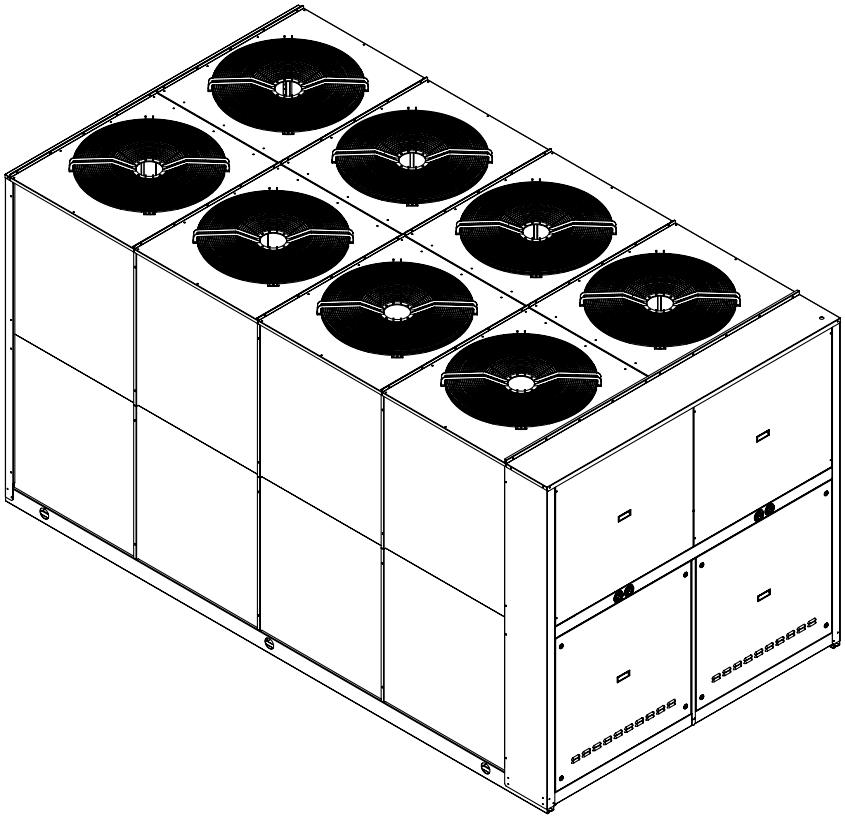
Ferroli

RLA

Cod. 1ZZ0481A

AIR COOLED WATER CHILLERS
AND HEAT PUMPS WITH AXIAL FANS
202 ÷ 419 kW

OZONE SAVED
R410A



CE

INSTALLATION MANUAL

Dear Customer,
Thank you for having purchased a FERROLI Idustrial coolers. It is the result of many years experience, particular research and has been made with top quality materials and higlly advanced technologies.The CE mark guaranteed thats the appliances meets European Machine Directive requirements regarding safety.
The qualitative level is kept under constant surveillance. 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

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

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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 condensed in air with axial fans suitable for outdoor 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 seven models divided in two sizes with nominal cooling capacity from **203 to 416 kW** and thermal capacity from **213 to 435 kW**.
The units product cold water from 5 to 20°C (in summer) and hot water from 30 to 53°C (in winter) and as standard they are equipped with continuous adjustment of axial fans rotating 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.
All the units are equipped with 4 scroll compressors arranged in pairs (tandem) on 2 circuits 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, axial fans with profiled blades to contain noise and with thermal protection built-in, 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) a Low Noise Unit (AS) which provides sound attenuation thanks to sound absorbing insulation in compressors area, sound jackets on compressors and reduced speed axial fans, or an Extra Low Noise Unit (AX), which provides in addition slower axial fans and more powerful finned coils.
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.

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 machine 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.**

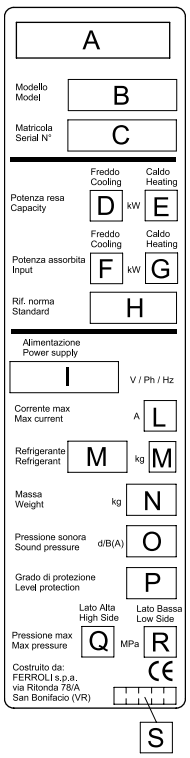
European Directives

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

- Machinery directive **2006/42/EC**
- Pressurised equipment directive (PED) **97/23/EC**
- Electromagnetic compatibility directive (EMC) **2004/108/EC**
- Low voltage directive (LVD) **2006/95/EC**

GENERAL SPECIFICATIONS

Identification plate of the Unit



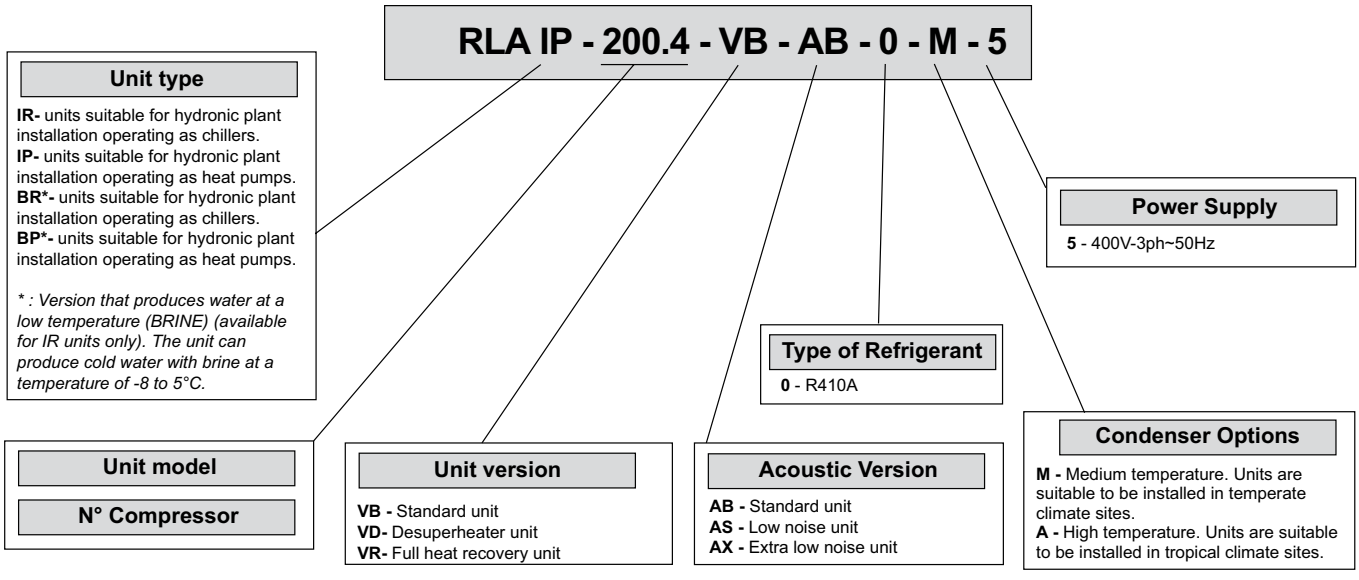
The figure on the left depicts the identification plate of the unit, affixed to the outer left-hand side of the Electric Panel.
A description of the data is given below:

Basic versions

A - Trademark
B - Model
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 current absorption
M - Type of refrigerant and weight of charge
N - Shipping weight of the unit
O - Sound pressure
P - IP Level Protection
Q - Maximum pressure - High Side
R - Maximum pressure - Low Side
S - PED certification authority

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 forboth 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.

VR: Total Heat Recovery version
Produces cold water as in the standard version plus hot water at a temperature of 35 to 50°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.

GENERAL SPECIFICATIONS

Description of the components

1. Fans. These are the helical type with scythe-shaped blades to 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. As standard they are equipped with continuous adjustment of axial fans rotating 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.

2. Electric control and monitoring panel.
It is housed in a cabinet made of adequately thick painted sheet metal suitable for outdoor installation (protection degree IP 54). The panel comprises the following main components:
- Main door-locking circuit-breaker.
- Fuse holders with protection fuses for each compressor.
- Fuse holders with protection fuses for the antifreeze heater.
- Fuse holders and protection fuses for the fans (accessories).
- Fan control contactors.
- Insulating and safety transformer to power the auxiliaries, protected with fuses.
- Basic monitoring board with microprocessor

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.

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 E/I (only IP unit), demand limit, double Set-point.

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), additional heating management, available digital contact on compressors running.

Analogic input functions: in and out water temperature, coil temperature probe, external air temperature probe.

Analogic output functions: continuous adjustment of axial fans rotating speed.

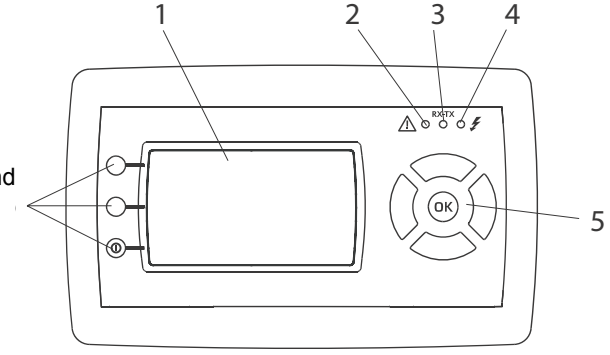
Moreover the controller allows:
- Alarm history (max 50m alarms managed with FIFO logic)
- Time scheduling (daily and weekly)
- Precise control of the water leaving temperature
- Prevention of the block of the unit: In case of critical conditions the machine does not stop but is able to regulate itself and provide the maximum power that can be generated in those conditions with the compressors working inside the admissible limits.
-Demand Limit by Digital Input and/or by Analog Input (4-20mA)
-Double Set Point by Digital Input
-Connection to BMS (supervision systems) through serial port RS 485 and MODBUS protocol

3. User interfacing terminal with display.
Control panel: composed of the instrument's front panel, equipped with an LCD display, three indicator LEDs, and one joystick buttons and three function button, it enables viewing and/or checking the operating mode and parameters, resources and complete alarm diagnostics.
In particular, it enables:

· Managing alarm situations
· Checking the status of resources.

KEY

1.Display
2. Alarms LED
3. LED for communication between the motherboard governing the unit and the keypad
4. Power supply LED
5. Joystick Menu Button
6. Function Button



GENERAL SPECIFICATIONS

3. Compressors. They are the SCROLL type with orbiting coil equipped with built-in thermal protection and oil heater. The version unit AS and AX includes: a soundproofing jacket for the compressors, acoustic cladding for the entire compressor compartment to reduce the noise level and continuous adjustment of axial fans rotating speed. All units are equipped with four compressors connected in parallel (2 cooling circuits) which can operate at the same time (100% cooling power) or individually (75-50-25% 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 maximun 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 maximun 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.

9. 4-way cycle reversal valve (IP unit only), reverses the flow direction of the gas as the summer/winter operating mode is changed.

Hydraulic and cooling circuit components

10. Safety valve. Installed on the delivery pipe of the compressors, this operates if extreme faults should occur in the plant.
11. Fluid tap. Ball type, this allows the gas flow on the fluid line to be turned on and off. Along with the tap 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): pump down.
12. Compressor delivery tap. Ball type, allows the gas delivered to the compressors to be turned on and off.
13. Dehydrator filter. Mechanical cartridge type. Retains impurities and traces of moisture in the circuit.
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. 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 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.
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.
- 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.

ACCESSORIES AND OPTIONAL EQUIPMENT

Available accessories

NOTE: The accessories can be of the following type:
(M): only installed in the factory.
(F): supplied for installation by the customer.

MP- Hydronic kit (M). Hydronic group with 1 or 2 pumps (available static head aprox 100 kPa with standard MP) equipped with metallic water filter, non-return valves (only with two pumps hydronic group), vent valves with all the connections needed for a quick installation and easy maintenance. Hydronic groups with high available static head on request.

SAA- Water Storage tank (M). Painted steel water storage tank reduces compressor startup frequency and temperature fluctuation on water side. It is coated with thermo insulated material to avoid air condensing and losses due to heat transfer. It is available on delivery side and also for primary-secondary hydraulic circuit interface.

KT- Pipes kit (M). Provides in and out connections from outside of the unit it is made of pipes coated with thermo insulated material.

BCN- Drain Pan Kit (M). Provides a pan under the coil to drain the condensing water, fitted with 1/2” outlet connection positioned opposite to the electric control panel.

GP- Coil protection grid (M). Protects external surface of the finned coils.

GM- Pressure gauges kit (M). 4 pressure gauges allow visualization of high and low refrigerant gas pressure.

TP - High pressure transducers (M). Allow the delivery pressure values of the compressors to be displayed.

TP - Low pressure transducers (M). Allow the intake pressure values of the compressors to be displayed.

AVG- Rubber vibration dampers (F). Reduce vibrations transmitted to the floor by compressors and fans during normal operating conditions (until 85%).

AVM- Spring vibration dampers (F). Reduce vibrations transmitted to the floor by compressors and fans during normal operating conditions (until 90%).

RAG- Storage tank electrical heater (F). Keeps water in storage tank above freezing point to avoid risk of icing during winter stops it is activated together with plate heat exchanger electrical heater.

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.

CR- Remote control panel (F). Replies every control and visualization of the onboard control panel.

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

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).

TECHNICAL SPECIFICATIONS AND STANDARD PERFORMANCES - IR COOLING UNIT ONLY

General technical specifications Basic Version Unit

Acoustic Version: AB (Basic Version)

The following data refer to an **IR** unit

MODELS	200.4	230.4	260.4	290.4	330.4	375.4	420.4	UM
Power supply	400-3-50							V-ph-Hz
Refrigerant type	R410A							-
Refrigeration circuits	2							N°
Refrigerant type	Take as reference the Refrigerant type value on the Unit Identification plate							kg
Cooling capacity(1) (E)	203	227	259	293	329	375	416	kW
Total power input (1)	69.4	77.9	89.0	101	113	128	143	kW
EER (E)	2.93	2.91	2.91	2.90	2.91	2.93	2.91	-
ESEER (E)	4.10	4.08	4.07	4.06	4.08	4.10	4.07	-
Water flow rate(1)	9.70	10.9	12.4	14.0	15.7	17.9	19.9	l/s
Water pressure drop(1) (E)	62	62	67	70	59	62	62	kPa
Working head(1) (MP)	106	93	68	101	123	80	101	kPa
Compressor specifications								
Power input(1)	62.2	70.7	78.2	90.4	102	114	128	kW
Type	scroll							-
Quantity	4							N°
Oil charge CP1	4.7	4.7	6.8	6.8	6.3	6.3	6.3	l
Oil charge CP2	4.7	6.8	6.8	6.3	6.3	6.3	6.3	l
Oil charge CP3	4.7	4.7	6.8	6.8	6.3	6.3	6.3	l
Oil charge CP4	4.7	6.8	6.8	6.3	6.3	6.3	6.3	l
Load steps	0-25-50-75-100							%
Heat Exchanger								
Type	Brazed plates							-
Quantity	1							N°
Total water capacity	9.5	10.8	12.0	14.2	23.0	25.7	29.3	l
Coils specifications								
Type	Aluminum fins and copper tubes							-
Quantity	2							N°
Total area	5.90	5.90	5.90	5.90	7.41	7.41	7.41	m^2
Fan specifications								
Type	Axial							-
Quantity	4	4	6	6	6	8	8	N°
Maximum rotation speed	900							rpm
Total air flow rate	82920	79760	124380	119640	124380	165840	159520	m^3/h
Power input	7.2	7.2	10.8	10.8	10.8	14.4	14.4	kW
Electrical specifications								
Units without pumping module								
Total maximum power input [FLA]	163	179	204	234	263	301	330	A
Total maximum power input [FLI]	98.4	108	122	139	156	182	203	kW
Total maximum starting current [MIC]	352	407	432	484	514	621	650	A
Units with pumping module MP-PS (1 or 2 pumps)								
Total maximum power input [FLA]	169	186	210	245	275	312	341	A
Total maximum power input [FLI]	102	112	126	146	163	188	210	kW
Total maximum starting current [MIC]	358	413	438	496	525	633	662	A
Units with pumping module MP-AM and MP-SS (1 or 2 pumps)								
Total maximum power input [FLA]	172	188	213	245	275	312	345	A
Total maximum power input [FLI]	103	113	127	146	163	188	212	kW
Total maximum starting current [MIC]	360	416	441	496	525	633	665	A
Units with pumping module MP-AM AP (1 or 2 pumps)								
Total maximum power input [FLA]	175	191	216	249	278	316	352	A
Total maximum power input [FLI]	105	115	129	148	165	188	216	kW
Total maximum starting current [MIC]	363	418	443	499	529	636	672	A
Water Storage Tank (SAA accessory)								
Water volume	450				760			l
Surge chamber volume	24							l
Safety valve setting	600							kPa
Surge chamber default pressure	150							kPa
Max. operating pressure	800							kPa

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
(MP): with standard hydronic kit MP-AM and MP-SS
(SAA): with storage tank
(E): data declared according to LCP EUROVENT certification program

TECHNICAL SPECIFICATIONS AND STANDARD PERFORMANCES - IR COOLING UNIT ONLY

Standard performances in cooling mode - Basic Version AB

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
200.4	5	232	43.6	216	50.2	205	55.3	192	61.0	179	67.2	165	73.3	152	79.3
	6	238	44.1	222	50.7	210	55.8	197	61.6	184	67.9	170	74.0	156	80.0
	7	245	44.5	229	51.2	216	56.4	**203**	**62.2**	189	68.6	175	74.7	161	80.8
	8	252	45.0	235	51.8	222	57.0	209	62.9	194	69.3	180	75.6	-	-
	9	259	45.4	242	52.3	229	57.6	215	63.5	200	70.0	185	76.3	-	-
	10	266	45.9	248	52.8	235	58.2	220	64.1	205	70.7	190	77.1	-	-
	11	273	46.3	254	53.3	241	58.8	226	64.8	210	71.4	195	77.8	-	-
	12	280	46.8	261	53.8	247	59.3	232	65.4	216	72.1	200	78.6	-	-
230.4	5	259	49.6	242	57.1	229	62.9	215	69.3	200	76.4	185	83.3	170	90.1
	6	266	50.1	249	57.6	235	63.5	221	70.0	205	77.1	190	84.1	175	90.9
	7	274	50.6	256	58.2	242	64.1	**227**	**70.7**	211	77.9	196	85.0	180	91.9
	8	282	51.1	263	58.8	249	64.8	233	71.5	217	78.8	201	85.9	-	-
	9	290	51.7	270	59.4	256	65.5	240	72.2	223	79.6	207	86.8	-	-
	10	297	52.2	277	60.0	262	66.1	246	72.9	229	80.4	212	87.6	-	-
	11	305	52.7	285	60.6	269	66.8	253	73.6	235	81.2	218	88.5	-	-
	12	313	53.2	292	61.2	276	67.4	259	74.3	241	81.9	224	89.3	-	-
260.4	5	296	54.9	276	63.1	261	69.6	245	76.7	228	84.5	211	92.2	194	99.6
	6	304	55.4	284	63.7	268	70.2	252	77.4	234	85.3	217	93.0	199	100.6
	7	313	55.9	292	64.4	276	70.9	**259**	**78.2**	241	86.2	223	94.0	205	101.6
	8	322	56.6	300	65.1	284	71.7	266	79.1	248	87.1	230	95.0	-	-
	9	330	57.1	308	65.7	292	72.4	274	79.9	255	88.0	236	96.0	-	-
	10	339	57.7	317	66.4	299	73.1	281	80.6	261	88.9	242	96.9	-	-
	11	348	58.3	325	67.0	307	73.9	288	81.4	268	89.8	248	97.9	-	-
	12	357	58.8	333	67.7	315	74.6	296	82.2	275	90.6	255	98.8	-	-
290.4	5	334	63.4	312	73.0	295	80.4	277	88.7	258	97.7	239	107	219	115
	6	344	64.0	321	73.7	303	81.2	285	89.5	265	98.6	245	108	225	116
	7	354	64.7	330	74.4	312	82.0	**293**	**90.4**	273	99.6	252	109	232	117
	8	364	65.4	340	75.2	321	82.9	301	91.4	280	100.7	260	110	-	-
	9	374	66.0	349	76.0	330	83.7	310	92.3	288	101.8	267	111	-	-
	10	384	66.7	358	76.7	339	84.6	318	93.2	296	102.8	274	112	-	-
	11	393	67.4	367	77.5	347	85.4	326	94.1	303	104	281	113	-	-
	12	404	68.0	377	78.3	357	86.2	335	95.1	311	105	288	114	-	-
330.4	5	376	71.6	351	82.3	331	90.7	311	100.0	289	110	268	120	246	130
	6	386	72.2	360	83.1	341	91.6	320	101.0	297	111	275	121	253	131
	7	397	73.0	371	84.0	351	92.5	**329**	**102.0**	306	112	284	123	260	133
	8	408	73.8	381	84.9	361	93.5	338	103.1	315	114	292	124	-	-
	9	420	74.5	392	85.7	370	94.5	348	104.2	323	115	300	125	-	-
	10	431	75.3	402	86.6	380	95.4	357	105	332	116	308	126	-	-
	11	442	76.0	412	87.4	390	96.3	366	106	341	117	315	128	-	-
	12	454	76.7	424	88.3	401	97.3	376	107	350	118	324	129	-	-
375.4	5	428	80.0	400	92.0	378	101.4	355	112	330	123	306	134	281	145
	6	440	80.7	411	92.9	388	102.4	364	113	339	124	314	136	288	147
	7	453	81.6	423	93.8	400	103.4	**375**	**114**	349	126	323	137	297	148
	8	466	82.5	435	94.9	411	104.5	386	115	359	127	332	139	-	-
	9	478	83.3	447	95.8	422	106	396	116	369	128	341	140	-	-
	10	491	84.1	458	96.8	433	107	407	118	378	130	351	141	-	-
	11	504	84.9	470	97.7	445	108	417	119	388	131	359	143	-	-
	12	517	85.8	483	98.7	457	109	428	120	399	132	369	144	-	-
420.4	5	475	89.8	443	103	419	114	393	126	366	138	339	151	311	163
	6	488	90.7	456	104	431	115	404	127	376	140	348	152	320	165
	7	502	91.6	469	105	443	116	**416**	**128**	387	141	358	154	329	166
	8	516	92.6	482	107	456	117	428	129	398	143	369	156	-	-
	9	531	93.5	495	108	468	119	440	131	409	144	379	157	-	-
	10	545	94.4	508	109	481	120	451	132	420	145	389	159	-	-
	11	559	95.4	521	110	493	121	463	133	431	147	399	160	-	-
	12	574	96.3	536	111	506	122	475	135	442	148	410	162	-	-

Tw= Outlet water temperature °C **kWf** = Cooling capacity (kW). **kWa** = Compressor power input (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).

