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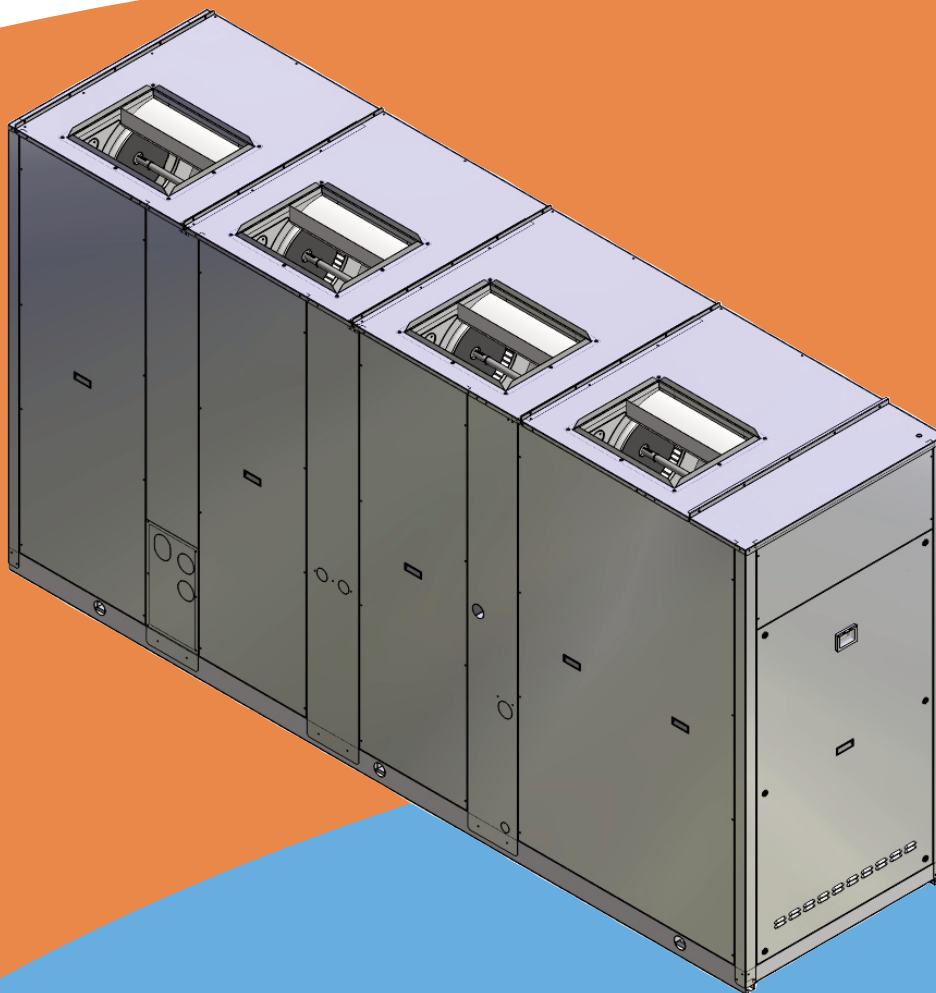
RGC

AIR COOLED WATER CHILLERS AND HEAT PUMPS
WITH CENTRIFUGAL FANS

53.5 ÷ 200 kW IN COOLING MODE

53.2 ÷ 202 kW IN HEATING MODE

EUROVENT
CERTIFIED PERFORMANCE



TECHNICAL MANUAL

TABLE OF CONTENTS

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

GENERAL SPECIFICATIONS .....	.5
PRESENTATION OF THE UNIT .....	.5
IDENTIFICATION CODE OF THE UNIT .....	.5
DESCRIPTION OF THE COMPONENTS .....	.6
HYDRAULIC AND COOLING CIRCUIT COMPONENTS .....	.8
VERSION WITH DESUPERHEATER (AVAILABLE FOR BOTH IR UNITS AND IP UNITS) .....	.9
ACCESSORIES AND OPTIONAL EQUIPMENT .....	.10
MECHANICAL ACCESSORIES .....	.10
ELECTRICAL ACCESSORIES .....	.12
MECHANICAL OPTIONS .....	.12
ELECTRICAL OPTIONS .....	.12
ACCESSORIES - MODEL COMBINATIONS .....	.13
TECHNICAL SPECIFICATIONS AND STANDARD PERFORMANCES - IR COOLING UNIT ONLY .....	.15
TECHNICAL SPECIFICATIONS OF UNIT AB STANDARD UNIT / AB STANDARD UNIT + KS SILENCER KIT .....	.15
STANDARD PERFORMANCES AB STANDARD UNIT / AB STANDARD UNIT + KS SILENCER KIT .....	.16
VERSION WITH DESUPERHEATER (VD) .....	.18
RECOVERED HEATING CAPACITY IN VERSION WITH DESUPERHEATER (VD) .....	.18
SPECIFIC DATA FOT BRINE VERSION (VI) .....	.19
TECHNICAL SPECIFICATIONS AND STANDARD PERFORMANCES - IP HEAT PUMP UNITS .....	.20
TECHNICAL SPECIFICATIONS OF UNIT AB STANDARD UNIT / AB STANDARD UNIT + KS SILENCER KIT .....	.20
STANDARD PERFORMANCES IN COOLING MODE AB STANDARD UNIT / AB STANDARD UNIT + KS SILENCER KIT .....	.21
STANDARD PERFORMANCES IN HEATING MODE AB STANDARD UNIT / AB STANDARD UNIT + KS SILENCER KIT .....	.23
VERSION WITH DESUPERHEATER (VD) .....	.24
RECOVERED HEATING CAPACITY IN VERSION WITH DESUPERHEATER (VD) .....	.24
NOISE LEVELS .....	.25
STANDARD AB VERSION .....	.25
AB VERSION + LOW NOISE KIT KS .....	.25
OPERATING RANG .....	.26
OPERATING RANGE .....	.26
WATER PRESSURE DROP PLATE HEAT EXCHANGER .....	.27
WATER PRESSURE DROP OF THE DESUPERHEATER .....	.28
WORKING HEAD OF THE PUMPING MODULE MP-AM AND MP-SS .....	.29
WORKING HEAD OF THE PUMPING MODULE MP-AM AP AND MP-SS AP .....	.30
MAXIMUM VOLUME OF WATER .....	.31
MAXIMUM WATER VOLUME OF THE SYSTEM WITH HYDRONIC KIT .....	.31
DIMENSIONAL DATA .....	.32
OVERALL DIMENSIONS .....	.32
DESCRIPTION OF THE COMPONENTS .....	.33
POSITION OF CONDENSATE DRAIN .....	.33
MINIMUM OPERATIVE SPACE .....	.33
WEIGHT DURING OPERATION AND TRANSPORT .....	.34

GENERAL SPECIFICATIONS

Presentation of the unit

This new series of industrial chillers and heat pumps has been designed to meet the demands of global markets in the small-medium power industrial and commercial plants. Units are compact and highly configurable, built to fit different types of plants so to meet the needs of highly qualified engineers.

Units are water chillers and heat pumps air condensed with centrifugal fans suitable for outdoor and indoor installation: the structure and panels are robust, made of galvanized and painted steel; all fasteners are made of stainless steel or galvanized steel, the frame containing the electrical equipment and all the components exposed to weather have a minimum **IP54** degree of protection.

This series is composed of 12 models divided in four sizes with nominal cooling capacity from **53.5 to 200 kW** and heating capacity from **53.2 to 202 kW**.

The units product cold water from 5 to 20°C (in summer) and hot water from 30 to 53°C (in winter) and they can be equipped with continuous adjustment of centrifugal fans speed in order to allow the units to operate both with low outdoor temperature in cooling mode and with high outdoor temperature in heating mode as well as to reduce noise emissions (IMV accessory).

All the units are equipped with 2 scroll compressors arranged in pairs (tandem) on 1 circuit operating with **environmental friendly R410A** gas, brazed plate heat exchanger completely insulated and protected by water side with a differential pressure control and with an antifreeze electrical heater, coil heat exchanger made of louver aluminum fins and copper tubes, double inlet centrifugal fans with forward curved blades and transmission with belts and pulleys by a thermal protected motor, on-board electrical control panel equipped with control system to manage the main functions.

Hydronic group (MP) composed of fittings and connections is available as an accessory with 1 or 2 pumps and also with high available head pumps; the accessory Water Storage Tank (SAA) is completely insulated and available on delivery side or for primary-secondary hydraulic circuit (Victaulic connections already in place) depending on the kind of plants to serve.

A variety of other accessories are available to extend the capabilities of the units.

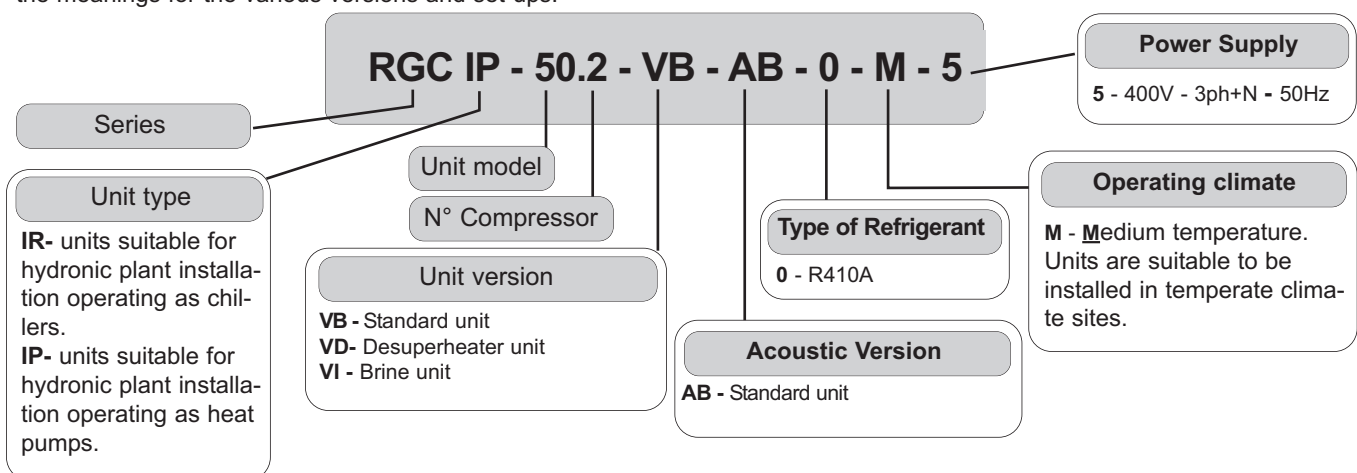
During the design of the units particular attention has been given to achieve high system efficiency, to reduce overall energy consumptions and sound levels in order to meet the increasingly restrictive laws in terms of noise. Upon request, you can choose for a Standard Unit (AB) or a Low Noise Kit (KS) which provides sound attenuation thanks to sound absorbing insulation in compressors area and sound jackets on compressors.

All units are accurately build in compliance with the existing standards and are individually tested in factory. Only electrical and hydraulic connections are required for installation.



Identification code of the unit

The codes that identify the units are listed below and include the sequences of letters that determine the meanings for the various versions and set-ups.



The available special versions are described below:

VB: Basic version.

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

Produces cold water in the same way as the standard version plus hot water **from 40 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 15 to 20% of the heating capacity that would otherwise be dispersed in the air.

VI: Version that produces water at a low temperature (BRINE) (available for IR units only)

The unit can produce cold water with brine at a temperature of **-8 to 5°C**.

GENERAL SPECIFICATIONS

Description of the components

The complete series of industrial chillers and heat pumps for use in hydronic systems includes **12 constructional sizes** ranging from **53.5 to 200 kW** in the cooling mode and **from 53.2 to 202 kW** in the heating mode.

Main components:

1. Fans. It is composed of single and/or twin dual-intake centrifugal fans with forwards blades curved, balanced both statically and dynamically in compliance with ISO 1940 class 6.3 standards. The screw conveyor, rotor and frame are made of galvanized plate, while the shaft is made of C40 steel. The fan is coupled via belt and pulley to a 4-pole, three-phase, asynchronous motor secured on a special tightener slide, with protection class IP55, insulation class F and suitable for continuous service (S1) with sufficient thermal margin in the event of overloads of limited duration. The pulley fitted on the motor has a variable diameter and, within certain limits, enables adjusting the speed of rotation of the fan in order to obtain the desired air flow rate and useful static head.

2. Electric control and monitoring panel. This is housed in a metal casing in which the various electrical components are positioned on one metal plate.

2a. The power section includes:

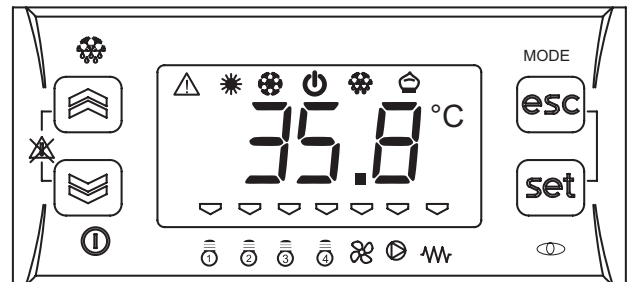
- Main door-locking circuit-breaker.
- Fuse-holder that can be isolated with protection fuse triad for each compressor.
- Fuse-holder that can be isolated with protection fuse for compressor oil heaters and antifreeze (if installed).
- Control contactor for each compressor.
- Protection fuse for the ventilation unit.
- Fan speed regulating board.
- Contactor and magnetothermic switch to protect the pump (if the Hydronic Kit accessory is installed).
- Pump contactor (if the Hydronic Kit accessory is installed).
- Phase presence and sequence monitoring device on power supply

2b. The auxiliary section includes:

- Fuses on the auxiliary transformer.
- Fuses for fans protection
- Electromagnetic noise filter
- Adjusting fan speed board
- Insulating and safety transformer to power the auxiliary circuit.

2c. The microprocessor monitoring section includes:

- User interfacing terminal with display.
- On-off key.
- Operating mode selector key.
- Compressor on-off display **LED**.
- Operational mode **LED**
- Antifreeze heaters activated indicator **LED**.
- Fans on-off display **LED**
- Pumps on-off display **LED**
- Check-control with fault code display
- Defrosting, alarm, economy, stand-by **LED**.
- **Remote ON/OFF functions** - Summer/Winter (E/I) remote selection (IP unit only).



Control system main functions: temperature control of the water produced by the unit, smart defrosting control, compressor and pump operating hour counter, timing and cycling of start-ups, input parameters by keyboard, alarms management, operating mode change (only IP unit), dynamic set-point (climatic control), "Adaptive" function for better temperature control for unit without storage tank.

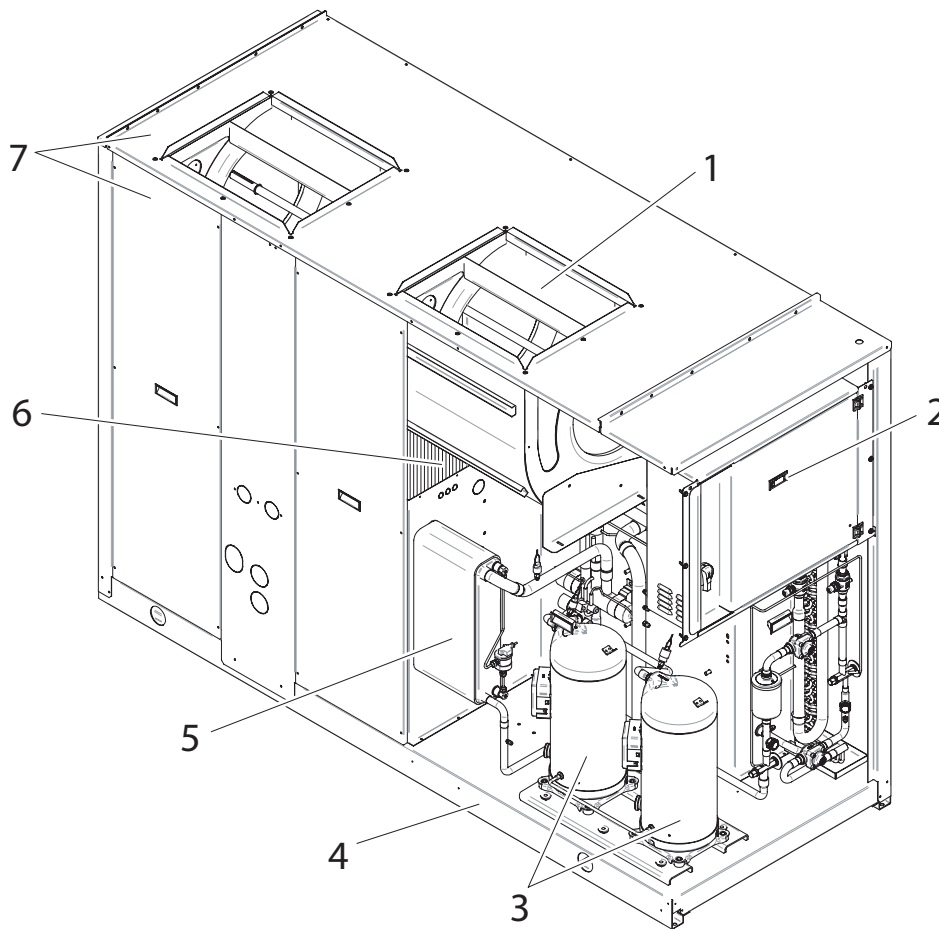
Digital input functions: low pressure, high pressure, high temperature on compressor supply, phase presence and sequence monitoring device on power supply, differential water pressure control, compressors thermal protection, fans thermal protection, pumps thermal protection (only if installed MP accessory), remote ON/OFF and remote operating mode change (only IP unit).

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).

Analogic input functions: in and out water temperature, coil temperature probe, external air temperature probe (if present).

Analogic output functions: continuous adjustment of centrifugal fans rotating speed by inverter (only if installed IMV accessory).

GENERAL SPECIFICATIONS



3. Compressors. They are the **SCROLL** type with orbiting coil equipped with built-in thermal protection and oil heater. The KS kit includes: a soundproofing jacket for the compressors and acoustic cladding for the entire compressor compartment to reduce the 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 structure made of galvanized sheet metal panels coated with polyurethane powder paint to ensure maximum protection against adverse weather conditions.

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.

