AERMEC
air conditioning

English

NRL R410A

TECHNICAL MANUAL FOR INSTALLATION AND MAINTENANCE

Chillers, heat pumps with scroll compressors

A	HIGH EFFICIENCY
E	HIGH EFFICIENCY LOW NOISE OPERATION
HA	HIGH EFFICIENCY HEAT PUMP
HE	HIGH EFFICIENCY LOW NOISE HEAT PUMP

CE

EUROVENT CERTIFIED PERFORMANCE

AERMEC
COMPANY QUALITY SYSTEM
ICIM
ISO 9001:2000 - Cert. n° 0128/5
CISQ IQNet CERTIFIED QUALITY SYSTEM
AERMEC S.P.A.

❄ 195 kW - 469 kW

✻ 165 kW - 472 kW

INRLPY.0110.4086906_03

Dear customer,
thank you for choosing an AERMEC product.It is the fruit of many years of experience and special design studies and has been made of the highest grade materials and with cutting edge technology.
In addition, all our products bear the EC mark indicating that they meet the requirements of the European Machine Directive regarding safety. The quality level is being constantly monitored, so AERMEC products are synonymous with Safety, Quality and Reliability.

The data may undergo modifications considered necessary for the improvement of the product, at any time and without the obligation for any notice thereof.

Thank you once again.
AERMEC S.p.A

CONTENTS

To install the unit, please observe the safety warnings included in these instructions


Danger: moving parts


Danger: cut off power supply


Danger: high temperature


General danger


Danger: power supply


Useful information and warnings

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NRL

SERIAL NUMBER	

CONFORMITY DECLARATION We, the undersigned, declare on our own exclusive responsibility that the object in question, so defined:

NAME **NRL**

TYPE **AIR - WATER CHILLER/HEAT PUMP**

MODEL

and to which this declaration refers, complies with the following standardised regulations:

CEI EN 60335-2-40	Safety regulation regarding electric heat pumps, air conditioners and dehumidifiers
CEI EN 61000-6-1 **CEI EN 61000-6-3**	Electromagnetic immunity and emission in residential environment
CEI EN 61000-6-2 **CEI EN 61000-6-4**	Electromagnetic immunity and emission in industrial environment
EN378	Refrigerating system and heat pumps - Safety and environmental requirements
UNI EN 12735	Round welding-free copper pipes for air conditioning and cooling
UNI EN 14276	Pressure equipment for refrigerating systems and heat pumps

thus meeting the essential requisites of the following directives:

- LV Directive: 2006/95/EC
- Electromagnetic Compatibility Directive 2004/108/EC
- Machine Directive 2006/42/EC
- PED Directive relating to pressure equipment 97/23/EC

In compliance with Directive 97/23/EC, the product meets the Full quality assurance procedure (module H) with certificate no. 06/270-QT3664 Rev.3 issued by the notified body no. 1131 CEC via Pisacane 46 Legnano (MI) - Italy

Bevilacqua 28/12/2009

Marketing Director
Signature

1. WARNINGS ON THE DOCUMENTATION

1.1. INTENDED USE

AERMEC devices are built according to the recognised technical standards and safety regulations. These units have been designed and built for heating and cooling, and the production of hot domestic water; they must be used for these purposes, in accordance with their performance characteristics. There may still arise risks for the safety of the user or third parties, or even damage to the units and other objects, in case of improper use.
Any use not specifically indicated in this manual is forbidden and **AERMEC cannot therefore be held responsible for any damage whatsoever resulting from the failure to observe these instructions.**

1.2. CONSERVING THE DOCUMENTATION

Deliver the following installation instructions with all the complementary documentation to the user of the unit, who shall be responsible for keeping the instructions so that they are always available when needed.
READ THIS DOCUMENT CAREFULLY. The unit must be installed by qualified skilled personnel, in compliance with the national legislation in force in the country of destination. (M.D. 329/2004).
The unit must be installed in such a way as to make all maintenance and/or repair operations possible. The warranty of the device does not in any case cover costs incurred as a result of motorised ladders, scaffolding or any other lifting systems made necessary to carry out the operations under warranty.

The warranty shall not be valid if the indications mentioned above are not observed.

2. ESSENTIAL SAFETY RULES

Remember that the use of products employing electricity and water requires the observance of some essential safety rules:

- The use of this unit is not intended for people (including children) with any physical or mental disability or any sensory impairment nor for people lacking experience and knowledge, unless they are supervised or instructed on the use of the unit by a person responsible for their safety. Children should be supervised in order to make sure that they do not play with the unit.
- It is forbidden to carry out any technical or maintenance operation before disconnecting the unit from the mains by positioning the system and control panel main switches at "off".
- It is forbidden to modify safety or regulation devices without the manufacturer's authorisation and indications.
- It is forbidden to pull, disconnect or twist the electrical cables of the unit, even if it has been disconnected from the mains.
- It is forbidden to leave containers and flammable substances near the unit.
- It is forbidden to touch the unit with wet parts of the body and bare feet.
- It is forbidden to open the access doors to the unit internal parts, without having first turned off the system main switch.
- It is forbidden to spread, leave or keep the packaging material within the reach of children as it may be a possible source of danger.

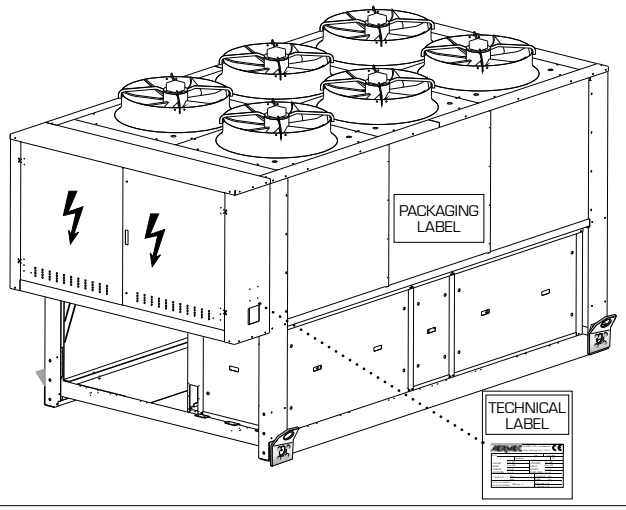
3. PRODUCT IDENTIFICATION

NRL is identifiable by:

– **the packaging label**
showing the product identification data

– **the technical label**
located on the electronic box side sill

NB
If the identification plate is tampered with, or removed, this prevents the certain identification of the product, making all installation and maintenance operations more difficult.



4. DESCRIPTION OF THE UNIT

- The devices of the **NRL** range are units used to produce cold water for technological systems; the heat pump models also allow you to produce hot water for heating. They consist of two chiller circuits using R410A, and a single hydraulic circuit which may or may not be fitted with a water accumulator and/or a pumping unit. The presence of more than one scroll type compressor allows the **NRL** chillers various capacity controls of the cooling capacity. By means of a microprocessor, the electronic regulation controls and manages all the components and working parameters of the unit; an internal memory registers the working conditions in the moment when an alarm condition arises, in order to visualise it on the display. The units have a protection class of **IP 24**.

4.1. AVAILABLE MODELS

- **"COOLING ONLY" (A - E)** maximum outside temperature allowed **46°C**;
- processed water temperature **18°C ;**
- **"HEAT PUMP" (HA - HE)** in cooling mode, the operating limits arrive at a maximum external air temperature of **46°C**; processed water temperature **18°C**; in heating mode, the operating limits arrive at a maximum external air temperature of **42°C**; processed water temperature 55°C;
- NRLH do not offer the following configurations:
- YH (with processed water lower than 4°C)
- HC (condensing heat pump)

4.2. VERSIONS AVAILABLE

- **HEAT RECOVERY UNITS**
- with **desuperheater** inserted as standard **(D)**

- **WARNING:**
  in the heat pump versions, the desuperheater must be intercepted during heat pump operation: otherwise, the guarantee will no longer be considered valid.

- **Total heat recovery (T)**
  With plate heat exchanger inserted in parallel with the coils

- **Both versions (D - T) use:**
- a hot gas bypass device upstream from the evaporator
- Water filter before the recovery heat exchanger:

- (only for 750 size in all versions)

The units with desuperheater (D) or total recovery (T) are not available in the versions:
- YD
- YT
- XD "only for temperatures lower than 4°C".
- XT "only for temperatures lower than 4°C".

The NRL-C condensing units are not available in the versions:
- HC (condensing heat pump)
- TC (condensing units with total recovery)
- DC (condensing units with desuperheater)

- **Mechanical thermostatic valve (Y):**
- version Y: this is the version that allows you to produce chilled water below the standard value of +4°C, to a minimum of -6°C. For lower values, contact the company headquarters.

4.3. CONFIGURATOR

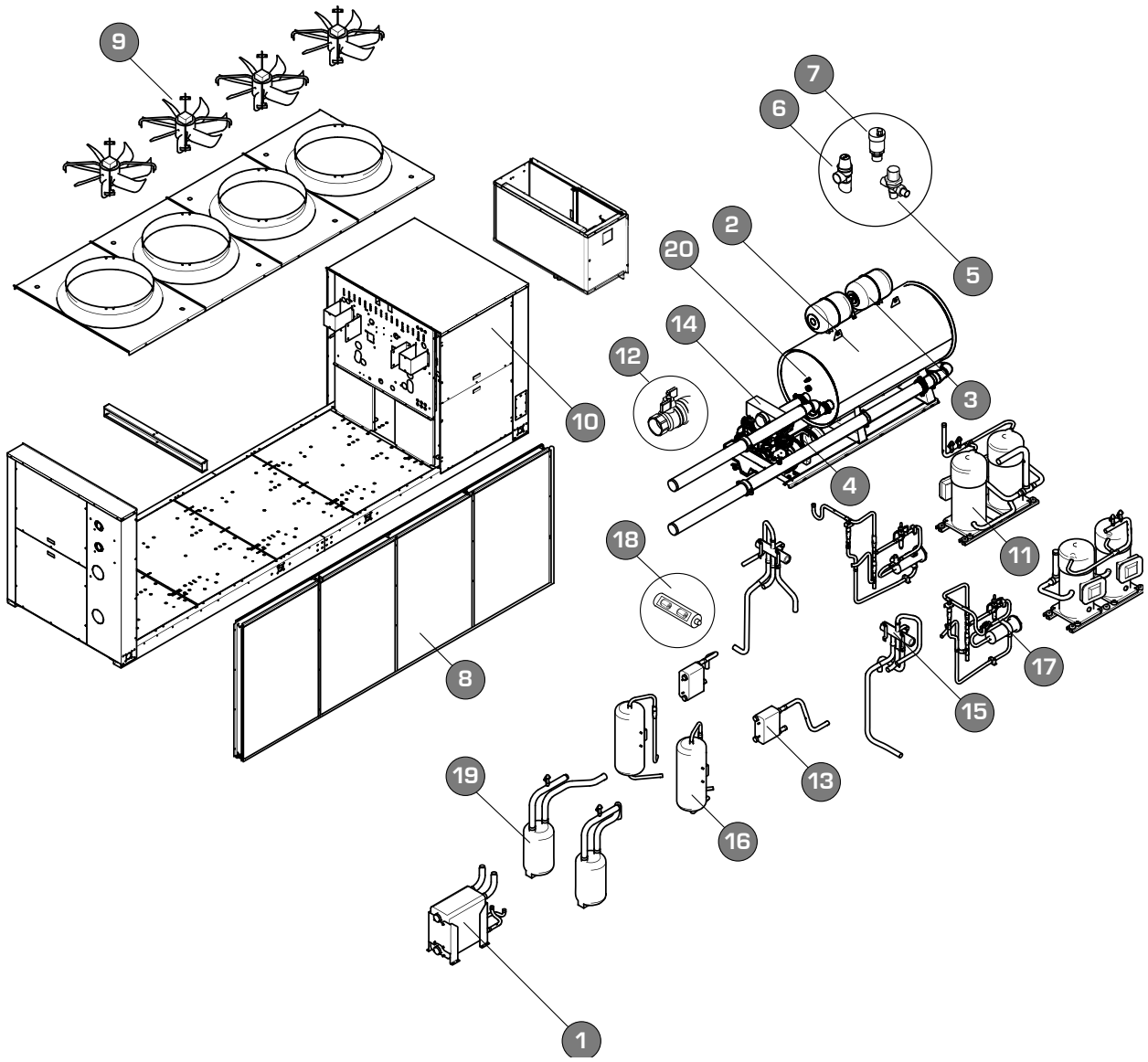
1,2,3	4,5,6	7	8	9	10	11	12	13	14	15, 16
NRL	075	0	°	°	°	A	°	°	°	00

Field	Code	
1, 2, 3	NRL	
4, 5, 6	Size	075, 080, 090, 100, 125, 140, 150, 165, 180
7	Compressor	
	0	Standard compressor
8	Thermostatic valve	
	°	Standard mechanical thermostatic valve (to +4°C)
	Y	Low water temperature mechanical thermostatic valve (to -6°C)
	X	Electronic thermostatic valve also for low water temperature (to -6°C)
9	Model	
	°	Cooling only
	C	Condensing system
	H	Heat pump
10	Heat recovery	
	°	Without recovery units
	D	Desuperheater
	T	Total recovery
11	Version	
	A	High efficiency
	E	High efficiency, low noise operation
12	Coils	
	°	Made of aluminium
	R	Made of copper
	S	Tinned copper
	V	Varnished
13	Fans	
	°	Standard
	M	Enlarged
	J	Inverter
14	Power supply	
	°	400V-3N-50Hz with thermomagnetic switches
	1	230V-3-50Hz with thermomagnetic switches
	2	500V-3-50Hz with thermomagnetic switches
15, 16	Accumulation	
	00	Without hydronic water accumulator
	01	Low-head water accumulator and single pump
	02	Low-head water accumulator and reserve pump
	03	High-head water accumulator and single pump
	04	High-head water accumulator and reserve pump
	05	Water accumulator with holes for supplementary electric heater, low head and single pump
	06	Water accumulator with holes for supplementary electric heater, low head and reserve pump
	07	Water accumulator with holes for supplementary electric heater, high head and single pump
	08	Water accumulator with holes for supplementary electric heater, high head and reserve pump
	09	Double hydraulic ring
	10	Double hydraulic ring with supplementary electric heater
	P1	Without water accumulator, with low-head pump
	P2	Without water accumulator, with low-head pump and reserve pump
	P3	Without water accumulator, with high-head pump
	P4	Without water accumulator, with high-head pump and reserve pump

WARNING
With size 075, it is not possible to configure a 230V or 500V power supply.
With sizes 080 - 090 - 100 - 125 - 140 - 150 - 165 - 180, it is not possible to configure a 230V power supply.
NB For the heat pump versions, M fans are not available, only ° and J.

5. DESCRIPTION OF COMPONENTS

5.1. NRL 0750 - 1250 HIGH EFFICIENCY

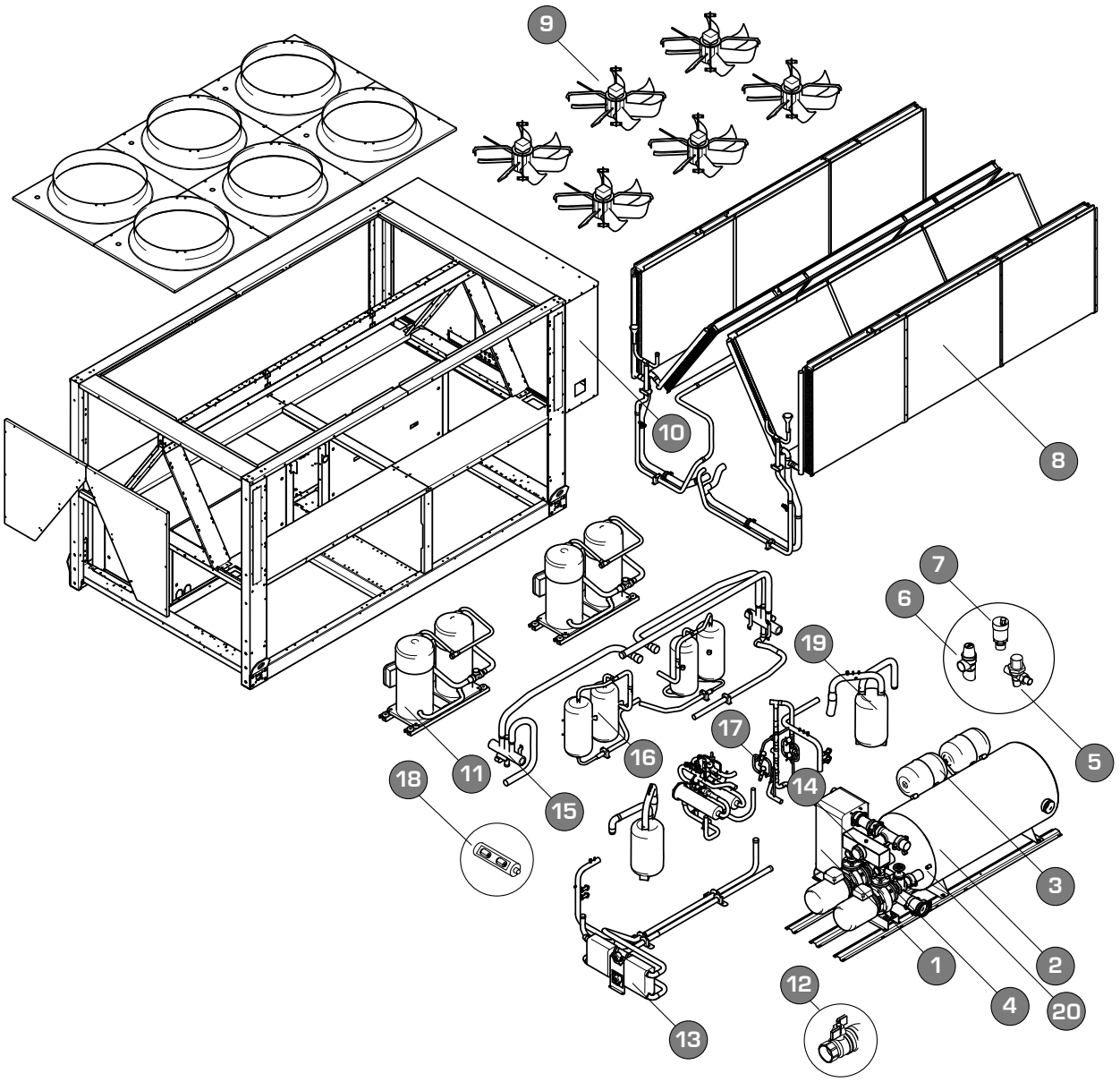


NB
The drawings shown here only represent an example of the machine.

KEY

1	Plate heat exchanger	11	Compressors
2	Accumulation	12	Accumulation discharge
3	Expansion tank	13	Desuperheater
4	Pumps	14	Filter assembled
5	Charging unit	15	Reverse cycle valve
6	Safety valve	16	Liquid accumulation
7	Drain valve	17	Thermostatic valves
8	Battery	18	Filter-drier
9	Fans	19	Liquid separator
10	Electrical panel	20	Electric heater

5.2. NRL 1400 - 1800 HIGH EFFICIENCY



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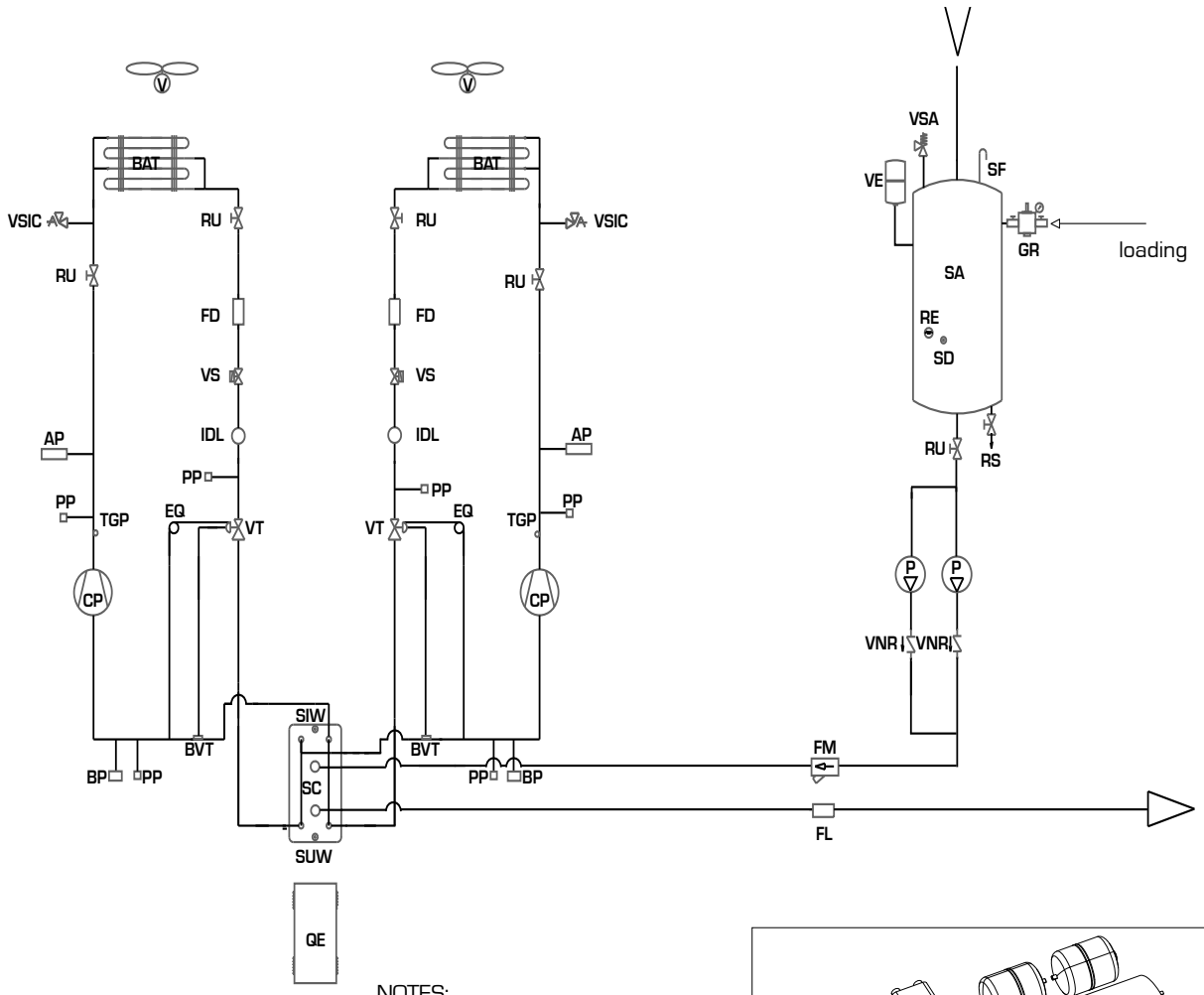
8	Battery	18	Filter-drier
9	Fans	19	Liquid separator
10	Electrical panel	20	Electric heater

5.3. CHILLER CIRCUITS, HYDRAULIC (A - E)



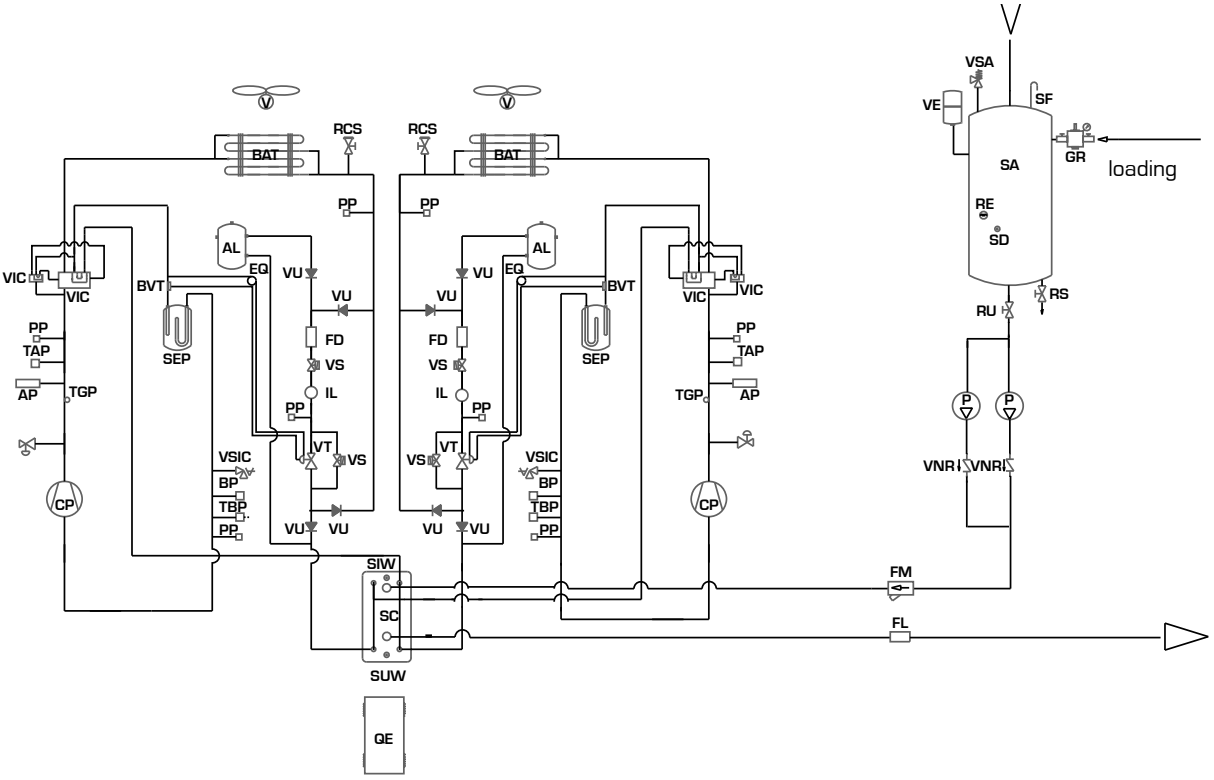
NOTES:
In all sizes (except for 750 size) selected with the additional heater the water flow goes in the opposite direction compared to the standard version.
Consequently. the tank is positioned underneath the heat exchanger

V	Fan
BAT	Battery
VSIC	Safety valve
RU	Tap
FD	Filter-drier
VS	Solenoid valve
IDL	Liquid indicator
AP	High pressure switch
PP	Pressure test point
EQ	Equaliser
TGP	Discharge gas thermostat

VT	thermostatic valve
CP	Compressor
BVT	Temperature valve bulb
BP	Low pressure switch
SIW	Water inlet temperature sensor
SC	Heat exchanger
SUW	Water outlet temperature sensor
QE	Electrical panel
FL	Flow switch

VSA	Water safety valve
VE	Expansion tank
SF	Vent
GR	Filling unit
SA	Water tank
RE	300W electric heater
SD	Anti-freeze sensor
RS	Discharge tap
P	Accumulation
VNR	Non-return valve
FM	Water filter

5.4. CHILLER CIRCUITS, HYDRAULIC (HA - HE)



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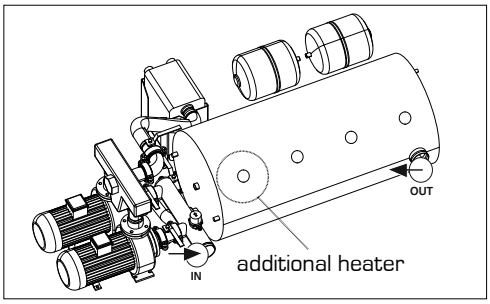
Consequently. the tank is positioned underneath the heat exchanger



V	Fan
BAT	Battery
RCS	Filling/discharge tap
VIC	Reverse cycle valve
PP	Pressure test point
TAP	High pressure transducer
AP	High pressure switch
TGP	Discharge gas thermostat
VSA	Water safety valve
CP	Compressor
BVT	Temperature valve bulb
SEP	Liquid separator

VSIC	Safety valve
BP	Low pressure switch
TBP	Low pressure transducer
AL	Liquid accumulator
EQ	Equaliser
VU	Non-return valve
SIW	Water inlet temperature sensor
SC	Heat exchanger
SUW	Water outlet temperature sensor
QE	Electrical panel
VE	Expansion tank
VSA	Water safety valve
SF	Vent

GR	Filling unit
SA	Water tank
RE	300W electric heater
SD	Anti-freeze sensor
RS	Discharge tap
RU	Tap
P	Accumulation
VNR	Non-return valve
FM	Water filter
FL	Flow switch

5.5. CHILLER CIRCUIT

Compressors
High efficiency scroll-type hermetic compressors (assembled on elastic anti-vibration supports), driven by a 2-pole electric motor with internal thermal protection of the electric heater casing included as standard. The heater is automatically powered when the unit stops, provided that the unit is kept under tension.

Air side heat exchanger
High efficiency device made of copper pipes and aluminium blades locked into place via mechanical pipe expansion.