TECHNICAL SPECIFICATIONS AND STANDARD PERFORMANCES - IR COOLING UNIT ONLY

Acoustic Version: AS (Low noise Version)

The following data refer to an **IR** unit

MODELS	200.4	230.4	260.4	290.4	330.4	375.4	420.4	UM
Power supply	400-3-50							V-ph-Hz
Refrigerant type	R410A							-
Refrigeration circuits	2							N°
Refrigerant type	Take as reference the Refrigerant type value on the Unit Identification plate							kg
Cooling capacity(1) (E)	195	218	249	281	316	360	399	kW
Total power input (1)	74.4	83.6	95.3	108	121	137	152	kW
EER (E)	2.62	2.61	2.61	2.60	2.61	2.63	2.63	-
ESEER (E)	3.67	3.65	3.66	3.64	3.66	3.68	3.68	-
Water flow rate(1)	9.32	10.4	11.9	13.4	15.1	17.2	19.1	l/s
Water pressure drop(1) (E)	58	57	62	64	55	57	57	kPa
Working head(1) (MP)	115	100	73	110	133	87	110	kPa
Compressor specifications								
Power input(1)	67.2	76.4	84.5	97.6	110	123	138	kW
Type	scroll							-
Quantity	4							N°
Oil charge CP1	4.7	4.7	6.8	6.8	6.3	6.3	6.3	l
Oil charge CP2	4.7	6.8	6.8	6.3	6.3	6.3	6.3	l
Oil charge CP3	4.7	4.7	6.8	6.8	6.3	6.3	6.3	l
Oil charge CP4	4.7	6.8	6.8	6.3	6.3	6.3	6.3	l
Load steps	0-25-50-75-100							%
Heat Exchanger								
Type	Brazed plates							-
Quantity	1							N°
Total water capacity	9.5	10.8	12.0	14.2	23.0	25.7	29.3	l
Coils specifications								
Type	Aluminum fins and copper tubes							-
Quantity	2							N°
Total area	5.90	5.90	5.90	5.90	7.41	7.41	7.41	m^2
Fan specifications								
Type	Axial							-
Quantity	4	4	6	6	6	8	8	N°
Maximum rotation speed	750							rpm
Total air flow rate	69100	66467	103650	99700	103650	138200	132933	m^3/h
Power input	7.2	7.2	10.8	10.8	10.8	14.4	14.4	kW
Electrical specifications								
Units without pumping module								
Total maximum power input [FLA]	163	179	204	234	263	301	330	A
Total maximum power input [FLI]	98.4	108	122	139	156	182	203	kW
Total maximum starting current [MIC]	352	407	432	484	514	621	650	A
Units with pumping module MP-PS (1 or 2 pumps)								
Total maximum power input [FLA]	169	186	210	245	275	312	341	A
Total maximum power input [FLI]	102	112	126	146	163	188	210	kW
Total maximum starting current [MIC]	358	413	438	496	525	633	662	A
Units with pumping module MP-AM and MP-SS (1 or 2 pumps)								
Total maximum power input [FLA]	172	188	213	245	275	312	345	A
Total maximum power input [FLI]	103	113	127	146	163	188	212	kW
Total maximum starting current [MIC]	360	416	441	496	525	633	665	A
Units with pumping module MP-AM AP (1 or 2 pumps)								
Total maximum power input [FLA]	175	191	216	249	278	316	352	A
Total maximum power input [FLI]	105	115	129	148	165	188	216	kW
Total maximum starting current [MIC]	363	418	443	499	529	636	672	A
Water Storage Tank (SAA accessory)								
Water volume	450				760			l
Surge chamber volume	24							l
Safety valve setting	600							kPa
Surge chamber default pressure	150							kPa
Max. operating pressure	800							kPa

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
(MP): with standard hydronic kit MP-AM and MP-SS
(SAA): with storage tank
(E): data declared according to LCP EUROVENT certification program

TECHNICAL SPECIFICATIONS AND STANDARD PERFORMANCES - IR COOLING UNIT ONLY

Standard performances in cooling mode - Low noise Version AS

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
200.4	5	223	47.1	208	54.2	196	59.8	184	65.9	172	72.6	159	79.2	146	85.6
	6	229	47.6	214	54.8	202	60.3	189	66.5	176	73.3	163	79.9	150	86.4
	7	235	48.1	220	55.3	208	61.0	**195**	**67.2**	181	74.1	168	80.8	154	87.3
	8	242	48.6	226	55.9	214	61.6	201	67.9	187	74.9	173	81.6	-	-
	9	249	49.1	232	56.5	220	62.2	206	68.6	192	75.6	178	82.5	-	-
	10	255	49.6	238	57.1	225	62.9	212	69.3	197	76.4	182	83.3	-	-
	11	262	50.1	244	57.6	231	63.5	217	70.0	202	77.1	187	84.1	-	-
	12	269	50.6	251	58.2	237	64.1	223	70.7	207	77.9	192	84.9	-	-
230.4	5	249	53.6	232	61.7	220	68.0	206	74.9	192	82.6	178	90.0	163	97.3
	6	256	54.1	239	62.3	226	68.6	212	75.6	197	83.4	183	90.9	168	98.3
	7	263	54.7	246	62.9	232	69.3	**218**	**76.4**	203	84.2	188	91.8	173	99.3
	8	271	55.3	253	63.6	239	70.1	224	77.2	209	85.1	193	92.8	-	-
	9	278	55.8	260	64.2	245	70.8	230	78.0	214	86.0	198	93.8	-	-
	10	285	56.4	266	64.9	252	71.5	236	78.8	220	86.8	204	94.7	-	-
	11	293	56.9	273	65.5	258	72.2	243	79.6	226	87.7	209	95.6	-	-
	12	301	57.5	281	66.1	265	72.9	249	80.3	232	88.6	215	96.5	-	-
260.4	5	284	59.3	265	68.2	251	75.2	235	82.9	219	91.3	203	99.6	186	108
	6	292	59.8	273	68.9	258	75.9	242	83.6	225	92.2	208	100.5	191	109
	7	301	60.5	281	69.6	265	76.6	**249**	**84.5**	232	93.1	215	101.5	197	110
	8	309	61.1	289	70.3	273	77.5	256	85.4	238	94.2	221	102.7	-	-
	9	318	61.7	296	71.0	280	78.3	263	86.3	245	95.1	227	103.7	-	-
	10	326	62.3	304	71.7	288	79.0	270	87.1	251	96.1	233	104.7	-	-
	11	334	63.0	312	72.4	295	79.8	277	88.0	258	97.0	239	105.7	-	-
	12	343	63.6	321	73.1	303	80.6	285	88.9	265	97.9	245	106.8	-	-
290.4	5	321	68.5	299	78.8	283	86.8	266	95.7	247	105.5	229	115	210	124
	6	330	69.1	308	79.5	291	87.6	273	96.6	254	106.5	235	116	216	126
	7	339	69.8	317	80.3	299	88.5	**281**	**97.6**	261	108	242	117	222	127
	8	349	70.6	326	81.2	308	89.5	289	98.7	269	109	249	119	-	-
	9	358	71.3	335	82.0	316	90.4	297	99.7	276	110	256	120	-	-
	10	368	72.0	343	82.9	325	91.3	305	100.7	284	111	263	121	-	-
	11	377	72.7	352	83.7	333	92.2	313	101.6	291	112	269	122	-	-
	12	388	73.4	362	84.5	342	93.1	321	102.6	299	113	277	123	-	-
330.4	5	361	77.2	337	88.8	318	97.8	299	108	278	119	257	130	236	140
	6	371	77.9	346	89.6	327	98.8	307	109	286	120	265	131	243	141
	7	381	78.7	356	90.6	337	99.8	**316**	**110**	294	121	272	132	250	143
	8	392	79.6	366	91.6	346	100.9	325	111	302	123	280	134	-	-
	9	403	80.4	376	92.5	356	101.9	334	112	311	124	288	135	-	-
	10	414	81.2	386	93.4	365	102.9	343	113	319	125	295	136	-	-
	11	424	82.0	396	94.3	375	103.9	352	115	327	126	303	138	-	-
	12	436	82.8	407	95.2	385	104.9	361	116	336	127	311	139	-	-
375.4	5	411	86.3	384	99.3	363	109	340	121	317	133	293	145	269	157
	6	422	87.1	394	100.2	373	110	350	122	325	134	301	146	277	158
	7	435	88.0	406	101.3	384	112	**360**	**123**	335	136	310	148	285	160
	8	447	89.0	417	102.4	394	113	370	124	344	137	319	149	-	-
	9	459	89.9	429	103.4	405	114	380	126	354	138	328	151	-	-
	10	471	90.8	440	104.4	416	115	390	127	363	140	336	152	-	-
	11	483	91.6	451	105.4	427	116	400	128	373	141	345	154	-	-
	12	497	92.5	464	106.5	438	117	411	129	383	143	354	155	-	-
420.4	5	455	96.8	425	111	402	123	377	135	351	149	325	163	299	176
	6	468	97.7	437	112	413	124	388	137	361	151	334	164	307	177
	7	482	98.7	450	114	425	125	**399**	**138**	371	152	344	166	316	179
	8	495	99.8	462	115	437	127	410	140	382	154	354	168	-	-
	9	509	100.8	475	116	449	128	422	141	392	155	363	169	-	-
	10	522	101.8	488	117	461	129	433	142	403	157	373	171	-	-
	11	536	102.8	500	118	473	130	444	144	413	158	382	173	-	-
	12	550	103.8	514	119	486	132	456	145	424	160	393	174	-	-

Tw= Outlet water temperature °C **kWf** = Cooling capacity (kW). **kWa** = Compressor power input (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).

TECHNICAL SPECIFICATIONS AND STANDARD PERFORMANCES - IR COOLING UNIT ONLY

Acoustic Version: AX (Extra low noise Version)

The following data refer to an **IR** unit

MODELS	200.4	230.4	260.4	290.4	330.4	375.4	420.4	UM
Power supply	400-3-50							V-ph-Hz
Refrigerant type	R410A							-
Refrigeration circuits	2							N°
Refrigerant type	Take as reference the Refrigerant type value on the Unit Identification plate							kg
Cooling capacity(1) (E)	191	213	243	275	309	353	391	kW
Total power input (1)	78.1	87.8	100	114	127	144	160	kW
EER (E)	2.45	2.43	2.43	2.41	2.43	2.45	2.44	-
ESEER (E)	3.42	3.40	3.40	3.38	3.41	3.43	3.42	-
Water flow rate(1)	9.13	10.2	11.6	13.1	14.8	16.9	18.7	l/s
Water pressure drop(1) (E)	55	54	59	62	52	55	55	kPa
Working head(1) (MP)	120	105	77	115	139	90	114	kPa
Compressor specifications								
Power input(1)	70.9	80.6	89.1	103	116	130	146	kW
Type	scroll							-
Quantity	4							N°
Oil charge CP1	4.7	4.7	6.8	6.8	6.3	6.3	6.3	l
Oil charge CP2	4.7	6.8	6.8	6.3	6.3	6.3	6.3	l
Oil charge CP3	4.7	4.7	6.8	6.8	6.3	6.3	6.3	l
Oil charge CP4	4.7	6.8	6.8	6.3	6.3	6.3	6.3	l
Load steps	0-25-50-75-100							%
Heat Exchanger								
Type	Brazed plates							-
Quantity	1							N°
Total water capacity	9.5	10.8	12.0	14.2	23.0	25.7	29.3	l
Coils specifications								
Type	Aluminum fins and copper tubes							-
Quantity	2							N°
Total area	5.90	5.90	5.90	5.90	7.41	7.41	7.41	m^2
Fan specifications								
Type	Axial							-
Quantity	4	4	6	6	6	8	8	N°
Maximum rotation speed	600							rpm
Total air flow rate	55280	53173	82920	79760	82920	110560	106347	m^3/h
Power input	7.2	7.2	10.8	10.8	10.8	14.4	14.4	kW
Electrical specifications								
Units without pumping module								
Total maximum power input [FLA]	163	179	204	234	263	301	330	A
Total maximum power input [FLI]	98.4	108	122	139	156	182	203	kW
Total maximum starting current [MIC]	352	407	432	484	514	621	650	A
Units with pumping module MP-PS (1 or 2 pumps)								
Total maximum power input [FLA]	169	186	210	245	275	312	341	A
Total maximum power input [FLI]	102	112	126	146	163	188	210	kW
Total maximum starting current [MIC]	358	413	438	496	525	633	662	A
Units with pumping module MP-AM and MP-SS (1 or 2 pumps)								
Total maximum power input [FLA]	172	188	213	245	275	312	345	A
Total maximum power input [FLI]	103	113	127	146	163	188	212	kW
Total maximum starting current [MIC]	360	416	441	496	525	633	665	A
Units with pumping module MP-AM AP (1 or 2 pumps)								
Total maximum power input [FLA]	175	191	216	249	278	316	352	A
Total maximum power input [FLI]	105	115	129	148	165	188	216	kW
Total maximum starting current [MIC]	363	418	443	499	529	636	672	A
Water Storage Tank (SAA accessory)								
Water volume	450				760			l
Surge chamber volume	24							l
Safety valve setting	600							kPa
Surge chamber default pressure	150							kPa
Max. operating pressure	800							kPa

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
(MP): with standard hydronic kit MP-AM and MP-SS
(SAA): with storage tank
(E): data declared according to LCP EUROVENT certification program

TECHNICAL SPECIFICATIONS AND STANDARD PERFORMANCES - IR COOLING UNIT ONLY

Standard performances in cooling mode - Extra low noise Version AX

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
200.4	5	218	49.7	204	57.2	192	63.1	181	69.5	168	76.6	156	83.6	143	90.3
	6	224	50.2	209	57.8	198	63.7	186	70.2	173	77.4	160	84.3	147	91.2
	7	231	50.7	215	58.4	204	64.3	**191**	**70.9**	178	78.1	165	85.2	151	92.1
	8	237	51.3	221	59.0	209	65.0	196	71.7	183	79.0	169	86.1	-	-
	9	244	51.8	227	59.6	215	65.7	202	72.4	188	79.8	174	87.0	-	-
	10	250	52.3	233	60.2	221	66.3	207	73.1	193	80.6	179	87.9	-	-
	11	257	52.8	239	60.8	226	67.0	212	73.8	198	81.4	183	88.7	-	-
	12	263	53.3	246	61.4	233	67.6	218	74.6	203	82.2	188	89.6	-	-
230.4	5	243	56.6	227	65.1	215	71.7	201	79.0	187	87.1	174	95.0	159	102.7
	6	250	57.1	233	65.7	221	72.4	207	79.8	193	87.9	178	95.9	164	103.7
	7	257	57.7	240	66.4	227	73.1	**213**	**80.6**	198	88.8	184	96.9	169	104.7
	8	264	58.3	247	67.1	233	73.9	219	81.5	204	89.8	189	97.9	-	-
	9	272	58.9	254	67.8	240	74.7	225	82.3	209	90.7	194	98.9	-	-
	10	279	59.5	260	68.4	246	75.4	231	83.1	215	91.6	199	99.9	-	-
	11	286	60.1	267	69.1	252	76.1	237	83.9	220	92.5	204	100.9	-	-
	12	294	60.6	274	69.8	259	76.9	243	84.8	226	93.4	210	101.8	-	-
260.4	5	277	62.5	259	71.9	245	79.3	230	87.4	214	96.3	198	105.0	182	114
	6	285	63.1	266	72.6	252	80.0	236	88.2	220	97.2	203	106.0	187	115
	7	293	63.7	274	73.3	259	80.8	**243**	**89.1**	226	98.2	209	107.1	192	116
	8	302	64.5	282	74.2	266	81.7	250	90.1	232	99.3	215	108.3	-	-
	9	310	65.1	289	74.9	274	82.5	257	91.0	239	100.3	221	109.3	-	-
	10	318	65.7	297	75.6	281	83.3	264	91.9	245	101.3	227	110	-	-
	11	326	66.4	305	76.4	288	84.2	270	92.8	252	102.3	233	112	-	-
	12	335	67.0	313	77.1	296	85.0	278	93.7	258	103.3	239	113	-	-
290.4	5	314	72.3	293	83.2	277	91.6	260	101.0	242	111	224	121	206	131
	6	323	72.9	301	83.9	285	92.5	267	102.0	249	112	230	123	211	132
	7	332	73.7	310	84.8	293	93.4	**275**	**103.0**	256	114	237	124	218	134
	8	341	74.5	319	85.7	301	94.5	283	104.1	263	115	244	125	-	-
	9	351	75.3	327	86.6	310	95.4	291	105.2	270	116	250	126	-	-
	10	360	76.0	336	87.4	318	96.3	298	106.2	278	117	257	128	-	-
	11	369	76.7	345	88.3	326	97.3	306	107.3	285	118	264	129	-	-
	12	379	77.5	354	89.2	335	98.2	314	108.3	292	119	271	130	-	-
330.4	5	353	81.4	329	93.6	311	103.2	292	114	272	125	252	137	231	148
	6	362	82.2	338	94.5	320	104.1	300	115	279	127	259	138	238	149
	7	373	83.0	348	95.5	329	105.2	**309**	**116**	287	128	266	139	245	151
	8	384	83.9	358	96.5	339	106.4	318	117	296	129	274	141	-	-
	9	394	84.8	368	97.5	348	107.4	327	118	304	131	281	142	-	-
	10	405	85.6	378	98.5	357	108.5	335	120	312	132	289	144	-	-
	11	415	86.4	387	99.4	366	109.6	344	121	320	133	296	145	-	-
	12	426	87.3	398	100.4	376	111	353	122	328	134	304	147	-	-
375.4	5	403	91.2	376	104.9	356	116	334	127	311	141	288	153	264	166
	6	414	92.1	387	105.9	365	117	343	129	319	142	296	155	271	167
	7	426	93.0	398	107.0	376	118	**353**	**130**	328	143	304	156	279	169
	8	438	94.0	409	108.2	387	119	363	131	338	145	313	158	-	-
	9	450	95.0	420	109.3	397	120	373	133	347	146	321	160	-	-
	10	462	95.9	431	110.4	408	122	383	134	356	148	330	161	-	-
	11	474	96.9	443	111	418	123	393	135	365	149	338	163	-	-
	12	487	97.8	455	113	430	124	403	137	375	151	348	164	-	-
420.4	5	446	102.4	417	118	394	130	370	143	344	158	319	172	293	186
	6	459	103.4	428	119	405	131	380	145	353	159	327	174	301	188
	7	472	104.5	441	120	417	132	**391**	**146**	364	161	337	175	309	190
	8	485	105.6	453	122	428	134	402	148	374	163	346	177	-	-
	9	499	106.7	466	123	440	135	413	149	384	164	356	179	-	-
	10	512	107.7	478	124	452	137	424	151	395	166	365	181	-	-
	11	525	108.8	490	125	463	138	435	152	405	168	375	183	-	-
	12	539	110	503	126	476	139	447	154	416	169	385	184	-	-

Tw= Outlet water temperature °C **kWf** = Cooling capacity (kW). **kWa** = Compressor power input (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).

TECHNICAL SPECIFICATIONS AND STANDARD PERFORMANCES - IP HEAT PUMP UNITS

General technical specifications Basic Version Unit

Acoustic Version: AB (Basic Version)

The following data refer to an **IP** unit

MODELS	200.4	230.4	260.4	290.4	330.4	375.4	420.4	UM
Power supply	400-3-50							V-ph-Hz
Refrigerant type	R410A							-
Refrigeration circuits	2							N°
Refrigerant type	Take as reference the Refrigerant type value on the Unit Identification plate							kg
Cooling capacity(1) (E)	194	217	246	278	312	360	401	kW
Total power input (1)	67.9	76.7	87.7	99.2	111	126	140	kW
EER (E)	2.86	2.83	2.81	2.80	2.81	2.86	2.86	-
ESEER (E)	4.00	3.96	3.93	3.92	3.94	4.00	4.01	-
Water flow rate(1)	9.27	10.4	11.8	13.3	14.9	17.2	19.2	l/s
Water pressure drop(1) (E)	57	57	61	63	53	57	58	kPa
Working head(1) (MP)	116	101	75	113	137	87	109	kPa
Heating capacity(2) (E)	213	238	270	305	342	391	435	kW
Total power input (2)	70.1	78.9	89.8	101	113	128	143	kW
COP (E)	3.04	3.02	3.01	3.02	3.03	3.05	3.04	-
Water flow rate(2)	10.18	11.4	12.9	14.6	16.3	18.7	20.8	l/s
Water pressure drop(2) (E)	69	68	73	76	64	67	68	kPa
Working head(2) (MP)	97	84	62	94	114	74	92	kPa
Compressor specifications								
Power input(1)	60.7	69.5	76.9	88.4	100	111	125	kW
Power input(2)	62.9	71.7	79.0	90.4	102	114	129	kW
Type	scroll							-
Quantity	4							N°
Oil charge CP1	4.7	4.7	6.8	6.8	6.3	6.3	6.3	l
Oil charge CP2	4.7	6.8	6.8	6.3	6.3	6.3	6.3	l
Oil charge CP3	4.7	4.7	6.8	6.8	6.3	6.3	6.3	l
Oil charge CP4	4.7	6.8	6.8	6.3	6.3	6.3	6.3	l
Load steps	0-25-50-75-100							%
Heat Exchanger								
Type	Brazed plates							-
Quantity	1							N°
Total water capacity	9.5	10.8	12.0	14.2	23.0	25.7	29.3	l
Coils specifications								
Type	Aluminum fins and copper tubes							-
Quantity	2							N°
Total area	5.90	5.90	5.90	5.90	7.41	7.41	7.41	m^2
Fan specifications								
Type	Axial							-
Quantity	4	4	6	6	6	8	8	N°
Maximum rotation speed	900							rpm
Total air flow rate	82920	79760	124380	119640	124380	165840	159520	m^3/h
Power input	7.2	7.2	10.8	10.8	10.8	14.4	14.4	kW
Electrical specifications								
Units without pumping module								
Total maximum power input [FLA]	163	179	204	234	263	301	330	A
Total maximum power input [FLI]	98.4	108	122	139	156	182	203	kW
Total maximum starting current [MIC]	352	407	432	484	514	621	650	A
Units with pumping module MP-PS (1 or 2 pumps)								
Total maximum power input [FLA]	169	186	210	245	275	312	341	A
Total maximum power input [FLI]	102	112	126	146	163	188	210	kW
Total maximum starting current [MIC]	358	413	438	496	525	633	662	A
Units with pumping module MP-AM and MP-SS (1 or 2 pumps)								
Total maximum power input [FLA]	172	188	213	245	275	312	345	A
Total maximum power input [FLI]	103	113	127	146	163	188	212	kW
Total maximum starting current [MIC]	360	416	441	496	525	633	665	A
Units with pumping module MP-AM AP (1 or 2 pumps)								
Total maximum power input [FLA]	175	191	216	249	278	316	352	A
Total maximum power input [FLI]	105	115	129	148	165	188	216	kW
Total maximum starting current [MIC]	363	418	443	499	529	636	672	A
Water Storage Tank (SAA accessory)								
Water volume	450				760			l
Surge chamber volume	24							l
Safety valve setting	600							kPa
Surge chamber default pressure	150							kPa
Max. operating pressure	800							kPa

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
(MP): with standard hydronic kit MP-AM and MP-SS
(SAA): with storage tank
(E): data declared according to LCP EUROVENT certification program

