

# NRL R410A

## TECHNICAL MANUAL FOR INSTALLATION AND MAINTENANCE

Chillers, heat pumps with scroll compressors

- ° **COMPACT STANDARD**
- L** **COMPACT LOW NOISE**
- H** **STANDARD COMPACT HEAT PUMP**
- HL** **SILENCED COMPACT HEAT PUMP**



**EUROVENT**  
CERTIFIED PERFORMANCE



**AERMEC**

COMPANY QUALITY SYSTEM



ISO 9001:2000 - Cert. n° 0128/5



AERMEC S.P.A.

❄ 174 kW - 449 kW

☀ 165 kW - 454 kW

**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**

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



**Danger: moving parts**



**Danger: high temperature**



**Danger: power supply**



**Danger: cut off power supply**



**General danger**



**Useful information and warnings**



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# NRL

SERIAL NUMBER

## DECLARATION OF CONFORMITY

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

Electromagnetic immunity and emission in residential environment

CEI EN 61000-6-3

Electromagnetic immunity and emission in industrial environment

CEI EN 61000-6-2

CEI EN 61000-6-4

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 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.

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.**

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 tech-

nical 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.

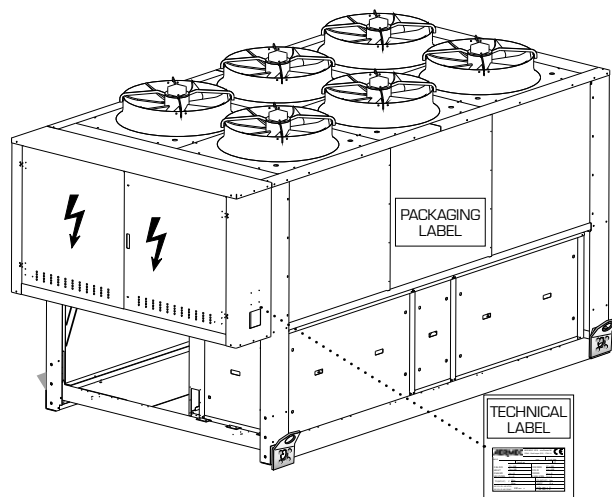
# 3. PRODUCT IDENTIFICATION

**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.



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## 4. DESCRIPTION OF THE UNIT

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- 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" (° - L)**  
maximum outside temperature allowed **42°C**;
- processed water temperature **18°C**;
- **"HEAT PUMP" (H - HL)** in cooling mode, the operating limits arrive at

a maximum external air temperature of **42°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 **50°C**;

### 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)**
- **(from 800 to 1250 size only for ° - L version)**

**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	°	°	°	°	°	°	°	00

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

#### WARNING

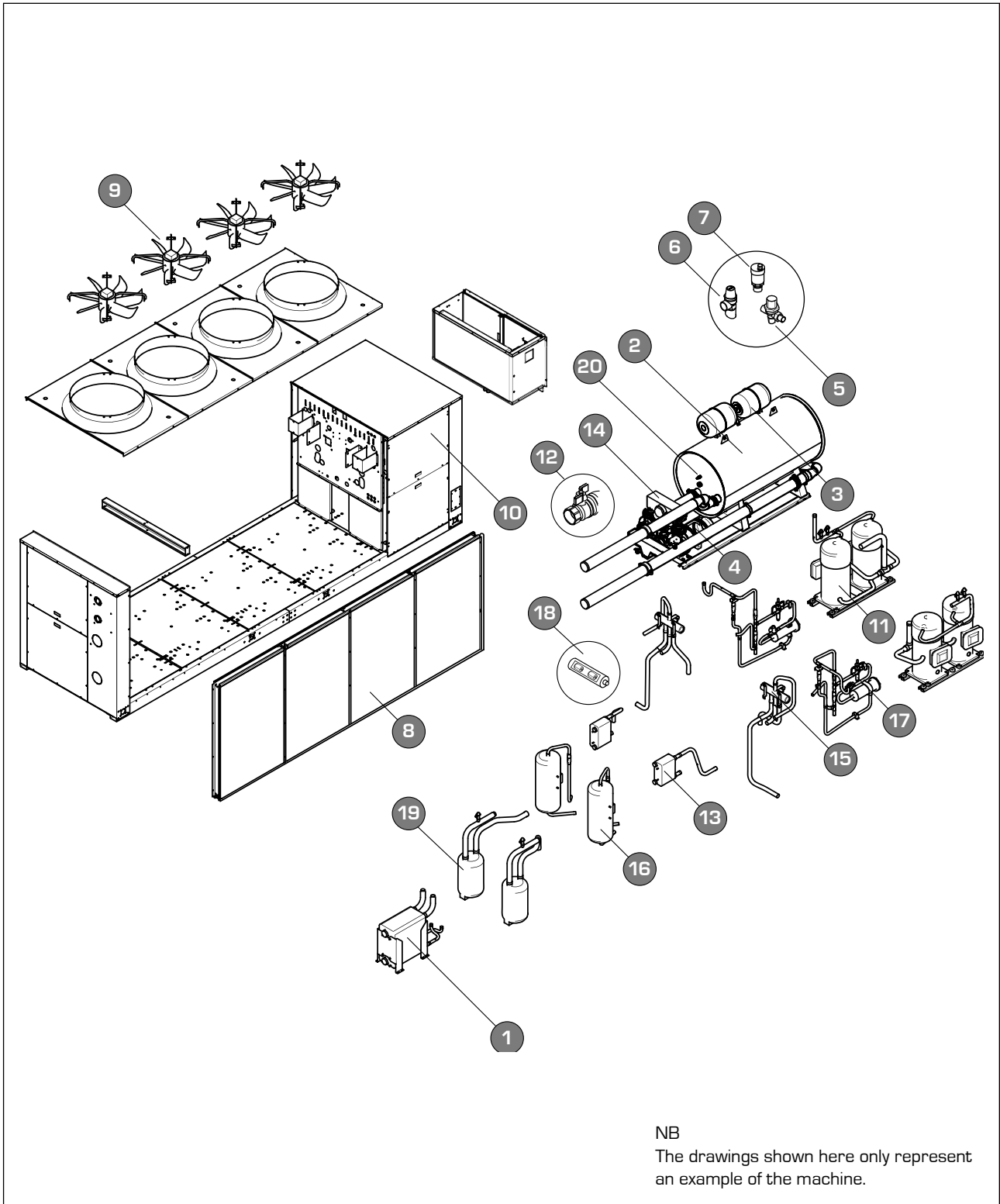
With size 075, it is not possible to configure a 230V or 500V power supply.

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 COMPACT

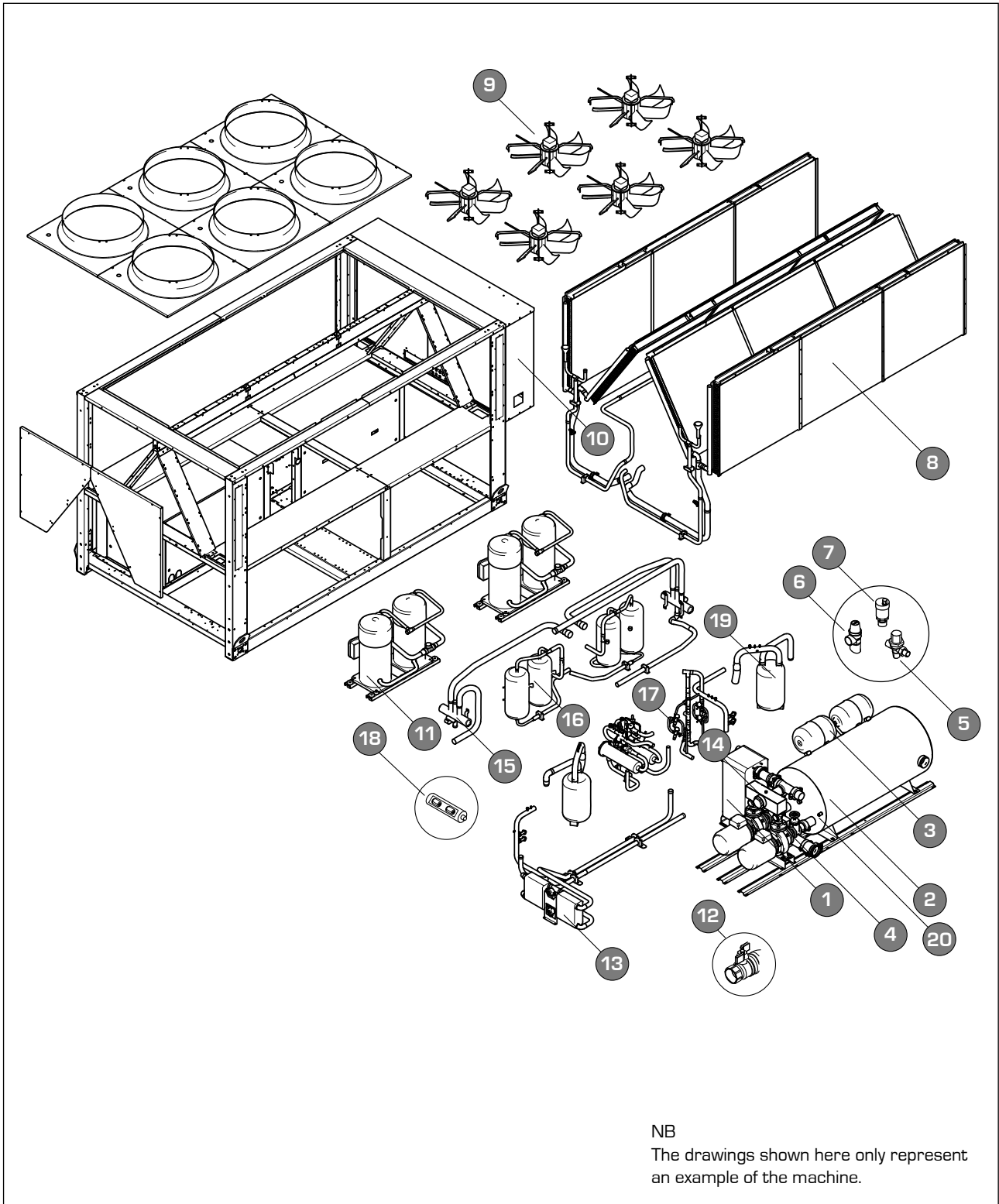


#### KEY

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



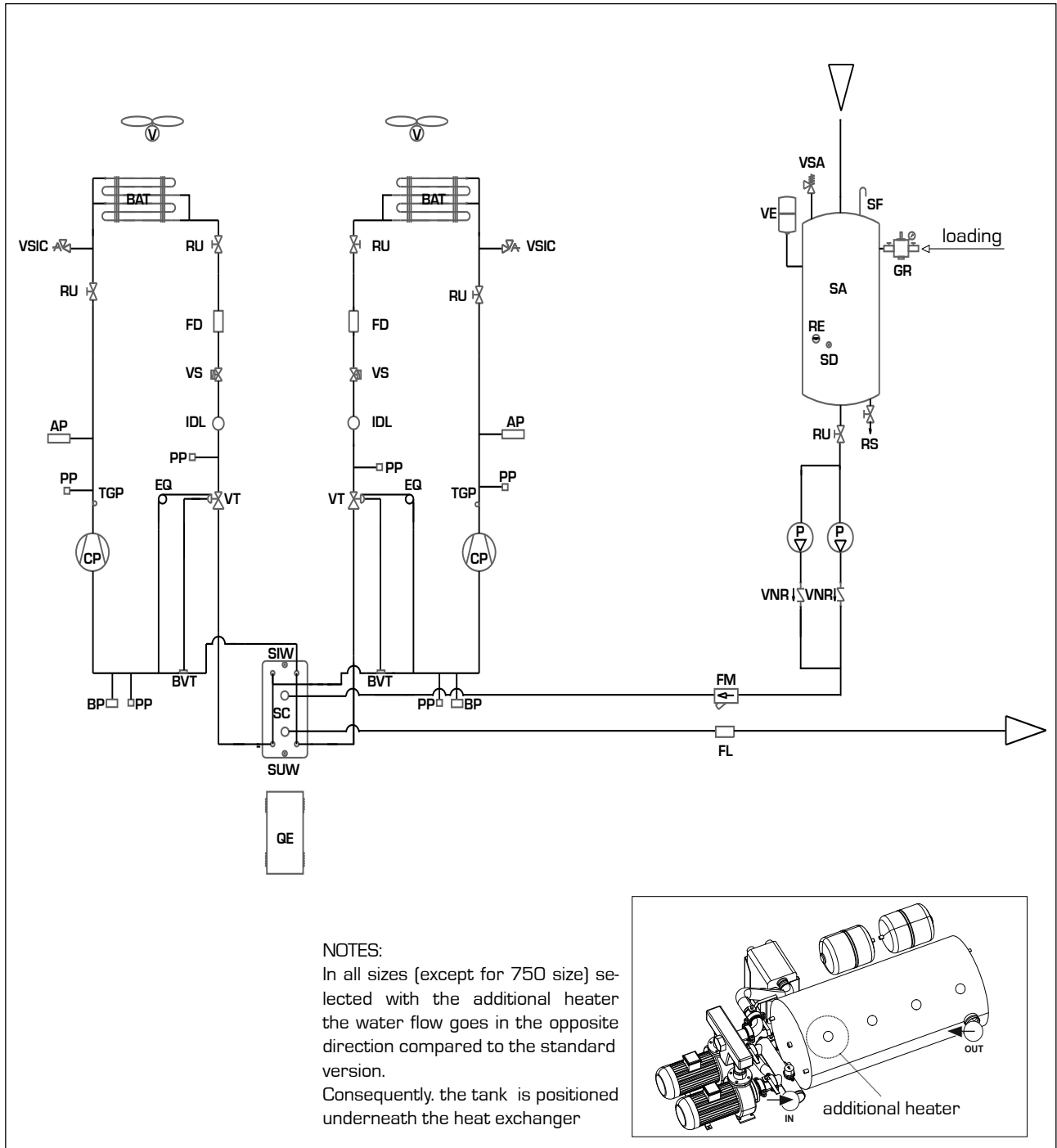
5.2. NRL 1400 - 1800 COMPACT



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

5.3. CHILLER CIRCUITS,  
HYDRAULIC ( ° - L )

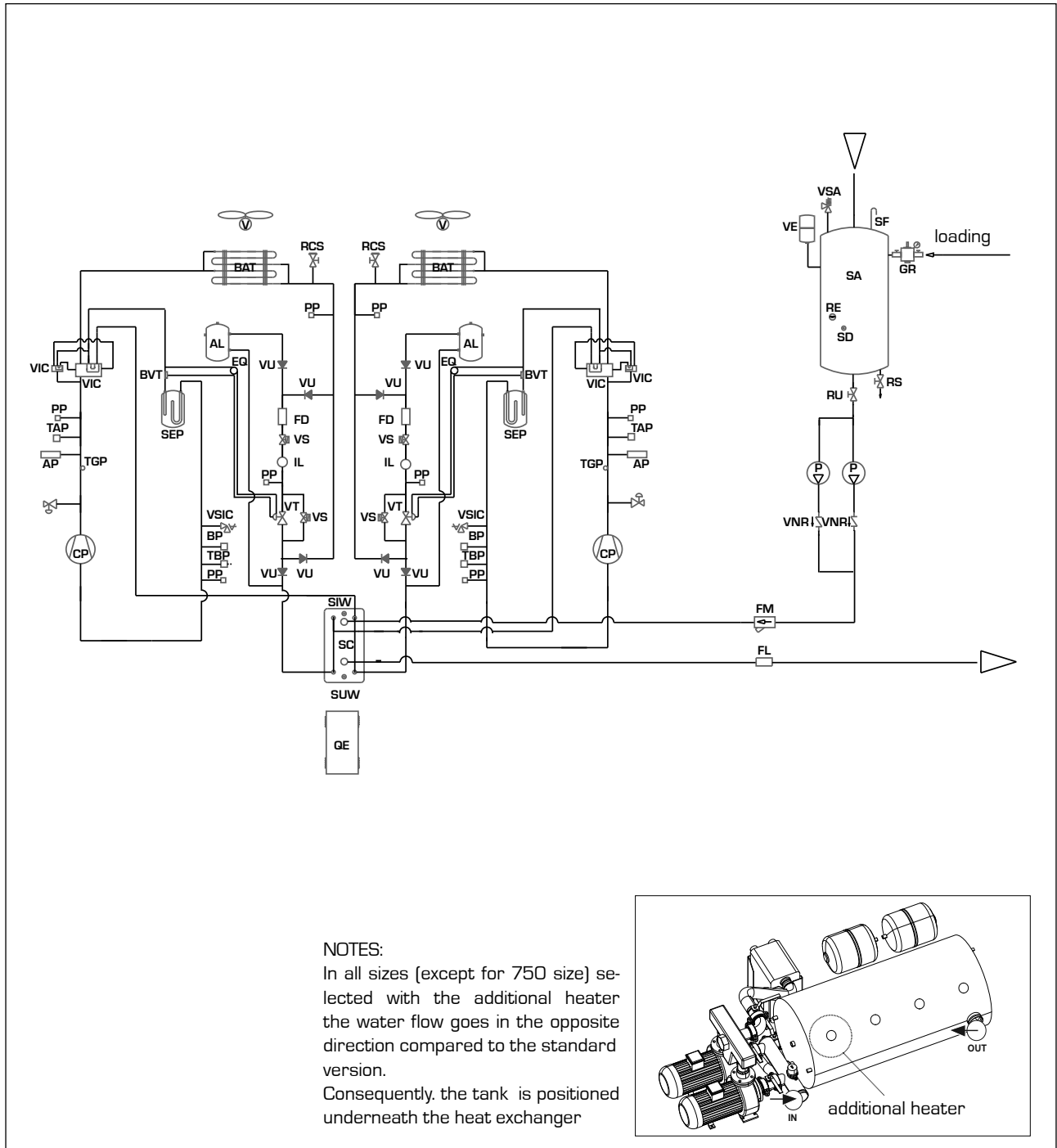


V	Fan
BAT	Battery
VSIC	Safety valve
RU	Tap
FD	Filter-drier
VS	Solenoid valve
IDL	Liquid indicator
AP	High pressure switch
PP	Pressure test point
EQ	Equaliser
TGP	Discharge gas thermostat

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 ( H - HL )



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 thermostats
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
GE	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 (for heat pump only)

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 the versions with water accumulator or pump, and in sizes "800-1200" compact).

This checks that the water is circulating. If this is not the case, it shuts down the unit.

### Water filter (assembled in the version with water accumulator or pump, and in sizes 800-1250 compact; 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. 2 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 (° - L)

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 (° - L)

#### - Heat pump (H - HL)

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 (° - L) "accessory"

#### - Heat pump (H - HL) "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 (° - L) "standard"

#### - Heat pump (H - HL) "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 on heat pump).

## 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
<b>AER485</b>	Through this accessory it is possible to connect the unit with BMS supervision systems with electrical standard RS 485 and MODBUS type protocol.								
°	•	•	•	•	•	•	•	•	•
L	•	•	•	•	•	•	•	•	•
H	•	•	•	•	•	•	•	•	•
HL	•	•	•	•	•	•	•	•	•
<b>VT (00-P1-P2-P3-P4)</b>	Rubber anti-vibration support. Select the model using the compatibility table.								
°	23	-	-	-	-	-	-	-	-
L	23	-	-	-	-	-	-	-	-
H	23	-	-	-	-	-	-	-	-
HL	23	-	-	-	-	-	-	-	-
<b>VT (01-02-03-04-05-06-07-08)</b>	Rubber anti-vibration support. Select the model using the compatibility table.								
°	23	-	-	-	-	-	-	-	-
L	23	-	-	-	-	-	-	-	-
H	23	-	-	-	-	-	-	-	-
HL	23	-	-	-	-	-	-	-	-
<b>AVX (00)</b>	Sprung anti-vibration supports. Select the model using the compatibility table.								
°	-	701	707	713	713	722	722	733	730
L	-	701	707	713	713	722	722	733	730
H	-	701	707	713	713	722	722	733	730
HL	-	701	707	713	713	722	722	733	730
<b>AVX (01-02-03-04)</b>	Sprung anti-vibration supports. Select the model using the compatibility table.								
°	-	702	708	714	717	723	728	728	728
L	-	702	708	714	717	723	728	728	728
H	-	702	708	714	717	723	728	728	728
HL	-	702	708	714	717	723	728	728	728
<b>AVX (P1-P2-P3-P4)</b>	Sprung anti-vibration supports. Select the model using the compatibility table.								
°	-	703	709	715	718	724	729	729	732
L	-	703	709	715	718	724	729	729	732
H	-	703	709	715	718	724	729	729	732
HL	-	703	709	715	718	724	729	729	732
<b>GP</b>	Protect the external coils from accidental knocks.								
°	10 (x3)	10 (x3)	10 (x3)	10 (x4)	10 (x4)	350	350	350	350
L	10 (x3)	10 (x3)	10 (x3)	10 (x4)	10 (x4)	350	350	350	350
H	10 (x3)	10 (x3)	10 (x3)	10 (x4)	10 (x4)	350	350	350	350
HL	10 (x3)	10 (x3)	10 (x3)	10 (x4)	10 (x4)	350	350	350	350

	0750	0800	0900	1000	1250	1400	1500	1650	1800
<b>PGS</b>		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.							
°	•	•	•	•	•	•	•	•	•
L	•	•	•	•	•	•	•	•	•
H	•	•	•	•	•	•	•	•	•
HL	•	•	•	•	•	•	•	•	•
<b>AERWEB30</b>		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.							
°	•	•	•	•	•	•	•	•	•
L	•	•	•	•	•	•	•	•	•
H	•	•	•	•	•	•	•	•	•
HL	•	•	•	•	•	•	•	•	•
<b>TP2</b>		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.							
°									
L	(X2)	(X2)	(X2)	(X2)	(X2)	(X2)	(X2)	(X2)	(X2)
H	standard								
HL	standard								
<b>REF</b>		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.							
°									
L	53	87	89	91	91	93	94	94	94
H	53	87	89	91	91	93	94	94	94
HL	53	87	89	91	91	93	94	94	94
<b>DRE</b>		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.							
°									
L	751	801	901	1001	1251	1401	1501	1651	1801
H	751	801	901	1001	1251	1401	1501	1651	1801
HL	751	801	901	1001	1251	1401	1501	1651	1801
<b>DCPX</b>		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.							
°	64	64	64	65	65	66	66	67	67
L	standard								
H	64	65	65	65	65	66	66	68	68
HL	standard								
<b>DCPX M</b>		DCPX only for configurations with enlarged fans (M).							
°	65	65	65	65	65	66	66	68	68
L	standard								
<b>DUALCHILLER</b>		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.							
°	•	•	•	•	•	•	•	•	•
L	•	•	•	•	•	•	•	•	•
H	•	•	•	•	•	•	•	•	•
HL	•	•	•	•	•	•	•	•	•
<b>MULTICHILLER</b>		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.							
°	•	•	•	•	•	•	•	•	•
L	•	•	•	•	•	•	•	•	•
H	•	•	•	•	•	•	•	•	•
HL	•	•	•	•	•	•	•	•	•
<b>TRX1</b>		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.							
°	•	•	•	•	•	•	•	•	•
L	•	•	•	•	•	•	•	•	•
H	•	•	•	•	•	•	•	•	•
HL	•	•	•	•	•	•	•	•	•
<b>PRM 1</b>		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.							
°	•	•	•	•	•	-	-	-	-
L	•	•	•	•	•	-	-	-	-
H	•	•	•	•	•	-	-	-	-
HL	•	•	•	•	•	-	-	-	-
<b>PRM 2</b>		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.							
°	-	-	-	-	-	•	•	•	•
L	-	-	-	-	-	•	•	•	•
H	-	-	-	-	-	•	•	•	•
HL	-	-	-	-	-	•	•	•	•