Water side heat exchanger
Of the plate type (AISI 316), externally insulated with closed cell material to reduce thermal dispersion. Fitted, as standard, with anti-freeze heater.

Liquid separator (only for heat pump)
Located on the suction point of the compressor, to protect against any flowback of liquid refrigerant, flooded start-ups, operation in the presence of liquid.

Liquid accumulation
(only for heat pumps and total recovery)
To compensate the difference in volume between the finned coil and the plate heat exchanger, holding back excess liquid.

Filter drier
Of the mechanical type with cartridges, made of ceramics and hygroscopic material able to trap impurities and any traces of humidity in the chiller circuit.

Sight glass
For checking the refrigerating gas load and any humidity in the refrigerating circuit.

Thermostatic valve
The mechanical type valve, with outside equaliser on the evaporator outlet, modulates the gas flow to the evaporator on the basis of the thermal load, in such a way as to ensure the proper degree of overheating of the intake gas.

Electronic valve (optional)

Liquid and discharge taps
(cooling-only versions)
They allow the refrigerant to be cut off during extraordinary maintenance.

Solenoid valve
The valve closes when the compressor turns off, preventing the flow of refrigerant gas towards the evaporator.

Bypass solenoid valve
(only for heat pumps)
To bypass the thermostat-controlled valve during the defrosting cycle.

Reverse cycle valve (only for heat pumps)
Inverts the flow of refrigerant when operation is switched between summer/winter, and during defrosting cycles.

Non-return valve
Allows the refrigerant to flow in one direction only (heat pump or total recovery).

Desuperheater (only upon request)
Of the plate type (AISI 316), externally insulated with closed cell material to reduce thermal dispersion.

Total recovery (only upon request)
Of the plate type (AISI 316), externally insulated with closed cell material to reduce thermal dispersion.

5.6. FRAME AND FANS

Fan unit
Screw type, statically and dynamically balanced. The electric fans are protected electrically with thermomagnetic switches and mechanically with metal anti-intrusion grilles, in accordance with the standard CEI EN 60335-2-40.

Enlarged fans (M)
These offer a useful head to overcome the pressure drops in the aeraulic system.

Inverter fans (J)

Load-bearing structure
Made of hot-galvanised steel sheet of a suitable thickness, varnished with polyester powders able to resist atmospheric agents over time.

5.7. HYDRAULIC COMPONENTS

Circulation pump
Depending on the characteristics of the pump chosen, it offers a useful head to overcome the pressure drops in the system.
There is also the possibility to have a reserve pump. The reserve pump is managed by the electronic card.

Flow switch (assembled in versions with water accumulator or pump).

Water filter (assembled in the version with water accumulator or pump; supplied with the other versions).
Allows you to block and eliminate any impurities in the hydraulic circuits. Inside, it has a filtering mesh with holes not greater than one millimetre. It is essential in order to avoid serious damage to the plate heat exchanger.

Accumulation tank
In stainless steel, with a 700-litre capacity. In order to reduce the thermal dispersion and eliminate the phenomenon of the formation of condensation, it is insulated with polyurethane material of a suitable thickness.
Two anti-freeze electric heaters of 300W (down to -20°C outside temperature and tank water temperature 5°C) assembled as standard and commanded from the card via an anti-freeze sensor inserted in the tank.

Drain valve
(versions with water accumulator or pump)
Of the automatic type, assembled on the upper part of the hydraulic system; it releases any air bubbles that may be present in the system.

Charging unit
(versions with water accumulator or pump)
This has a pressure gauge showing the pressure in the system.

Expansion tank
(versions with water accumulator or pump)
Of the membrane type, with nitrogen pre-charge.

Hydraulic circuit safety valve
(versions with water accumulator or pump)
Calibrated to 6 bar and with ductable discharge, it releases overpressure in the event of abnormal working pressure levels.

5.8. SAFETY AND CONTROL COMPONENTS

Low pressure switch (BP)
- Cooling only (A - E)
Of fixed calibration, located on the low pressure side of the refrigerating circuit, it stops the operation of the compressor in the event of anomalous work pressures.

High pressure switch (AP)
- Cooling only (A - E)
- Heat pump (HA - HE)
With fixed calibration, placed on the high pressure side of the chiller circuit, it shuts down compressor operation in the case of abnormal operating pressure.

Low pressure transducers (TP2)
- Cooling only (A - E) "accessory"
- Heat pump (HA - HE) "standard"
Placed on the high pressure side of the chiller circuit, it communicates to the control card the operating pressure, sending a pre-alarm in case of abnormal pressure.

High pressure transducer (TP3)
- Cooling only (A - E) "standard"
- Heat pump (HA - HE) "standard"
Placed on the high pressure side of the chiller circuit, it communicates to the control card the operating pressure, sending a pre-alarm in case of abnormal pressure.

Anti-freeze heater
(installed as standard)
Its operation is commanded by the anti-freeze probe located in the plate evaporator. It is activated when the water temperature is +3°C, and deactivated when the water temperature is +5°C. The dedicated software in the regulation card manages the heater.

Refrigerating circuit safety valve
This intervenes by releasing overpressure in the event of abnormal working pressure levels.
- Calibrated at 45 bar on the HP branch
- Calibrated at 30 bar on the BP branch (only for heat pumps)

5.9. ELECTRICAL COMPONENTS

Electrical panel

Contains the power section and the management of the controls and safety devices.
In accordance with standards:
CEI EN 61000-6-1
CEI EN 61000-6-3 (immunity and electromagnetic emissions for the residential sector).
CEI EN 61000-6-2
CEI EN 61000-6-4 (immunity and electromagnetic emissions for the industrial sector).
and Directives EMC 89/336/EEC and 92/31/EEC concerning electromagnetic compatibility, Low Voltage Directive LVD 2006/95/EC.

Door-block disconnecting switch

IT is possible to access the electrical panel by disconnecting the voltage, then using the opening lever of the panel itself. This lever can be blocked with one or more padlocks during maintenance, in order to prevent the machine being powered up accidentally.

Control keypad

Provides full control functions. For a detailed description of the keypad refer to the user manual.

Remote control panel

This allows the chiller command operations to be given from a distance.

compressor protection thermomagnetic switch;
fan protection thermomagnetic switch;
auxiliary protection thermomagnetic switch;
discharge gas temperature control thermostat.

ELECTRONIC REGULATION

Microprocessor card

Consisting of a management/control card and a visualisation card.

- **Functions carried out:**
  - adjustment of water temperature at evaporator inlet, with thermostat control for up to 4 levels and integral-proportional fan speed control (with DCPX accessory);
  - compressor start-up delay;
  - compressor sequence rotation;
  - count of compressor work hours;
  - start/stop;
  - reset;
  - permanent alarms memory;
  - autostart after voltage drop;
  - multi-lingual messages;
  - operation with local or remote control.

- **Machine status display:**
  - ON/OFF compressors;
  - alarms summary.

- **Alarm management:**
  - high pressure;
  - flow switch;
  - low pressure;
  - anti-freeze;
  - compressor overload;
  - fan overload;
  - pump overload.

- **Display of the following parameters:**
  - water inlet temperature;
  - accumulation temperature;
  - water outlet temperature;
  - delta T;
  - high pressure;
  - low pressure;
  - waiting time for restart;
  - alarms visualisation.

- **Settings:**
  a) without password:
  cooling set;
  total differential.
  b) with password:
  anti-freeze set;
  low pressure exclusion time;
  display language;
  access code.

For further information, refer to the user manual.

6. ACCESSORIES

	0750	0800	0900	1000	1250	1400	1500	1650	1800
AER485		Through this accessory it is possible to connect the unit with BMS supervision systems with electrical standard RS 485 and MODBUS type protocol.							
A	•	•	•	•	•	•	•	•	•
E	•	•	•	•	•	•	•	•	•
HA	•	•	•	•	•	•	•	•	•
HE	•	•	•	•	•	•	•	•	•
VT (00-P1-P2-P3-P4)		Rubber anti-vibration support. Select the model using the compatibility table.							
A	23	-	-	-	-	-	-	-	-
E									
HA	23	-	-	-	-	-	-	-	-
HE									
VT (01-02-03-04-05-06-07-08)		Rubber anti-vibration support. Select the model using the compatibility table.							
A	23	-	-	-	-	-	-	-	-
E									
HA	23	-	-	-	-	-	-	-	-
HE									
AVX (00)		Sprung anti-vibration supports. Select the model using the compatibility table.							
A	-	704	710	716	719	725	730	734	737
E									
HA	-	704	710	716	719	725	730	734	737
HE									
AVX (01-02-03-04)		Sprung anti-vibration supports. Select the model using the compatibility table.							
A	-	705	711	711	720	726	731	735	738
E									
HA	-	705	711	711	720	726	731	735	738
HE									
AVX (P1-P2-P3-P4)		Sprung anti-vibration supports. Select the model using the compatibility table.							
A	-	706	712	712	721	727	732	736	736
E									
HA	-	706	712	712	721	727	732	736	736
HE									
GP		Protect the external coils from accidental knocks.							
A	10 (x3)	260	260	260	350	350	350	500	500
E									
HA	10 (x3)	260	260	260	350	350	350	500	500
HE									

	0750	0800	0900	1000	1250	1400	1500	1650	1800
PGS	Card to be inserted in the electronic card of the unit. Allows you to programme two time bands per day (two switch on/off cycles) and to have differentiated programming for each day of the week.								
A	•	•	•	•	•	•	•	•	•
E	•	•	•	•	•	•	•	•	•
HA	•	•	•	•	•	•	•	•	•
HE	•	•	•	•	•	•	•	•	•
AERWEB30	AERWEB30: the AERWEB device allows the remote control of a chiller from a common PC, using a serial connection. Using additional modules, the device allows the chiller to be controlled via the telephone line, using the AERMODEM accessory, or via the GSM network, using the AERMODEM GSM accessory. AERWEB can pilot up to 9 chillers, but each of these must be equipped with accessory AER485 or AER485P2.								
A	•	•	•	•	•	•	•	•	•
E	•	•	•	•	•	•	•	•	•
HA	•	•	•	•	•	•	•	•	•
HE	•	•	•	•	•	•	•	•	•
TP2	It makes it possible to show the value of the compressor's intake pressure (one per circuit) on the microprocessor card display. Placed on the low pressure side of the refrigerating circuit, it shuts down compressor operation in the case of abnormal operating pressure.								
A	(X2)	(X2)	(X2)	(X2)	(X2)	(X2)	(X2)	(X2)	(X2)
E									
HA	standard								
HE									
REF	Current rephaser. Parallel connection with the motor makes the reduction of input current possible. It can only be installed when the machine is being made and must therefore be specified when the order is placed.								
A	53	88	90	92	92	93	94	94	94
E									
HA	53	88	90	92	92	93	94	94	94
HE									
DRE	It permits the reduction of the starting current needed by the machine in the start up phase. This accessory can only be applied in the factory.								
A	751	801	901	1001	1251	1401	1501	1651	1801
E									
HA	751	801	901	1001	1251	1401	1501	1651	1801
HE									
DCPX	This accessory allows correct operation with outside temperatures below 10°C and down to -10°C. It is made up of an electronic regulation card that varies the fan rpm on the basis of the condensation pressure (read by the high pressure transducer), to keep it sufficiently high for the proper functioning of the unit. It also allows correct heating operation with outside temperatures greater than 30°C and up to 42°C.								
A	64	66	66	66	67	67	67	68	68
E	standard								
HA	65	66	66	66	68	68	68	68	68
HE	standard								
DCPX M	DCPX only for configurations with enlarged fans (M).								
A	65	66	66	66	68	68	68	68	68
E	standard								
DUALCHILLER	Simplified control system to switch on and off, and command, two chillers (using Aermec GR3 command) in a single system, as if they were a single unit.								
A	•	•	•	•	•	•	•	•	•
E	•	•	•	•	•	•	•	•	•
HA	•	•	•	•	•	•	•	•	•
HE	•	•	•	•	•	•	•	•	•
MULTICHILLER	Control system to switch the individual chillers on and off, and command them, in a system in which several units are installed in parallel, always ensuring a constant delivery to the evaporators.								
A	•	•	•	•	•	•	•	•	•
E	•	•	•	•	•	•	•	•	•
HA	•	•	•	•	•	•	•	•	•
HE	•	•	•	•	•	•	•	•	•
TRX1	The water accumulators with holes and supplementary electric heaters leave the factory with plastic protection caps. Before loading the system, if the installation of an electric heater is not envisaged it is compulsory to replace the plastic caps with the special TRX1.								
A	•	•	•	•	•	•	•	•	•
E	•	•	•	•	•	•	•	•	•
HA	•	•	•	•	•	•	•	•	•
HE	•	•	•	•	•	•	•	•	•
PRM 1	FACTORY-ASSEMBLED ACCESSORY. Pressure switch with manual reset (using a tool), electrically connected in series to the high pressure switch on the compressor delivery pipe.								
A	•	-	-	-	-	-	-	-	-
E	•	-	-	-	-	-	-	-	-
HA	•	-	-	-	-	-	-	-	-
HE	•	-	-	-	-	-	-	-	-
PRM 2	FACTORY-ASSEMBLED ACCESSORY. Pressure switch with manual reset (using a tool), electrically connected in series to the high pressure switch on the compressor delivery pipe.								
A	-	•	•	•	•	•	•	•	•
E	-	•	•	•	•	•	•	•	•
HA	-	•	•	•	•	•	•	•	•
HE	-	•	•	•	•	•	•	•	•

7. TECHNICAL DATA

7.1. TECHNICAL DATA VERSIONS (A - E)

COOLING			750	800	900	1000	1250	1400	1500	1650	1800
Cooling capacity:	kW	A	195	218	242	271	322	357	399	437	469
		E	180	203	224	250	298	329	367	409	436
Total input power	kW	A	62	69	81	93	106	124	142	154	167
		E	68	76	88	101	115	134	154	165	179
Water flow rate	l/h	A	33540	37,500	41,620	46,610	55,380	61,400	68,630	75,160	80,670
		E	30960	34,920	38,530	43,000	51,260	56,590	63,120	70,350	74,990
Total pressure drops	kPa	A	88	66	70	70	73	78	61	61	62
		E	75	58	61	61	63	67	52	54	54

ENERGY INDICES											
EER	W/W	A	3.15	3.16	2.99	2.91	3.04	2.88	2.81	2.84	2.81
		E	2.65	2.67	2.55	2.48	2.59	2.46	2.38	2.48	2.44
ESEER	W/W	A	4.19	4.39	4.27	4.17	4.34	4.12	4.02	4.06	4.02
		E	4.05	4.27	4.20	4.08	4.28	4.05	3.93	4.02	4.02

ELECTRICAL DATA											
Fuel feed	A	A	400V 3N-50Hz	400V-3-50Hz							
		E									
Input current	A	A	113	136	158	180	196	235	273	289	304
		E	120	145	169	192	211	251	292	306	324
Maximum current	A	A	144	173	195	217	267	296	325	365	398
		E									
Peak current	A	A	320	348	404	426	535	505	534	633	666
		E									

COMPRESSORS (SCROLL)											
Number/Circuit	no./no.	A	4/2	4/2	4/2	4/2	4/2	5/2	6/2	6/2	6/2
		E									

FANS (AXIAL)											
Quantity	no.	A	3	4	4	4	6	6	6	8	8
		E									
Air flow rate	m^3/h	A	49000	72800	71500	70200	106200	104100	102000	125800	122000
		E	35300	50960	51805	52650	74340	75420	76500	91110	91500
Input power	kW	A	3.75	5.0	5.0	5.0	7.5	7.5	7.5	10.0	10.0
		E									
Input current	A	A	8.4	10.8	10.8	10.8	16.2	16.2	16.2	21.6	21.6
		E									

ENLARGED FANS (AXIAL)											
Quantity	no.	A	3	4	4	4	6	6	6	8	8
Input power	kW	A	3.75	7.0	7.0	7.0	10.5	10.5	10.5	13.9	13.9
Input current	A	A	8.4	14.8	14.8	14.8	22.2	22.2	22.2	29.6	29.6
Useful head	Pa	A	40	40	40	40	40	40	40	40	40

EVAPORATORS (PLATES)											
Quantity	no.	A	1								
		E									
Plumbing connections* (IN/OUT)	diam	A	3"	3"	3"	3"	4"	4"	4"	4"	4"
		E									

HYDRAULIC CIRCUIT											
Accumulation capacity	L	A	700								
		E									
Accumulation anti-freeze heater	n°/W	A	2x300	2x300	2x300	2x300	2x300	2x300	2x300	2x300	2x300
		E									
Plumbing connections* (IN/OUT) hydronic/pumping unit	diam	A	4"	4"	4"	4"	4"	4"	4"	4"	4"
		E									
Expansion tank	n°/l	A	2/24	2/24	2/24	2/24	2/24	2/24	2/24	2/24	2/24
		E									
LOW-HEAD CIRCULATION PUMP											
Input power	KW	A	3.0	3.4	3.4	3.4	4.6	4.6	5.9	5.9	5.9
		E									
Input current	A	A	6.2	5.8	5.8	5.8	7.8	7.8	10.0	10.0	10.0
		E									
Useful head	kPa	A	71	109	95	85	103	82	106	94	82
		E	89	122	111	104	125	108	125	111	102

*** The plumbing connections are all of the Victaulic type**

			0750	0800	0900	1000	1250	1400	1500	1650	1800
HIGH-HEAD CIRCULATION PUMP											
Input power	KW	A	5.2	5.7	5.7	5.7	8.3	8.3	8.3	10.5	10.5
		E									
Input current	A	A	11.0	9.7	9.7	9.7	14.1	14.1	14.1	17.8	17.8
		E									
Useful head	kPa	A	191	227	213	200	247	222	226	233	221
		E	213	237	226	216	264	246	250	245	236
SOUND DATA											
Sound power (1)	dBA	A	85	88.0	88.0	88.0	91.0	90.5	90.5	91.5	93.5
		E	77	83.0	83.0	83.0	86.0	85.5	85.0	86.5	88.5
Sound pressure (2)	dBA	A	53	56.0	56.0	56.0	59.0	58.5	58.5	59.5	61.5
		E	45	51.0	51.0	51.0	54.0	53.5	53.0	54.5	56.5
DIMENSIONS											
Height	mm	A	1975	2450	2450	2450	2450	2450	2450	2450	2450
		E									
Width	mm	A	1500	2200	2200	2200	2200	2200	2200	2200	2200
		E									
Depth	mm	A	4350	3400	3400	3400	4250	4250	4250	5750	5750
		E									
Weight when empty	kg	A	1663	2120	2265	2410	2710	2910	3125	3620	3735
		E	1678	2135	2280	2425	2725	2925	3140	3635	3750

NOMINAL REFERENCE CONDITIONS

COOLING MODE
- Inlet water temperature 12°C
- Outlet water temperature 7°C
- Outside air temperature 35°C
- Δt 5°C

(1) SOUND POWER
Aermec determines the sound power value on the basis of measurements taken in accordance with standard 9614-2, in compliance with the Eurovent certification.

(2) SOUND PRESSURE
Sound pressure in an unrestricted range on a reflective plane (directional fact. Q=2), 10m away from the unit external surface, complying with ISO 3744.

7.2. TECHNICAL DATA VERSIONS (HA - HE)

COOLING			0750	0800	0900	1000	1250	1400	1500	1650	1800
Cooling capacity:	kW	HA	176	211	239	261	315	351	388	437	472
		HE	165	194	213	231	284	319	355	398	426
Total input power	kW	HA	70	73	82	94	109	126	143	151	162
		HE	77	81	94	107	122	140	158	168	182
Water flow rate	l/h	HA	30270	36290	41110	44890	54180	60370	66740	75160	81180
		HE	28380	33370	36640	39730	48850	54870	61060	68460	73270
Total pressure drops	kPa	HA	74	55	56	53	61	48	49	54	53
		HE	65	47	45	43	51	40	41	45	44

HEATING											
Heating capacity	kW	HA	201	233	263	293	344	388	433	484	523
		HE									
Total input power	kW	HA	65.2	74	83	93	110	124	139	153	163
		HE									
Water flow rate	l/h	HA	34570	40080	45240	50400	59170	66740	74480	83250	89960
		HE									
Total pressure drops	kPa	HA	96	68	69	69	76	58	60	66	66
		HE									

ENERGY INDICES											
EER	W/W	HA	2.51	2.89	2.91	2.78	2.89	2.79	2.71	2.89	2.91
		HE	2.13	2.40	2.27	2.16	2.33	2.28	2.25	2.37	2.34
COP	W/W	HA	3.08	3.15	3.17	3.15	3.13	3.13	3.12	3.16	3.21
		HE									

ELECTRICAL DATA											
Fuel feed	A	HA	400V 3N-50Hz	400V-3-50Hz							
		HE									
Input current	A	HA	113	138	157	177	197	231	265	282	293
		HE									
Maximum current	A	HA	144	177	199	221	274	303	332	373	406
		HE									
Peak current	A	HA	320	352	408	430	542	512	541	641	674
		HE									

COMPRESSORS (SCROLL)											
Number/Circuit	no./no.	HA	4/2	4/2	4/2	4/2	4/2	5/2	6/2	6/2	6/2
		HE									

FANS (AXIAL)											
Quantity	no.	HA	3	4	4	4	6	6	6	8	8
		HE									
Air flow rate	m^3/h	HA	50200	85600	84600	83600	126000	124200	122400	168000	165600
		HE	41700	59920	59220	60610	88200	90000	91800	117600	115920
Input power	kW	HA	3.75	6.8	6.8	6.8	10.2	10.2	10.2	13.6	13.6
		HE									
Input current	A	HA	8.4	14.4	14.4	14.4	21.6	21.6	21.6	28.8	28.8
		HE									

EVAPORATORS (PLATES)											
Quantity	no.	HA	1								
		HE									
Plumbing connections (IN/OUT)	diam	HA	2"1/2	3"	3"	3"	4"	4"	4"	4"	4"
		HE									

HYDRAULIC CIRCUIT											
Accumulation capacity	L	HA	700								
		HE									
Accumulation anti-freeze heater	W	HA	2x300	2x300	2x300	2x300	2x300	2x300	2x300	2x300	2x300
		HE									
Plumbing connections* (IN/OUT) hydronic/pumping unit	diam	HA	4"	4"	4"	4"	4"	4"	4"	4"	4"
		HE									
Expansion tank	n°/l	A	2/24	2/24	2/24	2/24	2/24	2/24	2/24	2/24	2/24
		E									
LOW-HEAD CIRCULATION PUMP											
Input power	KW	HA	3.0	3.4	3.4	3.4	4.6	4.6	5.9	5.9	5.9
		HE									
Input current	A	HA	6.2	5.8	5.8	5.8	7.8	7.8	10.0	10.0	10.0
		HE									
Useful head	kPa	HA	104	123	114	111	128	128	125	106	95
		HE	110	135	132	131	150	149	141	126	119

*** The plumbing connections are all of the Victaulic type**

			0750	0800	0900	1000	1250	1400	1500	1650	1800
HIGH-HEAD CIRCULATION PUMP											
Input power	KW	HA	5.5	5.7	5.7	5.7	8.3	8.3	8.3	10.5	10.5
		HE									
Input current	A	HA	11.0	9.7	9.7	9.7	14.1	14.1	14.1	17.8	17.8
		HE									
Useful head	kPa	HA	224	240	230	225	269	266	246	241	232
		HE	231	252	249	247	293	289	272	261	255
SOUND DATA											
Sound power (1)	dBA	HA	85.0	89.0	89.0	89.0	92.0	91.5	91.0	92.5	95.5
		HE	80.0	83.0	83.0	83.0	86.5	86.0	85.5	87.0	89.0
Sound pressure (2)	dBA	HA	53.0	56.5	56.5	56.5	59.5	59.0	58.5	60.0	62.0
		HE	48.0	51.0	51.0	51.0	54.0	53.5	53.0	54.5	56.5
DIMENSIONS											
Height	mm	HA	1975	2450	2450	2450	2450	2450	2450	2450	2450
		HE									
Width	mm	HA	1500	2200	2200	2200	2200	2200	2200	2200	2200
		HE									
Depth	mm	HA	4350	3400	3400	3400	4250	4250	4250	5750	5750
		HE									
Weight when empty	kg	HA	1487	2150	2300	2460	2750	2990	3190	3680	3800
		HE		2160	2310	2470	2760	3000	3200	3690	3810

NOMINAL REFERENCE CONDITIONS

COOLING MODE

- Inlet water temperature	12°C
- Outlet water temperature	7°C
- Outside air temperature	35°C
- Δt	5°C

HEATING MODE

- Inlet water temperature	40°C
- Outlet water temperature	45°C
- Outside air temperature	7/6°C
- Δt	5°C

(1) SOUND POWER
Aermec determines the sound power value on the basis of measurements taken in accordance with standard 9614-2, in compliance with the Eurovent certification.

(2) SOUND PRESSURE
Sound pressure in an unrestricted range on a reflective plane (directional fact. Q=2), 10m away from the unit external surface, complying with ISO 3744.

8. OPERATING LIMITS

8.1. COOLING MODE

The devices in their standard configurations are not suitable for installation in salty environments. The maximum and minimum limits for the water flow rate to the exchanger are indicated by the curves of the pressure drop diagrams. For the operating limits, refer to the diagrams below, valid for Δt = 5°C.

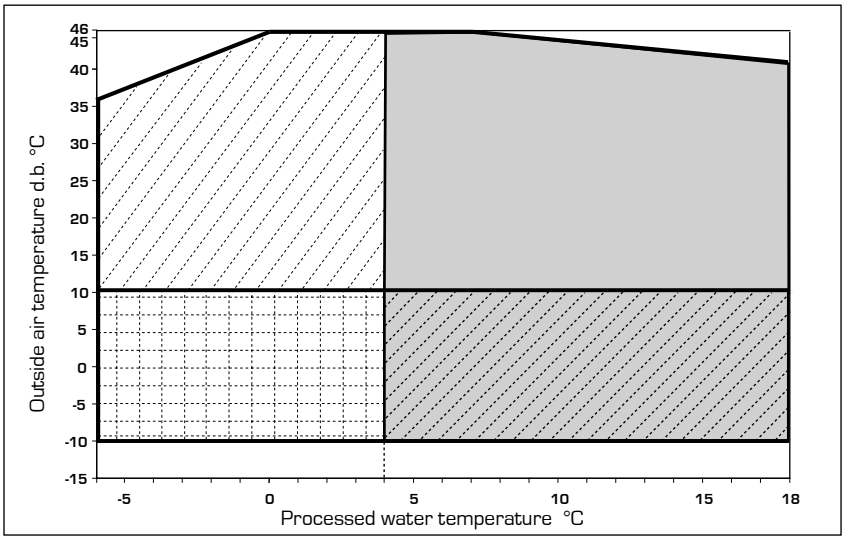
NB

The unit can be activated with external air at 46°C and inlet water at 35°C in the summer function.

The unit can be activated with external air at -15°C and inlet water at 20°C in the winter function.

Under these conditions the unit function is possible only for a short time in order to bring the system up to right temperature.

To reduce the time of this operation a three-way valve allowing to by-pass the water from the supply to the system should be fitted, until the conditions enabling the unit to operate within the permitted operating limits are reached.



KEY:

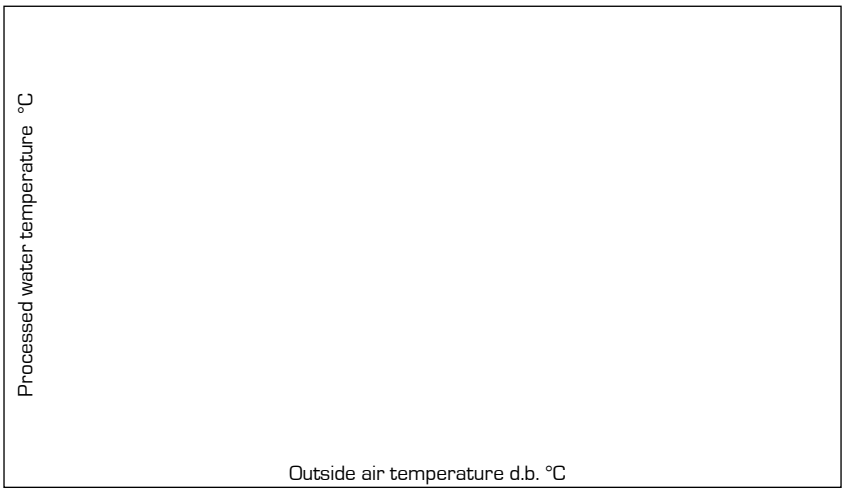
Operation with glycol

Operation with glycol, with DCPX accessory

Standard operation

Standard operation with DCPX accessory

8.2. HEATING MODE



For buffer tanks 09-10 (double water ring) the temperature of the plant is the temperature produced by the unit:

- **3 °C higher in cooling mode;**
- **3°C lower in heating mode.**

9. CORRECTION FACTORS

9.1. COOLING CAPACITY AND INPUT POWER –"HIGH EFFICIENCY VERSIONS"

The refrigerating capacity yielded and the input electrical capacity in conditions other than rated conditions are obtained by multiplying the rated values (Pf, Pa) by the respective correction coefficients (Cf, Ca).
The following diagrams allow you to obtain the correction coefficients to be used for the various versions of the devices, in cold mode; next to each curve you can see the outside air temperature to which it refers.