TECHNICAL SPECIFICATIONS AND STANDARD PERFORMANCES - IP HEAT PUMP UNITS

Standard performances in cooling mode - Basic Version AB

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
200.4	5	221	42.6	207	49.0	195	54.0	183	59.5	171	65.6	158	71.5	145	77.3
	6	228	43.0	212	49.5	201	54.5	189	60.1	175	66.2	162	72.2	149	78.1
	7	234	43.4	219	50.0	207	55.1	**194**	**60.7**	180	66.9	167	72.9	154	78.9
	8	241	43.9	225	50.5	213	55.7	199	61.4	186	67.6	172	73.7	-	-
	9	247	44.3	231	51.0	218	56.2	205	62.0	191	68.3	177	74.5	-	-
	10	254	44.8	237	51.5	224	56.8	210	62.6	196	69.0	181	75.2	-	-
	11	261	45.2	243	52.0	230	57.3	216	63.2	201	69.7	186	76.0	-	-
	12	268	45.7	250	52.5	236	57.9	222	63.8	206	70.4	191	76.7	-	-
230.4	5	248	48.8	231	56.1	219	61.8	205	68.2	191	75.1	177	81.9	162	88.6
	6	255	49.2	238	56.6	225	62.4	211	68.8	196	75.8	182	82.7	167	89.4
	7	262	49.7	245	57.2	231	63.0	**217**	**69.5**	202	76.6	187	83.5	172	90.3
	8	269	50.3	251	57.8	238	63.7	223	70.3	208	77.5	192	84.4	-	-
	9	277	50.8	258	58.4	244	64.4	229	71.0	213	78.2	198	85.3	-	-
	10	284	51.3	265	59.0	251	65.0	235	71.7	219	79.0	203	86.1	-	-
	11	291	51.8	272	59.6	257	65.6	241	72.4	225	79.8	208	87.0	-	-
	12	299	52.3	279	60.2	264	66.3	248	73.1	231	80.6	214	87.8	-	-
260.4	5	281	54.0	262	62.1	248	68.4	233	75.4	216	83.1	200	90.6	184	98.0
	6	289	54.5	269	62.7	255	69.0	239	76.1	222	83.9	206	91.5	189	98.9
	7	297	55.0	277	63.3	262	69.7	**246**	**76.9**	229	84.8	212	92.4	195	99.9
	8	305	55.6	285	64.0	270	70.5	253	77.7	235	85.7	218	93.4	-	-
	9	314	56.2	293	64.6	277	71.2	260	78.5	242	86.6	224	94.4	-	-
	10	322	56.7	301	65.3	284	71.9	267	79.3	248	87.4	230	95.3	-	-
	11	330	57.3	308	65.9	292	72.6	274	80.1	255	88.3	236	96.2	-	-
	12	339	57.9	317	66.6	300	73.3	281	80.9	262	89.1	242	97.2	-	-
290.4	5	317	62.0	296	71.4	280	78.6	263	86.7	245	95.6	226	104	208	113
	6	326	62.6	304	72.0	288	79.4	270	87.5	251	96.4	233	105	214	114
	7	336	63.2	313	72.8	296	80.2	**278**	**88.4**	259	97.4	240	106	220	115
	8	345	63.9	322	73.6	305	81.1	286	89.4	266	98.5	246	107	-	-
	9	355	64.6	331	74.3	313	81.9	294	90.3	273	99.5	253	108	-	-
	10	364	65.2	340	75.0	321	82.7	302	91.2	281	100.5	260	110	-	-
	11	373	65.9	348	75.8	330	83.5	309	92.1	288	101	266	111	-	-
	12	383	66.5	358	76.5	338	84.3	318	93.0	296	102	274	112	-	-
330.4	5	356	70.2	332	80.7	314	88.9	295	98.1	274	108	254	118	233	127
	6	366	70.8	342	81.5	323	89.8	303	99.0	282	109	261	119	240	129
	7	377	71.5	352	82.3	332	90.7	**312**	**100.0**	290	110	269	120	247	130
	8	387	72.3	362	83.2	342	91.7	321	101.1	299	111	276	121	-	-
	9	398	73.1	372	84.1	351	92.6	330	102.1	307	113	284	123	-	-
	10	409	73.8	381	84.9	361	93.5	338	103	315	114	292	124	-	-
	11	419	74.5	391	85.7	370	94.5	347	104	323	115	299	125	-	-
	12	430	75.2	402	86.6	380	95.4	356	105	332	116	307	126	-	-
375.4	5	411	77.9	384	89.6	363	98.7	340	109	317	120	293	131	269	141
	6	422	78.6	394	90.5	373	99.7	350	110	325	121	301	132	277	143
	7	435	79.4	406	91.4	384	100.7	**360**	**111**	335	122	310	133	285	144
	8	447	80.3	417	92.4	394	101.8	370	112	344	124	319	135	-	-
	9	459	81.1	429	93.3	405	103	380	113	354	125	328	136	-	-
	10	471	81.9	440	94.2	416	104	390	114	363	126	336	138	-	-
	11	483	82.7	451	95.2	427	105	400	116	373	127	345	139	-	-
	12	497	83.5	464	96.1	438	106	411	117	383	129	354	140	-	-
420.4	5	458	87.7	427	101	404	111	379	123	353	135	327	147	300	159
	6	470	88.5	439	102	415	112	390	124	363	136	336	149	308	161
	7	484	89.4	452	103	427	113	**401**	**125**	373	138	346	150	317	162
	8	498	90.4	465	104	439	115	412	126	384	139	355	152	-	-
	9	512	91.3	477	105	452	116	424	128	394	141	365	153	-	-
	10	525	92.2	490	106	463	117	435	129	405	142	375	155	-	-
	11	539	93.1	503	107	475	118	446	130	415	143	384	156	-	-
	12	553	94.0	516	108	488	119	458	131	426	145	395	158	-	-

Tw= Outlet water temperature °C **kWf** = Cooling capacity (kW). **kWa** = Compressor power input (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).

TECHNICAL SPECIFICATIONS AND STANDARD PERFORMANCES - IP HEAT PUMP UNITS

Standard performances in heating mode - Basic Version AB

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
200.4	30	163	44.8	186	45.0	204	45.7	217	45.9	233	46.5	249	47.0	266	47.5
	35	162	49.6	185	49.9	203	50.6	216	50.9	231	51.5	247	52.1	265	52.7
	40	161	55.2	184	55.5	202	56.3	214	56.6	230	57.3	246	57.9	263	58.6
	45	160	61.3	183	61.7	200	62.5	**213**	**62.9**	228	63.6	244	64.4	261	65.1
	50	159	68.2	182	68.6	199	69.5	212	69.9	227	70.7	243	71.5	259	72.4
230.4	30	182	51.0	208	51.4	228	52.1	242	52.4	260	53.0	278	53.6	297	54.2
	35	181	56.6	207	56.9	227	57.7	241	58.0	259	58.7	276	59.4	296	60.0
	40	180	62.9	206	63.3	225	64.1	240	64.5	257	65.3	275	66.0	294	66.8
	45	179	69.9	205	70.3	224	71.3	**238**	**71.7**	255	72.5	273	73.4	292	74.2
	50	177	77.7	203	78.2	222	79.3	236	79.7	253	80.6	271	81.6	290	82.5
260.4	30	206	56.2	236	56.6	258	57.4	275	57.7	295	58.4	315	59.0	337	59.7
	35	205	62.3	235	62.7	257	63.6	273	63.9	293	64.7	314	65.4	335	66.1
	40	204	69.3	234	69.7	256	70.7	272	71.1	292	71.9	312	72.7	334	73.6
	45	203	77.0	232	77.5	254	78.5	**270**	**79.0**	290	79.9	310	80.8	331	81.7
	50	201	85.6	231	86.1	252	87.3	268	87.8	288	88.8	307	89.9	329	90.9
290.4	30	233	64.4	267	64.7	292	65.6	310	66.0	333	66.8	356	67.5	381	68.3
	35	232	71.3	266	71.7	290	72.7	309	73.2	331	74.0	354	74.8	379	75.7
	40	230	79.3	264	79.8	289	80.9	307	81.3	329	82.3	352	83.2	377	84.2
	45	229	88.1	262	88.7	287	89.9	**305**	**90.4**	327	91.4	350	92.5	374	93.5
	50	227	98.0	260	98.6	285	99.9	303	100.5	325	101.7	347	102.8	372	104.0
330.4	30	261	72.6	299	73.1	327	74.1	348	74.5	373	75.3	399	76.2	427	77.1
	35	260	80.5	298	81.0	326	82.1	346	82.5	371	83.5	397	84.5	425	85.4
	40	258	89.5	296	90.0	324	91.2	344	91.8	369	92.8	395	93.9	422	95.0
	45	257	99.4	294	100.0	322	101.4	**342**	**102.0**	367	103.2	392	104.4	420	105.5
	50	255	111	292	111	319	113	340	113	364	115	389	116	417	117
375.4	30	299	81.2	342	81.6	374	82.8	398	83.2	427	84.2	456	85.2	488	86.1
	35	297	89.9	340	90.5	372	91.7	396	92.3	425	93.3	454	94.4	486	95.5
	40	295	100.0	338	100.6	370	102.0	394	102.6	422	103.8	451	104.9	483	106.1
	45	293	111	336	112	368	113	**391**	**114**	419	115	448	117	480	118
	50	291	124	334	124	365	126	388	127	416	128	445	130	476	131
420.4	30	332	91.8	381	92.4	416	93.7	443	94.2	475	95.3	508	96.4	543	97.5
	35	330	101.8	379	102.4	414	103.8	441	104.4	472	105.6	505	106.8	540	108
	40	329	113	377	114	412	115	438	116	470	117	502	119	537	120
	45	326	126	374	127	409	128	**435**	**129**	467	130	499	132	534	133
	50	324	140	371	141	406	143	432	143	463	145	495	147	530	148

Tw= Outlet water temperature °C **kWt** = Heating capacity (kW). **kWa** = Compressor power input (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} m^2 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

Acoustic Version: AS (Low noise Version)

The following data refer to an **IP** unit

MODELS	200.4	230.4	260.4	290.4	330.4	375.4	420.4	UM
Power supply	400-3-50							V-ph-Hz
Refrigerant type	R410A							-
Refrigeration circuits	2							N°
Refrigerant type	Take as reference the Refrigerant type value on the Unit Identification plate							kg
Cooling capacity(1) (E)	186	208	236	267	300	346	385	kW
Total power input (1)	72.8	82.3	93.9	106	119	134	149	kW
EER (E)	2.55	2.53	2.51	2.52	2.52	2.58	2.58	-
ESEER (E)	3.58	3.54	3.52	3.53	3.53	3.61	3.62	-
Water flow rate(1)	8.89	9.9	11.3	12.8	14.3	16.5	18.4	l/s
Water pressure drop(1) (E)	52	52	56	58	49	53	53	kPa
Working head(1) (MP)	127	110	82	122	148	94	118	kPa
Heating capacity(2) (E)	207	231	262	296	332	379	422	kW
Total power input (2)	70.7	79.6	90.6	102	114	129	144	kW
COP (E)	2.93	2.90	2.89	2.90	2.91	2.94	2.93	-
Water flow rate(2)	9.89	11.0	12.5	14.1	15.9	18.1	20.2	l/s
Water pressure drop(2) (E)	65	64	69	71	60	63	64	kPa
Working head(2) (MP)	102	89	66	99	121	78	98	kPa
Compressor specifications								
Power input(1)	65.6	75.1	83.1	95.5	108	120	135	kW
Power input(2)	63.5	72.4	79.8	91.3	103	115	130	kW
Type	scroll							-
Quantity	4							N°
Oil charge CP1	4.7	4.7	6.8	6.8	6.3	6.3	6.3	l
Oil charge CP2	4.7	6.8	6.8	6.3	6.3	6.3	6.3	l
Oil charge CP3	4.7	4.7	6.8	6.8	6.3	6.3	6.3	l
Oil charge CP4	4.7	6.8	6.8	6.3	6.3	6.3	6.3	l
Load steps	0-25-50-75-100							%
Heat Exchanger								
Type	Brazed plates							-
Quantity	1							N°
Total water capacity	9.5	10.8	12.0	14.2	23.0	25.7	29.3	l
Coils specifications								
Type	Aluminum fins and copper tubes							-
Quantity	2							N°
Total area	5.90	5.90	5.90	5.90	7.41	7.41	7.41	m^2
Fan specifications								
Type	Axial							-
Quantity	4	4	6	6	6	8	8	N°
Maximum rotation speed	750							rpm
Total air flow rate	69100	66467	103650	99700	103650	138200	132933	m^3/h
Power input	7.2	7.2	10.8	10.8	10.8	14.4	14.4	kW
Electrical specifications								
Units without pumping module								
Total maximum power input [FLA]	163	179	204	234	263	301	330	A
Total maximum power input [FLI]	98.4	108	122	139	156	182	203	kW
Total maximum starting current [MIC]	352	407	432	484	514	621	650	A
Units with pumping module MP-PS (1 or 2 pumps)								
Total maximum power input [FLA]	169	186	210	245	275	312	341	A
Total maximum power input [FLI]	102	112	126	146	163	188	210	kW
Total maximum starting current [MIC]	358	413	438	496	525	633	662	A
Units with pumping module MP-AM and MP-SS (1 or 2 pumps)								
Total maximum power input [FLA]	172	188	213	245	275	312	345	A
Total maximum power input [FLI]	103	113	127	146	163	188	212	kW
Total maximum starting current [MIC]	360	416	441	496	525	633	665	A
Units with pumping module MP-AM AP (1 or 2 pumps)								
Total maximum power input [FLA]	175	191	216	249	278	316	352	A
Total maximum power input [FLI]	105	115	129	148	165	188	216	kW
Total maximum starting current [MIC]	363	418	443	499	529	636	672	A
Water Storage Tank (SAA accessory)								
Water volume	450				760			l
Surge chamber volume	24							l
Safety valve setting	600							kPa
Surge chamber default pressure	150							kPa
Max. operating pressure	800							kPa

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
(MP): with standard hydronic kit MP-AM and MP-SS
(SAA): with storage tank
(E): data declared according to LCP EUROVENT certification program

TECHNICAL SPECIFICATIONS AND STANDARD PERFORMANCES - IP HEAT PUMP UNITS

Standard performances in cooling mode - Low noise Version AS

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
200.4	5	212	46.0	198	53.0	187	58.3	176	64.3	164	70.9	152	77.3	139	83.6
	6	218	46.5	204	53.5	193	58.9	181	64.9	168	71.6	156	78.0	143	84.4
	7	225	46.9	210	54.0	198	59.5	**186**	**65.6**	173	72.3	160	78.8	147	85.2
	8	231	47.5	216	54.6	204	60.2	191	66.3	178	73.1	165	79.7	-	-
	9	237	47.9	221	55.1	209	60.8	197	67.0	183	73.8	169	80.5	-	-
	10	244	48.4	227	55.7	215	61.4	202	67.7	188	74.6	174	81.3	-	-
	11	250	48.9	233	56.2	220	62.0	207	68.3	193	75.3	178	82.1	-	-
	12	257	49.4	239	56.8	226	62.6	213	69.0	198	76.0	183	82.9	-	-
230.4	5	237	52.7	222	60.6	210	66.8	197	73.6	183	81.2	169	88.5	156	95.7
	6	244	53.2	228	61.2	215	67.4	202	74.3	188	81.9	174	89.3	160	96.6
	7	251	53.7	234	61.8	222	68.1	**208**	**75.1**	194	82.8	179	90.2	165	97.6
	8	258	54.3	241	62.5	228	68.9	214	75.9	199	83.7	184	91.2	-	-
	9	265	54.9	248	63.1	234	69.6	220	76.7	204	84.5	189	92.2	-	-
	10	272	55.4	254	63.8	240	70.2	226	77.5	210	85.4	194	93.1	-	-
	11	279	56.0	261	64.4	247	70.9	231	78.2	215	86.2	199	94.0	-	-
	12	287	56.5	268	65.0	253	71.6	238	79.0	221	87.0	205	94.9	-	-
260.4	5	269	58.3	251	67.1	238	73.9	223	81.5	208	89.8	192	97.9	177	106
	6	277	58.9	258	67.7	244	74.6	229	82.3	213	90.7	198	98.8	182	107
	7	285	59.5	266	68.4	251	75.4	**236**	**83.1**	220	91.6	203	99.9	187	108
	8	293	60.1	273	69.2	259	76.2	243	84.0	226	92.6	209	101.0	-	-
	9	301	60.7	281	69.9	266	77.0	249	84.9	232	93.5	215	102.0	-	-
	10	309	61.3	288	70.5	273	77.7	256	85.7	238	94.5	221	103.0	-	-
	11	317	61.9	296	71.2	280	78.5	263	86.5	244	95.4	226	104.0	-	-
	12	326	62.5	304	71.9	287	79.3	270	87.4	251	96.3	232	105.0	-	-
290.4	5	305	67.0	284	77.1	269	84.9	252	93.7	235	103.2	218	113	200	122
	6	313	67.6	292	77.8	276	85.7	259	94.5	241	104.2	224	114	205	123
	7	322	68.3	301	78.6	285	86.6	**267**	**95.5**	248	105	230	115	211	124
	8	331	69.1	309	79.5	293	87.6	275	96.6	255	106	237	116	-	-
	9	341	69.8	318	80.3	301	88.5	282	97.5	262	107	243	117	-	-
	10	350	70.5	326	81.1	309	89.3	290	98.5	269	109	250	118	-	-
	11	359	71.2	335	81.9	316	90.2	297	99.5	276	110	256	120	-	-
	12	368	71.9	344	82.7	325	91.1	305	100.4	284	111	263	121	-	-
330.4	5	342	75.8	320	87.2	302	96.1	284	106	264	117	244	127	225	138
	6	352	76.5	328	88.0	311	97.0	291	107	271	118	251	128	231	139
	7	362	77.3	338	88.9	320	98.0	**300**	**108**	279	119	259	130	237	140
	8	372	78.1	348	89.9	329	99.0	309	109	287	120	266	131	-	-
	9	383	78.9	357	90.8	338	100.0	317	110	295	122	273	133	-	-
	10	393	79.7	367	91.7	347	101.0	325	111	303	123	280	134	-	-
	11	403	80.5	376	92.6	356	102.0	334	112	310	124	288	135	-	-
	12	414	81.3	386	93.5	365	103.0	343	114	319	125	295	136	-	-
375.4	5	395	84.2	369	96.9	349	107	327	118	304	130	282	141	259	153
	6	406	85.0	379	97.8	358	108	336	119	313	131	290	143	266	154
	7	418	85.9	390	98.8	369	109	**346**	**120**	322	132	298	144	274	156
	8	430	86.8	401	99.9	379	110	356	121	331	134	307	146	-	-
	9	441	87.7	412	100.9	390	111	366	123	340	135	315	147	-	-
	10	453	88.5	423	101.9	400	112	375	124	349	136	323	149	-	-
	11	465	89.4	434	102.9	410	113	385	125	358	138	332	150	-	-
	12	477	90.3	446	103.9	421	114	395	126	368	139	341	152	-	-
420.4	5	439	94.7	410	109	388	120	364	132	339	146	314	159	288	172
	6	452	95.6	422	110	399	121	374	134	348	147	322	161	296	174
	7	465	96.6	434	111	410	122	**385**	**135**	358	149	332	162	305	175
	8	478	97.7	446	112	422	124	396	136	368	150	341	164	-	-
	9	491	98.6	458	113	434	125	407	138	379	152	351	166	-	-
	10	504	99.6	471	115	445	126	418	139	389	153	360	167	-	-
	11	517	100.6	483	116	456	128	428	141	398	155	369	169	-	-
	12	531	101.6	496	117	469	129	440	142	409	156	379	171	-	-

Tw= Outlet water temperature °C **kWf** = Cooling capacity (kW). **kWa** = Compressor power input (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).

TECHNICAL SPECIFICATIONS AND STANDARD PERFORMANCES - IP HEAT PUMP UNITS

Standard performances in heating mode - Low noise Version AS

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
200.4	30	158	45.2	181	45.5	198	46.1	211	46.4	226	46.9	242	47.4	258	48.0
	35	157	50.1	180	50.4	197	51.1	210	51.4	225	52.0	240	52.6	257	53.2
	40	156	55.7	179	56.0	196	56.8	208	57.1	224	57.8	239	58.5	256	59.1
	45	155	61.9	178	62.3	195	63.1	**207**	**63.5**	222	64.2	237	65.0	254	65.7
	50	154	68.8	177	69.2	193	70.2	206	70.6	220	71.4	236	72.2	252	73.0
230.4	30	176	51.5	202	51.9	221	52.6	235	52.9	252	53.5	270	54.1	288	54.7
	35	175	57.1	201	57.5	220	58.3	234	58.6	251	59.3	268	59.9	287	60.6
	40	174	63.5	200	63.9	219	64.8	233	65.1	249	65.9	267	66.7	285	67.4
	45	173	70.6	199	71.0	217	72.0	**231**	**72.4**	248	73.2	265	74.1	283	74.9
	50	172	78.5	197	78.9	216	80.0	229	80.5	246	81.4	263	82.4	281	83.3
260.4	30	200	56.8	229	57.2	251	57.9	267	58.3	286	58.9	306	59.6	327	60.3
	35	199	63.0	228	63.3	249	64.2	265	64.6	285	65.3	304	66.1	325	66.8
	40	198	70.0	227	70.4	248	71.4	264	71.8	283	72.6	303	73.5	324	74.3
	45	197	77.8	225	78.3	246	79.3	**262**	**79.8**	281	80.7	300	81.6	321	82.6
	50	195	86.5	224	87.0	245	88.2	260	88.7	279	89.7	298	90.8	319	91.8
290.4	30	226	65.0	259	65.4	283	66.3	301	66.7	323	67.4	346	68.2	370	69.0
	35	225	72.0	258	72.5	282	73.5	300	73.9	321	74.7	344	75.6	368	76.4
	40	224	80.1	256	80.6	280	81.7	298	82.2	320	83.1	342	84.1	366	85.0
	45	222	89.0	254	89.5	278	90.8	**296**	**91.3**	317	92.4	339	93.4	363	94.5
	50	220	99.0	253	99.5	276	100.9	294	101.5	315	102.7	337	103.8	361	105.0
330.4	30	254	73.3	291	73.8	318	74.8	338	75.2	362	76.1	388	77.0	415	77.8
	35	252	81.3	289	81.7	316	82.9	336	83.4	361	84.3	386	85.3	412	86.2
	40	251	90.4	287	90.9	314	92.1	334	92.7	359	93.8	383	94.8	410	95.9
	45	249	100.4	285	101.0	312	102.4	**332**	**103.0**	356	104.2	381	105.4	407	107
	50	247	112	283	112	310	114	330	115	354	116	378	117	404	118
375.4	30	289	81.9	332	82.4	363	83.5	386	84.0	414	84.9	442	85.9	473	86.9
	35	288	90.7	330	91.3	361	92.5	384	93.1	412	94.1	440	95.2	471	96.3
	40	286	100.9	328	101.5	359	102.9	382	103.5	409	104.7	438	105.9	468	107
	45	284	112	326	113	356	114	**379**	**115**	406	116	435	118	465	119
	50	282	125	324	125	354	127	376	128	404	129	432	131	462	132
420.4	30	322	92.6	369	93.1	404	94.4	430	94.9	461	96.0	493	97.1	527	98.2
	35	321	102.6	367	103.2	402	105	427	105	458	106	490	108	524	109
	40	319	114	365	115	400	116	425	117	456	118	487	120	521	121
	45	317	127	363	127	397	129	**422**	**130**	453	132	484	133	518	135
	50	314	141	360	142	394	144	419	145	449	146	481	148	514	150

Tw= Outlet water temperature °C **kWt** = Heating capacity (kW). **kWa** = Compressor power input (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} m^2 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

Acoustic Version: AX (Extra low noise Version)

The following data refer to an **IP** unit

MODELS	200.4	230.4	260.4	290.4	330.4	375.4	420.4	UM
Power supply	400-3-50							V-ph-Hz
Refrigerant type	R410A							-
Refrigeration circuits	2							N°
Refrigerant type	Take as reference the Refrigerant type value on the Unit Identification plate							kg
Cooling capacity(1) (E)	182	204	231	261	293	338	377	kW
Total power input (1)	76.4	86.4	98.5	112	125	141	157	kW
EER (E)	2.38	2.36	2.35	2.33	2.34	2.40	2.40	-
ESEER (E)	3.34	3.31	3.28	3.26	3.28	3.36	3.36	-
Water flow rate(1)	8.70	9.8	11.0	12.5	14.0	16.2	18.0	l/s
Water pressure drop(1) (E)	50	50	53	55	47	50	51	kPa
Working head(1) (MP)	132	115	85	128	155	98	123	kPa
Heating capacity(2) (E)	200	224	254	287	321	368	409	kW
Total power input (2)	71.4	80.3	91.4	103	115	130	146	kW
COP (E)	2.80	2.79	2.78	2.79	2.79	2.83	2.80	-
Water flow rate(2)	9.56	10.7	12.1	13.7	15.3	17.6	19.5	l/s
Water pressure drop(2) (E)	61	60	65	67	56	60	60	kPa
Working head(2) (MP)	110	95	71	106	129	83	104	kPa
Compressor specifications								
Power input(1)	69.2	79.2	87.7	101	114	127	143	kW
Power input(2)	64.2	73.1	80.6	92.2	104	116	132	kW
Type	scroll							-
Quantity	4							N°
Oil charge CP1	4.7	4.7	6.8	6.8	6.3	6.3	6.3	l
Oil charge CP2	4.7	6.8	6.8	6.3	6.3	6.3	6.3	l
Oil charge CP3	4.7	4.7	6.8	6.8	6.3	6.3	6.3	l
Oil charge CP4	4.7	6.8	6.8	6.3	6.3	6.3	6.3	l
Load steps	0-25-50-75-100							%
Heat Exchanger								
Type	Brazed plates							-
Quantity	1							N°
Total water capacity	9.5	10.8	12.0	14.2	23.0	25.7	29.3	l
Coils specifications								
Type	Aluminum fins and copper tubes							-
Quantity	2							N°
Total area	5.90	5.90	5.90	5.90	7.41	7.41	7.41	m^2
Fan specifications								
Type	Axial							-
Quantity	4	4	6	6	6	8	8	N°
Maximum rotation speed	600							rpm
Total air flow rate	55280	53173	82920	79760	82920	110560	106347	m^3/h
Power input	7.2	7.2	10.8	10.8	10.8	14.4	14.4	kW
Electrical specifications								
Units without pumping module								
Total maximum power input [FLA]	163	179	204	234	263	301	330	A
Total maximum power input [FLI]	98.4	108	122	139	156	182	203	kW
Total maximum starting current [MIC]	352	407	432	484	514	621	650	A
Units with pumping module MP-PS (1 or 2 pumps)								
Total maximum power input [FLA]	169	186	210	245	275	312	341	A
Total maximum power input [FLI]	102	112	126	146	163	188	210	kW
Total maximum starting current [MIC]	358	413	438	496	525	633	662	A
Units with pumping module MP-AM and MP-SS (1 or 2 pumps)								
Total maximum power input [FLA]	172	188	213	245	275	312	345	A
Total maximum power input [FLI]	103	113	127	146	163	188	212	kW
Total maximum starting current [MIC]	360	416	441	496	525	633	665	A
Units with pumping module MP-AM AP (1 or 2 pumps)								
Total maximum power input [FLA]	175	191	216	249	278	316	352	A
Total maximum power input [FLI]	105	115	129	148	165	188	216	kW
Total maximum starting current [MIC]	363	418	443	499	529	636	672	A
Water Storage Tank (SAA accessory)								
Water volume	450				760			l
Surge chamber volume	24							l
Safety valve setting	600							kPa
Surge chamber default pressure	150							kPa
Max. operating pressure	800							kPa