## 7. TECHNICAL DATA

### 7.1. TECHNICAL DATA VERSIONS (° - L)

COOLING			750	800	900	1000	1250	1400	1500	1650	1800
Cooling capacity:	kW	°	190	211	231	257	303	338	375	412	449
		L	174	190	210	235	271	302	336	366	393
Total input power	kW	°	69.2	78	92	104	121	142	161	175	187
		L	75	88	101	113	134	157	177	192	208
Water flow rate	l/h	°	32,680	36,290	39,730	44,200	52,120	58,140	64,500	70,860	77,230
		L	29,930	32,680	36,120	40,420	46,610	51,940	57,790	62,950	67,600
Total pressure drops	kPa	°	86	66	68	73	80	73	79	59	59
		L	72	55	57	61	65	59	64	48	46

ENERGY INDICES											
EER	W/W	°	2.75	2.71	2.51	2.47	2.50	2.38	2.33	2.35	2.40
		L	2.32	2.16	2.08	2.08	2.02	1.92	1.90	1.91	1.89
ESEER	W/W	°	3.87	4.19	3.97	3.98	3.96	3.76	3.68	3.72	3.79
		L	3.85	4.10	3.95	3.95	3.84	3.65	3.61	3.62	3.59

ELECTRICAL DATA											
Power supply	A	°	400V	400V-3-50Hz							
		L	3N-50Hz								
Input current	A	°	122	142	166	189	208	249	286	305	319
		L	132	153	177	200	226	269	308	328	348
Maximum current	A	°	144	170	192	217	261	290	319	358	391
		L									
Peak current	A	°	320	345	401	426	529	499	528	626	659
		L									

COMPRESSORS (SCROLL)											
Number/Circuit	no./no.	°	4 / 2	4/2	4/2	4/2	4/2	4/2	5/2	6/2	6/2
		L									

FANS (AXIAL)											
Quantity	no.	°	3	3	3	4	4	4	4	6	6
		L									
Air flow rate	m³/h	°	51400	54900	54150	75800	73200	77000	76000	108300	106200
		L	42700	38430	40575	53060	51240	57700	60800	75810	74340
Input power	kW	°	3.8	3.8	3.8	5.0	5.0	7.5	7.5	7.5	7.5
		L	2.8	2.8	2.8	3.8	3.8	5.6	5.6	5.6	5.6
Input current	A	°	8.4	8.1	8.1	10.8	10.8	16.2	16.2	16.2	16.2
		L	6.1	6.1	6.1	8.1	8.1	12.2	12.2	12.2	12.2

ENLARGED FANS (AXIAL)											
Quantity	no.	A	3	3	3	4	4	4	4	6	6
Input power	kW	A	3.75	5.2	5.2	7.0	7.0	10.5	10.5	10.5	10.5
Input current	A	A	8.4	11.1	11.1	14.8	14.8	22.2	22.2	22.2	22.2
Useful head	Pa	A	40	40	40	40	40	40	40	40	40

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

HYDRAULIC CIRCUIT											
Accumulation capacity	L	°	700								
		L									
Accumulation anti-freeze heater	n°/W	°	2x300	2x300	2x300	2x300	2x300	2x300	2x300	2x300	2x300
		L									
Plumbing connections* (IN/OUT) hydronic/pumping unit	diam	°	4"	4"	4"	4"	4"	4"	4"	4"	4"
		L									
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	°	3.0	3.4	3.4	3.4	4.6	4.6	5.9	5.9	5.9
		L									
Input current	A	°	6.2	5.8	5.8	5.8	7.8	7.8	10.0	10.0	10.0
		L									
Useful head	kPa	°	81	100	92	91	111	102	88	109	99
		L	100	120	112	111	139	133	116	134	130

\* The plumbing connections are all of the Victaulic type

			0750	0800	0900	1000	1250	1400	1500	1650	1800
<b>HIGH-HEAD CIRCULATION PUMP</b>											
Input power	KW	°	5.5	5.7	5.7	5.7	8.3	8.3	8.3	10.5	10.5
		L									
Input current	A	°	11.0	9.7	9.7	9.7	14.1	14.1	14.1	17.8	17.8
		L									
Useful head	kPa	°	201	219	211	208	256	246	220	246	237
		L	223	241	232	229	286	279	258	271	267

<b>SOUND DATA</b>											
Sound power (1)	dBA	°	85.0	86.0	86.0	90.0	91.0	90.5	90.5	92.0	92.0
		L	80.0	83.0	83.0	87.0	88.0	87.5	87.5	89.0	89.0
Sound pressure (2)	dBA	°	53.0	54.0	54.0	58.0	59.0	58.5	58.5	60.0	60.0
		L	48.0	51.0	51.0	55.0	56.0	55.5	55.5	57.0	57.0

<b>DIMENSIONS</b>											
Height	mm	°	1975	1975	1975	1975	1975	2450	2450	2450	2450
		L									
Width	mm	°	1500	1500	1500	1500	1500	2200	2200	2200	2200
		L									
Depth	mm	°	4355	4355	4355	5355	5355	4250	4250	4250	4250
		L									
Weight when empty	kg	°	1382	1730	1860	2015	2135	2765	2960	3055	3160
		L	1392	1740	1870	2025	2145	2775	2970	3065	3170

#### NOMINAL REFERENCE CONDITIONS

##### COOLING MODE

- Inlet water temperature
- Outlet water temperature
- Outside air temperature
- $\Delta t$

12°C  
7°C  
35°C  
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 (H - HL)

COOLING			0750	0800	0900	1000	1250	1400	1500	1650	1800
Cooling capacity:	kW	H	176	201	222	262	300	333	367	423	454
		HL	165	184	200	237	265	302	332	373	397
Total input power	kW	H	70.1	81	94	101	120	140	159	166	179
		HL	77.4	90	105	112	136	154	174	187	204
Water flow rate	l/h	H	30270	34570	38180	45060	51600	57280	63120	72760	78090
		HL	28380	31650	34400	40760	45580	51940	57100	64160	68280
Total pressure drops	kPa	H	74	46	45	50	57	40	40	47	46
		HL	65	39	37	41	45	33	34	37	36

HEATING											
Heating capacity	kW	H	201	227	256	293	340	384	427	468	503
		HL									
Total input power	kW	H	65.2	75	85	96	111	126	141	155	166
		HL									
Water flow rate	l/h	H	34570	39040	44030	50400	58480	66050	73440	80500	86520
		HL									
Total pressure drops	kPa	H	96	61	62	65	78	54	55	59	58
		HL									

ENERGY INDICES											
EER	W/W	H	2.51	2.48	2.36	2.59	2.50	2.38	2.31	2.55	2.54
		HL	2.13	2.04	1.90	2.12	1.95	1.96	1.91	1.99	1.95
COP	W/W	H	3.08	3.03	3.01	3.05	3.06	3.05	3.03	3.02	3.03
		HL									

ELECTRICAL DATA											
Power supply	A	H	400V 3N-50Hz	400V-3-50Hz							
		HL									
Input current	A	H	113	136	156	179	193	227	261	279	290
		HL									
Maximum current	A	H	144	173	195	221	265	294	323	365	398
		HL									
Peak current	A	H	320	348	404	430	533	503	532	633	666
		HL									

COMPRESSORS (SCROLL)											
Number/Circuit	no./no.	H	4/2	4/2	4/2	4/2	4/2	5/2	6/2	6/2	6/2
		HL									

FANS (AXIAL)											
Quantity	no.	H	3	3	3	4	4	4	4	6	6
		HL									
Air flow rate	m³/h	H	50200	64500	63750	85600	80800	87400	86800	124200	122400
		HL	41700	45200	44600	59900	56600	65500	69400	86900	85700
Input power	kW	H	3.75	5.1	5.1	6.8	6.8	6.8	6.8	10.2	10.2
		HL									
Input current	A	H	8.4	10.8	10.8	14.4	14.4	14.4	14.4	21.6	21.6
		HL									

EVAPORATORS (PLATES)											
Quantity	no.	H	1								
		HL									
Plumbing connections* (IN/OUT)	diam	H	2"1/2	3"	3"	3"	3"	4"	4"	4"	4"
		HL									

HYDRAULIC CIRCUIT											
Accumulation capacity	L	H	700								
		HL									
Accumulation anti-freeze heater	W	H	2x300	2x300	2x300	2x300	2x300	2x300	2x300	2x300	2x300
		HL									
Plumbing connections* (IN/OUT) hydronic/pumping unit	diam	H	4"	4"	4"	4"	4"	4"	4"	4"	4"
		HL									
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	H	3.0	3.4	3.4	3.4	4.6	4.6	5.9	5.9	5.9
		HL									
Input current	A	H	6.2	5.8	5.8	5.8	7.8	7.8	10.0	10.0	10.0
		HL									
Useful head	kPa	H	97	125	120	118	142	149	142	122	115
		HL	109	138	135	134	165	167	157	145	141

\* The plumbing connections are all of the Victaulic type

			0750	0800	0900	1000	1250	1400	1500	1650	1800
<b>HIGH-HEAD CIRCULATION PUMP</b>											
Input power	KW	H	5.5	5.7	5.7	5.7	8.3	8.3	8.3	10.5	10.5
		HL									
Input current	A	H	11.0	9.7	9.7	9.7	14.1	14.1	14.1	17.8	17.8
		HL									
Useful head	kPa	H	221	243	237	233	285	290	274	257	251
		HL	235	257	253	250	309	310	297	280	276

<b>SOUND DATA</b>											
Sound power (1)	dBA	H	85	89	89	91	94	91.5	91.5	92.5	94.5
		HL	80	86.5	86.5	88	91	88.5	88.5	89.5	91.5
Sound pressure (2)	dBA	H	53	57	57	59	62	59	59	60	62
		HL	48	54	54	56	59	56	56	57	59

<b>DIMENSIONS</b>											
Height	mm	H	1975	1975	1975	1975	1975	2450	2450	2450	2450
		HL									
Width	mm	H	1500	1500	1500	1500	1500	2200	2200	2200	2200
		HL									
Depth	mm	H	4350	4355	4355	5355	5355	4250	4250	4250	4250
		HL									
Weight when empty	kg	H	1487	1800	1940	2170	2320	2930	3140	3220	3330
		HL		1800	1950	2180	2320	2940	3150	3230	3340

#### 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

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  $\Delta t = 5^\circ\text{C}$ .

### NB

The unit can be activated with external air at  $46^\circ\text{C}$  and inlet water at  $35^\circ\text{C}$  in the summer function.

The unit can be activated with external air at  $-15^\circ\text{C}$  and inlet water at  $20^\circ\text{C}$  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

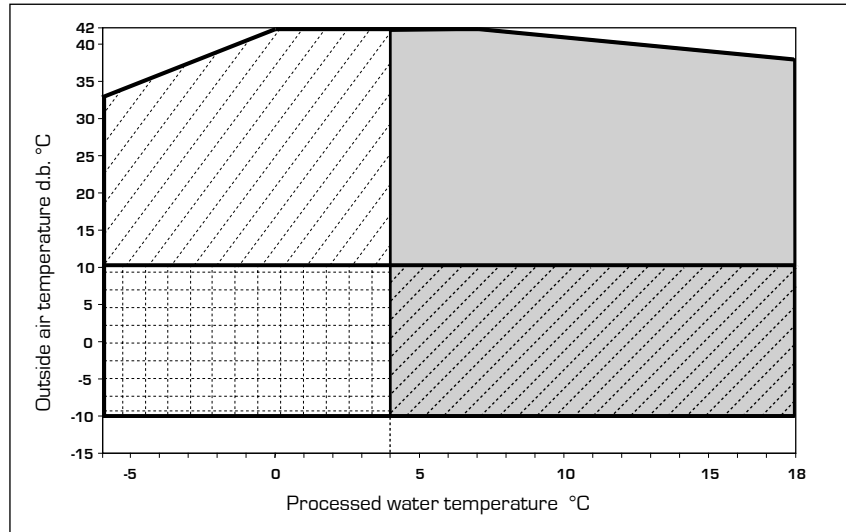


Standard operation

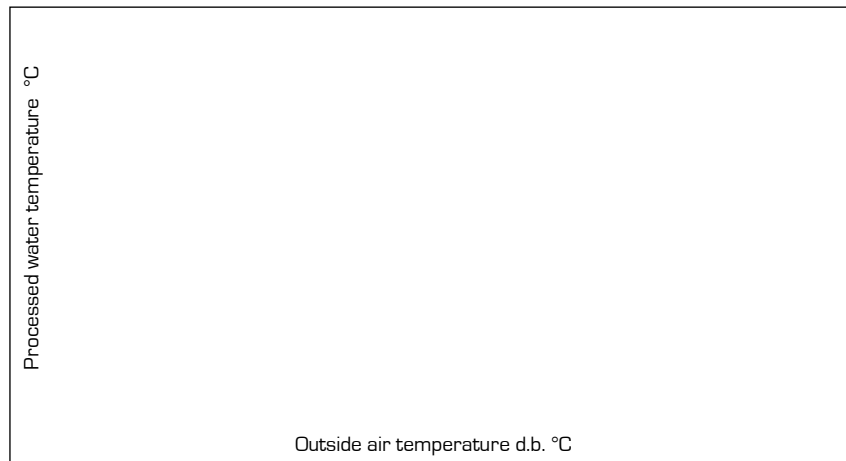


Standard operation with DCPX accessory

### 8.1. COOLING MODE



### 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

#### - "STANDARD 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.

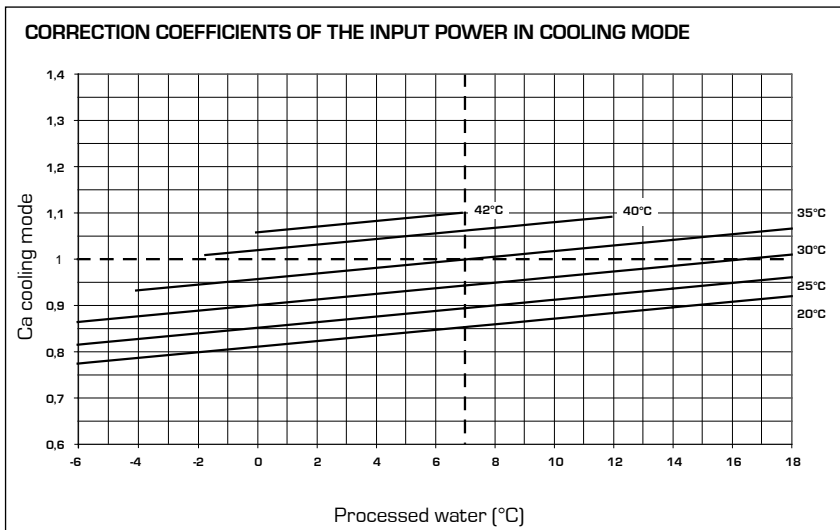
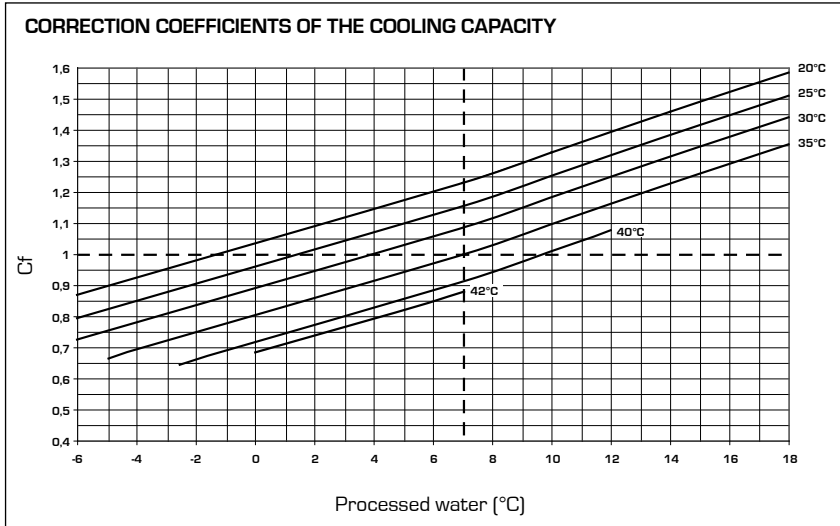
#### KEY

**Cf:** correction coefficient of the cooling capacity.

**Ca:** correction coefficient of the input power.

#### FOR $\Delta t$ 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.



## 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

**Ct:** correction coefficient of the heating capacity.

**Ca:** Correction coefficient of the input power.

#### CORRECTION COEFFICIENTS OF THE HEATING CAPACITY

Ct

External air temperature [°C]

#### CORRECTION COEFFICIENTS OF THE INPUT POWER IN HEATING MODE

Ca in heating mode

External air temperature [°C]

## 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 <sup>2</sup> ]/[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

## 10. ETHYLENE GLYCOL SOLUTION

- 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  $\Delta t$  that would be used in the absence of glycols.

NB

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

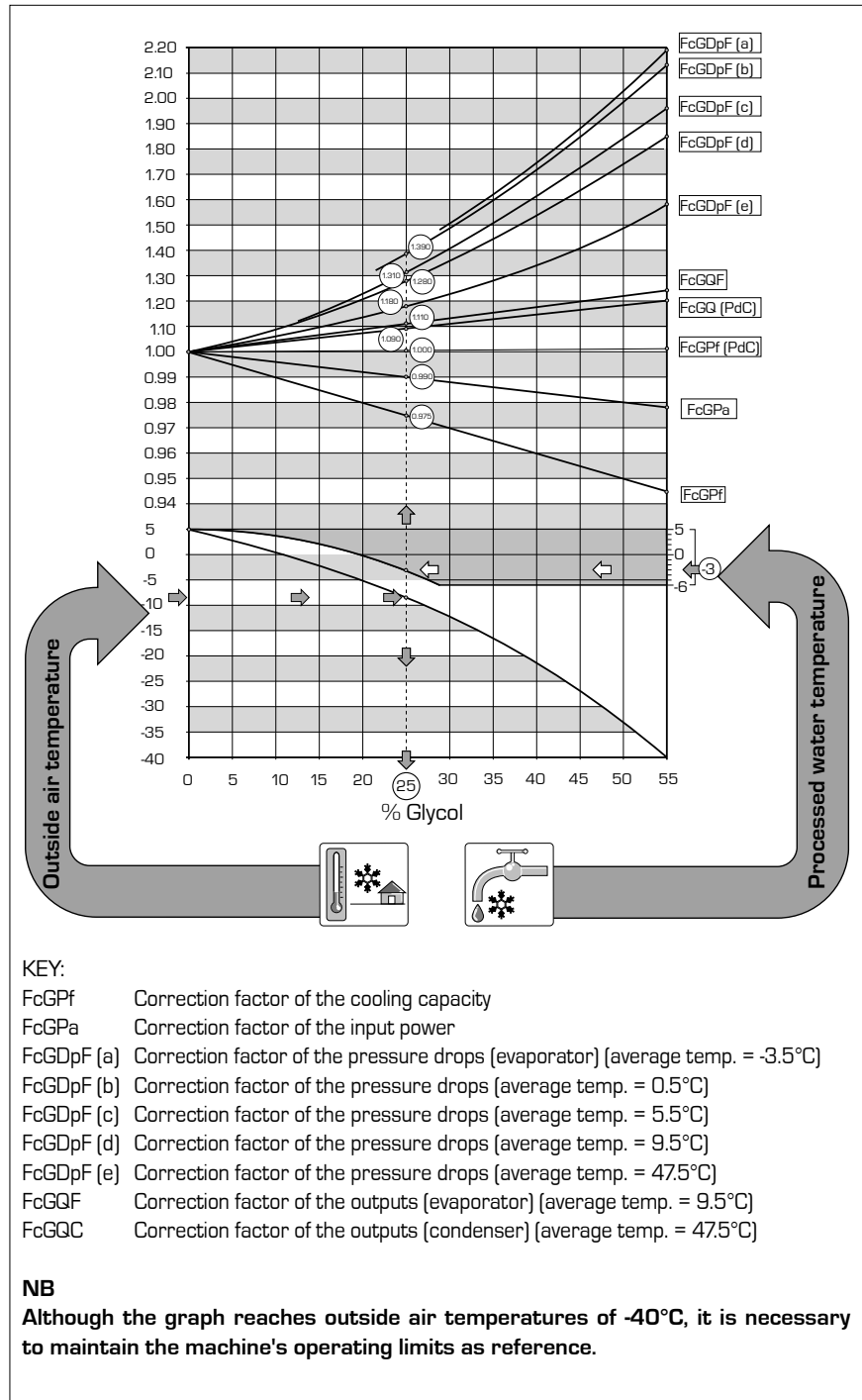
By using the diagram below it possible to establish the percentage of glycol necessary; this percentage can be calculated taking into account one of the following factors:

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 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

to produce water at the required temperature.

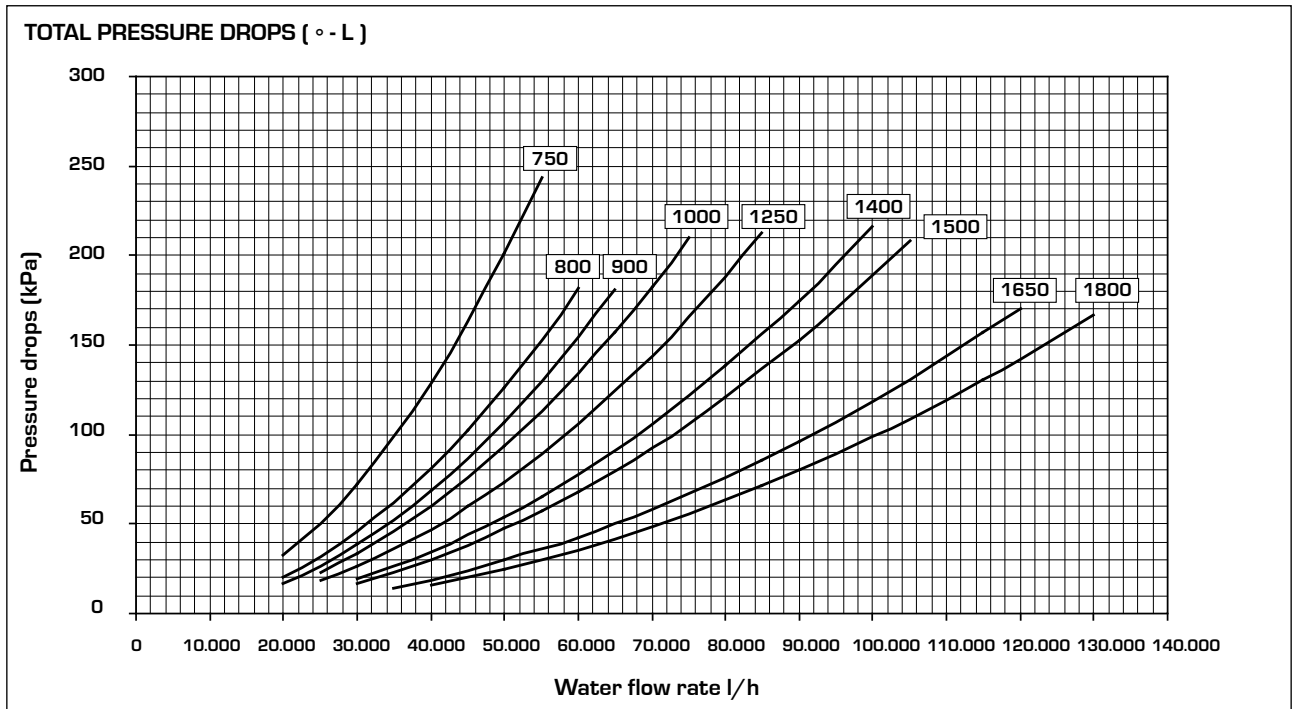
- Remember that the initial sizes "OUTSIDE AIR TEMPERATURE" and "PROCESSED WATER TEMPERATURE", are not directly linked to each other, so it is not possible to enter the curve of one of these sizes, and obtain the corresponding point on the other curve.