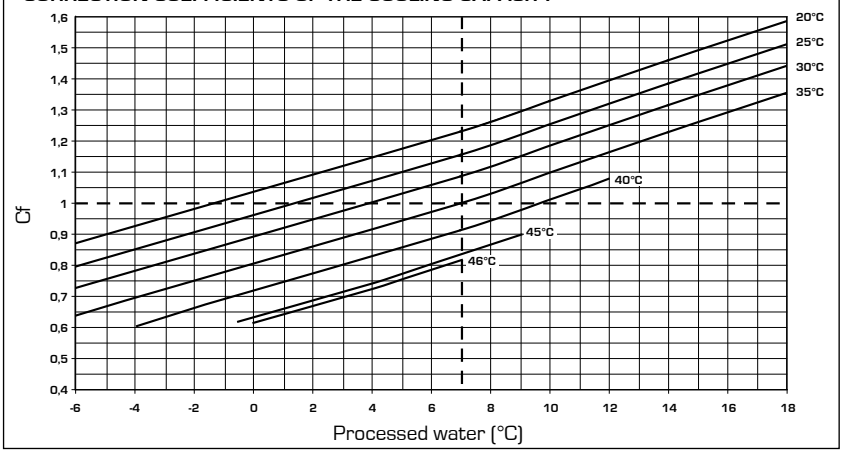
KEY

Cf: correction coefficient of the cooling capacity.

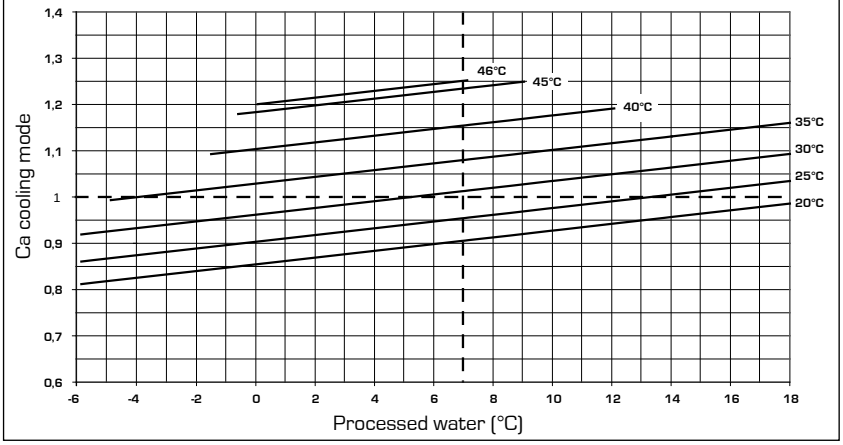
Ca: correction coefficient of the input power.

FOR Δt DIFFERENT FROM 5°C
For the evaporator, refer to Tab. 9.3.1 to obtain the cooling capacity and input power correction factors. To take into account the exchanger soiling, apply the relative fouling factors, Tab. 9.4.1.

CORRECTION COEFFICIENTS OF THE COOLING CAPACITY



CORRECTION COEFFICIENTS OF THE INPUT POWER IN COOLING MODE



9.2. HEATING CAPACITY AND INPUT POWER

– **"HEAT PUMP VERSIONS"**

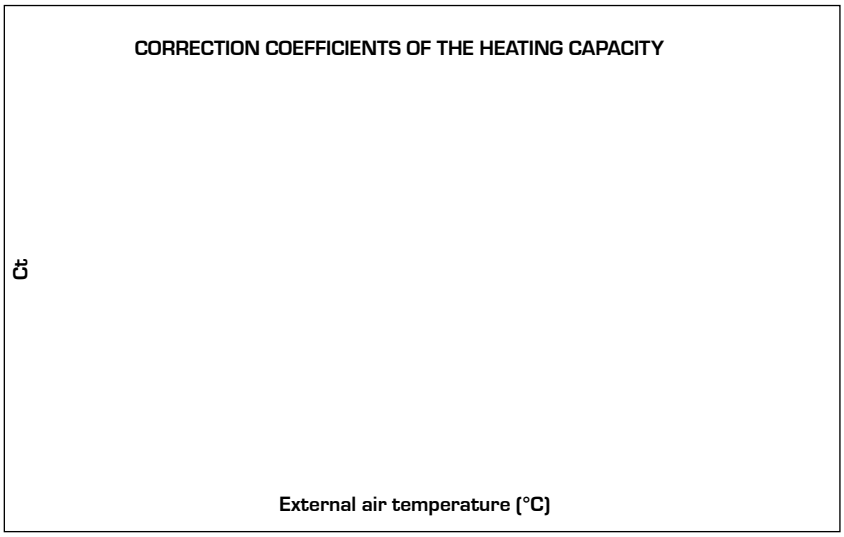
The heating capacity yielded and the input electrical capacity in conditions other than rated conditions are obtained by multiplying the rated values (Pt, Pa) by the respective correction coefficients (Ct, Ca).
The diagram allows you to obtain the correction coefficients; in line with each curve you will see the hot processed water temperature to which it refers, assuming a difference of temperature between the condenser inlet and outlet water equal to 5°C.

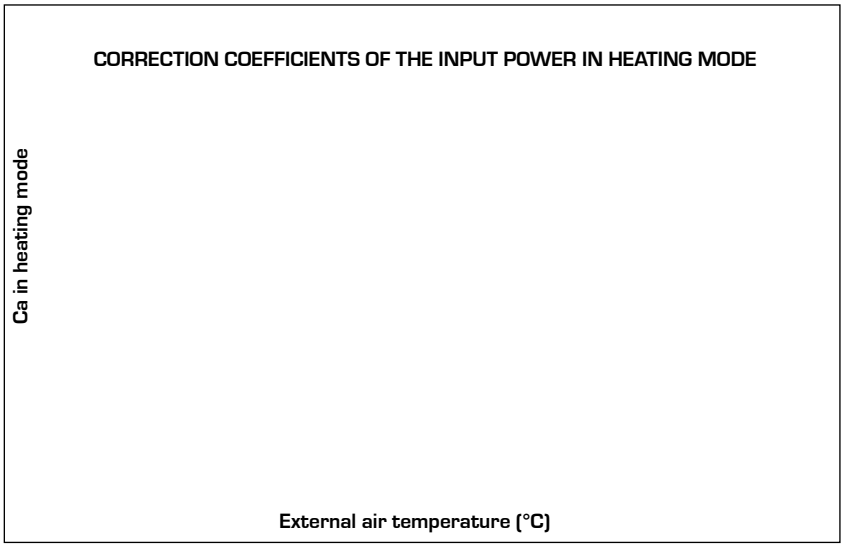
The outputs are intended as net of the defrosting cycles.

KEY

Ca: Correction coefficient of the input power.

Ct: correction coefficient of the heating capacity.





9.3. FOR Δt DIFFERENT FROM THE RATED VALUE

The performance levels indicated in the technical data are obtained with Δt 5°C. To obtain the correction factors for a cooling capacity and input power different from Δt 5°C, use table 9.3.1.

9.3.1. Δt different from the rated value	3	5	8	10
Cooling capacity correction factors	0.99	1	1.02	1.03
Cooling capacity correction factors	0.99	1	1.01	1.02

9.4. FOULING FACTORS

The performance levels indicated in the technical data refer to conditions with clean tubes, with a fouling factor = 1.
For other fouling factor values, multiply the data of performance table 9.4.1. by the coefficients given.

9.4.1. Fouling factors [k*m^2]/[w]	0.00005	0.0001	0.0002
Cooling capacity correction factors	1	0.98	0.94
Cooling capacity correction factors	1	0.98	0.95

- The cooling capacity and input power correction factors make allowance for the presence of glycol and the different evaporation temperature.
- The pressure drop correction factor already takes account of the different flow rate deriving from the application of the water flow rate correction factor.
- The correction factor of the water flow rate is calculated so as to maintain the same Δt that would be used in the absence of glycols.

NB

To make it easier to read the following graph, an example is given.

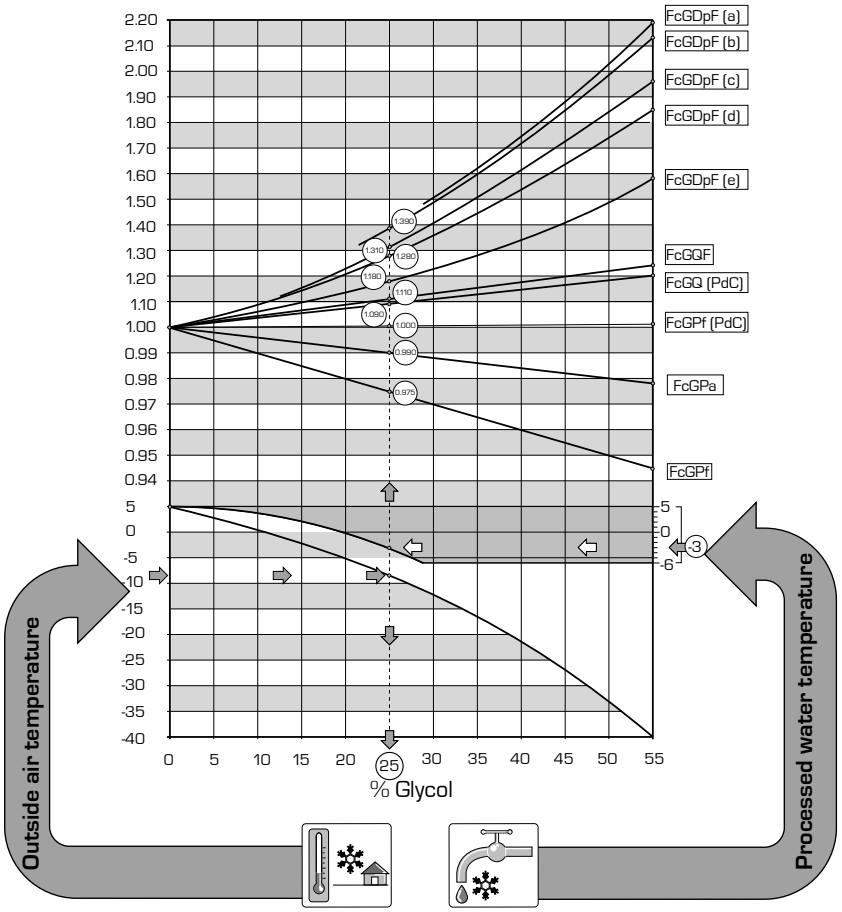
By using the diagram below it possible to establish the percentage of glycol necessary; this percentage can be calculated taking into account one of the following factors:

On the basis of the fluid considered (water or air), it will be necessary to enter the graph from the right or left side, from the intersection of the outside air temperature or processed water temperature straight lines and the relative curves, a point is obtained through which the vertical line that will identify both the percentage of glycol and the relative correction coefficients will have to pass.

10.1. HOW TO READ THE GLYCOL CURVES

The curves shown in the figure summarise a notable quantity of data, each of which is represented by a specific curve. In order to use these curves correctly, it is necessary to make some initial considerations:

- If you want to calculate the percentage of glycol on the basis of the outside air temperature, you must enter from the left-hand axis and, once you have intersected the curve, trace a vertical line which, in turn, will intercept all the other curves; the points obtained from the upper curves represent the coefficients for the correction of the cooling capacity and input power, for the flow rates and the pressure drops (remember that these coefficients must anyway be multiplied by the nominal value of the sizes examined); the lower axis advises the percentage of glycol necessary on the basis of the outside air temperature considered.
- If you want to calculate the percentage of glycol on the basis of the temperature of the processed water, you must enter from the right-hand axis and, once you have intersected the curve, trace a vertical line which, in turn, will intercept all the other curves; the points obtained from the upper curves represent the coefficients for the cooling capacity and input power, for the flow rates and the pressure drops (remember that these coefficients must anyway be multiplied by the nominal value of the sizes examined); the lower axis advises the percentage of glycol necessary to produce water at the required temperature.
- Remember that the initial sizes "OUTSIDE AIR TEMPERATURE" and "PROCESSED WATER TEMPERATURE", are not directly linked to each other, so it is not possible to enter the curve of one of these sizes, and obtain the corresponding point on the other curve.



KEY:

FcGPf	Correction factor of the cooling capacity
FcGPa	Correction factor of the input power
FcGDpF (a)	Correction factor of the pressure drops (evaporator) (average temp. = -3.5°C)
FcGDpF (b)	Correction factor of the pressure drops (average temp. = 0.5°C)
FcGDpF (c)	Correction factor of the pressure drops (average temp. = 5.5°C)
FcGDpF (d)	Correction factor of the pressure drops (average temp. = 9.5°C)
FcGDpF (e)	Correction factor of the pressure drops (average temp. = 47.5°C)
FcGQF	Correction factor of the outputs (evaporator) (average temp. = 9.5°C)
FcGQC	Correction factor of the outputs (condenser) (average temp. = 47.5°C)

NB

Although the graph reaches outside air temperatures of -40°C, it is necessary to maintain the machine's operating limits as reference.

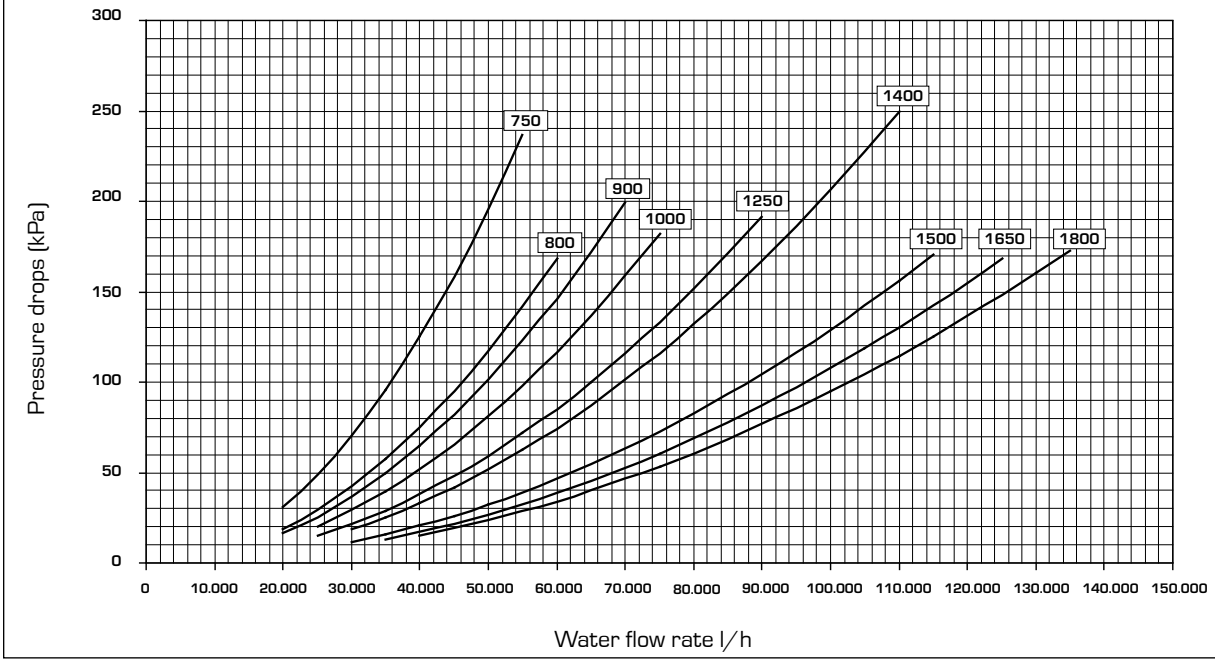
11. PRESSURE DROPS

11.1. TOTAL PRESSURE DROPS

Standard NRL cooling only unit (A - E)

NB
The pressure drops and useful heads are calculated in cooling mode, with water at 10°C

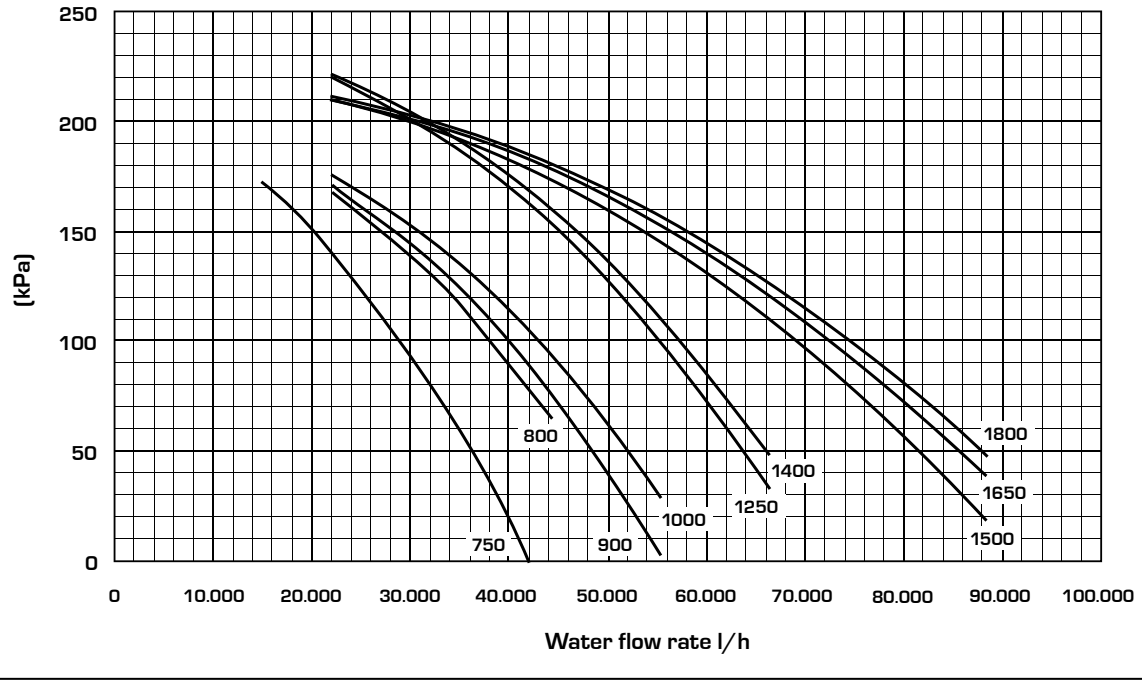
TOTAL PRESSURE DROPS (A - E)



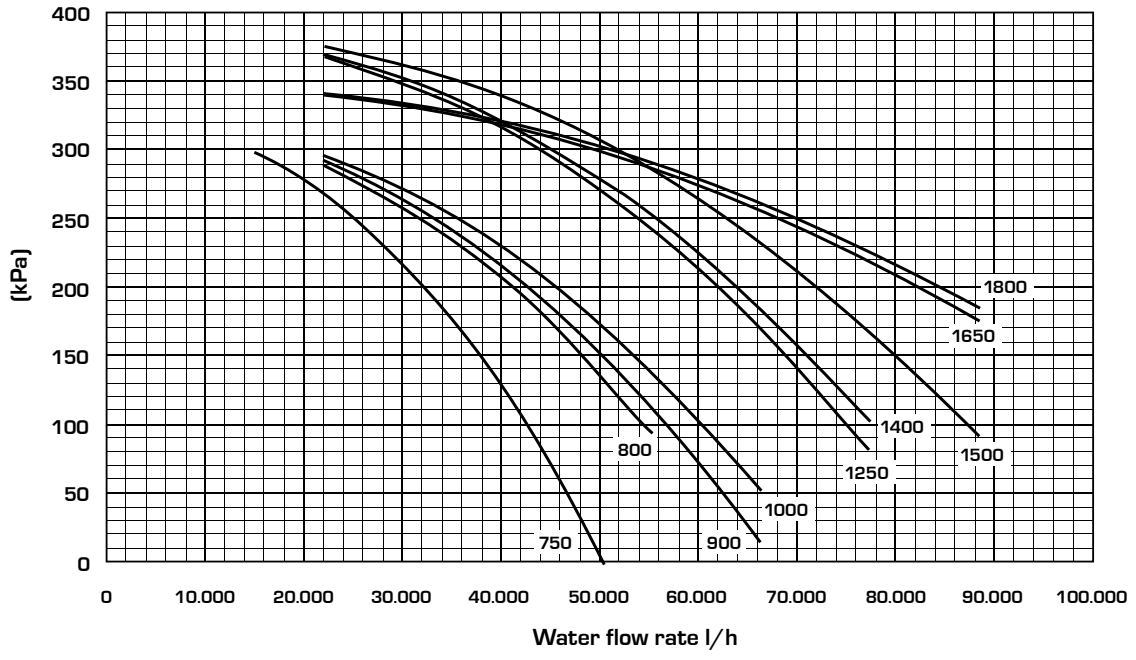
Average water temperature	5	10	15	20	30	40	50
Multiplicational coefficient	1.02	1	0.985	0.97	0.95	0.93	0.91

12. USEFUL HEADS

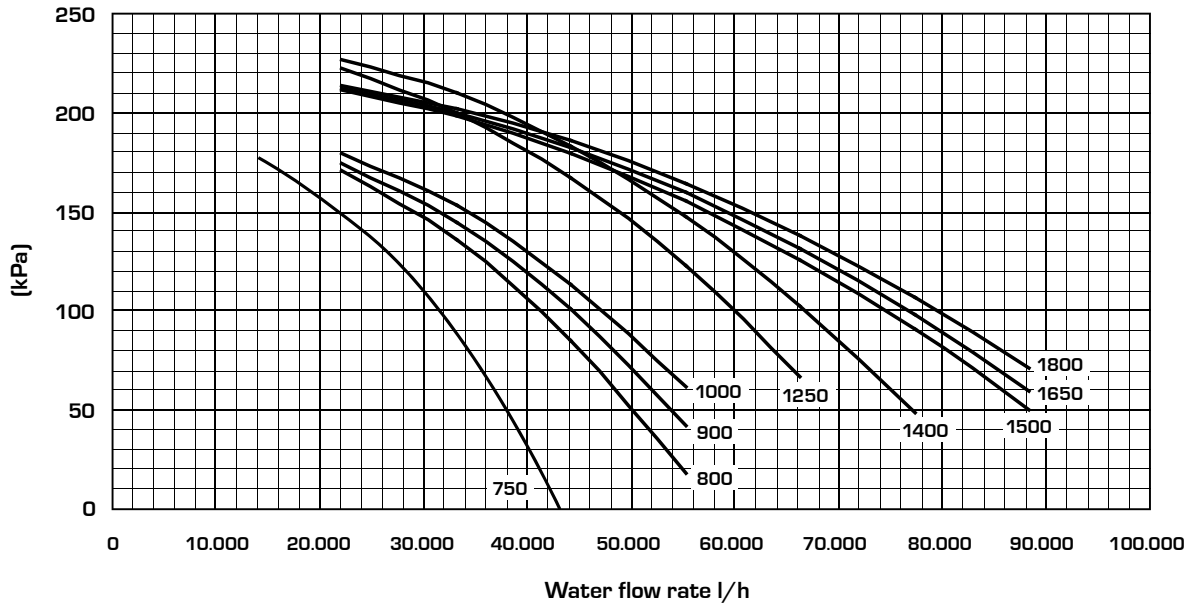
USEFUL HEADS, LOW HEAD VERSIONS A - E



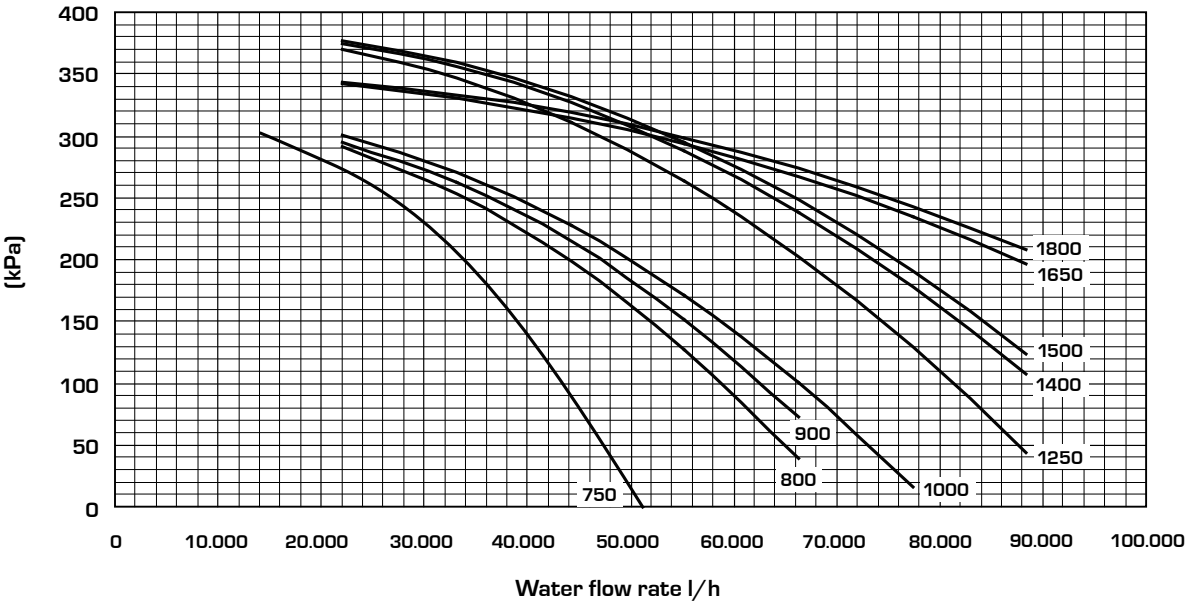
USEFUL HEADS, HIGH HEAD VERSIONS A - E



USEFUL HEADS, LOW HEAD VERSIONS HA - HE



USEFUL HEADS, HIGH HEAD VERSIONS HA - HE



13. ACCUMULATION

13.1. MAXIMUM/MINIMUM WATER CONTENT IN THE SYSTEM

13.1.1. Maximum water content recommended

Table 13.2 indicates the maximum water content, in litres, of the hydraulic system, compatible with the capacity of the expansion tank. The values shown in the table refer to three conditions of maximum and minimum water temperature. If the effective water content of the hydraulic system (including the accumulation tank, if present) is greater than that shown in the operational conditions table, another, additional expansion tank must be installed, measured (using the common criteria) with reference to the additional volume of water.

From tables 13.3, it is possible to obtain the values of maximum system content, also for other operational conditions with glycol water.

The values are obtained by multiplying the reference value by the correction coefficient.

13.1.2. Expansion tank calibration

The standard pressure value for precharging the expansion tank is 1.5 bar, and the volume is 24 litres (maximum value 6 bar).

The tank must be calibrated according to the maximum difference in height (H) of the device (see figure) according to the formula: p (calibration) [bar] = H [m] / 10.2 + 0.3.

For example, if the level difference H is 20m, the calibration value of the tank will be 2.3 bar.

If the calibration value obtained from the calculation is lower than 1.5 bar (i.e. for H < 12.25), maintain the standard calibration.

13.2.

Hydraulic height	H m	30	25	20	15	≥ 12.25
Expansion tank calibration	bar	3.2	2.8	2.3	1.8	1.5
Water content reference value	l (1)	2,174	2,646	3,118	3590	3852
Water content reference value	l (2)	978	1190	1404	1616	1732
Water content reference value	l (3)	510	622	732	844	904

13.3.

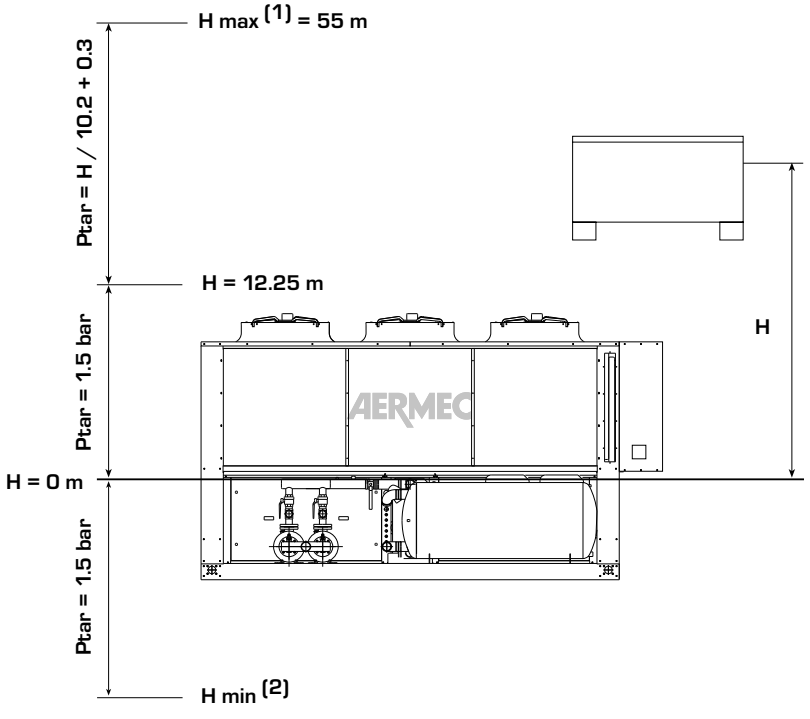
Glycol water	Water temp. °C		Correction coefficient	Reference condition
	max.	min.		
10%	40	-2	0.507	(1)
10%	60	-2	0.686	(2)
10%	85	-2	0.809	(3)
20%	40	-6	0.434	(1)
20%	60	-6	0.604	(2)
20%	85	-6	0.729	(3)
35%	40	-6	0.393	(1)
35%	60	-6	0.555	(2)
35%	85	-6	0.677	(3)

Working reference conditions:

(1) Cooling: Max. water temp. = 40°C, Min. water temp. = 4°C.

