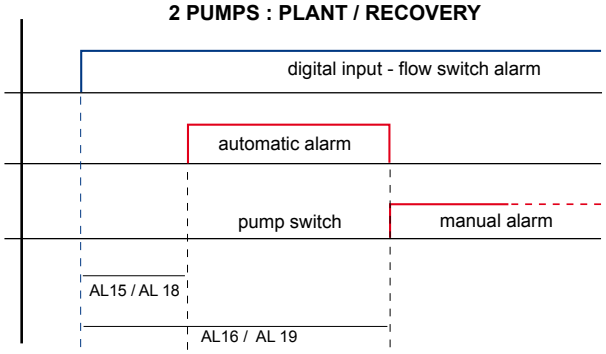
Unit with 1 pump:
The alarm s active if the input is active for at least the time *AL 15* (plant) / *AL 18* (source). It remains automatic for the time *AL 16* (plant) / *AL 19* (source): if, during this time the alarm is deactivated the unit can restart to work, instead if remains active becomes manual.

Unit with 2 pumps:
The alarm s 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.

1 PUMP : PLANT / RECOVERY



2 PUMPS : PLANT / RECOVERY



**<u>If there is the flow switch alarm during the first startup of the unit control the cleaness of the water plant.
Particularly diring 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 excahanger is working as evaporator).</u>**

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 si not communication between the devices connected trough 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	Allarm	Cause	Effect	Alarm type	Alarm on main controller	Input on main controller	Troubleshooting
Er01	AI1	Probe AI1 fault	Probe fault / shortcircuit / non connected	Valve closed	Automatic	er05	DI3	Check wiring of the probe, replace probe AI1
Er03	AI3	Probe AI3 fault	Probe fault / shortcircuit / non connected	Valve closed	Automatic	er05	DI3	Check wiring of the probe, replace probe AI3
Er06	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
Er07	-	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	Excedeed 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

Inverter alarm table

Code	Input on inverter	Alarm	Cause	Effect	Alarm on main controller	Input on main controller	Troubleshooting
oc	U-V-W	Over current	Abnormal increase in current	Pump stopped	Er21	DI4	1. Check if motor power corresponds with the AC motor drive output power 2. Check the wiring connections to U/T1, V/T2, W/T3 for possible short circuits 3. Check the wiring connections between the AC motor drive and motor for possible short circuits, also to ground 4. Check for loose contacts between AC motor drive and motor 5. Increase the Acceleration Time 6. Check for possible excessive loading conditions at the motor 7. If there are still any abnormal conditions when operating the AC motor drive after a shortcircuit is removed and the other points above are checked, it should be sent back to manufacturer
ou	-	Over voltage	The DC bus voltage has exceeded its maximum allowable value	Pump stopped	Er21	DI4	1. Check if the input voltage falls within the rated AC motor drive input voltage range 2. Check for possible voltage transients 3. DC-bus over-voltage may also be caused by motor regeneration. Either increase the Decel. Time or add an optional brake resistor (and brake unit) 4. Check whether the required braking power is within the specified limits