7. Covering panels, made of galvanized sheet metal coated with polyurethane powder paint to ensure maximum protection against adverse weather conditions

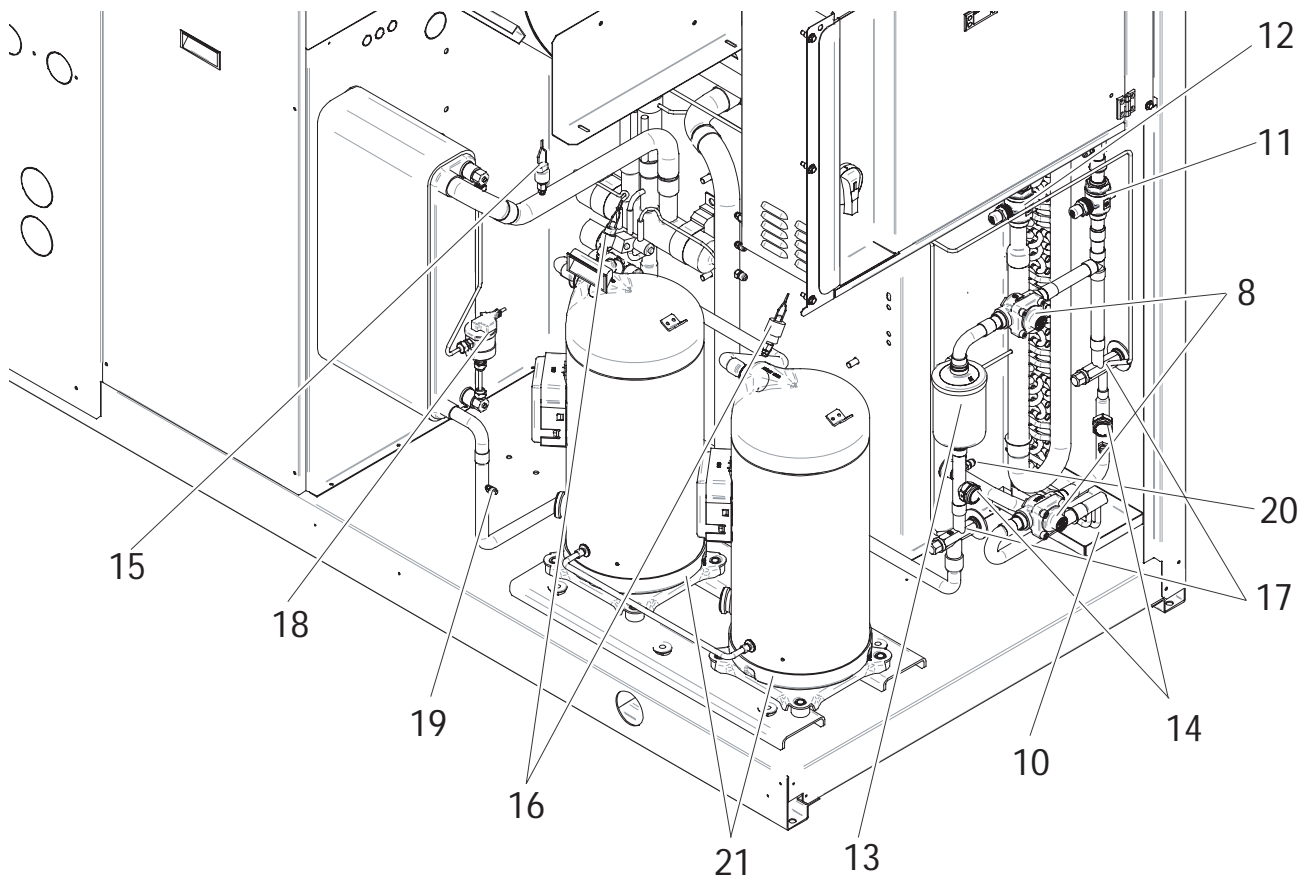
8. One-way valves (IP unit only), allowing the coolant to pass into the appropriate exchangers, depending on the operating cycle.

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

GENERAL SPECIFICATIONS

Hydraulic and cooling circuit components

- 10. Drain Pan Kit (standard for IP version).** Provides a pan under the coil to drain the condensing water, fitted with 1/2" outlet connection positioned opposite the electric control panel.
- 11. Fluid cock.** 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 coolant from the unit).
- 12. Compressor delivery cock.** Ball type, allows the gas delivered to the compressors to be turned on and off.
- 13. Dehydrator filter.** Mechanical type. Retains impurities and traces of moisture in the circuit. **Hermetic** type for models **50÷80**; **cartridge** type for models **90÷160**.
- 14. Fluid and humidity indicator.** Signals when fluid passes through the circuit, indicating that the coolant charge is correct. The fluid indicator light also indicates the amount of moisture in the coolant by changing colour.
- 15. 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.
- 16. High pressure switch (n°2).** With fixed setting. Are installed on the delivery pipe and blocks the compressors if the operating pressures exceed the tolerated values. If it activates, the unit will block and can only be restarted by resetting via the user interface terminal.
- 17. Thermostatic valve.** With external equalizer, this supplies the evaporator correctly, keeping the selected overheating degree at a steady level.
- 18. 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.
- 19. 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.
- 20. 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.
- 21. Electrical heating elements to heat the compressor oil.** "Belt" type. These activate when the compressor turns off and keep the temperature of the oil sufficiently high so as to prevent coolant from migrating during these pauses.
- Safety valve.** Installed on the delivery pipe of the compressors, this operates if extreme faults should occur in the plant.
- Fluid receiver (IP unit only),** this is a plenum tank that accounts for variations to the coolant charge the machine must supply as the summer/winter operating mode varies.
- Fluid separator (IP unit only),** on the compressor intake to protect against possible fluid back-flows.

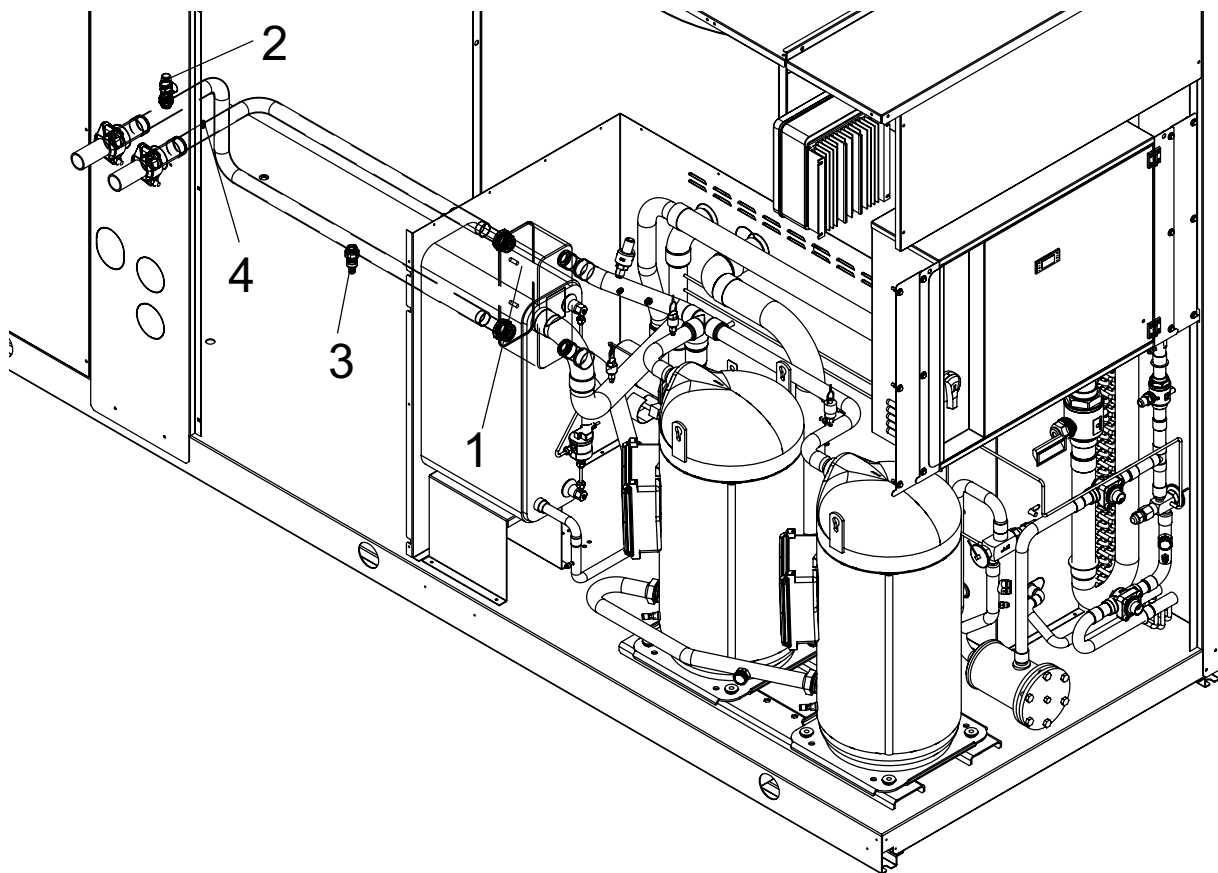


GENERAL SPECIFICATIONS

Version with Desuperheater 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 cock** for emptying the exchangers and pipes of the machine 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.



ACCESSORIES AND OPTIONAL EQUIPMENT

Mechanical options

AVG - Rubber vibration dampers. Consisting of 4/6 rubber vibration dampers to fit under the unit. Reduce the extent to which the mechanical vibrations created by the compressors and fans during normal operation are transmitted to the bearing surface of the machine. The insulating degree of the vibration dampers is about 85%.

GM - Pressure gauge unit. Consisting of 2 pressure gauges that display the pressure values of the refrigerating fluid on the compressor suction and delivery sides.

GP - Protective grilles. These are metal grilles installed to protect the finned banks.

SAA - Water storage tank. Made of adequately thick painted sheet metal, this reduces the number of compressor start-ups and fluctuations in the temperature of the water conveyed to the users. It is insulated with thermal barrier material to prevent the formation of condensation and heat exchanges towards the outside.

Water storage tank. It consists of:

Water draining. On-off action by means of a cock that can be accessed by removing the rear panel, positioned on the side of the unit opposite to the electric panel.

Air vent. Accessed by removing the rear panel positioned on the side of the unit opposite to the electric panel. It consists of a manually operated valve installed on the highest part of the wet pipes.

Water safety valve, on the rear part of the tank. It acts whenever faulty service leads to an operating pressure in the hydraulic circuit that exceeds the valve opening value.

Antifreeze heater connection. 1"1/4 female threaded connection pre-engineered for installation of the antifreeze heater (RAG accessory).

KS- Low noise kit (M). Provides sound attenuation thanks to sound absorbing insulation in compressors area and sound jackets on compressors.

KB- KB- Drain Pan Kit (standard for IP version) (M). Provides a pan under the coil to drain the condensing water, fitted with 1/2" outlet connection positioned opposite the electric control panel.

KT - the following kits are available (this accessory is mandatory if the Hydronic Kit is not installed).

- **Basic pipe kit.** This accessory consists of steel pipes insulated with thermal barrier material and allows the water inlet/outlet to be connected straight inside the unit.

- **Complete pipe kit.** This accessory consists of steel pipes insulated with thermal barrier material and allows the water inlet/outlet connection to be routed to the machine.

- **Water storage tank pipe kit.** This accessory consists of steel pipes insulated with thermal barrier material and allows the water inlet/outlet connection to be routed to the machine.

NB: YOU CAN CHOOSE ONLY ONE KIT.

• **MP. Hydronic Kit (M).** Consists of:

1 **On-off ball valves.** Turn components such as the water filter, surge chamber and pump on and off when they require routine or extraordinary maintenance.

2 **Metal gauze water filter.** Can be turned on and off and inspected. It is installed on the pump delivery side. Prevents machining residues (dust, swarf, etc.) in the water pipes from entering the plate-type heat exchanger.

3 **Hydraulic pump.** Circulates water around the system. The pumps have a low/high head and suit the majority of installation requirements. The pumps are safeguarded by a magnetothermics installed in the chiller's electric panel.

4 **Surge chamber.** This is a closed, diaphragm type chamber. It absorbs the variations in the volumes of water in the system caused by temperature variations.

5 **Water filling.** Manual function with control positioned on the side of the unit opposite the electric panel and turned on and off by a cock that can be accessed by removing the rear panel.

6 **Water pressure gauge.** Connected to the water fill pipe. Displays the pressure of the water in the system.

7 **Water safety valve.**

8 **Water outlet.**

9 **Air vent.**

10 **Antifreeze heater connection** (RAG accessory).

MP. Hydronic Kit.

MP : Hydronic Kit with 1 o 2 Pumps: Besides the pumps, this accessory is equipped with all the hydraulic components (water filter, expansion tank, on-off valves, water pressure gauge, air vent, water outlet) required for complete installation and easy maintenance.

Different water accumulation tank configurations are therefore available in combination with the Hydronic Kit accessory:

MP - AM: Accumulation on the Plant Delivery side (Standard)^(A): The pump draws water from the system, sends it to the plate exchanger and from thence to the inertial accumulation tank. During normal operating conditions, the pump in this configuration is able to provide a residue head from 86 to 150 kPa (from 9 to 15 m.w.c.) for the circulating water.

MP - AM AP: Accumulation on the Plant Delivery side (High)^(B): The pump draws water from the system, sends it to the plate exchanger and from thence to the inertial accumulation tank. During normal operating conditions, the pump in this configuration is able to provide a residue head from 198 to 255 kPa (from 20 to 25 m.w.c.) for the circulating water.

MP - PS: Accumulation pre-engineered for the primary and secondary circuit : The sole function of the pump is to circulate the water around the primary circuit: this circuit includes the accumulation tank and plate exchanger (chiller water circuit). The installer must mount the pumping section relative to the secondary circuit formed by the accumulation tank (with the pre-engineered wet connections) and the system served. No high working head version available.

MP-SS: Hydronic Kit without Water Storage Tank (Standard) ^(A). The pump draws water from the system, sends it to the plate heat exchanger and returns it to the system. During normal operating conditions, the pump in this configurations can provide a residue head from 86 to 150 kPa (from 9 to 15 m.w.c.).

MP-SS AP: Hydronic Kit without Water Storage Tank (High Working Head) ^(B). The pump draws water from the system, sends it to the plate heat exchanger and returns it to the system. During normal operating conditions, the pump in this configurations can provide a residue head from 198 to 255 kPa (from 20 to 25 m.w.c.).

(A): For the working head values depending on the water flow rate, consult the Standard Working Head MP-AM graph.

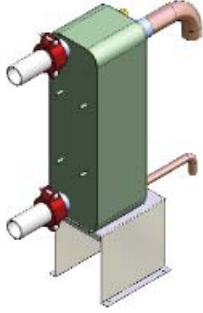
(B): For the working head values depending on the water flow rate, consult the High Working Head MP-AM graph.

NOTE: (M): Installed **(F):** To be installed by customers

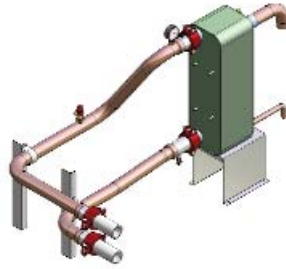
NOTE: It is essential to purchase the units with either the KT or MP accessory described previously. The choice of one automatically excludes the other.

ACCESSORIES AND OPTIONAL EQUIPMENT

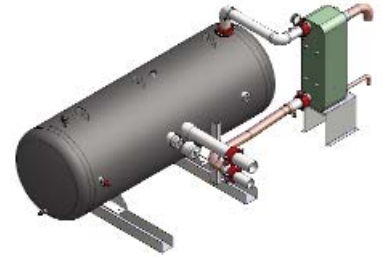
KT - BASIC PIPE KIT



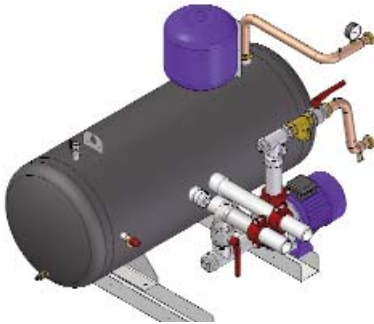
KT - COMPLETE PIPE KIT



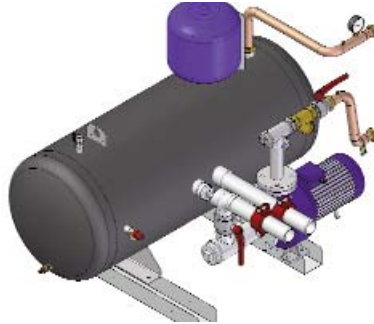
WATER STORAGE TANK PIPE KIT



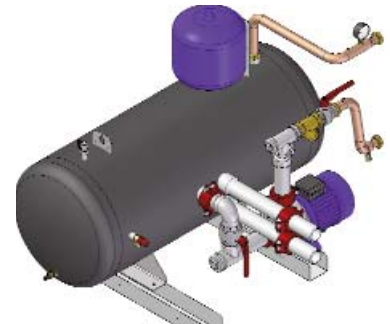
MP - 1P AM



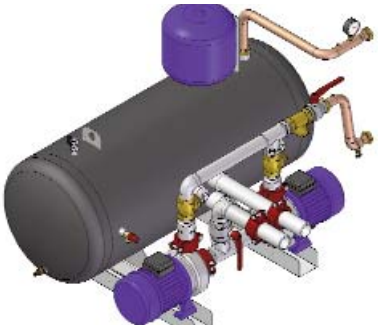
MP - 1P AM AP



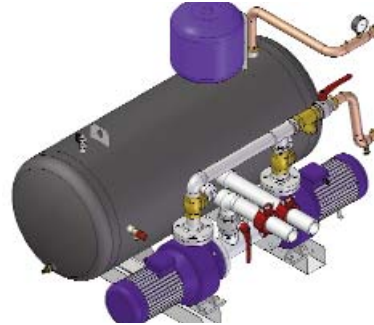
MP - 1P PS



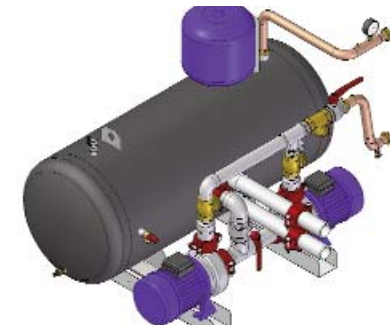
MP - 2P AM



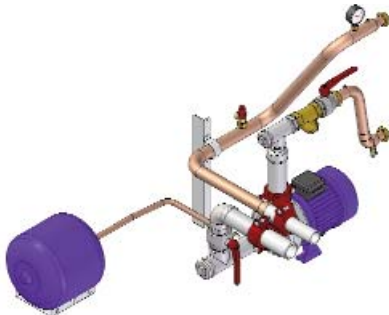
MP - 2P AM AP



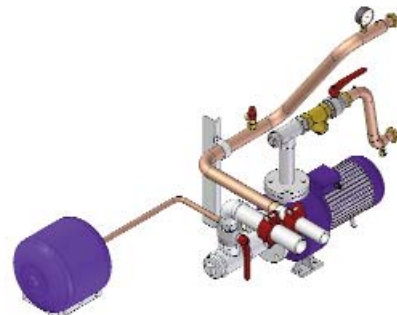
MP - 2P PS



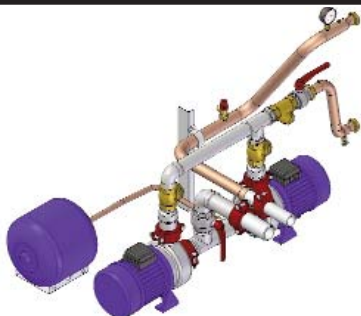
MP - 1P SS



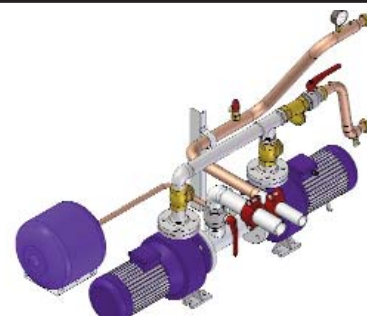
MP - 1P SS AP



MP - 2P SS



MP - 2P SS AP



ACCESSORIES AND OPTIONAL EQUIPMENT

Electrical options

CR - Remote control (F). This can be used to select all the monitoring and display functions of the control unit on the machine at a maximum distance of 100 meters away. It must be installed by using a cable with three strands or three wires in **PVC** of the **N07-VK** type with a 1mm² section. The transmission line must be installed in a race-way separate from any electric powering wires (**230/400 V**).