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
(MP): with standard hydronic kit MP-AM and MP-SS
(SAA): with storage tank
(E): data declared according to LCP EUROVENT certification program

TECHNICAL SPECIFICATIONS AND STANDARD PERFORMANCES - IP HEAT PUMP UNITS

Standard performances in cooling mode - Extra low noise Version AX

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
200.4	5	208	48.6	194	55.9	183	61.6	172	67.9	160	74.8	148	81.5	136	88.2
	6	213	49.0	199	56.4	188	62.1	177	68.5	165	75.5	152	82.3	140	89.0
	7	220	49.5	205	57.0	194	62.8	**182**	**69.2**	169	76.3	157	83.2	144	89.9
	8	226	50.1	211	57.6	199	63.5	187	70.0	174	77.1	161	84.1	-	-
	9	232	50.6	217	58.2	205	64.1	192	70.7	179	77.9	166	84.9	-	-
	10	238	51.1	222	58.7	210	64.7	197	71.4	184	78.7	170	85.8	-	-
	11	244	51.6	228	59.3	216	65.4	202	72.1	188	79.4	174	86.6	-	-
	12	251	52.1	234	59.9	222	66.0	208	72.8	193	80.2	179	87.4	-	-
230.4	5	233	55.6	217	63.9	206	70.4	193	77.7	179	85.6	166	93.3	153	100.9
	6	239	56.1	223	64.5	211	71.1	198	78.4	184	86.4	171	94.2	157	101.9
	7	246	56.7	230	65.2	217	71.8	**204**	**79.2**	190	87.3	176	95.2	161	102.9
	8	253	57.3	236	65.9	224	72.6	210	80.1	195	88.3	181	96.2	-	-
	9	260	57.9	243	66.6	230	73.4	216	80.9	201	89.1	186	97.2	-	-
	10	267	58.4	249	67.2	236	74.1	221	81.7	206	90.0	191	98.2	-	-
	11	274	59.0	256	67.9	242	74.8	227	82.5	211	90.9	196	99.1	-	-
	12	281	59.6	263	68.6	248	75.5	233	83.3	217	91.8	201	100.1	-	-
260.4	5	264	61.5	246	70.8	233	78.0	218	86.0	203	94.8	188	103.3	173	112
	6	271	62.1	253	71.5	239	78.7	224	86.8	209	95.7	193	104.3	178	113
	7	279	62.7	260	72.2	246	79.5	**231**	**87.7**	215	96.7	199	105.4	183	114
	8	287	63.4	268	73.0	253	80.4	238	88.7	221	97.7	205	106.5	-	-
	9	295	64.1	275	73.7	260	81.2	244	89.6	227	98.7	210	107.6	-	-
	10	302	64.7	282	74.5	267	82.0	251	90.4	233	99.7	216	109	-	-
	11	310	65.3	290	75.2	274	82.8	257	91.3	239	100.7	221	110	-	-
	12	319	66.0	297	75.9	281	83.6	264	92.2	246	101.6	227	111	-	-
290.4	5	298	70.9	278	81.5	263	89.8	247	99.0	230	109	213	119	195	129
	6	306	71.5	286	82.3	270	90.7	254	100.0	236	110	219	120	201	130
	7	315	72.3	294	83.1	278	91.6	**261**	**101.0**	243	111	225	121	207	131
	8	324	73.1	302	84.1	286	92.6	268	102.1	250	113	231	123	-	-
	9	333	73.8	311	84.9	294	93.5	276	103.1	257	114	238	124	-	-
	10	342	74.5	319	85.7	302	94.5	283	104.2	263	115	244	125	-	-
	11	351	75.3	327	86.6	309	95.4	290	105.2	270	116	250	126	-	-
	12	360	76.0	336	87.4	318	96.3	298	106.2	277	117	257	128	-	-
330.4	5	334	80.0	312	92.0	295	101.4	277	112	258	123	239	134	219	145
	6	344	80.7	321	92.9	303	102.4	285	113	265	124	245	136	225	147
	7	354	81.6	330	93.8	312	103.4	**293**	**114**	273	126	252	137	232	148
	8	364	82.5	340	94.9	321	104.5	301	115	280	127	260	139	-	-
	9	374	83.3	349	95.8	330	105.6	310	116	288	128	267	140	-	-
	10	384	84.1	358	96.8	339	106.6	318	118	296	130	274	141	-	-
	11	393	84.9	367	97.7	347	107.7	326	119	303	131	281	143	-	-
	12	404	85.8	377	98.7	357	109	335	120	311	132	288	144	-	-
375.4	5	386	89.1	360	102.5	341	113	320	125	297	137	275	150	253	162
	6	396	89.9	370	103.5	350	114	328	126	306	139	283	151	260	163
	7	408	90.9	381	104.5	360	115	**338**	**127**	314	140	291	153	268	165
	8	420	91.9	392	105.7	370	116	348	128	323	142	300	154	-	-
	9	431	92.8	402	106.8	381	118	357	130	332	143	308	156	-	-
	10	443	93.7	413	107.8	391	119	367	131	341	144	316	157	-	-
	11	454	94.6	424	109	401	120	376	132	350	146	324	159	-	-
	12	466	95.6	435	110	412	121	386	134	359	147	333	160	-	-
420.4	5	430	100.3	402	115	380	127	356	140	332	155	307	169	282	182
	6	442	101.3	413	117	390	128	366	142	341	156	316	170	290	184
	7	455	102.3	425	118	402	130	**377**	**143**	351	158	325	172	298	186
	8	468	103.4	437	119	413	131	388	145	361	159	334	174	-	-
	9	481	104.5	449	120	424	132	398	146	371	161	343	175	-	-
	10	494	105.5	461	121	436	134	409	147	380	163	352	177	-	-
	11	506	106.6	473	123	447	135	419	149	390	164	361	179	-	-
	12	520	108	485	124	459	136	431	150	401	166	371	181	-	-

Tw= Outlet water temperature °C **kWf** = Cooling capacity (kW). **kWa** = Compressor power input (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).

TECHNICAL SPECIFICATIONS AND STANDARD PERFORMANCES - IP HEAT PUMP UNITS

Standard performances in heating mode - Extra low noise Version AX

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
200.4	30	153	45.7	175	46.0	191	46.6	204	46.9	218	47.4	233	48.0	250	48.5
	35	152	50.7	174	51.0	190	51.7	203	52.0	217	52.6	232	53.2	248	53.8
	40	151	56.3	173	56.7	189	57.4	201	57.8	216	58.4	231	59.1	247	59.8
	45	150	62.6	172	63.0	188	63.8	**200**	**64.2**	214	64.9	229	65.7	245	66.4
	50	149	69.6	171	70.0	187	71.0	199	71.4	213	72.2	228	73.0	244	73.8
230.4	30	171	52.0	196	52.4	214	53.1	228	53.4	245	54.0	261	54.6	280	55.2
	35	170	57.7	195	58.0	213	58.8	227	59.2	243	59.8	260	60.5	278	61.2
	40	169	64.1	194	64.5	212	65.4	226	65.8	242	66.5	259	67.3	277	68.1
	45	168	71.3	193	71.7	211	72.7	**224**	**73.1**	240	73.9	257	74.8	275	75.6
	50	167	79.2	191	79.7	209	80.8	222	81.3	239	82.2	255	83.1	273	84.1
260.4	30	194	57.4	222	57.7	243	58.5	259	58.9	277	59.5	296	60.2	317	60.9
	35	193	63.6	221	64.0	242	64.8	257	65.2	276	66.0	295	66.7	316	67.5
	40	192	70.7	220	71.1	240	72.1	256	72.5	274	73.4	293	74.2	314	75.0
	45	191	78.6	218	79.0	239	80.1	**254**	**80.6**	272	81.5	291	82.5	312	83.4
	50	189	87.4	217	87.9	237	89.1	252	89.6	271	90.6	289	91.7	309	92.7
290.4	30	219	65.6	251	66.0	275	66.9	292	67.3	313	68.1	335	68.9	358	69.7
	35	218	72.7	250	73.2	273	74.2	291	74.6	312	75.5	333	76.3	357	77.2
	40	217	80.9	248	81.4	272	82.5	289	83.0	310	83.9	331	84.9	355	85.8
	45	215	89.9	247	90.4	270	91.7	**287**	**92.2**	308	93.3	329	94.3	352	95.4
	50	214	99.9	245	100.5	268	101.9	285	102.5	306	103.7	327	105	350	106.1
330.4	30	245	74.0	281	74.5	307	75.5	327	75.9	350	76.8	375	77.7	401	78.6
	35	244	82.1	279	82.5	306	83.7	325	84.2	349	85.1	373	86.1	399	87.1
	40	242	91.2	278	91.8	304	93.0	323	93.6	347	94.7	371	95.7	396	96.8
	45	241	101.4	276	102.0	302	103.4	**321**	**104**	344	105	368	106	394	108
	50	239	113	274	113	300	115	319	116	342	117	366	118	391	120
375.4	30	281	82.6	322	83.1	352	84.2	375	84.7	402	85.7	430	86.7	460	87.6
	35	280	91.5	320	92.1	350	93.3	373	93.9	400	95.0	427	96.0	457	97.1
	40	278	101.8	319	102.4	348	103.8	371	104	397	106	425	107	455	108
	45	276	113	316	114	346	115	**368**	**116**	395	117	422	119	451	120
	50	274	126	314	126	344	128	365	129	392	130	419	132	448	133
420.4	30	312	94.0	358	94.5	391	95.8	416	96.4	447	97.5	477	98.6	511	99.7
	35	311	104	356	105	389	106	414	107	444	108	475	109	508	111
	40	309	116	354	116	387	118	412	119	442	120	472	122	505	123
	45	307	129	352	129	385	131	**409**	**132**	439	134	469	135	502	137
	50	305	143	349	144	382	146	406	147	436	148	466	150	498	152

Tw= Outlet water temperature °C **kWt** = Heating capacity (kW). **kWa** = Compressor power input (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} m^2 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.

CORRECTION FACTOR FOR THE USE OF GLYCOL

Correction factor for the use of glycol IN HEATING MODE

Correction factor for the use of **ETHYLENE GLYCOL** with water produced between 30÷55ºC.

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
Cooling capacity CCPF Power input CCPA	1,000	0,995	0,985	0,975	0,970
Power input CCPA	1,000	1,010	1,015	1,020	1,030
Water flow rate CCQA	1,000	1,038	1,062	1,091	1,127
Water pressure drop CCDP	1,000	1,026	1,051	1,077	1,103

Correction factor for the use of **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
Cooling capacity CCPF Power input CCPA	1	0,99	0,975	0,965	0,955
Power input CCPA	1	1,01	1,02	1,03	1,04
Water flow rate CCQA	1	1,018	1,032	1,053	1,082
Water pressure drop CCDP	1	1,026	1,051	1,077	1,103

Correction factor for the use of glycol IN COOLING MODE

Correction factor for the use of **ETHYLENE GLYCOL** with water produced between 5÷20ºC.

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
Cooling capacity CCPF Power input CCPA	1	0,99	0,98	0,97	0,95
Power input CCPA	1	1	0,99	0,99	0,98
Water flow rate CCQA	1	1,04	1,08	1,12	1,16
Water pressure drop CCDP	1	1,08	1,16	1,25	1,35

Correction factor for the use of **PROPYLENE GLYCOL** with water produced between 5÷20ºC.

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
Cooling capacity CCPF Power input CCPA	1	0,98	0,96	0,94	0,92
Power input CCPA	1	0,99	0,98	0,95	0,93
Water flow rate CCQA	1	1,01	1,03	1,06	1,09
Water pressure drop CCDP	1	1,05	1,11	1,22	1,38

Brine Unit BR - BP

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
Refrigerating power c.f.	0,912	0,855	0,798	0,738	0,683	-	-
Power input c.f.	0,967	0,957	0,947	0,927	0,897	-	-
Water flow rate c.f.	0,955	0,895	0,836	0,773	0,715	-	-
Water pressure drop c.f.	1,09	1,095	1,1	1,11	1,12	-	-

percentage of glycol in mass / volume	30 / 27.7						
freezing point [°C]	-14						
Produced water temperature	4	2	0	-2	-4	-6	-8
Refrigerating power c.f.	0,899	0,842	0,785	0,725	0,67	0,613	0,562
Power input c.f.	0,96	0,95	0,94	0,92	0,89	0,87	0,84
Water flow rate c.f.	0,967	0,905	0,844	0,78	0,72	0,659	0,604
Water pressure drop c.f.	1,14	1,145	1,15	1,155	1,16	1,175	1,19

percentage of glycol in mass / volume	40 / 37.5						
freezing point [°C]	-22						
Produced water temperature	4	2	0	-2	-4	-6	-8
Refrigerating power c.f.	0,884	0,827	0,77	0,71	0,655	0,598	0,547
Power input c.f.	0,88	0,87	0,86	0,84	0,81	0,79	0,76
Water flow rate c.f.	1,062	0,929	0,887	0,798	0,74	0,672	0,607
Water pressure drop c.f.	1,19	1,195	1,2	1,21	1,22	1,235	1,25

PROPYLENE GLYCOL

percentage of glycol in mass / volume	20 / 19.4						
freezing point [°C]	-8						
Produced water temperature	4	2	0	-2	-4	-6	-8
Refrigerating power c.f.	0,874	0,807	0,74	0,69	0,641	-	-
Power input c.f.	0,945	0,935	0,925	0,9	0,875	-	-
Water flow rate c.f.	0,915	0,845	0,774	0,723	0,671	-	-
Water pressure drop c.f.	1,11	1,115	1,12	1,13	1,14	-	-

percentage of glycol in mass / volume	30 / 29.4						
freezing point [°C]	-14						
Produced water temperature	4	2	0	-2	-4	-6	-8
Refrigerating power c.f.	0,869	0,799	0,729	0,68	0,63	0,583	0,536
Power input c.f.	0,935	0,923	0,91	0,888	0,865	0,838	0,81
Water flow rate c.f.	0,934	0,859	0,784	0,731	0,678	0,627	0,576
Water pressure drop c.f.	1,16	1,175	1,19	1,2	1,21	1,255	1,3

percentage of glycol in mass / volume	40 / 39.6						
freezing point [°C]	-22						
Produced water temperature	4	2	0	-2	-4	-6	-8
Refrigerating power c.f.	0,848	0,784	0,719	0,67	0,62	0,57	0,52
Power input c.f.	0,865	0,855	0,845	0,82	0,795	0,773	0,75
Water flow rate c.f.	1,062	0,881	0,887	0,752	0,74	0,641	0,607
Water pressure drop c.f.	1,23	1,275	1,32	1,375	1,43	1,5	1,57

GENERAL SPECIFICATIONS - VERSION WITH DESUPERHEATER (VD)
IR COOLING UNIT ONLY

Acoustic Version: AB (Basic Version)

Recovery heat exchanger specifications

MODEL	200.4	230.4	260.4	290.4	330.4	375.4	420.4	UM
Type of recovery exchanger	Brazed plates							-
Quantity	1							N°
Max. operating pressure on wet side	600							kPa
Total water content of recovery exchangers	1.3	1.3	1.3	1.3	1.6	1.6	1.6	l
Unit specification								
Cooling capacity VD(1)	211	237	270	305	342	390	433	kW
Total power input VD (1)	60.3	68.6	75.8	87.7	99.4	110	124	kW
Power input compressor VD (1)	67.5	75.8	86.6	98.5	110	125	139	kW
EER VD (1)	3.13	3.13	3.12	3.10	3.11	3.12	3.12	-
Recovered heating capacity (1)	59.1	65.7	74.3	84.2	97.8	111	125	kW
Recovered water flow rate (1)	2.82	3.14	3.55	4.02	4.67	5.30	5.97	l/s
Recovered water pressure drop (1)	8	10	13	16	16	21	25	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.

Acoustic Version: AS (Low noise Version)

Recovery heat exchanger specifications

MODEL	200.4	230.4	260.4	290.4	330.4	375.4	420.4	UM
Type of recovery exchanger	Brazed plates							-
Quantity	1							N°
Max. operating pressure on wet side	600							kPa
Total water content of recovery exchangers	1.3	1.3	1.3	1.3	1.6	1.6	1.6	l
Unit specification								
Cooling capacity VD(1)	205	229	261	296	332	378	420	kW
Total power input VD (1)	66.3	75.5	83.4	96.4	109	121	137	kW
Power input compressor VD (1)	73.5	82.7	94.2	107	120	136	151	kW
EER VD (1)	2.79	2.77	2.77	2.76	2.77	2.78	2.78	-
Recovered heating capacity (1)	59.1	65.7	74.3	84.2	97.8	111	125	kW
Recovered water flow rate (1)	2.82	3.14	3.55	4.02	4.67	5.30	5.97	l/s
Recovered water pressure drop (1)	8	10	13	16	16	21	25	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.

Acoustic Version: AX (Extra low noise Version)

Recovery heat exchanger specifications

MODEL	200.4	230.4	260.4	290.4	330.4	375.4	420.4	UM
Type of recovery exchanger	Brazed plates							-
Quantity	1							N°
Max. operating pressure on wet side	600							kPa
Total water content of recovery exchangers	1.3	1.3	1.3	1.3	1.6	1.6	1.6	l
Unit specification								
Cooling capacity VD(1)	197	220	252	285	318	363	404	kW
Total power input VD (1)	68.5	78.3	85.6	98.9	112	124	142	kW
Power input compressor VD (1)	68.5	78.3	85.6	99	112	124	142	kW
EER VD (1)	2.88	2.81	2.94	2.88	2.84	2.93	2.85	-
Recovered heating capacity (1)	59.1	65.7	74.3	84.2	97.8	111	125	kW
Recovered water flow rate (1)	2.82	3.14	3.55	4.02	4.67	5.30	5.97	l/s
Recovered water pressure drop (1)	8	8	8	8	9	9	9	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.

GENERAL SPECIFICATIONS - VERSION WITH DESUPERHEATER (VD)
IR COOLING UNIT ONLY

Recovered heating capacity

MOD.	TW	OUTDOOR AIR TEMPERATURE (°C D.B.)				
		25	30	35	40	45
		kWtr = Recovered HEATING CAPACITY [kW]				
200.4	30	49.6	56.4	64.2	72.9	82.6
	35	49.3	56.0	63.9	72.5	82.1
	40	48.0	54.5	62.1	70.5	79.9
	45	45.6	51.9	**59.1**	67.1	76.0
	50	42.2	48.0	54.7	62.1	70.3
	55	37.8	43.0	49.0	55.6	63.0
	60	32.4	36.9	42.0	47.7	54.0
	65	26.0	29.5	33.6	38.2	43.2
	70	18.5	21.0	23.9	27.2	30.8
230.4	30	55.6	63.0	71.6	81.2	91.8
	35	55.3	62.7	71.2	80.7	91.3
	40	53.8	61.0	69.2	78.5	88.8
	45	51.0	57.9	**65.7**	74.5	84.3
	50	47.1	53.4	60.6	68.7	77.8
	55	41.9	47.5	54.0	61.2	69.2
	60	35.5	40.3	45.8	51.9	58.7
	65	27.9	31.7	36.0	40.8	46.2
	70	19.1	21.7	24.6	27.9	31.6
260.4	30	62.5	70.7	80.4	91.1	103
	35	62.5	70.7	80.4	91.1	103
	40	60.9	69.0	78.3	88.8	100
	45	57.7	65.4	**74.3**	84.2	95.2
	50	53.0	60.1	68.2	77.3	87.5
	55	46.8	53.0	60.2	68.2	77.1
	60	38.9	44.1	50.1	56.7	64.2
	65	29.5	33.4	38.0	43.0	48.7
	70	18.5	21.0	23.8	27.0	30.5
290.4	30	70.3	79.9	90.7	103	116
	35	70.4	80.0	90.9	103	116
	40	68.7	78.1	88.7	100	113
	45	65.2	74.1	**84.2**	95.3	107
	50	59.9	68.0	77.3	87.4	98.6
	55	52.7	59.9	68.0	76.9	86.8
	60	43.6	49.6	56.3	63.7	71.9
	65	32.8	37.2	42.3	47.9	54.0
	70	20.1	22.8	25.9	29.3	33.0
330.4	30	82.3	93.5	106	120	135
	35	82.2	93.3	106	120	135
	40	80.0	90.9	103	117	132
	45	75.9	86.3	**97.8**	111	125
	50	69.9	79.4	90.0	102	115
	55	61.8	70.3	79.6	90.1	102
	60	51.8	58.9	66.8	75.6	85.2
	65	39.9	45.3	51.3	58.1	65.5
	70	25.9	29.4	33.4	37.8	42.6
375.4	30	93.4	106	120	136	154
	35	93.2	106	120	136	153
	40	90.8	103	117	132	149
	45	86.2	97.9	**111**	126	142
	50	79.3	90.1	102	116	130
	55	70.2	79.7	90.4	102	115
	60	58.8	66.8	75.8	85.8	96.7
	65	45.2	51.4	58.3	65.9	74.3
	70	29.4	33.4	37.9	42.9	48.3
420.4	65	105	120	135	153	173
	70	105	119	135	153	173
	40	102	116	132	149	168
	45	97.1	110	**125**	141	159
	50	89.3	101	115	130	147
	55	79.0	89.8	102	115	130
	60	66.3	75.3	85.3	96.6	109
	65	50.9	57.9	65.6	74.3	83.7
	70	33.1	37.6	42.7	48.3	54.4

GENERAL SPECIFICATIONS - VERSION WITH DESUPERHEATER (VD)
IP HEAT PUMP UNIT

Acoustic Version: AB (Basic Version)

Recovery heat exchanger specifications

MODEL	200.4	230.4	260.4	290.4	330.4	375.4	420.4	UM
Type of recovery exchanger	Brazed plates							-
Quantity	1							N°
Max. operating pressure on wet side	600							kPa
Total water content of recovery exchangers	1.3	1.3	1.3	1.3	1.6	1.6	1.6	l
Unit specification								
Cooling capacity VD(1)	202	226	255	289	324	375	417	kW
Total power input VD (1)	58.9	67.4	74.5	85.7	97.2	108	122	kW
Power input compressor VD (1)	66.1	74.6	85.3	96.5	108	122	136	kW
EER VD (1)	3.06	3.03	2.99	2.99	3.00	3.07	3.07	-
Recovered heating capacity (1)	58.1	65.6	73.3	84.0	94.7	108	121	kW
Recovered water flow rate (1)	2.78	3.13	3.50	4.01	4.52	5.16	5.78	l/s
Recovered water pressure drop (1)	8	10	13	16	15	19	24	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.