ALARMS

Code	Input on inverter	Alarm	Cause	Effect	Alarm on main controller	Input on main controller	Troubleshooting
oH1	-	Overheating	Heat sink temperature too high	Pump stopped	Er21	DI4	1. Ensure that the ambient temperature falls within the specified temperature range 2. Make sure that the ventilation holes are not obstructed 3. Remove any foreign objects from the heatsinks and check for possible dirty heat sink fins 4. Check the fan and clean it 5. Provide enough spacing for adequate ventilation
oH2	-	Overheating	Heat sink temperature too high	Pump stopped	Er21	DI4	1. Ensure that the ambient temperature falls within the specified temperature range 2. Make sure that the ventilation holes are not obstructed 3. Remove any foreign objects from the heatsinks and check for possible dirty heat sink fins 4. Check the fan and clean it 5. Provide enough spacing for adequate ventilation
LU	-	Low voltage	The AC motor drive detects the the DC bus voltage has fallen below its minimum value	Pump stopped	Er21	DI4	1. Check whether the input voltage falls within the AC motor drive rated input voltage range 2. Check for abnormal load in motor 3. Check for correct wiring of input power to R-ST (for 3-phase models) without phase loss
oL	-	Overload	The AC motor drive detects excessive drive output current	Pump stopped	Er21	DI4	1. Check whether the motor is overloaded 2. Reduce torque compensation setting in Pr.07.02 3. Use the next higher power AC motor drive model
oL1	-	Overload 1	Internal electronic overload trip	Pump stopped	Er21	DI4	1. Check for possible motor overload 2. Check electronic thermal overload setting 3. Use a higher power motor 4. Reduce the current level so that the drive output current does not exceed the value set by the Motor Rated Current Pr.07.00
oL2	-	Overload 2	Motor overload	Pump stopped	Er21	DI4	1. Reduce the motor load 2. Adjust the over-torque detection setting to an appropriate setting (Pr.06.03 to Pr.06.05)
HPF1	-	CC (Current clamp)	Internal error	Pump stopped	Er21	DI4	Return to factory
HPF2	-	OV hardware error	Internal error	Pump stopped	Er21	DI4	Return to factory
HPF3	-	GFF hardware error	Internal error	Pump stopped	Er21	DI4	Return to factory
HPF4	-	OC hardware error	Internal error	Pump stopped	Er21	DI4	Return to factory
bb	-	External base block	External base block	Pump stopped	Er21	DI4	1. When the external input terminal (B.B) is active, the AC motor drive output will be turned off 2. Deactivate the external input terminal (B.B) to operate the AC motor drive again
ocA	-	Over-current during acceleration	Over-current during acceleration	Pump stopped	Er21	DI4	1. Short-circuit at motor output: Check for possible poor insulation at the output lines 2. Torque boost too high: Decrease the torque compensation setting in Pr.07.02 3. Acceleration Time too short: Increase the Acceleration Time 4. AC motor drive output power is too small: Replace the AC motor drive with the next higher power model
ocd	-	Over-current during deceleration	Over-current during deceleration	Pump stopped	Er21	DI4	1. Short-circuit at motor output: Check for possible poor insulation at the output line 2. Deceleration Time too short: Increase the Deceleration Time 3. AC motor drive output power is too small: Replace the AC motor drive with the next higher power model
ocn	-	Over-current during constant speed operation	Over-current during constant speed operation	Pump stopped	Er21	DI4	1. Short-circuit at motor output: Check for possible poor insulation at the output line 2. Sudden increase in motor loading: Check for possible motor stall 3. AC motor drive output power is too small: Replace the AC motor drive with the next higher power model
EF	-	External fault	External fault	Pump stopped	Er21	DI4	1. When multi-function input terminals (MI3-MI9) are set to external fault, the AC motor drive stops output U, V and W 2. Give RESET command after fault has been cleared