The control unit has the following buttons:



MODE key : used to select the operating mode

ON/OFF key : used to turn the unit ON/OFF and to reset the alarms

Mode + ON/OFF keys : used to access and quit the various menu levels

UP key: scrolls forwards through the menu items or increases the value of a parameter

Tasto DOWN: scrolls backwards through the menu items or decreases the value of a parameter.

meter.

KOP - Programmer clock (F). Allows the unit to be turned on and off depending on the programmed time setting (up to 14 switching actions can be programmed as required throughout the 7 days of the week).

RAG: Antifreeze heating element for the accumulation tank (M/F). Plug type. This activates in parallel with the evaporator's antifreeze heating element and keeps the water at a temperature able to prevent ice from forming when the unit remains idle during the winter.

TAT- High Temperature Thermostat (M). Two thermostats in series on compressors outlet pipes preserve operation not allowing temperature to rise up than a specified non adjustable value.

SND- External Air Probe (M). External air probe mounted near coil allows smart defrosting and climatic variation of setpoint

INT - Serial interface (F). Allows serial communication on RS485 by MODBUS protocol

IMV- Fan motor inverter(M). Adjusts continuously centrifugal fan speed in order to allow the units to operate both with low outdoor temperature in cooling mode and with high outdoor temperature in heating mode

NOTE: (M): Factory mounted **(F):** To be installed by customers

Mechanical options

Special finned heat exchangers

- Coils with copper fins
- Coils with tin-coated copper fins
- Coils with aluminium fins with acrylic coating

Electrical options

Other power source voltage rating (contact our technical department).

ACCESSORIES AND OPTIONAL EQUIPMENT

Accessories - Model Combinations

MODEL / ACCESSORY CODE			M / F	50	60	70	80	90	100	115	130	145	160	180	200	
Mechanical Accessories	Rubber vibration dampers	With Tank	AVG13	F	•	•	•	•								
			AVG15	F					•	•	•	•	•	•	•	•
		Without Tank	AVG12	F	•	•	•	•								
			AVG14	F						•	•	•	•	•	•	
			AVG16	F											•	•
	Gas pressure gauges		GM12	M	•	•	•	•	•	•	•	•	•	•	•	•
	Protective grilles		GP49	M	•	•	•	•								
			GP50	M					•	•						
			GP51	M							•	•	•	•		
			GP66	M											•	•
	Drain pan kit (1)		BCN3	M	•	•	•	•								
			BCN4	M					•	•	•	•	•	•		
			BCN12	M											•	•
	Low noise kit		KS5	M	•	•	•	•								
			KS6	M					•							
			KS7	M						•						
			KS8	M							•					
			KS9	M								•	•	•		
			KS15	M											•	•
	Basic pipe kit		KT30	M	•	•	•	•								
KT29			M					•	•	•	•	•	•	•	•	
Copmplete pipe kit		KT31	M	•	•	•	•									
		KT33	M					•	•	•	•	•	•			
		KT40	M											•	•	
Tank pipe kit		KT34	M	•	•	•	•									
		KT35	M					•	•	•	•	•	•			
		KT41	M											•	•	
Water storage tank		SAA29	M	•	•	•	•									
		SAA30	M					•	•	•	•	•	•			
		SAA39	M											•	•	

NOTE:

(M): factory mounted
(F): to be installed by customer
(1): standard for IP version

Table Continued on next page.

ACCESSORIES AND OPTIONAL EQUIPMENT

MODEL / ACCESSORY CODE				M / F	50	60	70	80	90	100	115	130	145	160	180	200			
Mechanical Accessories	Hydronic kit	With tank on delivery (Standard Head)	1 Pump	MP105	M	.	.	.	.						
				MP106	M										
				MP113	M									.	.				
				MP147	M											.	.		
			2 Pumps	MP122	M										
				MP124	M										
				MP133	M										.	.			
				MP152	M												.	.	
		With tank on delivery (High Head)	1 Pump	MP107	M										
				MP108	M					.	.								
				MP109	M										
				MP148	M												.	.	
			2 Pumps	MP125	M										
				MP126	M						.	.							
				MP127	M										
				MP153	M												.	.	
	With tank for primary - Secondary circuit	1 Pump	MP111	M	.	.	.	.							
			MP112	M					.	.	.	.			
			MP113	M									.	.					
			MP149	M												.	.		
		2 Pumps	MP128	M											
			MP129	M											
			MP130	M										.	.				
			MP154	M												.	.		
	Without tank (Standard Head)	1 Pump	MP117	M	.	.	.	.							
			MP118	M					.	.	.	.			
			MP131	M									.	.					
			MP150	M												.	.		
		2 Pumps	MP134	M											
			MP135	M											
			MP136	M										.	.				
			MP155	M												.	.		
Without tank (High Head)	1 Pump	MP119	M	.	.	.	.								
		MP120	M					.	.										
		MP121	M							.	.	.	.		
		MP151	M												.	.			
	2 Pumps	MP137	M	.	.	.	.								
		MP138	M						.	.									
		MP139	M								.	.	.	.	
		MP156	M												.	.			
Electrical Accessories	MODEL / ACCESSORY CODE			M / F	50	60	70	80	90	100	115	130	145	160	180	200			
	External air probe			SND3	M	.	.	.	.	.	.	.	.	.	.	.	.
	Programming clock kit			KOP1	F	.	.	.	.	.	.	.	.	.	.	.
	Storage tank electrical heater kit			RAG13	M	.	.	.	.	.	.	.	.	.	.	.
				RAG14	F	.	.	.	.	.	.	.	.	.	.	.	.
	High temperature thermostat kit (2)			TAT8	M	.	.	.	.	.	.	.	.	.	.	.
	Remote control kit			CR6	F	.	.	.	.	.	.	.	.	.	.	.
	Serial interface kit			INT2	M	.	.	.	.	.	.	.	.	.	.	.
	Kit Inverter			VRT5	M	.	.	.	.						
				VRT6	M					.	.								
				VRT7	M							.	.						
				VRT8	M									.	.	.	.

NOTE:

- (M): factory mounted
- (F): to be installed by customer
- (2): standard for VI version

TECHNICAL SPECIFICATIONS AND STANDARD PERFORMANCES - IR COOLING UNIT ONLY

Technical specifications of unit AB Standard Unit / AB Standard Unit + KS Silencer kit

Model	50	60	70	80	90	100	115	130	145	160	180	200	UM
Power supply	400V - 3ph+N - 50 Hz												V-f-Hz
Type of refrigerant	R410A												/
Circuits	1												n°
Cooling capacity ^{(1)(E)}	53,5	58,6	68,8	78,7	91,0	102	112	126	143	158	180	200	kW
Compressors power input ⁽¹⁾	16,3	18,5	20,9	25,6	28,2	31,6	35,5	40,5	46,0	51,0	56,0	62,8	kW
EER	3,28	3,17	3,29	3,07	3,23	3,22	3,15	3,11	3,11	3,10	3,21	3,18	-
Total power input ⁽¹⁾	21,8	24,0	26,4	31,1	34,4	37,8	44,5	49,5	62,5	67,5	78,0	84,8	kW
Total power input ^{(1)(E)}	17,8	20,0	22,5	27,3	30,6	34,1	37,9	42,9	53,9	59,2	66,5	73,7	kW
Total EER	3,01	2,93	3,06	2,88	2,97	2,98	2,96	2,94	2,65	2,67	2,71	2,71	-
ESEER ^(E)	4,15	4,04	4,22	3,98	4,10	4,11	4,08	4,05	3,66	3,68	3,74	3,74	-
Water flow rate ⁽¹⁾	2,56	2,80	3,29	3,76	4,35	4,85	5,35	6,02	6,83	7,55	8,60	9,56	l/s
Water pressure drops ^{(1)(E)}	42	51	48	40	40	40	40	39	39	39	58	57	kPa
Working head ^{(1)(MP)}	135	116	97	75	143	129	113	92	116	95	141	107	kPa

Compressor

Type	Scroll												/
Quantity	2												n°
Load steps	0-50-100												%
Oil charge CP1	3,25	3,25	3,25	3,25	3,25	4,7	4,7	6,8	6,8	6,3	6,3	6,3	l
Oil charge CP2	3,25	3,25	3,25	3,25	4,7	4,7	6,8	6,8	6,3	6,3	6,3	6,3	l

Heat Exchanger

Type	Brazen plates												/
Quantity	1												n°
Water volume	3,6	3,6	4,6	5,4	7,6	8,4	9,7	10,9	12,6	14,5	11,1	13,0	l

Fan

Type	Centrifugal												-	
Quantity	1			2			3			4			n°	
Total air flow rate	29050	29050	28100	27680	41460	40100	47440	47440	62190	59820	82920	79760	m³/h	
Working head NOM/MAX (3)	50 /150												rpm	
Power input	5,5			6,2			9			16,5			22	kW

Coil

Type	Aluminum fins and copper tubes												/
Quantity	1												n°
Front area	3,38			4,72			5,90			7,41			m²

Water Storage Tank (SAA accessory)

Water volume	200			400			460						l
Safety valve setting	600												kPa
Surge chamber volume	12						24						l
Surge chamber default pressure	150												kPa
Max. operating pressure	1000						800						kPa

Electrical Data

Units without pumping module

Total maximum power input [FLA]	52,7	55,3	62,8	73,1	80,6	86,1	101	109	138	152	178	193	A
Total maximum power input [FLI]	30,3	32,5	35,9	40,3	47,1	52,7	60,9	65,6	82,7	91,5	108	119	kW
Total maximum starting current [MIC]	150	151	177	215	269	275	328	336	389	403	498	513	A

Units with pumping module MP-AM and MP-PS (1 or 2 pumps)

Total maximum power input [FLA]	55,9	58,5	66,0	76,3	85,4	90,9	106	114	144	158	186	201	A
Total maximum power input [FLI]	32,1	34,3	37,7	42,1	50,0	55,6	63,8	68,5	85,9	94,7	113	124	kW
Total maximum starting current [MIC]	153	155	180	218	274	279	333	341	394	409	507	521	A

Units with pumping module MP-AM AP (1 or 2 pumps)

Total maximum power input [FLA]	58,9	61,6	69,0	79,3	86,8	92,4	109	117	146	161	189	204	A
Total maximum power input [FLI]	34,1	36,3	39,7	44,1	50,8	56,5	65,6	70,3	87,5	96,3	115	126	kW
Total maximum starting current [MIC]	156	158	183	221	275	281	336	345	397	411	509	524	A

Data referred to standard operating condition.

(1): water temperature: in 12°C - out 7°C air temperature: in 35°C d.b.

(2): water temperature: in 40°C - out 45°C air temperature: in 7°C d.b. 87% RH

(3): Adjustable changing the diameter of the motors pulley

(MP): with standard hydronic kit MP-AM and MP-SS

(SAA): with storage tank

(E): data declared according to LCP EUROVENT certification program, Total power input is corrected of external available static pressure as defined in UNI EN 14511:2008

TECHNICAL SPECIFICATIONS AND STANDARD PERFORMANCES - IR COOLING UNIT ONLY

Standard performances AB Standard unit / AB Standard Unit + KS Silencer kit

Mod. 50-100

MOD.	Tw	OUTDOOR AIR TEMPERATURE (°C D.B.)													
		20		25		30		35		40		45		50	
		kWf	kWa	kWf	kWa	kWf	kWa	kWf	kWa	kWf	kWa	kWf	kWa	kWf	kWa
50	5	61,1	11,4	57,0	13,2	53,9	14,5	50,6	16,0	47,1	17,6	43,6	19,2	40,0	20,8
	6	62,8	11,5	58,6	13,3	55,4	14,6	52,0	16,1	48,4	17,8	44,8	19,4	41,1	21,0
	7	64,6	11,7	60,3	13,4	57,0	14,8	53,5	16,3	49,8	18,0	46,1	19,6	42,3	21,2
	8	66,4	11,8	62,0	13,6	58,6	14,9	55,0	16,5	51,2	18,2	47,4	19,8	-	-
	9	68,2	11,9	63,7	13,7	60,2	15,1	56,5	16,6	52,6	18,3	48,7	20,0	-	-
	10	70,1	12,0	65,4	13,8	61,8	15,2	58,0	16,8	54,0	18,5	50,0	20,2	-	-
	11	71,8	12,1	67,1	14,0	63,4	15,4	59,5	17,0	55,4	18,7	51,3	20,4	-	-
	12	73,8	12,3	68,9	14,1	65,1	15,5	61,1	17,1	56,9	18,9	52,7	20,6	-	-
60	5	66,9	13,0	62,4	14,9	59,0	16,5	55,4	18,1	51,5	20,0	47,7	21,8	43,9	23,6
	6	68,7	13,1	64,2	15,1	60,7	16,6	56,9	18,3	53,0	20,2	49,1	22,0	45,1	23,8
	7	70,7	13,2	66,0	15,2	62,4	16,8	58,6	18,5	54,5	20,4	50,5	22,2	46,4	24,0
	8	72,8	13,4	67,9	15,4	64,2	17,0	60,3	18,7	56,1	20,6	51,9	22,5	-	-
	9	74,8	13,5	69,8	15,6	66,0	17,1	61,9	18,9	57,6	20,8	53,4	22,7	-	-
	10	76,7	13,7	71,6	15,7	67,7	17,3	63,6	19,1	59,1	21,0	54,8	22,9	-	-
	11	78,7	13,8	73,5	15,9	69,5	17,5	65,2	19,3	60,7	21,2	56,2	23,2	-	-
	12	80,8	13,9	75,5	16,0	71,3	17,6	67,0	19,5	62,3	21,4	57,7	23,4	-	-
70	5	78,5	14,7	73,3	16,9	69,3	18,6	65,0	20,5	60,5	22,6	56,1	24,6	51,5	26,6
	6	80,7	14,8	75,3	17,0	71,2	18,8	66,9	20,7	62,2	22,8	57,6	24,9	52,9	26,9
	7	83,1	15,0	77,5	17,2	73,3	19,0	68,8	20,9	64,0	23,0	59,3	25,1	54,5	27,2
	8	85,4	15,1	79,7	17,4	75,4	19,2	70,7	21,1	65,8	23,3	61,0	25,4	-	-
	9	87,8	15,3	81,9	17,6	77,5	19,4	72,7	21,3	67,6	23,5	62,6	25,6	-	-
	10	90,1	15,4	84,1	17,7	79,5	19,5	74,6	21,6	69,4	23,8	64,3	25,9	-	-
	11	92,4	15,6	86,2	17,9	81,6	19,7	76,5	21,8	71,2	24,0	66,0	26,2	-	-
	12	94,9	15,7	88,6	18,1	83,8	19,9	78,6	22,0	73,1	24,2	67,7	26,4	-	-
80	5	89,8	18,0	83,9	20,7	79,3	22,8	74,4	25,1	69,2	27,7	64,1	30,2	58,9	32,6
	6	92,3	18,1	86,2	20,9	81,5	23,0	76,5	25,3	71,1	27,9	65,9	30,5	60,5	32,9
	7	95,0	18,3	88,7	21,1	83,9	23,2	78,7	25,6	73,2	28,2	67,8	30,8	62,3	33,3
	8	97,7	18,5	91,2	21,3	86,2	23,5	80,9	25,9	75,3	28,5	69,7	31,1	-	-
	9	100	18,7	93,7	21,5	88,6	23,7	83,2	26,1	77,4	28,8	71,7	31,4	-	-
	10	103	18,9	96,2	21,7	91,0	23,9	85,4	26,4	79,4	29,1	73,6	31,7	-	-
	11	106	19,1	98,7	21,9	93,3	24,2	87,5	26,7	81,5	29,4	75,4	32,0	-	-
	12	109	19,3	101	22,2	95,8	24,4	89,9	26,9	83,7	29,7	77,5	32,3	-	-
90	5	104	19,8	97,0	22,8	91,7	25,1	86,0	27,7	80,1	30,5	74,1	33,2	68,1	35,9
	6	107	20,0	100	23,0	94,2	25,3	88,4	27,9	82,3	30,8	76,2	33,5	70,0	36,3
	7	110	20,2	103	23,2	97,0	25,6	91,0	28,2	84,7	31,1	78,4	33,9	72,0	36,6
	8	113	20,4	105	23,5	100	25,9	93,6	28,5	87,1	31,4	80,6	34,3	-	-
	9	116	20,6	108	23,7	102	26,1	96,2	28,8	89,5	31,7	82,9	34,6	-	-
	10	119	20,8	111	23,9	105	26,4	98,7	29,1	91,8	32,1	85,1	34,9	-	-
	11	122	21,0	114	24,2	108	26,6	101	29,4	94,2	32,4	87,2	35,3	-	-
	12	126	21,2	117	24,4	111	26,9	104	29,7	96,7	32,7	89,6	35,6	-	-
100	5	116	22,2	109	25,5	103	28,1	96,4	31,0	89,7	34,2	83,1	37,2	76,3	40,3
	6	120	22,4	112	25,7	106	28,4	99,1	31,3	92,2	34,5	85,4	37,6	78,4	40,6
	7	123	22,6	115	26,0	109	28,7	102	31,6	94,9	34,8	87,9	38,0	80,7	41,1
	8	127	22,9	118	26,3	112	29,0	105	31,9	97,6	35,2	90,4	38,4	-	-
	9	130	23,1	121	26,6	115	29,3	108	32,3	100	35,6	92,9	38,8	-	-
	10	134	23,3	125	26,8	118	29,6	111	32,6	103	35,9	95,3	39,2	-	-
	11	137	23,5	128	27,1	121	29,8	113	32,9	106	36,3	97,8	39,5	-	-
	12	141	23,8	131	27,4	124	30,1	117	33,2	108	36,6	100	39,9	-	-