# 11. PRESSURE DROPS

## 11.1. TOTAL PRESSURE DROPS

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

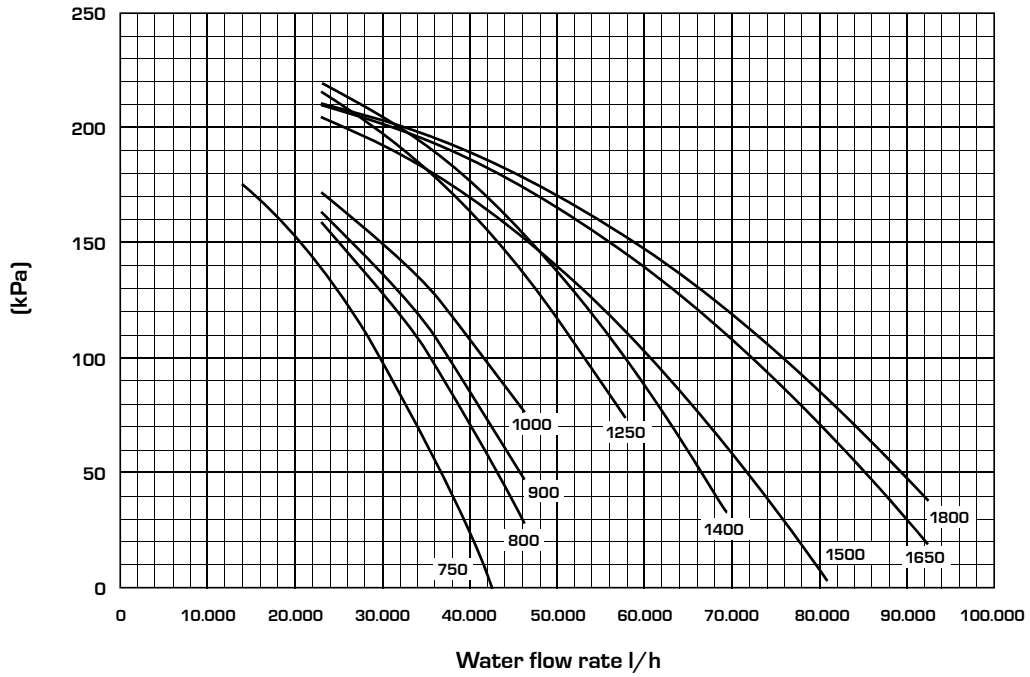
Standard NRL cooling only unit (° - L)



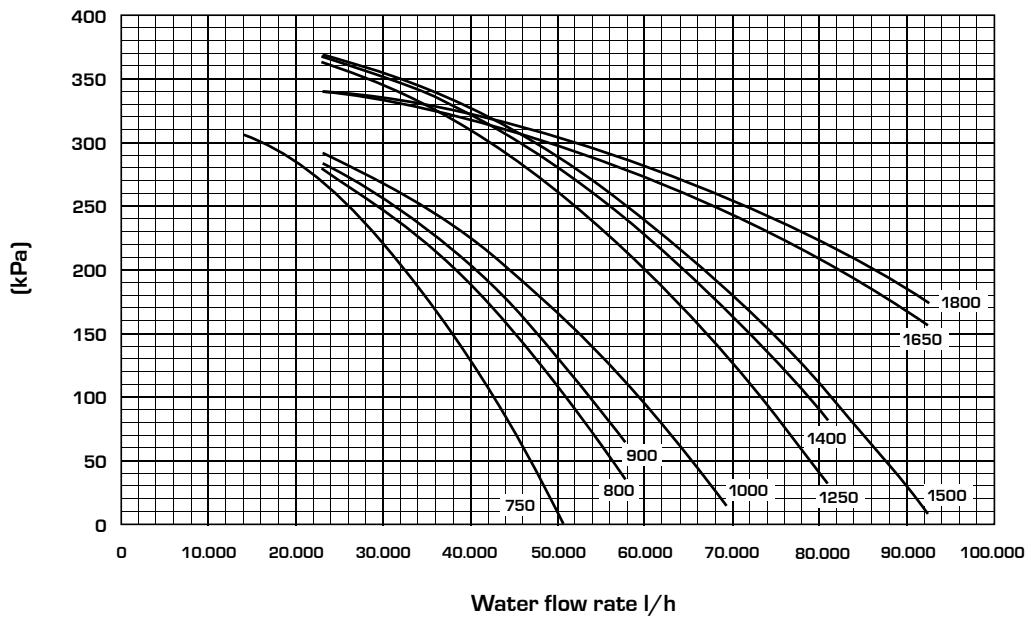
Average water temperature	5	10	15	20	30	40	50
Multiplicational coefficient	1.02	1	0.985	0.97	0.95	0.93	0.91

## 12. USEFUL HEADS

USEFUL HEADS, LOW HEAD VERSIONS ° - L

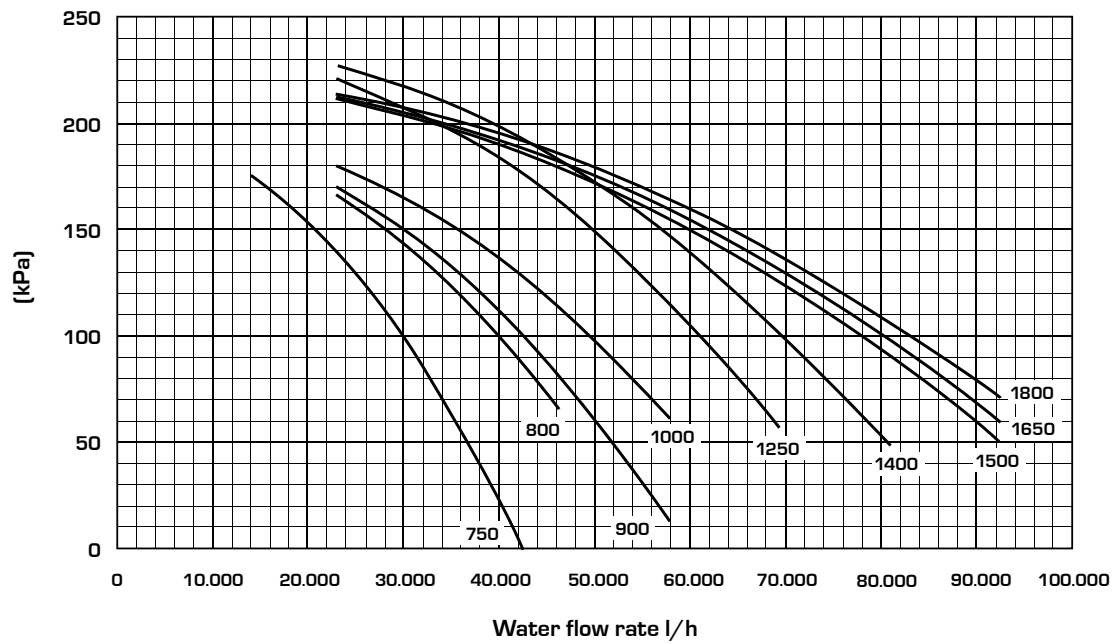


USEFUL HEADS, HIGH HEAD VERSIONS ° - L

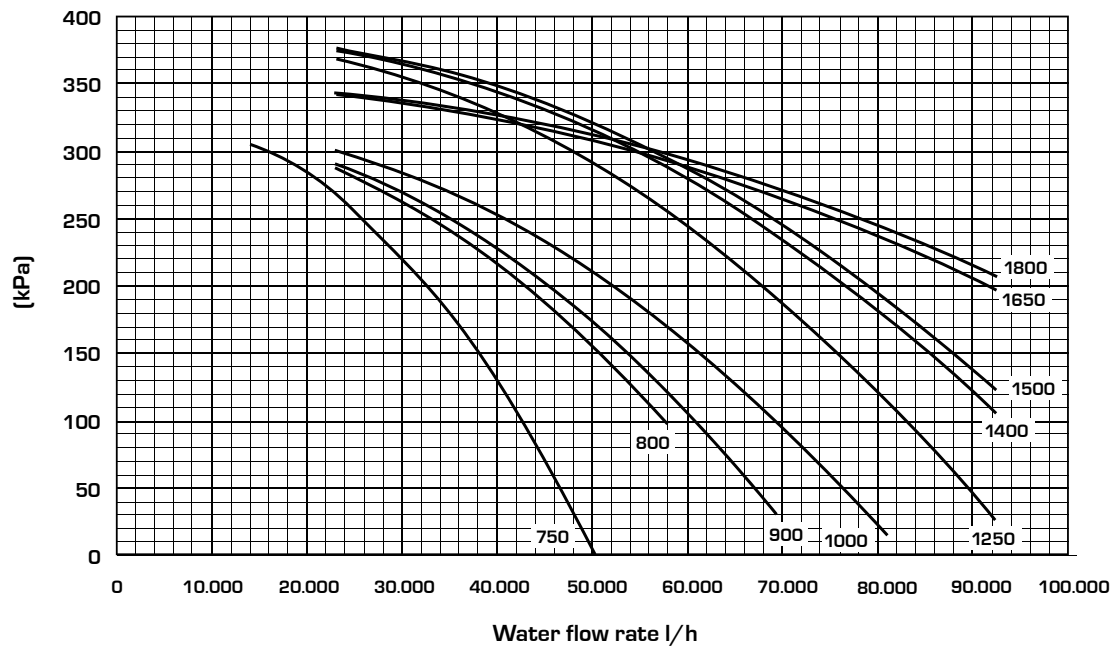




USEFUL HEADS, LOW HEAD VERSIONS H - HL



USEFUL HEADS, HIGH HEAD VERSIONS H - HL



## 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 pre-charging 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:

$p \text{ [calibration] [bar]} = H \text{ [m]} / 10.2 + 0.3$ .  
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.

### 13.4. MINIMUM WATER CONTENT RECOMMENDED

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

### 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 <sup>(1)</sup>	2,174	2,646	3,118	3590	3852
Water content reference value	l <sup>(2)</sup>	978	1190	1404	1616	1732
Water content reference value	l <sup>(3)</sup>	510	622	732	844	904

### 13.3.

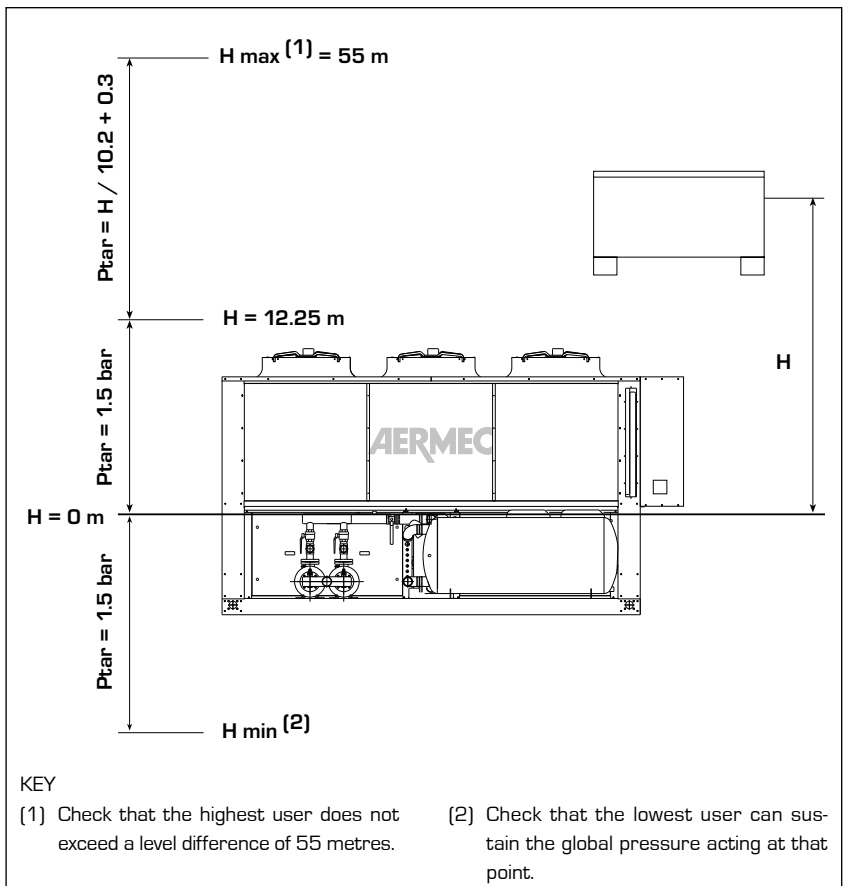
Glycol water	Water temp. °C		Correction coefficient	Reference condition
	max.	min.		
10%	40	-2	0.507	(1)
10%	60	-2	0.686	(2)
10%	85	-2	0.809	(3)
20%	40	-6	0.434	(1)
20%	60	-6	0.604	(2)
20%	85	-6	0.729	(3)
35%	40	-6	0.393	(1)
35%	60	-6	0.555	(2)
35%	85	-6	0.677	(3)

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.



(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 $\Delta t$ less than 5°C.

## 14. CAPACITY CONTROL

[*] Cooling capacity %	Levels of power					
	1°	2°	3°	4°	5°	6°
<b>Versions</b>						
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					
	1°	2°	3°	4°	5°	6°
<b>Versions</b>						
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					
	1°	2°	3°	4°	5°	6°
<b>Versions</b>						
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					
	1°	2°	3°	4°	5°	6°
<b>Versions</b>						
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

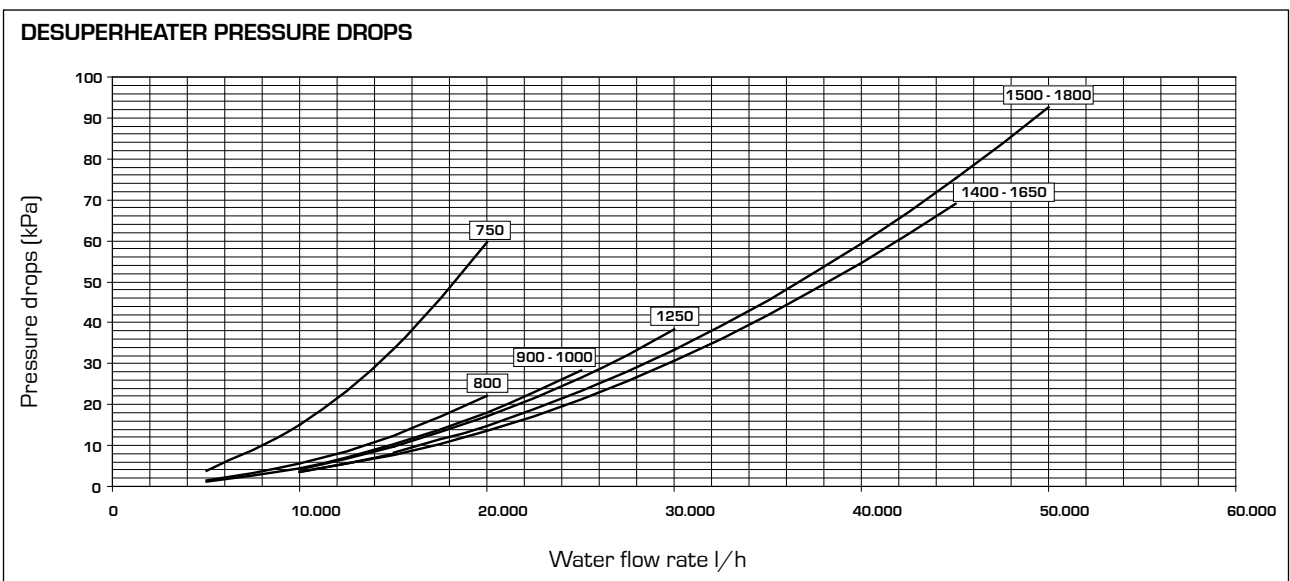
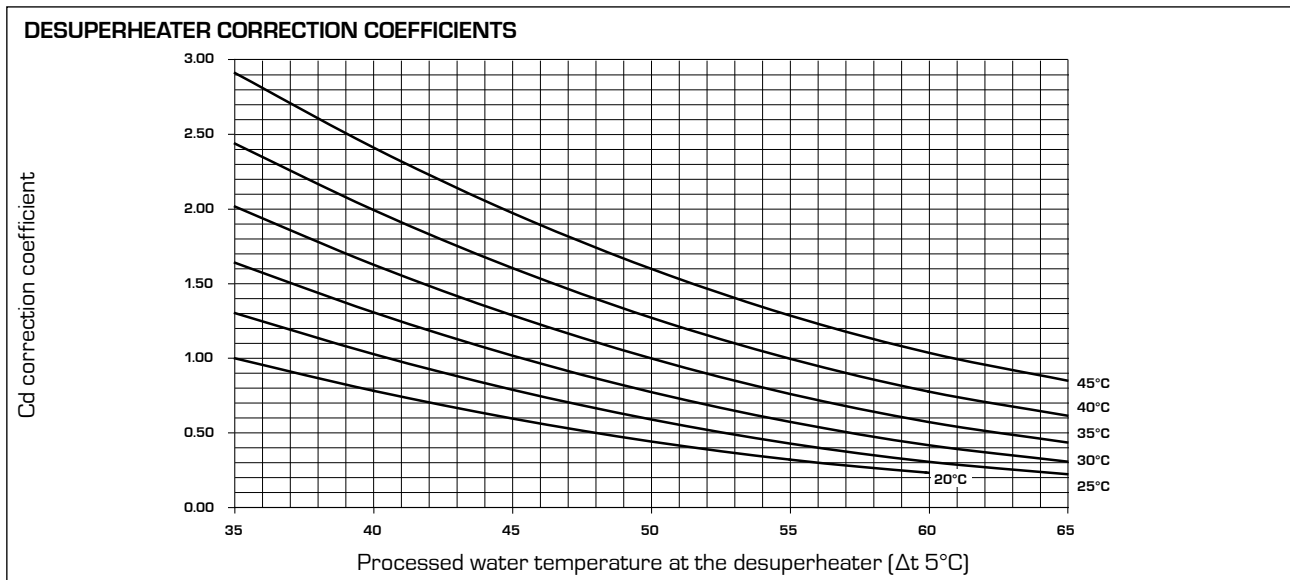
the characteristics of the desuperheaters and the pressure drop curves are shown below.

For processed water temperatures different from 50°C, the result obtained is multiplied by the correction factor that can be obtained from Table 15.1.1.

The nominal value refers to:

- air temperature 35°C
- water at the desuperheater 45/50°C
- $\Delta t$  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



### 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] (A)										
NRL 0750 °	85,0	53,0	66,0	72,4	73,0	78,1	78,5	80,0	76,2	65,2
NRL 0750 L	80,0	48,0	62,0	68,4	70,4	72,0	72,8	74,4	69,5	65,2
NRL 0750 H°	85,0	53,0	66,0	72,4	73,0	78,1	78,5	80,0	76,2	65,2
NRL 0750 HL	80,0	48,0	62,0	68,4	70,4	72,0	72,8	74,4	69,5	65,2
NRL 0800 °	86,0	54,0	67,5	97,0	84,5	82,0	80,0	75,5	71,0	64,5
NRL 0800 L	83,0	51,0	64,5	95,5	81,5	78,0	75,0	72,0	69,0	63,0
NRL 0800 H°	88,5	56,5	70,0	100,0	89,0	83,5	82,0	77,0	72,5	63,5
NRL 0800 HL	85,5	53,5	67,0	99,5	84,5	78,0	76,0	72,0	66,0	59,5
NRL 0900 °	86,0	54,0	67,5	97,0	84,5	82,0	80,0	75,5	71,0	64,5
NRL 0900 L	83,0	51,0	64,5	95,5	81,5	78,0	75,0	72,0	69,0	63,0
NRL 0900 H°	88,5	56,5	70,0	100,0	89,0	83,5	82,0	77,0	72,5	63,5
NRL 0900 HL	85,5	53,5	67,0	99,5	84,5	78,0	76,0	72,0	66,0	59,5
NRL 1000 °	90,0	58,0	71,5	101,5	90,5	87,5	81,5	76,7	70,7	61,0
NRL 1000 L	87,0	55,0	68,5	99,5	85,0	84,7	77,8	73,1	65,8	59,0
NRL 1000 H°	90,5	58,5	72,0	101,5	92,5	87,9	82,0	77,0	71,0	62,0
NRL 1000 HL	87,5	55,5	69,0	99,6	86,0	85,4	78,6	74,6	66,3	60,2
NRL 1250 °	91,0	59,0	72,5	102,5	90,5	89,0	82,6	78,0	72,0	64,0
NRL 1250 L	88,0	56,0	69,5	100,0	88,0	86,0	79,0	73,0	65,5	59,5
NRL 1250 H°	93,5	61,5	75,0	103,0	93,8	89,0	88,0	84,0	77,5	67,0
NRL 1250 HL	90,5	58,5	72,0	99,0	92,5	86,0	84,0	82,0	73,5	63,5
NRL 1400 °	90,5	58,5	72,0	100,5	90,5	88,9	82,0	80,0	73,5	67,0
NRL 1400 L	87,5	55,5	69,0	98,5	89,0	82,5	80,0	77,0	72,0	67,0
NRL 1400 H°	91,0	59,0	72,5	102,0	90,0	87,0	86,0	78,0	70,0	63,0
NRL 1400 HL	88,0	56,0	69,5	99,5	86,0	85,0	82,5	73,0	62,0	56,0
NRL 1500 °	90,5	58,5	72,0	100,5	90,0	87,5	84,0	81,0	70,7	64,0
NRL 1500 L	87,5	55,5	69,0	98,5	86,5	84,5	81,5	75,5	67,5	61,5
NRL 1500 H°	90,5	58,5	72,0	102,5	88,0	86,0	85,0	77,5	69,0	61,0
NRL 1500 HL	87,5	55,5	69,0	102,0	82,5	80,5	77,5	73,5	64,0	58,0
NRL 1650 °	92,0	60,0	73,5	102,0	92,0	89,0	85,0	82,0	77,0	72,0
NRL 1650 L	89,0	57,0	70,5	99,5	89,0	85,5	82,3	78,0	75,0	70,0
NRL 1650 H°	92,0	60,0	73,5	102,5	92,0	88,0	86,5	81,0	72,0	65,0
NRL 1650 HL	89,0	57,0	70,5	101,0	88,0	85,0	82,0	78,0	68,0	62,0
NRL 1800 °	92,0	60,0	73,5	102,5	91,5	88,0	86,0	82,0	76,0	71,0
NRL 1800 L	89,0	57,0	70,5	99,0	88,6	87,0	83,0	76,0	68,0	65,0
NRL 1800 H°	94,0	62,0	75,5	102,0	95,0	90,5	89,5	82,0	72,5	67,0
NRL 1800 HL	91,0	59,0	72,5	100,0	92,5	88,5	85,0	79,0	70,0	65,0

The values refer to:

- Inlet water temperature                    12°C
- Processed water temperature            7°C ;
- Outside air temperature                    35°C