ALARMS

Code	Input on inverter	Alarm	Cause	Effect	Alarm on main controller	Input on main controller	Troubleshooting
cF1.0	-	Internal EEPROM can not be programmed	Internal error	Pump stopped	Er21	DI4	Return to factory
cF1.1	-	Internal EEPROM can not be programmed	Internal error	Pump stopped	Er21	DI4	Return to factory
cF2.0	-	Internal EEPROM can not be read	Internal error	Pump stopped	Er21	DI4	1. Press RESET key to set all parameters to factory setting 2. Return to the factory
cF2.1	-	Internal EEPROM can not be read	Internal error	Pump stopped	Er21	DI4	1. Press RESET key to set all parameters to factory setting 2. Return to the factory
cF3.0	-	U-phase error	Internal error	Pump stopped	Er21	DI4	Return to factory
cF3.1	-	V-phase error	Internal error	Pump stopped	Er21	DI4	Return to factory
cF3.2	-	W-phase error	Internal error	Pump stopped	Er21	DI4	Return to factory
cF3.3	-	OV or LV	Internal error	Pump stopped	Er21	DI4	Return to factory
cF3.4	-	Temperature sensor error	Internal error	Pump stopped	Er21	DI4	Return to factory
cF3.5	-	Temperature sensor error	Internal error	Pump stopped	Er21	DI4	Return to factory
OFF	-	Ground fault	Ground fault	Pump stopped	Er21	DI4	When (one of) the output terminal(s) is grounded, short circuit current is more than 50% of AC motor drive rated current, the AC motor drive power module may be damaged NOTE: The short circuit protection is provided for AC motor drive protection, not for protection of the user 1. Check whether the IGBT power module is damaged 2. Check for possible poor insulation at the output line
cFA	-	Auto accel/decel failure	Auto accel/ decel failure	Pump stopped	Er21	DI4	1. Check if the motor is suitable for operation by AC motor drive 2. Check if the regenerative energy is too large 3. Load may have changed suddenly
cE--	-	Communication error	No communication	Pump stopped	Er21	DI4	1. Check the RS485 connection between the AC motor drive and RS485 master for loose wires and wiring to correct pins 2. Check if the communication protocol, address, transmission speed, etc. are properly set 3. Use the correct checksum calculation 4. Please refer to group 9 in the chapter 5 for detail information
codE	-	Software protection failure	Internal error	Pump stopped	Er21	DI4	Return to factory
AErr	AVI-ACM	Analog signal error	No signal on ACI	Pump stopped	Er21	DI4	Check the wiring of ACI
FbE	AVI-ACM	PID feedback signal error	No signal on ACI	Pump stopped	Er21	DI4	1. Check parameter settings (Pr.10.01) and AVI/ACI wiring 2. Check for possible fault between system response time and the PID feedback signal detection time (Pr.10.08)
PHL	-	Phase loss	Loss of a input phase	Pump stopped	Er21	DI4	Check input phase wiring for loose contacts
AUE	-	Auto tuning error	Auto tuning feature failure	Pump stopped	Er21	DI4	1. Check cabling between drive and motor 2. Retry again
CP10	-	Communication time-out error on the control board or power board	Communication time-out	Pump stopped	Er21	DI4	1. Press RESET key to set all parameters to factory setting 2. Return to the factory
PtC1	-	Motor overheat protection	Possible motor overheat	Pump stopped	Er21	DI4	1. Check if the motor is overheat 2. Check Pr.07.12 to Pr.07.17 settings
PtC2	-	Motor overheat protection	Possible motor overheat	Pump stopped	Er21	DI4	1. Check if the motor is overheat 2. Check Pr.07.12 to Pr.07.17 settings

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 ⏻

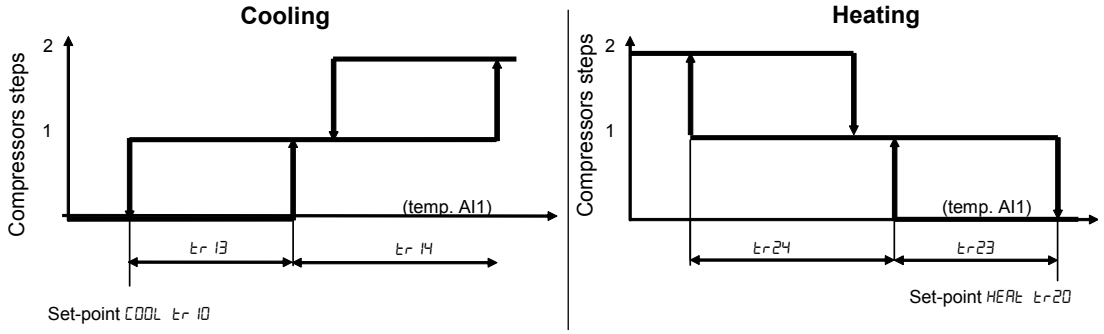
This function allows remote selection of the STANDBY mode. If the input is activated (contact open) the controller is in STANDBY mode and the operation mode cannot be modified from keyboard.
The function is available if one of the configurable inputs is configured for this, contact closed = unit ON (display 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”.