Tw= Outlet water temperature °C

kWf = refrigerating power (kW).

kWa = Power input of compressors (kW)

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

TECHNICAL SPECIFICATIONS AND STANDARD PERFORMANCES - IR COOLING UNIT ONLY

Mod. 115-200

MOD.	Tw	OUTDOOR AIR TEMPERATURE (°C D.B.)													
		20		25		30		35		40		45		50	
		kWf	kWa	kWf	kWa	kWf	kWa	kWf	kWa	kWf	kWa	kWf	kWa	kWf	kWa
115	5	128	24,9	119	28,7	113	31,6	106	34,8	98,5	38,4	91,3	41,8	83,8	45,2
	6	131	25,1	123	28,9	116	31,9	109	35,1	101	38,7	93,8	42,2	86,1	45,7
	7	135	25,4	126	29,2	119	32,2	112	35,5	104	39,1	96,5	42,7	88,6	46,1
	8	139	25,7	130	29,5	123	32,6	115	35,9	107	39,6	99,2	43,1	-	-
	9	143	25,9	133	29,8	126	32,9	118	36,3	110	40,0	102	43,6	-	-
	10	147	26,2	137	30,1	129	33,2	121	36,6	113	40,4	105	44,0	-	-
	11	150	26,5	140	30,4	133	33,5	125	37,0	116	40,7	107	44,4	-	-
	12	154	26,7	144	30,7	136	33,9	128	37,3	119	41,1	110	44,9	-	-
130	5	144	28,4	134	32,7	127	36,0	119	39,7	111	43,8	103	47,7	94,3	51,6
	6	148	28,7	138	33,0	130	36,4	122	40,1	114	44,2	106	48,2	96,9	52,1
	7	152	29,0	142	33,3	134	36,7	126	40,5	117	44,6	109	48,7	100	52,6
	8	156	29,3	146	33,7	138	37,1	130	40,9	121	45,1	112	49,2	-	-
	9	161	29,6	150	34,0	142	37,5	133	41,4	124	45,6	115	49,7	-	-
	10	165	29,9	154	34,4	146	37,9	137	41,8	127	46,0	118	50,2	-	-
	11	169	30,2	158	34,7	149	38,3	140	42,2	130	46,5	121	50,7	-	-
	12	174	30,5	162	35,1	153	38,6	144	42,6	134	46,9	124	51,2	-	-
145	5	163	32,3	152	37,1	144	40,9	135	45,1	126	49,7	117	54,2	107	58,6
	6	168	32,6	157	37,5	148	41,3	139	45,5	129	50,2	120	54,7	110	59,2
	7	173	32,9	161	37,9	152	41,7	143	46,0	133	50,7	123	55,3	113	59,8
	8	178	33,3	166	38,3	157	42,2	147	46,5	137	51,3	127	55,9	-	-
	9	182	33,6	170	38,7	161	42,6	151	47,0	141	51,8	130	56,4	-	-
	10	187	33,9	175	39,1	165	43,0	155	47,4	144	52,3	134	57,0	-	-
	11	192	34,3	179	39,4	170	43,5	159	47,9	148	52,8	137	57,6	-	-
	12	197	34,6	184	39,8	174	43,9	163	48,4	152	53,3	141	58,1	-	-
160	5	180	35,8	168	41,2	159	45,4	149	50,0	139	55,1	129	60,1	118	65,0
	6	185	36,1	173	41,6	164	45,8	154	50,5	143	55,6	132	60,7	122	65,6
	7	191	36,5	178	42,0	168	46,3	158	51,0	147	56,2	136	61,3	125	66,3
	8	196	36,9	183	42,4	173	46,8	162	51,6	151	56,8	140	62,0	-	-
	9	202	37,3	188	42,9	178	47,2	167	52,1	155	57,4	144	62,6	-	-
	10	207	37,6	193	43,3	183	47,7	171	52,6	159	58,0	148	63,2	-	-
	11	212	38,0	198	43,7	187	48,2	176	53,1	164	58,5	151	63,8	-	-
	12	218	38,4	203	44,1	192	48,6	181	53,6	168	59,1	156	64,4	-	-
180	5	205	39,3	192	45,2	181	49,8	170	54,9	158	60,5	147	66,0	135	71,4
	6	211	39,7	197	45,6	186	50,3	175	55,4	163	61,1	151	66,6	138	72,0
	7	217	40,1	203	46,1	192	50,8	180	56,0	167	61,7	155	67,3	142	72,8
	8	223	40,5	209	46,6	197	51,4	185	56,6	172	62,4	160	68,0	-	-
	9	230	40,9	214	47,1	203	51,9	190	57,2	177	63,0	164	68,7	-	-
	10	236	41,3	220	47,5	208	52,4	195	57,8	182	63,7	168	69,4	-	-
	11	242	41,7	226	48,0	213	52,9	200	58,3	186	64,3	173	70,1	-	-
	12	248	42,1	232	48,5	219	53,4	206	58,9	191	64,9	177	70,8	-	-
200	5	228	44,1	213	50,7	202	55,9	189	61,6	176	67,9	163	74,0	150	80,0
	6	235	44,5	219	51,2	207	56,4	194	62,2	181	68,5	167	74,7	154	80,8
	7	241	44,9	225	51,7	213	57,0	200	62,8	186	69,2	172	75,5	158	81,6
	8	248	45,4	232	52,3	219	57,6	206	63,5	191	70,0	177	76,3	-	-
	9	255	45,9	238	52,8	225	58,2	211	64,1	197	70,7	182	77,1	-	-
	10	262	46,3	244	53,3	231	58,7	217	64,8	202	71,4	187	77,8	-	-
	11	269	46,8	251	53,8	237	59,3	222	65,4	207	72,1	192	78,6	-	-
	12	276	47,2	258	54,4	244	59,9	229	66,0	213	72,8	197	79,4	-	-

Tw= Outlet water temperature °C

kWf = refrigerating power (kW).

kWa = Power input of compressors (kW)

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

TECHNICAL SPECIFICATIONS AND STANDARD PERFORMANCES - IR COOLING UNIT ONLY

Version with Desuperheater (VD)

Recovery heat exchanger specifications

Model	50	60	70	80	90	100	115	130	145	160	180	200	UM	
Type of recovery exchanger	PIASTRE INOX SALDOBRASATE													
Quantity	1												N°	
Max. operating pressure on wet side	600													kPa
Total water content of recovery exchangers	0,6			0,8			1,3			1,8			l	

Unit specification

Recovered heating capacity (1)	15,7	17,6	20,0	23,6	27,1	30,4	34,4	38,4	44,0	49,3	55,4	61,3	kW
Recovered water flow rate (1)	0,75	0,84	0,96	1,13	1,29	1,45	1,64	1,83	2,10	2,36	2,65	2,93	l/s
Recovered water pressure drop (1)	9	11	14	19	15	18	11	14	18	22	18	21	kPa

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

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

Recovered heating capacity in Version with Desuperheater (VD)

MOD.	TWR	OUTDOOR AIR TEMPERATURE (°C D.B.)					MOD.	TWR	OUTDOOR AIR TEMPERATURE (°C D.B.)				
		25	30	35	40	45			25	30	35	40	45
		kW _{tr} = RECOVERED HEATING CAPACITY [KW]							kW _{tr} = RECOVERED HEATING CAPACITY [KW]				
50	30	12,8	14,7	16,9	19,3	22,0	115	30	29,1	33,0	37,5	42,5	48,1
	35	12,9	14,8	17,0	19,4	22,1		35	28,9	32,8	37,3	42,3	47,8
	40	12,6	14,4	16,6	18,9	21,6		40	28,2	31,9	36,2	41,1	46,5
	45	11,9	13,7	15,7	17,9	20,5		45	26,7	30,3	34,4	39,0	44,1
	50	10,9	12,5	14,3	16,4	18,7		50	24,7	28,0	31,7	36,0	40,7
	55	9,5	10,9	12,5	14,3	16,3		55	21,9	24,9	28,3	32,0	36,2
	60	7,7	8,8	10,1	11,6	13,2		60	18,6	21,1	24,0	27,2	30,7
	65	5,5	6,4	7,3	8,4	9,5		65	14,6	16,6	18,8	21,4	24,2
70	3,0	3,5	4,0	4,6	5,2	70	10,0	11,4	12,9	14,6	16,5		
55	30	14,6	16,8	19,0	21,7	24,6	130	30	32,3	36,6	41,5	47,1	53,2
	35	14,6	16,8	19,0	21,7	24,6		35	32,3	36,6	41,5	47,1	53,2
	40	14,2	16,3	18,6	21,2	24,0		40	31,5	35,6	40,5	45,9	51,9
	45	13,5	15,5	17,6	20,1	22,8		45	29,8	33,8	38,4	43,5	49,2
	50	12,4	14,2	17,0	18,5	20,9		50	27,4	31,1	35,3	40,0	45,2
	55	10,9	12,5	15,0	16,3	18,4		55	24,2	27,4	31,1	35,2	39,9
	60	9,0	10,4	12,5	13,5	15,3		60	20,1	22,8	25,9	29,3	33,2
	65	6,8	7,9	9,4	10,2	11,6		65	15,2	17,3	19,6	22,2	25,1
70	4,3	4,9	5,9	6,4	7,2	70	9,6	10,8	12,3	14,0	15,8		
60	30	16,6	19,0	21,6	24,7	28,0	145	30	36,7	41,7	47,4	53,6	60,5
	35	16,6	19,0	21,6	24,7	28,0		35	36,8	41,8	47,5	53,8	60,6
	40	16,1	18,6	21,1	24,1	27,3		40	35,9	40,8	46,4	52,5	59,2
	45	15,3	17,6	20,0	22,8	25,9		45	34,1	38,7	44,0	49,8	56,2
	50	14,0	16,2	18,4	21,0	23,8		50	31,3	35,6	40,4	45,7	51,5
	55	12,4	14,2	16,2	18,5	20,9		55	27,5	31,3	35,5	40,2	45,4
	60	10,3	11,8	13,4	15,4	17,4		60	22,8	25,9	29,4	33,3	37,6
	65	7,8	8,9	10,2	11,6	13,1		65	17,1	19,5	22,1	25,0	28,2
70	4,8	5,6	6,3	7,2	8,2	70	10,5	11,9	13,5	15,3	17,3		
70	30	19,4	22,2	25,4	29,2	33,4	160	30	41,5	47,1	53,4	60,5	68,2
	35	19,4	22,3	25,5	29,3	33,6		35	41,4	47,1	53,3	60,4	68,1
	40	19,0	21,7	24,9	28,6	32,8		40	40,3	45,8	52,0	58,8	66,3
	45	18,0	20,6	23,6	27,1	31,1		45	38,3	43,5	49,3	55,8	62,9
	50	16,4	18,8	21,6	24,8	28,4		50	35,2	40,0	45,4	51,3	57,9
	55	14,4	16,5	18,9	21,7	24,8		55	31,2	35,4	40,1	45,4	51,2
	60	11,8	13,5	15,5	17,8	20,4		60	26,1	29,7	33,7	38,1	42,9
	65	8,6	9,9	11,3	13,0	14,9		65	20,1	22,8	25,9	29,3	33,0
70	5,0	5,7	6,5	7,5	8,6	70	13,1	14,8	16,8	19,0	21,5		
90	30	22,5	25,6	29,2	33,3	37,8	180	30	46,6	53,0	60,0	68,0	76,6
	35	22,6	25,7	29,3	33,4	38,0		35	46,5	52,9	59,9	67,8	76,5
	40	22,1	25,1	28,6	32,6	37,1		40	45,3	51,5	58,4	66,1	74,5
	45	20,9	23,8	27,1	30,9	35,1		45	43,0	48,9	55,4	62,7	70,7
	50	19,1	21,8	24,8	28,3	32,1		50	39,6	45,0	51,0	57,7	65,0
	55	16,7	19,1	21,7	24,7	28,1		55	35,0	39,8	45,1	51,1	57,6
	60	13,7	15,6	17,8	20,3	23,1		60	29,4	33,4	37,8	42,8	48,3
	65	10,1	11,5	13,1	14,9	17,0		65	22,6	25,7	29,1	32,9	37,1
70	5,9	6,7	7,6	8,7	9,9	70	14,7	16,7	18,9	21,4	24,1		
100	30	25,5	29,0	33,0	37,5	42,5	200	30	51,6	58,6	66,4	75,2	84,8
	35	25,3	28,8	32,8	37,3	42,2		35	51,5	58,5	66,3	75,1	84,6
	40	24,7	28,1	32,0	36,3	41,1		40	50,2	57,0	64,6	73,1	82,4
	45	23,5	26,7	30,4	34,5	39,1		45	47,6	54,1	61,3	69,4	78,2
	50	21,7	24,7	28,2	32,0	36,2		50	43,8	49,8	56,4	63,8	72,0
	55	19,5	22,1	25,2	28,6	32,4		55	38,8	44,0	49,9	56,5	63,7
	60	16,7	19,0	21,6	24,5	27,8		60	32,5	36,9	41,8	47,4	53,4
	65	13,4	15,2	17,3	19,6	22,2		65	25,0	28,4	32,2	36,4	41,1
70	9,5	10,8	12,3	14,0	15,8	70	16,2	18,5	20,9	23,7	26,7		

kW_{tr} = RECOVERED HEATING CAPACITY [KW]

Twr = Desuperheater outlet water temperature, Δtin-out= 5°C

TECHNICAL SPECIFICATIONS AND STANDARD PERFORMANCES - IR COOLING UNIT ONLY

Specific data for Brine Version (VI)

Correction factors to apply to the basic version data

Brine percentage freezing point [°C]	20% Ethylene Glicol						
	-8						
Produced water temperature	4	2	0	-2	-4	-6	-8
Cooling capacity c.f.	0,912	0,855	0,798	0,738	0,683	-	-
Compressor power input c.f.	0,967	0,957	0,947	0,927	0,897	-	-
Water flow rate c.f.	0,984	0,899	0,821	0,750	0,685	0,620	0,561
Water pressure drop c.f.	1,289	1,071	0,890	0,740	0,615	0,490	0,390

Brine percentage freezing point [°C]	30% Ethylene Glicol						
	-14						
Produced water temperature	4	2	0	-2	-4	-6	-8
Cooling capacity c.f.	0,899	0,842	0,785	0,725	0,670	0,613	0,562
Compressor power input c.f.	0,960	0,950	0,940	0,920	0,890	0,870	0,840
Water flow rate c.f.	1,013	0,928	0,851	0,780	0,715	0,650	0,591
Water pressure drop c.f.	1,431	1,184	0,979	0,810	0,670	0,530	0,419

Brine percentage freezing point [°C]	40% Ethylene Glicol						
	-22						
Produced water temperature	4	2	0	-2	-4	-6	-8
Cooling capacity c.f.	0,884	0,827	0,770	0,710	0,655	0,598	0,547
Compressor power input c.f.	0,880	0,870	0,860	0,840	0,810	0,790	0,760
Water flow rate c.f.	1,062	0,970	0,887	0,810	0,740	0,670	0,607
Water pressure drop c.f.	1,542	1,279	1,061	0,880	0,730	0,580	0,461

A calculation example showing how the table is used is given below.

Consider unit **IR 160.2** in the Basic Version with:

- Cooling capacity of the Basic Version unit (VB): $P_{f_{VB}} = 158 \text{ kW}$
- Power input of the Compressors in the Basic Version unit (VB): $P_{ass_{CP,VB}} = 53.2 \text{ kW}$
- Water Flow Rate of the Basic Version unit (VB): $Q_{VB} = 7.55 \text{ l/s}$
- Water pressure drop of the Basic Version unit (VB): $\Delta p_{VB} = 39 \text{ kPa}$
- with 30% brine and -2°C temperature of the water produced

The corresponding values for the Brine Version are:

- Cooling capacity $P_{f_{VI}} = P_{f_{VB}} \times (0.725) = 115 \text{ kW}$
- Compressor power input $P_{ass_{CP,VI}} = P_{ass_{CP,VB}} \times (0.92) = 48.9 \text{ kW}$
- Water flow rate $Q_{VI} = Q_{VB} \times (0.78) = 5.89 \text{ l/s}$
- Water pressure drop $\Delta p_{VI} = \Delta p_{VB} \times (0.81) = 32 \text{ kPa}$

If you need to calculate the performances of the unit with outdoor air temp. different than 35°C, you have to use the values for $P_{f_{VB}}$ and $P_{ass_{CP,VB}}$ reported on the tables standard performances for the requisited air temp. and with water leaving temp=7°C.

With $P_{f_{VB}}$ calculate Q_{VB} and using the graph water pressure drop Basic Version you have Δp_{VB} . Then apply the corrective coefficients indicated on the tables for VI.

In case of other type of antifreezing fluid please contact our sales office.