Acoustic Version: AS (Low noise Version)

Recovery heat exchanger specifications

MODEL	200.4	230.4	260.4	290.4	330.4	375.4	420.4	UM
Type of recovery exchanger	Brazed plates							-
Quantity	1							N°
Max. operating pressure on wet side	600							kPa
Total water content of recovery exchangers	1.3	1.3	1.3	1.3	1.6	1.6	1.6	l
Unit specification								
Cooling capacity VD(1)	196	219	248	281	314	363	404	kW
Total power input VD (1)	64.8	74.2	82.0	94.3	106.9	119	134	kW
Power input compressor VD (1)	72.0	81.4	92.8	105	118	133	148	kW
EER VD (1)	2.72	2.69	2.67	2.67	2.66	2.73	2.73	-
Recovered heating capacity (1)	58.1	65.6	73.3	84.0	94.7	108	121	kW
Recovered water flow rate (1)	2.78	3.13	3.50	4.01	4.52	5.16	5.78	l/s
Recovered water pressure drop (1)	8	10	13	16	15	19	24	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.

Acoustic Version: AS (Low noise Version)

Recovery heat exchanger specifications

MODEL	200.4	230.4	260.4	290.4	330.4	375.4	420.4	UM
Type of recovery exchanger	Brazed plates							-
Quantity	1							N°
Max. operating pressure on wet side	600							kPa
Total water content of recovery exchangers	1.3	1.3	1.3	1.3	1.6	1.6	1.6	l
Unit specification								
Cooling capacity VD(1)	189	212	240	271	305	352	392	kW
Total power input VD (1)	67.1	76.8	85.1	98.0	111	123	139	kW
Power input compressor VD (1)	67.1	76.8	85.1	98	111	123	139	kW
EER VD (1)	2.82	2.76	2.82	2.77	2.75	2.86	2.82	-
Recovered heating capacity (1)	58.1	65.6	73.3	84.0	94.7	108	121	kW
Recovered water flow rate (1)	2.78	3.13	3.50	4.01	4.52	5.16	5.78	l/s
Recovered water pressure drop (1)	0	8	7	8	9	9	9	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.

GENERAL SPECIFICATIONS - VERSION WITH DESUPERHEATER (VD)
IP HEAT PUMP UNIT

Recovered heating capacity

MOD.	TW	OUTDOOR AIR TEMPERATURE (°C D.B.)				
		25	30	35	40	45
		kWtr = Recovered HEATING CAPACITY [kW]				
200.4	30	48.7	55.4	63.1	71.7	81.2
	35	48.4	55.1	62.8	71.2	80.7
	40	47.1	53.6	61.1	69.3	78.5
	45	44.8	51.0	**58.1**	65.9	74.7
	50	41.5	47.2	53.8	61.1	69.2
	55	37.2	42.3	48.2	54.7	62.0
	60	31.9	36.2	41.3	46.9	53.1
	65	25.5	29.0	33.1	37.5	42.5
	70	18.2	20.7	23.5	26.7	30.3
230.4	30	55.5	63.0	71.5	81.0	91.7
	35	55.2	62.6	71.1	80.6	91.2
	40	53.7	60.9	69.1	78.4	88.7
	45	51.0	57.8	**65.6**	74.4	84.1
	50	47.0	53.3	60.5	68.6	77.6
	55	41.9	47.5	53.9	61.1	69.1
	60	35.5	40.2	45.7	51.8	58.6
	65	27.9	31.6	35.9	40.7	46.1
	70	19.1	21.7	24.6	27.9	31.6
260.4	30	63.2	71.6	81.3	92.1	104
	35	61.6	69.8	79.3	89.8	102
	40	60.1	68.0	77.3	87.6	99.1
	45	57.0	64.5	**73.3**	83.1	94.0
	50	52.3	59.3	67.3	76.3	86.3
	55	46.1	52.3	59.4	67.3	76.1
	60	38.4	43.5	49.4	56.0	63.3
	65	29.1	33.0	37.4	42.4	48.0
	70	18.3	20.7	23.5	26.6	30.1
290.4	30	71.8	81.6	92.7	105	118
	35	70.3	79.8	90.7	103	116
	40	68.6	77.9	88.5	100	113
	45	65.1	73.9	**84.0**	95.0	107
	50	59.7	67.9	77.1	87.2	98.4
	55	52.5	59.7	67.8	76.7	86.6
	60	43.5	49.5	56.2	63.6	71.7
	65	32.7	37.1	42.2	47.7	53.9
	70	20.0	22.7	25.8	29.2	33.0
330.4	30	81.0	92.1	104	118	133
	35	79.5	90.4	102	116	131
	40	77.5	88.1	100	113	127
	45	73.5	83.5	**94.7**	107	121
	50	67.7	76.9	87.1	98.6	111
	55	59.9	68.0	77.1	87.3	98.4
	60	50.2	57.0	64.6	73.2	82.5
	65	38.6	43.9	49.7	56.3	63.4
	70	25.1	28.5	32.3	36.6	41.2
375.4	30	92.4	105	119	135	152
	35	90.7	103	117	132	149
	40	88.4	100	114	129	145
	45	83.9	95.3	**108**	122	138
	50	77.2	87.7	99.4	112	127
	55	68.3	77.6	88.0	100	112
	60	57.2	65.0	73.7	83.4	94.1
	65	44.0	50.0	56.7	64.2	72.3
	70	28.6	32.5	36.9	41.7	47.0
420.4	65	104	118	133	151	170
	70	102	115	131	148	167
	40	99.0	113	128	144	163
	45	94.0	107	**121**	137	154
	50	86.4	98.2	111	126	142
	55	76.5	86.9	98.5	112	126
	60	64.1	72.9	82.6	93.5	105
	65	49.3	56.0	63.5	71.9	81.0
	70	32.1	36.4	41.3	46.7	52.7

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).
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 $2x10^{-12}$ 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)** 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.

AB Basic Version

MOD.	SWL (dB)										SPL [dB(A)]		
	Octave bands (Hz)								Total				
	63	125	250	500	1000	2000	4000	8000	dB	dB(A)	1	5	10
200.4	96.4	94.1	92.6	90.0	87.2	81.8	75.2	66.8	**100**	**92**	73	65	60
230.4	97.4	95.1	93.6	91.0	88.2	82.8	76.2	67.8	**101**	**93**	74	66	61
260.4	98.4	96.2	93.8	91.4	88.9	85.9	78.1	68.6	**102**	**94**	75	67	62
290.4	98.4	96.2	93.8	91.4	88.9	85.9	78.1	68.6	**102**	**94**	75	67	62
330.4	99.4	97.2	94.8	92.4	89.9	86.9	79.1	69.6	**103**	**95**	75	68	63
375.4	100.4	98.2	95.8	93.4	90.9	87.9	80.1	70.6	**104**	**96**	76	69	64
420.4	100.4	98.2	95.8	93.4	90.9	87.9	80.1	70.6	**104**	**96**	76	69	64

AS Low noise Version

MOD.	SWL (dB)										SPL [dB(A)]		
	Octave bands (Hz)								Total				
	63	125	250	500	1000	2000	4000	8000	dB	dB(A)	1	5	10
200.4	94.2	91.9	89.4	85.3	81.0	74.6	67.0	58.6	**97**	**87**	68	60	55
230.4	92.4	90.1	88.6	86.0	83.2	77.8	71.2	62.8	**96**	**88**	69	61	56
260.4	95.4	93.0	90.8	86.3	83.4	79.8	71.3	62.0	**99**	**89**	70	62	57
290.4	95.4	93.0	90.8	86.3	83.4	79.8	71.3	62.0	**99**	**89**	70	62	57
330.4	95.1	91.2	90.3	88.2	85.1	80.0	73.4	65.9	**98**	**90**	70	63	58
375.4	96.1	92.2	91.3	89.2	86.1	81.0	74.4	66.9	**99**	**91**	71	64	59
420.4	96.1	92.2	91.3	89.2	86.1	81.0	74.4	66.9	**99**	**91**	71	64	59

AX Extra low noise Version

MOD.	SWL (dB)										SPL [dB(A)]		
	Octave bands (Hz)								Total				
	63	125	250	500	1000	2000	4000	8000	dB	dB(A)	1	5	10
200.4	89.4	87.0	84.8	80.3	77.4	73.8	65.3	56.0	**93**	**83**	64	56	51
230.4	90.4	88.0	85.8	81.3	78.4	74.8	66.3	57.0	**94**	**84**	65	57	52
260.4	91.4	89.0	86.8	82.3	79.4	75.8	67.3	58.0	**95**	**85**	66	58	53
290.4	91.4	89.0	86.8	82.3	79.4	75.8	67.3	58.0	**95**	**85**	66	58	53
330.4	92.4	90.0	87.8	83.3	80.4	76.8	68.3	59.0	**96**	**86**	66	59	54
375.4	94.2	91.9	89.4	85.3	81.0	74.6	67.0	58.6	**97**	**87**	67	60	55
420.4	94.2	91.9	89.4	85.3	81.0	74.6	67.0	58.6	**97**	**87**	67	60	55

OPERATING RANGE

Operating range Basic Version

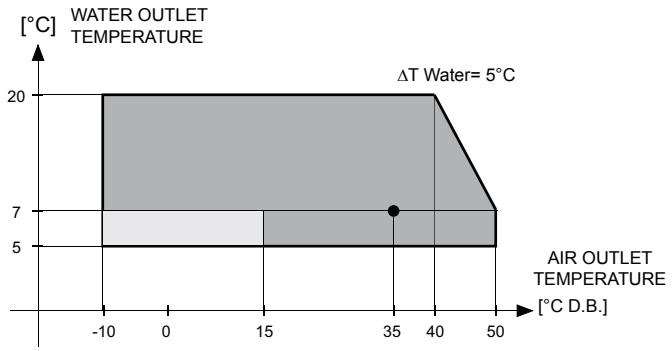
The table below lists the operating ranges within which correct operation of the units is guaranteed, depending on the Version and Operating Mode available for each type of unit.
Remember that in Heat Pump units, heat recovery only takes place during operation in the cooling mode.

Operating range of Basic Version

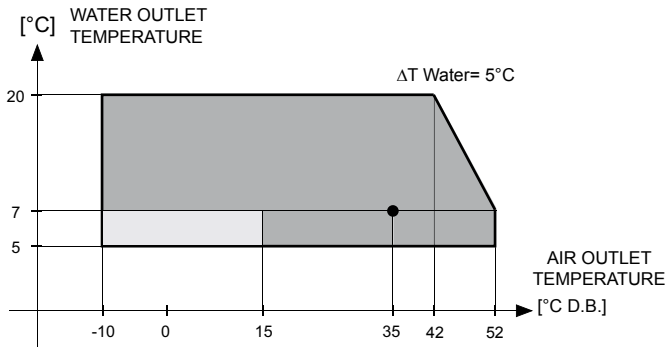
Thermal gradient of the water*		Limit value
Minimum	°C	3
Maximum	°C	8

IN COOLING MODE

UNIT MEDIUM TEMPERATURE - 0 M 5

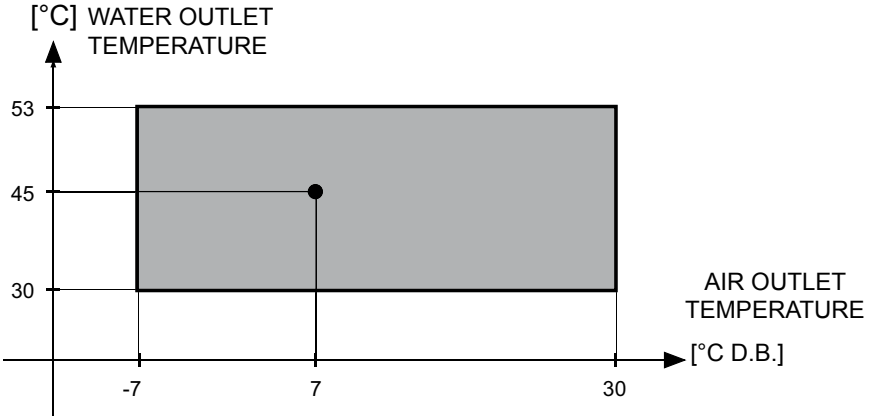


UNIT HIGH TEMPERATURE - 0 A 5

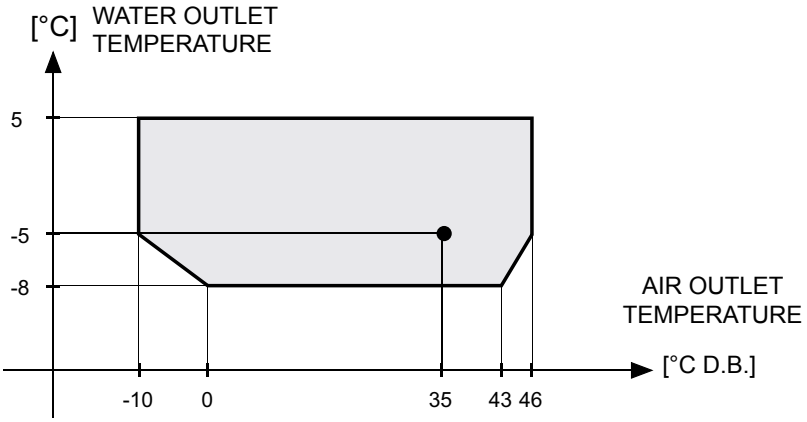


With accessory Head pressure control (brine is recommended)

IN HEATING MODE

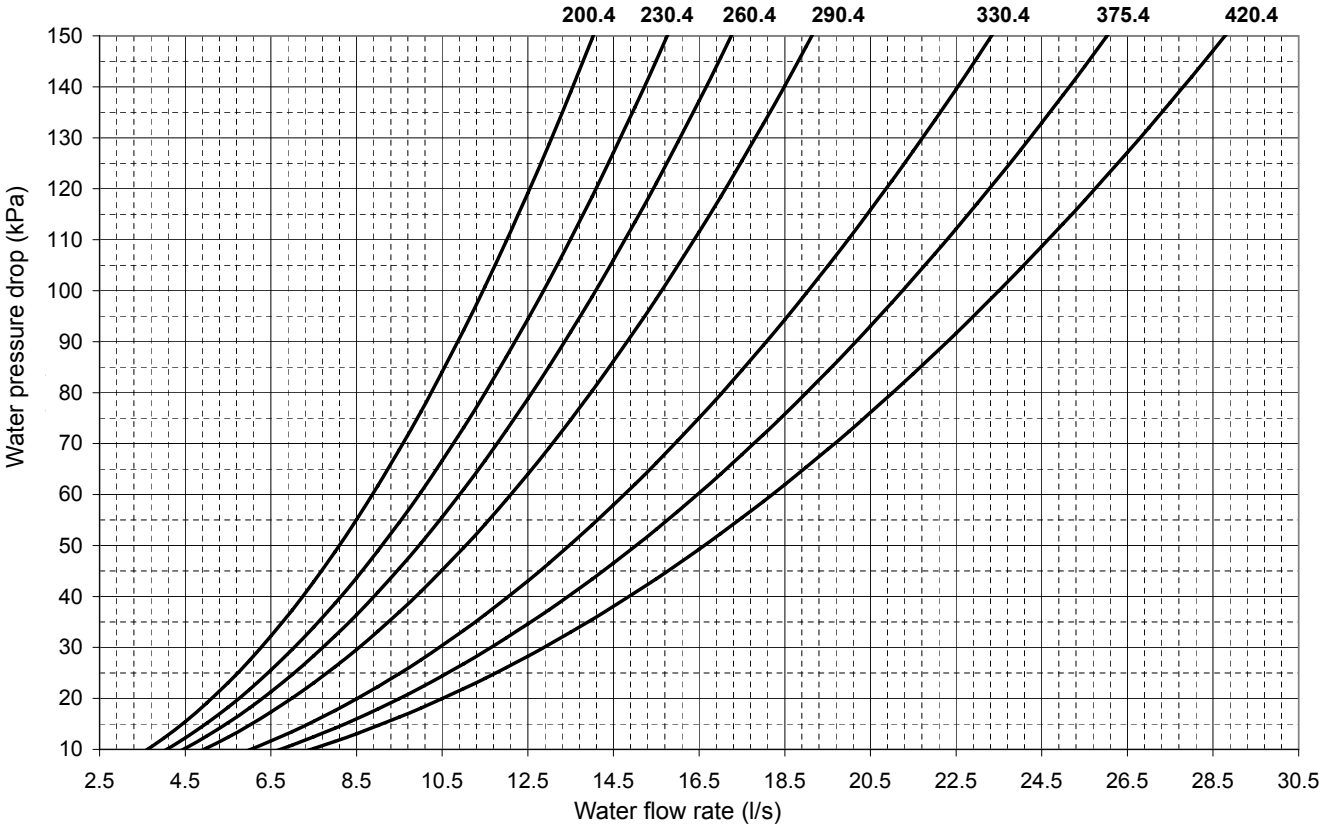


BRINE UNIT BR - IN COOLING MODE



WATER PRESSURE DROP EVAPORATOR

The graph below illustrates for the evaporator 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.

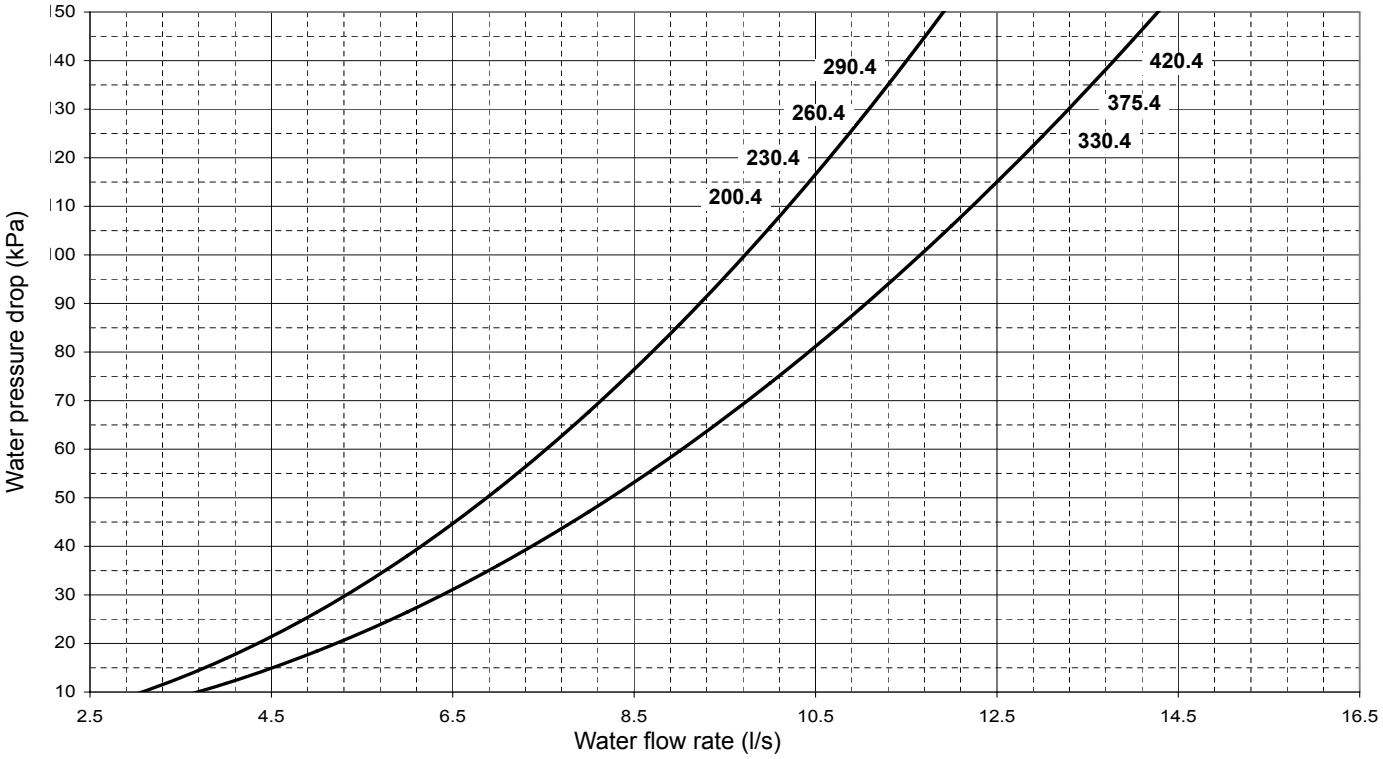


Operating range

Unit size		200.4	230.4	260.4	290.4	330.4	375.4	420.4	UM	NOTES
Lower limit value	Q	3.62	4.07	4.45	4.94	6.02	6.72	7.43	l/s	**Q=** Water flow rate **ΔP=** Water pressure drop
	Δp	10							kPa	
Upper limit value	Q	14.0	15.8	17.2	19.1	23.3	26.0	28.8	l/s	
	Δp	150							kPa	

WATER PRESSURE DROP DESUPERHEATER

The graph below illustratesfor the desupherheater exchanger 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.

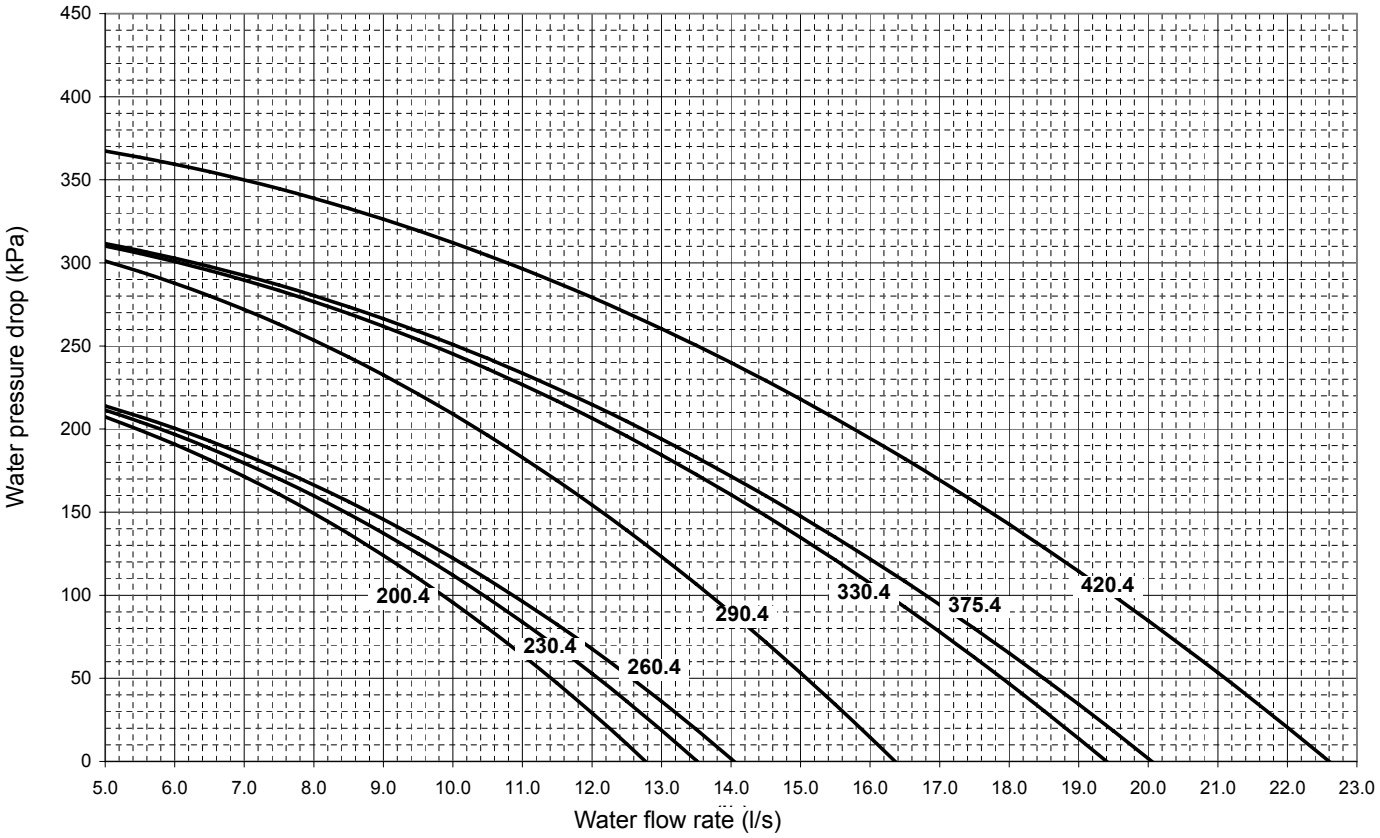


Operating range

Unit size		200.4	230.4	260.4	290.4	330.4	375.4	420.4	UM	NOTES
Lower limit value	Q	3.08				3.69			l/s	**Q=** Water flow rate **ΔP=** Water pressure drop
	Δp	10							kPa	
Upper limit value	Q	11.9				14.3			l/s	
	Δp	150							kPa	

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

The graph below illustrates for the evaporator 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.