(2) Heating (heat pump): Max. water temp. = 60°C, Min. water temp. = 4°C.

(3) Heating (boiler): Max. water temp. = 85°C, Min. water temp. = 4°C.



KEY

(1) Check that the highest user does not exceed a level difference of 55 metres.

(2) Check that the lowest user can sustain the global pressure acting at that point.

13.4. MINIMUM WATER CONTENT RECOMMENDED

NRL	Compressor no.	(1) l/KW	(2) l/KW
0750	4	4	8
0800			
0900			
1000			
1250			
1400	5	4	8
1500	6	4	8
1650			
1800			

(1)	Minimum water content
(2)	Minimum water content in the case of process applications or operation with low outside temperatures and low load.
	Adjusting the outlet water temperature
	project Δt less than 5°C.

14. CAPACITY CONTROL

[❄] Cooling capacity %	Levels of power					
Versions	**1°**	**2°**	**3°**	**4°**	**5°**	**6°**
NRL 750	27	53	77	100	-	-
NRL 800	27	53	77	100	-	-
NRL 900	27	53	77	100	-	-
NRL 1000	27	53	77	100	-	-
NRL 1250	27	53	77	100	-	-
NRL 1400	23	44	63	82	100	-
NRL 1500	19	37	55	71	86	100
NRL 1650	19	37	55	71	86	100
NRL 1800	19	37	55	71	86	100

[❄] Input power %	Levels of power					
Versions	**1°**	**2°**	**3°**	**4°**	**5°**	**6°**
NRL 750	23	47	73	100	-	-
NRL 800	23	47	73	100	-	-
NRL 900	23	47	73	100	-	-
NRL 1000	23	47	73	100	-	-
NRL 1250	23	47	73	100	-	-
NRL 1400	18	37	56	77	100	-
NRL 1500	14	29	46	63	81	100
NRL 1650	14	29	46	63	81	100
NRL 1800	14	29	46	63	81	100

[☼] Heating capacity %	Levels of power					
Versions	**1°**	**2°**	**3°**	**4°**	**5°**	**6°**
NRL 750	27	52	77	100	-	-
NRL 800	27	52	77	100	-	-
NRL 900	27	52	77	100	-	-
NRL 1000	27	52	77	100	-	-
NRL 1250	27	52	77	100	-	-
NRL 1400	24	43	62	83	100	-
NRL 1500	18	36	53	69	85	100
NRL 1650	18	36	53	69	85	100
NRL 1800	18	36	53	69	85	100

[☼] Input power %	Levels of power					
Versions	**1°**	**2°**	**3°**	**4°**	**5°**	**6°**
NRL 750	23	47	73	100	-	-
NRL 800	23	47	73	100	-	-
NRL 900	23	47	73	100	-	-
NRL 1000	23	47	73	100	-	-
NRL 1250	23	47	73	100	-	-
NRL 1400	20	37	56	79	100	-
NRL 1500	14	29	46	63	81	100
NRL 1650	14	29	46	63	81	100
NRL 1800	14	29	46	63	81	100

KEY

The performance levels refer to the following conditions:

- ❄ Processed water temperature: 7°C
- ❄ Outside air temperature: 35°C
- ☼ Processed water temperature: 50°C
- ☼ External air temperature: 7°C D.B./6°C W.B.

WARNING

As can be seen from the table, in choke mode the reduction of the input power is greater than the reduction of the output power, hence obtaining an E.E.R. greater than that in full load operation.
This is because during capacity control the heat exchangers are "oversized" in relation to the respective refrigerant flow rates, thereby allowing greater energy efficiency. For this reason, this series of devices is especially suitable for reducing energy consumption with variable load (typical of the comfort applications).

15. DESUPERHEATER

The heating capacity that can be obtained from the desuperheater is obtained by multiplying the nominal value (Pd) shown in table 15.1.1 by a suitable coefficient (Cd).
The diagrams will give you the correction coefficients to be used for the chillers in the various versions; next to each curve you can see the outside air temperature to which it refers.
In the heat pump versions, the desuperheater must be intercepted during heat pump operation: otherwise, the guarantee will no longer be considered valid.

15.1. PRESSURE DROPS

All sizes of the NRL models with desuperheater have 2 desuperheaters (arranged parallel to each other).

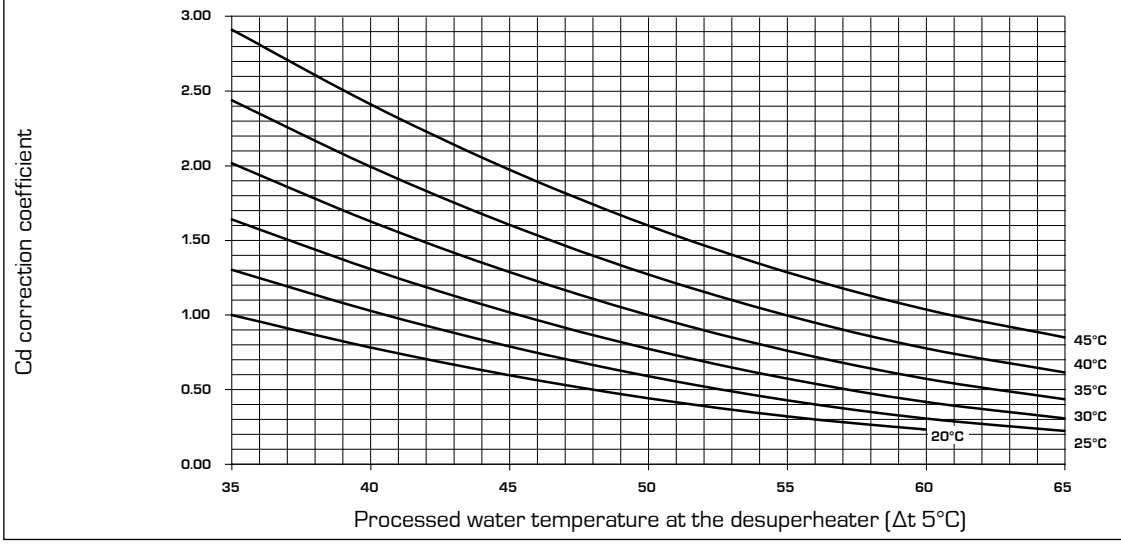
NB
the characteristics of the desuperheaters and the pressure drop curves are shown below.
For processed water temperatures different from 50°C, the result obtained is multiplied by the correction factor that can be obtained from Table 15.1.2.

The nominal value refers to:

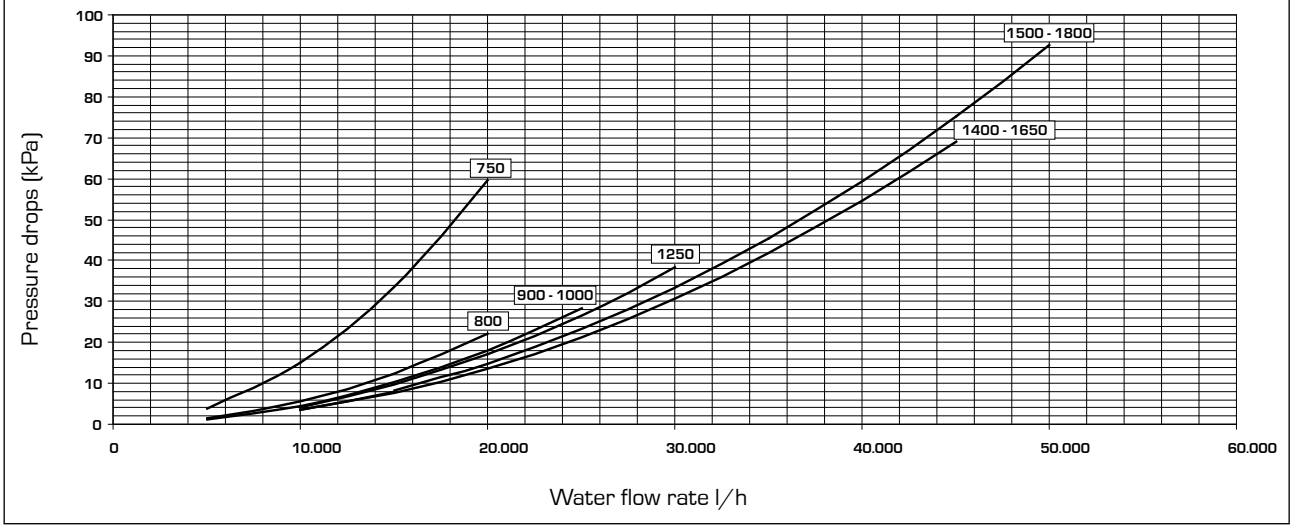
–air temperature	35°C
–water at the desuperheater	45/50°C
–Δt	5°C

15.1.1. NRL (D)		750	800	900	1000	1250	1400	1500	1650	1800
Heat capacity recovered	**kW**	69.0	74.3	84.8	95.4	110.9	126.7	142.6	155.1	167.7
Desuperheater water flow rate	**l/h**	11870	12790	14590	16400	19070	21800	24520	26680	28840
Desuperheater pressure drops	**kPa**	21	9.0	9.6	12.5	15.5	16.5	22.5	24.3	30.9

DESUPERHEATER CORRECTION COEFFICIENTS



DESUPERHEATER PRESSURE DROPS



15.1.2.

Average water temperature	30	40	50	60	70
Multiplicational coefficient	1.04	1.02	1	0.98	0.96

16. SOUND DATA

Sound power
Aermec determines the sound power value on the basis of measurements taken in accordance with standard 9614-2, in compliance with the Eurovent certification.

Sound pressure
Sound pressure in free field, on a reflecting plane (directional factor Q=2), in accordance with standard ISO 3744.

NB
The data refer to the version with standard fans.

NRL	Total sound levels			Octave band[Hz]						
	Pow. dB(A)	Pressure		125	250	500	1000	2000	4000	8000
		dB(A) 10m	dB(A) 1m	Sound power by central band frequency [dB]						
NRL 0750 A	85,0	53,0	66,0	72,8	73,3	78,1	78,5	80,0	76,2	65,2
NRL 0750 E	77,0	45,0	58,0	65,9	67,9	68,8	69,8	71,2	65,5	61,9
NRL 0750 HE	77,0	45,0	58,0	65,9	67,9	68,8	69,8	71,2	65,5	61,9
NRL 0750 HA	85,0	53,0	66,0	72,8	73,3	78,1	78,5	80,0	76,2	65,2
NRL 0800 A	88,0	56,0	69,5	97,7	86,5	84,5	82,0	78,5	74,5	66,0
NRL 0800 E	83,0	51,0	64,5	95,0	82,5	78,0	74,5	73,0	69,0	65,0
NRL 0800 HA	88,5	56,5	70,0	99,5	87,5	84,5	83,0	76,5	72,0	64,0
NRL 0800 HE	83,0	51,0	64,5	96,5	80,0	77,0	75,5	69,0	65,0	59,0
NRL 0900 A	88,0	56,0	69,5	97,7	86,5	84,5	82,0	78,5	74,5	66,0
NRL 0800 E	83,0	51,0	64,5	95,0	82,5	78,0	74,5	73,0	69,0	65,0
NRL 0900 HA	88,5	56,5	70,0	99,5	87,5	84,5	83,0	76,5	72,0	64,0
NRL 0900 HE	83,0	51,0	64,5	96,5	80,0	77,0	75,5	69,0	65,0	59,0
NRL 1000 A	88,0	56,0	69,5	97,5	86,5	84,5	82,0	78,5	74,5	66,0
NRL 1000 E	83,0	51,0	64,5	95,0	82,5	78,0	74,5	73,0	69,0	65,0
NRL 1000 HA	88,5	56,5	70,0	98,0	87,0	84,8	82,9	79,1	75,1	67,0
NRL 1000 HE	83,5	51,5	65,0	96,0	82,7	78,6	74,2	73,3	69,3	65,4
NRL 1250 A	91,0	59,0	72,5	100,0	91,0	88,0	84,5	81,0	77,0	73,0
NRL 1250 E	86,0	54,0	67,5	97,0	86,0	82,3	78,7	75,0	71,0	69,0
NRL 1250 HA	91,5	59,5	73,0	99,2	93,5	87,5	85,5	82,2	76,0	65,2
NRL 1250 HE	86,0	54,0	67,5	95,5	88,0	80,5	79,5	77,0	70,0	62,0
NRL 1400 A	90,5	58,5	72,0	102,0	90,0	87,0	83,0	79,5	75,0	69,0
NRL 1400 E	85,5	53,5	67,0	97,6	82,2	80,1	80,0	74,0	68,0	59,7
NRL 1400 HA	91,0	59,0	72,5	101,0	90,0	86,0	87,0	79,0	71,0	64,0
NRL 1400 HE	85,5	53,5	67,0	98,0	83,0	80,5	79,5	73,0	64,0	58,0
NRL 1500 A	90,5	58,5	72,0	102,0	90,5	87,0	82,5	79,5	74,5	69,0
NRL 1500 E	85,0	53,0	66,5	95,5	85,0	81,0	78,5	75,0	69,1	62,1
NRL 1500 HA	90,5	58,5	72,0	102,0	89,0	86,0	85,0	79,0	71,5	65,0
NRL 1500 HE	85,0	53,0	66,5	99,0	82,0	79,0	76,0	72,0	63,0	57,0
NRL 1650 A	91,5	59,5	73,0	101,5	90,5	88,0	86,0	81,0	75,0	69,0
NRL 1650 E	86,5	54,5	68,0	98,0	84,0	81,0	79,5	78,0	72,5	66,5
NRL 1650 HA	92,0	60,0	73,5	101,0	92,5	88,5	87,0	81,0	73,0	66,0
NRL 1650 HE	86,5	54,5	68,0	99,0	84,0	79,5	80,0	77,0	67,0	62,0
NRL 1800 A	93,5	61,5	75,0	103,0	92,0	90,0	88,0	84,0	78,0	73,0
NRL 1800 E	88,5	56,5	70,0	96,0	86,0	83,0	83,0	82,0	75,0	69,0
NRL 1800 HA	94,0	62,0	75,5	102,0	95,0	90,5	89,5	82,0	73,0	67,0
NRL 1800 HE	88,5	56,5	70,0	100,0	87,5	81,8	83,0	78,5	69,0	63,4

The values refer to:

- water inlet temperature 12°C
- processed water temperature 7°C
- outside air temperature 35°C

17. SAFETY AND CHECK PARAMETER SETTING

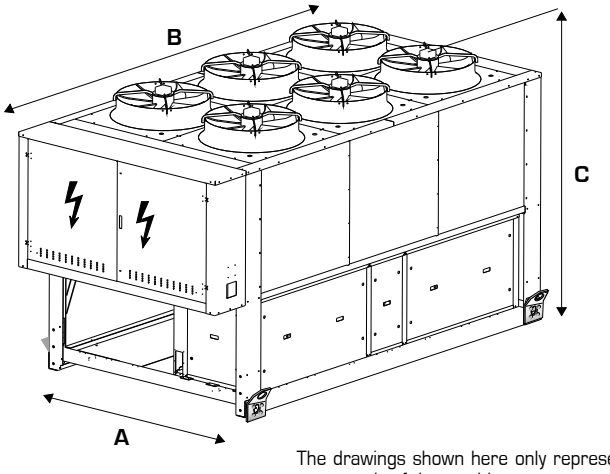
CHECK PARAMETERS			
Cold Setting	Water inlet temperature in cooling mode	**MIN.**	-10°C
		MAX.	20°C
		DEFAULT	7.0°C
heating Setting	Water inlet temperature in heat mode	**MIN.**	30°C
		MAX.	50°C
		DEFAULT	50°C
Anti-freeze intervention	Anti-freeze alarm intervention temperature on EV side (water output temperature).	**MIN.**	-15°C
		MAX.	4°C
		DEFAULT	3°C
Total differential	Proportional temperature band within which the compressors are activated and deactivated	**MIN.**	3°C
		MAX.	10°C
		DEFAULT	5°C
Autostart	auto		

NRL	0750	0800	0900	1000	1250	1400	1500	1650	1800
COMPRESSOR THERMOMAGNETIC SWITCHES 400V									
MTC1	29A	40A	40A	51A	62A	62	51A	51A	62A
mtc1a	29A	40A	40A	51A	62A	62	51A	51A	62A
mtc1b	-	-	-	-	-	-	51A	51A	62A
mtc2	40A	40A	51A	51A	62A	51A	51A	62A	62A
mtc2a	40A	40A	51A	51A	62A	51A	51A	62A	62A
mtc2b	-	-	-	-	-	51A	51A	62A	62A
HIGH PRESSURE SWITCH WITH MANUAL RESET									
PA (bar)	40	40	40	40	40	40	40	40	40
High pressure transducer									
TAP (bar)	39	39	39	39	39	39	39	39	39
LOW PRESSURE TRANSDUCER									
TBP (bar)	2	2	2	2	2	2	2	2	2
CHILLER CIRCUIT SAFETY VALVE									
AP (bar)	45	45	45	45	45	45	45	45	45
BP (bar) only in heat pump	30	30	30	30	30	30	30	30	30
FAN THERMOMAGNETIC SWITCHES - the calibration is made on a thermomagnetic switch (single ventilation line)									
Fans A	11A	11A	11A	13A	13A	-	-	-	-
Fans E									
Fans HA	14A	-	-	-	-	-	-	-	-
Fans HE									
FAN THERMOMAGNETIC SWITCHES - the calibration is made on 2 thermomagnetic switches (2 ventilation lines)									
Fans A	-	-	-	-	-	7A	7A	11A	11A
Fans E									
Fans HA	-	9A	9A	9A	14A	14A	14A	18A	18A
Fans HE									
NUMBER OF FANS									
No. of fans A	3	4	4	4	6	6	6	8	8
No. of fans E									
No. of fans HA									
No. of fans HE									

18. DIMENSIONS

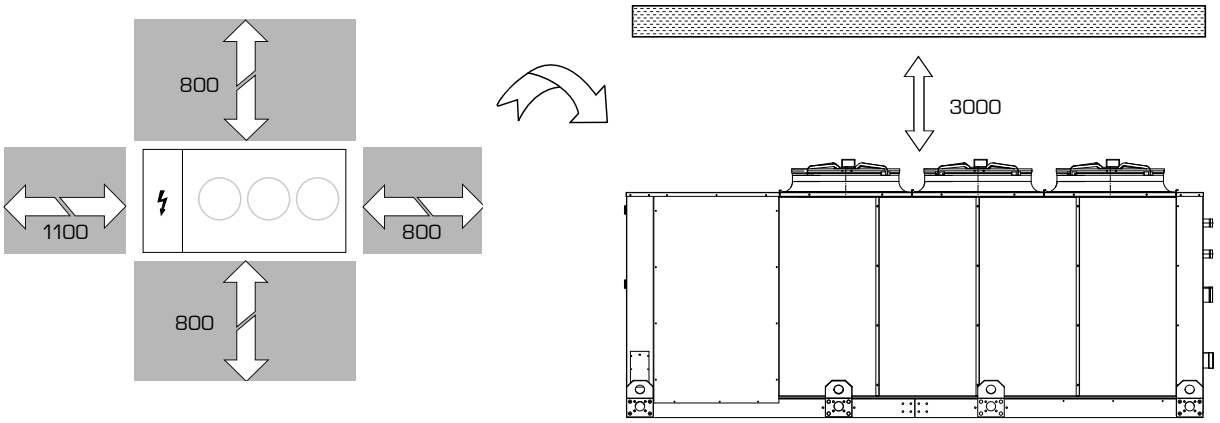
18.1. NRL 0750 - 0800 - 0900 - 1000 - 1250 - 1400 - 1500 - 1650 - 1800

MOD.	VERSIONS	A (mm)	B (mm)	C (mm)
0750	A-E-HA-HE	1500	4350	1975
0800	A-E-HA-HE	2200	3400	2450
0900	A-E-HA-HE	2200	3400	2450
1000	A-E-HA-HE	2200	3400	2450
1250	A-E-HA-HE	2200	4250	2450
1400	A-E-HA-HE	2200	4250	2450
1500	A-E-HA-HE	2200	4250	2450
1650	A-E-HA-HE	2200	5750	2450
1800	A-E-HA-HE	2200	5750	2450



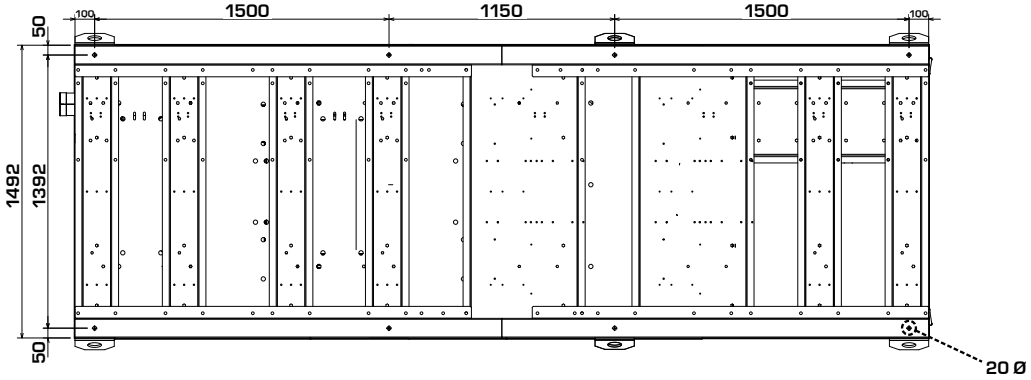
The drawings shown here only represent an example of the machine.

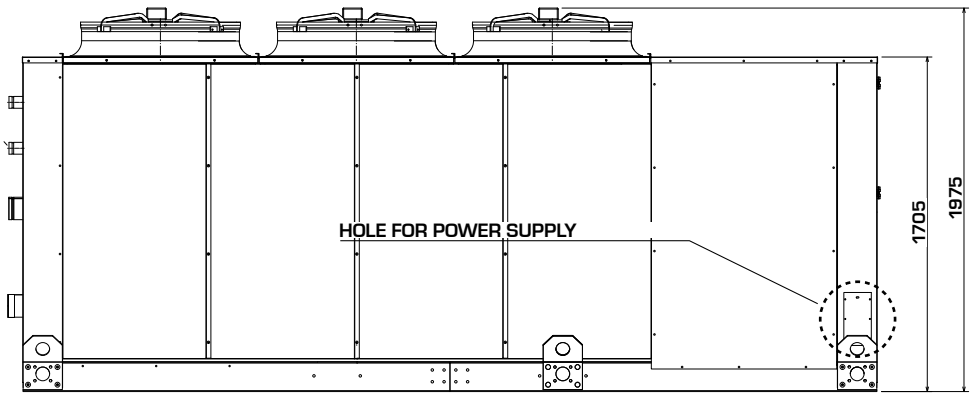
18.2. MINIMUM TECHNICAL CLEARANCES



19. POSITION OF PLUMBING CONNECTIONS POSITION OF VIBRATION DAMPERS

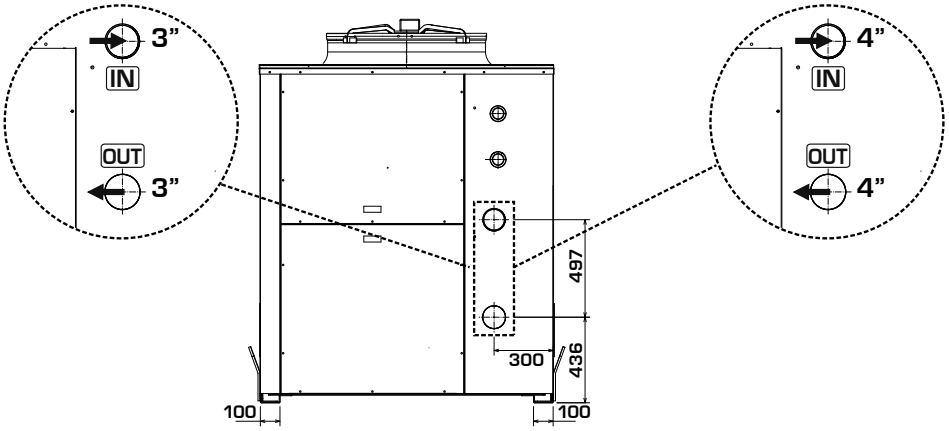
19.1. NRL 750 HIGH EFFICIENCY



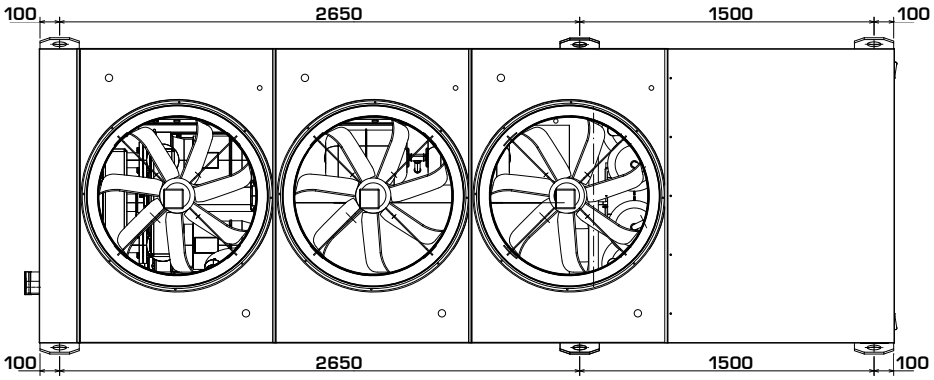


PLUMBING CONNECTIONS
VERSION "00" AND PUMPS

PLUMBING CONNECTIONS
WITH ACCUMULATION

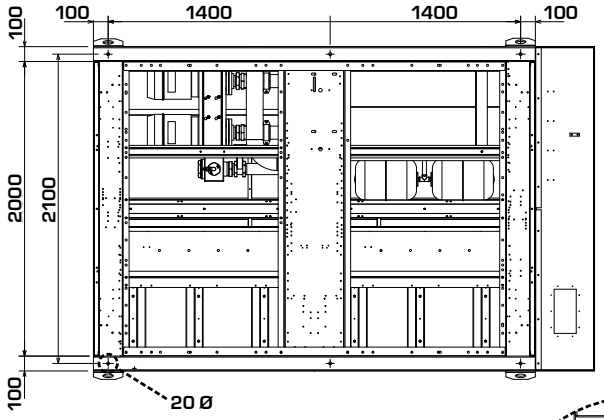


POSITION OF LIFTING POINTS

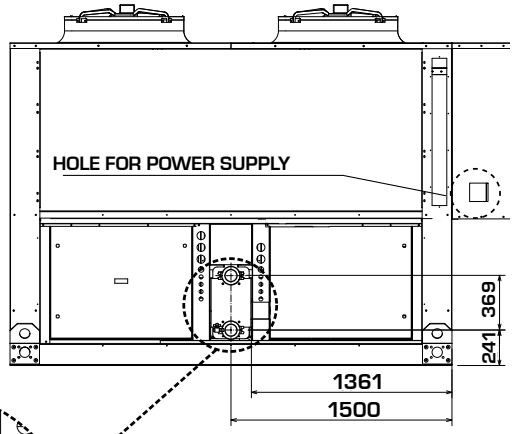


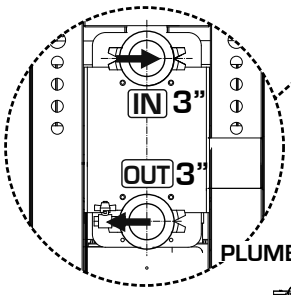
19.2. NRL 800 - 900 - 1000 HIGH EFFICIENCY

POSITION OF VIBRATION DAMPERS

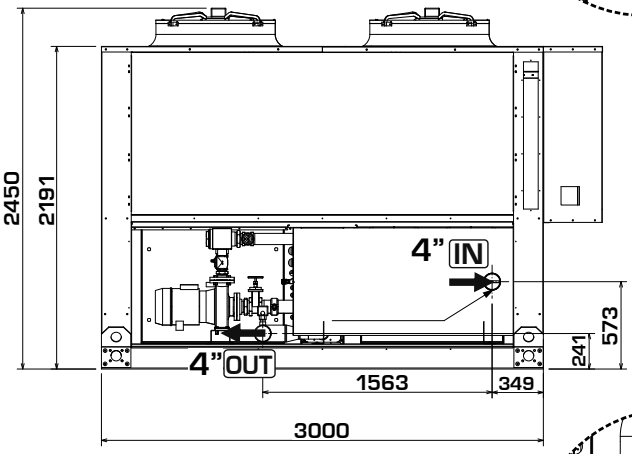


VERSION (00)