TECHNICAL SPECIFICATIONS AND STANDARD PERFORMANCES - IP HEAT PUMP UNITS

Technical specifications of unit AB Standard Unit / AB Standard Unit + KS Silencer kit

Model	50	60	70	80	90	100	115	130	145	160	180	200	UM
Power supply	400V - 3ph+N - 50 Hz												V-f-Hz
Type of refrigerant	R410A												/
Circuits	1												n°
Cooling capacity ^{(1)(E)}	52,9	57,5	67,2	74,1	89,2	99,0	110	122	138	154	178	198	kW
Compressors power input ⁽¹⁾	16,2	18,4	20,7	24,7	28,0	31,4	35,4	40,0	45,8	50,5	55,0	62,5	kW
EER	3,27	3,13	3,25	3,00	3,19	3,15	3,11	3,05	3,01	3,05	3,24	3,17	-
Total power input ⁽¹⁾	21,7	23,9	26,2	30,2	34,2	37,6	44,4	49,0	62,3	67,0	77,0	84,5	kW
Total power input ^{(1)(E)}	17,7	19,9	22,3	26,4	28,4	32,0	37,8	42,4	53,7	58,7	65,5	73,4	kW
Total EER	2,99	2,89	3,01	2,81	3,14	3,09	2,91	2,88	2,57	2,62	2,72	2,70	-
ESEER ^(E)	4,12	3,99	4,16	3,87	4,33	4,27	4,02	3,97	3,55	3,62	3,75	3,72	-
Water flow rate ⁽¹⁾	2,53	2,75	3,21	3,54	4,26	4,73	5,26	5,83	6,59	7,36	8,50	9,46	l/s
Water pressure drops ^{(1)(E)}	41	49	46	35	38	38	39	37	36	37	57	56	kPa
Working head ^{(1)(MP)}	138	120	102	85	149	136	117	98	125	100	144	109	kPa
Heating capacity ^{(2)(E)}	53,2	58,0	67,7	76,2	91,4	103	113	125	143	156	184	202	kW
Compressors power input ⁽²⁾	16,2	18,0	20,3	23,1	28,2	31,4	34,8	39,0	45,1	49,8	54,0	61,0	kW
COP	3,28	3,22	3,34	3,30	3,24	3,28	3,25	3,21	3,17	3,13	3,41	3,31	-
Total power input ⁽²⁾	21,7	23,5	25,8	28,6	34,4	37,6	43,8	48,0	61,6	66,3	76,0	83,0	kW
Total power input ^{(2)(E)}	17,7	19,5	21,9	24,8	28,6	32,0	37,2	41,4	53,0	58,0	64,5	71,9	kW
Total COP	3,01	2,97	3,09	3,07	3,20	3,22	3,04	3,02	2,70	2,69	2,85	2,81	-
Water flow rate ⁽²⁾	2,54	2,77	3,23	3,64	4,37	4,92	5,40	5,97	6,83	7,45	8,79	9,65	l/s
Water pressure drops ^{(2)(E)}	41	50	46	37	40	41	41	38	39	38	61	58	kPa
Working head ^{(2)(MP)}	137	119	101	80	142	125	111	94	116	98	135	105	kPa

Compressor

Type	Scroll												/
Quantity	2												n°
Load steps	0-50-100												%
Oil charge CP1	3,25	3,25	3,25	3,25	3,25	4,7	4,7	6,8	6,8	6,3	6,3	6,3	l
Oil charge CP2	3,25	3,25	3,25	3,25	4,7	4,7	6,8	6,8	6,3	6,3	6,3	6,3	l

Heat Exchanger

Type	Brazen plates												/
Quantity	1												n°
Water volume	3,6	3,6	4,6	5,4	7,6	8,4	9,7	10,9	12,6	14,5	11,1	13,0	l

Fan

Type	Centrifugal												-	
Quantity	1			2			3			4			n°	
Total air flow rate	29050	29050	28100	27680	41460	40100	47440	47440	62190	59820	82920	79760	m³/h	
Working head NOM/MAX (3)	50 / 150												rpm	
Power input	5,5			6,2			9			16,5			22	kW

Coil

Type	Aluminum fins and copper tubes												/
Quantity	1												n°
Front area	3,38			4,72			5,90			7,41			m²

Water Storage Tank (SAA accessory)

Water volume	200			400			460						l
Safety valve setting	600												kPa
Surge chamber volume	12			24									l
Surge chamber default pressure	150												kPa
Max. operating pressure	1000			800									kPa

Electrical Data

Units without pumping module

Total maximum power input [FLA]	52,7	55,3	62,8	73,1	80,6	86,1	101	109	138	152	178	193	A
Total maximum power input [FLI]	30,3	32,5	35,9	40,3	47,1	52,7	60,9	65,6	82,7	91,5	108	119	kW
Total maximum starting current [MIC]	150	151	177	215	269	275	328	336	389	403	498	513	A

Units with pumping module MP-AM and MP-PS (1 or 2 pumps)

Total maximum power input [FLA]	55,9	58,5	66,0	76,3	85,4	90,9	106	114	144	158	186	201	A
Total maximum power input [FLI]	32,1	34,3	37,7	42,1	50,0	55,6	63,8	68,5	85,9	94,7	113	124	kW
Total maximum starting current [MIC]	153	155	180	218	274	279	333	341	394	409	507	521	A

Units with pumping module MP-AM AP (1 or 2 pumps)

Total maximum power input [FLA]	58,9	61,6	69,0	79,3	86,8	92,4	109	117	146	161	189	204	A
Total maximum power input [FLI]	34,1	36,3	39,7	44,1	50,8	56,5	65,6	70,3	87,5	96,3	115	126	kW
Total maximum starting current [MIC]	156	158	183	221	275	281	336	345	397	411	509	524	A

Data referred to standard operating condition.

(1): water temperature: in 12°C - out 7°C air temperature: in 35°C d.b.

(2): water temperature: in 40°C - out 45°C air temperature: in 7°C d.b. 87% RH

(3): Adjustable changing the diameter of the motors pulley

(MP): with standard hydronic kit MP-AM and MP-SS

(SAA): with storage tank

(E): data declared according to LCP EUROVENT certification program, Total power input is corrected of external available static pressure as defined in UNI EN 14511:2008

TECHNICAL SPECIFICATIONS AND STANDARD PERFORMANCES - IP HEAT PUMP UNITS

Standard performances in cooling mode AB Standard Unit / AB Standard Unit + KS Silencer kit

Mod. 50-100

MOD.	Tw	OUTDOOR AIR TEMPERATURE (°C D.B.)													
		20		25		30		35		40		45		50	
		kWf	kWa	kWf	kWa	kWf	kWa	kWf	kWa	kWf	kWa	kWf	kWa	kWf	kWa
50	5	60,4	11,4	56,4	13,1	53,3	14,4	50,0	15,9	46,5	17,5	43,1	19,1	39,6	20,6
	6	62,1	11,5	57,9	13,2	54,8	14,5	51,4	16,0	47,8	17,7	44,3	19,3	40,7	20,8
	7	63,9	11,6	59,6	13,3	56,4	14,7	52,9	16,2	49,2	17,9	45,6	19,5	41,9	21,0
	8	65,7	11,7	61,3	13,5	58,0	14,9	54,4	16,4	50,6	18,1	46,9	19,7	-	-
	9	67,5	11,8	63,0	13,6	59,6	15,0	55,9	16,5	52,0	18,2	48,2	19,9	-	-
	10	69,3	12,0	64,7	13,8	61,1	15,2	57,4	16,7	53,4	18,4	49,4	20,1	-	-
	11	71,0	12,1	66,3	13,9	62,7	15,3	58,8	16,9	54,8	18,6	50,7	20,3	-	-
	12	73,0	12,2	68,1	14,0	64,4	15,5	60,4	17,0	56,2	18,8	52,1	20,5	-	-
60	5	65,6	12,9	61,3	14,9	57,9	16,4	54,4	18,0	50,6	19,9	46,8	21,7	43,0	23,4
	6	67,5	13,0	63,0	15,0	59,5	16,5	55,9	18,2	52,0	20,1	48,1	21,9	44,2	23,7
	7	69,4	13,2	64,8	15,1	61,3	16,7	57,5	18,4	53,5	20,3	49,5	22,1	45,5	23,9
	8	71,4	13,3	66,6	15,3	63,0	16,9	59,1	18,6	55,0	20,5	51,0	22,4	-	-
	9	73,4	13,4	68,5	15,5	64,7	17,0	60,8	18,8	56,5	20,7	52,4	22,6	-	-
	10	75,3	13,6	70,3	15,6	66,5	17,2	62,4	19,0	58,0	20,9	53,7	22,8	-	-
	11	77,2	13,7	72,1	15,8	68,2	17,4	64,0	19,2	59,5	21,1	55,1	23,0	-	-
	12	79,3	13,8	74,0	15,9	70,0	17,5	65,7	19,3	61,1	21,3	56,6	23,3	-	-
70	5	76,7	14,5	71,6	16,7	67,7	18,4	63,5	20,3	59,1	22,4	54,8	24,4	50,3	26,4
	6	78,8	14,7	73,6	16,9	69,6	18,6	65,3	20,5	60,8	22,6	56,3	24,6	51,7	26,6
	7	81,1	14,8	75,7	17,0	71,6	18,8	67,2	20,7	62,5	22,8	57,9	24,9	53,2	26,9
	8	83,4	15,0	77,9	17,2	73,6	19,0	69,1	20,9	64,3	23,1	59,5	25,1	-	-
	9	85,7	15,1	80,0	17,4	75,7	19,2	71,0	21,1	66,1	23,3	61,2	25,4	-	-
	10	88,0	15,3	82,1	17,6	77,7	19,4	72,9	21,3	67,8	23,5	62,8	25,7	-	-
	11	90,2	15,4	84,2	17,7	79,7	19,6	74,8	21,6	69,6	23,8	64,4	25,9	-	-
	12	92,7	15,6	86,5	17,9	81,8	19,7	76,8	21,8	71,4	24,0	66,2	26,2	-	-
80	5	84,6	17,3	79,0	19,9	74,7	22,0	70,1	24,2	65,2	26,7	60,4	29,1	55,5	31,5
	6	86,9	17,5	81,1	20,1	76,7	22,2	72,0	24,4	67,0	26,9	62,0	29,4	57,0	31,8
	7	89,5	17,7	83,5	20,3	79,0	22,4	74,1	24,7	68,9	27,2	63,9	29,7	58,7	32,1
	8	92,0	17,9	85,9	20,6	81,2	22,7	76,2	25,0	70,9	27,5	65,7	30,0	-	-
	9	94,5	18,0	88,2	20,8	83,4	22,9	78,3	25,2	72,8	27,8	67,5	30,3	-	-
	10	97,0	18,2	90,6	21,0	85,6	23,1	80,4	25,5	74,8	28,1	69,3	30,6	-	-
	11	100	18,4	92,9	21,2	87,8	23,3	82,4	25,7	76,7	28,4	71,0	30,9	-	-
	12	102	18,6	95,4	21,4	90,2	23,6	84,7	26,0	78,8	28,6	73,0	31,2	-	-
90	5	102	19,6	95,0	22,6	89,9	24,9	84,3	27,5	78,5	30,3	72,7	33,0	66,8	35,7
	6	105	19,8	97,7	22,8	92,4	25,1	86,7	27,7	80,6	30,5	74,7	33,3	68,6	36,0
	7	108	20,0	101	23,0	95,1	25,4	89,2	28,0	83,0	30,9	76,9	33,6	70,6	36,4
	8	111	20,3	103	23,3	97,7	25,7	91,7	28,3	85,3	31,2	79,0	34,0	-	-
	9	114	20,5	106	23,5	100	25,9	94,3	28,6	87,7	31,5	81,2	34,4	-	-
	10	117	20,7	109	23,8	103	26,2	96,8	28,9	90,0	31,8	83,4	34,7	-	-
	11	120	20,9	112	24,0	106	26,4	99,2	29,2	92,3	32,1	85,5	35,0	-	-
	12	123	21,1	115	24,2	109	26,7	102	29,4	94,8	32,5	87,8	35,4	-	-
100	5	113	22,0	105	25,3	100	27,9	93,6	30,8	87,1	33,9	80,7	37,0	74,1	40,0
	6	116	22,2	108	25,6	103	28,2	96,2	31,1	89,5	34,3	82,9	37,3	76,1	40,4
	7	120	22,5	112	25,8	105	28,5	99,0	31,4	92,1	34,6	85,3	37,7	78,4	40,8
	8	123	22,7	115	26,1	108	28,8	102	31,7	94,7	35,0	87,7	38,1	-	-
	9	126	22,9	118	26,4	111	29,1	105	32,1	97,3	35,3	90,1	38,5	-	-
	10	130	23,2	121	26,7	114	29,4	107	32,4	100	35,7	92,5	38,9	-	-
	11	133	23,4	124	26,9	117	29,7	110	32,7	102	36,0	94,9	39,3	-	-
	12	137	23,6	127	27,2	121	29,9	113	33,0	105	36,4	97,5	39,7	-	-

Tw= Outlet water temperature in °C

kWf = refrigerating power (kW).

kWa = Power input of compressors (kW)

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

TECHNICAL SPECIFICATIONS AND STANDARD PERFORMANCES - IP HEAT PUMP UNITS

Mod. 115-200

MOD.	Tw	OUTDOOR AIR TEMPERATURE (°C D.B.)													
		20		25		30		35		40		45		50	
		kWf	kWa	kWf	kWa	kWf	kWa	kWf	kWa	kWf	kWa	kWf	kWa	kWf	kWa
115	5	126	24,8	117	28,6	111	31,5	104	34,7	96,8	38,3	89,6	41,7	82,3	45,1
	6	129	25,1	120	28,8	114	31,8	107	35,0	99,4	38,6	92,1	42,1	84,6	45,5
	7	133	25,3	124	29,1	117	32,1	110	35,4	102	39,0	94,8	42,5	87,1	46,0
	8	137	25,6	127	29,5	121	32,5	113	35,8	105	39,4	97,5	43,0	-	-
	9	140	25,9	131	29,8	124	32,8	116	36,1	108	39,8	100	43,4	-	-
	10	144	26,1	134	30,1	127	33,1	119	36,5	111	40,2	103	43,9	-	-
	11	148	26,4	138	30,3	130	33,4	122	36,9	114	40,6	105	44,3	-	-
	12	152	26,6	142	30,6	134	33,8	126	37,2	117	41,0	108	44,7	-	-
130	5	139	28,1	130	32,3	123	35,6	115	39,2	107	43,2	99,4	47,1	91,3	51,0
	6	143	28,3	134	32,6	126	35,9	119	39,6	110	43,6	102	47,6	93,8	51,4
	7	147	28,6	137	32,9	130	36,3	122	40,0	114	44,1	105	48,1	96,6	52,0
	8	151	28,9	141	33,3	134	36,7	125	40,4	117	44,6	108	48,6	-	-
	9	156	29,2	145	33,6	137	37,0	129	40,8	120	45,0	111	49,1	-	-
	10	160	29,5	149	34,0	141	37,4	132	41,3	123	45,5	114	49,6	-	-
	11	164	29,8	153	34,3	145	37,8	136	41,7	126	45,9	117	50,1	-	-
	12	168	30,1	157	34,6	149	38,2	139	42,1	130	46,4	120	50,5	-	-
145	5	158	32,1	147	37,0	139	40,7	130	44,9	121	49,5	112	54,0	103	58,4
	6	162	32,4	151	37,3	143	41,1	134	45,3	125	50,0	116	54,5	106	58,9
	7	167	32,8	156	37,7	147	41,5	138	45,8	128	50,5	119	55,0	109	59,5
	8	171	33,1	160	38,1	151	42,0	142	46,3	132	51,0	122	55,6	-	-
	9	176	33,5	164	38,5	155	42,4	146	46,8	136	51,6	126	56,2	-	-
	10	181	33,8	169	38,9	160	42,8	150	47,2	139	52,1	129	56,8	-	-
	11	185	34,1	173	39,3	164	43,3	154	47,7	143	52,6	132	57,3	-	-
	12	190	34,5	178	39,6	168	43,7	158	48,2	147	53,1	136	57,9	-	-
160	5	176	35,4	164	40,8	155	44,9	146	49,5	135	54,6	125	59,5	115	64,3
	6	181	35,8	169	41,2	159	45,3	150	50,0	139	55,1	129	60,1	118	64,9
	7	186	36,1	174	41,6	164	45,8	154	50,5	143	55,7	133	60,7	122	65,6
	8	191	36,5	178	42,0	169	46,3	158	51,1	147	56,3	136	61,4	-	-
	9	196	36,9	183	42,5	173	46,8	163	51,6	151	56,8	140	62,0	-	-
	10	202	37,3	188	42,9	178	47,2	167	52,1	155	57,4	144	62,6	-	-
	11	207	37,6	193	43,3	183	47,7	171	52,6	159	58,0	148	63,2	-	-
	12	212	38,0	198	43,7	188	48,2	176	53,1	164	58,5	152	63,8	-	-
180	5	203	38,6	190	44,4	179	48,9	168	53,9	157	59,4	145	64,8	133	70,1
	6	209	39,0	195	44,8	184	49,4	173	54,4	161	60,0	149	65,4	137	70,7
	7	215	39,4	201	45,3	190	49,9	178	55,0	166	60,6	153	66,1	141	71,5
	8	221	39,8	206	45,8	195	50,4	183	55,6	170	61,3	158	66,8	-	-
	9	227	40,2	212	46,2	200	50,9	188	56,2	175	61,9	162	67,5	-	-
	10	233	40,6	218	46,7	206	51,4	193	56,7	180	62,5	166	68,2	-	-
	11	239	41,0	223	47,2	211	52,0	198	57,3	184	63,1	171	68,8	-	-
	12	246	41,4	229	47,6	217	52,5	203	57,8	189	63,7	175	69,5	-	-
200	5	226	43,9	211	50,5	199	55,6	187	61,3	174	67,6	161	73,7	148	79,6
	6	232	44,3	217	50,9	205	56,1	192	61,9	179	68,2	166	74,3	152	80,4
	7	239	44,7	223	51,5	211	56,7	198	62,5	184	68,9	171	75,1	157	81,2
	8	246	45,2	229	52,0	217	57,3	204	63,2	189	69,6	175	75,9	-	-
	9	253	45,7	236	52,5	223	57,9	209	63,8	195	70,3	180	76,7	-	-
	10	259	46,1	242	53,1	229	58,5	215	64,5	200	71,0	185	77,5	-	-
	11	266	46,6	248	53,6	235	59,0	220	65,1	205	71,7	190	78,2	-	-
	12	273	47,0	255	54,1	241	59,6	226	65,7	210	72,4	195	79,0	-	-

Tw= Outlet water temperature in °C

kWf = refrigerating power (kW).

kWa = Power input of compressors (kW)

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

TECHNICAL SPECIFICATIONS AND STANDARD PERFORMANCES - IP HEAT PUMP UNITS

Standard performances in heating mode AB Standard Unit / AB Standard Unit + KS Silencer kit