## 17. SAFETY AND CHECK PARAMETER SETTING

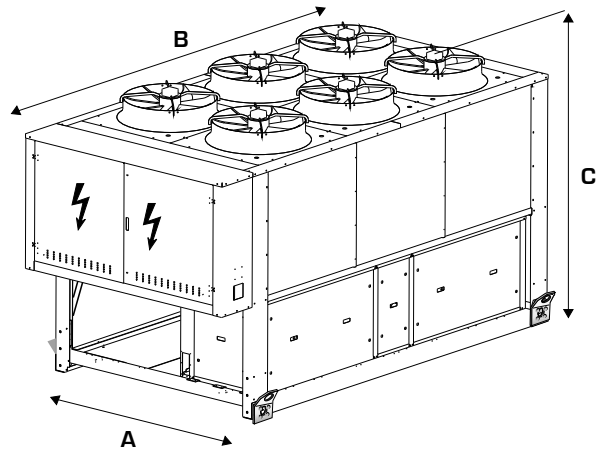
CHECK PARAMETERS			
Cold Setting	Water inlet temperature in cooling mode	MIN.	-10°C
		MAX.	20°C
		DEFAULT	7.0°C
heating Setting	Water inlet temperature in heat mode	MIN.	30°C
		MAX.	50°C
		DEFAULT	50°C
Anti-freeze intervention	Intervention temperature for the anti-freeze alarm, on EV side (water outlet 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
<b>COMPRESSOR THERMOMAGNETIC SWITCHES 400V</b>									
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
<b>HIGH PRESSURE SWITCH WITH MANUAL RESET</b>									
PA (bar)	40	40	40	40	40	40	40	40	40
<b>HIGH PRESSURE TRANSDUCER</b>									
TAP (bar)	39	39	39	39	39	39	39	39	39
<b>LOW PRESSURE TRANSDUCER</b>									
TBP (bar)	2	2	2	2	2	2	2	2	2
<b>CHILLER CIRCUIT SAFETY VALVE</b>									
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
<b>FAN THERMOMAGNETIC SWITCHES - the calibration is made on a thermomagnetic switch (single ventilation line)</b>									
Fans °	11A	11A	11A	13A	13A	-	-	-	-
Fans L									
Fans H	14A	14A	14A	18A	18A	-	-	-	-
Fans HL									
<b>FAN THERMOMAGNETIC SWITCHES - the calibration is made on 2 thermomagnetic switches (2 ventilation lines)</b>									
Fans °	-	-	-	-	-	7A	7A	11A	11A
Fans L									
Fans H	-	-	-	-	-	9A	9A	14A	14A
Fans HL									
<b>NUMBER OF FANS</b>									
No. of fans °									
No. of fans L									
No. of fans H	-	-	-	-	-	7A	7A	11A	11A
No. of fans HL									

## 18. DIMENSIONS

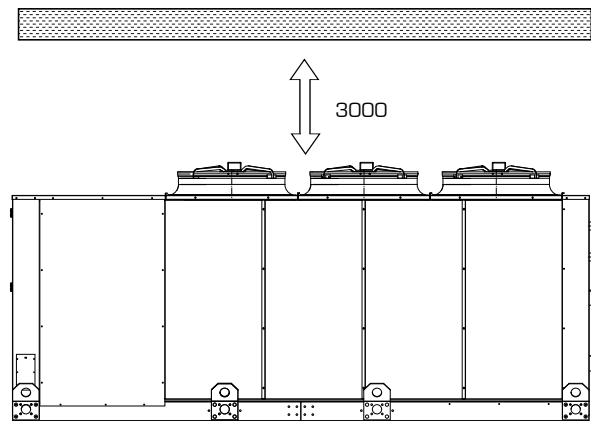
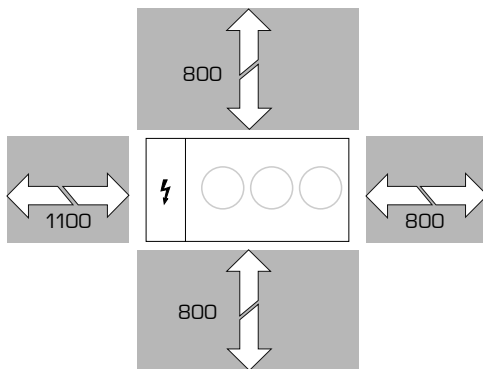
### 18.1. NRL 0750 - 0800 - 0900 - 1000 - 1250 - 1400 - 1500 - 1650 - 1800

MOD.	VERSIONS	A (mm)	B (mm)	C (mm)
0750	◦-L-H-HL	1500	4355	1975
0800	◦-L-H-HL	1500	4355	1975
0900	◦-L-H-HL	1500	4355	1975
1000	◦-L-H-HL	1500	5355	1975
1250	◦-L-H-HL	1500	5355	1975
1400	◦-L-H-HL	2200	4250	2450
1500	◦-L-H-HL	2200	4250	2450
1650	◦-L-H-HL	2200	4250	2450
1800	◦-L-H-HL	2200	4250	2450



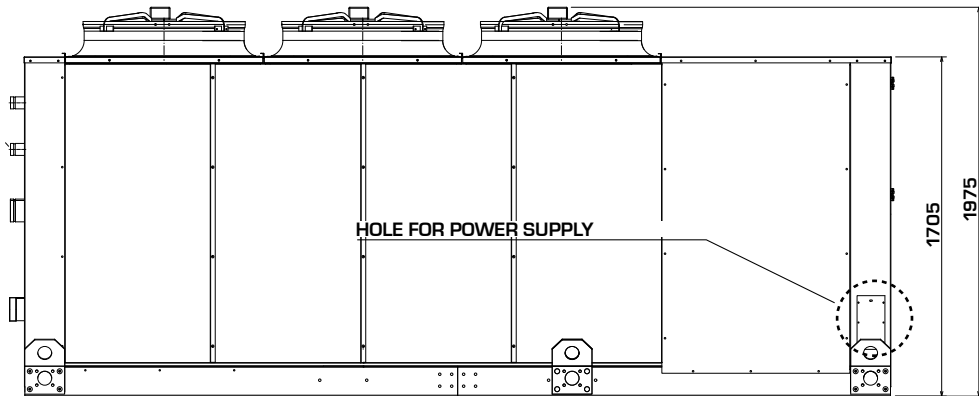
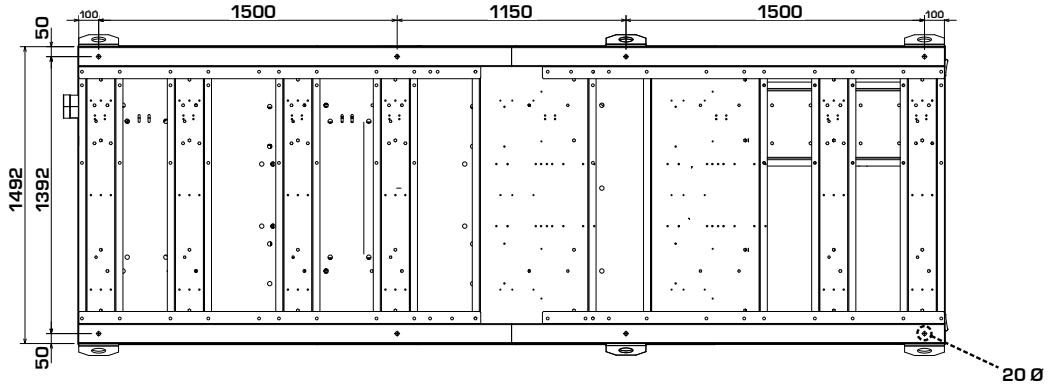
The drawings shown here only represent an example of the machine.

### 18.2. MINIMUM TECHNICAL CLEARANCES

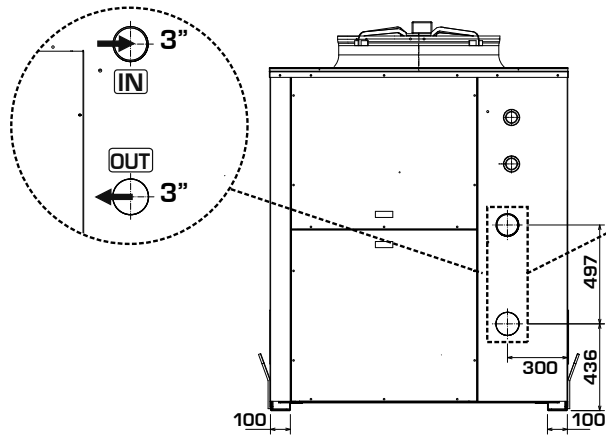


# 19. POSITION OF PLUMBING CONNECTIONS POSITION OF VIBRATION DAMPERS

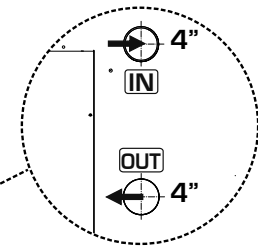
## 19.1. NRL 750 COMPACT POSITION OF VIBRATION DAMPERS



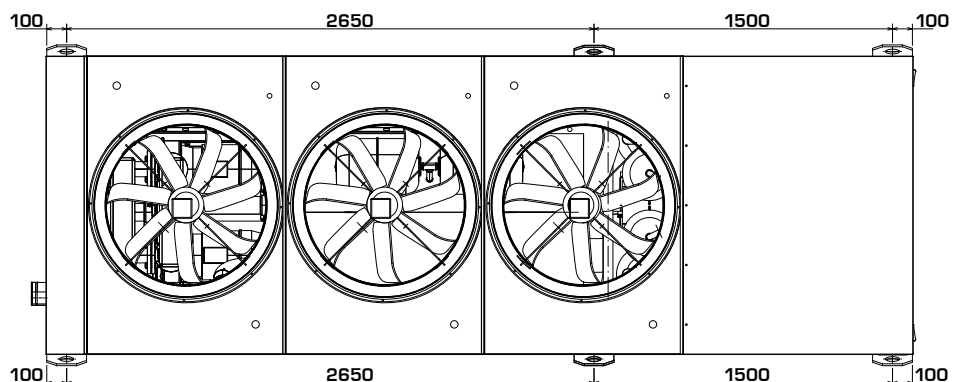
### PLUMBING CONNECTIONS VERSION "00" AND PUMPS



### PLUMBING CONNECTIONS WITH ACCUMULATION



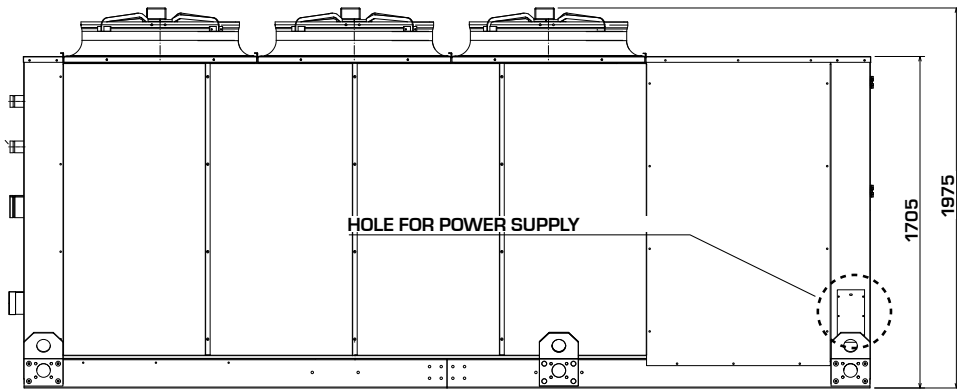
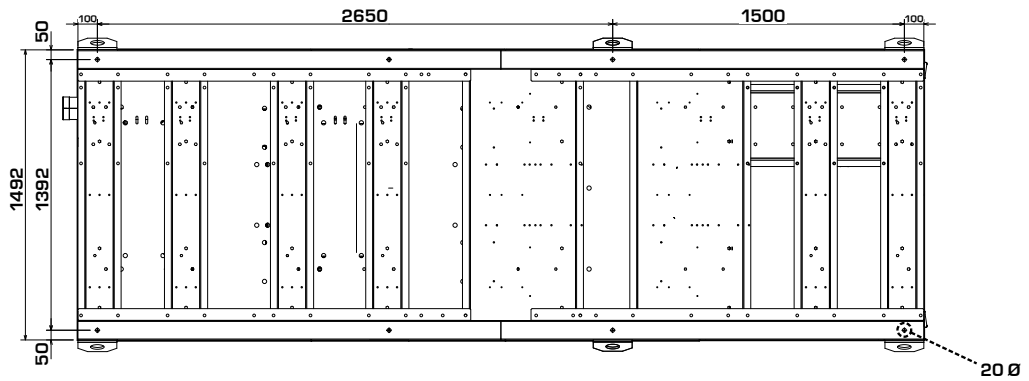
### POSITION OF LIFTING POINTS





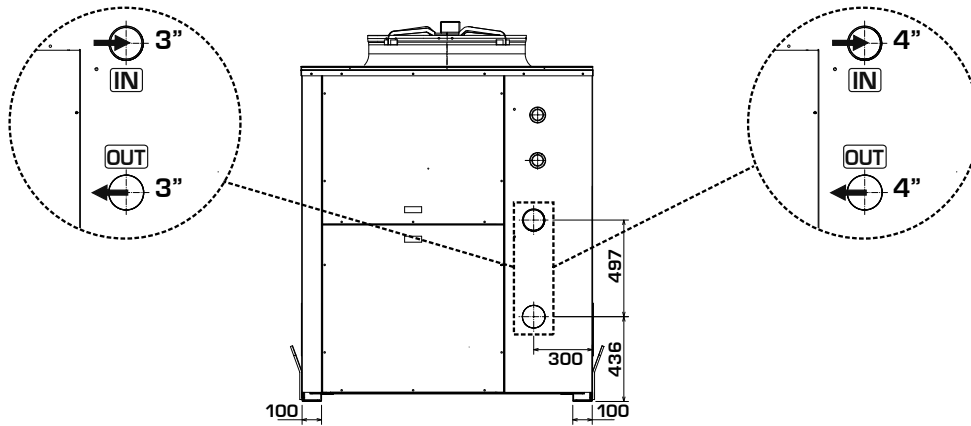
19.2. NRL 800 - 900 COMPACT

POSITION OF VIBRATION DAMPERS

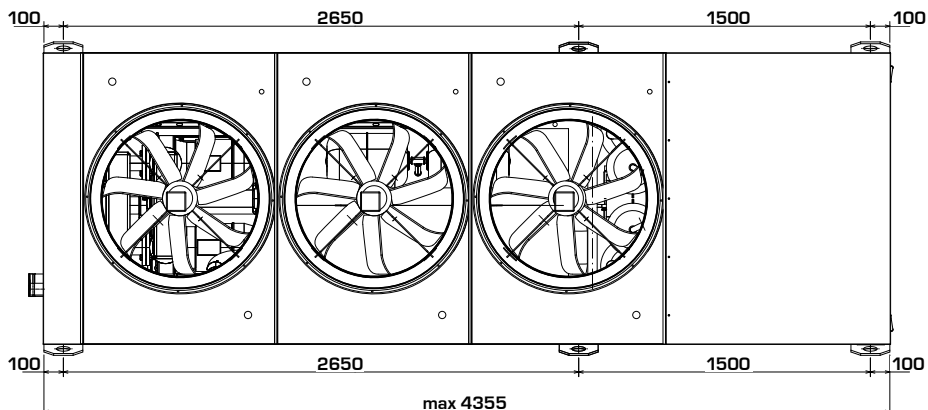


PLUMBING CONNECTIONS  
VERSION "00" AND PUMPS

PLUMBING CONNECTIONS  
WITH ACCUMULATION

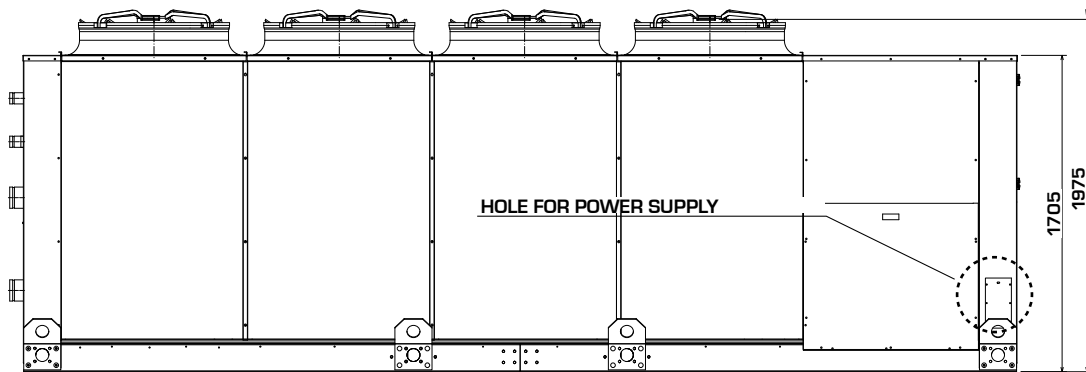
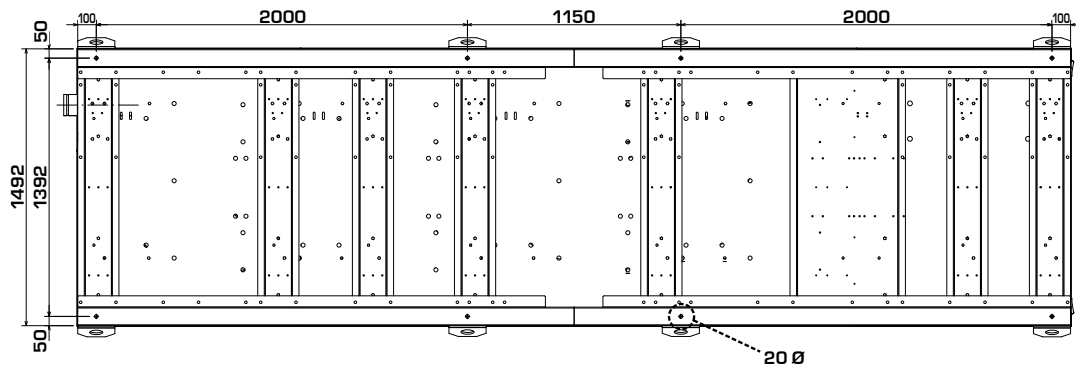


POSITION OF LIFTING POINTS



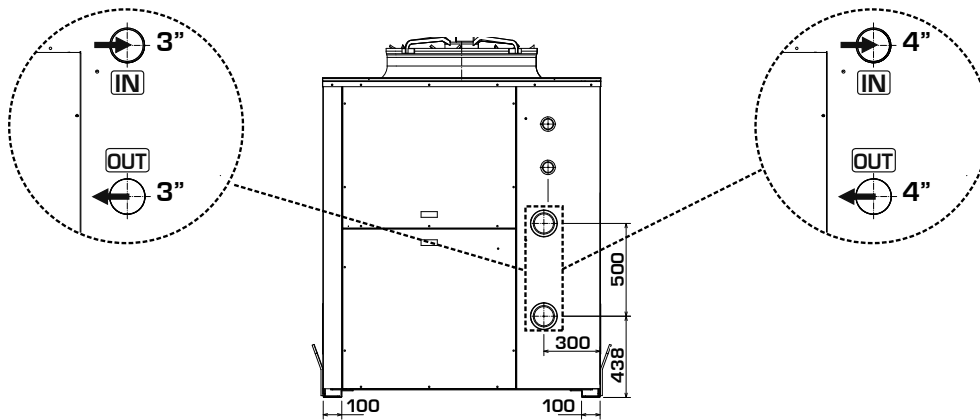
19.3. NRL 1000 - 1250 COMPACT

POSITION OF VIBRATION DAMPERS

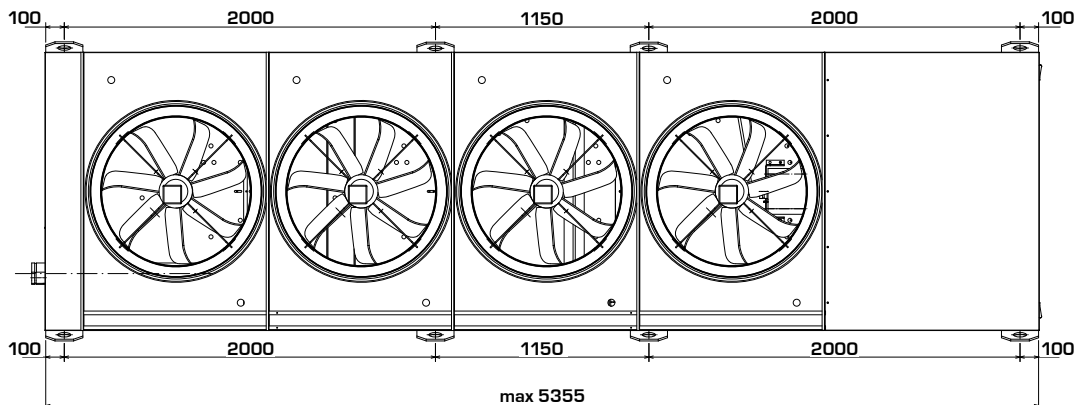


PLUMBING CONNECTIONS  
VERSION "00" AND PUMPS

PLUMBING CONNECTIONS  
WITH ACCUMULATION

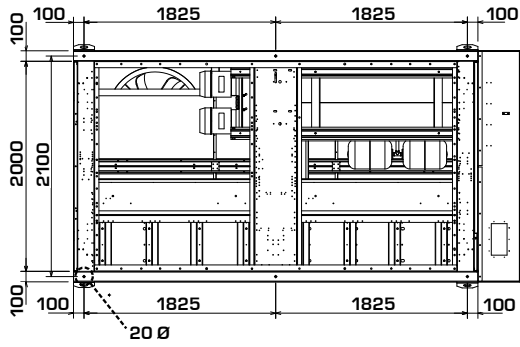


POSITION OF LIFTING POINTS

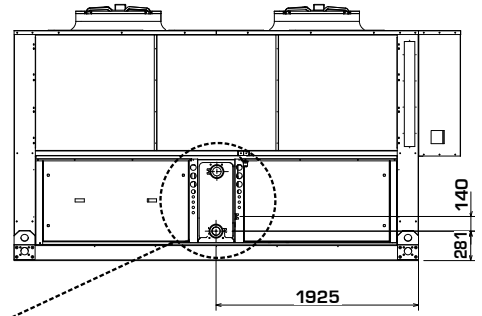


19.4. NRL 1400 - 1500 COMPACT

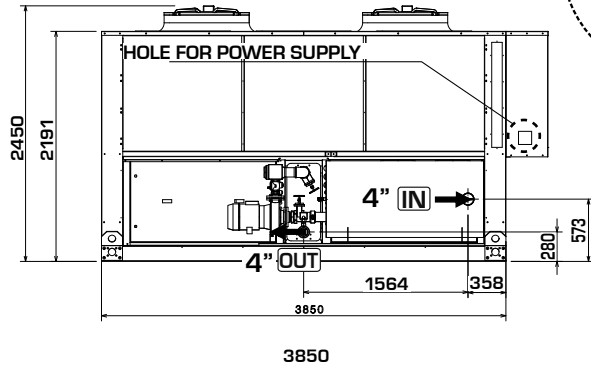
POSITION OF VIBRATION DAMPERS



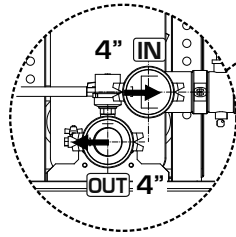
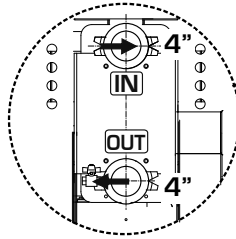
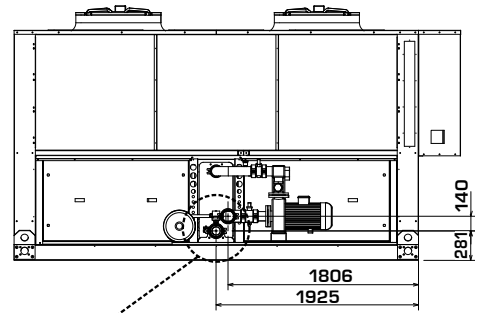
VERSION ( 00 )