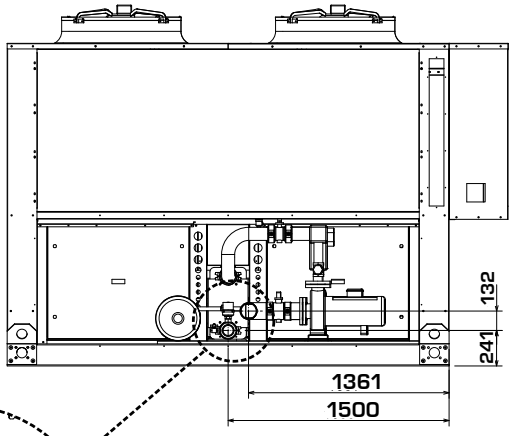


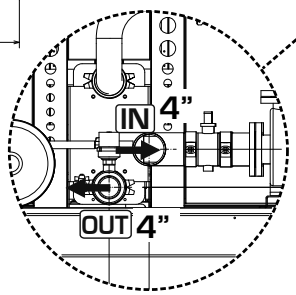


PLUMBING CONNECTIONS FOR HYDRONIC UNIT

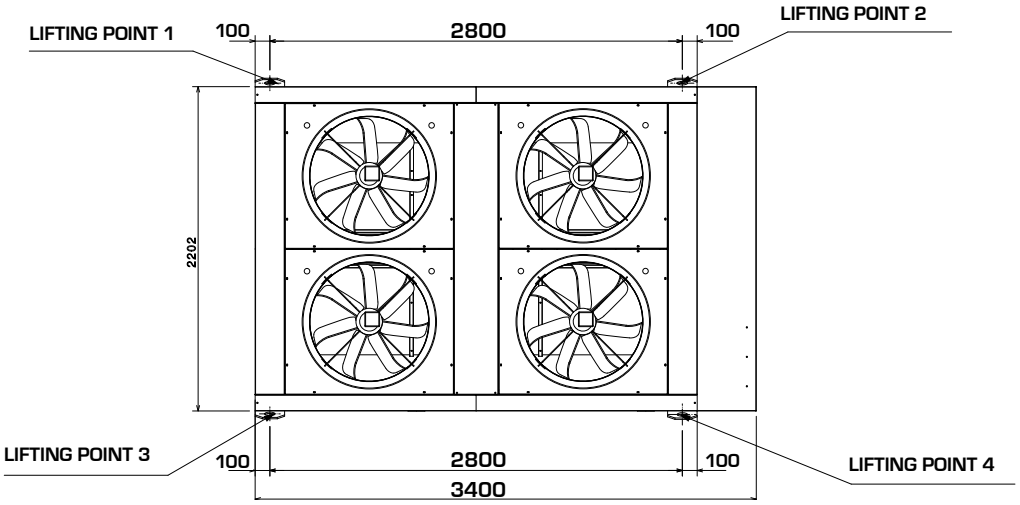


PLUMBING CONNECTIONS FOR PUMP UNIT



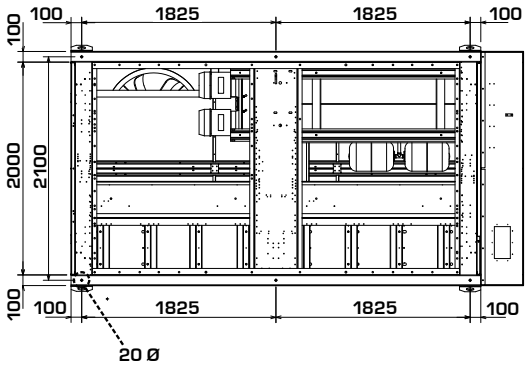


POSITION OF LIFTING POINTS

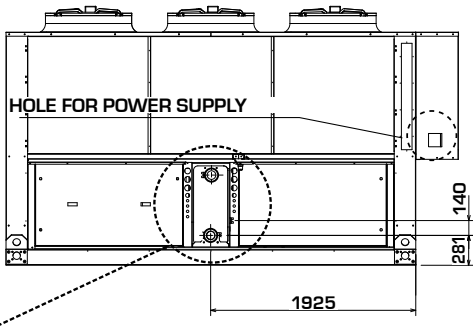


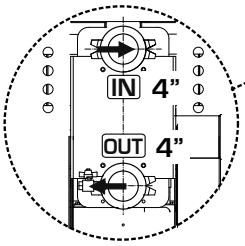
19.3. NRL 1250 - 1400 - 1500 HIGH EFFICIENCY

POSITION OF VIBRATION DAMPERS

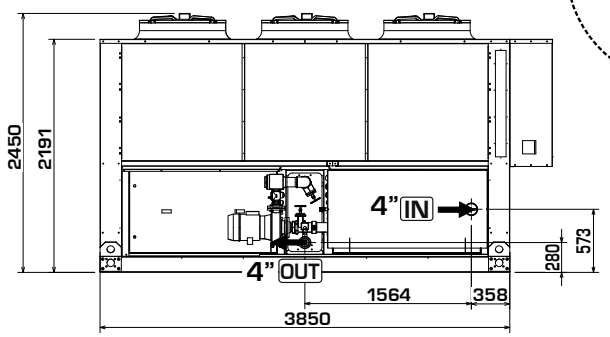


VERSION (00)

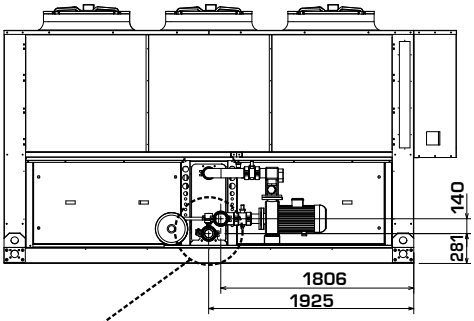


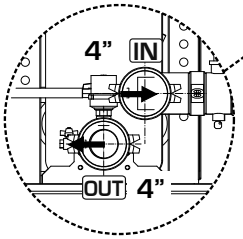


PLUMBING CONNECTIONS FOR HYDRONIC UNIT

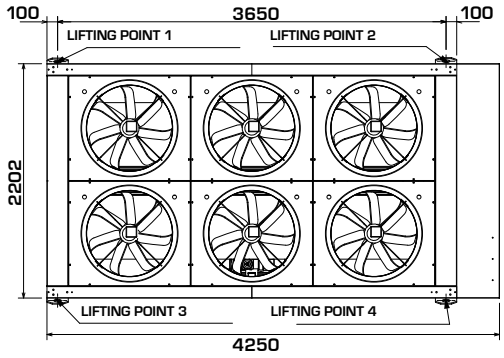


PLUMBING CONNECTIONS FOR PUMP UNIT



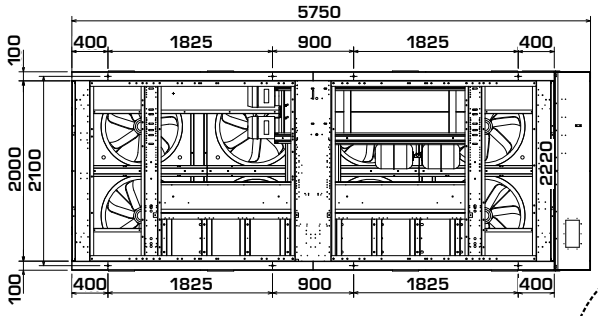


POSITION OF LIFTING POINTS

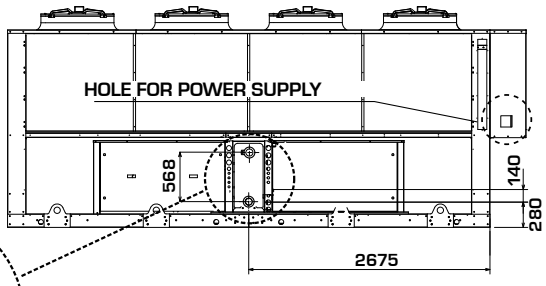


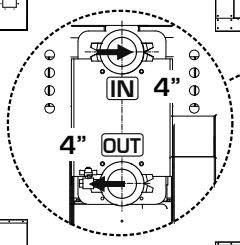
19.4. NRL 1650 - 1800 HIGH EFFICIENCY

POSITION OF VIBRATION DAMPERS

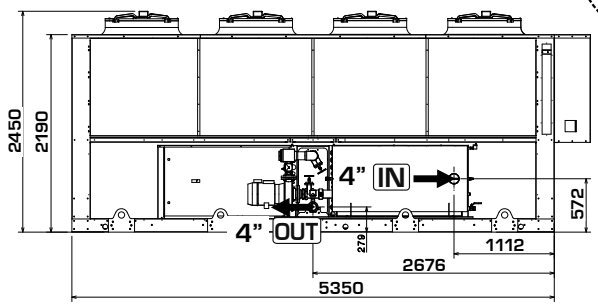


VERSION (00)

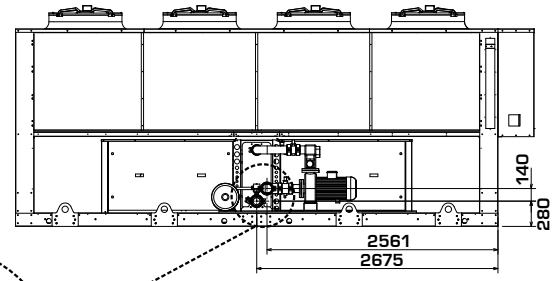


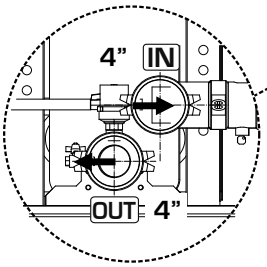


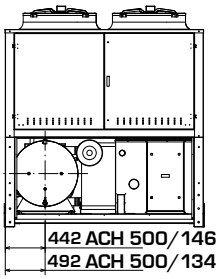
PLUMBING CONNECTIONS FOR HYDRONIC UNIT

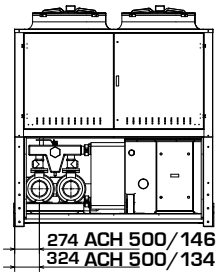


PLUMBING CONNECTIONS FOR PUMP UNIT

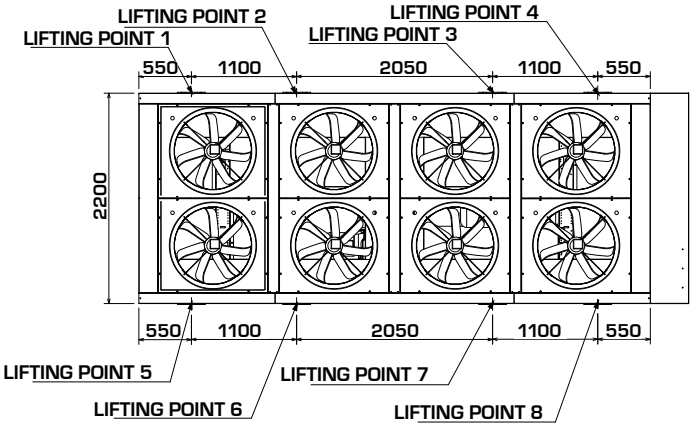




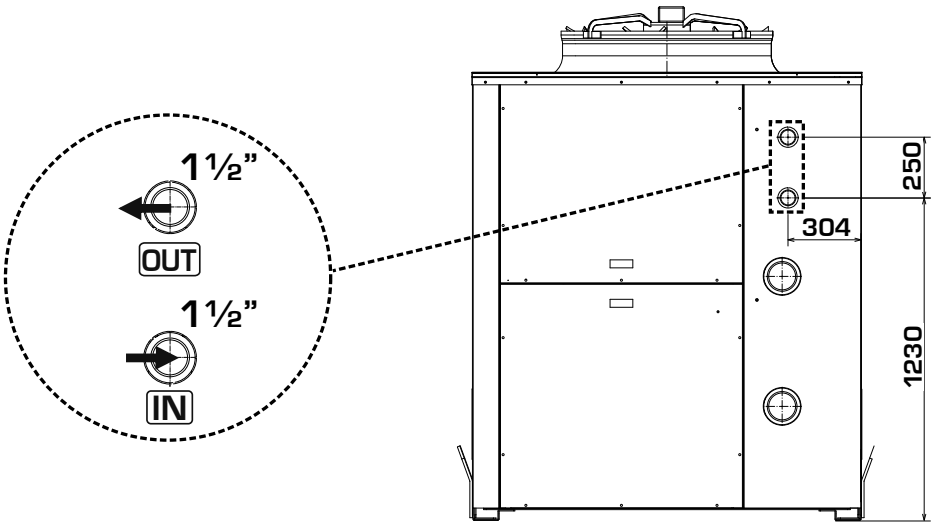




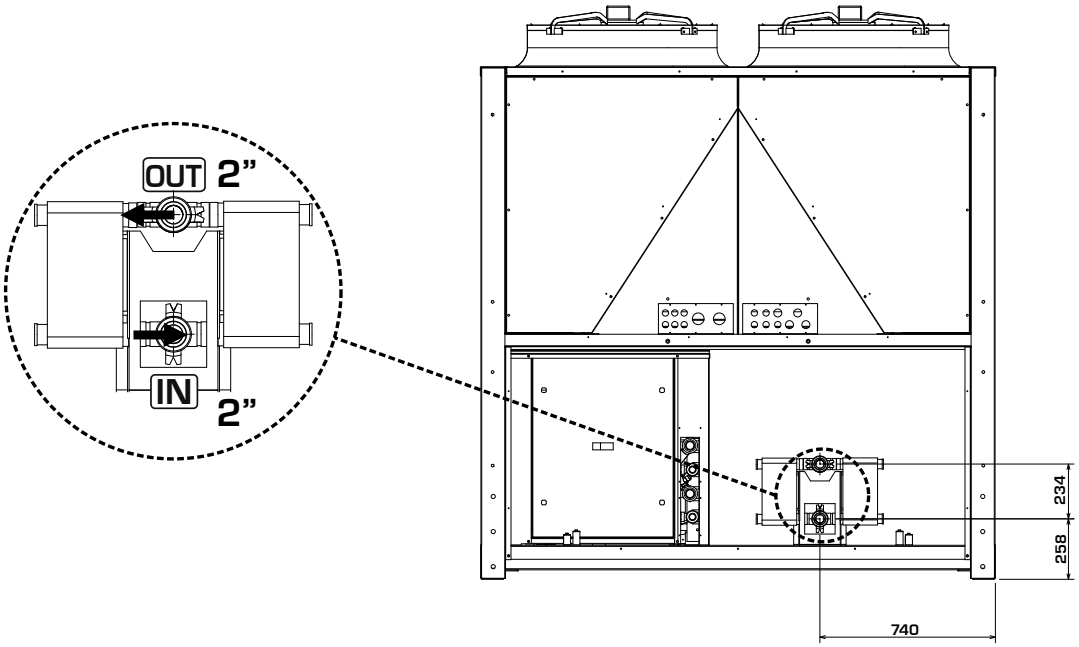
POSITION OF LIFTING POINTS

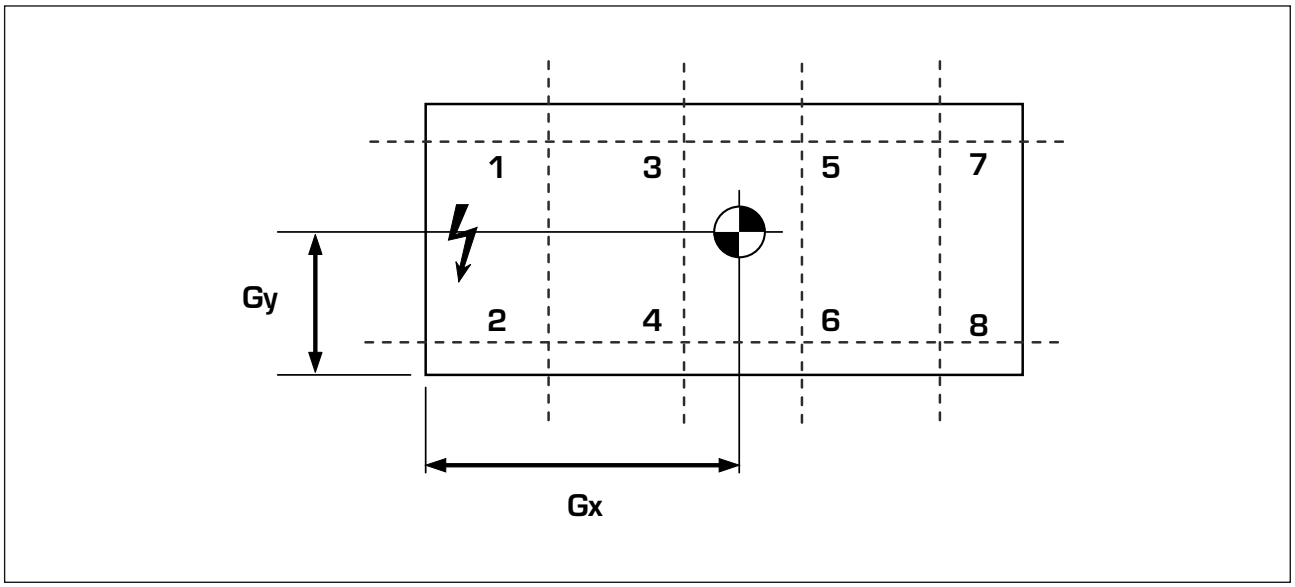


19.5. NRL 0750
DESUPERHEATER (HIGH EFFICIENCY)



19.6. NRL 0800 - 0900 - 1000 - 1250 - 1400 - 1500 - 1650 - 1800
DESUPERHEATER (HIGH EFFICIENCY)





20.1. PERCENTAGE WEIGHT DISTRIBUTION ON THE SUPPORTS VERSION (A - E)

MODEL		EMPTY			OPERATING				PERCENTAGE WEIGHT DISTRIBUTION ON SUPPORTS WITH MACHINE OPERATING (%)								VT KIT
		WEIGHT (kg)	CENTRE OF GRAVITY		TOTAL WEIGHT		CENTRE OF GRAVITY										
			Gy	Gx	kg	Water	Gy	Gx	1	2	3	4	5	6	7	8	
750A	00	1663	723	1,905	1699	36	732	1,909	9%	10%	15%	15%	23%	24%	3%	3%	23
750A	01	1873	726	1,988	2609	736	739	2,097	6%	7%	15%	15%	27%	28%	2%	2%	23
750A	02	1933	727	2,028	2669	736	739	2,124	6%	6%	14%	15%	27%	28%	2%	2%	23
750A	03	1873	726	1,988	2609	736	739	2,097	6%	7%	15%	15%	27%	28%	2%	2%	23
750A	04	1933	727	2,028	2669	736	739	2,124	6%	6%	14%	15%	27%	28%	2%	2%	23
750A	P1	1723	724	1,953	1759	36	733	1,955	9%	9%	14%	15%	23%	24%	3%	3%	23
750A	P2	1783	725	1,997	1819	36	734	1,999	9%	9%	13%	14%	24%	25%	3%	3%	23
750A	P3	1723	724	1,953	1759	36	733	1,955	9%	9%	14%	15%	23%	24%	3%	3%	23
750A	P4	1783	725	1,997	1819	36	734	1,999	9%	9%	13%	14%	24%	25%	3%	3%	23
750 E	00	1663	723	1,905	1699	36	732	1,909	9%	10%	15%	15%	23%	24%	3%	3%	23
750 E	01	1873	726	1,988	2609	736	739	2,097	6%	7%	15%	15%	27%	28%	2%	2%	23
750 E	02	1933	727	2,028	2669	736	739	2,124	6%	6%	14%	15%	27%	28%	2%	2%	23
750 E	03	1873	726	1,988	2609	736	739	2,097	6%	7%	15%	15%	27%	28%	2%	2%	23
750 E	04	1933	727	2,028	2669	736	739	2,124	6%	6%	14%	15%	27%	28%	2%	2%	23
750 E	P1	1723	724	1,953	1759	36	733	1,955	9%	9%	14%	15%	23%	24%	3%	3%	23
750 E	P2	1783	725	1,997	1819	36	734	1,999	9%	9%	13%	14%	24%	25%	3%	3%	23
750 E	P3	1723	724	1,953	1759	36	733	1,955	9%	9%	14%	15%	23%	24%	3%	3%	23
750 E	P4	1783	725	1,997	1819	36	734	1,999	9%	9%	13%	14%	24%	25%	3%	3%	23

MODEL		EMPTY			OPERATING				PERCENTAGE WEIGHT DISTRIBUTION ON SUPPORTS WITH MACHINE OPERATING (%)								VT KIT
		WEIGHT (kg)	CENTRE OF GRAVITY		TOTAL WEIGHT		CENTRE OF GRAVITY										
			Xg	Yg	kg	Water	Xg	Yg	1	2	3	4	5	6	7	8	
800 A	00	2126	1327	843	2139	13	1331	821	11.2 %	18.8 %	19.5 %	32.7%	6.7 %	11.2 %	-	-	704
800 A	01	2446	1317	949	3189	743	1294	1146	17.3 %	15.9 %	25.1 %	23.1%	9.7 %	8.9 %	-	-	705
800 A	02	2486	1315	963	3229	743	1293	1155	17.5 %	15.9 %	25.2 %	22.8%	9.8 %	8.8%	-	-	
800 A	03	2476	1315	960	3219	743	1294	1152	17.5 %	15.9 %	25.2 %	22.9%	9.7 %	8.9 %	-	-	
800 A	04	2546	1313	983	3289	743	1292	1167	17.8 %	15.7 %	25.4%	22.5%	9.9 %	8.8%	-	-	
800 A	P1	2271	1297	884	2360	89	1278	919	13.3 %	18.6 %	21.7%	30.3%	6.7 %	9.4 %	-	-	706
800 A	P2	2311	1289	900	2410	99	1269	935	13.7 %	18.6 %	22.1 %	29.8 %	6.7 %	9.1 %	-	-	
800 A	P3	2301	1291	896	2390	89	1272	930	13.6%	18.6 %	21.9 %	30.0%	6.7 %	9.2 %	-	-	
800 A	P4	2351	1280	915	2430	79	1266	942	13.9 %	18.5%	22.2 %	29.7%	6.7 %	9.0 %	-	-	
800 E	00	2141	1327	843	2154	13	1331	821	11.2 %	18.8 %	19.5 %	32.7%	6.7 %	11.2 %	-	-	704
800 E	01	2461	1317	949	3204	743	1294	1146	17.3 %	15.9 %	25.1 %	23.1%	9.7 %	8.9 %	-	-	705
800 E	02	2501	1315	963	3244	743	1293	1155	17.5 %	15.9 %	25.2 %	22.8%	9.8 %	8.8%	-	-	
800 E	03	2491	1315	960	3234	743	1294	1152	17.5 %	15.9 %	25.2 %	22.9%	9.7 %	8.9 %	-	-	
800 E	04	2561	1313	983	3304	743	1292	1167	17.8 %	15.7 %	25.4%	22.5%	9.9 %	8.8%	-	-	
800 E	P1	2286	1297	884	2375	89	1278	919	13.3 %	18.6 %	21.7%	30.3%	6.7 %	9.4 %	-	-	706
800 E	P2	2326	1289	900	2425	99	1269	935	13.7 %	18.6 %	22.1 %	29.8 %	6.7 %	9.1 %	-	-	
800 E	P3	2316	1291	896	2405	89	1272	930	13.6%	18.6 %	21.9 %	30.0%	6.7 %	9.2 %	-	-	
800 E	P4	2366	1280	915	2445	79	1266	942	13.9 %	18.5%	22.2 %	29.7%	6.7 %	9.0 %	-	-	
900 A	00	2273	1371	814	2287	14	1374	794	10.1%	17.9 %	19.1 %	33.8%	6.9 %	12.2 %	-	-	710
900 A	01	2593	1355	919	3337	744	1325	1113	16.1 %	15.7 %	24.7%	24.1%	9.8 %	9.6 %	-	-	711
900 A	02	2633	1353	931	3377	744	1324	1122	16.3 %	15.7 %	24.8%	23.8%	9.9 %	9.5 %	-	-	
900 A	03	2623	1354	928	3367	744	1325	1119	16.2 %	15.7 %	24.8%	23.9%	9.9 %	9.5 %	-	-	
900 A	04	2693	1350	951	3437	744	1322	1134	16.5 %	15.6 %	25.0%	23.5%	10.0 %	9.4 %	-	-	
900 A	P1	2418	1340	854	2510	92	1321	888	12.2 %	18.0 %	21.2%	31.4%	7.0 %	10.3 %	-	-	712
900 A	P2	2458	1331	869	2550	92	1311	904	12.5 %	17.9 %	21.6 %	30.9%	7.0 %	10.0 %	-	-	
900 A	P3	2448	1333	866	2540	92	1314	899	12.4 %	18.0 %	21.5%	31.1%	7.0 %	10.1%	-	-	
900 A	P4	2498	1323	884	2570	72	1307	911	12.7%	17.9 %	21.7%	30.8%	7.0 %	9.9 %	-	-	
900 E	00	2288	1371	814	2302	14	1374	794	10.1%	17.9 %	19.1 %	33.8%	6.9 %	12.2 %	-	-	710
900 E	01	2608	1355	918	3352	744	1325	1113	16.1 %	15.7 %	24.7%	24.1%	9.8 %	9.6 %	-	-	711
900 E	02	2648	1353	931	3392	744	1324	1122	16.3 %	15.7 %	24.8%	23.8%	9.9 %	9.5 %	-	-	
900 E	03	2638	1354	928	3382	744	1325	1119	16.2 %	15.7 %	24.8%	23.9%	9.9 %	9.5 %	-	-	
900 E	04	2708	1350	951	3452	744	1322	1134	16.5 %	15.6 %	25.0%	23.5%	10.0 %	9.4 %	-	-	
900 E	P1	2433	1340	854	2525	92	1321	888	12.2 %	18.0 %	21.2%	31.4%	7.0 %	10.3 %	-	-	712
900 E	P2	2473	1331	869	2565	92	1311	904	12.5 %	17.9 %	21.6 %	30.9%	7.0 %	10.0 %	-	-	
900 E	P3	2463	1333	866	2555	92	1314	899	12.4 %	18.0 %	21.5%	31.1%	7.0 %	10.1%	-	-	
900 E	P4	2513	1323	884	2585	72	1307	911	12.7%	17.9 %	21.7%	30.8%	7.0 %	9.9 %	-	-	