MOD.	Tw	OUTDOOR AIR TEMPERATURE (°C D.B.)													
		-6		-2		2		6		9		12		15	
		kWt	kWa	kWt	kWa	kWt	kWa	kWt	kWa	kWt	kWa	kWt	kWa	kWt	kWa
50	30	40,6	11,5	46,6	11,6	50,9	11,8	54,2	11,8	58,1	12,0	62,1	12,1	66,4	12,2
	35	40,4	12,8	46,3	12,9	50,7	13,0	53,9	13,1	57,8	13,3	61,8	13,4	66,1	13,6
	40	40,2	14,2	46,1	14,3	50,4	14,5	53,6	14,6	57,5	14,7	61,4	14,9	65,7	15,1
	45	39,9	15,8	45,7	15,9	50,0	16,1	53,2	16,2	57,1	16,4	61,0	16,6	65,3	16,8
	50	39,6	17,6	45,4	17,7	49,7	17,9	52,8	18,0	56,7	18,2	60,6	18,4	64,8	18,6
60	30	44,3	12,8	50,8	12,9	55,5	13,1	59,0	13,1	63,3	13,3	67,7	13,4	72,4	13,6
	35	44,1	14,2	50,5	14,3	55,2	14,5	58,7	14,6	63,0	14,7	67,4	14,9	72,1	15,1
	40	43,8	15,8	50,2	15,9	54,9	16,1	58,4	16,2	62,6	16,4	67,0	16,6	71,6	16,8
	45	43,5	17,5	49,9	17,7	54,5	17,9	58,0	18,0	62,2	18,2	66,5	18,4	71,1	18,6
	50	43,2	19,5	49,5	19,6	54,2	19,9	58,0	20,0	61,8	20,2	66,0	20,5	70,7	20,7
70	30	51,7	14,5	59,2	14,5	64,8	14,7	68,9	14,8	73,9	15,0	79,0	15,2	84,5	15,3
	35	51,4	16,0	58,9	16,1	64,5	16,3	68,6	16,4	73,5	16,6	78,6	16,8	84,1	17,0
	40	51,1	17,8	58,6	17,9	64,1	18,2	68,2	18,3	73,1	18,5	78,2	18,7	83,6	18,9
	45	50,8	19,8	58,2	19,9	63,7	20,2	67,7	20,3	72,6	20,5	77,6	20,8	83,0	21,0
	50	50,4	22,0	57,8	22,1	63,2	22,4	67,2	22,6	72,1	22,8	77,1	23,1	82,5	23,4
80	30	58,2	16,4	66,7	16,5	72,9	16,8	77,6	16,9	83,2	17,1	88,9	17,3	95,2	17,5
	35	57,9	18,2	66,3	18,3	72,6	18,6	77,2	18,7	82,8	18,9	88,5	19,1	94,7	19,3
	40	57,6	20,3	66,0	20,4	72,1	20,7	76,7	20,8	82,3	21,0	88,0	21,3	94,1	21,5
	45	57,2	22,5	65,5	22,7	71,7	23,0	76,2	23,1	81,7	23,4	87,4	23,6	93,5	23,9
	50	56,8	25,0	65,1	25,2	71,2	25,5	75,7	25,7	81,2	26,0	86,8	26,3	92,8	26,6
90	30	69,8	20,1	80,0	20,2	87,5	20,5	93,0	20,6	99,8	20,8	107	21,1	114	21,3
	35	69,4	22,2	79,6	22,4	87,0	22,7	92,6	22,8	99,3	23,1	106	23,3	114	23,6
	40	69,0	24,7	79,1	24,9	86,5	25,2	92,0	25,4	98,7	25,7	106	26,0	113	26,3
	45	68,6	27,5	78,6	27,7	85,9	28,0	91,4	28,2	98,0	28,5	105	28,9	112	29,2
	50	68,1	30,6	78,0	30,7	85,3	31,2	90,8	31,4	97,3	31,7	104	32,1	111	32,4
100	30	78,7	22,4	90,1	22,5	98,6	22,8	105	22,9	112	23,2	120	23,5	129	23,7
	35	78,3	24,8	89,7	24,9	98,1	25,3	104	25,4	112	25,7	120	26,0	128	26,3
	40	77,8	27,5	89,2	27,7	97,5	28,1	104	28,3	111	28,6	119	28,9	127	29,2
	45	77,3	30,6	88,6	30,8	96,8	31,2	103	31,4	110	31,8	118	32,1	126	32,5
	50	76,7	34,0	87,9	34,2	96,2	34,7	102	34,9	110	35,3	117	35,7	125	36,1
115	30	86,3	24,8	98,9	24,9	108	25,3	115	25,4	123	25,7	132	26,0	141	26,3
	35	85,8	27,5	98,4	27,6	108	28,0	114	28,2	123	28,5	131	28,8	140	29,1
	40	85,4	30,5	97,8	30,7	107	31,1	114	31,3	122	31,7	130	32,0	140	32,4
	45	84,8	33,9	97,1	34,1	106	34,6	113	34,8	121	35,2	130	35,6	139	36,0
	50	84,2	37,7	96,5	37,9	106	38,5	112	38,7	120	39,1	129	39,6	138	40,0
130	30	95,5	27,8	109	27,9	120	28,3	127	28,5	136	28,8	146	29,1	156	29,5
	35	95,0	30,8	109	31,0	119	31,4	127	31,6	136	31,9	145	32,3	155	32,7
	40	94,4	34,2	108	34,4	118	34,9	126	35,1	135	35,5	144	35,9	154	36,3
	45	93,8	38,0	107	38,2	118	38,8	125	39,0	134	39,5	143	39,9	153	40,4
	50	93,1	42,3	107	42,5	117	43,1	124	43,4	133	43,9	142	44,4	152	44,9
145	30	109	32,1	125	32,3	137	32,7	146	32,9	156	33,3	167	33,7	179	34,1
	35	109	35,6	125	35,8	136	36,3	145	36,5	155	36,9	166	37,3	178	37,8
	40	108	39,6	124	39,8	135	40,3	144	40,6	154	41,1	165	41,5	177	42,0
	45	107	44,0	123	44,2	134	44,8	143	45,1	153	45,6	164	46,1	175	46,7
	50	107	48,9	122	49,2	134	49,9	142	50,1	152	50,7	163	51,3	174	51,9
160	30	119	35,5	137	35,7	149	36,2	159	36,4	170	36,8	182	37,2	195	37,6
	35	119	39,3	136	39,5	149	40,1	158	40,3	169	40,8	181	41,2	194	41,7
	40	118	43,7	135	43,9	148	44,6	157	44,8	168	45,3	180	45,8	193	46,4
	45	117	48,6	134	48,8	147	49,5	156	49,8	167	50,4	179	51,0	191	51,5
	50	116	54,0	133	54,3	146	55,0	155	55,4	166	56,0	178	56,6	190	57,3
180	30	141	38,4	161	38,7	176	39,2	187	39,4	201	39,9	215	40,3	230	40,8
	35	140	42,6	160	42,9	175	43,4	186	43,7	200	44,2	214	44,7	229	45,2
	40	139	47,4	159	47,7	174	48,3	185	48,6	199	49,2	212	49,7	227	50,3
	45	138	52,6	158	53,0	173	53,7	184	54,0	197	54,6	211	55,2	226	55,9
	50	137	58,5	157	58,9	172	59,7	183	60,0	196	60,7	210	61,4	224	62,1
200	30	154	43,4	177	43,7	193	44,3	206	44,5	221	45,1	236	45,6	252	46,1
	35	153	48,1	176	48,4	192	49,1	205	49,4	219	49,9	235	50,5	251	51,1
	40	153	53,5	175	53,8	191	54,6	203	54,9	218	55,5	233	56,2	250	56,8
	45	152	59,5	174	59,8	190	60,6	202	61,0	217	61,7	232	62,4	248	63,1
	50	150	66,1	172	66,5	189	67,4	201	67,8	215	68,6	230	69,4	246	70,2

Tw= Outlet water temperature in °C

kWt = heating output (kW).

kWa = Power input of compressors (kW)

The standard performances refer to a 5°C temperature difference between the water entering and leaving the plate-type heat exchanger, outdoor air with 87% relative humidity and to operation of the unit with all the fans to top speed. A 0.44 x 10⁻⁴ m² K/W fouling factor has also been considered with the unit installed at zero meters above sea level (Pb = 1013mbar).

NOTE

For air temperatures of less than 7°C, the heating capacity is declared without considering the effect of the thawing cycles, strictly correlated with the humidity in the outdoor air.

TECHNICAL SPECIFICATIONS AND STANDARD PERFORMANCES - IP HEAT PUMP UNITS

Version with Desuperheater (VD)

Recovery heat exchanger specifications

Model	50	60	70	80	90	100	115	130	145	160	180	200	UM
Type of recovery exchanger	PIASTRE INOX SALDOBRASATE												
Quantity	1												N°
Max. operating pressure on wet side	600												kPa
Total water content of recovery exchangers	0,6			0,8			1,3			1,8			l

Unit specification

Recovered heating capacity (1)	15,2	17,0	19,4	22,9	26,2	29,2	33,2	37,1	42,4	47,5	52,4	58,1	kW
Recovered water flow rate (1)	0,73	0,81	0,93	1,10	1,25	1,39	1,58	1,77	2,03	2,27	2,50	2,78	l/s
Recovered water pressure drop (1)	8	10	13	18	14	17	10	13	17	20	16	19	kPa

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



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

Recovered heating capacity in Version with Desuperheater (VD)

MOD.	TWR	OUTDOOR AIR TEMPERATURE (°C D.B.)					MOD.	TWR	OUTDOOR AIR TEMPERATURE (°C D.B.)				
		25	30	35	40	45			25	30	35	40	45
		kW _{tr} = RECOVERED HEATING CAPACITY [KW]							kW _{tr} = RECOVERED HEATING CAPACITY [KW]				
50	30	12,4	14,2	16,3	18,6	21,2	115	30	27,8	31,6	35,9	40,6	45,8
	35	12,4	14,2	16,4	18,7	21,3		35	27,8	31,6	35,9	40,6	45,8
	40	12,2	13,9	16,0	18,3	20,8		40	27,1	30,8	35,0	39,6	44,7
	45	11,5	13,2	15,2	17,4	19,8		45	25,7	29,3	33,2	37,6	42,5
	50	10,6	12,1	13,9	15,9	18,1		50	23,7	26,9	30,5	34,6	39,1
	55	9,3	10,6	12,2	14,0	15,9		55	20,9	23,8	27,0	30,6	34,5
	60	7,6	8,8	10,1	11,5	13,1		60	17,5	19,9	22,6	25,6	28,9
	65	5,7	6,5	7,5	8,5	9,7		65	13,4	15,2	17,3	19,6	22,1
55	30	13,9	15,9	18,2	20,8	23,6	130	30	31,2	35,3	40,1	45,4	51,4
	35	14,0	16,0	18,3	20,9	23,8		35	31,2	35,3	40,1	45,4	51,4
	40	13,7	15,7	17,9	20,4	23,2		40	30,4	34,5	39,1	44,3	50,1
	45	13,0	14,9	17,0	19,4	22,1		45	28,9	32,7	37,1	42,0	47,5
	50	11,9	13,7	16,4	17,8	20,2		50	26,5	30,0	34,1	38,6	43,7
	55	10,4	12,0	14,4	15,6	17,7		55	23,4	26,5	30,1	34,1	38,5
	60	8,6	9,9	11,9	12,9	14,6		60	19,5	22,1	25,1	28,4	32,1
	65	6,4	7,3	8,8	9,5	10,8		65	14,8	16,8	19,1	21,6	24,4
60	30	15,9	18,2	20,8	23,7	27,0	145	30	35,7	40,6	46,0	52,1	58,8
	35	15,9	18,3	20,9	23,9	27,1		35	35,7	40,5	45,9	52,0	58,7
	40	15,6	17,9	20,4	23,3	26,5		40	34,7	39,5	44,7	50,6	57,2
	45	14,8	17,0	19,4	22,2	25,2		45	33,0	37,4	42,4	48,1	54,3
	50	13,6	15,6	17,8	20,3	23,1		50	30,3	34,5	39,0	44,2	49,9
	55	11,9	13,7	15,6	17,8	20,3		55	26,9	30,5	34,6	39,2	44,2
	60	9,8	11,3	12,9	14,7	16,7		60	22,5	25,6	29,0	32,9	37,1
	65	7,3	8,3	9,5	10,9	12,4		65	17,4	19,7	22,3	25,3	28,6
70	30	18,7	21,5	24,6	28,2	32,0	160	30	39,8	45,2	51,2	58,0	65,5
	35	18,8	21,6	24,7	28,3	32,2		35	39,9	45,3	51,4	58,2	65,7
	40	18,3	21,1	24,2	27,6	31,4		40	39,0	44,3	50,1	56,8	64,2
	45	17,4	20,0	22,9	26,2	29,8		45	36,9	41,9	47,5	53,8	60,8
	50	15,9	18,3	21,0	24,0	27,3		50	33,8	38,3	43,4	49,2	55,6
	55	13,9	16,0	18,4	21,0	23,9		55	29,5	33,5	38,0	43,0	48,6
	60	11,4	13,2	15,1	17,2	19,6		60	24,2	27,4	31,1	35,2	39,7
	65	8,4	9,7	11,1	12,7	14,5		65	17,7	20,1	22,8	25,8	29,1
90	30	21,7	24,8	28,2	32,3	36,7	180	30	43,9	49,8	56,5	64,0	72,2
	35	21,8	24,9	28,3	32,4	36,8		35	44,1	50,0	56,7	64,2	72,5
	40	21,2	24,3	27,6	31,6	36,0		40	43,0	48,8	55,3	62,7	70,8
	45	20,1	23,0	26,2	30,0	34,1		45	40,7	46,3	52,4	59,4	67,0
	50	18,4	21,1	24,0	27,4	31,2		50	37,3	42,3	47,9	54,3	61,3
	55	16,1	18,5	21,0	24,0	27,3		55	32,6	37,0	41,9	47,5	53,6
	60	13,2	15,2	17,2	19,7	22,4		60	26,6	30,3	34,3	38,8	43,8
	65	9,8	11,2	12,7	14,5	16,5		65	19,5	22,2	25,1	28,5	32,1
100	30	24,4	27,8	31,5	35,8	40,5	200	30	48,7	55,3	62,6	70,9	80,1
	35	24,5	27,9	31,6	35,9	40,6		35	48,8	55,5	62,8	71,2	80,4
	40	23,9	27,2	30,8	35,0	39,6		40	47,7	54,1	61,3	69,5	78,5
	45	22,6	25,7	29,2	33,2	37,5		45	45,2	51,3	58,1	65,8	74,3
	50	20,7	23,5	26,7	30,3	34,3		50	41,3	46,9	53,1	60,2	68,0
	55	18,1	20,6	23,3	26,5	30,0		55	36,1	41,0	46,4	52,6	59,4
	60	14,8	16,8	19,1	21,7	24,5		60	29,5	33,5	38,0	43,1	48,6
	65	10,8	12,3	14,0	15,9	18,0		65	21,6	24,6	27,8	31,5	35,6
70	6,2	7,0	8,0	9,1	10,3	70	12,4	14,1	15,9	18,1	20,4		

kW_{tr} = RECOVERED HEATING CAPACITY [KW]

Twr = Desuperheater outlet water temperature, Δtin-out= 5°C

NOISE LEVELS

The noise levels refer to units operating in the nominal conditions (water temperature: inlet: 12°C - outlet: 7°C, Outdoor air temperature 35°C), units with accessory IMV may have lower noise levels.

The acoustic pressure levels are measured 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 2×10^{-12} W.

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

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

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

The sound pressure levels are values calculated by applying the **ISO-3744 relation (Eurovent 8/1)** and refer to a distance of 1 meter away from the external surface of units operating in the open field with directivity factor 2 and the units operating in nominal conditions in the cooling mode.

Standard AB version

Mod.	SWL (dB) (E)									SPL (dBA)			
	Octave bands (Hz)								Total		1m	5m	10m
	63	125	250	500	1000	2000	4000	8000	dB	dB(A)			
50	83,3	82,0	82,4	84,4	82,5	83,4	80,9	75,5	91	89	71	62	57
60	83,3	82,0	82,4	84,4	82,5	83,4	80,9	75,5	91	89	71	62	57
70	83,3	82,0	82,4	84,4	82,5	83,4	80,9	75,5	91	89	71	62	57
80	83,3	82,0	82,4	84,4	82,5	83,4	80,9	75,5	91	89	71	62	57
90	85,8	84,2	83,9	85,9	84,5	85,4	84,0	80,0	94	91	73	65	59
100	85,8	84,2	83,9	85,9	84,5	85,4	84,0	80,0	94	91	73	65	59
115	94,6	91,1	90,4	92,1	89,8	90,1	88,9	84,5	100	96	78	69	64
130	94,6	91,1	90,4	92,1	89,8	90,1	88,9	84,5	100	96	78	69	64
145	95,2	91,7	91,0	92,7	90,4	90,7	89,5	85,1	101	97	79	70	65
160	95,2	91,7	91,0	92,7	90,4	90,7	89,5	85,1	101	97	79	70	65
180	101,8	98,2	96,8	95,7	93,3	89,8	83,6	85,5	105	98	79	71	66
200	101,8	98,2	96,8	95,7	93,3	89,8	83,6	85,5	105	98	79	71	66

AB version + Low noise Kit KS

Mod.	SWL (dB) (E)									SPL (dBA)			
	Octave bands (Hz)								Total		1m	5m	10m
	63	125	250	500	1000	2000	4000	8000	dB	dB(A)			
50	80,2	78,9	79,3	81,3	79,4	80,3	77,8	72,4	88	86	68	59	54
60	80,2	78,9	79,3	81,3	79,4	80,3	77,8	72,4	88	86	68	59	54
70	80,2	78,9	79,3	81,3	79,4	80,3	77,8	72,4	88	86	68	59	54
80	80,2	78,9	79,3	81,3	79,4	80,3	77,8	72,4	88	86	68	59	54
90	82,8	81,2	80,9	82,9	81,5	82,4	81,0	77,0	91	88	70	62	56
100	82,8	81,2	80,9	82,9	81,5	82,4	81,0	77,0	91	88	70	62	56
115	91,6	88,1	87,4	89,1	86,8	87,1	85,9	81,5	97	93	75	66	61
130	91,6	88,1	87,4	89,1	86,8	87,1	85,9	81,5	97	93	75	66	61
145	92,2	88,7	88,0	89,7	87,4	87,7	86,5	82,1	98	94	76	67	62
160	92,2	88,7	88,0	89,7	87,4	87,7	86,5	82,1	98	94	76	67	62
180	98,8	95,2	93,8	92,7	90,3	86,8	80,6	82,5	102	95	76	68	63
200	98,8	95,2	93,8	92,7	90,3	86,8	80,6	82,5	102	95	76	68	63

OPERATING RANGE

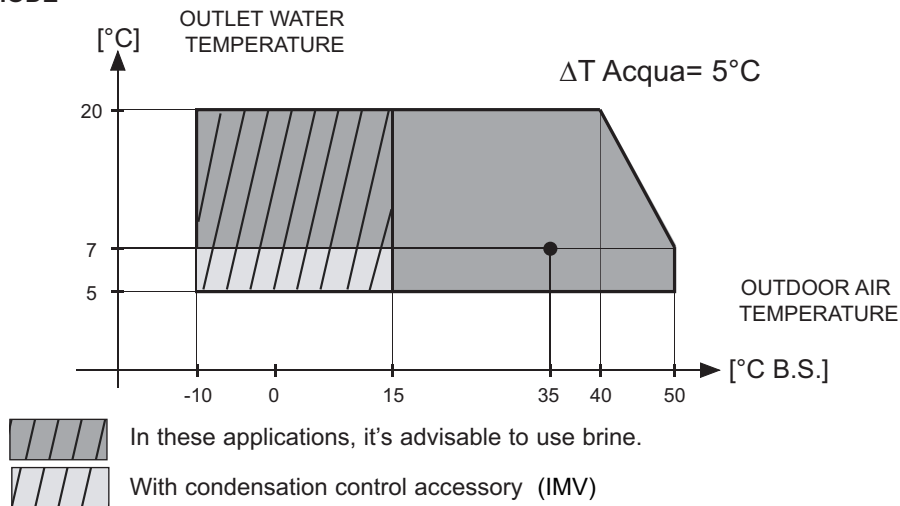
Operating range

The graphs below give the operating ranges within which correct operation of the units is guaranteed. The use of the units in conditions differing from those indicated will void the warranty with which the product is supplied. In the following table, there are the thermal water head limit values of the unit.