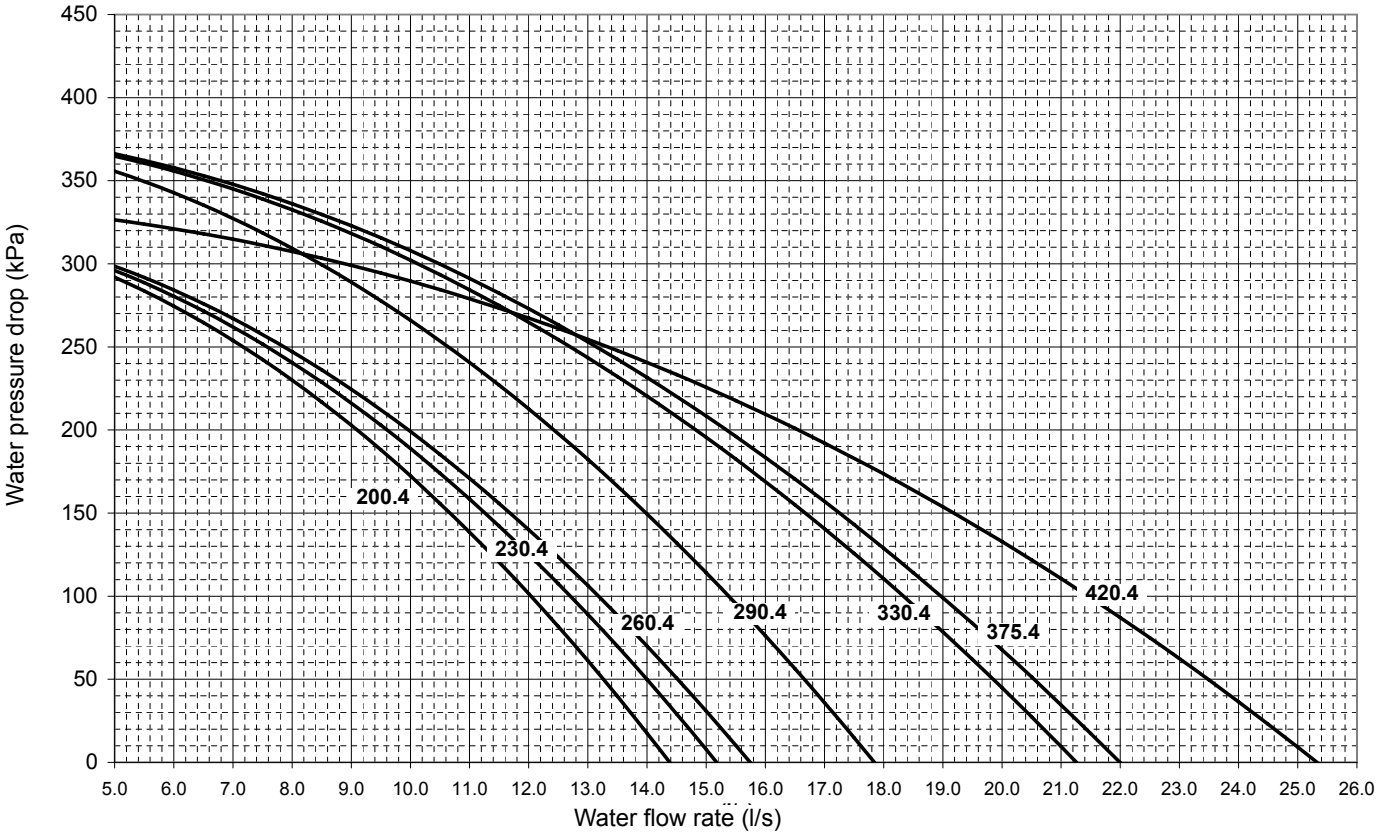


Operating range

Unit size		200.4	230.4	260.4	290.4	330.4	375.4	420.4	UM	NOTES
Lower limit value	**Q**	3.62	4.07	4.45	4.94	6.02	6.72	7.43	l/s	**Q**= Water flow rate
Upper limit value	**Q**	12.9	13.6	14.1	16.4	19.5	20.1	22.6	kPa	

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

The graph below illustrates for the evaporator 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.



Operating range

Unit size		200.4	230.4	260.4	290.4	330.4	375.4	420.4	UM	NOTES
Lower limit value	**Q**	3.62	4.07	4.45	4.94	6.02	6.72	7.43	l/s	**Q**= Water flow rate
Upper limit value	**Q**	14.5	15.3	15.8	17.9	21.4	22.0	25.4	kPa	

RECEPTION AND POSITIONING

Inspections on arrival

As soon as the unit is consigned, it is essential to make sure that all the ordered items have been received and that the dispatch is complete. Carefully check that the load 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 at the plant means that any damages will be reimbursed by the insurance company as established by law.

Safety prescriptions

Comply with the current safety provisions in relation to the equipment used to handle the unit and the ways in which these operations are carried out.

Handling

Before moving the unit, check its weight on the data plate with the general specifications of the appliance and consult the **Main Features** section of this manual. Make sure that the unit is handled with care, that it is not jolted in any way and that none of its functional parts is damaged.
Comply with the following instructions when lifting and positioning the unit:

• Handling with a lift truck or similar

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 (**Fig.1)**. 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).

Refer to the data plates (**Part.3 Fig.1)** that identify the center of gravity position, applied to the 4 sides of the base.

Fig. 1

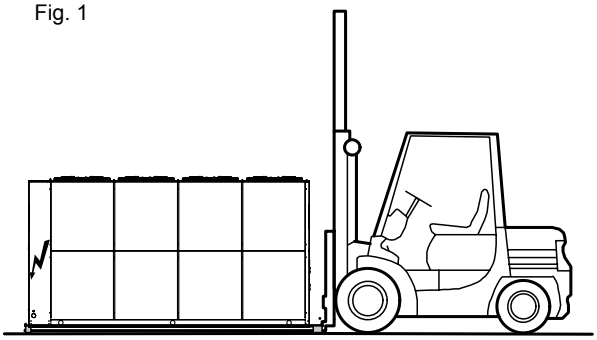


Fig. 2

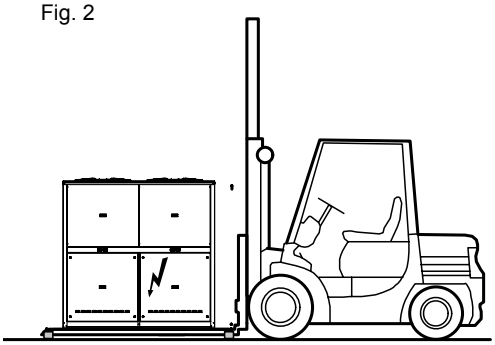
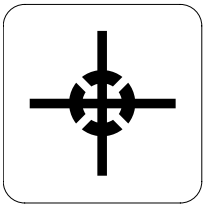
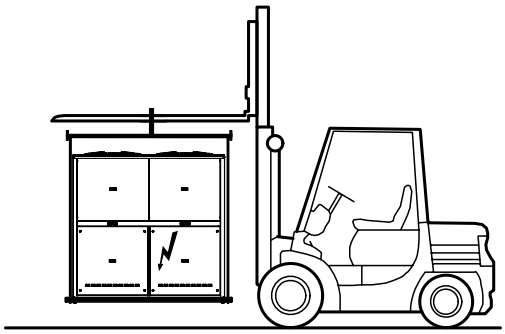


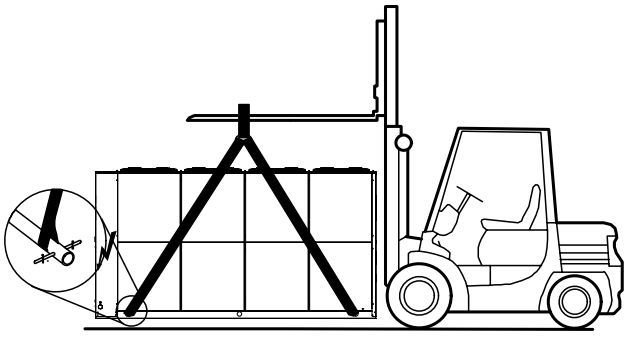
Fig. 3



• Lifting and handling with a crane or similar

- Position metal tubes of an adequate thickness in the holes on the base of the unit in order to lift it.
- The ends of the tubes must project to an adequate extent to allow safety components to be inserted and the lifting belts to be fitted.
- Consult the tables in the **When the appliance arrives** section for the venter of gravity position.
- Use spacer bars in the top part of the unit to prevent the banks and plastic parts covering the unit from being crushed and damaged.





WARNING:
Before proceeding with the handling operations, read the information on the wrapping to ensure the safety of persons and property.
Also be sure to:

- Handle the load with care
- Avoid stacking other objects on top of the unit

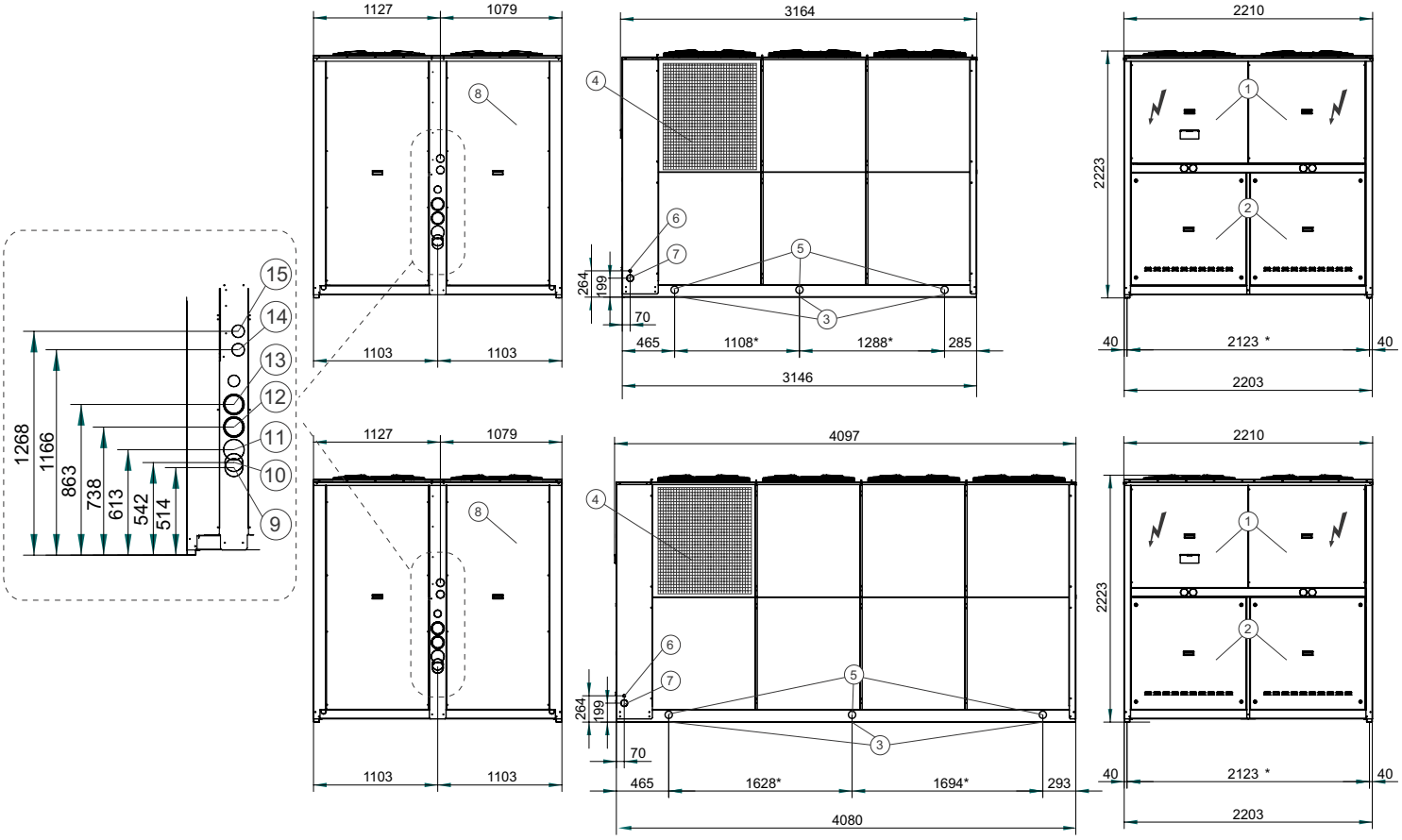
Storage

The units must be stored in a dry place sheltered from the run, rain, sand and wind.
The storage conditions are:

- Do not stack the units
- Maximum temperature = **60°C**
- Minimum temperature = -**10°C**
- Humidity = **90%**

DIMENSIONAL DATA

Overall dimensions



Description of the components

1 - Access panel to electric panel's power section
2 - Access panel to compressor compartment
3 - Vibration damper fixing holes (6 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

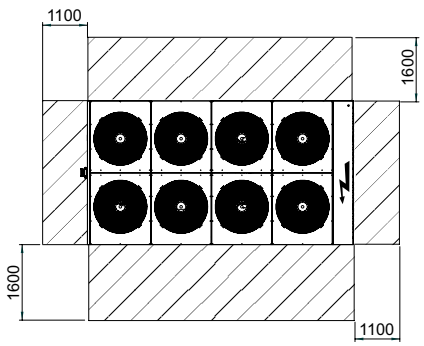
9-10-11 Water inlet for MP-AM AP and MP-SS AP
Water inlet for MP-AM and MP-SS
Water inlet for KT and KT + SAA
12 - Water inlet for MP-SS
13 - Water outlet
14 - Water inlet for Desuperheater (only VD version)
15 - Water outlet for Desuperheater (only VD version)
*** :** Center distance of vibration damper holes

	PIPES KIT COMPLETE PIPES KIT WITH TANK MP-AM AP MP-SS AP				MP-AM MP-SS				MP-SS				VD			
	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.
200																
230	3"	10	3"		3"	9	3"		3"		3"			14		
260																
290				13		10		13		12		13	1 1/2"		1 1/2"	15
330																
375	4"	11	4"		4"	11	4"		4"		4"			14		
420																

Ø	DN	Type
1 1/2"	DN40	Victaulic
3"	DN80	Victaulic
4"	DN100	Victaulic

Minimum space required for operation

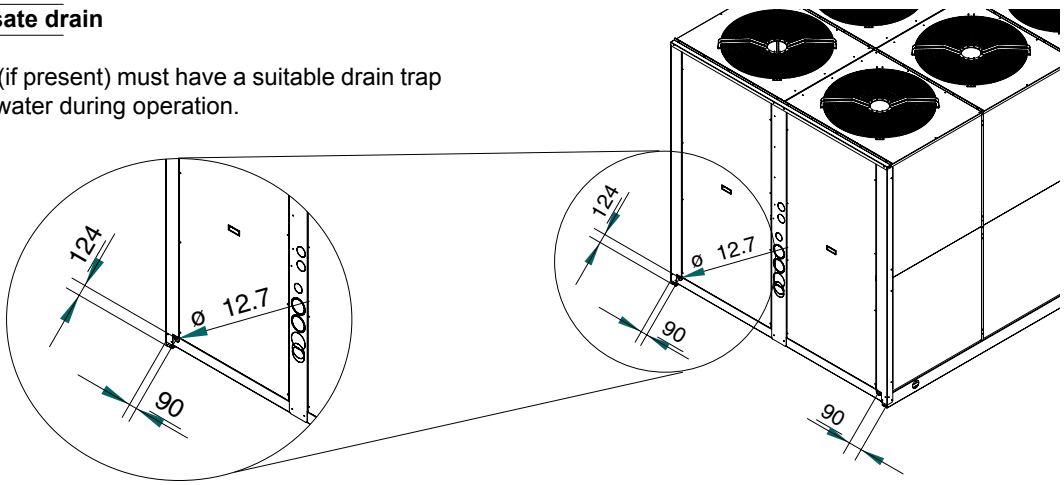
To correctly install the unit, comply with the measurements for the free area that must be left around the machine, as shown in the figure.
This will ensure good air circulation, allow the unit to operate correctly and facilitate future maintenance work.
The distances must be doubled if the unit is to be installed in a pit.
NOTE. Allow for an uncluttered area of not less than 2.5 meters above the unit.



DIMENSIONAL DATA

Position of condensate drain

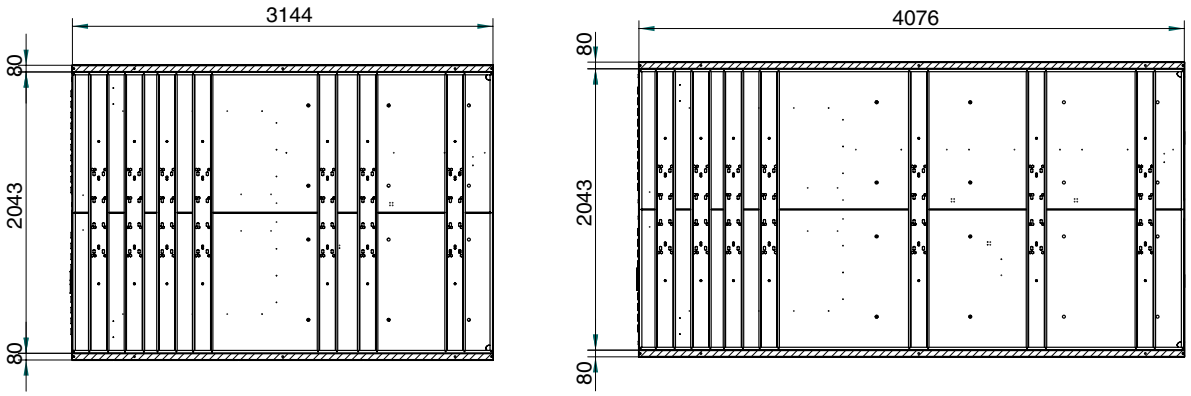
The condensate tray (if present) must have a suitable drain trap to prevent spilling of water during operation.



Vibration-damper installation

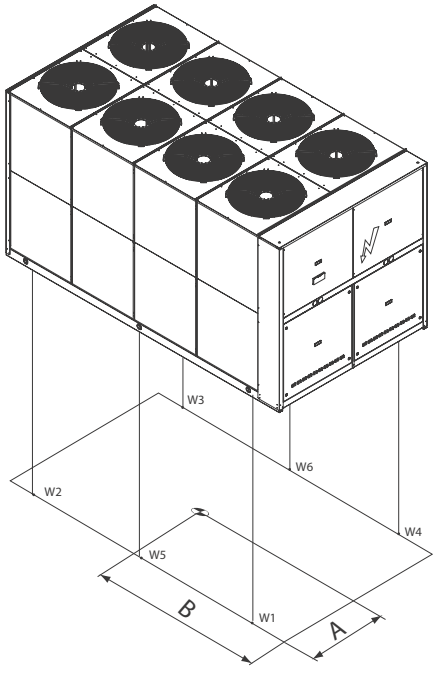
To prevent the operating unit from transmitting vibrations to the bearing structure, vibration dampening materials should be inserted under the bearing points.
The unit can be supplied with the rubber or spring vibration dampening accessory. This must be mounted by the installer.

Area of support



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.



Mod.	420.4		UM
	Transport	Operation	
A	1149	1115	kg
B	1976	2228	kg
W1	551	591	kg
W2	485	687	kg
W3	497	715	kg
W4	535	645	kg
W5	517	640	kg
W6	574	666	kg
TOT.	**3160**	**3916**	kg

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.

Compressor specification

UNIT		200.4	230.4	260.4	290.4	330.4	375.4	420.4	UM
Power supply		400 - 3 - 50							V-ph-Hz
FLA	CP1A	36.4	36.4	44.6	44.6	59.3	59.3	73.8	A
	CP1B	36.4	44.6	44.6	59.3	59.3	73.8	73.8	
	CP2A	36.4	36.4	44.6	44.6	59.3	59.3	73.8	
	CP2B	36.4	44.6	44.6	59.3	59.3	73.8	73.8	
LRA	CP1A	225	225	272	272	310	310	394	A
	CP1B	225	272	272	310	310	394	394	
	CP2A	225	225	272	272	310	310	394	
	CP2B	225	272	272	310	310	394	394	
FLI	CP1A	22.6	22.6	27.6	27.6	36.1	36.1	46.7	kW
	CP1B	22.6	27.6	27.6	36.1	36.1	46.7	46.7	
	CP2A	22.6	22.6	27.6	27.6	36.1	36.1	46.7	
	CP2B	22.6	27.6	27.6	36.1	36.1	46.7	46.7	

Single Fan specifications

UNIT		200.4	230.4	260.4	290.4	330.4	375.4	420.4	UM
Power supply		400 - 3 - 50							V-ph-Hz
FLA	AB	17.2		25.8			34.4		A
LRA	AB	60.0		90.0			120		A
FLI	AB	8.0		12.0			16.0		kW

Summary specifications Fans

UNIT		200.4	230.4	260.4	290.4	330.4	375.4	420.4	UM
Power supply		400 - 3 - 50							V-ph-Hz
FLA	AB	4.3							A
FLI	AB	15.0							kW
MIC	AB	2.0							A

ELECTRICAL CONNECTIONS

Specifications of pumping module accessory MP-PS

UNIT	200.4	230.4	260.4	290.4	330.4	375.4	420.4	UM
Power supply	400 - 3 - 50							V-ph-Hz
FLA	6.2	6.2	6.2	11.8	11.8	11.8	11.8	A
LRA	56.0	56.0	56.0	95.0	95.0	95.0	95	A
FLI	3.6	3.6	3.6	6.7	6.7	6.7	6.7	kW

Specifications of pumping module accessory MP-AM and MP-SS

UNIT	200.4	230.4	260.4	290.4	330.4	375.4	420.4	UM
Power supply	400 - 3 - 50							V-ph-Hz
FLA	8.9	8.9	8.9	11.8	11.8	11.8	15.0	A
LRA	71.0	71.0	71.0	95.0	95.0	95.0	124	A
FLI	4.9	4.9	4.9	6.7	6.7	6.7	8.8	kW

Specifications of pumping module accessory High working head MP-AM AP and MP-SS AP

UNIT	200.4	230.4	260.4	290.4	330.4	375.4	420.4	UM
Power supply	400 - 3 - 50							V-ph-Hz
FLA	11.8	11.8	11.8	15.0	15.0	15.0	22.0	A
LRA	95.0	95.0	95.0	124	124	124	169	A
FLI	6.7	6.7	6.7	8.8	8.8	8.8	13.5	kW

NOTES:
Values valid for **IP** and **IR** units, **BASIC** and **SILENCED** versions, **WITH** or **WITHOUT** water tank
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
Values relative to a **400V~3~50Hz** power supply voltage rating

Summary tables (total values):

Units without pumping module

UNIT	200.4	230.4	260.4	290.4	330.4	375.4	420.4	UM
Total maximum power input [FLA]	163	179	204	234	263	301	330	A
Total maximum power input [FLI]	98.4	108	122	139	156	182	203	kW
Total maximum starting current [MIC]	352	407	432	484	514	621	650	A

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

Total maximum power input [FLA]	172	188	213	245	275	312	345	A
Total maximum power input [FLI]	103	113	127	146	163	188	212	kW
Total maximum starting current [MIC]	360	416	441	496	525	633	665	A

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

Total maximum power input [FLA]	175	191	216	249	278	316	352	A
Total maximum power input [FLI]	105	115	129	148	165	188	216	kW
Total maximum starting current [MIC]	363	418	443	499	529	636	672	A

ELECTRICAL CONNECTIONS

1) Connection to the electricity main

• Power supply line;
The machine'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 machine. Then continue inside the panel and connect the conductors directly to the input terminals of the main disconnecting device of the machine.
• Power supply system;
The power cables of the machine's supply line must be taken from a system of symmetrical three-phase voltages and of a separate protection conductor.