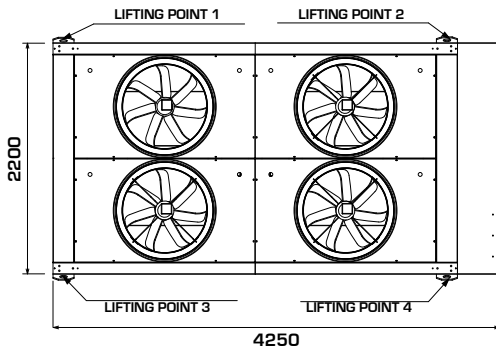
PLUMBING CONNECTIONS FOR HYDRONIC UNIT



PLUMBING CONNECTIONS FOR PUMP UNIT

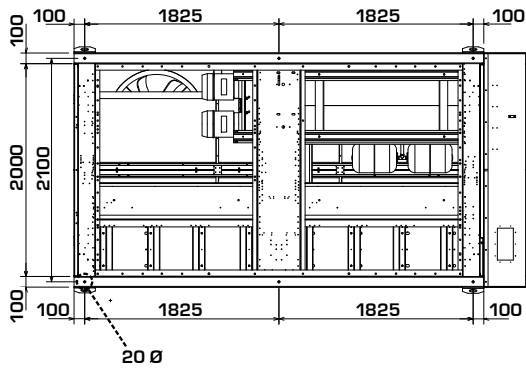


POSITION OF LIFTING POINTS

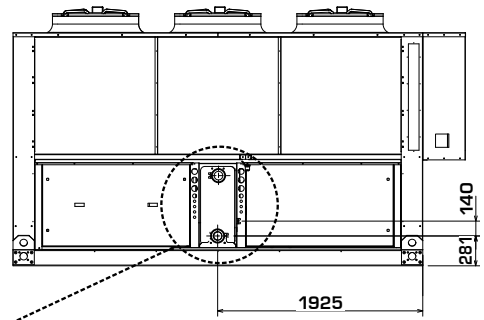


19.5. NRL 1650 - 1800 COMPACT

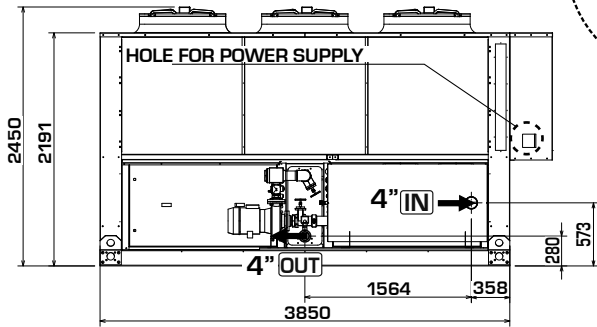
POSITION OF VIBRATION DAMPERS



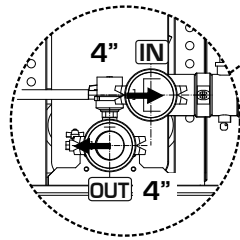
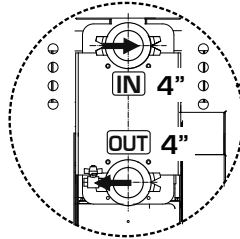
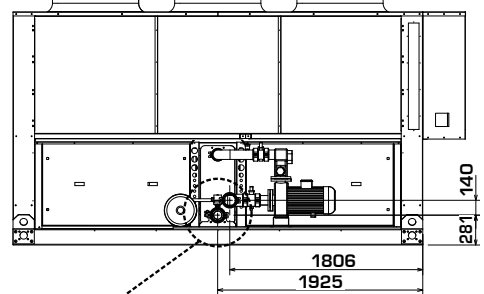
VERSION ( 00 )



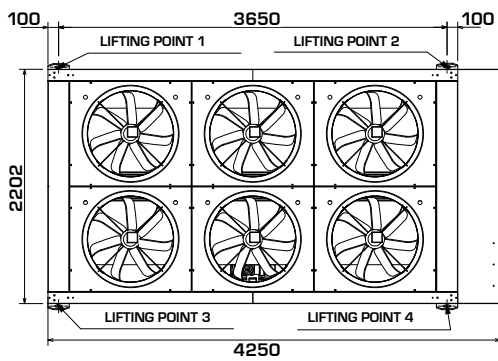
PLUMBING CONNECTIONS FOR HYDRONIC UNIT



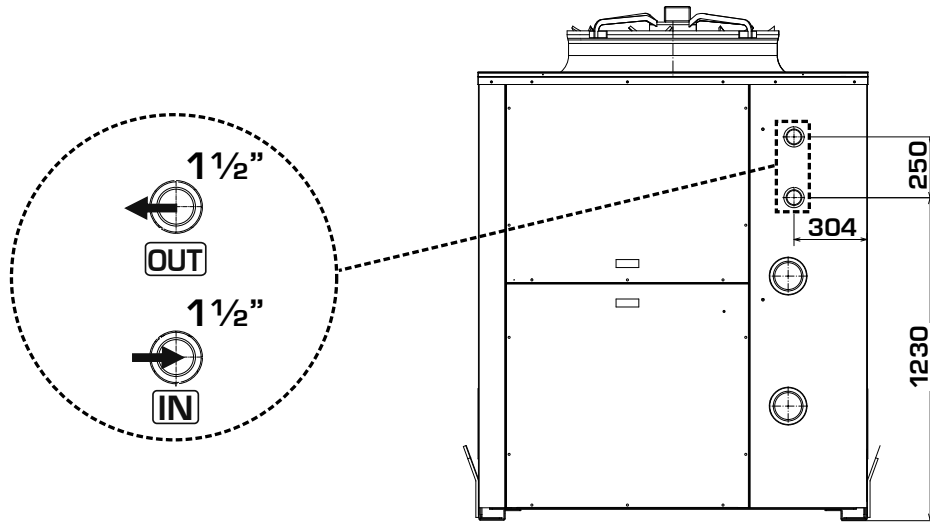
PLUMBING CONNECTIONS FOR PUMP UNIT



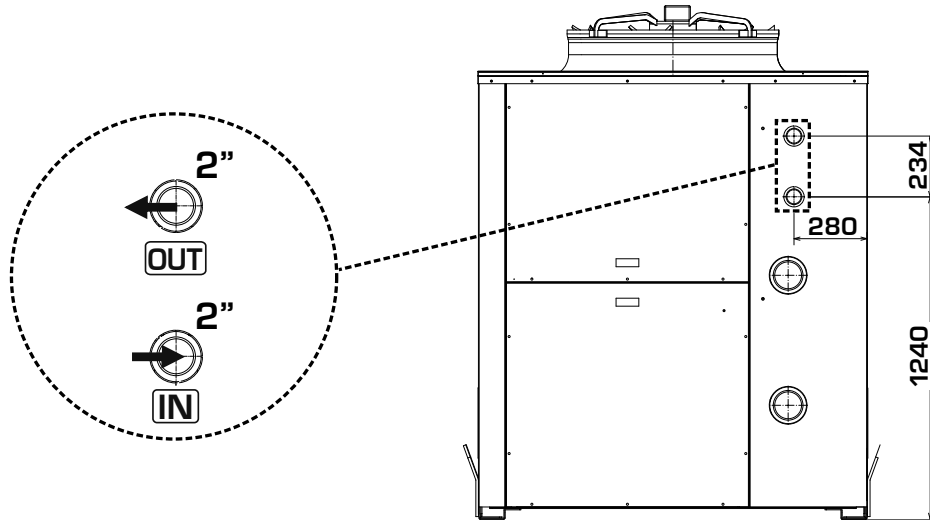
POSITION OF LIFTING POINTS



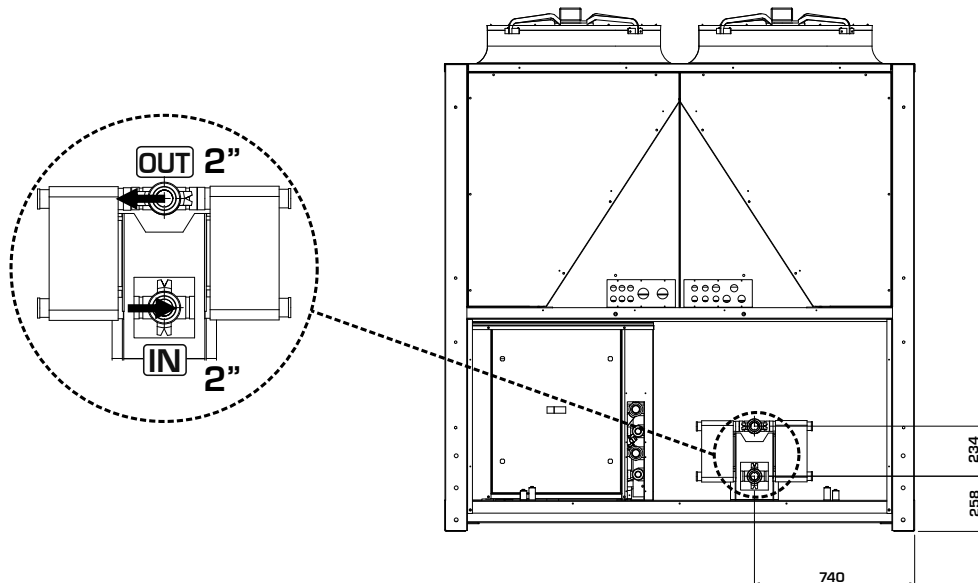
19.6. NRL 0750  
DESUPERHEATER (COMPACT)



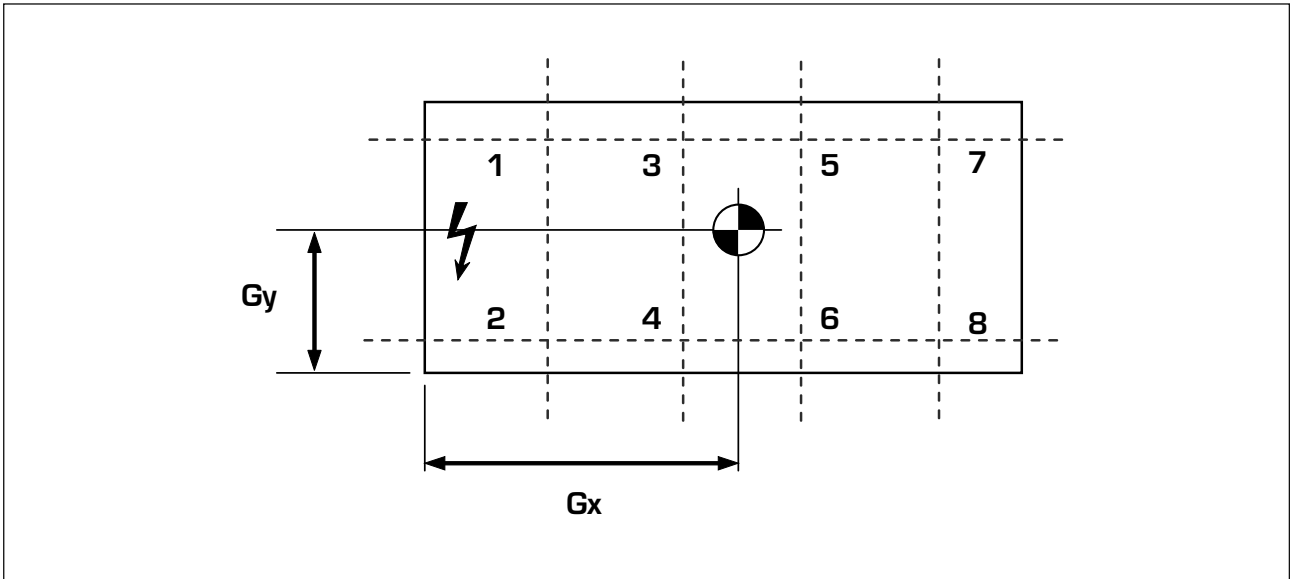
19.7. NRL 0800 - 0900 - 1000 - 1250  
DESUPERHEATER (COMPACT)



19.8. NRL 1400 - 1500 - 1650 - 1800  
DESUPERHEATER (COMPACT)



## 20. WEIGHT DISTRIBUTION AND CENTRES OF GRAVITY



### 20.1. PERCENTAGE WEIGHT DISTRIBUTION ON THE SUPPORTS VERSION ( ° - L )

MODEL	EMPTY			OPERATING				PERCENTAGE WEIGHT DISTRIBUTION ON SUPPORTS WITH MACHINE OPERATING (%)								VT KIT
	WEIGHT (kg)	CENTRE OF GRAVITY		TOTAL WEIGHT		CENTRE OF GRAVITY		1	2	3	4	5	6	7	8	
		Gy	Gx	kg	Water	Gx	Gy									
750° 00	1382	718	1736	1413	31	1747	729	10.2 %	10.7 %	16.0 %	17.0 %	19.5 %	20.6 %	2.9 %	3.1 %	23
750° 01	1592	722	1855	2323	731	2022	737	6.8 %	7.0 %	15.6 %	16.2 %	25.1 %	26.0 %	1.6 %	1.7 %	23
750° 02	1652	723	1906	2383	731	2053	738	6.7 %	6.9 %	15.2 %	15.7 %	25.5 %	26.4 %	1.8 %	1.9 %	23
750° 03	1592	722	1855	2323	731	2022	737	6.8 %	7.0 %	15.6 %	16.2 %	25.1 %	26.0 %	1.6 %	1.7 %	23
750° 04	1652	723	1906	2383	731	2053	738	6.7 %	6.9 %	15.2 %	15.7 %	25.5 %	26.4 %	1.8 %	1.9 %	23
750° P1	1442	719	1799	1473	31	1809	730	9.9 %	10.5 %	15.4 %	16.2 %	20.2 %	21.3 %	3.1 %	3.3 %	23
750° P2	1502	721	1858	1533	31	1866	731	9.7 %	10.2 %	14.7 %	15.5 %	20.9 %	22.0 %	3.4 %	3.5 %	23
750° P3	1442	719	1799	1473	31	1809	730	9.9 %	10.5 %	15.4 %	16.2 %	20.2 %	21.3 %	3.1 %	3.3 %	23
750° P4	1502	721	1858	1533	31	1866	731	9.7 %	10.2 %	14.7 %	15.5 %	20.9 %	22.0 %	3.4 %	3.5 %	23
750 L 00	1382	718	1736	1413	31	1747	729	10.2 %	10.7 %	16.0 %	17.0 %	19.5 %	20.6 %	2.9 %	3.1 %	23
750 L 01	1592	722	1855	2323	731	2022	737	6.8 %	7.0 %	15.6 %	16.2 %	25.1 %	26.0 %	1.6 %	1.7 %	23
750 L 02	1652	723	1906	2383	731	2053	738	6.7 %	6.9 %	15.2 %	15.7 %	25.5 %	26.4 %	1.8 %	1.9 %	23
750 L 03	1592	722	1855	2323	731	2022	737	6.8 %	7.0 %	15.6 %	16.2 %	25.1 %	26.0 %	1.6 %	1.7 %	23
750 L 04	1652	723	1906	2383	731	2053	738	6.7 %	6.9 %	15.2 %	15.7 %	25.5 %	26.4 %	1.8 %	1.9 %	23
750 L P1	1442	719	1799	1473	31	1809	730	9.9 %	10.5 %	15.4 %	16.2 %	20.2 %	21.3 %	3.1 %	3.3 %	23
750 L P2	1502	721	1858	1533	31	1866	731	9.7 %	10.2 %	14.7 %	15.5 %	20.9 %	22.0 %	3.4 %	3.5 %	23
750 L P3	1442	719	1799	1473	31	1809	730	9.9 %	10.5 %	15.4 %	16.2 %	20.2 %	21.3 %	3.1 %	3.3 %	23
750 L P4	1502	721	1858	1533	31	1866	731	9.7 %	10.2 %	14.7 %	15.5 %	20.9 %	22.0 %	3.4 %	3.5 %	23

MODEL		EMPTY			OPERATING				PERCENTAGE WEIGHT DISTRIBUTION ON SUPPORTS WITH MACHINE OPERATING (%)								VT KIT
		WEIGHT (kg)	CENTRE OF GRAVITY		TOTAL WEIGHT		CENTRE OF GRAVITY		1	2	3	4	5	6	7	8	
			Xg	Yg	kg	Water	Xg	Yg									
800°	00	1736	1656	750	1748	12	1658	750	15.7 %	15.7 %	19.3 %	19.3 %	8.9 %	8.9 %	6.1 %	6.1 %	701
800°	01	2056	1844	750	2798	742	2112	750	9.5 %	9.5 %	17.7 %	17.6 %	13.9 %	13.9 %	9.0 %	9.0 %	702
800°	02	2096	1864	750	2838	742	2124	750	9.3 %	9.3 %	17.6 %	17.6 %	14.0 %	14.0 %	9.1 %	9.1 %	
800°	03	2086	1859	750	2828	742	2120	750	9.4 %	9.3 %	17.6 %	17.6 %	14.0 %	14.0 %	9.0 %	9.0 %	
800°	04	2156	1891	750	2898	742	2139	750	9.1 %	9.1 %	17.6 %	17.5 %	14.2 %	14.2 %	9.2 %	9.2 %	
800°	P1	1881	1750	750	1980	99	1801	750	13.7 %	13.7 %	18.8 %	18.8 %	10.5 %	10.5 %	7.0 %	7.0 %	703
800°	P2	1921	1773	750	2030	109	1824	750	13.4 %	13.4 %	18.7 %	18.7 %	10.7 %	10.7 %	7.2 %	7.2 %	
800°	P3	1911	1767	750	2010	99	1817	750	13.5 %	13.5 %	18.7 %	18.7 %	10.7 %	10.6 %	7.1 %	7.1 %	
800°	P4	1961	1765	750	2050	89	1834	750	13.3 %	13.3 %	18.7 %	18.6 %	10.9 %	10.8 %	7.2 %	7.2 %	
800 L	00	1746	1656	750	1758	12	1658	750	15.7 %	15.7 %	19.3 %	19.3 %	8.9 %	8.9 %	6.1 %	6.1 %	701
800 L	01	2066	1844	750	2808	742	2112	750	9.5 %	9.5 %	17.7 %	17.6 %	13.9 %	13.9 %	9.0 %	9.0 %	702
800 L	02	2106	1864	750	2848	742	2124	750	9.3 %	9.3 %	17.6 %	17.6 %	14.0 %	14.0 %	9.1 %	9.1 %	
800 L	03	2096	1859	750	2838	742	2120	750	9.4 %	9.3 %	17.6 %	17.6 %	14.0 %	14.0 %	9.0 %	9.0 %	
800 L	04	2166	1891	750	2908	742	2139	750	9.1 %	9.1 %	17.6 %	17.5 %	14.2 %	14.2 %	9.2 %	9.2 %	
800 L	P1	1891	1750	750	1990	99	1801	750	13.7 %	13.7 %	18.8 %	18.8 %	10.5 %	10.5 %	7.0 %	7.0 %	703
800 L	P2	1931	1773	750	2040	109	1824	750	13.4 %	13.4 %	18.7 %	18.7 %	10.7 %	10.7 %	7.2 %	7.2 %	
800 L	P3	1921	1767	750	2020	99	1817	750	13.5 %	13.5 %	18.7 %	18.7 %	10.7 %	10.6 %	7.1 %	7.1 %	
800 L	P4	1971	1765	750	2060	89	1834	750	13.3 %	13.3 %	18.7 %	18.6 %	10.9 %	10.8 %	7.2 %	7.2 %	
900°	00	1870	1611	717	1883	13	1613	720	15.6 %	16.9 %	18.8 %	20.4 %	7.9 %	8.6 %	5.6 %	6.1 %	707
900°	01	2190	1795	717	2933	743	2063	731	12.6 %	13.3 %	13.2 %	13.9 %	12.1 %	12.8 %	10.7 %	11.3 %	708
900°	02	2230	1814	717	2973	743	2075	731	12.5 %	13.1 %	13.1 %	13.7 %	12.3 %	12.9 %	10.9 %	11.5 %	
900°	03	2220	1809	717	2963	743	2071	731	12.5 %	13.2 %	13.1 %	13.8 %	12.2 %	12.9 %	10.9 %	11.4 %	
900°	04	2290	1841	717	3033	743	2091	731	12.3 %	13.0 %	12.8 %	13.5 %	12.5 %	13.1 %	11.1 %	11.7 %	
900°	P1	2015	1702	717	2110	95	1752	723	14.8 %	15.9 %	17.3 %	18.6 %	9.0 %	9.7 %	7.0 %	7.5 %	709
900°	P2	2055	1725	717	2160	105	1775	724	14.7 %	15.8 %	17.1 %	18.3 %	9.2 %	9.9 %	7.2 %	7.8 %	
900°	P3	2045	1719	717	2140	95	1767	723	14.7 %	15.8 %	17.2 %	18.4 %	9.2 %	9.8 %	7.2 %	7.7 %	
900°	P4	2095	1747	717	2180	85	1785	724	14.6 %	15.7 %	17.0 %	18.2 %	9.3 %	10.0 %	7.4 %	7.9 %	
900 L	00	1880	1611	717	1893	13	1613	720	15.6 %	16.9 %	18.8 %	20.4 %	7.9 %	8.6 %	5.6 %	6.1 %	707
900 L	01	2200	1795	717	2943	743	2063	731	12.6 %	13.3 %	13.2 %	13.9 %	12.1 %	12.8 %	10.7 %	11.3 %	708
900 L	02	2240	1814	717	2983	743	2075	731	12.5 %	13.1 %	13.1 %	13.7 %	12.3 %	12.9 %	10.9 %	11.5 %	
900 L	03	2230	1809	717	2973	743	2071	731	12.5 %	13.2 %	13.1 %	13.8 %	12.2 %	12.9 %	10.9 %	11.4 %	
900 L	04	2300	1841	717	3043	743	2091	731	12.3 %	13.0 %	12.8 %	13.5 %	12.5 %	13.1 %	11.1 %	11.7 %	
900 L	P1	2025	1702	717	2120	95	1752	723	14.8 %	15.9 %	17.3 %	18.6 %	9.0 %	9.7 %	7.0 %	7.5 %	709
900 L	P2	2065	1725	717	2170	105	1775	724	14.7 %	15.8 %	17.1 %	18.3 %	9.2 %	9.9 %	7.2 %	7.8 %	
900 L	P3	2055	1719	717	2150	95	1767	723	14.7 %	15.8 %	17.2 %	18.4 %	9.2 %	9.8 %	7.2 %	7.7 %	
900 L	P4	2105	1747	717	2190	85	1785	724	14.6 %	15.7 %	17.0 %	18.2 %	9.3 %	10.0 %	7.4 %	7.9 %	