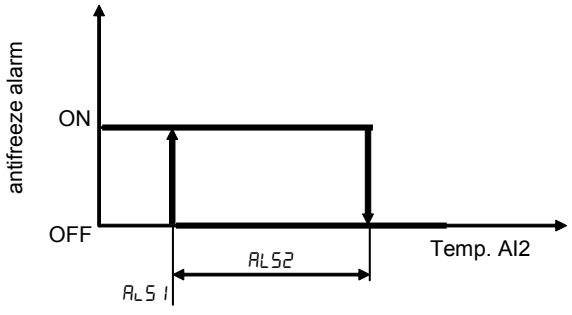
Set point

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).



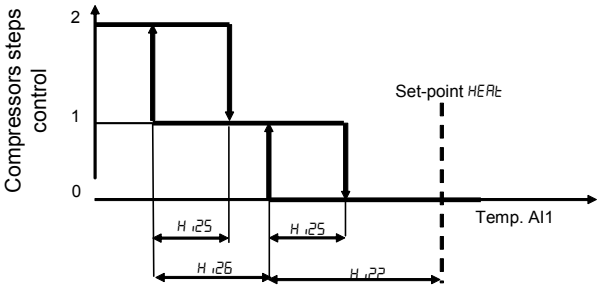
Antifreeze ∿∿

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 H i20 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.



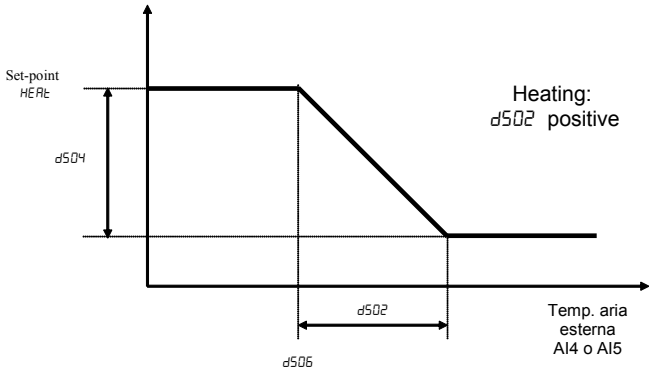
AVAILABLE FUNCTION

Dinamic setpoint

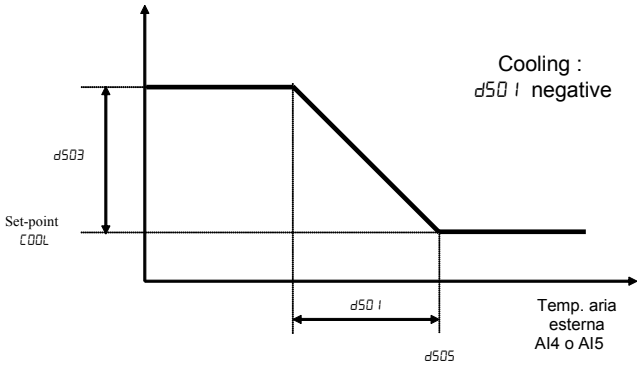
The parameter d500 allows the dynamic setpoint; if d500=1 the setpoint is corrected as a function of external air temperature (if present). To set the external air temp follow the indications of the section “Configurable Inputs”.

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 SEtr.

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 Pi 20 the first compèressor 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 Pi 21 the pump is switched off.

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

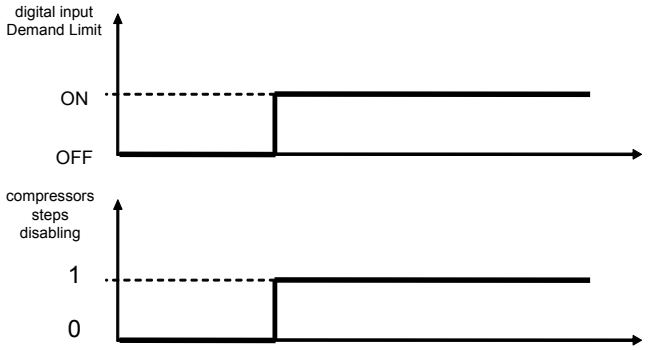
Plant pump modulating control

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 Pi 31 in cooling, Pi 41 in heating.
For instance with Pi 31=70 and Pi 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”.