V= 400V ± 10%
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 machine 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 machine. 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 machine.
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 machine 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 machine.

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 machine 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 machine 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 machine 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 machinery. Electrical equipment of machines. Part 1:
General rules.
- Directive **2004/108/EEC** concerning **"Electromagnetic compatibility".**

4) User connection

On the electric panel are available the terminal connection for:
a) control of a pump group with 1 or 2 pumps and relative safety devices (relay 230V-2A)
b) clear contact input for remote ON/OFF of the unit
The following additional connections are present on Heat recovery versions:
c) general alarm relay (SPDT NO/NC 230V-2A)
d) recovery circulating pump control and relative safety devices (relay 230V-2A)
e) remote input for enabling of recovery mode

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

IDRAULIC CONNECTIONS

General rules

A mesh filter (hole Ø ≤ 500 µm) must be installed on the unit's water inlet otherwise warranty is immediately forfeited for units with either the standard or the complete pipe kit and MP-SS. The filter performs the function of blocking any foreign matter in the system's plumbing circuit (shavings, machining debris, etc.). This prevents the plate exchanger water pipes from clogging then possibly freezing (and therefore bursting). This filter is included in the unit equipped with the pumping module accessory.

Comply with the local laws governing safety matters in order to correctly design the hydraulic circuit. The following information gives suggestions on how to correctly install the unit.

1) Standard supply.
   • Standard supply includes a differential pressure switch situated between the water inlet and outlet of the plate exchanger to avoid freezing if the water flow stops for any reason.
   Activation is calibrated for a 105 mbar ±5 Δp, while resetting occurs with a Δp of 80 mbar ±5.
2) With pumping module accessory.
   • Besides the standard accessories, the unit is equipped with all the hydraulic components, as specified in the "Options and accessories" section.

Hydraulic layout of the system

General suggestions

• 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 (with which the unit is equipped if the pumping module accessory is installed) 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.

• Depending on the chosen accessory, there may be male threaded connections or 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 anti-vibration mounts are installed under the unit, it is recommended to use flexible couplings before and after the water circulation pump and near the unit.

• Install a tap on the outlet of the unit in order to regulate the water flow.

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 plumbing system completely, open the water drain ball valves and the air vent valves).

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)

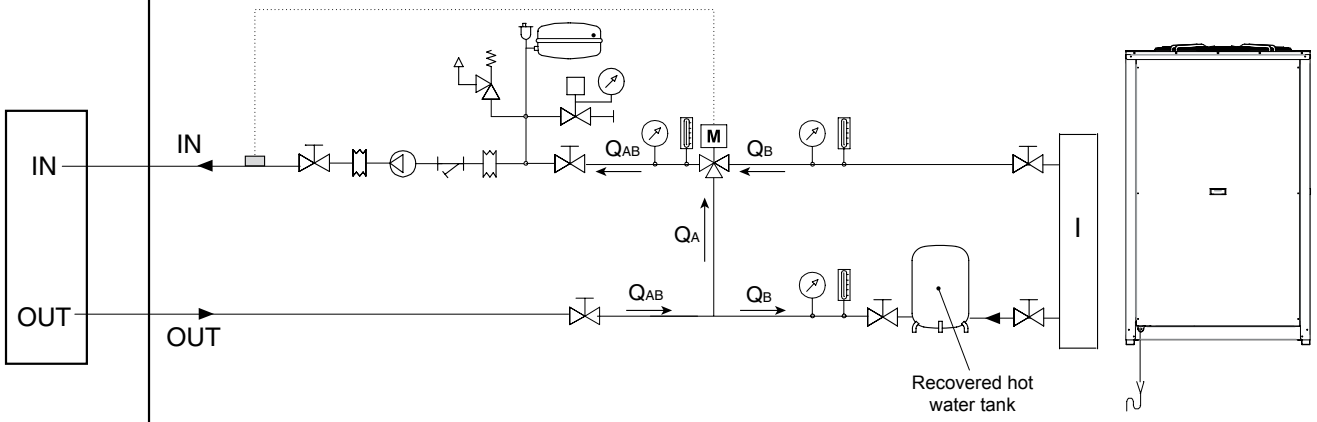
3. If it is certain that the unit will always be powered throughout the winter, the unit is able to protect itself from freezing, down to a temperature of -20°C: this is possible thanks to an antifreeze electric heating element installed on the plate exchanger and intelligent control of the water pump 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

IDRAULIC CONNECTIONS

Basic diagram Standard Unit VB [COLD WATER CIRCUIT]

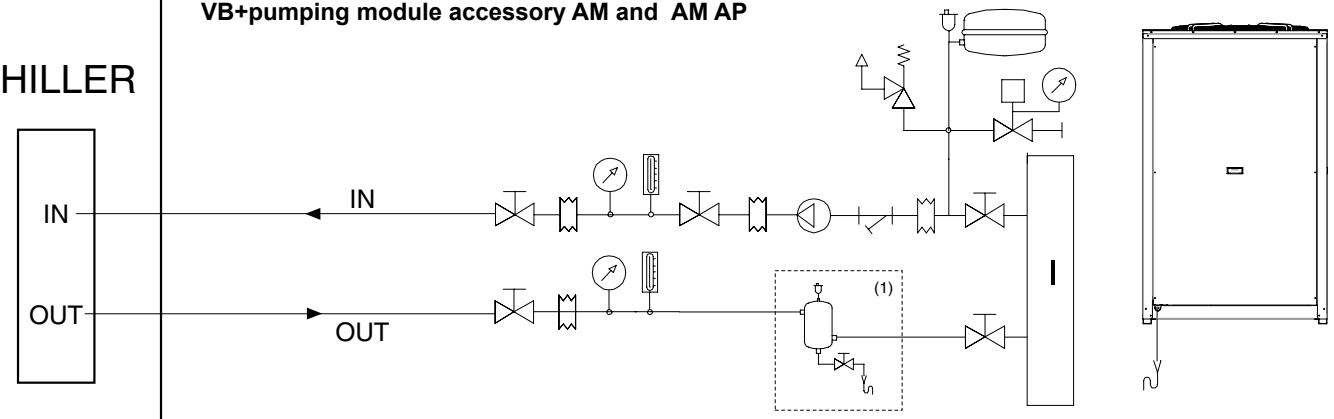
The following figures represent connections to the evaporator circuit.
IMPORTANT: There must be a constant flow of water to the exchanger. With accessory primary-secondary pumping module MP-SS is mandatory to install a water filter in the secondary circuit immediately before of the water tank.

VB+pumping module accessory PS



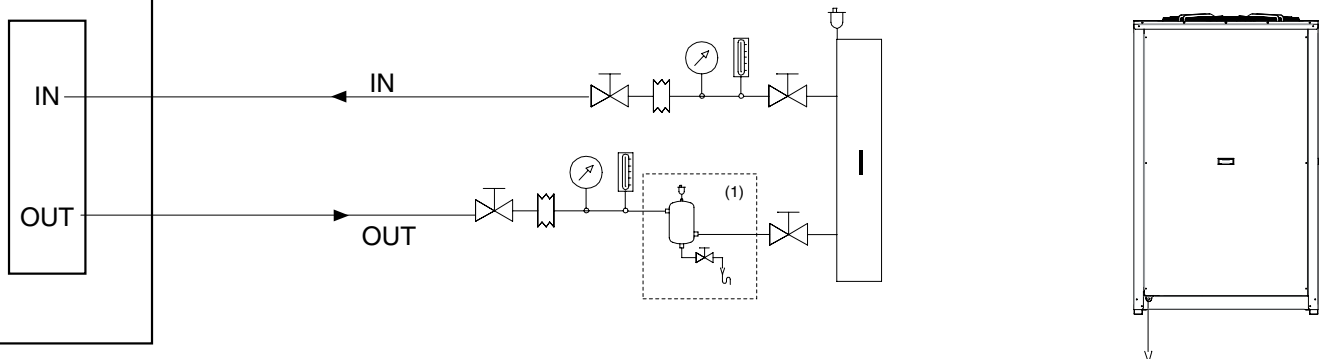
VB+pumping module accessory AM and AM AP

CHILLER



Basic diagram for units with Desuperheater [HOT 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.



(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

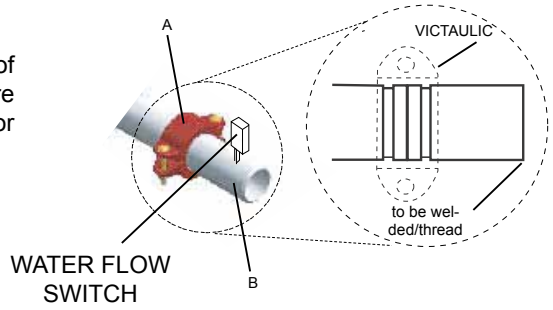
IDRAULIC CONNECTIONS

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.

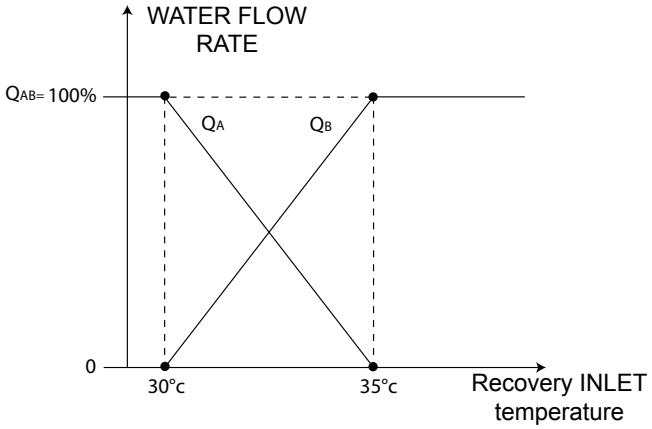
Plumbing connection with Victaulic couplings and Water flow switch

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.



Valve regulating diagram valve

To prevent problems from occurring when the machine 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.

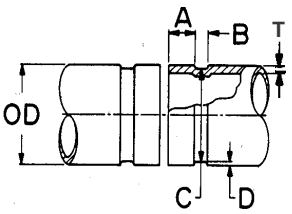


IDRAULIC CONNECTIONS

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

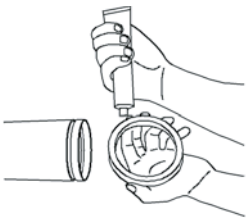
Check the depth and diameter of the grooves and their distance from the pipe ends. Make sure that the work has been carried out with care and that the end surface of the pipes is smooth and not ovalized. Make sure that there are no notches, burrs or other imperfections that could impair the tightness.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



2) Checking the seal and relative lubrication

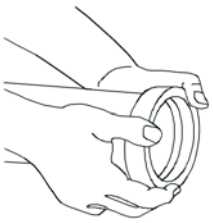
Make sure that the type of seal used is compatible with the nature and temperature of the fluid. Signal green **EPDM** seals are used.

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.



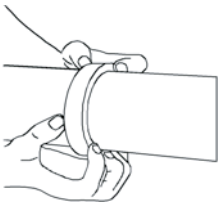
3) How to fit the seal

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



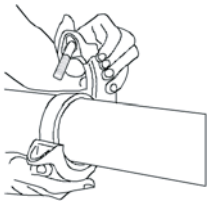
4) Alignment

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.

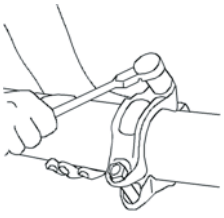


6) Nut torquing

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.



R410A PROTECTION DEVICES

Protection devices HIGH PRESSURE

The unit is protected against risk of overpressure by means of 5 levels protection chain.

Each compressor and so each circuit is equipped with:
1) ATC (Cooling Capacity Control)
2) high pressure transducer connected to electronic controller (if installed)
3) high pressure automatic switch connected to electronic controller
4) high pressure manual switch connected to compressor contactor command and to electronic controller
5) high pressure safety valve

Protection devices technical data

LEVEL	1	2	3	4	5
Device	ATC (Cooling Capacity Control)	High pressure transducer	High pressure automatic switch	High pressure manual switch	High pressure safety valve
Trip out (barg)	-	40.5	41.0	43.0	45.0
Trip in (barg)	-		29.5	31.0	41.0
connected to	electronic controller	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 compressor and the fans	stop the compressor and the fans	stop the compressor	Discharge the refrigerant to atmosphere to reduce the system pressure
reset *	Automatic	YES by keyboard after the solution of the problem that generates the alarm	YES by keyboard if the high pressure switch has trip-in and after the solution of the problem that generates the alarm	Reset the button present on the manual pressure switch	Not necessary

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

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 compressor.	stop the compressor.
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)

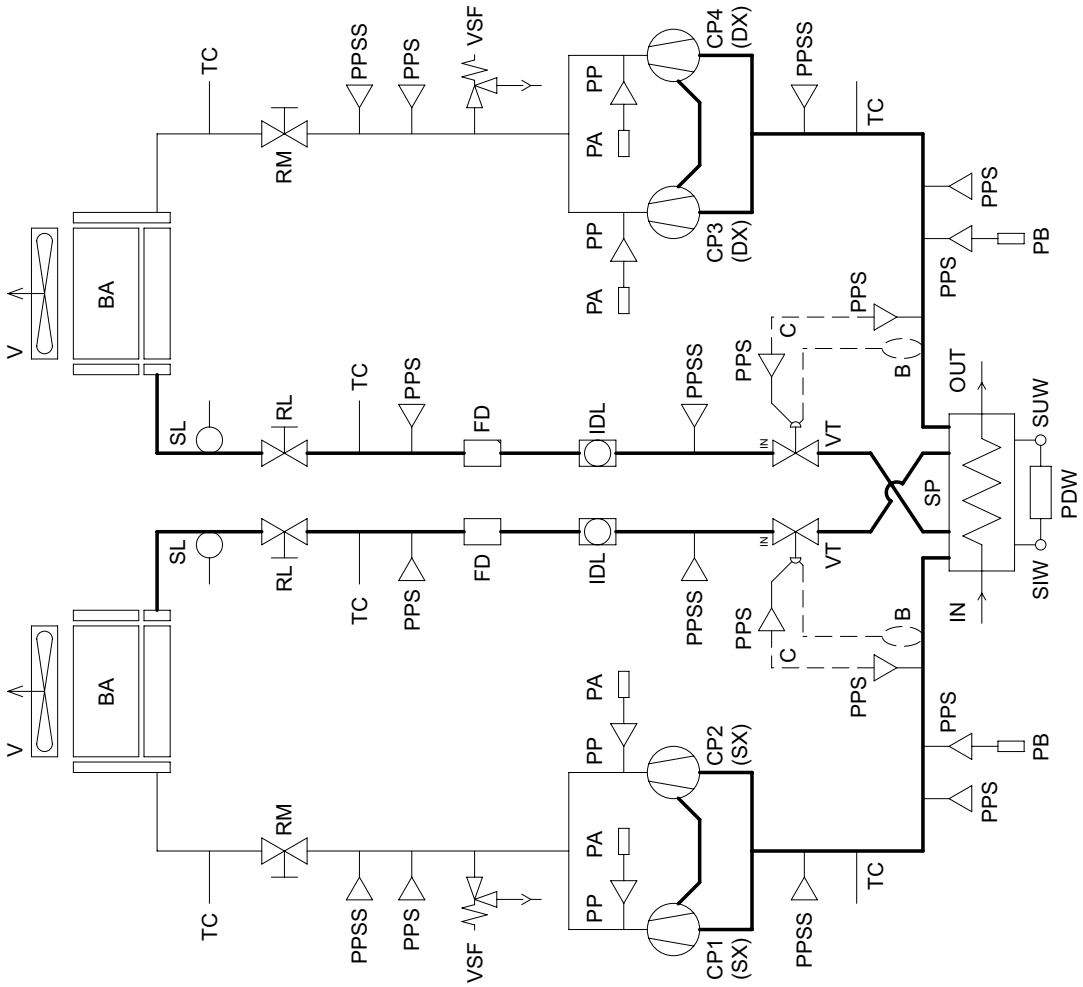
LEVEL	2
Device	Discharge Temperature
Trip out	135°C
Trip in	120°C
connected to	electronic controller
effect	stop the compressor.
reset *	YES by keyboard after the solution of the problem that generates the alarm

REFRIGERANT FLOW DIAGRAM - BASIC VERSION VB

Refrigerant flow diagram in cooling mode IR

	Descrizione	Description
BA	BATTERIA ALETTATA	FIN AND TUBE COIL
CP	COMPRESSORE	COMPRESSOR
FD	FILTRO DEIDRATORE	FILTER DRIER
IDL	INDICATORE LIQUIDO E UMIDITA'	LIQUID AND MOISTURE INDICATOR
PA	PRESSOSTATO DI ALTA	HIGH PRESSURE SWITCH
PB	PRESSOSTATO DI BASSA	LOW PRESSURE SWITCH
PDW	PRESSOSTATO DIFFERENZIALE ACQUA	WATER PRESSURE SWITCH
PP	PRESA DI PRESSIONE 1/4" SAE SENZA SPILLO	PRESSURE SOCKET 1/4" SAE WITOUT CORE
PPS	PRESA DI PRESSIONE 1/4" SAE CON SPILLO	PRESSURE SOCKET 1/4" SAE WITH CORE
PPSS	PRESA DI PRESSIONE 5/16" SAE CON SPILLO	PRESSURE SOCKET 5/16" SAE WITH CORE
RL	RUBINETTO DEL LIQUIDO	LIQUID BALL VALVE
RM	RUBINETTO DI MANDATA	COMPRESSOR OUTLET BALL VALVE
SIW	SONDA INGRESSO ACQUA	WATER INLET PROBE
SL	SONDA DEL LIQUIDO	LIQUID PROBE
SP	SCAMBIATORE A PIASTRE	PLATE HEAT EXCHANGER
SUW	SONDA USCITA ACQUA	WATER OUTLET PROBE
TC	TRONCHETTO DI CARICA	CHARGING TUBE
V	VENTILATORE	FAN
VSF	VALVOLA DI SICUREZZA CIRCUITO FRIGO	SAFETY VALVE
VT	VALVOLA TERMOSTATICA	EXPANSION VALVE