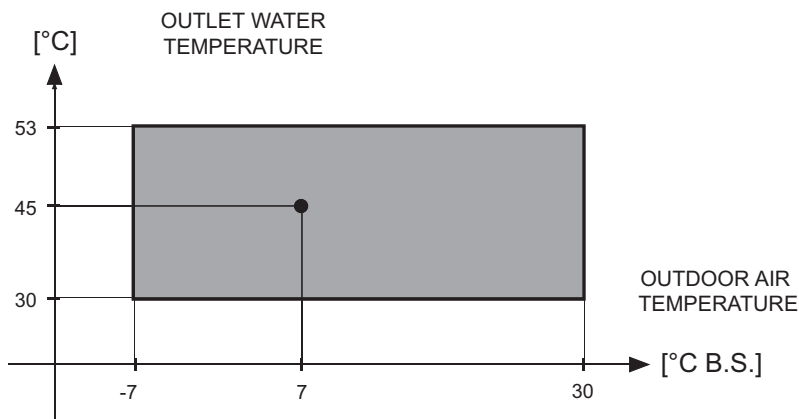
Thermal Water Head		Limit value
Minimum	°C	3
Maximum	°C	8

Note: Make sure the water flow is within the minimum and maximum pressure drop as reported "water pressure drop plate heat exchanger".

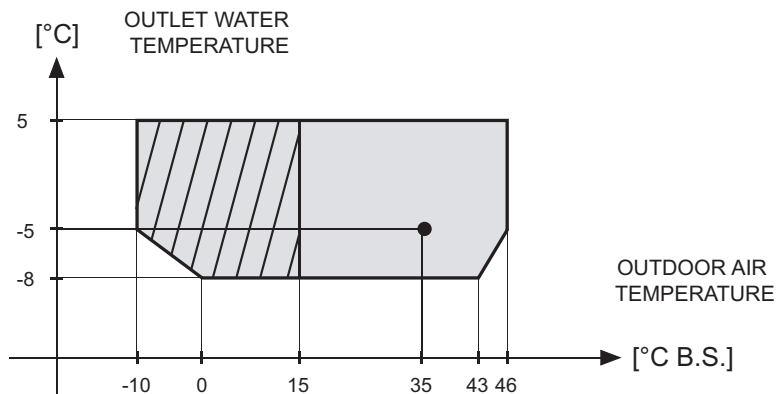
COOLING MODE



HEATING MODE



COOLING MODE BRINE VERSION (VI)

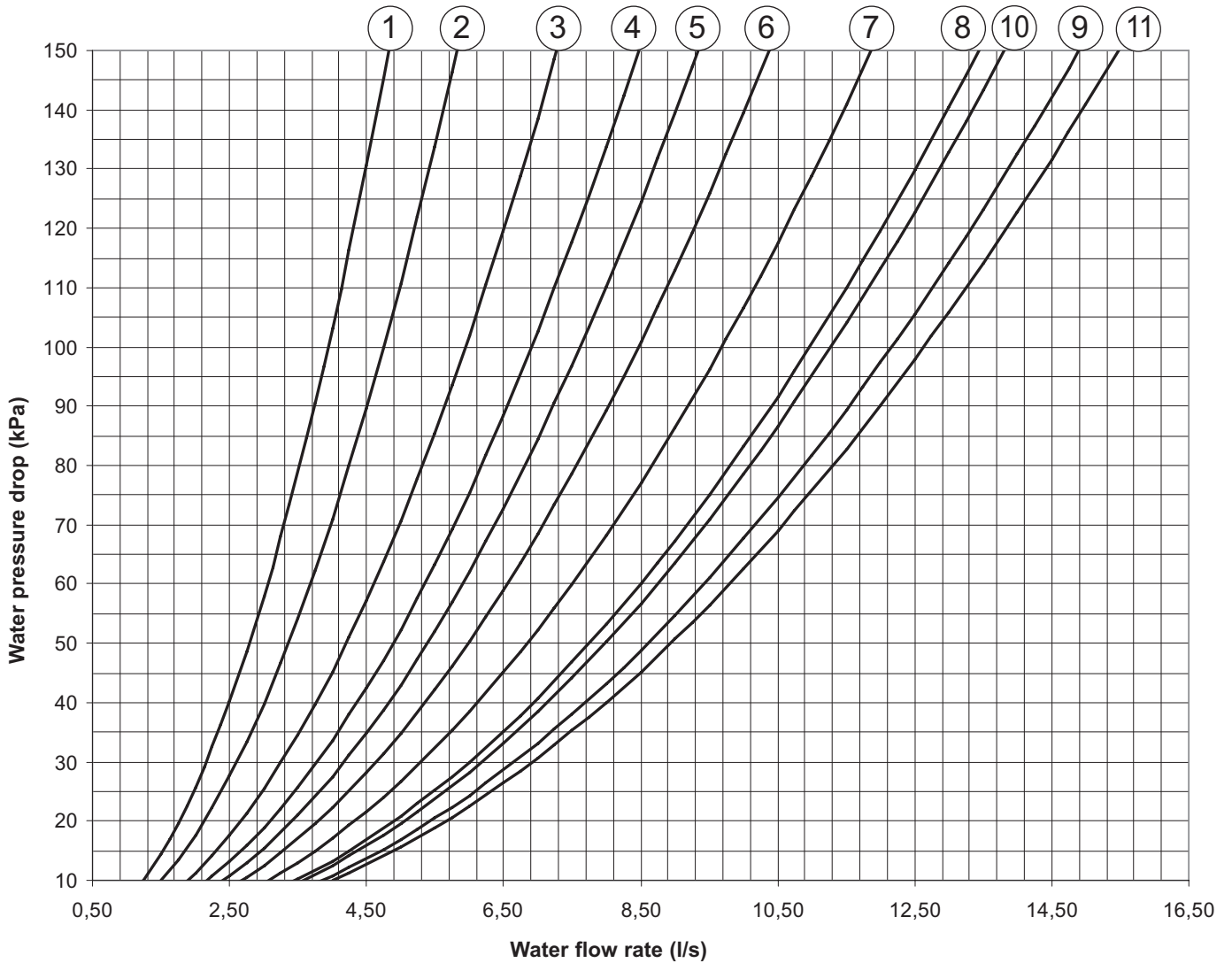


Use water glicol as specified in the paragraph "Specification data for Brine Version (VI)".

With condensation control accessory (IMV)

WATER PRESSURE DROP PLATE HEAT 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.

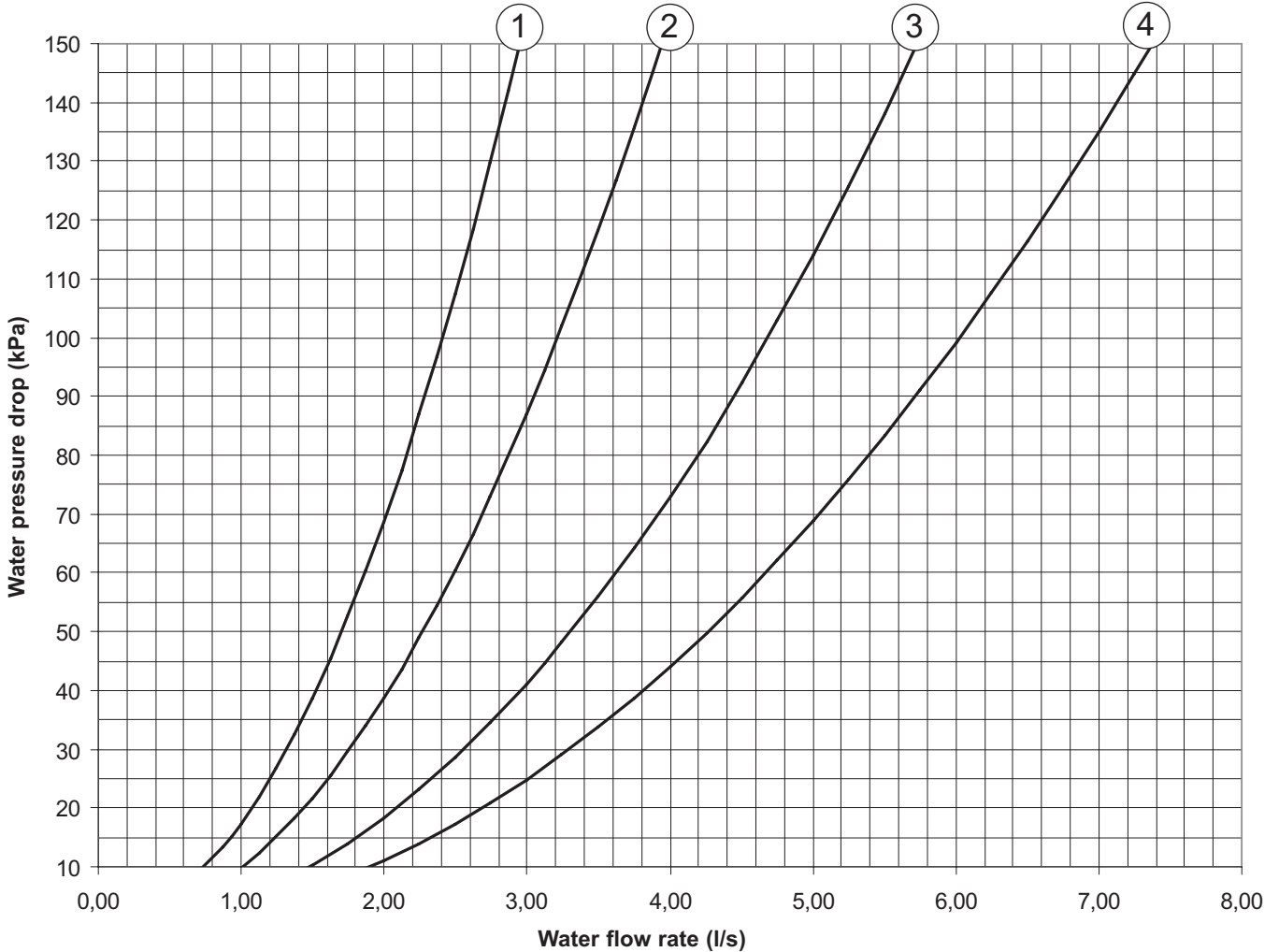


Operation limit

Unit Size		50	60	70	80	90	100	115	130	145	160	180	200	UM	NOTES
Graph reference		1	2	3	4	5	6	7	8	9	10	11			Q =Water flow rate Δp =Water pressure drop
Lower limit value	Q	1,2	1,5	1,9	2,2	2,4	2,7	3,1	3,5	3,8	3,6	4,0	l/s		
	Δp	10											kPa		
Upper limit value	Q	4,8	5,8	7,3	8,5	9,3	10,4	11,9	13,4	14,9	13,8	15,5	l/s		
	Δp	150											kPa		
Max. operating pressure on wet side		600											kPa		

WATER PRESSURE DROP OF THE DESUPERHEATER

The graph below illustrates the water pressure drop values in **kPa** depending on the flow rate in **liters/second**, for the Special Versions with Desuperheater (VD) in both the units that operate in the Cooling mode only (IR) and in Heat Pump units (IP). The operating range is delimited by the minimum and maximum values given in the next table.

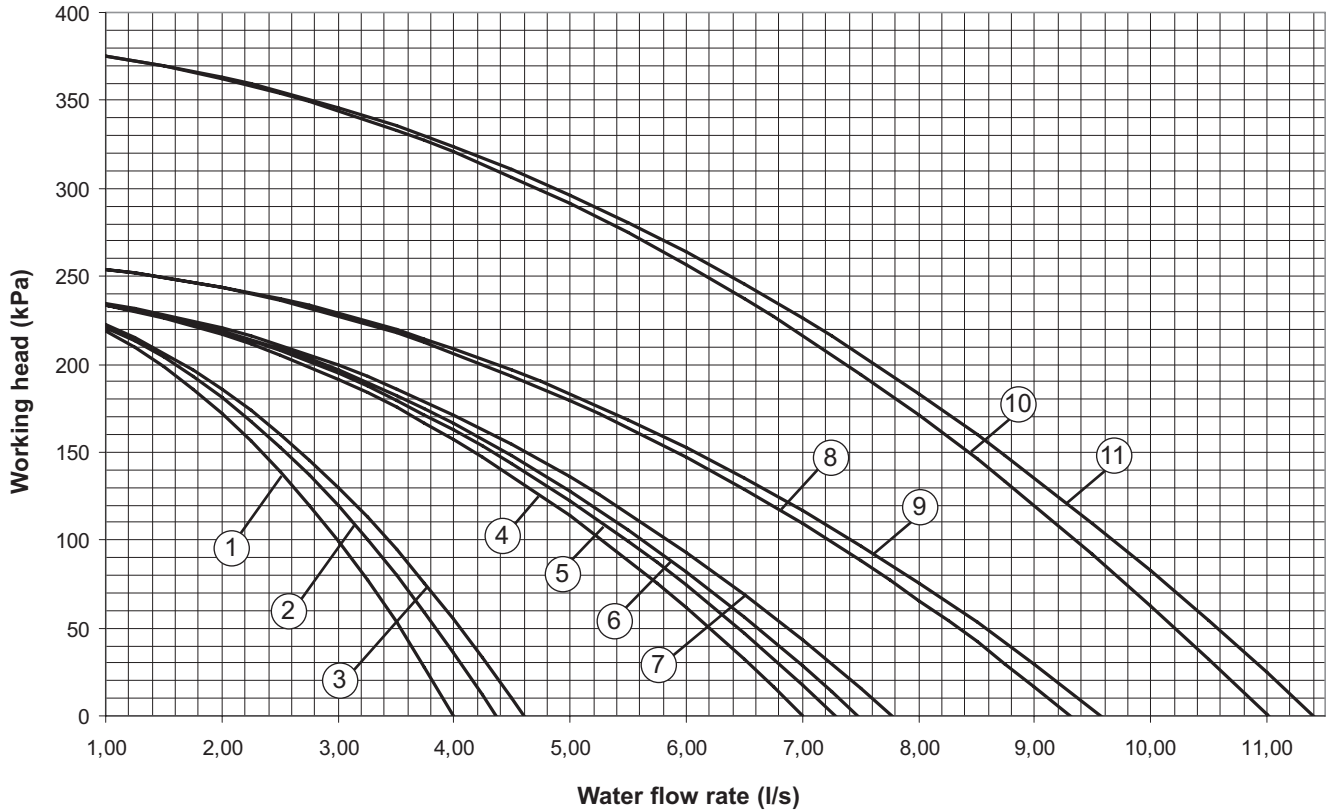


Limits to operation

Unit Size		50	60	70	80	90	100	115	130	145	160	180	200	UM	NOTES
Graph reference		1			2		3			4					Q =Water flow rate Δp =Water pressure drop
Lower limit value	Q	0,8			1,0		1,5			1,9		l/s			
	Δp	10											kPa		
Upper limit value	Q	3,0			3,9		5,7			7,4		l/s			
	Δp	150											kPa		

WORKING HEAD OF THE PUMPING MODULE MP-AM AND MP-SS

The following graph gives the head values (**kPa**) depending on the water flow rate (**liters/second**). The operating range is delimited by the minimum and maximum values given in the next table.
Working head is the one on the wet module outlet minus all the load losses of the unit.