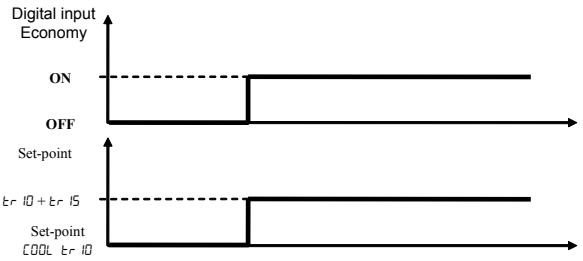


AVAILABLE FUNCTION

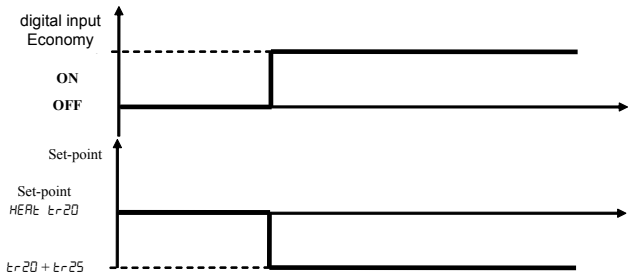
Funzione economy

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 tr 15 (es. tr 15 + 5 °C).
In heating mode the setpoint is decreased of the value of the parameter tr25 (es. tr25 - 6°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:
tr 15 usually positive value
tr 10 set-point COOL



Heating mode HEAt:
tr25 usually negative value
tr20 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

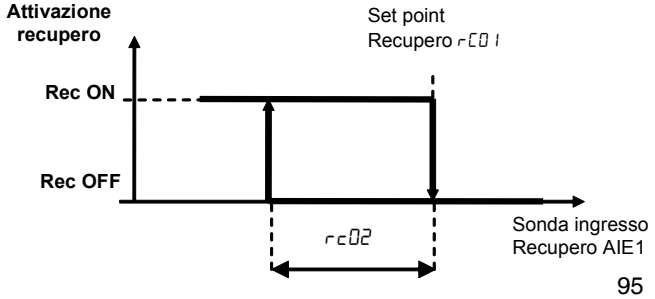
The controller is able to log and save up to 90 alarm events. Alarms are visible in the menu “Par \ EU”.
Push SET to display alarm EU00 (if present) that is always the latest, EU01 is the one before and so on.
Scroll to UP and DOWN keys to display all the other alarms, push SET to display more information 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
└ alarm code	Er01
└ start event time	20:01
└ start event date	28.03
└ stop event time	20:09
└ stop event date	28.03
└ type of alarm	AUto / MAnU

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 St01 parameter - Enable change analogue input setting.

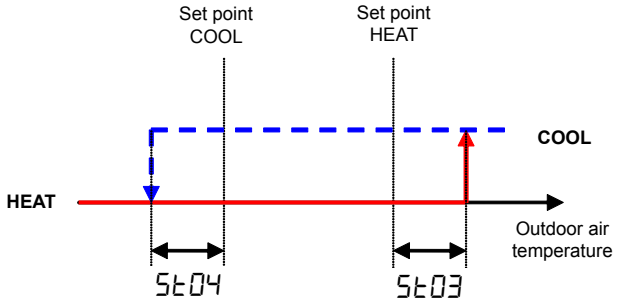
St01 = 0 automatic change-over disable
St01 = 1 automatic change-over enable

The automatic change-over can take place from the analog signal of the probe set by parameters St02 - probe selection for automatic change-over:

St02 = 0 outdoor air temperature
St02 = 1 inlet water temperature plant exchanger
St02 = 2 outlet water temperature plant exchanger

The entrance in cooling and heating mode with two different differentials set by parameter St03 - Differential for automatic chan-over in heating - and St04 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 (St02 = 0)



Set point COOL and set point HEAT are the real set-point and can differ from set-point tr10 and tr20 due to climatic regulation enabled (economy function and dinamic set point)

Note:
- St04 is summed to set point COOL; St03 is summed to set point HEAT.