MODEL		EMPTY			OPERATING				PERCENTAGE WEIGHT DISTRIBUTION ON SUPPORTS WITH MACHINE OPERATING (%)								VT KIT
		WEIGHT (kg)	CENTRE OF GRAVITY		TOTAL WEIGHT		CENTRE OF GRAVITY		1	2	3	4	5	6	7	8	
			Xg	Yg	kg	Water	Xg	Yg									
1000°	00	2004	1859	750	2019	15	1860	750	19.2 %	19.1 %	18.3 %	18.2 %	6.8 %	6.8 %	5.9 %	5.9 %	713
1000°	01	2324	1996	750	3069	745	2203	750	15.4 %	15.4 %	12.0 %	12.0 %	16.5 %	16.4 %	6.2 %	6.2 %	714
1000°	02	2364	2011	750	3109	745	2212	750	15.3 %	15.3 %	11.8 %	11.8 %	16.8 %	16.8 %	6.2 %	6.2 %	
1000°	03	2354	2007	750	3099	745	2209	750	15.3 %	15.3 %	11.8 %	11.8 %	16.7 %	16.7 %	6.2 %	6.2 %	
1000°	04	2424	2032	750	3169	745	2225	750	15.1 %	15.1 %	11.5 %	11.5 %	17.2 %	17.2 %	6.2 %	6.2 %	
1000°	P1	2149	1927	750	2270	121	1964	750	18.2 %	18.1 %	16.6 %	16.5 %	9.3 %	9.3 %	6.0 %	5.9 %	715
1000°	P2	2189	1944	750	2320	131	1981	750	18.0 %	17.9 %	16.3 %	16.3 %	9.8 %	9.8 %	6.0 %	6.0 %	
1000°	P3	2179	1940	750	2300	121	1976	750	18.1 %	18.0 %	16.4 %	16.4 %	9.7 %	9.6 %	6.0 %	5.9 %	
1000°	P4	2229	1960	750	2340	111	1989	750	17.9 %	17.9 %	16.2 %	16.1 %	10.0 %	10.0 %	6.0 %	6.0 %	
1000 L	00	2014	1859	750	2029	15	1860	750	19.2 %	19.1 %	18.3 %	18.2 %	6.8 %	6.8 %	5.9 %	5.9 %	713
1000 L	01	2334	1996	750	3079	745	2203	750	15.4 %	15.4 %	12.0 %	12.0 %	16.5 %	16.4 %	6.2 %	6.2 %	714
1000 L	02	2374	2011	750	3119	745	2212	750	15.3 %	15.3 %	11.8 %	11.8 %	16.8 %	16.8 %	6.2 %	6.2 %	
1000 L	03	2364	2007	750	3109	745	2209	750	15.3 %	15.3 %	11.8 %	11.8 %	16.7 %	16.7 %	6.2 %	6.2 %	
1000 L	04	2434	2032	750	3179	745	2225	750	15.1 %	15.1 %	11.5 %	11.5 %	17.2 %	17.2 %	6.2 %	6.2 %	
1000 L	P1	2159	1927	750	2280	121	1964	750	18.2 %	18.1 %	16.6 %	16.5 %	9.3 %	9.3 %	6.0 %	5.9 %	715
1000 L	P2	2199	1944	750	2330	131	1981	750	18.0 %	17.9 %	16.3 %	16.3 %	9.8 %	9.8 %	6.0 %	6.0 %	
1000 L	P3	2189	1940	750	2310	121	1976	750	18.1 %	18.0 %	16.4 %	16.4 %	9.7 %	9.6 %	6.0 %	5.9 %	
1000 L	P4	2239	1960	750	2350	111	1989	750	17.9 %	17.9 %	16.2 %	16.1 %	10.0 %	10.0 %	6.0 %	6.0 %	
1250°	00	2144	1860	750	2160	16	1848	750	18.8 %	18.7 %	19.2 %	19.1 %	6.6 %	6.6 %	5.5 %	5.5 %	713
1250°	01	2469	1981	750	3215	746	2182	750	15.3 %	15.2 %	13.0 %	13.0 %	15.9 %	15.9 %	5.9 %	5.8 %	717
1250°	02	2514	1997	750	3260	746	2191	750	15.2 %	15.1 %	12.8 %	12.8 %	16.2 %	16.2 %	5.9 %	5.9 %	
1250°	03	2499	1992	750	3245	746	2188	750	15.2 %	15.2 %	12.9 %	12.8 %	16.1 %	16.1 %	5.9 %	5.8 %	
1250°	04	2574	2017	750	3320	746	2204	750	15.0 %	15.0 %	12.5 %	12.5 %	16.6 %	16.6 %	5.9 %	5.9 %	
1250°	P1	2294	1914	750	2390	96	1948	750	17.9 %	17.8 %	17.6 %	17.5 %	9.1 %	9.0 %	5.6 %	5.6 %	718
1250°	P2	2339	1932	750	2440	101	1965	750	17.7 %	17.6 %	17.3 %	17.2 %	9.5 %	9.5 %	5.6 %	5.6 %	
1250°	P3	2324	1926	750	2440	116	1967	750	17.7 %	17.6 %	17.2 %	17.2 %	9.6 %	9.5 %	5.6 %	5.6 %	
1250°	P4	2379	1948	750	2460	81	1972	750	17.6 %	17.6 %	17.1 %	17.1 %	9.7 %	9.7 %	5.6 %	5.6 %	
1250 L	00	2154	1860	750	2170	16	1848	750	18.8 %	18.7 %	19.2 %	19.1 %	6.6 %	6.6 %	5.5 %	5.5 %	713
1250 L	01	2479	1981	750	3225	746	2182	750	15.3 %	15.2 %	13.0 %	13.0 %	15.9 %	15.9 %	5.9 %	5.8 %	717
1250 L	02	2524	1997	750	3270	746	2191	750	15.2 %	15.1 %	12.8 %	12.8 %	16.2 %	16.2 %	5.9 %	5.9 %	
1250 L	03	2509	1992	750	3255	746	2188	750	15.2 %	15.2 %	12.9 %	12.8 %	16.1 %	16.1 %	5.9 %	5.8 %	
1250 L	04	2584	2017	750	3330	746	2204	750	15.0 %	15.0 %	12.5 %	12.5 %	16.6 %	16.6 %	5.9 %	5.9 %	
1250 L	P1	2304	1914	750	2400	96	1948	750	17.9 %	17.8 %	17.6 %	17.5 %	9.1 %	9.0 %	5.6 %	5.6 %	718
1250 L	P2	2349	1932	750	2450	101	1965	750	17.7 %	17.6 %	17.3 %	17.2 %	9.5 %	9.5 %	5.6 %	5.6 %	
1250 L	P3	2334	1926	750	2450	116	1967	750	17.7 %	17.6 %	17.2 %	17.2 %	9.6 %	9.5 %	5.6 %	5.6 %	
1250 L	P4	2389	1948	750	2470	81	1972	750	17.6 %	17.6 %	17.1 %	17.1 %	9.7 %	9.7 %	5.6 %	5.6 %	
1400°	00	2709	1780	755	2729	20	1782	757	9.2 %	17.5 %	18.7 %	35.7 %	6.5 %	12.4 %	-	-	722
1400°	01	3034	1709	864	3784	750	1594	1044	15.4 %	17.1 %	25.2 %	27.9 %	6.8 %	7.6 %	-	-	723
1400°	02	3079	1700	878	3829	750	1589	1052	15.7 %	17.1 %	25.3 %	27.6 %	6.8 %	7.5 %	-	-	
1400°	03	3064	1703	873	3814	750	1591	1050	15.6 %	17.1 %	25.3 %	27.7 %	6.8 %	7.5 %	-	-	
1400°	04	3139	1689	895	3889	750	1581	1064	15.9 %	17.0 %	25.6 %	27.3 %	6.8 %	7.3 %	-	-	
1400°	P1	2859	1745	808	3020	161	1728	838	10.8 %	17.6 %	20.6 %	33.4 %	6.7 %	10.9 %	-	-	724
1400°	P2	2904	1736	823	3070	166	1719	853	11.1 %	17.6 %	20.9 %	33.0 %	6.7 %	10.7 %	-	-	
1400°	P3	2889	1739	818	3050	161	1722	848	11.0 %	17.6 %	20.8 %	33.2 %	6.7 %	10.7 %	-	-	
1400°	P4	2944	1727	836	3090	146	1715	859	11.2 %	17.6 %	21.0 %	32.9 %	6.8 %	10.5 %	-	-	
1400 L	00	2724	1780	755	2744	20	1782	757	9.2 %	17.5 %	18.7 %	35.7 %	6.5 %	12.4 %	-	-	722
1400 L	01	3049	1709	864	3799	750	1594	1044	15.4 %	17.1 %	25.2 %	27.9 %	6.8 %	7.6 %	-	-	723
1400 L	02	3094	1700	878	3844	750	1589	1052	15.7 %	17.1 %	25.3 %	27.6 %	6.8 %	7.5 %	-	-	
1400 L	03	3079	1703	873	3829	750	1591	1050	15.6 %	17.1 %	25.3 %	27.7 %	6.8 %	7.5 %	-	-	
1400 L	04	3154	1689	895	3904	750	1581	1064	15.9 %	17.0 %	25.6 %	27.3 %	6.8 %	7.3 %	-	-	
1400 L	P1	2874	1745	808	3035	161	1728	838	10.8 %	17.6 %	20.6 %	33.4 %	6.7 %	10.9 %	-	-	724
1400 L	P2	2919	1736	823	3085	166	1719	853	11.1 %	17.6 %	20.9 %	33.0 %	6.7 %	10.7 %	-	-	
1400 L	P3	2904	1739	818	3065	161	1722	848	11.0 %	17.6 %	20.8 %	33.2 %	6.7 %	10.7 %	-	-	
1400 L	P4	2959	1727	836	3105	146	1715	859	11.2 %	17.6 %	21.0 %	32.9 %	6.8 %	10.5 %	-	-	



MODEL		EMPTY			OPERATING				PERCENTAGE WEIGHT DISTRIBUTION ON SUPPORTS WITH MACHINE OPERATING (%)								VT KIT
		WEIGHT (kg)	CENTRE OF GRAVITY		TOTAL WEIGHT		CENTRE OF GRAVITY		1	2	3	4	5	6	7	8	
			Xg	Yg	kg	Water	Xg	Yg									
1500°	00	2903	1763	757	2926	23	1764	760	9.0 %	17.0 %	19.7 %	37.3 %	5.9 %	11.2 %	-	-	722
1500°	01	3258	1692	869	4011	753	1587	1037	15.0 %	16.8 %	25.9 %	29.0 %	6.3 %	7.0 %	-	-	728
1500°	02	3333	1679	889	4086	753	1578	1051	15.3 %	16.7 %	26.2 %	28.6 %	6.3 %	6.8 %	-	-	
1500°	03	3258	1692	869	4011	753	1587	1037	15.0 %	16.8 %	25.9 %	29.0 %	6.3 %	7.0 %	-	-	
1500°	04	3333	1679	889	4086	753	1578	1051	15.3 %	16.7 %	26.2 %	28.6 %	6.3 %	6.8 %	-	-	
1500°	P1	3083	1725	817	3250	167	1710	845	10.6 %	17.1 %	21.6 %	34.7 %	6.1 %	9.8 %	-	-	
1500°	P2	3158	1711	840	3320	162	1696	866	11.1 %	17.1 %	22.1 %	34.1 %	6.2 %	9.5 %	-	-	729
1500°	P3	3083	1725	817	3250	167	1710	845	10.6 %	17.1 %	21.6 %	34.7 %	6.1 %	9.8 %	-	-	
1500°	P4	3138	1714	834	3280	142	1704	855	10.9 %	17.1 %	21.9 %	34.4 %	6.1 %	9.7 %	-	-	
1500 L	00	2918	1763	757	2941	23	1764	760	9.0 %	17.0 %	19.7 %	37.3 %	5.9 %	11.2 %	-	-	722
1500 L	01	3273	1692	869	4026	753	1587	1037	15.0 %	16.8 %	25.9 %	29.0 %	6.3 %	7.0 %	-	-	728
1500 L	02	3348	1679	889	4101	753	1578	1051	15.3 %	16.7 %	26.2 %	28.6 %	6.3 %	6.8 %	-	-	
1500 L	03	3273	1692	869	4026	753	1587	1037	15.0 %	16.8 %	25.9 %	29.0 %	6.3 %	7.0 %	-	-	
1500 L	04	3348	1679	889	4101	753	1578	1051	15.3 %	16.7 %	26.2 %	28.6 %	6.3 %	6.8 %	-	-	
1500 L	P1	3098	1725	817	3265	167	1710	845	10.6 %	17.1 %	21.6 %	34.7 %	6.1 %	9.8 %	-	-	
1500 L	P2	3173	1711	840	3335	162	1696	866	11.1 %	17.1 %	22.1 %	34.1 %	6.2 %	9.5 %	-	-	729
1500 L	P3	3098	1725	817	3265	167	1710	845	10.6 %	17.1 %	21.6 %	34.7 %	6.1 %	9.8 %	-	-	
1500 L	P4	3153	1714	834	3295	142	1704	855	10.9 %	17.1 %	21.9 %	34.4 %	6.1 %	9.7 %	-	-	
1650°	00	3000	1777	744	3026	26	1779	748	8.5 %	16.6 %	19.6 %	38.1 %	5.8 %	11.3 %	-	-	733
1650°	01	3355	1707	854	4111	756	1602	1021	14.4 %	16.6 %	25.8 %	29.8 %	6.2 %	7.2 %	-	-	728
1650°	02	3430	1694	874	4186	756	1593	1035	14.8 %	16.6 %	26.1 %	29.4 %	6.2 %	7.0 %	-	-	
1650°	03	3385	1702	862	4141	756	1598	1027	14.6 %	16.6 %	25.9 %	29.6 %	6.2 %	7.1 %	-	-	
1650°	04	3490	1684	890	4246	756	1586	1046	15.0 %	16.6 %	26.3 %	29.0 %	6.2 %	6.8 %	-	-	
1650°	P1	3180	1740	803	3350	170	1725	831	10.2 %	16.8 %	21.6 %	35.5 %	6.0 %	9.9 %	-	-	
1650°	P2	3255	1725	825	3420	165	1711	852	10.6 %	16.8 %	22.0 %	34.9 %	6.1 %	9.6 %	-	-	729
1650°	P3	3210	1734	812	3380	170	1719	839	10.3 %	16.8 %	21.8 %	35.3 %	6.0 %	9.8 %	-	-	
1650°	P4	3295	1718	837	3440	145	1708	858	10.7 %	16.8 %	22.2 %	34.7 %	6.1 %	9.5 %	-	-	
1650 L	00	3015	1777	744	3041	26	1779	748	8.5 %	16.6 %	19.6 %	38.1 %	5.8 %	11.3 %	-	-	733
1650 L	01	3370	1707	854	4126	756	1602	1021	14.4 %	16.6 %	25.8 %	29.8 %	6.2 %	7.2 %	-	-	728
1650 L	02	3445	1694	874	4201	756	1593	1035	14.8 %	16.6 %	26.1 %	29.4 %	6.2 %	7.0 %	-	-	
1650 L	03	3400	1702	862	4156	756	1598	1027	14.6 %	16.6 %	25.9 %	29.6 %	6.2 %	7.1 %	-	-	
1650 L	04	3505	1684	890	4261	756	1586	1046	15.0 %	16.6 %	26.3 %	29.0 %	6.2 %	6.8 %	-	-	
1650 L	P1	3195	1740	803	3365	170	1725	831	10.2 %	16.8 %	21.6 %	35.5 %	6.0 %	9.9 %	-	-	
1650 L	P2	3270	1725	825	3435	165	1711	852	10.6 %	16.8 %	22.0 %	34.9 %	6.1 %	9.6 %	-	-	729
1650 L	P3	3225	1734	812	3395	170	1719	839	10.3 %	16.8 %	21.8 %	35.3 %	6.0 %	9.8 %	-	-	
1650 L	P4	3310	1718	837	3455	145	1708	858	10.7 %	16.8 %	22.2 %	34.7 %	6.1 %	9.5 %	-	-	
1800°	00	3157	1772	759	3187	30	1774	763	8.7 %	16.4 %	20.1 %	37.9 %	5.8 %	11.0 %	-	-	730
1800°	01	3512	1704	864	4272	760	1603	1026	14.4 %	16.5 %	26.0 %	29.8 %	6.2 %	7.1 %	-	-	728
1800°	02	3587	1692	884	4347	760	1594	1040	14.7 %	16.5 %	26.3 %	29.4 %	6.2 %	6.9 %	-	-	
1800°	03	3542	1699	872	4302	760	1599	1032	14.6 %	16.5 %	26.2 %	29.6 %	6.2 %	7.0 %	-	-	
1800°	04	3647	1682	899	4407	760	1587	1050	15.0 %	16.4 %	26.5 %	29.1 %	6.2 %	6.8 %	-	-	
1800°	P1	3337	1736	815	3450	113	1722	842	10.3 %	16.6 %	22.0 %	35.4 %	6.0 %	9.7 %	-	-	
1800°	P2	3412	1722	837	3530	118	1709	863	10.7 %	16.6 %	22.4 %	34.8 %	6.1 %	9.4 %	-	-	732
1800°	P3	3367	1730	824	3480	113	1717	851	10.5 %	16.6 %	22.2 %	35.1 %	6.0 %	9.6 %	-	-	
1800°	P4	3452	1715	848	3550	98	1705	868	10.8 %	16.6 %	22.6 %	34.6 %	6.1 %	9.3 %	-	-	
1800 L	00	3172	1772	759	3202	30	1774	763	8.7 %	16.4 %	20.1 %	37.9 %	5.8 %	11.0 %	-	-	730
1800 L	01	3527	1704	864	4287	760	1603	1026	14.4 %	16.5 %	26.0 %	29.8 %	6.2 %	7.1 %	-	-	728
1800 L	02	3602	1692	884	4362	760	1594	1040	14.7 %	16.5 %	26.3 %	29.4 %	6.2 %	6.9 %	-	-	
1800 L	03	3557	1699	872	4317	760	1599	1032	14.6 %	16.5 %	26.2 %	29.6 %	6.2 %	7.0 %	-	-	
1800 L	04	3662	1682	899	4422	760	1587	1050	15.0 %	16.4 %	26.5 %	29.1 %	6.2 %	6.8 %	-	-	
1800 L	P1	3352	1736	815	3465	113	1722	842	10.3 %	16.6 %	22.0 %	35.4 %	6.0 %	9.7 %	-	-	
1800 L	P2	3427	1722	837	3545	118	1709	863	10.7 %	16.6 %	22.4 %	34.8 %	6.1 %	9.4 %	-	-	732
1800 L	P3	3382	1730	824	3495	113	1717	851	10.5 %	16.6 %	22.2 %	35.1 %	6.0 %	9.6 %	-	-	
1800 L	P4	3467	1715	848	3565	98	1705	868	10.8 %	16.6 %	22.6 %	34.6 %	6.1 %	9.3 %	-	-	

**20.2. PERCENTAGE WEIGHT DISTRIBUTION ON THE SUPPORTS VERSION ( H - HL )**

MODEL	EMPTY				OPERATING				PERCENTAGE WEIGHT DISTRIBUTION ON SUPPORTS WITH MACHINE OPERATING (%)								VT KIT
	WEIGHT (kg)	CENTRE OF GRAVITY		TOTAL WEIGHT		CENTRE OF GRAVITY		1	2	3	4	5	6	7	8		
		Gy	Gx	kg	Water	Gx	Gy										
750 H - HL 00	1487	760	1729	1518	31	750	1739	11 %	11 %	17 %	17 %	20%	20%	3%	3%	23	
750 H - HL 01	1842	759	1842	2428	586	750	2005	7%	7%	16 %	16 %	25%	25%	2%	2%	23	
750 H - HL 02	1890	759	1890	2488	598	750	2036	7%	7%	15%	15%	26 %	26 %	2%	2%	23	
750 H - HL 03	1842	759	1842	2428	586	750	2005	7%	7%	16 %	16 %	25%	25%	2%	2%	23	
750 H - HL 04	1890	759	1890	2488	598	750	2036	7%	7%	15%	15%	26 %	26 %	2%	2%	23	
750 H - HL P1	1547	760	1788	1578	31	750	1797	10%	10%	16 %	16 %	21 %	21 %	3%	3%	23	
750 H - HL P2	1607	759	1844	1638	31	750	1851	10%	10%	15%	15%	21 %	21 %	3%	3%	23	
750 H - HL P3	1547	760	1788	1578	31	750	1797	10%	10%	16 %	16 %	21 %	21 %	3%	3%	23	
750 H - HL P4	1607	759	1844	1638	31	750	1851	10%	10%	15%	15%	21 %	21 %	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		1	2	3	4	5	6	7	8		
		Gy	Gx	kg	Water	Gx	Gy										
800 H 00	1810	1628	750	1820	10	1625	750	16.1 %	16.0 %	19.7 %	19.6 %	8.4%	8.3 %	5.9 %	5.9 %	701	
800 H 01	2130	1814	750	2870	740	2080	750	9.9 %	9.8 %	17.9 %	17.9 %	13.4 %	13.4 %	8.8%	8.8%	702	
800 H 02	2170	1833	750	2910	740	2092	750	9.7 %	9.7 %	17.9 %	17.8 %	13.6%	13.6%	8.9 %	8.9 %		
800 H 03	2160	1829	750	2900	740	2088	750	9.7 %	9.7 %	17.9 %	17.9 %	13.5 %	13.5 %	8.9 %	8.9 %		
800 H 04	2230	1861	750	2970	740	2108	750	9.5 %	9.5 %	17.8 %	17.8 %	13.8 %	13.7 %	9.0 %	9.0 %		
800 H P1	1950	1720	750	2050	100	1767	750	14.1 %	14.1 %	19.1 %	19.1 %	10.0 %	9.9 %	6.8 %	6.8 %	703	
800 H P2	1990	1743	750	2090	100	1791	750	13.8 %	13.8 %	19.0 %	19.0 %	10.2 %	10.2 %	7.0 %	7.0 %		
800 H P3	1980	1737	750	2080	100	1783	750	13.9 %	13.9 %	19.1 %	19.0 %	10.1%	10.1%	6.9 %	6.9 %		
800 H P4	2030	1765	750	2130	100	1801	750	13.7 %	13.7 %	19.0 %	19.0 %	10.3 %	10.3 %	7.1 %	7.0 %		
800 HL 00	1815	1628	750	1825	10	1625	750	16.1 %	16.0 %	19.7 %	19.6 %	8.4%	8.3 %	5.9 %	5.9 %	701	
800 HL 01	2135	1814	750	2875	740	2080	750	9.9 %	9.8 %	17.9 %	17.9 %	13.4 %	13.4 %	8.8%	8.8%	702	
800 HL 02	2175	1833	750	2915	740	2092	750	9.7 %	9.7 %	17.9 %	17.8 %	13.6%	13.6%	8.9 %	8.9 %		
800 HL 03	2165	1829	750	2905	740	2088	750	9.7 %	9.7 %	17.9 %	17.9 %	13.5 %	13.5 %	8.9 %	8.9 %		
800 HL 04	2235	1861	750	2975	740	2108	750	9.5 %	9.5 %	17.8 %	17.8 %	13.8 %	13.7 %	9.0 %	9.0 %		
800 HL P1	1955	1720	750	2055	100	1767	750	14.1 %	14.1 %	19.1 %	19.1 %	10.0 %	9.9 %	6.8 %	6.8 %	703	
800 HL P2	1995	1743	750	2095	100	1791	750	13.8 %	13.8 %	19.0 %	19.0 %	10.2 %	10.2 %	7.0 %	7.0 %		
800 HL P3	1985	1737	750	2085	100	1783	750	13.9 %	13.9 %	19.1 %	19.0 %	10.1%	10.1%	6.9 %	6.9 %		
800 HL P4	2035	1765	750	2135	100	1801	750	13.7 %	13.7 %	19.0 %	19.0 %	10.3 %	10.3 %	7.1 %	7.0 %		
900 H 00	1950	1585	719	1970	20	1582	720	15.9 %	17.2 %	19.2 %	20.8 %	7.4 %	8.0 %	5.5 %	6.0 %	707	
900 H 01	2275	1766	724	3015	740	2029	730	12.9 %	13.6%	13.8 %	14.5%	11.6 %	12.2 %	10.4%	11.0 %	708	
900 H 02	2315	1785	724	3055	740	2040	730	12.8 %	13.5 %	13.6%	14.3%	11.7 %	12.3 %	10.6 %	11.1 %		
900 H 03	2305	1780	724	3045	740	2037	730	12.9 %	13.6%	13.7 %	14.4 %	11.6 %	12.3 %	10.5 %	11.1 %		
900 H 04	2375	1812	725	3115	740	2056	731	12.7%	13.4 %	13.4 %	14.1 %	11.9 %	12.5 %	10.8 %	11.3 %		
900 H P1	2095	1674	721	2195	100	1717	723	15.1 %	16.3 %	17.8 %	19.2 %	8.5 %	9.1 %	6.8 %	7.3 %	709	
900 H P2	2135	1696	722	2235	100	1737	723	15.0 %	16.1 %	17.6 %	18.9%	8.6 %	9.3 %	7.0 %	7.5 %		
900 H P3	2125	1691	722	2225	100	1732	723	15.0 %	16.2 %	17.6 %	19.0 %	8.6 %	9.2 %	6.9 %	7.4 %		
900 H P4	2175	1718	722	2275	100	1757	724	14.9 %	16.0 %	17.4%	18.6 %	8.8%	9.5 %	7.2 %	7.7 %		
900 HL 00	1955	1585	719	1975	20	1582	720	15.9 %	17.2 %	19.2 %	20.8 %	7.4 %	8.0 %	5.5 %	6.0 %	707	
900 HL 01	2280	1766	724	3020	740	2029	730	12.9 %	13.6%	13.8 %	14.5%	11.6 %	12.2 %	10.4%	11.0 %	708	
900 HL 02	2320	1785	724	3060	740	2040	730	12.8 %	13.5 %	13.6%	14.3%	11.7 %	12.3 %	10.6 %	11.1 %		
900 HL 03	2310	1780	724	3050	740	2037	730	12.9 %	13.6%	13.7 %	14.4 %	11.6 %	12.3 %	10.5 %	11.1 %		
900 HL 04	2380	1812	725	3120	740	2056	731	12.7%	13.4 %	13.4 %	14.1 %	11.9 %	12.5 %	10.8 %	11.3 %		
900 HL P1	2100	1674	721	2200	100	1717	723	15.1 %	16.3 %	17.8 %	19.2 %	8.5 %	9.1 %	6.8 %	7.3 %	709	
900 HL P2	2140	1696	722	2240	100	1737	723	15.0 %	16.1 %	17.6 %	18.9%	8.6 %	9.3 %	7.0 %	7.5 %		
900 HL P3	2130	1691	722	2230	100	1732	723	15.0 %	16.2 %	17.6 %	19.0 %	8.6 %	9.2 %	6.9 %	7.4 %		
900 HL P4	2180	1718	722	2280	100	1757	724	14.9 %	16.0 %	17.4%	18.6 %	8.8%	9.5 %	7.2 %	7.7 %		