MODEL		EMPTY			OPERATING				PERCENTAGE WEIGHT DISTRIBUTION ON SUPPORTS WITH MACHINE OPERATING (%)								VT KIT
		WEIGHT (kg)	CENTRE OF GRAVITY		TOTAL WEIGHT		CENTRE OF GRAVITY										
			Xg	Yg	kg	Water	Xg	Yg	1	2	3	4	5	6	7	8	
1000 A	00	2423	1351	812	2439	16	1354	793	10.2 %	18.1 %	19.4%	34.4 %	6.5 %	11.5 %	-	-	716
1000 A	01	2743	1339	910	3489	746	1314	1098	15.9 %	16.0 %	24.8%	24.8%	9.3 %	9.3 %	-	-	711
1000 A	02	2783	1337	923	3529	746	1312	1107	16.1 %	15.9 %	24.9%	24.6%	9.3 %	9.2 %	-	-	
1000 A	03	2773	1337	920	3519	746	1313	1104	16.0 %	15.9 %	24.8%	24.6%	9.3 %	9.2 %	-	-	
1000 A	04	2843	1335	942	3589	746	1311	1119	16.3 %	15.8 %	25.1 %	24.2%	9.5 %	9.1 %	-	-	
1000 A	P1	2568	1323	850	2660	92	1305	882	12.1 %	18.1 %	21.4%	32.0%	6.6 %	9.8 %	-	-	712
1000 A	P2	2608	1315	864	2700	92	1297	897	12.5 %	18.1 %	21.8 %	31.6%	6.6 %	9.5 %	-	-	
1000 A	P3	2598	1317	861	2690	92	1300	892	12.4 %	18.1 %	21.6 %	31.7%	6.6 %	9.6 %	-	-	
1000 A	P4	2648	1307	879	2720	72	1293	904	12.6 %	18.1 %	21.9 %	31.4%	6.6 %	9.4 %	-	-	
1000 E	00	2438	1351	812	2454	16	1354	793	10.2 %	18.1 %	19.4%	34.4 %	6.5 %	11.5 %	-	-	716
1000 E	01	2758	1339	910	3504	746	1314	1098	15.9 %	16.0 %	24.8%	24.8%	9.3 %	9.3 %	-	-	711
1000 E	02	2798	1337	923	3544	746	1312	1107	16.1 %	15.9 %	24.9%	24.6%	9.3 %	9.2 %	-	-	
1000 E	03	2788	1337	920	3534	746	1313	1104	16.0 %	15.9 %	24.8%	24.6%	9.3 %	9.2 %	-	-	
1000 E	04	2858	1335	942	3604	746	1311	1119	16.3 %	15.8 %	25.1 %	24.2%	9.5 %	9.1 %	-	-	
1000 E	P1	2583	1323	850	2675	92	1305	882	12.1 %	18.1 %	21.4%	32.0%	6.6 %	9.8 %	-	-	712
1000 E	P2	2623	1315	864	2715	92	1297	897	12.5 %	18.1 %	21.8 %	31.6%	6.6 %	9.5 %	-	-	
1000 E	P3	2613	1317	861	2705	92	1300	892	12.4 %	18.1 %	21.6 %	31.7%	6.6 %	9.6 %	-	-	
1000 E	P4	2663	1307	879	2735	72	1293	904	12.6 %	18.1 %	21.9 %	31.4%	6.6 %	9.4 %	-	-	
1250 A	00	2718	1751	813	2738	20	1748	796	10.5 %	18.5%	18.7 %	33.1%	7.0 %	12.3 %	-	-	719
1250 A	01	3043	1679	902	3793	750	1568	1075	16.7 %	17.5 %	25.0%	26.2 %	7.2 %	7.5 %	-	-	720
1250 A	02	3088	1671	915	3838	750	1562	1084	16.9 %	17.4%	25.2 %	25.9 %	7.1 %	7.4 %	-	-	
1250 A	03	3073	1672	911	3823	750	1564	1081	16.9 %	17.5 %	25.1 %	26.0 %	7.1 %	7.4 %	-	-	
1250 A	04	3148	1660	932	3898	750	1555	1095	17.2 %	17.4%	25.4%	25.7%	7.1 %	7.2 %	-	-	
1250 A	P1	2868	1715	848	2970	102	1697	875	12.1 %	18.3 %	20.5%	31.1%	7.1 %	10.8 %	-	-	721
1250 A	P2	2913	1705	862	3020	107	1688	889	12.4 %	18.3 %	20.9 %	30.8%	7.2 %	10.6 %	-	-	
1250 A	P3	2898	1708	858	3000	102	1691	884	12.3 %	18.3 %	20.7%	30.9%	7.1 %	10.6 %	-	-	
1250 A	P4	2953	1697	875	3040	87	1684	895	12.5 %	18.3 %	21.0 %	30.6%	7.2 %	10.4%	-	-	
1250 E	00	2733	1751	813	2753	20	1748	796	10.5 %	18.5%	18.7 %	33.1%	7.0 %	12.3 %	-	-	719
1250 E	01	3058	1679	902	3808	750	1568	1075	16.7 %	17.5 %	25.0%	26.2 %	7.2 %	7.5 %	-	-	720
1250 E	02	3103	1671	915	3853	750	1562	1084	16.9 %	17.4%	25.2 %	25.9 %	7.1 %	7.4 %	-	-	
1250 E	03	3088	1672	911	3838	750	1564	1081	16.9 %	17.5 %	25.1 %	26.0 %	7.1 %	7.4 %	-	-	
1250 E	04	3163	1660	932	3913	750	1555	1095	17.2 %	17.4%	25.4%	25.7%	7.1 %	7.2 %	-	-	
1250 E	P1	2883	1715	848	2985	102	1697	875	12.1 %	18.3 %	20.5%	31.1%	7.1 %	10.8 %	-	-	721
1250 E	P2	2928	1705	862	3035	107	1688	889	12.4 %	18.3 %	20.9 %	30.8%	7.2 %	10.6 %	-	-	
1250 E	P3	2913	1708	858	3015	102	1691	884	12.3 %	18.3 %	20.7%	30.9%	7.1 %	10.6 %	-	-	
1250 E	P4	2968	1697	875	3055	87	1684	895	12.5 %	18.3 %	21.0 %	30.6%	7.2 %	10.4%	-	-	
1400 A	00	2924	1788	905	2947	23	1789	907	10.9 %	15.6 %	22.4 %	32.0%	7.8 %	11.2 %	-	-	725
1400 A	01	3249	1719	995	4002	753	1607	1143	16.7 %	15.5 %	27.6 %	25.5 %	7.6 %	7.1 %	-	-	726
1400 A	02	3294	1710	1006	4047	753	1601	1150	16.9 %	15.4 %	27.7 %	25.3 %	7.6 %	7.0 %	-	-	
1400 A	03	3279	1713	1002	4032	753	1603	1148	16.8 %	15.4 %	27.7 %	25.4%	7.6 %	7.0 %	-	-	
1400 A	04	3354	1699	1020	4107	753	1594	1160	17.2 %	15.4 %	27.9 %	25.1 %	7.6 %	6.8 %	-	-	
1400 A	P1	3074	1754	948	3170	96	1738	973	12.4 %	15.7 %	23.9%	30.2%	7.9 %	9.9 %	-	-	727
1400 A	P2	3119	1744	961	3210	91	1729	984	12.7%	15.7 %	24.2%	29.8 %	7.9 %	9.7 %	-	-	
1400 A	P3	3104	1748	957	3200	96	1732	981	12.6 %	15.7 %	24.1%	30.0%	7.9 %	9.8 %	-	-	
1400 A	P4	3159	1736	972	3230	71	1725	989	12.8 %	15.7 %	24.3%	29.7%	7.9 %	9.6 %	-	-	
1400 E	00	2939	1788	905	2962	23	1789	907	10.9 %	15.6 %	22.4 %	32.0%	7.8 %	11.2 %	-	-	725
1400 E	01	3264	1719	995	4017	753	1607	1143	16.7 %	15.5 %	27.6 %	25.5 %	7.6 %	7.1 %	-	-	726
1400 E	02	3309	1710	1006	4062	753	1601	1150	16.9 %	15.4 %	27.7 %	25.3 %	7.6 %	7.0 %	-	-	
1400 E	03	3294	1713	1002	4047	753	1603	1148	16.8 %	15.4 %	27.7 %	25.4%	7.6 %	7.0 %	-	-	
1400 E	04	3369	1699	1020	4122	753	1594	1160	17.2 %	15.4 %	27.9 %	25.1 %	7.6 %	6.8 %	-	-	
1400 E	P1	3089	1754	948	3185	96	1738	973	12.4 %	15.7 %	23.9%	30.2%	7.9 %	9.9 %	-	-	727
1400 E	P2	3134	1744	961	3225	91	1729	984	12.7%	15.7 %	24.2%	29.8 %	7.9 %	9.7 %	-	-	
1400 E	P3	3119	1748	957	3215	96	1732	981	12.6 %	15.7 %	24.1%	30.0%	7.9 %	9.8 %	-	-	
1400 E	P4	3174	1736	972	3245	71	1725	989	12.8 %	15.7 %	24.3%	29.7%	7.9 %	9.6 %	-	-	

MODEL		EMPTY			OPERATING				PERCENTAGE WEIGHT DISTRIBUTION ON SUPPORTS WITH MACHINE OPERATING (%)								VT KIT
		WEIGHT (kg)	CENTRE OF GRAVITY		TOTAL WEIGHT		CENTRE OF GRAVITY										
			Xg	Yg	kg	Water	Xg	Yg	1	2	3	4	5	6	7	8	
1500 A	00	3146	1771	767	3172	26	1772	771	8.9 %	16.6 %	20.1 %	37.3 %	6.0 %	11.1 %	-	-	730
1500 A	01	3501	1702	873	4257	756	1600	1034	14.7 %	16.6 %	26.0 %	29.3%	6.3 %	7.1 %	-	-	731
1500 A	02	3576	1690	892	4332	756	1591	1047	15.0 %	16.5 %	26.3 %	28.9%	6.3 %	6.9 %	-	-	
1500 A	03	3501	1702	873	4257	756	1600	1034	14.7 %	16.6 %	26.0 %	29.3%	6.3 %	7.1 %	-	-	
1500 A	04	3576	1690	892	4332	756	1591	1047	15.0 %	16.5 %	26.3 %	28.9%	6.3 %	6.9 %	-	-	
1500 A	P1	3326	1734	824	3420	94	1720	851	10.5 %	16.7 %	21.9 %	34.8 %	6.2 %	9.8 %	-	-	732
1500 A	P2	3401	1720	845	3490	89	1707	871	11.0 %	16.7 %	22.4 %	34.2%	6.2 %	9.5 %	-	-	
1500 A	P3	3326	1734	824	3420	94	1720	851	10.5 %	16.7 %	21.9 %	34.8 %	6.2 %	9.8 %	-	-	
1500 A	P4	3381	1724	840	3450	69	1714	860	10.7 %	16.7 %	22.2 %	34.5%	6.2 %	9.7 %	-	-	
1500 E	00	3161	1771	767	3187	26	1772	771	8.9 %	16.6 %	20.1 %	37.3 %	6.0 %	11.1 %	-	-	730
1500 E	01	3516	1702	873	4272	756	1600	1034	14.7 %	16.6 %	26.0 %	29.3%	6.3 %	7.1 %	-	-	731
1500 E	02	3591	1690	892	4347	756	1591	1047	15.0 %	16.5 %	26.3 %	28.9%	6.3 %	6.9 %	-	-	
1500 E	03	3516	1702	873	4272	756	1600	1034	14.7 %	16.6 %	26.0 %	29.3%	6.3 %	7.1 %	-	-	
1500 E	04	3591	1690	892	4347	756	1591	1047	15.0 %	16.5 %	26.3 %	28.9%	6.3 %	6.9 %	-	-	
1500 E	P1	3341	1734	824	3435	94	1720	851	10.5 %	16.7 %	21.9 %	34.8 %	6.2 %	9.8 %	-	-	732
1500 E	P2	3416	1720	845	3505	89	1707	871	11.0 %	16.7 %	22.4 %	34.2%	6.2 %	9.5 %	-	-	
1500 E	P3	3341	1734	824	3435	94	1720	851	10.5 %	16.7 %	21.9 %	34.8 %	6.2 %	9.8 %	-	-	
1500 E	P4	3396	1724	840	3465	69	1714	860	10.7 %	16.7 %	22.2 %	34.5%	6.2 %	9.7 %	-	-	
1650 A	00	3637	2503	789	3667	30	2504	792	8.4%	15.0 %	11.7 %	20.7%	9.8 %	17.5 %	6.1 %	10.8 %	734
1650 A	01	3992	2475	879	4752	760	2433	1023	9.8 %	11.3 %	18.0 %	20.7%	12.7%	14.7 %	5.9 %	6.8 %	735
1650 A	02	4067	2470	896	4827	760	2429	1035	9.9 %	11.2 %	18.3 %	20.7%	12.9 %	14.5%	5.9 %	6.6 %	
1650 A	03	4022	2473	886	4782	760	2431	1028	9.9 %	11.3 %	18.1 %	20.7%	12.8 %	14.6 %	5.9 %	6.8 %	
1650 A	04	4127	2466	909	4887	760	2426	1044	10.0 %	11.0 %	18.6 %	20.6 %	13.0 %	14.4 %	5.9 %	6.5 %	
1650 A	P1	3817	2488	837	3920	103	2483	860	8.9 %	13.9 %	13.4 %	20.9 %	10.7 %	16.6 %	6.1 %	9.6 %	736
1650 A	P2	3892	2482	855	3990	98	2478	878	9.0 %	13.6%	13.8 %	20.9 %	10.9 %	16.4 %	6.1 %	9.2 %	
1650 A	P3	3847	2486	844	3950	103	2481	867	8.9 %	13.7 %	13.6%	20.9 %	10.8 %	16.5 %	6.1 %	9.4 %	
1650 A	P4	3932	2479	865	4010	78	2476	882	9.0 %	13.5 %	14.0 %	20.9 %	11.0 %	16.4 %	6.1 %	9.2 %	
1650 E	00	3652	2503	789	3682	30	2504	792	8.4%	15.0 %	11.7 %	20.7%	9.8 %	17.5 %	6.1 %	10.8 %	734
1650 E	01	4007	2475	879	4767	760	2433	1023	9.8 %	11.3 %	18.0 %	20.7%	12.7%	14.7 %	5.9 %	6.8 %	735
1650 E	02	4082	2470	896	4842	760	2429	1035	9.9 %	11.2 %	18.3 %	20.7%	12.9 %	14.5%	5.9 %	6.6 %	
1650 E	03	4037	2473	886	4797	760	2431	1028	9.9 %	11.3 %	18.1 %	20.7%	12.8 %	14.6 %	5.9 %	6.8 %	
1650 E	04	4142	2466	909	4902	760	2426	1044	10.0 %	11.0 %	18.6 %	20.6 %	13.0 %	14.4 %	5.9 %	6.5 %	
1650 E	P1	3832	2488	837	3935	103	2483	860	8.9 %	13.9 %	13.4 %	20.9 %	10.7 %	16.6 %	6.1 %	9.6 %	736
1650 E	P2	3907	2482	855	4005	98	2478	878	9.0 %	13.6%	13.8 %	20.9 %	10.9 %	16.4 %	6.1 %	9.2 %	
1650 E	P3	3862	2486	844	3965	103	2481	867	8.9 %	13.7 %	13.6%	20.9 %	10.8 %	16.5 %	6.1 %	9.4 %	
1650 E	P4	3947	2479	865	4025	78	2476	882	9.0 %	13.5 %	14.0 %	20.9 %	11.0 %	16.4 %	6.1 %	9.2 %	
1800 A	00	3764	2500	803	3797	33	2502	807	8.5 %	14.7 %	12.1 %	20.9 %	9.9 %	17.0 %	6.2 %	10.7 %	737
1800 A	01	4119	2473	890	4882	763	2432	1029	9.9 %	11.3 %	18.2 %	20.7%	12.7%	14.4 %	6.0 %	6.8 %	738
1800 A	02	4194	2468	906	4957	763	2429	1041	9.9 %	11.1 %	18.6 %	20.7%	12.8 %	14.3%	6.0 %	6.6 %	
1800 A	03	4149	2471	897	4912	763	2431	1034	9.9 %	11.2 %	18.4 %	20.7%	12.7%	14.4 %	6.0 %	6.8 %	
1800 A	04	4254	2464	919	5017	763	2426	1050	10.0 %	10.9 %	18.9%	20.7%	12.9 %	14.2 %	5.9 %	6.5 %	
1800 A	P1	3944	2485	849	4040	96	2481	872	9.0 %	13.7 %	13.8 %	20.9 %	10.7 %	16.3 %	6.2 %	9.5 %	736
1800 A	P2	4019	2480	867	4110	91	2476	889	9.1 %	13.4 %	14.2 %	20.9 %	10.9 %	16.1 %	6.2 %	9.2 %	
1800 A	P3	3974	2483	856	4070	96	2479	879	9.0 %	13.6%	13.9 %	20.9 %	10.8 %	16.2 %	6.2 %	9.3 %	
1800 A	P4	4059	2477	876	4130	71	2475	894	9.1 %	13.3 %	14.3%	20.9 %	11.0 %	16.0 %	6.2 %	9.1 %	
1800 E	00	3779	2500	803	3812	33	2502	807	8.5 %	14.7 %	12.1 %	20.9 %	9.9 %	17.0 %	6.2 %	10.7 %	737
1800 E	01	4134	2473	890	4897	763	2432	1029	9.9 %	11.3 %	18.2 %	20.7%	12.7%	14.4 %	6.0 %	6.8 %	738
1800 E	02	4209	2468	906	4972	763	2429	1041	9.9 %	11.1 %	18.6 %	20.7%	12.8 %	14.3%	6.0 %	6.6 %	
1800 E	03	4164	2471	897	4927	763	2431	1034	9.9 %	11.2 %	18.4 %	20.7%	12.7%	14.4 %	6.0 %	6.8 %	
1800 E	04	4269	2464	919	5032	763	2426	1050	10.0 %	10.9 %	18.9%	20.7%	12.9 %	14.2 %	5.9 %	6.5 %	
1800 E	P1	3959	2485	849	4055	96	2481	872	9.0 %	13.7 %	13.8 %	20.9 %	10.7 %	16.3 %	6.2 %	9.5 %	736
1800 E	P2	4034	2480	867	4125	91	2476	889	9.1 %	13.4 %	14.2 %	20.9 %	10.9 %	16.1 %	6.2 %	9.2 %	
1800 E	P3	3989	2483	856	4085	96	2479	879	9.0 %	13.6%	13.9 %	20.9 %	10.8 %	16.2 %	6.2 %	9.3 %	
1800 E	P4	4074	2477	876	4145	71	2475	894	9.1 %	13.3 %	14.3%	20.9 %	11.0 %	16.0 %	6.2 %	9.1 %	

20.2. PERCENTAGE WEIGHT DISTRIBUTION ON THE SUPPORTS VERSION (HA - HE)

MODEL		EMPTY			OPERATING				PERCENTAGE WEIGHT DISTRIBUTION ON SUPPORTS WITH MACHINE OPERATING (%)								VT KIT
		WEIGHT (kg)	CENTRE OF GRAVITY		TOTAL WEIGHT		CENTRE OF GRAVITY										
			Gy	Gx	kg	Water	Gy	Gx	1	2	3	4	5	6	7	8	
750 HA-HE	00	1748	775	1865	1788	40	767	1868	9%	10%	15%	16 %	22 %	23%	3%	3%	23
750 HA-HE	01	1958	773	1949	2698	740	761	2064	7%	7%	15%	15%	26 %	27%	2%	2%	23
750 HA-HE	02	2018	772	1988	2758	740	761	2090	7%	7%	15%	15%	27%	27%	2%	2%	23
750 HA-HE	03	1958	773	1949	2698	740	761	2064	7%	7%	15%	15%	26 %	27%	2%	2%	23
750 HA-HE	04	2018	772	1988	2758	740	761	2090	7%	7%	15%	15%	27%	27%	2%	2%	23
750 HA-HE	P1	1808	774	1912	1848	40	766	1913	9%	10%	15%	15%	22 %	23%	3%	3%	23
750 HA-HE	P2	1868	774	1956	1908	40	766	1956	9%	9%	14%	15%	23%	24%	3%	3%	23
750 HA-HE	P3	1808	774	1912	1848	40	766	1913	9%	10%	15%	15%	22 %	23%	3%	3%	23
750 HA-HE	P4	1868	774	1956	1908	40	766	1956	9%	9%	14%	15%	23%	24%	3%	3%	23

MODEL		EMPTY			OPERATING				PERCENTAGE WEIGHT DISTRIBUTION ON SUPPORTS WITH MACHINE OPERATING (%)								VT KIT
		WEIGHT (kg)	CENTRE OF GRAVITY		TOTAL WEIGHT		CENTRE OF GRAVITY										
			Gy	Gx	kg	Water	Gy	Gx	1	2	3	4	5	6	7	8	
800 HA	00	2150	1333	816	2160	10	1334	818	11.0 %	18.5%	19.6 %	33.2 %	6.6 %	11.1 %	-	-	704
800 HA	01	2470	1318	943	3210	740	1297	1139	17.1 %	15.9 %	25.2 %	23.5%	9.5 %	8.9 %	-	-	705
800 HA	02	2510	1317	957	3250	740	1296	1147	17.2 %	15.8 %	25.3 %	23.2 %	9.6 %	8.8%	-	-	
800 HA	03	2500	1317	954	3240	740	1296	1145	17.2 %	15.8 %	25.3 %	23.3 %	9.6 %	8.8%	-	-	
800 HA	04	2570	1314	977	3310	740	1294	1159	17.5 %	15.7 %	25.5 %	22.9%	9.7 %	8.7 %	-	-	
800 HA	P1	2290	1299	878	2390	100	1283	912	13.1 %	18.4 %	21.8 %	30.8%	6.6 %	9.3 %	-	-	706
800 HA	P2	2330	1291	894	2430	100	1275	927	13.4 %	18.4 %	22.1 %	30.4 %	6.6 %	9.1 %	-	-	
800 HA	P3	2320	1293	890	2420	100	1277	923	13.3 %	18.4 %	22.0 %	30.5 %	6.6 %	9.1 %	-	-	
800 HA	P4	2370	1282	909	2470	100	1267	941	13.7 %	18.4 %	22.4 %	30.0%	6.6 %	8.8%	-	-	
800 HE	00	2155	1333	816	2165	10	1334	818	11.0 %	18.5%	19.6 %	33.2 %	6.6 %	11.1 %	-	-	704
800 HE	01	2475	1318	943	3215	740	1297	1139	17.1 %	15.9 %	25.2 %	23.5%	9.5 %	8.9 %	-	-	705
800 HE	02	2515	1317	957	3255	740	1296	1147	17.2 %	15.8 %	25.3 %	23.2 %	9.6 %	8.8%	-	-	
800 HE	03	2505	1317	954	3245	740	1296	1145	17.2 %	15.8 %	25.3 %	23.3 %	9.6 %	8.8%	-	-	
800 HE	04	2575	1314	977	3315	740	1294	1159	17.5 %	15.7 %	25.5 %	22.9%	9.7 %	8.7 %	-	-	
800 HE	P1	2295	1299	878	2395	100	1283	912	13.1 %	18.4 %	21.8 %	30.8%	6.6 %	9.3 %	-	-	706
800 HE	P2	2335	1291	894	2435	100	1275	927	13.4 %	18.4 %	22.1 %	30.4 %	6.6 %	9.1 %	-	-	
800 HE	P3	2325	1293	890	2425	100	1277	923	13.3 %	18.4 %	22.0 %	30.5 %	6.6 %	9.1 %	-	-	
800 HE	P4	2375	1282	909	2475	100	1267	941	13.7 %	18.4 %	22.4 %	30.0%	6.6 %	8.8%	-	-	
900 HA	00	2300	1376	789	2320	20	1377	792	9.9 %	17.7 %	19.3 %	34.3 %	6.8 %	12.0 %	-	-	710
900 HA	01	2620	1357	913	3360	740	1328	1106	15.8 %	15.7 %	24.8%	24.5 %	9.6 %	9.5 %	-	-	711
900 HA	02	2660	1355	926	3400	740	1327	1114	16.0 %	15.6 %	24.9%	24.3%	9.7 %	9.5 %	-	-	
900 HA	03	2650	1355	923	3390	740	1327	1112	16.0 %	15.6 %	24.9%	24.3%	9.7 %	9.5 %	-	-	
900 HA	04	2720	1352	945	3460	740	1325	1126	16.2 %	15.5 %	25.1 %	23.9%	9.8 %	9.4 %	-	-	
900 HA	P1	2440	1342	849	2540	100	1325	883	11.9 %	17.7 %	21.4%	31.9 %	6.9 %	10.2 %	-	-	712
900 HA	P2	2480	1333	864	2580	100	1316	897	12.2 %	17.7 %	21.7%	31.5 %	6.9 %	10.0 %	-	-	
900 HA	P3	2470	1335	860	2570	100	1318	893	12.1 %	17.7 %	21.6 %	31.6%	6.9 %	10.0 %	-	-	
900 HA	P4	2520	1324	879	2620	100	1309	911	12.5 %	17.7 %	22.0 %	31.1%	6.9 %	9.7 %	-	-	
900 HE	00	2305	1376	789	2325	20	1377	792	9.9 %	17.7 %	19.3 %	34.3 %	6.8 %	12.0 %	-	-	710
900 HE	01	2625	1357	913	3365	740	1328	1106	15.8 %	15.7 %	24.8%	24.5 %	9.6 %	9.5 %	-	-	711
900 HE	02	2665	1355	926	3405	740	1327	1114	16.0 %	15.6 %	24.9%	24.3%	9.7 %	9.5 %	-	-	
900 HE	03	2655	1355	923	3395	740	1327	1112	16.0 %	15.6 %	24.9%	24.3%	9.7 %	9.5 %	-	-	
900 HE	04	2725	1352	945	3465	740	1325	1126	16.2 %	15.5 %	25.1 %	23.9%	9.8 %	9.4 %	-	-	
900 HE	P1	2445	1342	849	2545	100	1325	883	11.9 %	17.7 %	21.4%	31.9 %	6.9 %	10.2 %	-	-	712
900 HE	P2	2485	1333	864	2585	100	1316	897	12.2 %	17.7 %	21.7%	31.5 %	6.9 %	10.0 %	-	-	
900 HE	P3	2475	1335	860	2575	100	1318	893	12.1 %	17.7 %	21.6 %	31.6%	6.9 %	10.0 %	-	-	
900 HE	P4	2525	1324	879	2625	100	1309	911	12.5 %	17.7 %	22.0 %	31.1%	6.9 %	9.7 %	-	-	