- (St03 + St04) < (Set HEAT – Set COOL), otherways the sum of the absolute value of the two differential may not overcome the value of (Set HEAT - 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 CL.
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		descroptions	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		tE 10__tE 14	tE38__tE42	tE66__tE70
	Hour / minutes	tE 10__tE 11	tE38__tE39	tE66__tE67
	Mode operating ON/Standby	tE 12	tE40	tE68
	SetPoint Cool	tE 13	tE41	tE69
	SetPoint Heat	tE 14	tE42	tE70
EVENT 2		tE 17__tE21	tE45__tE49	tE73__tE77
	Hour / minutes	tE 17__tE 18	tE45__tE46	tE73__tE74
	Mode operating ON/Standby	tE 19	tE47	tE75
	SetPoint Cool	tE20	tE48	tE76
	SetPoint Heat	tE21	tE49	tE77
EVENT 3		tE24__tE28	tE52__tE56	tE80__tE84
	Hour / minutes	tE24__tE25	tE52__tE53	tE80__tE81
	Mode operating ON/Standby	tE26	tE54	tE82
	SetPoint Cool	tE27	tE55	tE83
	SetPoint Heat	tE28	tE56	tE84
EVENT 4		tE31__tE35	tE59__tE63	tE87__tE91
	Hour / minutes	tE31__tE32	tE59__tE60	tE87__tE88
	Mode operating ON/Standby	tE33	tE61	tE89
	SetPoint Cool	tE34	tE62	tE90
	SetPoint Heat	tE35	tE63	tE91

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°Cin 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:

tE00**=1 enabling scheduling**

tE01, tE02, tE03, tE04, tE05**, = 1 time zone 1**

EVENT 1 – unit ON
tE 10=8 hour
tE 11=30 minutes

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

tE 13= 12 set point cool 12°C
tE 14=40 set point heat 40°C

EVENT 2 – change set point
tE17=12 hour
tE18=30 minutes

tE19= 0 ON, unit is ON (pay attention: 0=ON, 1=stand-by)

tE 20= 12 set point cool 14°C
tE 21=40 set point heat 37°C

EVENT 3 – change set point
tE 24=13 hour
tE 25=30 minutes

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

tE 27= 12 set point cool 12°C
tE 28=40 set point heat 40°C

EVENT 4 – unit in stand-by
tE 31=18 hour
tE 32=00 minutes

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

tE 34= 12 set point cool 12°C
tE 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 CL 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	CL03 = 0 CL33 = 0 CL53 = 0	----	----
		External probe sensor (provided with accessory SND3)	CL03 = 2 CL33 = 9 CL53 = 0	NTC probe	CL23 (-12,0... +12,0 [°C]) CL I3 = Start value scale AI4 [°C] CL I2 = Full scale value AI4 [°C]
		External probe air as analog input 4-20 mA	CL03 = 3 CL33 = 9 CL53 = 0	----	CL23 (-12,0... +12,0 [°C]) CL I3 = Start value scale AI4 [°C] CL I2 = Full scale value AI4 [°C]
		External probe air as analog input 0-10 V	CL03 = 4 CL33 = 9 CL53 = 0	----	CL23 (-12,0... +12,0 [°C]) CL I3 = Start value scale AI4 [°C] CL I2 = Full scale value AI4 [°C]
		External probe air as analog input 0-5 V	CL03 = 5 CL33 = 9 CL53 = 0	----	CL23 (-12,0... +12,0 [°C]) CL I3 = Start value scale AI4 [°C] CL I2 = Full scale value AI4 [°C]
		External probe air as analog input 0-1 V	CL03 = 6 CL33 = 9 CL53 = 0	----	CL23 (-12,0... +12,0 [°C]) CL I3 = Start value scale AI4 [°C] CL I2 = Full scale value AI4 [°C]
		ATC	CL03 = 1 CL33 = 0 CL53 = +21	input active open contact	open contact = ATC active close contact = ATC not active
		ON/STBY remote (digital input)	CL03 = 1 CL33 = 0 CL53 = +1	input active open contact	open contact = STAND-BY close contact = ON
		Summer / Winter remote (digital input)	CL03 = 1 CL33 = 0 CL53 = +3	input active close contact	close contact = HEAT (Winter)
		Demand Limit 50% (digital input)	CL03 = 1 CL33 = 0 CL53 = +21	input active close contact	close contact = Demand Limit 50%
		Economy (digital input)	CL03 = 1 CL33 = 0 CL53 = +22	input active close contact	close contact = economy
AI5	S2	Not configured	CL04 = 0 CL34 = 0 CL54 = 0	----	----
		External probe sensor (analogic input)	CL04 = 2 CL34 = 9 CL54 = 0	NTC probe	CL24 (-12,0... +12,0 [°C])
		ON/STBY remoto (digital input)	CL04 = 1 CL34 = 0 CL54 = +1	input active open contact	open contact = STAND-BY close contact = ON
		Summer / Winter remote (digital input)	CL04 = 1 CL34 = 0 CL54 = +3	input active open contact	close contact = HEAT (Winter)
		Demand Limit 50% (digital input)	CL04 = 1 CL34 = 0 CL54 = +21	input active open contact	close contact = Demand Limit 50%
		Economy (analogic input)	CL04 = 1 CL34 = 0 CL54 = +22	input active open contact	close contact = economy
DI5		Not configured	CL44 = 0	----	----
	QF2. 2	thermal pump 2	CL44 = -48	input active open contact	open contact = thermal pump 2
		ON/STBY remote	CL44 = -1	input active open contact	open contact = STAND-BY
		Summer / Winter remote	CL44 = +3	input active close contact	close contact = HEAT (Winter)
		Demand Limit 50%	CL44 = +21	input active close contact	close contact = Demand Limit 50%
		Economy	CL44 = +22	input active close contact	close contact = economy