MODEL	EMPTY				OPERATING				PERCENTAGE WEIGHT DISTRIBUTION ON SUPPORTS WITH MACHINE OPERATING (%)								VT KIT
	WEIGHT (kg)	CENTRE OF GRAVITY		TOTAL WEIGHT		CENTRE OF GRAVITY		1	2	3	4	5	6	7	8		
		Xg	Yg	kg	Water	Xg	Yg										
1000 H	00	2180	1857	750	2200	20	1851	750	19.2 %	19.1 %	18.6 %	18.5 %	6.5 %	6.5 %	5.8 %	5.8 %	713
1000 H	01	2500	1986	750	3250	750	2178	750	15.7 %	15.6 %	12.6 %	12.6 %	15.6 %	15.6 %	6.1 %	6.1 %	714
1000 H	02	2540	1999	750	3290	750	2187	750	15.6 %	15.5 %	12.5 %	12.4 %	15.9 %	15.9 %	6.1 %	6.1 %	
1000 H	03	2530	1996	750	3280	750	2185	750	15.6 %	15.5 %	12.5 %	12.5 %	15.9 %	15.8 %	6.1 %	6.1 %	
1000 H	04	2600	2019	750	3350	750	2199	750	15.4 %	15.4 %	12.2 %	12.2 %	16.3 %	16.3 %	6.1 %	6.1 %	
1000 H	P1	2325	1919	750	2435	110	1947	750	18.3 %	18.2 %	17.0 %	17.0 %	8.9 %	8.8 %	5.9 %	5.9 %	
1000 H	P2	2365	1935	750	2475	110	1962	750	18.1 %	18.1 %	16.8 %	16.7 %	9.3 %	9.2 %	5.9 %	5.9 %	715
1000 H	P3	2355	1931	750	2465	110	1958	750	18.1 %	18.1 %	16.8 %	16.8 %	9.2 %	9.1 %	5.9 %	5.9 %	
1000 H	P4	2405	1951	750	2515	110	1976	750	18.0 %	17.9 %	16.5 %	16.5 %	9.6 %	9.6 %	5.9 %	5.9 %	
1000 HL	00	2185	1857	750	2205	20	1851	750	19.2 %	19.1 %	18.6 %	18.5 %	6.5 %	6.5 %	5.8 %	5.8 %	713
1000 HL	01	2505	1986	750	3255	750	2178	750	15.7 %	15.6 %	12.6 %	12.6 %	15.6 %	15.6 %	6.1 %	6.1 %	714
1000 HL	02	2545	1999	750	3295	750	2187	750	15.6 %	15.5 %	12.5 %	12.4 %	15.9 %	15.9 %	6.1 %	6.1 %	
1000 HL	03	2535	1996	750	3285	750	2185	750	15.6 %	15.5 %	12.5 %	12.5 %	15.9 %	15.8 %	6.1 %	6.1 %	
1000 HL	04	2605	2019	750	3355	750	2199	750	15.4 %	15.4 %	12.2 %	12.2 %	16.3 %	16.3 %	6.1 %	6.1 %	
1000 HL	P1	2330	1919	750	2440	110	1947	750	18.3 %	18.2 %	17.0 %	17.0 %	8.9 %	8.8 %	5.9 %	5.9 %	
1000 HL	P2	2370	1935	750	2480	110	1962	750	18.1 %	18.1 %	16.8 %	16.7 %	9.3 %	9.2 %	5.9 %	5.9 %	715
1000 HL	P3	2360	1931	750	2470	110	1958	750	18.1 %	18.1 %	16.8 %	16.8 %	9.2 %	9.1 %	5.9 %	5.9 %	
1000 HL	P4	2410	1951	750	2520	110	1976	750	18.0 %	17.9 %	16.5 %	16.5 %	9.6 %	9.6 %	5.9 %	5.9 %	
1250 H	00	2320	1857	750	2345	25	1851	750	18.5 %	18.4 %	18.8 %	18.8 %	7.8 %	7.8 %	4.9 %	4.9 %	713
1250 H	01	2650	1980	750	3400	750	2165	750	15.3 %	15.2 %	13.1 %	13.1 %	16.3 %	16.3 %	5.4 %	5.3 %	717
1250 H	02	2695	1995	750	3445	750	2174	750	15.2 %	15.1 %	12.9 %	12.9 %	16.6 %	16.6 %	5.4 %	5.4 %	
1250 H	03	2680	1990	750	3430	750	2171	750	15.2 %	15.2 %	13.0 %	13.0 %	16.5 %	16.5 %	5.4 %	5.4 %	
1250 H	04	2755	2014	750	3505	750	2186	750	15.0 %	15.0 %	12.7 %	12.6 %	17.0 %	16.9 %	5.4 %	5.4 %	
1250 H	P1	2470	1943	750	2580	110	1953	750	17.7 %	17.6 %	17.3 %	17.3 %	10.0 %	10.0 %	5.0 %	5.0 %	
1250 H	P2	2520	1935	750	2630	110	1959	750	17.5 %	17.5 %	17.1 %	17.0 %	10.4 %	10.4 %	5.0 %	5.0 %	718
1250 H	P3	2500	1929	750	2610	110	1954	750	17.6 %	17.5 %	17.2 %	17.1 %	10.3 %	10.3 %	5.0 %	5.0 %	
1250 H	P4	2560	1949	750	2670	110	1972	750	17.4 %	17.3 %	16.8 %	16.8 %	10.8 %	10.8 %	5.1 %	5.1 %	
1250 HL	00	2325	1857	750	2350	25	1851	750	18.5 %	18.4 %	18.8 %	18.8 %	7.8 %	7.8 %	4.9 %	4.9 %	713
1250 HL	01	2655	1980	750	3405	750	2165	750	15.3 %	15.2 %	13.1 %	13.1 %	16.3 %	16.3 %	5.4 %	5.3 %	717
1250 HL	02	2700	1995	750	3450	750	2174	750	15.2 %	15.1 %	12.9 %	12.9 %	16.6 %	16.6 %	5.4 %	5.4 %	
1250 HL	03	2685	1990	750	3435	750	2171	750	15.2 %	15.2 %	13.0 %	13.0 %	16.5 %	16.5 %	5.4 %	5.4 %	
1250 HL	04	2760	2014	750	3510	750	2186	750	15.0 %	15.0 %	12.7 %	12.6 %	17.0 %	16.9 %	5.4 %	5.4 %	
1250 HL	P1	2475	1943	750	2585	110	1953	750	17.7 %	17.6 %	17.3 %	17.3 %	10.0 %	10.0 %	5.0 %	5.0 %	
1250 HL	P2	2525	1935	750	2635	110	1959	750	17.5 %	17.5 %	17.1 %	17.0 %	10.4 %	10.4 %	5.0 %	5.0 %	718
1250 HL	P3	2505	1929	750	2615	110	1954	750	17.6 %	17.5 %	17.2 %	17.1 %	10.3 %	10.3 %	5.0 %	5.0 %	
1250 HL	P4	2565	1949	750	2675	110	1972	750	17.4 %	17.3 %	16.8 %	16.8 %	10.8 %	10.8 %	5.1 %	5.1 %	
1400 H	00	2930	1789	757	2960	30	1790	761	8.8 %	16.7 %	19.4 %	36.8 %	6.3 %	11.9 %	-	-	722
1400 H	01	3260	1720	861	4020	760	1609	1034	14.8 %	16.7 %	25.6 %	28.9 %	6.6 %	7.5 %	-	-	723
1400 H	02	3300	1712	874	4060	760	1603	1042	15.0 %	16.6 %	25.8 %	28.6 %	6.6 %	7.4 %	-	-	
1400 H	03	3290	1714	870	4050	760	1605	1039	14.9 %	16.7 %	25.7 %	28.7 %	6.6 %	7.4 %	-	-	
1400 H	04	3360	1701	890	4120	760	1596	1053	15.3 %	16.6 %	26.0 %	28.3 %	6.6 %	7.2 %	-	-	
1400 H	P1	3085	1755	808	3195	110	1739	837	10.4 %	16.9 %	21.2 %	34.5 %	6.5 %	10.6 %	-	-	
1400 H	P2	3130	1746	822	3240	110	1730	850	10.6 %	16.9 %	21.5 %	34.1 %	6.5 %	10.3 %	-	-	724
1400 H	P3	3115	1749	817	3225	110	1733	846	10.5 %	16.9 %	21.4 %	34.3 %	6.5 %	10.4 %	-	-	
1400 H	P4	3170	1738	834	3280	110	1723	862	10.9 %	16.9 %	21.8 %	33.8 %	6.5 %	10.1 %	-	-	
1400 HL	00	2940	1789	757	2970	30	1790	761	8.8 %	16.7 %	19.4 %	36.8 %	6.3 %	11.9 %	-	-	722
1400 HL	01	3270	1720	861	4030	760	1609	1034	14.8 %	16.7 %	25.6 %	28.9 %	6.6 %	7.5 %	-	-	723
1400 HL	02	3310	1712	874	4070	760	1603	1042	15.0 %	16.6 %	25.8 %	28.6 %	6.6 %	7.4 %	-	-	
1400 HL	03	3300	1714	870	4060	760	1605	1039	14.9 %	16.7 %	25.7 %	28.7 %	6.6 %	7.4 %	-	-	
1400 HL	04	3370	1701	890	4130	760	1596	1053	15.3 %	16.6 %	26.0 %	28.3 %	6.6 %	7.2 %	-	-	
1400 HL	P1	3095	1755	808	3205	110	1739	837	10.4 %	16.9 %	21.2 %	34.5 %	6.5 %	10.6 %	-	-	
1400 HL	P2	3140	1746	822	3250	110	1730	850	10.6 %	16.9 %	21.5 %	34.1 %	6.5 %	10.3 %	-	-	724
1400 HL	P3	3125	1749	817	3235	110	1733	846	10.5 %	16.9 %	21.4 %	34.3 %	6.5 %	10.4 %	-	-	
1400 HL	P4	3180	1738	834	3290	110	1723	862	10.9 %	16.9 %	21.8 %	33.8 %	6.5 %	10.1 %	-	-	

MODEL		EMPTY			OPERATING				PERCENTAGE WEIGHT DISTRIBUTION ON SUPPORTS WITH MACHINE OPERATING (%)								VT KIT
		WEIGHT (kg)	CENTRE OF GRAVITY		TOTAL WEIGHT		CENTRE OF GRAVITY		1	2	3	4	5	6	7	8	
			Xg	Yg	kg	Water	Xg	Yg									
1500 H	O0	3140	1771	760	3170	30	1773	763	8.6 %	16.2 %	20.4 %	38.4 %	5.7 %	10.7 %	-	-	722
1500 H	O1	3500	1703	865	4260	760	1601	1028	14.3%	16.4 %	26.3 %	30.0%	6.0 %	6.9 %	-	-	728
1500 H	O2	3570	1691	885	4330	760	1593	1041	14.7 %	16.3 %	26.6 %	29.6 %	6.0 %	6.7 %	-	-	
1500 H	O3	3500	1703	865	4260	760	1601	1028	14.3%	16.4 %	26.3 %	30.0%	6.0 %	6.9 %	-	-	
1500 H	O4	3570	1691	885	4330	760	1593	1041	14.7 %	16.3 %	26.6 %	29.6 %	6.0 %	6.7 %	-	-	
1500 H	P1	3325	1735	816	3435	110	1721	843	10.2 %	16.4 %	22.2 %	35.8 %	5.9 %	9.5 %	-	-	729
1500 H	P2	3400	1721	838	3510	110	1708	864	10.6 %	16.4 %	22.7 %	35.1 %	5.9 %	9.2 %	-	-	
1500 H	P3	3325	1735	816	3435	110	1721	843	10.2 %	16.4 %	22.2 %	35.8 %	5.9 %	9.5 %	-	-	
1500 H	P4	3380	1725	832	3490	110	1711	858	10.5 %	16.4 %	22.6 %	35.3 %	5.9 %	9.3 %	-	-	
1500 HL	O0	3150	1771	760	3180	30	1773	763	8.6 %	16.2 %	20.4 %	38.4 %	5.7 %	10.7 %	-	-	722
1500 HL	O1	3510	1703	865	4270	760	1601	1028	14.3%	16.4 %	26.3 %	30.0%	6.0 %	6.9 %	-	-	728
1500 HL	O2	3580	1691	885	4340	760	1593	1041	14.7 %	16.3 %	26.6 %	29.6 %	6.0 %	6.7 %	-	-	
1500 HL	O3	3510	1703	865	4270	760	1601	1028	14.3%	16.4 %	26.3 %	30.0%	6.0 %	6.9 %	-	-	
1500 HL	O4	3580	1691	885	4340	760	1593	1041	14.7 %	16.3 %	26.6 %	29.6 %	6.0 %	6.7 %	-	-	
1500 HL	P1	3335	1735	816	3445	110	1721	843	10.2 %	16.4 %	22.2 %	35.8 %	5.9 %	9.5 %	-	-	729
1500 HL	P2	3410	1721	838	3520	110	1708	864	10.6 %	16.4 %	22.7 %	35.1 %	5.9 %	9.2 %	-	-	
1500 HL	P3	3335	1735	816	3445	110	1721	843	10.2 %	16.4 %	22.2 %	35.8 %	5.9 %	9.5 %	-	-	
1500 HL	P4	3390	1725	832	3500	110	1711	858	10.5 %	16.4 %	22.6 %	35.3 %	5.9 %	9.3 %	-	-	
1650 H	O0	3220	1785	744	3250	30	1786	748	8.2 %	16.0 %	20.1 %	39.0 %	5.7 %	11.0 %	-	-	733
1650 H	O1	3580	1717	849	4340	760	1615	1011	13.9%	16.3 %	26.1 %	30.6%	6.0 %	7.1 %	-	-	728
1650 H	O2	3650	1704	869	4410	760	1606	1025	14.2 %	16.3 %	26.4 %	30.2 %	6.0 %	6.9 %	-	-	
1650 H	O3	3610	1712	857	4370	760	1611	1017	14.0 %	16.3 %	26.2 %	30.5 %	6.0 %	7.0 %	-	-	
1650 H	O4	3710	1694	884	4470	760	1599	1035	14.4 %	16.2 %	26.6 %	29.9 %	6.0 %	6.8 %	-	-	
1650 H	P1	3405	1749	800	3515	110	1735	828	9.8 %	16.2 %	22.0 %	36.4 %	5.9 %	9.7 %	-	-	729
1650 H	P2	3480	1735	822	3590	110	1721	848	10.2 %	16.3 %	22.4 %	35.8 %	5.9 %	9.4 %	-	-	
1650 H	P3	3435	1743	809	3545	110	1729	836	9.9 %	16.2 %	22.2 %	36.2 %	5.9 %	9.6 %	-	-	
1650 H	P4	3520	1727	833	3630	110	1715	858	10.4%	16.3 %	22.7 %	35.5 %	5.9 %	9.2 %	-	-	
1650 HL	O0	3230	1785	744	3260	30	1786	748	8.2 %	16.0 %	20.1 %	39.0 %	5.7 %	11.0 %	-	-	733
1650 HL	O1	3590	1717	849	4350	760	1615	1011	13.9%	16.3 %	26.1 %	30.6%	6.0 %	7.1 %	-	-	728
1650 HL	O2	3660	1704	869	4420	760	1606	1025	14.2 %	16.3 %	26.4 %	30.2 %	6.0 %	6.9 %	-	-	
1650 HL	O3	3620	1712	857	4380	760	1611	1017	14.0 %	16.3 %	26.2 %	30.5 %	6.0 %	7.0 %	-	-	
1650 HL	O4	3720	1694	884	4480	760	1599	1035	14.4 %	16.2 %	26.6 %	29.9 %	6.0 %	6.8 %	-	-	
1650 HL	P1	3415	1749	800	3525	110	1735	828	9.8 %	16.2 %	22.0 %	36.4 %	5.9 %	9.7 %	-	-	729
1650 HL	P2	3490	1735	822	3600	110	1721	848	10.2 %	16.3 %	22.4 %	35.8 %	5.9 %	9.4 %	-	-	
1650 HL	P3	3445	1743	809	3555	110	1729	836	9.9 %	16.2 %	22.2 %	36.2 %	5.9 %	9.6 %	-	-	
1650 HL	P4	3530	1727	833	3640	110	1715	858	10.4%	16.3 %	22.7 %	35.5 %	5.9 %	9.2 %	-	-	
1800 H	O0	3330	1780	759	3370	40	1782	764	8.4%	15.8 %	20.7%	38.8 %	5.7 %	10.7 %	-	-	730
1800 H	O1	3690	1715	860	4450	760	1616	1016	13.8%	16.1 %	26.3 %	30.7%	6.0 %	7.0 %	-	-	728
1800 H	O2	3765	1703	878	4525	760	1607	1029	14.2 %	16.1 %	26.6 %	30.3 %	6.0 %	6.8 %	-	-	
1800 H	O3	3720	1710	867	4480	760	1612	1021	14.0 %	16.1 %	26.4 %	30.5 %	6.0 %	6.9 %	-	-	
1800 H	O4	3825	1693	893	4585	760	1601	1039	14.4 %	16.1 %	26.8 %	30.0 %	6.0 %	6.7 %	-	-	
1800 H	P1	3515	1745	813	3625	110	1732	839	9.9 %	16.0 %	22.4 %	36.3 %	5.9 %	9.5 %	-	-	732
1800 H	P2	3595	1732	833	3705	110	1719	859	10.3 %	16.1 %	22.9%	35.7 %	5.9 %	9.2 %	-	-	
1800 H	P3	3545	1740	821	3655	110	1727	847	10.0 %	16.0 %	22.6 %	36.1 %	5.9 %	9.4 %	-	-	
1800 H	P4	3635	1725	844	3745	110	1713	869	10.5 %	16.1 %	23.1%	35.4 %	5.9 %	9.0 %	-	-	
1800 HL	O0	3340	1780	759	3380	40	1782	764	8.4%	15.8 %	20.7%	38.8 %	5.7 %	10.7 %	-	-	730
1800 HL	O1	3700	1715	860	4460	760	1616	1016	13.8%	16.1 %	26.3 %	30.7%	6.0 %	7.0 %	-	-	728
1800 HL	O2	3775	1703	878	4535	760	1607	1029	14.2 %	16.1 %	26.6 %	30.3 %	6.0 %	6.8 %	-	-	
1800 HL	O3	3730	1710	867	4490	760	1612	1021	14.0 %	16.1 %	26.4 %	30.5 %	6.0 %	6.9 %	-	-	
1800 HL	O4	3835	1693	893	4595	760	1601	1039	14.4 %	16.1 %	26.8 %	30.0 %	6.0 %	6.7 %	-	-	
1800 HL	P1	3525	1745	813	3635	110	1732	839	9.9 %	16.0 %	22.4 %	36.3 %	5.9 %	9.5 %	-	-	732
1800 HL	P2	3605	1732	833	3715	110	1719	859	10.3 %	16.1 %	22.9%	35.7 %	5.9 %	9.2 %	-	-	
1800 HL	P3	3555	1740	821	3665	110	1727	847	10.0 %	16.0 %	22.6 %	36.1 %	5.9 %	9.4 %	-	-	
1800 HL	P4	3645	1725	844	3755	110	1713	869	10.5 %	16.1 %	23.1%	35.4 %	5.9 %	9.0 %	-	-	

## 21. SAFETY WARNINGS AND REGULATIONS

<p><b>i Safety warnings</b></p> <p>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).</p> <p>We shall not be held responsible for any damage whatsoever resulting</p>	<p>from the non-compliance with these instructions.</p> <p><b>i</b> Before starting any kind of work, it is necessary <b>TO READ CAREFULLY THE INSTRUCTIONS, AND TO PERFORM THE SAFETY CHECKS TO REDUCE ANY RISK TO A MINIMUM.</b> All the personnel in charge must know</p>	<p>the operations and possible risks that may arise when all the unit installation operations begin.</p>
<p><b>Danger!</b></p> <p>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.</p>	<p><b>GAS R410A</b></p> <p>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</p>	<p><b>Risk of electric discharge!</b></p> <p>Before opening the unit, it is necessary to disconnect the device completely from the mains.</p>

## 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

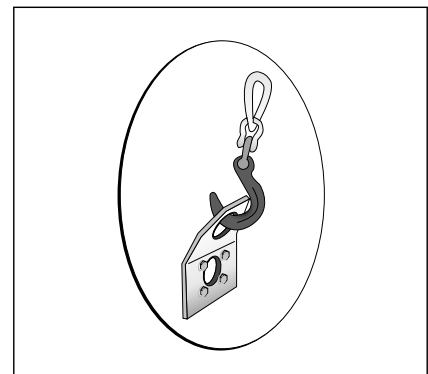
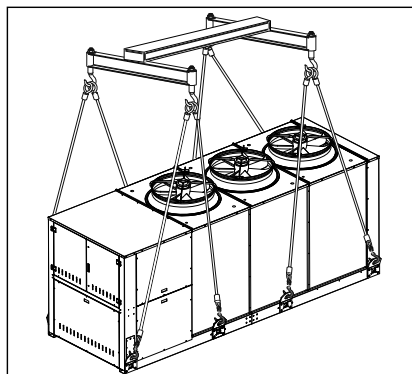
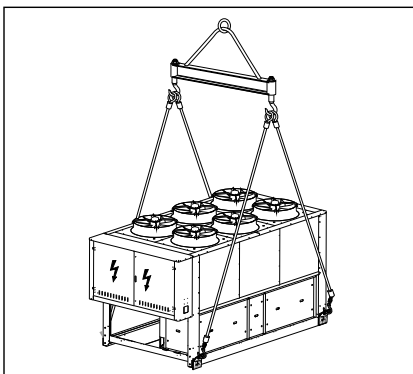
Before moving the unit, check the lifting capacity of the machines used. Once the packaging has been removed, the unit must be handled by qualified personnel, using the appropriate equipment. To handle the machine: "IN THE EVENT OF LIFTING", hook the lifting cables to the special eyebolts (as indicated 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.**