MODEL		EMPTY			OPERATING				PERCENTAGE WEIGHT DISTRIBUTION ON SUPPORTS WITH MACHINE OPERATING (%)								VT KIT
		WEIGHT (kg)	CENTRE OF GRAVITY		TOTAL WEIGHT		CENTRE OF GRAVITY										
			Xg	Yg	kg	Water	Xg	Yg	1	2	3	4	5	6	7	8	
1000 HA	00	2460	1356	787	2480	20	1358	790	10.0 %	17.8 %	19.6 %	35.0 %	6.3 %	11.3 %	-	-	716
1000 HA	01	2780	1341	904	3530	750	1317	1091	15.6 %	15.8 %	24.9%	25.3 %	9.1 %	9.2 %	-	-	711
1000 HA	02	2820	1339	917	3570	750	1316	1099	15.7 %	15.8 %	25.0%	25.1 %	9.2 %	9.2 %	-	-	
1000 HA	03	2810	1339	914	3560	750	1316	1097	15.7 %	15.8 %	25.0%	25.2 %	9.1 %	9.2 %	-	-	
1000 HA	04	2880	1337	935	3630	750	1314	1110	16.0 %	15.7 %	25.2 %	24.8%	9.3 %	9.1 %	-	-	
1000 HA	P1	2600	1325	844	2710	110	1310	876	11.8 %	17.9 %	21.6 %	32.6 %	6.4 %	9.7 %	-	-	712
1000 HA	P2	2640	1318	858	2750	110	1303	890	12.1 %	17.8 %	21.9 %	32.3 %	6.4 %	9.5 %	-	-	
1000 HA	P3	2630	1319	855	2740	110	1305	886	12.0 %	17.8 %	21.8 %	32.4 %	6.4 %	9.5 %	-	-	
1000 HA	P4	2680	1310	872	2790	110	1296	903	12.4 %	17.8 %	22.2 %	31.9 %	6.4 %	9.2 %	-	-	
1000 HE	00	2465	1356	787	2485	20	1358	790	10.0 %	17.8 %	19.6 %	35.0 %	6.3 %	11.3 %	-	-	716
1000 HE	01	2785	1341	904	3535	750	1317	1091	15.6 %	15.8 %	24.9%	25.3 %	9.1 %	9.2 %	-	-	711
1000 HE	02	2825	1339	917	3575	750	1316	1099	15.7 %	15.8 %	25.0%	25.1 %	9.2 %	9.2 %	-	-	
1000 HE	03	2815	1339	914	3565	750	1316	1097	15.7 %	15.8 %	25.0%	25.2 %	9.1 %	9.2 %	-	-	
1000 HE	04	2885	1337	935	3635	750	1314	1110	16.0 %	15.7 %	25.2 %	24.8%	9.3 %	9.1 %	-	-	
1000 HE	P1	2605	1325	844	2715	110	1310	876	11.8 %	17.9 %	21.6 %	32.6 %	6.4 %	9.7 %	-	-	712
1000 HE	P2	2645	1318	858	2755	110	1303	890	12.1 %	17.8 %	21.9 %	32.3 %	6.4 %	9.5 %	-	-	
1000 HE	P3	2635	1319	855	2745	110	1305	886	12.0 %	17.8 %	21.8 %	32.4 %	6.4 %	9.5 %	-	-	
1000 HE	P4	2685	1310	872	2795	110	1296	903	12.4 %	17.8 %	22.2 %	31.9 %	6.4 %	9.2 %	-	-	
1250 HA	00	2750	1749	791	2775	25	1751	794	10.3 %	18.2 %	18.9%	33.6 %	6.8 %	12.1 %	-	-	719
1250 HA	01	3070	1682	896	3830	760	1572	1071	16.5 %	17.4%	25.1 %	26.5 %	7.1 %	7.4 %	-	-	720
1250 HA	02	3110	1674	907	3870	760	1567	1077	16.6 %	17.3 %	25.3 %	26.3 %	7.1 %	7.3 %	-	-	
1250 HA	03	3100	1676	905	3860	760	1569	1075	16.6 %	17.4%	25.2 %	26.4 %	7.1 %	7.4 %	-	-	
1250 HA	04	3170	1663	924	3930	760	1560	1088	16.9 %	17.3 %	25.5 %	26.1 %	7.0 %	7.2 %	-	-	
1250 HA	P1	2900	1717	841	3010	110	1701	871	11.9 %	18.1 %	20.7%	31.6%	7.0 %	10.7 %	-	-	721
1250 HA	P2	2940	1708	854	3050	110	1693	883	12.1 %	18.1 %	21.0 %	31.3 %	7.0 %	10.5 %	-	-	
1250 HA	P3	2930	1711	851	3040	110	1695	880	12.1 %	18.1 %	20.9 %	31.3 %	7.0 %	10.6 %	-	-	
1250 HA	P4	2980	1700	867	3090	110	1685	895	12.4 %	18.1 %	21.2%	31.0 %	7.1 %	10.3 %	-	-	
1250 HE	00	2755	1749	791	2780	25	1751	794	10.3 %	18.2 %	18.9%	33.6 %	6.8 %	12.1 %	-	-	719
1250 HE	01	3075	1682	896	3835	760	1572	1071	16.5 %	17.4%	25.1 %	26.5 %	7.1 %	7.4 %	-	-	720
1250 HE	02	3115	1674	907	3875	760	1567	1077	16.6 %	17.3 %	25.3 %	26.3 %	7.1 %	7.3 %	-	-	
1250 HE	03	3105	1676	905	3865	760	1569	1075	16.6 %	17.4%	25.2 %	26.4 %	7.1 %	7.4 %	-	-	
1250 HE	04	3175	1663	924	3935	760	1560	1088	16.9 %	17.3 %	25.5 %	26.1 %	7.0 %	7.2 %	-	-	
1250 HE	P1	2905	1717	841	3015	110	1701	871	11.9 %	18.1 %	20.7%	31.6%	7.0 %	10.7 %	-	-	721
1250 HE	P2	2945	1708	854	3055	110	1693	883	12.1 %	18.1 %	21.0 %	31.3 %	7.0 %	10.5 %	-	-	
1250 HE	P3	2935	1711	851	3045	110	1695	880	12.1 %	18.1 %	20.9 %	31.3 %	7.0 %	10.6 %	-	-	
1250 HE	P4	2985	1700	867	3095	110	1685	895	12.4 %	18.1 %	21.2%	31.0 %	7.1 %	10.3 %	-	-	
1400 HA	00	2990	1791	900	3020	30	1792	902	10.6 %	15.2 %	22.8%	32.8 %	7.6 %	10.9 %	-	-	725
1400 HA	01	3315	1724	988	4075	760	1613	1135	16.3 %	15.3 %	27.9 %	26.1 %	7.5 %	7.0 %	-	-	726
1400 HA	02	3360	1715	999	4120	760	1607	1142	16.5 %	15.3 %	28.0 %	25.9 %	7.4 %	6.9 %	-	-	
1400 HA	03	3345	1718	996	4105	760	1609	1140	16.4 %	15.3 %	28.0 %	26.0 %	7.4 %	6.9 %	-	-	
1400 HA	04	3420	1704	1013	4180	760	1600	1152	16.7 %	15.2 %	28.2 %	25.7%	7.4 %	6.7 %	-	-	
1400 HA	P1	3140	1758	943	3250	110	1742	967	12.1 %	15.4 %	24.3%	30.9%	7.7 %	9.8 %	-	-	727
1400 HA	P2	3190	1749	955	3300	110	1734	979	12.3 %	15.4 %	24.5 %	30.6%	7.7 %	9.6 %	-	-	
1400 HA	P3	3170	1752	951	3280	110	1737	975	12.2 %	15.4 %	24.4 %	30.7 %	7.7 %	9.6 %	-	-	
1400 HA	P4	3230	1741	966	3340	110	1726	989	12.6 %	15.4 %	24.7%	30.3%	7.7 %	9.4 %	-	-	
1400 HE	00	3000	1791	900	3030	30	1792	902	10.6 %	15.2 %	22.8%	32.8 %	7.6 %	10.9 %	-	-	725
1400 HE	01	3325	1724	988	4085	760	1613	1135	16.3 %	15.3 %	27.9 %	26.1 %	7.5 %	7.0 %	-	-	726
1400 HE	02	3370	1715	999	4130	760	1607	1142	16.5 %	15.3 %	28.0 %	25.9 %	7.4 %	6.9 %	-	-	
1400 HE	03	3355	1718	996	4115	760	1609	1140	16.4 %	15.3 %	28.0 %	26.0 %	7.4 %	6.9 %	-	-	
1400 HE	04	3430	1704	1013	4190	760	1600	1152	16.7 %	15.2 %	28.2 %	25.7%	7.4 %	6.7 %	-	-	
1400 HE	P1	3150	1758	943	3260	110	1742	967	12.1 %	15.4 %	24.3%	30.9%	7.7 %	9.8 %	-	-	727
1400 HE	P2	3200	1749	955	3310	110	1734	979	12.3 %	15.4 %	24.5 %	30.6%	7.7 %	9.6 %	-	-	
1400 HE	P3	3180	1752	951	3290	110	1737	975	12.2 %	15.4 %	24.4 %	30.7 %	7.7 %	9.6 %	-	-	
1400 HE	P4	3240	1741	966	3350	110	1726	989	12.6 %	15.4 %	24.7%	30.3%	7.7 %	9.4 %	-	-	

MODEL		EMPTY			OPERATING				PERCENTAGE WEIGHT DISTRIBUTION ON SUPPORTS WITH MACHINE OPERATING (%)								VT KIT
		WEIGHT (kg)	CENTRE OF GRAVITY		TOTAL WEIGHT		CENTRE OF GRAVITY										
			Xg	Yg	kg	Water	Xg	Yg	1	2	3	4	5	6	7	8	
1500 HA	00	3190	1774	765	3220	30	1775	768	8.7 %	16.3 %	20.3 %	37.8 %	5.9 %	10.9 %	-	-	730
1500 HA	01	3550	1706	868	4310	760	1605	1028	14.4 %	16.4 %	26.1 %	29.8 %	6.2 %	7.1 %	-	-	731
1500 HA	02	3620	1694	888	4380	760	1596	1042	14.7 %	16.4 %	26.4 %	29.4 %	6.2 %	6.9 %	-	-	
1500 HA	03	3550	1706	868	4310	760	1605	1028	14.4 %	16.4 %	26.1 %	29.8 %	6.2 %	7.1 %	-	-	
1500 HA	04	3620	1694	888	4380	760	1596	1042	14.7 %	16.4 %	26.4 %	29.4 %	6.2 %	6.9 %	-	-	
1500 HA	P1	3375	1738	820	3485	110	1724	847	10.3 %	16.5 %	22.1 %	35.4 %	6.1 %	9.7 %	-	-	732
1500 HA	P2	3450	1724	841	3560	110	1711	867	10.7 %	16.5 %	22.6 %	34.7 %	6.1 %	9.4 %	-	-	
1500 HA	P3	3375	1738	820	3485	110	1724	847	10.3 %	16.5 %	22.1 %	35.4 %	6.1 %	9.7 %	-	-	
1500 HA	P4	3430	1728	836	3540	110	1714	862	10.6 %	16.5 %	22.5%	34.9 %	6.1 %	9.5 %	-	-	
1500 HE	00	3200	1774	765	3230	30	1775	768	8.7 %	16.3 %	20.3 %	37.8 %	5.9 %	10.9 %	-	-	730
1500 HE	01	3560	1706	868	4320	760	1605	1028	14.4 %	16.4 %	26.1 %	29.8 %	6.2 %	7.1 %	-	-	731
1500 HE	02	3630	1694	888	4390	760	1596	1042	14.7 %	16.4 %	26.4 %	29.4 %	6.2 %	6.9 %	-	-	
1500 HE	03	3560	1706	868	4320	760	1605	1028	14.4 %	16.4 %	26.1 %	29.8 %	6.2 %	7.1 %	-	-	
1500 HE	04	3630	1694	888	4390	760	1596	1042	14.7 %	16.4 %	26.4 %	29.4 %	6.2 %	6.9 %	-	-	
1500 HE	P1	3385	1738	820	3495	110	1724	847	10.3 %	16.5 %	22.1 %	35.4 %	6.1 %	9.7 %	-	-	732
1500 HE	P2	3460	1724	841	3570	110	1711	867	10.7 %	16.5 %	22.6 %	34.7 %	6.1 %	9.4 %	-	-	
1500 HE	P3	3385	1738	820	3495	110	1724	847	10.3 %	16.5 %	22.1 %	35.4 %	6.1 %	9.7 %	-	-	
1500 HE	P4	3440	1728	836	3550	110	1714	862	10.6 %	16.5 %	22.5%	34.9 %	6.1 %	9.5 %	-	-	
1650 HA	00	3680	2506	786	3710	30	2507	789	8.2 %	14.7 %	11.7 %	21.0 %	9.9 %	17.8 %	6.0 %	10.7 %	734
1650 HA	01	4040	2478	875	4800	760	2436	1018	9.7 %	11.2 %	18.0 %	20.9 %	12.8 %	14.9 %	5.8 %	6.8 %	735
1650 HA	02	4110	2473	892	4870	760	2432	1030	9.7 %	11.1 %	18.3 %	20.8 %	13.0 %	14.7 %	5.8 %	6.6 %	
1650 HA	03	4070	2476	882	4830	760	2434	1022	9.7 %	11.2 %	18.1 %	20.9 %	12.9 %	14.8 %	5.8 %	6.7 %	
1650 HA	04	4170	2469	905	4930	760	2429	1039	9.8 %	10.9 %	18.6 %	20.8 %	13.1 %	14.6 %	5.8 %	6.4 %	
1650 HA	P1	3865	2491	833	3975	110	2486	856	8.7 %	13.7 %	13.4 %	21.1 %	10.8 %	16.9 %	6.0 %	9.4 %	736
1650 HA	P2	3940	2485	852	4050	110	2481	874	8.8%	13.4 %	13.9 %	21.1 %	11.0 %	16.7 %	6.0 %	9.1 %	
1650 HA	P3	3895	2489	841	4005	110	2484	863	8.8%	13.6%	13.6%	21.1 %	10.9 %	16.8 %	6.0 %	9.3 %	
1650 HA	P4	3980	2482	861	4090	110	2478	883	8.9 %	13.3 %	14.1 %	21.1 %	11.1 %	16.6 %	6.0 %	9.0 %	
1650 HE	00	3690	2506	786	3720	30	2507	789	8.2 %	14.7 %	11.7 %	21.0 %	9.9 %	17.8 %	6.0 %	10.7 %	734
1650 HE	01	4050	2478	875	4810	760	2436	1018	9.7 %	11.2 %	18.0 %	20.9 %	12.8 %	14.9 %	5.8 %	6.8 %	735
1650 HE	02	4120	2473	892	4880	760	2432	1030	9.7 %	11.1 %	18.3 %	20.8 %	13.0 %	14.7 %	5.8 %	6.6 %	
1650 HE	03	4080	2476	882	4840	760	2434	1022	9.7 %	11.2 %	18.1 %	20.9 %	12.9 %	14.8 %	5.8 %	6.7 %	
1650 HE	04	4180	2469	905	4940	760	2429	1039	9.8 %	10.9 %	18.6 %	20.8 %	13.1 %	14.6 %	5.8 %	6.4 %	
1650 HE	P1	3875	2491	833	3985	110	2486	856	8.7 %	13.7 %	13.4 %	21.1 %	10.8 %	16.9 %	6.0 %	9.4 %	736
1650 HE	P2	3950	2485	852	4060	110	2481	874	8.8%	13.4 %	13.9 %	21.1 %	11.0 %	16.7 %	6.0 %	9.1 %	
1650 HE	P3	3905	2489	841	4015	110	2484	863	8.8%	13.6%	13.6%	21.1 %	10.9 %	16.8 %	6.0 %	9.3 %	
1650 HE	P4	3990	2482	861	4100	110	2478	883	8.9 %	13.3 %	14.1 %	21.1 %	11.1 %	16.6 %	6.0 %	9.0 %	
1800 HA	00	3800	2503	802	3840	40	2505	805	8.4%	14.5%	12.2 %	21.1 %	10.0 %	17.3 %	6.0 %	10.5 %	737
1800 HA	01	4165	2477	887	4925	760	2436	1024	9.7 %	11.1 %	18.2 %	20.9 %	12.8 %	14.7 %	5.9 %	6.7 %	738
1800 HA	02	4240	2471	903	5000	760	2432	1036	9.8 %	11.0 %	18.6 %	20.9 %	12.9 %	14.5%	5.8 %	6.6 %	
1800 HA	03	4195	2474	893	4955	760	2434	1029	9.7 %	11.1 %	18.4 %	20.9 %	12.8 %	14.6 %	5.9 %	6.7 %	
1800 HA	04	4300	2468	916	5060	760	2429	1045	9.8 %	10.8 %	18.8 %	20.8 %	13.0 %	14.4 %	5.8 %	6.4 %	
1800 HA	P1	3995	2489	847	4105	110	2485	869	8.8%	13.5 %	13.8 %	21.2%	10.8 %	16.6 %	6.1 %	9.3 %	736
1800 HA	P2	4065	2484	864	4175	110	2479	886	8.9 %	13.2 %	14.3%	21.2%	11.0 %	16.4 %	6.1 %	9.0 %	
1800 HA	P3	4025	2487	854	4135	110	2482	876	8.8%	13.4 %	14.0 %	21.2%	10.9 %	16.5 %	6.1 %	9.2 %	
1800 HA	P4	4105	2481	874	4215	110	2477	895	9.0 %	13.1 %	14.5%	21.2%	11.1 %	16.3 %	6.1 %	8.9 %	
1800 HE	00	3810	2503	802	3850	40	2505	805	8.4%	14.5%	12.2 %	21.1 %	10.0 %	17.3 %	6.0 %	10.5 %	737
1800 HE	01	4175	2477	887	4935	760	2436	1024	9.7 %	11.1 %	18.2 %	20.9 %	12.8 %	14.7 %	5.9 %	6.7 %	738
1800 HE	02	4250	2471	903	5010	760	2432	1036	9.8 %	11.0 %	18.6 %	20.9 %	12.9 %	14.5%	5.8 %	6.6 %	
1800 HE	03	4205	2474	893	4965	760	2434	1029	9.7 %	11.1 %	18.4 %	20.9 %	12.8 %	14.6 %	5.9 %	6.7 %	
1800 HE	04	4310	2468	916	5070	760	2429	1045	9.8 %	10.8 %	18.8 %	20.8 %	13.0 %	14.4 %	5.8 %	6.4 %	
1800 HE	P1	4005	2489	847	4115	110	2485	869	8.8%	13.5 %	13.8 %	21.2%	10.8 %	16.6 %	6.1 %	9.3 %	736
1800 HE	P2	4075	2484	864	4185	110	2479	886	8.9 %	13.2 %	14.3%	21.2%	11.0 %	16.4 %	6.1 %	9.0 %	
1800 HE	P3	4035	2487	854	4145	110	2482	876	8.8%	13.4 %	14.0 %	21.2%	10.9 %	16.5 %	6.1 %	9.2 %	
1800 HE	P4	4115	2481	874	4225	110	2477	895	9.0 %	13.1 %	14.5%	21.2%	11.1 %	16.3 %	6.1 %	8.9 %	

21. SAFETY WARNINGS AND REGULATIONS

Safety warnings

The unit must be installed by an authorised and qualified technician, in compliance with the national legislation in force in the country of destination (MD 329/2004).

We shall not be held responsible for any damage whatsoever resulting from the non-compliance with these instructions.

Before starting any kind of work, it is necessary TO READ CAREFULLY THE INSTRUCTIONS, AND TO PERFORM THE SAFETY CHECKS TO REDUCE ANY RISK TO A MINIMUM. All the personnel in charge must know the operations and possible risks that may arise when all the unit installation operations begin.

Danger!

The refrigerant circuit is under steam. High temperatures are also possible. The unit may only be opened by a SAT service technician or by an authorised and qualified technician. The operations in the cooling circuit can only be performed by a qualified refrigeration technician.

GAS R410A

The unit is delivered with the necessary amount of refrigerant R410A for its operation. It is a refrigerant without chlorine that is not harmful for the ozone layer. R410A is not flammable. However, all maintenance operations must only be carried out by a specialised technician with the suitable protection equipment

Risk of electric discharge!

Before opening the unit, it is necessary to disconnect the device completely from the mains.

22. RECEIVING THE PRODUCT

22.1. HANDLING

Before installing the unit, decide with the customer the position in which it will be placed, pay attention to the following points:

- The support surface must be able to withstand the weight of the unit.
- The selected place must be large enough for laying the necessary pipes.
- Take into account that when the chiller is working, vibrations may be generated; it is therefore advisable to install anti-vibration supports (VT - AVX accessories), fitting them to the holes in the base according to the assembly diagram.
- It is compulsory to provide the necessary technical clearances, to allow ROUTINE AND EXTRAORDINARY MAINTENANCE INTERVENTIONS.

22.2. POSITIONING

Before moving the unit, check the lifting capacity of the machines used.

Once the packaging has been removed, the unit must

be handled by qualified personnel, using the appropriate equipment.

To handle the machine:

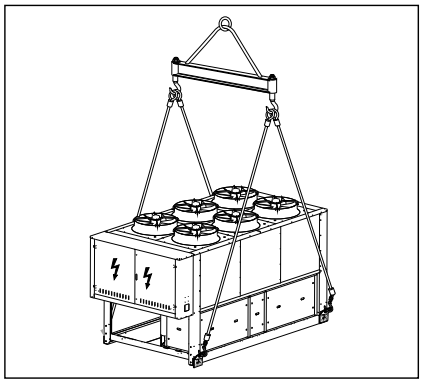
"IN THE EVENT OF LIFTING", hook the lifting cables to the special eyebolts (as indicated in the figure).

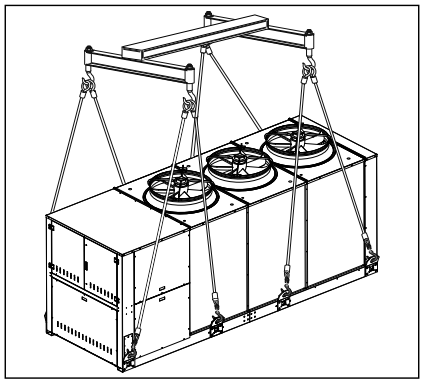
In order to avoid damaging the unit with the cables, insert protection elements between them and the machine. Is it absolutely forbidden to stand beneath the unit.

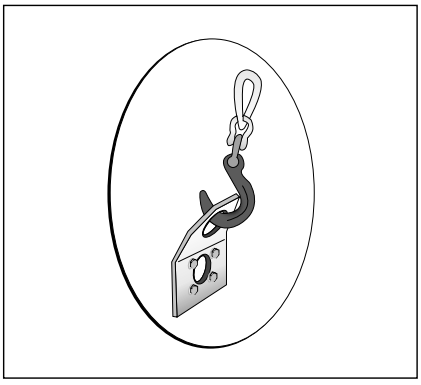
NB

The warranty of the device does not in any case cover costs owing to ladder trucks, lifts or other lifting systems that may be required in order to carry out the interventions under guarantee.

22.3. HANDLING EXAMPLE



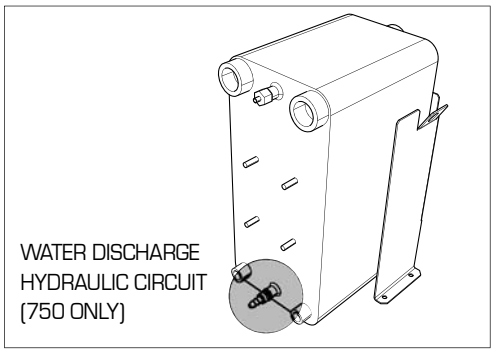




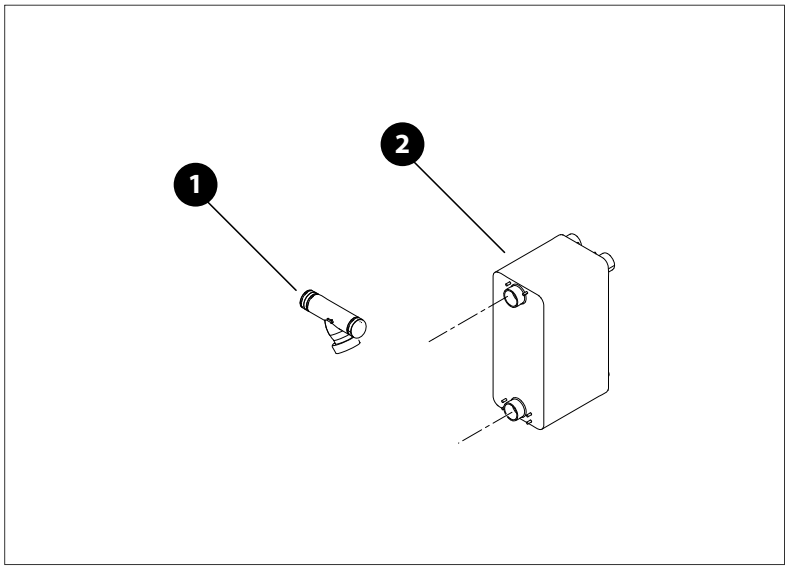
23. HYDRAULIC CIRCUITS

23.1. HYDRAULIC CIRCUIT INTERNAL NRL "00"

Key	
1	Heat exchanger
2	Water filter

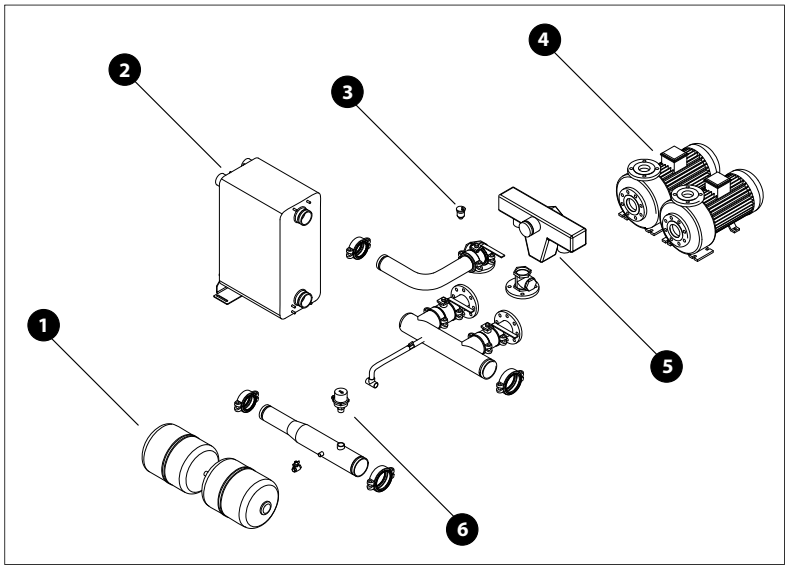


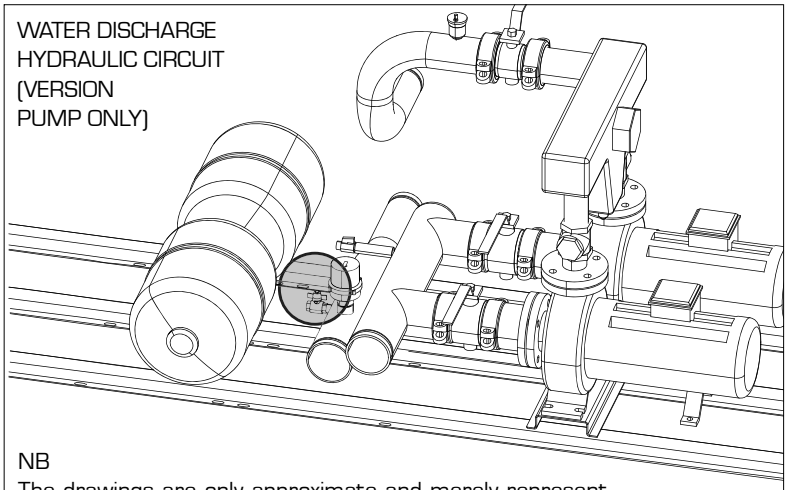
WATER DISCHARGE HYDRAULIC CIRCUIT (750 ONLY)



23.2. INTERNAL HYDRAULIC CIRCUIT NRL"P1-P2-P3-P4"

Key	
1	Expansion tanks
2	Plate heat exchanger
3	Drain valve
4	Pump unit
5	Water filter
6	Flow switch



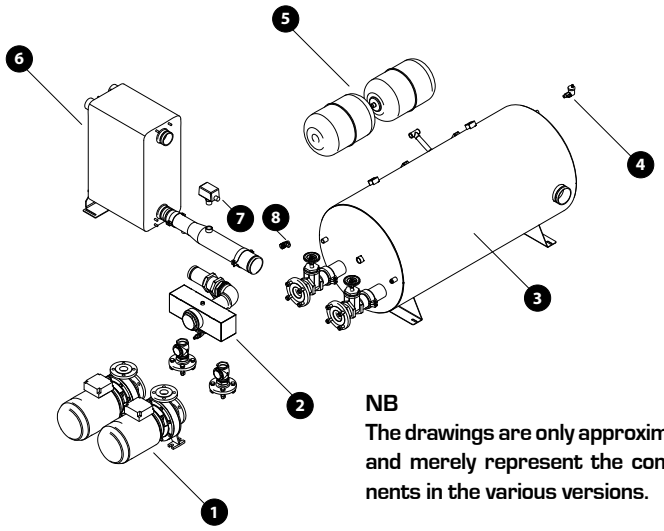


WATER DISCHARGE HYDRAULIC CIRCUIT (VERSION PUMP ONLY)

NB
The drawings are only approximate and merely represent the components in the various versions.

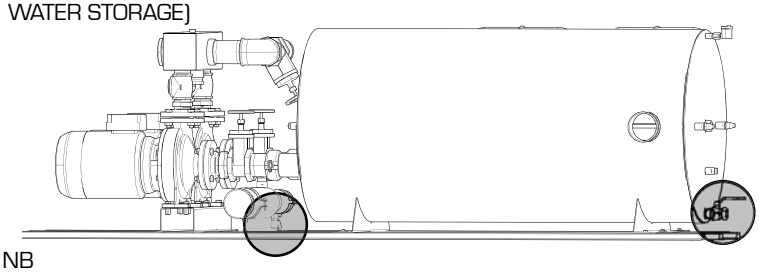
23.3. INTERNAL HYDRAULIC CIRCUIT NRL "01-02-03-04-05-06-07-08"

Key			
1	Pump unit	5	Expansion tanks
2	Water filter	6	Heat exchanger
3	Accumulation	7	Flow switch
4	Drain valve	8	Safety valve



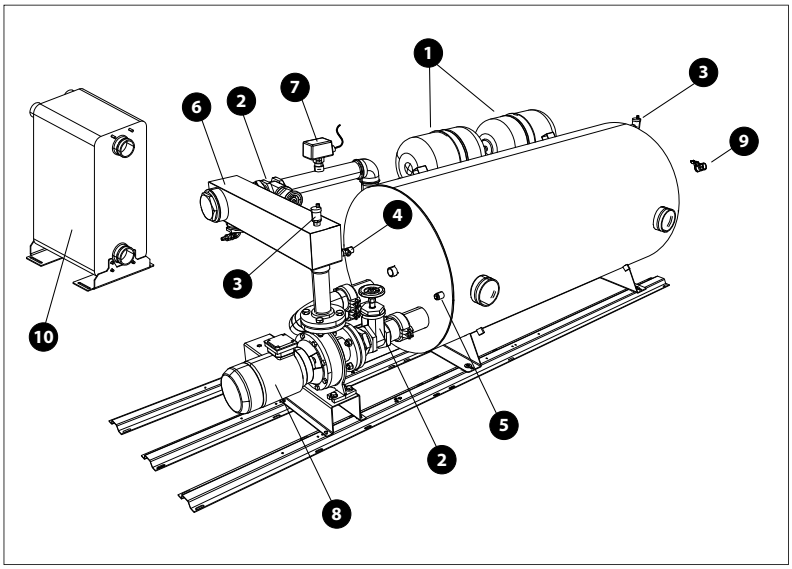
NB
The drawings are only approximate and merely represent the components in the various versions.

WATER DISCHARGE HYDRAULIC CIRCUIT (VERSION WITH WATER STORAGE)



NB
The drawings are only approximate and merely represent the components in the various versions.

23.4. INTERNAL HYDRAULIC CIRCUIT NRL "09 -10"



Key			
1	Expansion vessel	6	Filter
2	Shut-off valve	7	Flow switch
3	Vent valve	8	Pump
4	Safety valve (6 bar)	9	Storage tank draining
5	Probe	10	Plate heat exchanger

NB:
The presence of the filter should be considered obligatory, and ITS REMOVAL WILL MAKE THE GUARANTEE void. It must be kept clean, so it is necessary to check its clean state after the installation of the unit, and check it regularly.

The installation of the shutoff valves is recommended, to be able to disconnect the machine from the system, or for maintenance operations.

EXTERNAL HYDRAULIC CIRCUIT RECOMMENDED

The choice and installation of components aside of the NRL is the responsibility of the installer, who must use good working practices and observe the standards in force in the destination country (M.D. 329/2004).