* If present the module of pumping two pumps can not get that DI5 must be configured CL44 = -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

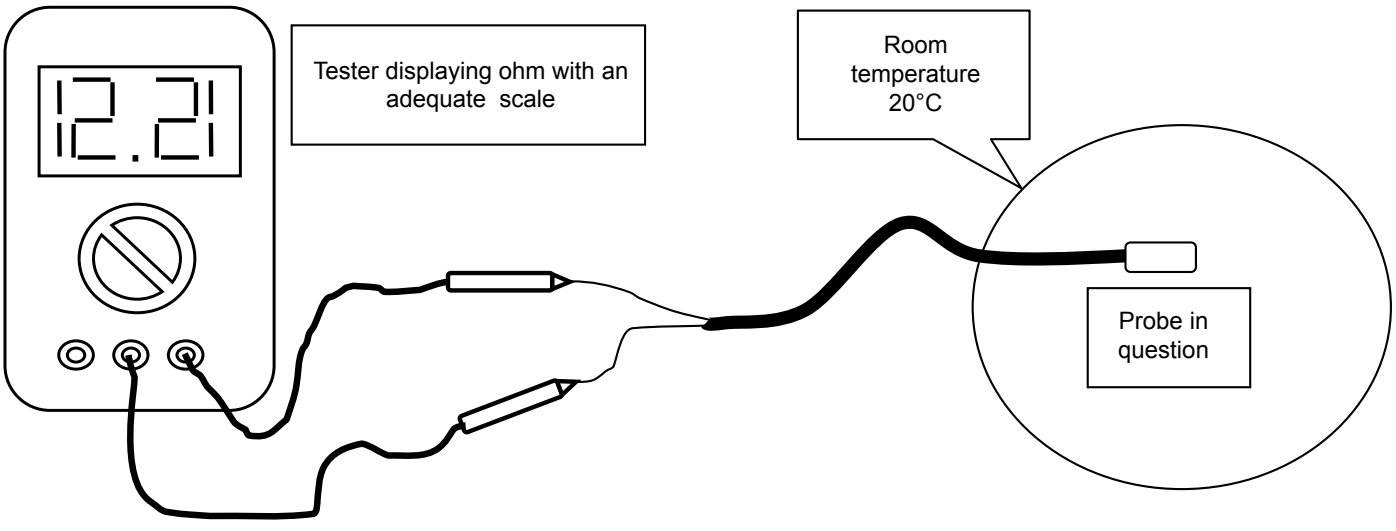
NTC10K-25°C type temperature probes are used.
When the probe bulb is at a temperature of 25°C the electrical resistance measurable at the probe ends with a multimeter is approx. 10 kW. The thermistor of these probes has a negative temperature coefficient: the electrical resistance value decreases as 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					
tr 10	Temperature control setpoint in Cool	RW	17062	042A6	16	0	Y	-1	°C
tr20	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
COOL	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
Er 10	Compressor 1 thermal switch alarm - high pressure - thermostat	R	33105,2	08151	1 bit	2	N	0	flag
Er 11	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
Er60	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.
Incompatible products	Explosives, flammable materials, organic peroxides.