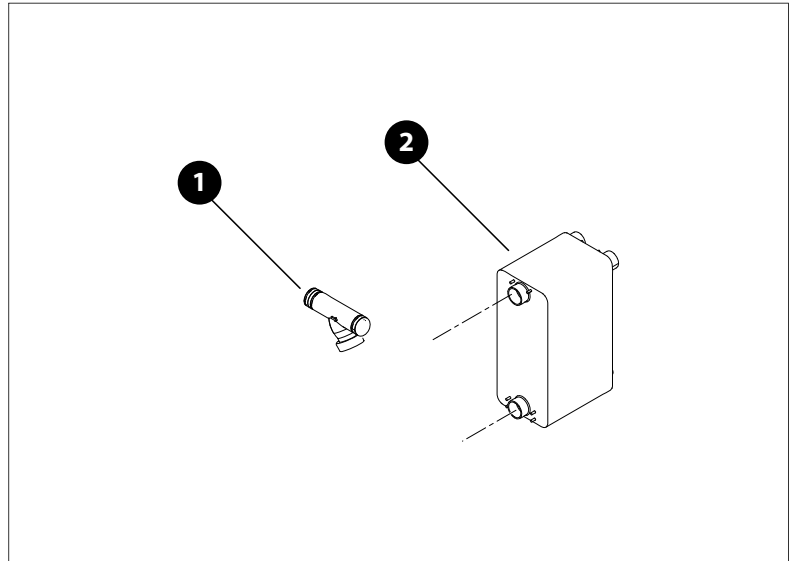
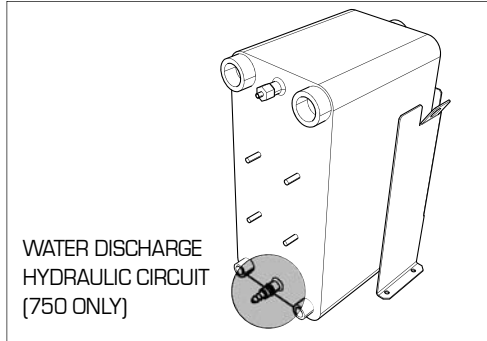
### 22.3. HANDLING EXAMPLE



## 23. HYDRAULIC CIRCUITS

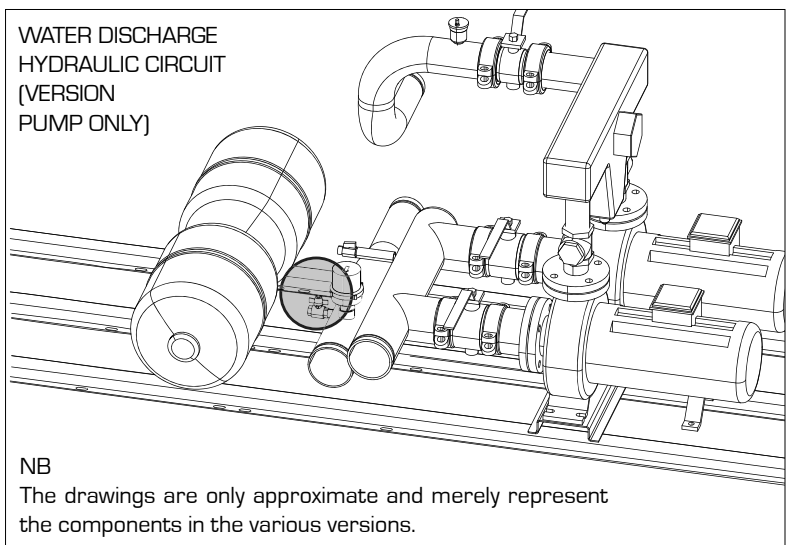
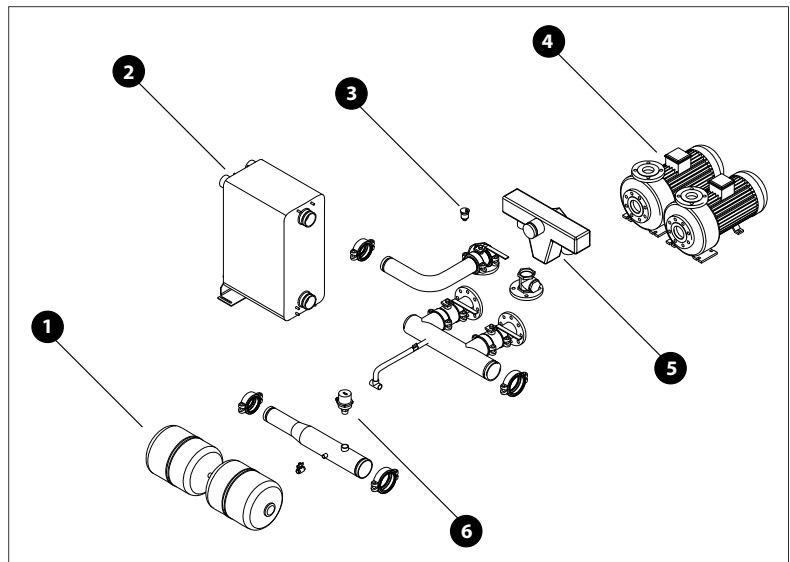
### 23.1. HYDRAULIC CIRCUIT INTERNAL NRL "00"

Key	
1	Heat exchanger
2	Water filter



### 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

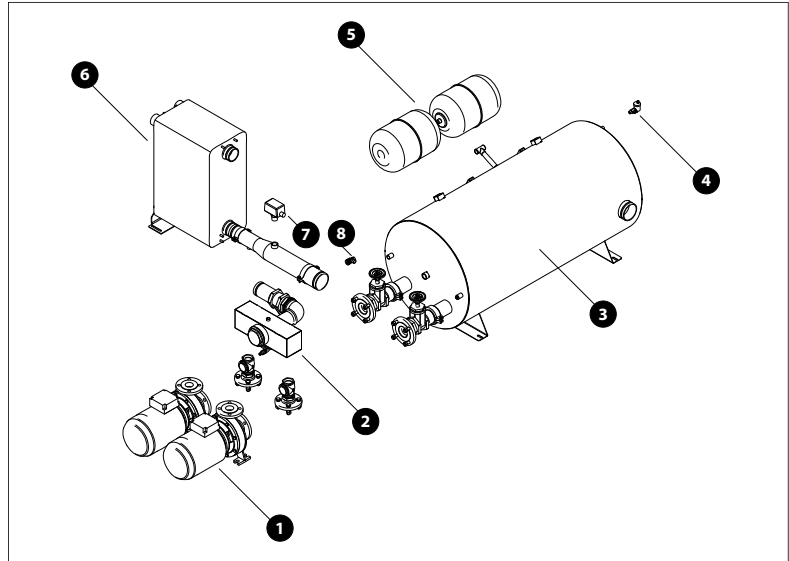


**23.3. INTERNAL HYDRAULIC CIRCUIT  
NRL "01-02-03-04-05-06-07-08"**

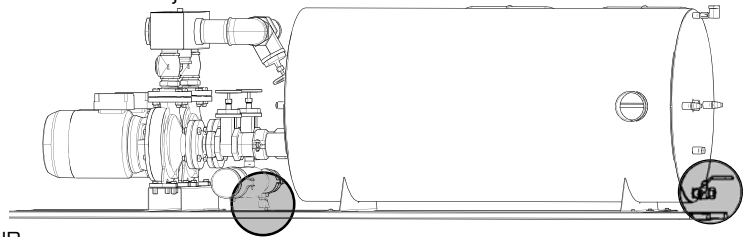
Key			
1	Pump unit	5	Expansion tanks
2	Water filter	6	Heat exchanger
3	Accumulation	7	Flow switch
4	Drain valve	8	Safety valve

**NB**

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



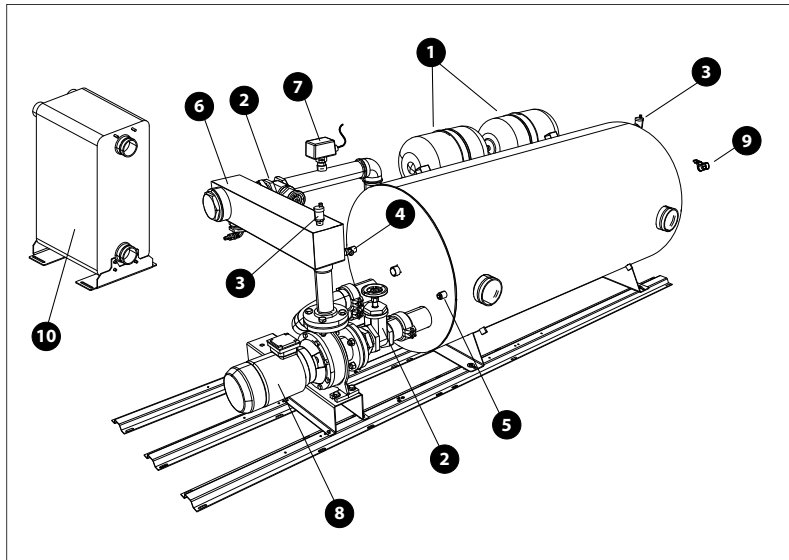
**WATER DISCHARGE  
HYDRAULIC CIRCUIT  
(VERSION WITH  
WATER STORAGE)**



**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.

#### 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)

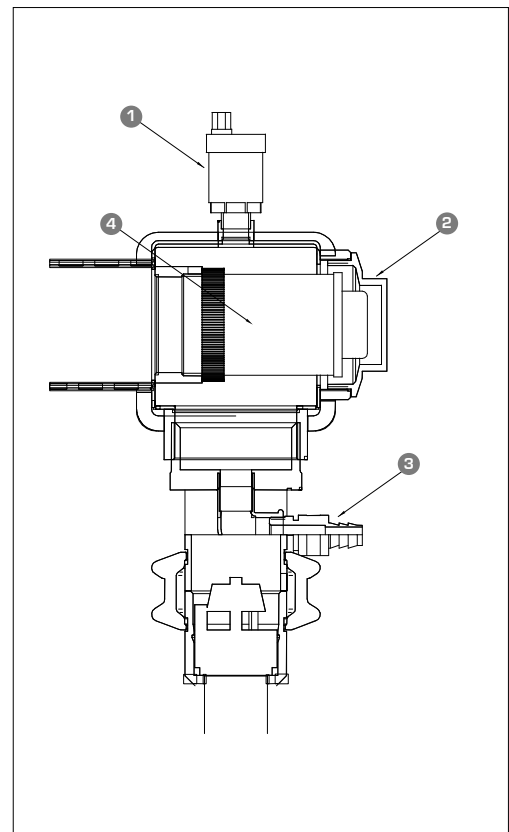
**The hydraulic piping for connection to the machine must be properly scaled for the actual water flow rate required by the plant when working. The water flow rate to the heat exchanger must always be constant.**

## 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



## 25. ELECTRICAL WIRING

**i** 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.

**i** 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

**i** installation. For installation requirements, the wiring layout 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.

**i** 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.

### 25.1. LINES AND ELECTRIC DATA FOR THE UNIT

#### NB

**Connection cables are not supplied.**

The cable sections shown in tab. 25.2 are recommended for a maximum length of 50m. For longer lengths, the DESIGNER must size the power sup-

ply 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

### 25.2. ELECTRICAL DATA

MODEL	VERSION	SECT. A mm <sup>2</sup>	SECT. B mm <sup>2</sup>	Earth (section PER) mm <sup>2</sup>	IL A
0750	ALL	95mm <sup>2</sup>	1.5mm <sup>2</sup>	50mm <sup>2</sup>	200A
0800	ALL	95mm <sup>2</sup>	1.5mm <sup>2</sup>	50mm <sup>2</sup>	200A
0900	ALL	95mm <sup>2</sup>	1.5mm <sup>2</sup>	50mm <sup>2</sup>	250A
1000	ALL	95mm <sup>2</sup>	1.5mm <sup>2</sup>	50mm <sup>2</sup>	250A
1250	ALL	120mm <sup>2</sup>	1.5mm <sup>2</sup>	70mm <sup>2</sup>	315A
1400	ALL	120mm <sup>2</sup>	1.5mm <sup>2</sup>	70mm <sup>2</sup>	315A
1500	ALL	185mm <sup>2</sup>	1.5mm <sup>2</sup>	95mm <sup>2</sup>	350A
1650	ALL	2x185mm <sup>2</sup>	1.5mm <sup>2</sup>	150mm <sup>2</sup>	400A
1800	ALL	2x185mm <sup>2</sup>	1.5mm <sup>2</sup>	150mm <sup>2</sup>	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.**

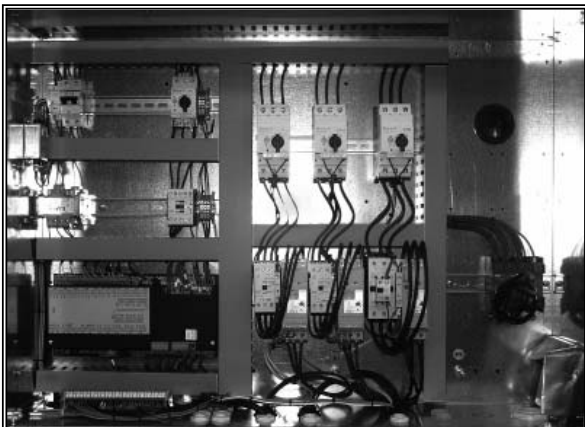
Key	
[*]Sect. A	Power supply
Sect. B	Remote panel
Earth	Earth to bring to the machine
IL	Main switch

#### [\*]Sect A

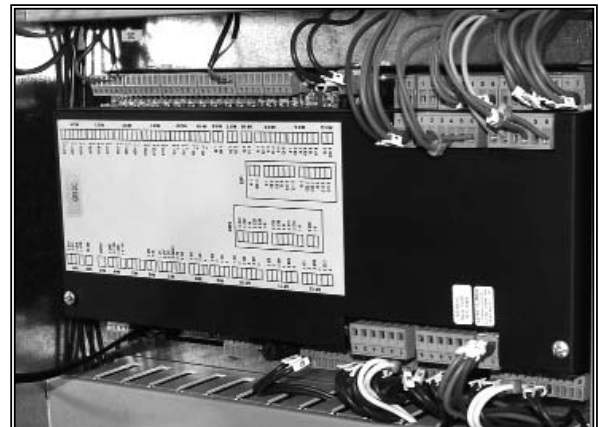
**Power supply 400V-3N-50Hz only for size 750**

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

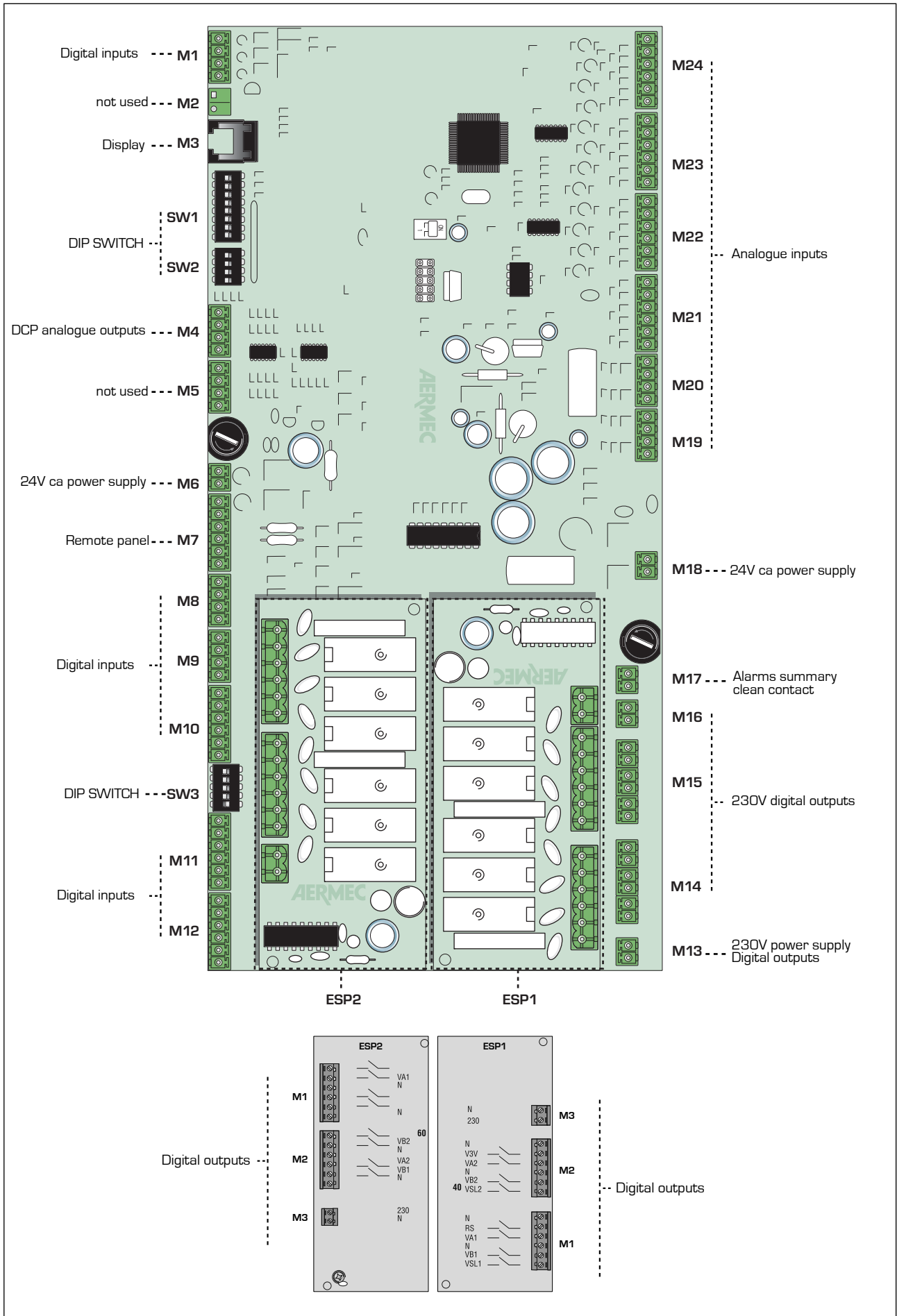
Electrical panel



GR3



25.3. "GR3" CONTROL BOARD

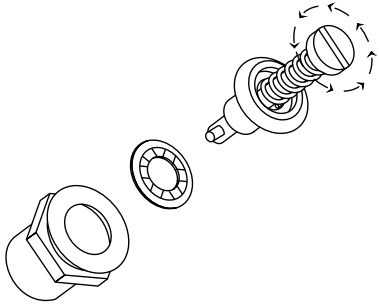


## 25.4. CONNECTION TO THE ELECTRICAL POWER SUPPLY

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

### To access the electric box:

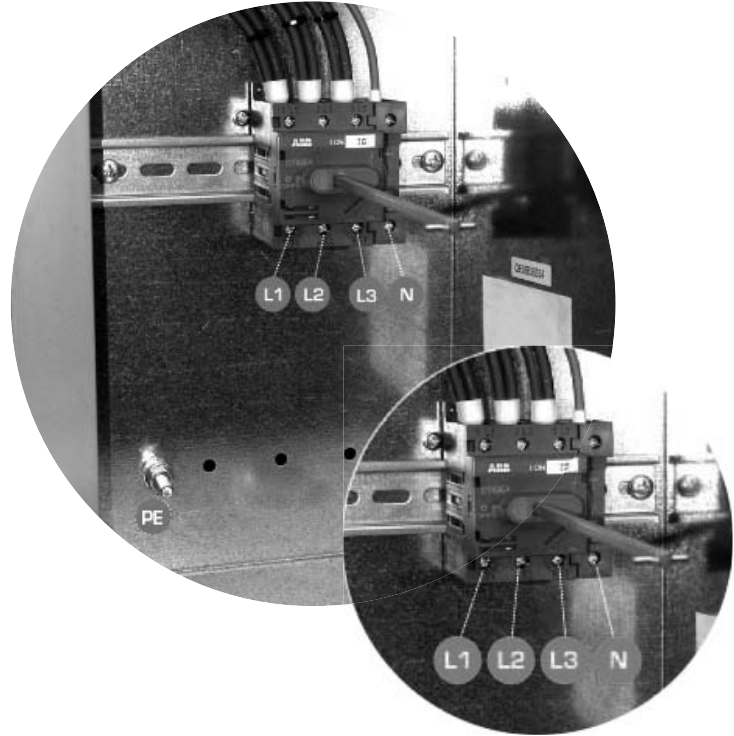
- **1** Make a ¼ turn of the screw, anticlockwise



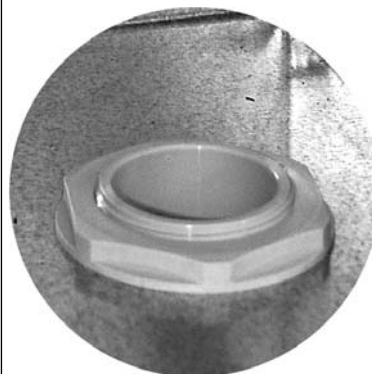
- **2** Turn the handle of the door-block disconnecting switch to OFF, then lock it and affix the warning notice.



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



Key			
<b>L1</b>	Line 1	<b>N</b>	Neutral
<b>L2</b>	Line 2	<b>PE</b>	Earth
<b>L3</b>	Line 3		



Hole for electric cables



PE: earth connection

## 26. START-UP

### 26.1. 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.

#### 26.1.1. 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  $\pm$ 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.

### 26.1.2. 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.

### 26.2. 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.

#### 26.2.1. 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.

### 26.2.2. 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.

### 26.2.3. 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 condensation 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.

### 26.2.4. 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.

### 26.3. 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).

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## 27. MAINTENANCE

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### 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 panneling 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.

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## 28. DISPOSAL

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### 28.1. 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.

### 28.2. 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.**

## 29. 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.

### 29.1. 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

## 30. 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/cm <sup>3</sup>
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.

<b>Toxicological information</b>	<p><b>Inhalation:</b> irregular heartbeat (arrhythmia).  <b>Ingestion:</b> no specific risk.  <b>Contact with the skin:</b> if the skin comes into contact with the quickly evaporating liquid, this may cause the tissues to freeze. Slightly irritating for the skin.  <b>Contact with the eyes:</b> slightly irritating for the eyes.</p>
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FIRE-FIGHTING MEASURES	
<b>Exinction means</b>	Not inflammable. ASTM D-56-82; ASTM E-681. In the event of a fire, use vaporised water, foam, dry chemical products or CO <sub>2</sub> .
<b>Particular risks from exposure</b>	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 vaporised 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	
<b>Environmental precautions</b>	Stop the leak if there is no risk involved. Any leaks will quickly evaporate.
<b>Cleaning methods</b>	The mixture evaporates

STORAGE AND HANDLING	
<b>Handling</b>	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.
<b>Warnings for safe use</b>	<ul style="list-style-type: none"> <li>• 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.</li> <li>• Protect your hands with heatproof gloves</li> <li>• Protect your eyes with safety goggles</li> <li>• When handling, observe the good practices of industrial hygiene and safety.</li> </ul>

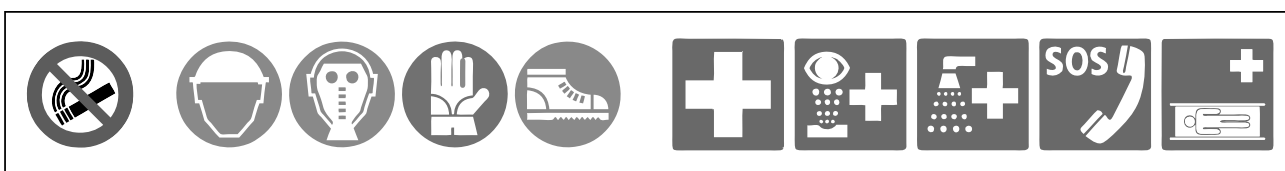
ECOLOGICAL INFORMATION	
<b>Substance</b>	FORANE 32
<b>In water</b>	Not easily biodegradable: 5% after 28d (Policy OCDE 107)
<b>In the air</b>	Degradation by OH radicals: t <sub>1/2</sub> life= 1472d Ozone destruction potential: ODP (R-11) = 0 Greenhouse effect potential of the halogenated hydrocarbons: HGWP (R-11=1) = 0.13
<b>Bio-accumulation</b>	Practically non-biaccumulable: log Pow = 0.21 Policy OCDE 107

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

DISPOSAL	
<b>Disposal methods</b>	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	
<b>Professional exposure limit:</b>	Difluoromethane (R32): LTEL - UK [ppm]: 1000

#### SYMBOLS



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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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