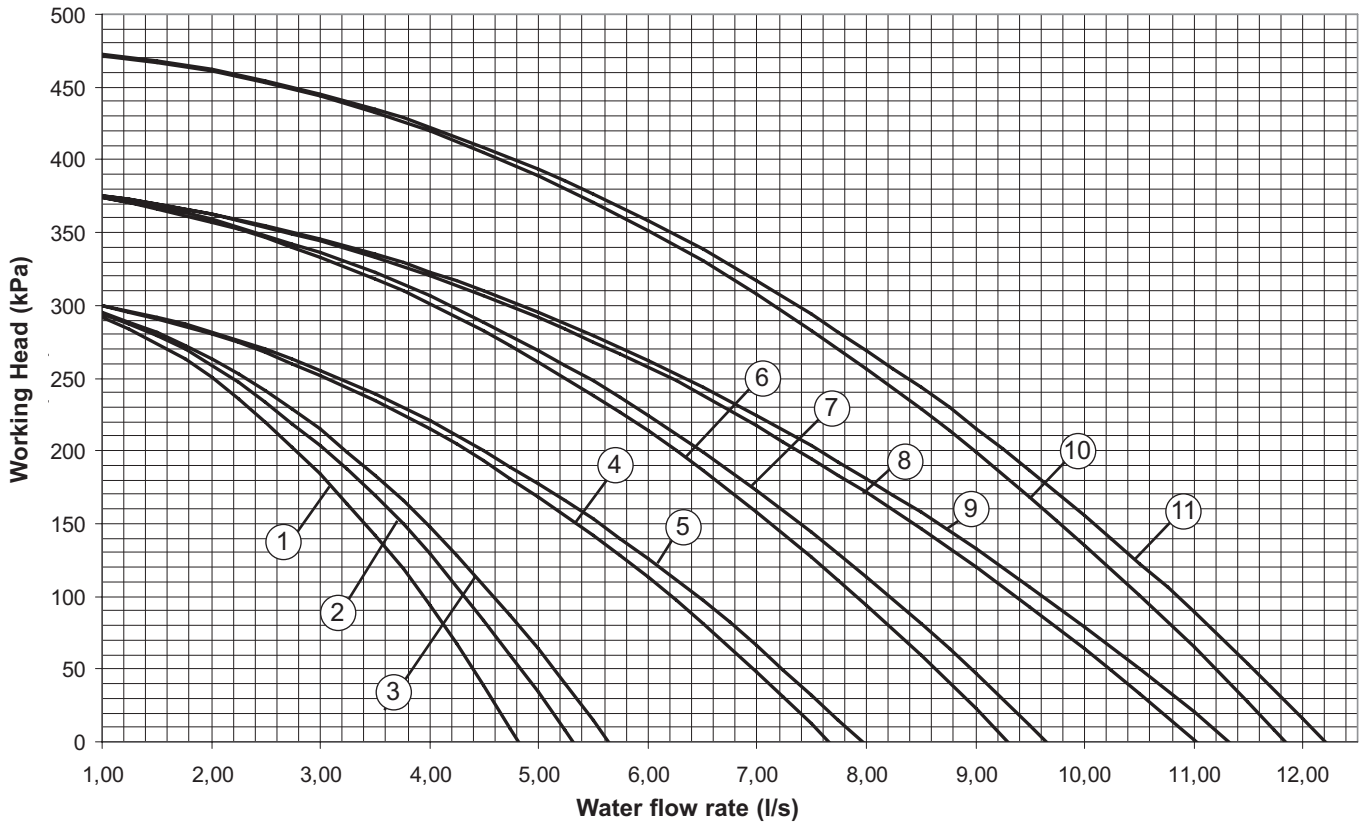


Operation limit

Unit Size	50	60	70	80	90	100	115	130	145	160	180	200	UM	NOTES
Graph reference	1		2	3	4	5	6	7	8	9	10	11		Q=Water flow rate
Lower limit value	Q	1,25	1,50	1,88	2,19	2,41	2,68	3,06	3,47	3,85	3,57	4,00	l/s	
Upper limit value		4,00	4,36	4,61	6,71	7,00	7,29	7,48	9,32	9,58	11,00	11,40	l/s	
Max. operating pressure on wet side	600											kPa		

HIGH WORKING HEAD OF THE PUMPING MODULE MP-AM AP AND MP-SS AP

The following graph gives the head values (kPa) depending on the water flow rate (liters/second). The operating range is delimited by the minimum and maximum values given in the next table.
Working head is the one on the wet module outlet minus all the load losses of the unit.



Operation limit

Unit Size	50	60	70	80	90	100	115	130	145	160	180	200	UM	NOTES
Graph reference	1		2	3	4	5	6	7	8	9	10	11		Q=Water flow rate
Lower limit value	1,25		1,50	1,88	2,19	2,41	2,68	3,06	3,47	3,85	3,57	4,00	l/s	
Upper limit value	4,82		5,31	5,65	7,67	7,96	9,29	9,65	11,03	11,32	11,85	12,21	l/s	
Max. operating pressure on wet side	600											kPa		

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 surge chamber supplied and the pressure at which it should be charged. The surge chamber 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 surge chamber's service charge value in kPa using the formula below:

$$\text{Surge chamber service charge} = [H/10.2 + 0.3] \times 100 = [\text{kPa}]$$

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

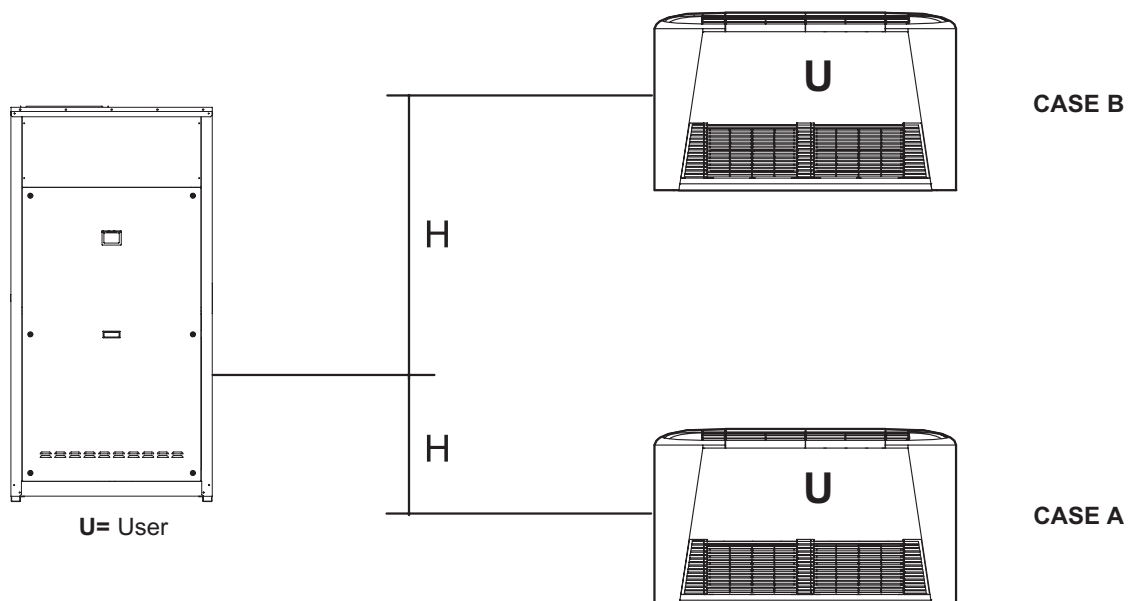
Tab.1

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

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

Corrective factors per total maximum volume of the system with brine

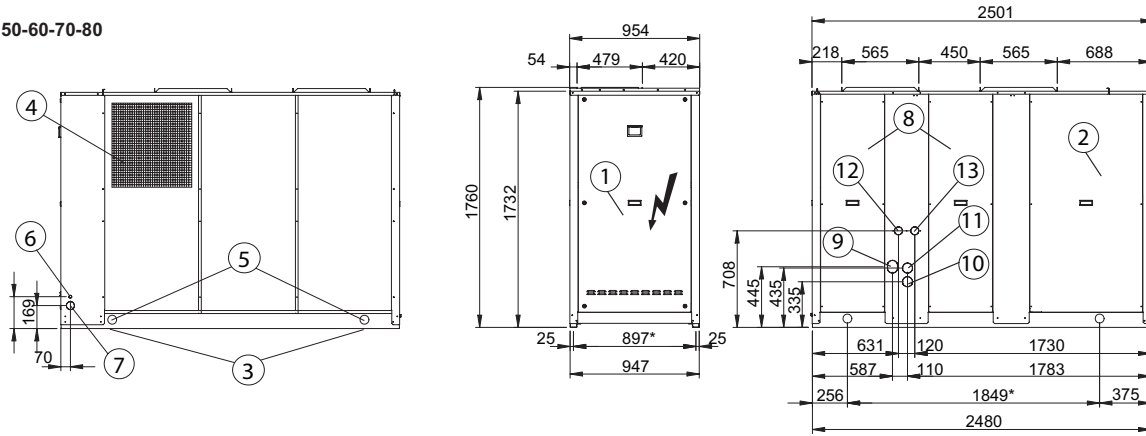
% of brine	0%	10%	20%	30%	40%
Cooling Mode	1.000	0.738	0.693	0.652	0.615
Heating Mode	1.000	0.855	0.811	0.769	0.731



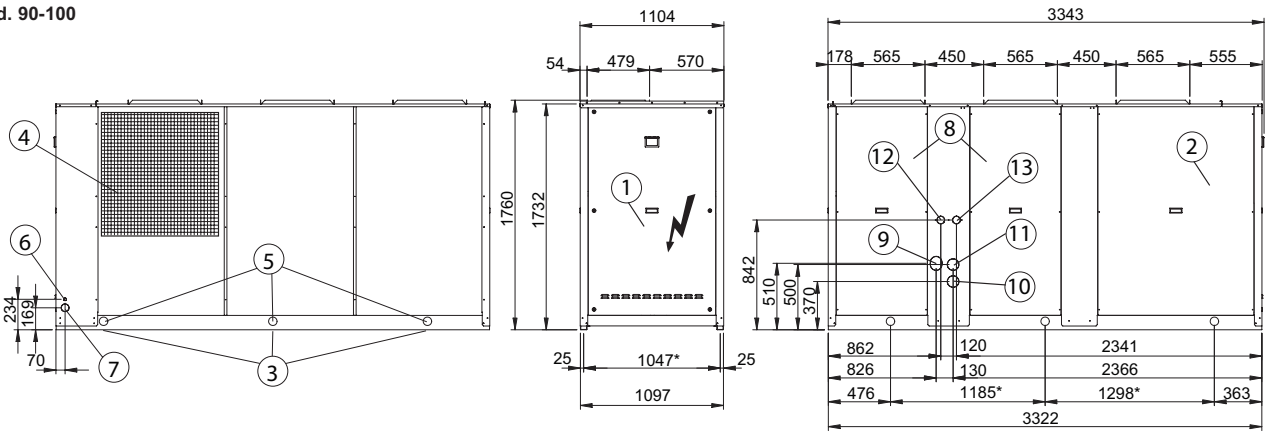
DIMENSIONAL DATA

Overall dimensions

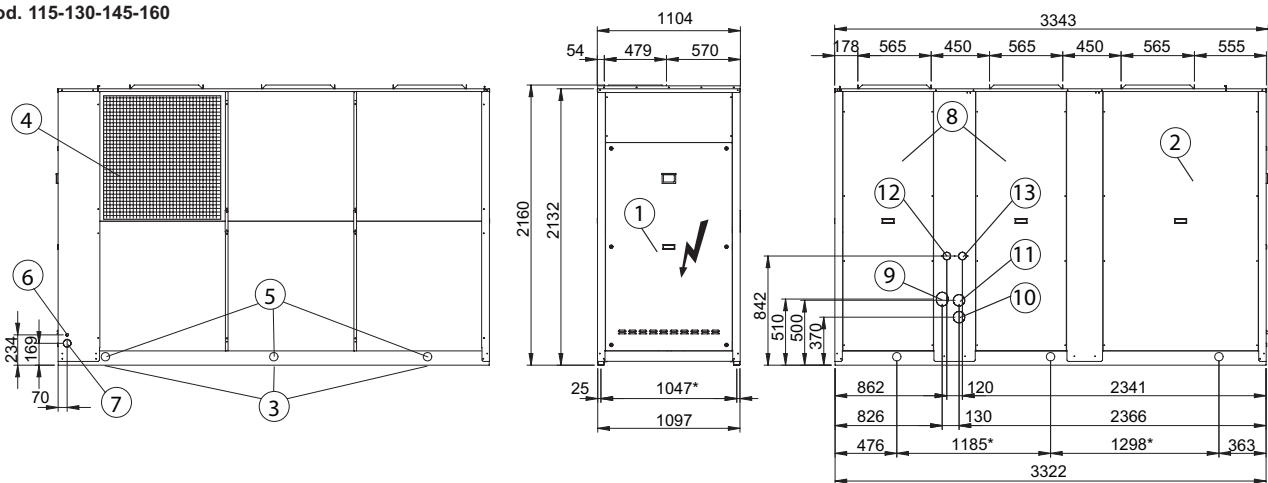
Mod. 50-60-70-80



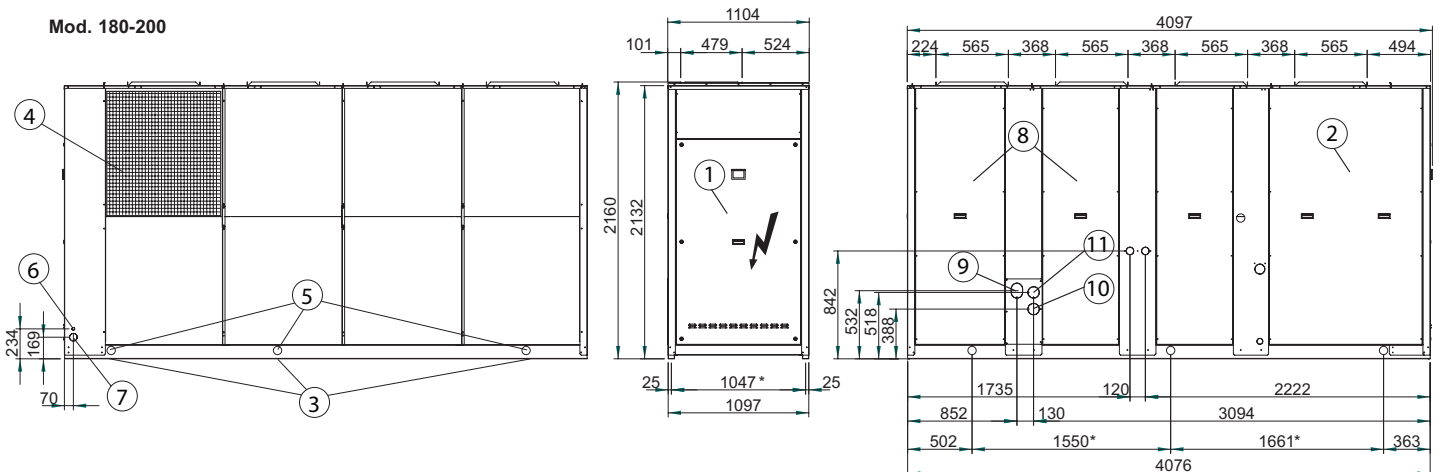
Mod. 90-100



Mod. 115-130-145-160



Mod. 180-200



DIMENSIONAL DATA

Description of the components

- 1 - Access panel to electric panel's power section
 - 2 - Access panel to compressor compartment
 - 3 - Vibration damper fixing holes (4 pcs)
 - 4 - Coil protection grilles (accessory)
 - 5 - \varnothing 65 mm lifting holes
 - 6 - \varnothing 22 mm input hole for accessory cables
 - 7 - \varnothing 60 mm hole for electric power supply input
 - 8 - Access panel to pump compartment
 - 9 - Water inlet for MP-AM and MP-SS
 - 10 - Water inlet for KT and MP-PS
 - 11 - Water outlet
 - 12 - Water inlet for Desuperheater (only VD version)
 - 13 - Water outlet for Desuperheater (only VD version)
- *: Center distance of vibration damper holes
Note (1): Basic pipe kit do not allow external connections.

Rif.	KT BASIC		KT COMPLETE		KT WATER STORAGE TANK		MP-AM		MP-AM AP		MP-SS		MP-SS AP		MP-PS		VD	
	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
50	(1)	(1)	10	11	10	11	9	11	9	11	9	11	9	11	10	11	12	13
60	2"M		1 1/2"		1 1/2"		2"		2"		2"		1 1/2"		2"		1 1/4"	
70	2 1/2"M		2"		2"		2 1/2"		2 1/2"		2 1/2"		2"		2 1/2"		1 1/4"	
80	2 1/2"M		2"		2"		2 1/2"		2 1/2"		2 1/2"		2"		2 1/2"		1 1/4"	
90	2 1/2"M		2"		2"		2 1/2"		2 1/2"		2 1/2"		2"		2 1/2"		1 1/4"	
100	2 1/2"M		2"		2"		2 1/2"		2 1/2"		2 1/2"		2"		2 1/2"		1 1/4"	
115	2 1/2"M		2"		2"		2 1/2"		2 1/2"		2 1/2"		2"		2 1/2"		1 1/4"	
130	2 1/2"M		2"		2"		2 1/2"		2 1/2"		2 1/2"		2"		2 1/2"		1 1/4"	
145	2 1/2"M		2"		2"		2 1/2"		2 1/2"		2 1/2"		2"		2 1/2"		1 1/4"	
160	2 1/2"M		2"		2"		2 1/2"		2 1/2"		2 1/2"		2"		2 1/2"		1 1/4"	
180	2 1/2"M		2"		2"		2 1/2"		2 1/2"		2 1/2"		2"		2 1/2"		1 1/4"	
200	2 1/2"M		2"		2"		2 1/2"		2 1/2"		2 1/2"		2"		2 1/2"		1 1/4"	

Minimum operative space

If it is intended to install the unit outdoors without the channel for expelling delivery air, a length of channel must nevertheless be provided as shown in Fig. 2 to ensure that rainwater cannot get into the unit and endanger its correct operation, is positioned in a hole, allow double values for the functional spaces. In the case of operation of multiple units, the functional spaces must be doubled.

N.B. For the distribution of loads on the supports, see the section "Weights and centres of gravity in operation".

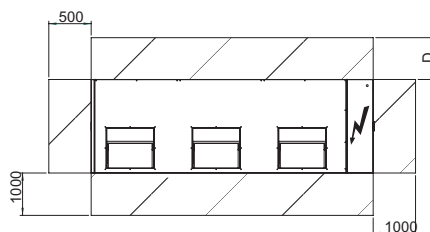


Fig.1

Modello	50-80	90-100	115-200
D [mm]	800		1000

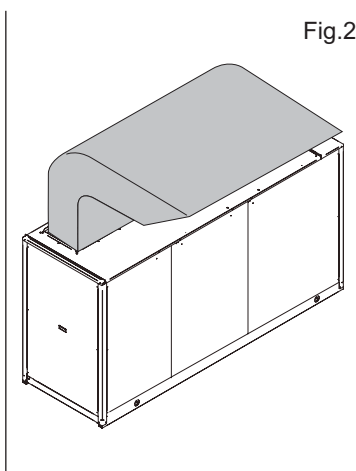


Fig.2

DIMENSIONAL DATA

Weight during operation and transport

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

IR VERSION

VB AB / VB AB + KS

Mod.	50	60	70	80	90	100	115	130	145	160	180	200
Trasport [kg]	663	663	702	727	1010	1091	1278	1305	1341	1389	1549	1593
Operation [kg]	666	667	706	732	1018	1099	1288	1316	1356	1404	1564	1608

VB AB / VB AB + KS with Water storage tank (SA) and Hydronic Kit with 2 Pumps (MP)

Trasport [kg]	842	842	881	906	1245	1325	1524	1551	1587	1635	1868	1912
Operation [kg]	1070	1070	1110	1136	1645	1726	1929	1957	1996	2044	2373	2417

IP VERSION

VB AB / VB AB + KS

Mod.	50	60	70	80	90	100	115	130	145	160	180	200
Trasport [kg]	695	695	735	759	1050	1130	1322	1349	1388	1439	1600	1644
Operation [kg]	698	699	739	765	1057	1138	1332	1360	1401	1453	1614	1658

VB AB / VB AB + KS with Water storage tank (SA) and Hydronic Kit with 2 Pumps (MP)

Trasport [kg]	874	874	914	938	1283	1363	1568	1594	1634	1684	1919	1963
Operation [kg]	1102	1102	1143	1168	1684	1765	1972	2000	2042	2094	2423	2467

Ferrolì

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