You are advised to install:

- the charging unit/air vent
- anti-vibration joints
- a pump (if it is not supplied with the machine)
- an expansion tank (if it is not supplied with the machine)
- shutoff taps
- a flow switch
- a safety valve (if it is not supplied with the machine)
- pressure gauges
- Drain tap chiller in the tube, outgoing evaporator (for standard versions, except size 750)

NB

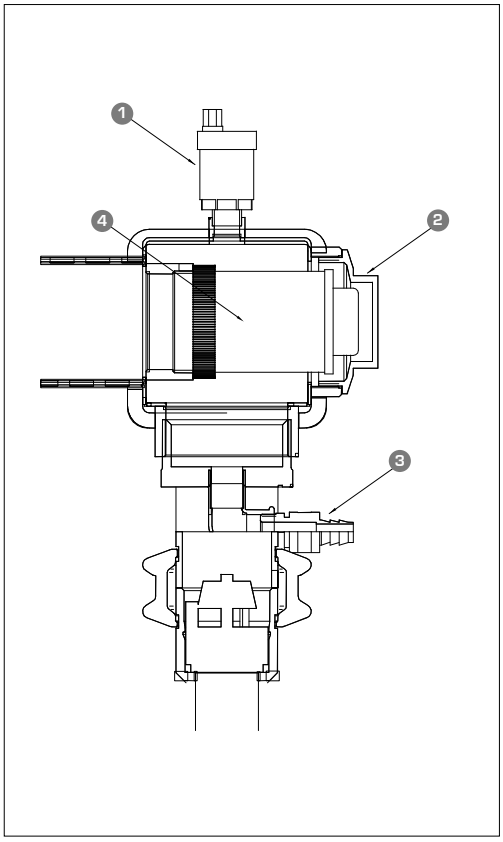
The hydraulic piping for connection to the machine must be properly scaled for the actual water flow rate required by the plant when working. The water flow rate to the heat exchanger must always be constant.

24. FILTER MAINTENANCE

24.1. FILTER CLEANING PROCEDURE:

(type of filter only assembled in the version with water accumulator and pump).

- Stop the machine.
- Turn on the filter discharge tap.
- Loosen the hexagonal nut on the filter head, remove the metal ring nut, and clean it.
- Replace the ring nut in the filter housing and retighten the hexagonal nut.



Key	
1	Drain valve
2	Hexagonal nut
3	Filter discharge tap
4	Metal ring nut housing

All electrical operations must be carried out BY QUALIFIED PERSONNEL, IN ACCORDANCE WITH THE CORRESPONDING REGULATIONS, trained and informed about the risks related to such operations.	The characteristics of electric lines and related components must be established by PERSONNEL AUTHORISED TO DESIGN ELECTRIC INSTALLATIONS, following international regulations and the national regulations of the country in which the unit is installed, in compliance with the legislative regulations in force at the moment of installation.	For installation requirements, the wiring layout supplied with the unit must be compulsory referred to. The wiring layout together with the manuals must be kept in good conditions and readily ACCESSIBLE FOR FUTURE OPERATIONS ON THE UNIT.	It is compulsory to check the machine sealing before connecting the electrical wiring. The machine should only be powered once the hydraulic and electric operations are completed.

The units are fully wired in the factory, and therefore only need to be connected to the mains supply. You are advised to check the characteristics of the mains supply, to ensure it is suitable for the levels indicated in the electric data table, also taking into consideration any other equipment that may be operating at the same time.

24.2. LINES AND ELECTRIC DATA FOR THE UNIT

NB

Connection cables are not supplied.

The cable sections shown in tab. 24.2 are recommended for a maximum length of 50m. For longer lengths, the DESIGNER must size the power supply line and the earthing connection accordingly, on the basis of:

- the length
- the type of cable
- unit absorption, its physical position and the room temperature

24.3. ELECTRICAL DATA

MODEL	VERSION	SECT. A mm^2	SECT. B mm^2	Earth (section PER) mm^2	IL A
0750	all	95mm²	1.5mm²	50mm²	200A
0800	all	95mm²	1.5mm²	50mm²	200A
0900	all	95mm²	1.5mm²	50mm²	250A
1000	all	95mm²	1.5mm²	50mm²	250A
1250	all	120mm²	1.5mm²	70mm²	315A
1400	all	120mm²	1.5mm²	70mm²	315A
1500	all	185mm²	1.5mm²	95mm²	350A
1650	all	2x185mm²	1.5mm²	150mm²	400A
1800	all	2x185mm²	1.5mm²	150mm²	400A

NB

Check that all power cables are correctly secured to the terminals when switched on for the first time and after 30 days of use. Afterwards, check the connection of the power cables every six months.

Slack terminals could cause the cables and components to overheat.

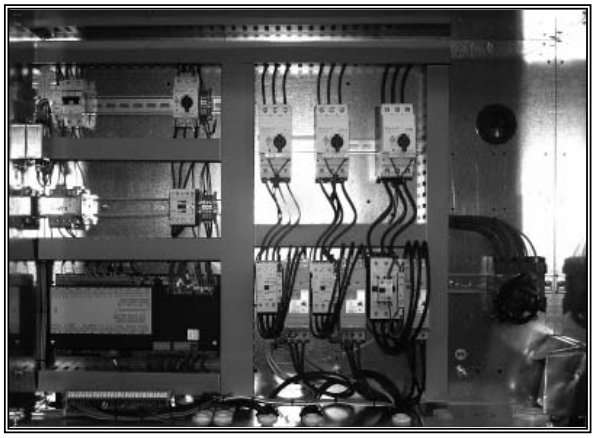
Key	
[*]Sect A	Power supply
Sect. B	Remote panel
Earth	Earth to bring to the machine
IL	Main switch

[*]Sect A

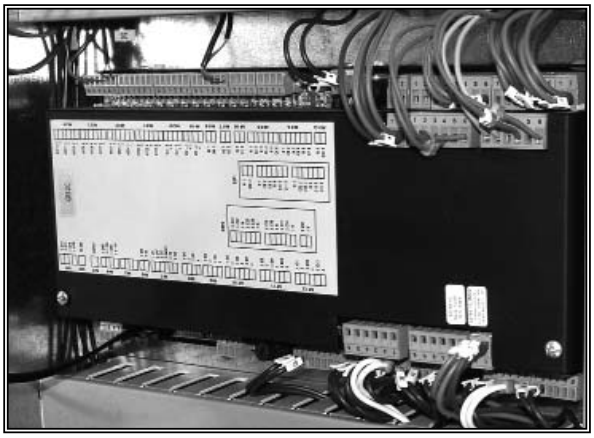
Power supply 400V-3N-50Hz only for size 750

Power supply 400V-3-50Hz from size 800 to size 1800

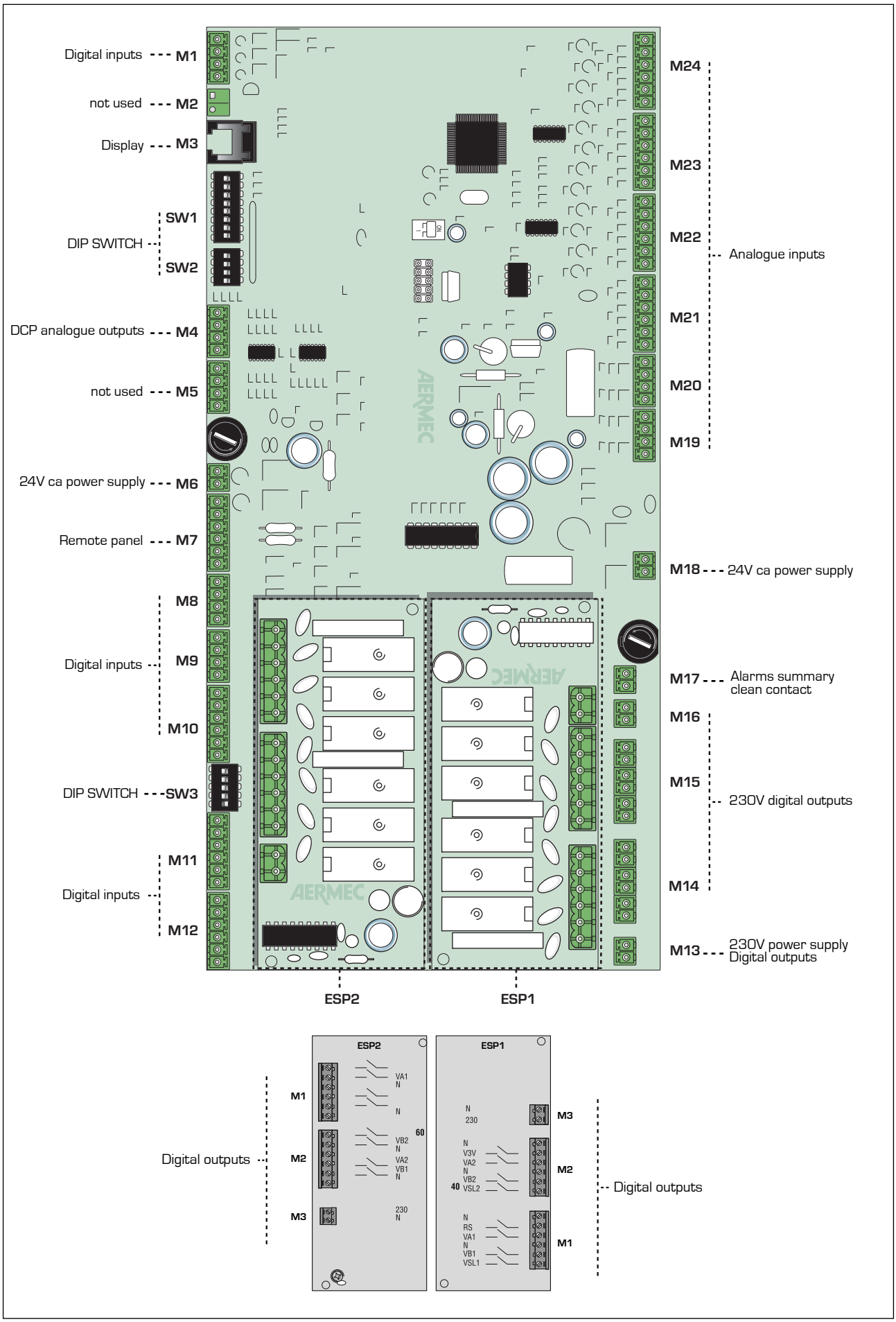
Electrical panel



GR3



24.4. "GR3" CONTROL BOARD

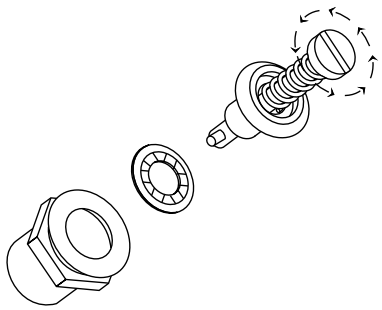


24.5. CONNECTION TO THE ELECTRICAL POWER SUPPLY

– Check there is no voltage on the electric line you want to use.

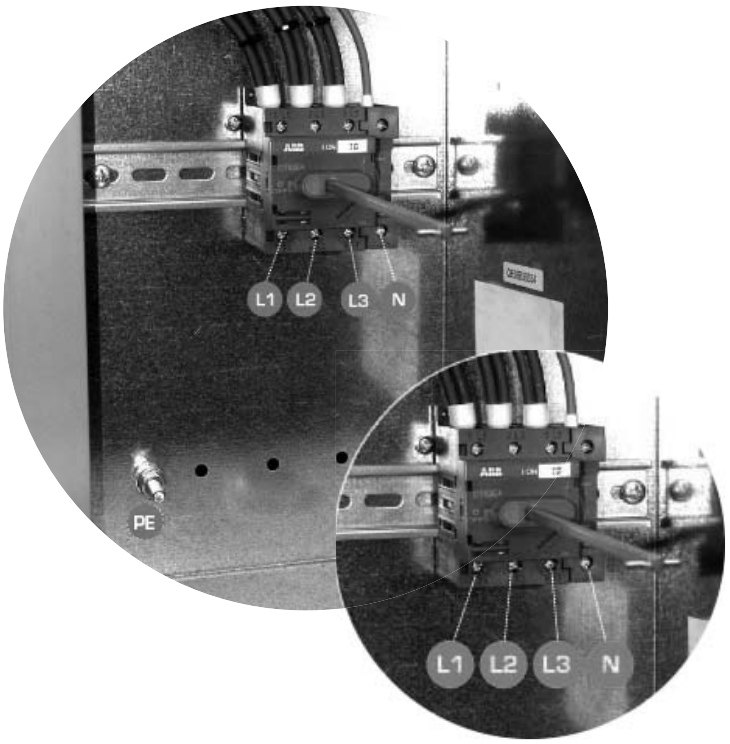
To access the electric box:

– **1** Make a ¼ turn of the screw, anticlockwise

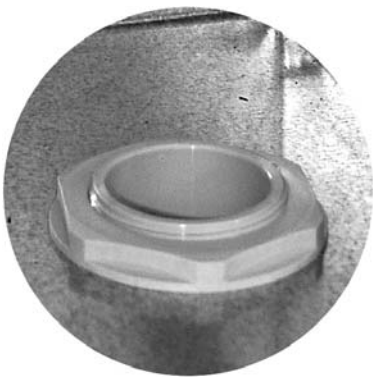


– **2** Turn the handle of the door-block disconnecting switch to OFF, then lock it and affix the warning notice.

The figures below show the various parts to facilitate the various line connections.



Key			
L1	Line 1	**N**	Neutral
L2	Line 2	**PE**	Earth
L3	Line 3		



Hole for electric cables

PE: earth connection

25. START-UP

25.1. PRELIMINARY OPERATIONS

WARNING
Before carrying out the controls indicated below, ensure that the unit is disconnected from the mains supply.
Ensure that the main switch is turned to OFF and locked in position, and attach a warning sign to the switch. Before beginning the operations, check the absence of voltage by means of a voltmeter or a phase detector.

25.1.1. Electrical checks

- Check the general power supply cables are of a suitable section, able to withstand the overall absorption of the unit (see electrical data), and that the unit has been duly earthed.
- Check all the electrical connections are correctly fixed and all the terminals adequately closed. The following operations must be carried out when the unit is not powered up.
- Power up the unit by turning the main switch to ON. The display will come on a few seconds after the machine is powered up, check that the operation status is at OFF (OFF BY KEYB at the bottom of the display).
- Using a tester, check that the value of the supply voltage to the RST phases is equal to 400V ±10%, furthermore, check that the imbalance between the phases is not more than 3%.
- Check that the connections made by the installer comply with the data given here.
- Check that the electric heater(s) of the compressor casing are working, by measuring the rise in the temperature in the oil sump. The heater(s) must work for at least 24 hours before the compressor start-up, and in any case the temperature of the oil sump must be 10-15°C higher than the room temperature.

WARNING

- At least 24 hours before starting up the unit (or at the end of each period of prolonged inactivity) the unit must be powered up, to allow the heaters of the compressor carter to evaporate any refrigerant that may be present in the oil. If this precaution is not performed the compressor could be seriously damaged and the guarantee would no longer be valid.

25.1.2. Hydraulic circuit controls

- Check that all the hydraulic connections are correctly made and that the indications on the plates are observed.
- Check that the hydraulic system is full and under pressure, and check also that there is no air (if there is air, bleed it).
- Check that any interception valves on the system are correctly opened.
- Check that the circulation pump(s) are working, and that the water flow rate is sufficient to close the flow switch contact.
- Check the correct working of the flow switch: closing the shutoff valve at the heat exchanger outlet, the lockout alarm must appear on the display. Finally, reopen the valve and rest the lockout.

25.2. START-UP

WARNING
Bear in mind that a free start-up service is offered by the AERMEC After Sales Service for the units of this series, at the request of Aermec customers or legitimate owners (VALID IN ITALY ONLY).
Placing machines in operation must be previously agreed on the basis of the system creation times. Before the intervention of the AERMEC After Sales Service department all the works (electrical and plumbing connections, charging and bleeding of the air of the system) must have been completed.
Before performing the checks indicated below, make sure that the unit is disconnected from the mains, using the suitable instruments.

25.2.1. Chiller circuit checks

- Check for refrigerant gas leaks, especially near the pressure test points, pressure gauges, pressure transducers and pressure switches; (vibration during transport may have loosened the connectors).
- After a brief working period, check the level of oil in the compressor and the absence of bubbles in the liquid indicator glass. A continuous passage of vapour bubbles in cooling mode may indicate an insufficient refrigerant charge or that the thermostatic valve is incorrectly set. The presence of vapour for brief periods is, however, possible.

25.2.2. Overheating

Check the level of overheating by comparing the temperature indicated with a contact thermostat placed on the compressor suction and the temperature shown on the low pressure gauge (saturation temperature corresponding to the evaporation pressure).
The difference between these two temperatures gives the superheating value. Optimum values are between 4 and 8°C.

25.2.3. Under-cooling

Check the level of under-cooling by comparing the temperature indicated with a contact thermostat placed on the tube at the condenser outlet and the temperature shown on the high pressure gauge (saturation temperature corresponding to the con

densation pressure).
The difference between these two temperatures gives the under-cooling value. Optimum values are between 4 and 5°C in cooling mode, and between 1°C and 3°C in heat mode.

25.2.4. Discharge temperature

If the values of under-cooling and overheating are regular, the temperature measured in the discharge tube
at the compressor outlet must be 30/40°C higher than the condensation temperature.

25.3. SYSTEM LOADING/UNLOADING

During the winter, if the system remains idle, the water in the heat exchanger may freeze, causing irreparable damage to the heat exchanger itself, the complete draining of the refrigerating circuits and, sometimes, damage to the compressors.

To avoid the risk of freezing, there are three possible solutions:

- the complete draining of the water from the heat exchanger at the end of the season, and the refilling at the start of the next season, by means of the drain valve located on the accumulation tank in the versions with accumulation and/or pump (Chapter 23)
- the operation with glycol water, with a glycol percentage chosen on the basis of the minimum outside temperature envisaged. In this case, it is necessary to take into consideration the different yields and absorption of the chiller, the measurements of the pumps and the output of the terminals
- the use of heaters in the heat exchanger (standard on all devices). In this case the heaters must always be powered for the entire winter period (machine in standby).

26. MAINTENANCE

NB
All the routine and extraordinary maintenance operations must be carried out only by qualified personnel.
Before starting any cleaning or maintenance operation, it is advisable to disconnect the unit from the power supply.

All the units are subject to wear along time.

Maintenance operations allow you to:

- uphold unit efficiency
- reduce the speed of wear
- collect information and data and understand the unit efficiency status, to prevent possible failures

IT is therefore essential to carry out regular checks:

- **ANNUALLY**
- **SPECIAL CASES**

It is advisable to keep a machine booklet (not supplied, but provided by the user), in order to keep trace of the operations carried out on the unit. In this way, it will be easier to organise the operations properly and facilitate troubleshooting. In the booklet, write down date, type of operation carried out (routine maintenance, inspection or repair), description of the operation, measures taken...

- **Annual checks**

Chiller circuit

- Check the chiller circuit seal, and make sure that the pipes in it have not suffered damage.
- Perform the acidity test on the oil of the chiller circuit.
- Check the functioning of the high and low pressure switches; in the event of poor functioning, replace them.
- Check for any scaling on the filter-drier and replace it if necessary.

- **Electrical checks**

- Check the conditions of the electrical wires and their insulators.
- Check the functioning of the evaporator heater, and the compressor casing.

- **Mechanical checks**

Check the screws on the fan grilles (and the fans themselves) are firmly tightened, as well as the compressors and the electric box, and the outer panelling of the unit. If they are poorly tightened, they produce abnormal noise and vibrations
Check the structure conditions.
If necessary, treat oxidised parts with paints suitable for eliminating or reducing oxidation.

- **Hydraulic checks**

- Clean the water filter
- Eliminate the air from the circuit
- Check the water flow rate
  to the evaporator is always constant
- Check the state of the hydraulic piping thermal insulation
- Check the glycol percentage, when present.

27. DISPOSAL

27.1. DISCONNECTING THE UNIT

The unit disconnection operations must be carried out by a registered technician.
Before disconnecting the unit, the following elements must be removed, if present:
• The refrigerant gas: the gas must be removed with suction devices that operate in closed circuit so that there is no gas leak in the environment.
• The glycol must not be thrown away in such a manner that affects the environment when it is removed. It must be placed in suitable containers.

NB
The disposal of refrigerant gas, any glycol water, and any other material or substance must be carried out by qualified personnel and in compliance with the legislation in force, in order to avoid damage to things or people or pollution of the surrounding area.

When the unit is pending disposal, it can also be stored in the open, as exposure to the elements and temperature changes do not cause harmful effects for the environment, as long as the unit electrical, cooling and hydraulic circuits are closed and in good conditions.

27.2. DISMANTLING AND DISPOSAL

In the dismantling phase, the fan, the motor and the coil, if operating, could be taken from the specialised centres for possible reuse.

NB
For lo dismantling/disposal, all the materials must be sent to the authorised centres in compliance with the national regulations in force. For further information on discharge contact the head office.

28. IMPROPER USE

The device is designed and built to ensure the maximum safety in its immediate vicinity (IP24) as well as to resist atmospheric agents.
The fans have protection grilles to prevent the unwanted intrusion of foreign bodies.
The accidental opening of the electric panel with the machine in operation is prevented by the door lock sectioning device.
Do not rest tools or heavy objects directly on the side heat exchanger coils, so as not to ruin the fins.

NB
Do not introduce objects or allow them to fall through the grilles of the fan motors. Do not rest cutting surfaces against the thermal exchange coils.

28.1. IMPORTANT SAFETY INFORMATION

The machine must not exceed the pressure and temperature limits indicated in the table given in the "Operating limits" paragraph of the technical manual.
Correct functioning is not guaranteed after a fire; before starting up the machine again, contact an authorised Assistance Centre.
The machine is equipped with safety valves which, in the event of excessive pressure, can discharge the high temperature gases into the atmosphere.
Wind, earthquakes and other natural phenomena of exceptional intensity have not been
taken into account.
If the unit is used in an aggressive atmosphere or with aggressive water, consult the company head office.

WARNING
Following extraordinary maintenance interventions on the refrigerating circuit, with the replacement of components, before restarting the machine it is necessary to carry out the following operations:

- Pay the closest attention when restoring the refrigerant load indicated on the machine's rating plate (inside the electrical panel).
- Open all the taps in the chiller circuit
- Correctly connect the power supply and the earthing
- Check the hydraulic connections
- Check the water pump works properly
- Clean the water filters
- Check that the condenser coils are not dirty or clogged
- Check the correct rotation of the fan unit

29. REFRIGERANT GAS R410A

CHEMICAL NAME	CONCENTRATION [%]
Difluoromethane (R32)	50%
Pentafluoromethane (R125)	50%

PHYSICAL AND CHEMICAL PROPERTIES	
Physical form	Liquefied gas
Colour	Colourless
Odour	Ethereal
PH	neutral at (25°C)
Boiling point/interval	-52.8°C (-63°F)
Flash point	not inflammable
Vapour pressure	11 740 hPa at 25°C
Vapour pressure	21 860 hPa at 50°C
Relative density	1.08g/cm3
Solubility	Water: 0.15g/100ml.

DANGER IDENTIFICATION
if the skin comes into contact with the quickly evaporating liquid, this may cause the tissues to freeze. High vapour concentrations can provoke headaches, dizziness, sleepiness, nausea, and also lead to lipothymia. irregular heartbeat (arrhythmia).

FIRST-AID MEASURES	
General information	If the person is unconscious, place him on his side in a stable position and call a doctor. Do not give anything to eat or drink to persons who have fainted. If the breathing is irregular or has stopped, practise artificial respiration. If the disturbances persist, contact a doctor.
Inhalation	In the event of inhalation, breathe in fresh air. If the person has trouble breathing, give him oxygen. If breathing has stopped, practise artificial respiration. Contact a doctor.
Contact with the skin	if the skin comes into contact with the quickly evaporating liquid, this may cause the tissues to freeze. In the event of contact with the liquid, heat the frozen tissues with water and call a doctor. Remove contaminated clothes and footwear. Wash the clothes before using them again.
Contact with the eyes	Rinse the eyes immediately with running water for at least 15 minutes, keeping the eyelids open. If the irritation persists, contact a doctor.
Note for the doctor	Do not give adrenaline or similar substances.

Toxicological information	**Inhalation:** irregular heartbeat (arrhythmia). **Ingestion:** no specific risk. **Contact with the skin:** if the skin comes into contact with the quickly evaporating liquid, this may cause the tissues to freeze. Slightly irritating for the skin. **Contact with the eyes:** slightly irritating for the eyes.

FIRE-FIGHTING MEASURES	
Extinction means	Not inflammable. ASTM D-56-82; ASTM E-681. In the event of a fire, use vapourised water, foam, dry chemical products or CO2.
Particular risks from exposure	Possibility of dangerous reactions being generated during a fire, due to the presence of F and/or Cl groups. In the event of a fire or overheating, there is an increase in pressure and the container could explode. Use vapourised water to keep the fire-exposed containers cool. This product is not inflammable at room temperature and atmospheric pressure. It could become inflammable however if mixed with pressurised air and exposed to strong ignition sources.

MEASURES TO BE ADOPTED IN THE EVENT OF ACCIDENTAL LEAKAGE	
Environmental precautions	Stop the leak if there is no risk involved. Any leaks will quickly evaporate.
Cleaning methods	The mixture evaporates

STORAGE AND HANDLING	
Handling	Open carefully to allow any internal pressure to be released gradually. Store and use away from heat, sparks, naked flames or other combustion sources. Pressurised container. Protect from direct sunlight and do not expose to temperatures above 50°C. Do not pierce or burn, even after use. Ensure adequate ventilation. Wash your hands well after touching the product.
Warnings for safe use	• Ensure there is a good air flow and/or aspiration in the working environment. For saving, maintenance, dismantling and disposal, use an autonomous breathing apparatus. The vapours are heavier than the air and can provoke suffocation, reducing the oxygen available for breathing. • Protect your hands with heatproof gloves • Protect your eyes with safety goggles • When handling, observe the good practices of industrial hygiene and safety.

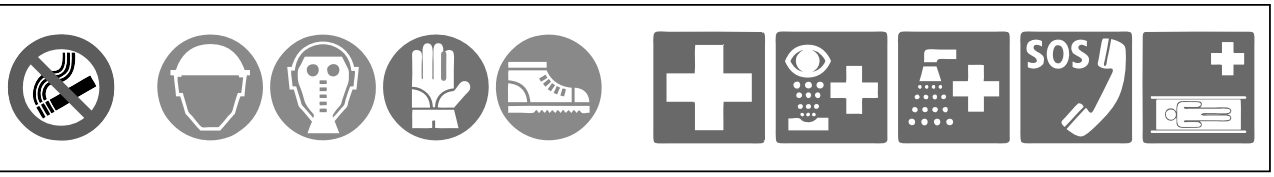
ECOLOGICAL INFORMATION	
Substance	FORANE 32
In water	Not easily biodegradable: 5% after 28d (Policy OCDE 107)
In the air	Degradation by OH radicals: t½ life= 1472d Ozone destruction potential: ODP (R-11) = 0 Greenhouse effect potential of the halogenated hydrocarbons: HGWP (R-11=1) = 0.13
Bio-accumulation	Practically non-biaccumulable: log Pow = 0.21 Policy OCDE 107

REGULATIONS INFORMATION	
EEC Directive **Safety cards**	D.91/155/EEC modified by D. 93/112/EEC and D.2001/58/EC: Dangerous substances and preparations
Dangerous preparations	D.199/45/EC modified by D.2001/60/EC **Not classified as dangerous**

DISPOSAL	
Disposal methods	Dispose of excess products and those that cannot be recycled via an authorised waste disposal firm. Refer to the information provided by the manufacturer/supplier with regard to recovery/recycling.

PERSONAL PROTECTION	
Professional exposure limit:	Difluoromethane (R32): LTEL - UK [ppm]: 1000

SYMBOLS



GB

Contains fluorinated greenhouse gases covered by the Kyoto Protocol

R410A (Global warming potential 1980)

ES

Contiene gases fluorados de efecto invernadero regulados por el Protocolo de Kioto

R410A (Potencial de calentamiento atmosférico 1980)

DE

Enthält vom Kyoto-Protokoll erfasste fluorierte Treibhausgase

R410A (Treibhauspotenzial 1980)

FR

Contient des gaz à effet de serre fluorés relevant du protocole de Kyoto

R410A (Potentiel de réchauffement planétaire 1980)

IT

Contiene gas fluorurati ad effetto serra disciplinati dal protocollo di Kyoto

R410A (Potenziale di riscaldamento globale 1980)

PT

Contém gases fluorados com efeito de estufa abrangidos pelo Protocolo de Quioto

R410A (Potencial de aquecimento global 1980)

GR

Περιέχει φθοριούχα αέρια θερμοκηπίου καλυπτόμενα από το πρωτόκολλο του Κιότο

R410A (Δυναμικό θέρμανσης του πλανήτη 1980)

PL

Zawiera fluorowane gazy cieplarniane objęte Protokołem z Kioto

R410A (Współczynnik ocieplenia globalnego 1980)

SE

Innehåller sådana fluorerade växthusgaser som omfattas av Kyotoprotokollet

R410A (Faktor för global uppvärmningspotential 1980)

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