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.
Eye protection	Total protection glasses.
Hand protection	Rubber gloves.
Hygiene measures	Do not smoke.

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 halocarbides; 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.

14 INFORMATION FOR TRANSPORT

Designation for transport	LIQUEFIED GAS N.A.S. (DIFLUOROMETHANE, PENTAFLUOROETHANE)
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.
CEFIC 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.

NOTE

NOTE

DECLARATION OF CONFORMITY

CE

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 :

DE

“EG” KONFORMITÄTSERKLÄRUNG

Wir, die Unterzeichner dies er Erklärung, erklären unter unseren ausschlie ßlichen Verantworfung, daß die genannte Maschine den Bestimmungen der folgenden EG-Richtlinien entspricht :

FR

DECLARATION “CE” DE CONFORMITE

Nous soussignés déclarons, sous notre entière responsabilité, que la machine en objet est conforme aux prescriptions des Directives :

IT

DICHIARAZIONE “CE” DI CONFORMITÀ

Noi sottoscritti dichiariamo, sotto la nostra responsabilità, che la macchina in questione è conforme alle prescrizioni delle Direttive :

ES

DECLARACION “CE” DE CONFORMIDAD

Quienes subscribimos la presente declaracion, declaramos, baio nuestra exclusiva responsabilidad, que la maquina en objeto respeta lo prescrito par las Directivas :

PT

DECLARAÇÃO “CE” DE CONFORMIDADE

Nós, signatários da presente, declaramos sob a nassa exclusiva responsabilidade, que a má quina em questão está em conformidade com as prescrições das Directrizes :

NL

“EG” CONFORMITEITSVERKLARING

Wij ondergetekenden verklaren hierbij op uitsluitend eigen verantwoording dat de bovengenoemde machine conform de voorschriften is van de Richtlijnen:

DK

“CE” OVERENSSTEMMELSESERKLERING

Underfegnede forsikrer under eget ansvar al den ovennævnte maskine er i overensstemmelse med vilkårene i direktiveme :

SE

FÖRSÄKRAN OM “CE” ÖVERENSSTÄMMELSE

Underfecknade försäkrar under eget ansvar alt ovannämnda maskinskinen er i overensstemmelse med vilkarene i direktivene :

NO

BEKREFTELSE OM ÆCEØ OVERENSSTEMMELSE

Underfegnede forsikrer under eget ansvar al den ovennevnte maskinen er i overensstemmelse med vilkarene i direktivene :

FI

“CE” VAATIMUSTENMUKAISUUSVAKUUTUS

Allekirjoittaneet vakuutamme omalla vastuullamme että yllämainittu kone noudattaa ehtoja direktiiveissä :

GR

ΔΗΛΩΣΗ ΣΥΜΒΑΤΟΤΗΤΑΣ “ΕΕ”

Εμετς που υπογραφουμε την παρουσα, δηλωνουμε υπο την αποκλειστικη μας ευθυνη, οτι το μηχανημα συμμορφουται οτα οσ α ορτζουν οι Οδηγιες :

HR

IZJAVA O “CE” SUGLASNOSTI

Mi niže potpisani izjavljujemo, pod našom odgovornošu, da ova Mašina odgovara zahtijevima iz Direktiva :

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 Ferroli

3QE22170 rev.03

Ferroli

COD. 3QE31560

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