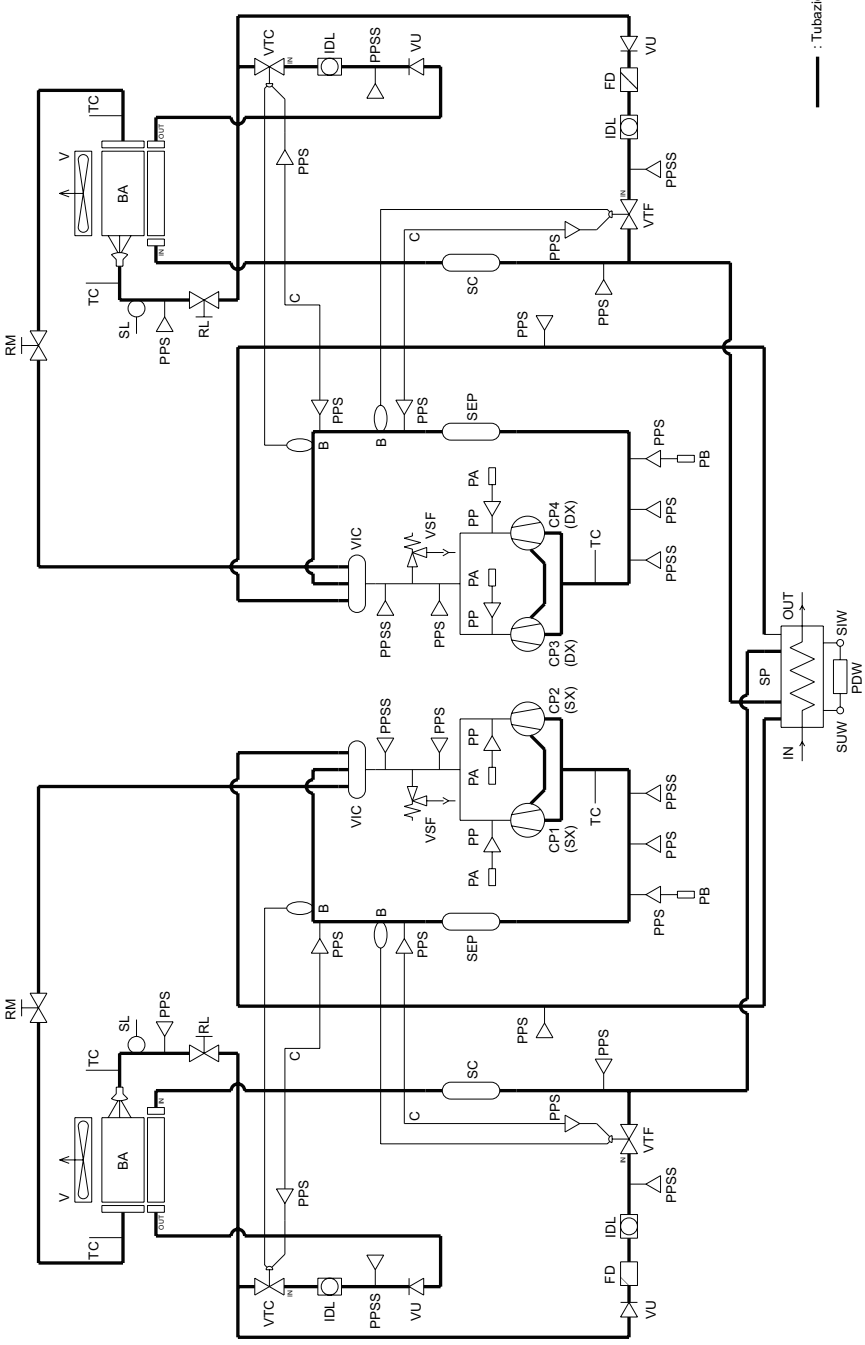
: Tubazioni isolate per le versioni VI



REFRIGERANT FLOW DIAGRAM - BASIC VERSION VB

Refrigerant flow diagram in heating mode IP

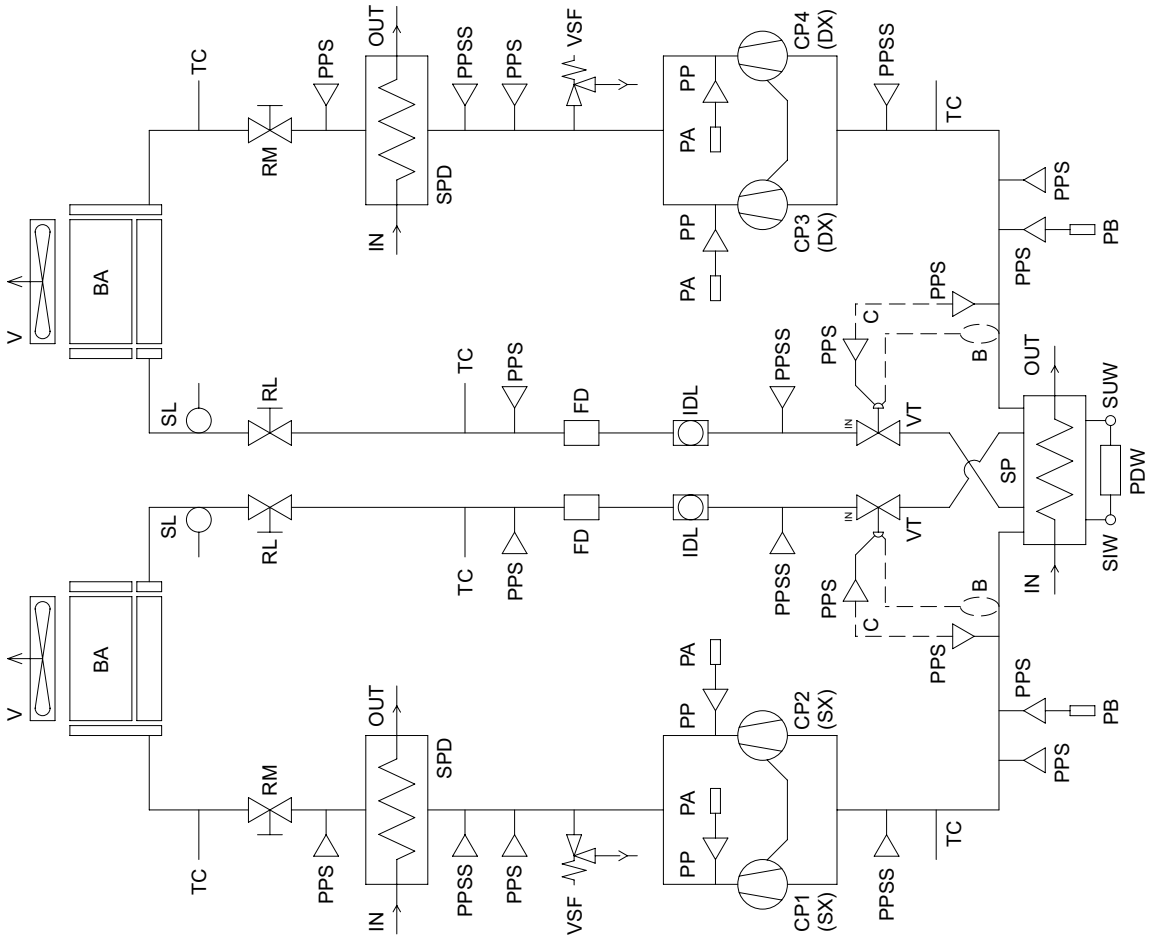
	Descrizione	Description
BA	BATTERIA ALETTATA	FIN AND TUBE COIL
CP	COMPRESSORE	COMPRESSOR
FD	FILTRO DEIDRATORE	FILTER DRIER
IDL	INDICATORE LIQUIDO E UMIDITA'	LIQUID AND MOISTURE INDICATOR
PA	PRESSOSTATO DI ALTA	HIGH PRESSURE SWITCH
PB	PRESSOSTATO DI BASSA	LOW PRESSURE SWITCH
PDW	PRESSOSTATO DIFFERENZIALE ACQUA	WATER PRESSURE SWITCH
PP	PRESA DI PRESSIONE 1/4" SAE SENZA SPILLO	PRESSURE SOCKET 1/4" SAE WITHOUT CORE
PPS	PRESA DI PRESSIONE 1/4" SAE CON SPILLO	PRESSURE SOCKET 1/4" SAE WITH CORE
PPSS	PRESA DI PRESSIONE 5/16" SAE CON SPILLO	PRESSURE SOCKET 5/16" SAE WITH CORE
RL	RUBINETTO DEL LIQUIDO	LIQUID BALL VALVE
RM	RUBINETTO DI MANDATA	COMPRESSOR OUTLET BALL VALVE
SC	RICEVITORE DI LIQUIDO	LIQUID RECEIVER
SEP	SEPARATORE DI LIQUIDO	LIQUID SEPARATOR
SIW	SONDA INGRESSO ACQUA	WATER INLET PROBE
SL	SONDA DEL LIQUIDO	LIQUID PROBE
SP	SCAMBIATORE A PIASTRE	PLATE HEAT EXCHANGER
SUW	SONDA USCITA ACQUA	WATER OUTLET PROBE
TC	TRONCHETTO DI CARICA	CHARGING TUBE
V	VENTILATORE	FAN
VIC	VALVOLA INVERSIONE CICLO	REVERSING CYCLE VALVE
VSF	VALVOLA DI SICUREZZA	SAFETY VALVE
VTC	VALVOLA TERMOSTATICA "RAMO" CALDO	HEAT PUMP EXPANSION VALVE
VTF	VALVOLA TERMOSTATICA "RAMO" FREDDO	COOLING EXPANSION VALVE
VU	VALVOLA UNIDIREZIONALE	CHECK VALVE



REFRIGERANT FLOW DIAGRAM - VERSION WITH DESUPERHEATERS VD

Refrigerant flow diagram in cooling mode IR

	Descrizione	Description
BA	BATTERIA ALETTATA	FIN AND TUBE COIL
CP	COMPRESSORE	COMPRESSOR
FD	FILTRO DEIDRATORE	FILTER DRIER
IDL	INDICATORE LIQUIDO E UMIDITA'	LIQUID AND MOISTURE INDICATOR
PA	PRESSOSTATO DI ALTA	HIGH PRESSURE SWITCH
PB	PRESSOSTATO DI BASSA	LOW PRESSURE SWITCH
PDW	PRESSOSTATO DIFFERENZIALE ACQUA	WATER PRESSURE SWITCH
PP	PRESA DI PRESSIONE 1/4" SAE SENZA SPILLO	PRESSURE SOCKET 1/4" SAE WITOUT CORE
PPS	PRESA DI PRESSIONE 1/4" SAE CON SPILLO	PRESSURE SOCKET 1/4" SAE WITH CORE
PPSS	PRESA DI PRESSIONE 5/16" SAE CON SPILLO	PRESSURE SOCKET 5/16" SAE WITH CORE
RL	RUBINETTO DEL LIQUIDO	LIQUID BALL VALVE
RM	RUBINETTO DI MANDATA	COMPRESSOR OUTLET BALL VALVE
SIW	SONDA INGRESSO ACQUA	WATER INLET PROBE
SL	SONDA DEL LIQUIDO	LIQUID PROBE
SP	SCAMBIATORE A PIASTRE	PLATE HEAT EXCHANGER
SPD	SCAMB. A PIASTRE DESURRISCALDATORE	DESUPERHEATER PLATE HEAT EXCHANGER
SUW	SONDA USCITA ACQUA	WATER OUTLET PROBE
TC	TRONCHETTO DI CARICA	CHARGING TUBE
V	VENTILATORE	FAN
VSF	VALVOLA DI SICUREZZA CIRCUITO FRIGO	SAFETY VALVE
VT	VALVOLA TERMOSTATICA	EXPANSION VALVE

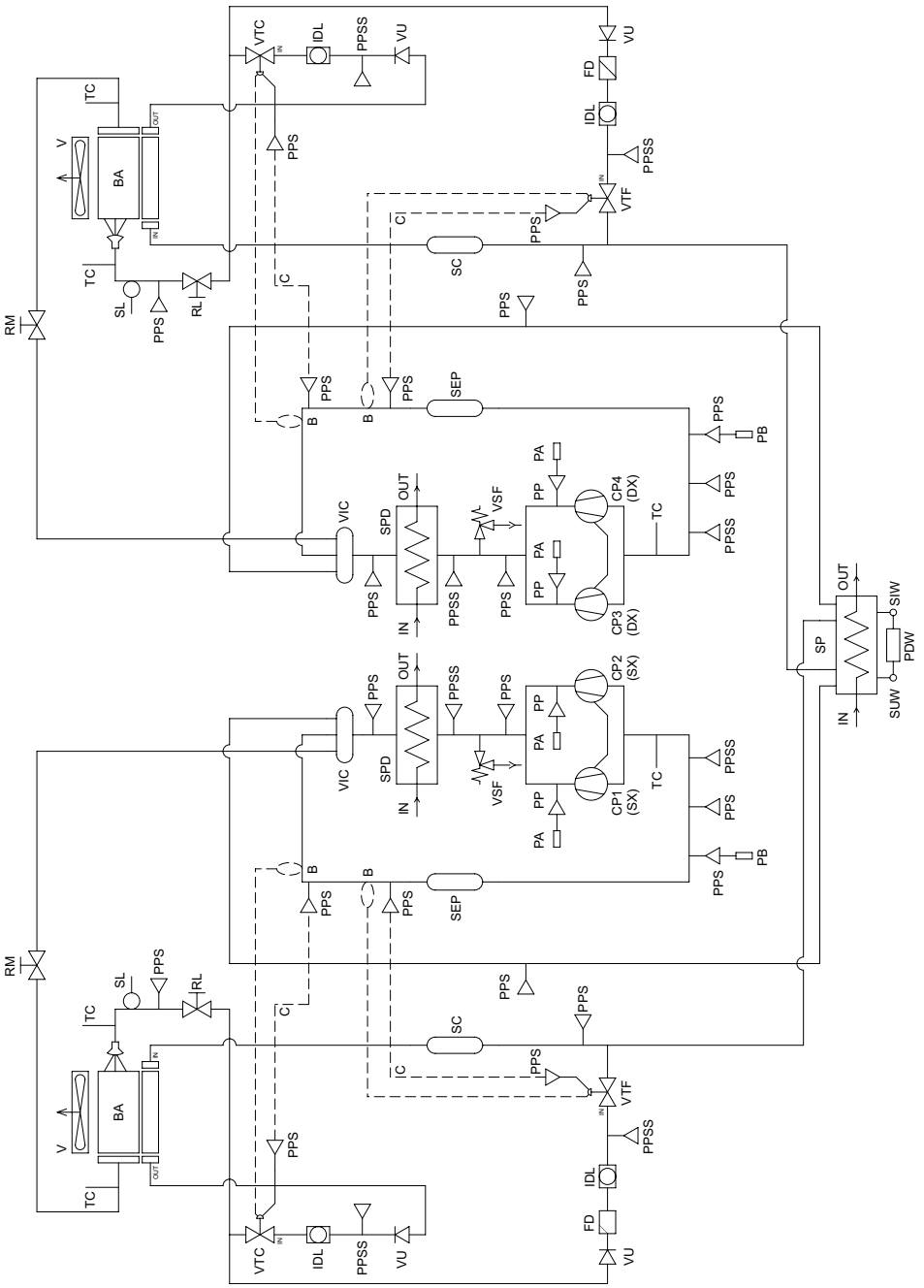


REFRIGERANT FLOW DIAGRAM - VERSION WITH DESUPERHEATERS VD

Refrigerant flow diagram in heating mode IP

	Description
BA	FIN AND TUBE COIL
CP	COMPRESSOR
FD	FILTER DRIER
IDL	LIQUID AND MOISTURE INDICATOR
PA	HIGH PRESSURE SWITCH
PB	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
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

	Descrizione
BA	BATTERIA ALETTATA
CP	COMPRESSORE
FD	FILTRO DEIDRATORE
IDL	INDICATORE LIQUIDO E UMIDITA'
PA	PRESSOSTATO DI ALTA
PB	PRESSOSTATO DI BASSA
PDW	PRESSOSTATO DIFFERENZIALE ACQUA
PP	PRESA DI PRESSIONE 1/4" SAE SENZA SPILLO
PPS	PRESA DI PRESSIONE 1/4" SAE CON SPILLO
PPSS	PRESA DI PRESSIONE 5/16" SAE CON SPILLO
RL	RUBINETTO DEL LIQUIDO
RM	RUBINETTO DI MANDATA
SC	RICEVITORE DI LIQUIDO
SEP	SEPARATORE DI LIQUIDO
SIW	SONDA INGRESSO ACQUA
SL	SONDA DEL LIQUIDO
SP	SCAMBIATORE A PIASTRE
SPD	SCAMB. A PIASTRE DESURRISCALDATORE
SUW	SONDA USCITA ACQUA
TC	TRONCHETTO DI CARICA
V	VENTILATORE
VIC	VALVOLA INVERSIONE CICLO
VSF	VALVOLA DI SICUREZZA
VTC	VALVOLA TERMOSTATICA "RAMO" CALDO
VTF	VALVOLA TERMOSTATICA "RAMO" FREDDO
VU	VALVOLA UNIDIREZIONALE



SETTING AT WORK

General Rules

To validate the contractual warranty, the machine 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. 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.

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.

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	•		

• Visual inspection of the 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 of the unit are well fixed.
Bad fixing gives rise to noise and abnormal vibrations.
• Inspection of 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.
• Inspection of 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.
• 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 jet of compressed air or pressurized water on the aluminium surface of the coils, remembering to direct the jet in a vertical 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. Bad fixing gives rise to noise and abnormal vibrations.
• 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)

General considerations

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

b. Elements of risk

The machine 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 machine, 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.

General recommendations about the R410A refrigerant used

The MSDS format adheres to the standards and regulatory requirements of the United States and may not meet regulatory requirements in other countries.

DuPont Page 1
Material Safety Data Sheet

"SUVA" 410A
6110FR Revised 29-AUG-2001

CHEMICAL PRODUCT/COMPANY IDENTIFICATION

Material Identification

"SUVA" is a registered trademark of DuPont.

Tradenames and Synonyms

"SUVA" 9100

Company Identification

MANUFACTURER/DISTRIBUTOR
DuPont
1007 Market Street
Wilmington, DE 19898

PHONE NUMBERS
Product Information : 1-800-441-9442
Transport Emergency : CHEMTREC: 1-800-424-9300
Medical Emergency : 1-800-441-3637

COMPOSITION/INFORMATION ON INGREDIENTS

Components

Material	CAS Number	%
PENTAFLUOROETHANE (HFC-125)	354-33-6	50
DIFLUOROMETHANE (HFC-32)	75-10-5	50

HAZARDS IDENTIFICATION

Potential Health Effects

Inhalation of high concentrations of vapor is harmful and may cause heart irregularities, unconsciousness, or death. Intentional misuse or deliberate inhalation may cause death without warning. Vapor reduces oxygen available for breathing and is heavier than air. Liquid contact can cause frostbite.

At flame temperatures, this material can decompose to hydrogen fluoride which can be lethal at much lower concentrations.

HUMAN HEALTH EFFECTS:

Overexposure to the vapors by inhalation may include temporary nervous system depression with anesthetic effects

(HAZARDS IDENTIFICATION - Continued)

such as dizziness, headache, confusion, incoordination, and loss of consciousness. Higher exposures to the vapors may cause temporary alteration of the heart's electrical activity with irregular pulse, palpitations, or inadequate circulation. Gross overexposure may be fatal. Skin contact with the liquid may cause frostbite.

Individuals with preexisting diseases of the central nervous or cardiovascular system may have increased susceptibility to the toxicity of increased exposures.

Carcinogenicity Information

None of the components present in this material at concentrations equal to or greater than 0.1% are listed by IARC, NTP, OSHA or ACGIH as a carcinogen.

FIRST AID MEASURES

First Aid

INHALATION

If inhaled, immediately remove to fresh air. Keep person calm. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician.

SKIN CONTACT

Flush area with lukewarm water. Do not use hot water. If frostbite has occurred, call a physician.

EYE CONTACT

In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Call a physician.

INGESTION

Ingestion is not considered a potential route of exposure.

Notes to Physicians

THIS MATERIAL MAY MAKE THE HEART MORE SUSCEPTIBLE TO ARRHYTHMIAS. Catecholamines such as adrenaline, and other compounds having similar effects, should be reserved for emergencies and then used only with special caution.

FIRE FIGHTING MEASURES

Flammable Properties

Flash Point : No flash point

Flammable Limits in Air, % by Volume:
LEL : None per ASTM E681
UEL : None per ASTM E681
Autoignition: Not determined

Fire and Explosion Hazards:

Cylinders may rupture under fire conditions. Decomposition may occur.

Contact of welding or soldering torch flame with high concentrations of refrigerant can result in visible changes in the size and color of torch flames. This flame effect will only occur in concentrations of product well above the recommended exposure limit, therefore stop all work and ventilate to disperse refrigerant vapors from the work area before using any open flames.

R-410A is not flammable in air at temperatures up to 100 deg C (212 deg F) at atmospheric pressure. However, mixtures of R-410A with high concentrations of air at elevated pressure and/or temperature can become combustible in the presence of an ignition source. R-410A can also become combustible in an oxygen enriched environment (oxygen concentrations greater than that in air). Whether a mixture containing R-410A and air, or R-410A in an oxygen enriched atmosphere becomes combustible depends on the inter-relationship of 1) the temperature 2) the pressure, and 3) the proportion of oxygen in the mixture. In general, R-410A should not be allowed to exist with air above atmospheric pressure or at high temperatures; or in an oxygen enriched environment. For example: R-410A should NOT be mixed with air under pressure for leak testing or other purposes.

Extinguishing Media

As appropriate for combustibles in area.

Fire Fighting Instructions

Cool cylinder with water spray or fog. Self-contained breathing apparatus (SCBA) is required if cylinders rupture and contents are released under fire conditions. Water runoff should be contained and neutralized prior to release.

ACCIDENTAL RELEASE MEASURES

Safeguards (Personnel)

NOTE: Review FIRE FIGHTING MEASURES and HANDLING (PERSONNEL) sections before proceeding with clean-up. Use appropriate PERSONAL PROTECTIVE EQUIPMENT during clean-up.

Accidental Release Measures

Ventilate area, especially low or enclosed places where heavy vapors might collect. Extinguish open flames. Use self-contained breathing apparatus (SCBA) for large spills or releases. Eliminate electrical sources.

HANDLING AND STORAGE

Handling (Personnel)

Avoid breathing vapor. Avoid liquid contact with eyes and skin. Use with sufficient ventilation to keep employee exposure below recommended limits. See Fire and Explosion Data section.

Storage

Clean, dry area. Do not heat above 52 deg C (125 deg F).

EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls

Avoid breathing vapors. Avoid contact with skin or eyes. Use with sufficient ventilation to keep employee exposure below the recommended exposure limit. Local exhaust should be used if large amounts are released. Mechanical ventilation should be used in low or enclosed places.

Personal Protective Equipment

Impervious gloves should be used to avoid prolonged or repeated exposure. Chemical splash goggles should be available for use as needed to prevent eye contact. Under normal manufacturing conditions, no respiratory protection is required when using this product provided exposure is maintained at or below occupational limits. Self-contained breathing apparatus (SCBA) is required if a large release occurs.

Exposure Guidelines

Applicable Exposure Limits
PENTAFLUOROETHANE (HFC-125)

PEL	(OSHA)	: None Established
TLV	(ACGIH)	: None Established
AEL *	(DuPont)	: 1000 ppm, 8 & 12 Hr. TWA
WEEL	(AIHA)	: 1000 ppm, 4900 mg/m3, 8 Hr. TWA

DIFLUOROMETHANE (HFC-32)

AEL *	(DuPont)	: 1000 ppm, 8 & 12 Hr. TWA
WEEL	(AIHA)	: 1000 ppm, 8 Hr. TWA

* AEL is DuPont's Acceptable Exposure Limit. Where governmentally imposed occupational exposure limits which are lower than the AEL are in effect, such limits shall take precedence.

PHYSICAL AND CHEMICAL PROPERTIES

Physical Data

Boiling Point	: -60.8 F (-51.6 C) @ 1 atm
Vapor Pressure	: 239.7 psia 25 C (77 F)
% Volatiles	: 100 WT%
Evaporation Rate	: (Cl4 = 1) Greater than 1
Solubility in Water	: Not determined
Odor	: Slight ethereal
Form	: Liquefied gas
Color	: Clear, colorless
Specific Gravity	: 1.066 @ 25 C (77 F)

STABILITY AND REACTIVITY

Chemical Stability

Material is stable. However, avoid open flames and high temperatures.

Incompatibility with Other Materials

Incompatible with active metals, alkali or alkaline earth metals--powdered Al, Zn, Be, etc.

Decomposition

Decomposition products are hazardous. This material can be decomposed by high temperatures (open flames, glowing metal surfaces, etc.) forming hydrofluoric acid and possibly carbonyl fluoride. These materials are toxic and irritating. Contact should be avoided.

Polymerization

Polymerization will not occur.

(STABILITY AND REACTIVITY - Continued)

Other Hazards

Decomposition : Decomposition products are hazardous. This material can be decomposed by high temperatures (open flames, glowing metal surfaces, etc.) forming hydrofluoric acid, and possibly carbonyl halides.

TOXICOLOGICAL INFORMATION

Animal Data

The blend is untested.

HFC-125

Inhalation 4-hour ALC: >709,000 ppm in rats

Single exposure to high doses caused: Lethargy. Labored breathing. Weak cardiac sensitization, a potentially fatal disturbance of heart rhythm caused by a heightened sensitivity to the action of epinephrine.
Lowest-Observed-Adverse-Effect-Level for cardiac sensitization: 100,000 ppm.
Repeated exposure caused: No significant toxicological effects. No-Observed-Adverse-Effect-Level(NOAEL): 50,000 ppm

ADDITIONAL TOXICOLOGICAL EFFECTS:

No animal data are available to define the following effects of this material: carcinogenicity, reproductive toxicity. In animal testing this material has not caused developmental toxicity. Tests have shown that this material does not cause genetic damage in bacterial or mammalian cell cultures, or in animals. This material has not been tested for its ability to cause permanent genetic damage in reproductive cells of mammals (not tested for heritable genetic damage).

HFC-32

Inhalation 4 hour-ALC: > 520,000 ppm in rats

Single exposure caused: Lethargy. Spasms. Loss of mobility in the hind limbs. Other effects include weak cardiac sensitization, a potentially fatal disturbance of heart rhythm caused by a heightened sensitivity to the action of epinephrine. 250,000 ppm.

Repeated exposure caused pathological changes of the lungs, liver, spleen, kidneys. In more recent studies repeated exposure caused: No significant toxicological effects. No-Observed-Effect-Level (NOEL): 49,100 ppm.

(TOXICOLOGICAL INFORMATION - Continued)

No animal data are available to define the following effects of this material: carcinogenicity, reproductive toxicity. Animal data show slight fetotoxicity but only at exposure levels producing other toxic effects in the adult animal. Tests have shown that this material does not cause genetic damage in bacterial or mammalian cell cultures, or in animals. This material has not been tested for its ability to cause permanent genetic damage in reproductive cells of mammals (not tested for heritable genetic damage).

DISPOSAL CONSIDERATIONS

Waste Disposal

Comply with Federal, State, and local regulations. Reclaim by distillation or remove to a permitted waste disposal facility.

TRANSPORTATION INFORMATION

Shipping Information

DOT/IMO/IATA

Proper Shipping Name	: Liquefied Gas, N.O.S. (Pentafluoroethane and Difluoromethane)
Hazard Class	: 2.2
UN No.	: 3163
Label(s)	: Nonflammable Gas

Shipping Containers

Tank Cars.

Cylinders
Ton Tanks

REGULATORY INFORMATION

U.S. Federal Regulations

TSCA Inventory Status : Reported/Included.

TITLE III HAZARD CLASSIFICATIONS SECTIONS 311, 312

Acute	: Yes
Chronic	: Yes
Fire	: No
Reactivity	: No
Pressure	: Yes

(REGULATORY INFORMATION - Continued)

LISTS:

SARA Extremely Hazardous Substance	-No
CERCLA Hazardous Substance	-No
SARA Toxic Chemical	-No

OTHER INFORMATION

NFPA, NPCA-HMIS

NPCA-HMIS Rating

Health	: 1
Flammability	: 0
Reactivity	: 1

Personal Protection rating to be supplied by user depending on use conditions.

The data in this Material Safety Data Sheet relates only to the specific material designated herein and does not relate to use in combination with any other material or in any process.

Responsibility for MSDS	: MSDS Coordinator
>	: DuPont Fluoroproducts
Address	: Wilmington, DE 19898
Telephone	: (800) 441-7515

# Indicates updated section.

This information is based upon technical information believed to be reliable. It is subject to revision as additional knowledge and experience is gained.

End of MSDS

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

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Codice 3QE27130

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