

Air/water chillers and heat pumps with axial fans

## User installer manual

### Chiller

HWA1-A 02106-04349

### Reversible heat pumps

HWA1-A/H 02109-04345



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The manual of units describes all the necessary information concerning the better use of the appliance under the operator’s safety conditions

## 1. PURPOSES AND CONTENTS OF THE MANUAL

This manual provides the basic information concerning the selection, installation, operation and maintenance of the units. It is addressed to the user of the appliance and it includes the necessary indications allowing the user to operate the unit efficiently, even without any previous specific knowledge of it.

|   |  |
|---|--|
|  | <p><b>WARNING: Although this manual has been drafted for the end user, some of the operations described are the responsibility of skilled personnel having technical or professional qualifications to perform the activities herein. They must also be kept up-to-date by attending refresher courses acknowledged by the competent authorities. These tasks include: installation, routine and extraordinary maintenance, decommissioning of the appliance and any other operation indicated “by qualified personnel”.</b></p> |
|   | <p><b>When the installation and/or maintenance operations are over, the qualified operator must correctly inform the end user regarding use of the appliance and the necessary periodical inspections.</b></p>   |
|   | <p><b>The operator has the responsibility of submitting all of the documentation necessary (including this manual) and of explaining that it all must be kept with care, in the vicinity of the appliance and always available.</b></p>  |

The manual describes the characteristics of the appliance at the time of its marketing; therefore, it must be considered adequate respecting the state of the art in terms of potentiality, ergonomics, safety and functionality.

The company introduces also technological improvements and is not constrained to update the manuals for previous versions of appliances that could not be compatible. So make sure to use the supplied manual for the installed unit.

It’s recommended that, the user must follow the instructions contained in this booklet, especially those concerning the safety and routine maintenance.

### 1.1 CONSERVATION OF THE MANUAL

The manual has to be always kept by the user for future references. It has to be stored in a safe place, away from dusts and moisture. It has to be available and accessible to all users who shall consult it any time they are in doubt on how to operate the appliance.

The company reserves the right to modify its products and related manuals without necessarily updating previous versions of the reference material. It declines also any responsibility for possible inaccuracies in the manual if due to printing or transcription errors.

The customer shall store any updated copy of the manual or parts of it delivered by the manufacturer as an attachment to this manual.

The company is available to give any detailed information about this manual and to give information regarding the use and the maintenance of its own appliances.

### 1.2 GRAPHIC SYMBOLS

|   |  |
|---|--|
|  | <p><b>Indicates operations that can be dangerous for people and/or disrupts the correct operation of the equipment.</b></p>                                    |
|  | <p><b>Indicates prohibited operations.</b></p>   |
|  | <p><b>Indicates important information which should be respected by the operator in order to guarantee the correct and safe operation of the equipment.</b></p> |

## 2. SAFETY LAWS

The units have been designed in accordance with the following directives and harmonised standards:

- EU Directives 2014/68/EU (PED), 2006/42/EC (MD), 2014/35/EU (LVD), 2014/30/EU (EMC), 2011/65/EU, 2011/65/EU and subsequent updating 2015/863, 2012/19/EU
- UNI EN 378-1, 378-2, 378-3, UNI EN 12735, EN 14276, EN 13134, EN 13136, EN 13585
- UNI EN ISO 12100, UNI ISO/TR 14121-2, UNI EN ISO 13857
- EN 60204-1, EN 61439
- CEI EN 61000-6-2, IEC 61000-6-4

And the following directives, regulations and standards on ecodesign and energy labelling:

- Community directive 2009/125/EU and subsequent transposal
- EU Regulation no.2017/1369
- EU Regulation no.2281/2016
- EU Regulation on.813/2013
- EN 14511, EN 14825, UNI EN ISO 9614-2

### 3. PERMITTED USES

- The company excludes any contractual and extra-contractual liabilities for damages caused to persons, animals or objects, by incorrect installation, setting and maintenance, improper use of the equipment, and the partial or superficial reading of the information described in this manual.
- These units have recently been designed only for heating and/or cooling of water. Any other use not expressly authorized by the manufacturer is considered improper and therefore not allowed. The fluid to be used is exclusively water or a mixture of water and glycol in case of low water temperatures.



**It is absolutely NOT allowed to connect the heated water supply from the UNIT directly to the taps of the domestic hot water circuit. This fluid is not intended for sanitary use and must not be ingested.**

- The location of the plant, the hydraulic and electrical circuits must be established by the planting designer and must take into account both technical requirements as well as any applicable local laws and authorized specifications.
- The execution of all works must be performed by skilled and qualified personnel and specialist competent in the existing rules in the country in which the appliance will be installed.
- This appliance is intended to be used by expert or trained operators.
- Direct interaction with the device by people with electrically controlled medical devices, such as pacemakers, is forbidden, as harmful interference may be created. It is recommended to keep adequate distance from unit installation, as indicated by the medical system used.



**Users of electrically controlled medical devices should exercise caution when interacting with the unit.**

### 4. GENERAL SAFETY GUIDELINES

Before beginning to operate on the units every user has to be perfectly knowledgeable about the functions of the equipment and its controls and has to have read and understood the information listed in this manual.



**It's strictly forbidden to remove and/or tamper with any safety device.**

**Children or unassisted disabled persons are not allowed to use the appliance.**

**Do not touch the appliance when barefoot or parts of the body are wet or damp.**

**Do not clean the unit when the power supply is 'ON'.**

**Do not pull, remove or twist the electrical cables coming out from the unit, even if it is disconnected from the main power supply.**

**Do not step with your feet on the appliance, sit down and/or place any type of object.**

**Do not spray or pour water directly on the unit.**

**Do not dispose of, abandon or leave within reach of children packaging materials (cardboard, staples, plastic bags, etc.) as they may represent an hazard.**



**Any routine and/or not-routine maintenance operation shall be carried out when the equipment has been shut down, disconnected from electric and pneumatic power sources and after its pneumatic system has been discharged.**

**Do not put neither your hands nor insert screwdrivers, spanners or other tools into moving parts of the equipment.**

**The equipment supervisor and the maintenance man have to receive suitable training for the performance of their tasks in safety.**

**Operators have to know how to use personal protective devices and have to know the accident-prevention guidelines contained in national and international laws and norms.**

#### 4.1 WORKERS' HEALTH AND SAFETY

The workplace health and safety laws, including 89/391/CEE, 89/686/CEE, 2009/104/CE, 86/188/CEE 89/655/CEE, and 77/576/CEE should be respected by every employer and he must also oblige the employees to respect them. It points out that:

|   |  |
|---|--|
|  | <b>Do not tamper with or replace parts of the equipment without the specific consent of the manufacturer. The manufacturer shall have no responsibility whatsoever in case of unauthorised operations.</b>   |
|  | <b>Using components, expendable materials or spare parts that do not correspond to those recommended by the manufacturer and/or listed in this manual may be dangerous for the operators and/or damage the equipment.</b>  |
|  | <b>The operator's workplace has to be kept clean, tidy and free from objects that may prevent free movements. Appropriate lighting of the work place shall be provided so as to allow the operator to carry out the required operations safely. Poor or too strong lighting can cause risks.</b> |
|  | <b>Ensure that work places are always adequately ventilated and that aspirators are working, in good condition and in compliance with the requirements of the laws in force.</b>   |
|  | <b>In the design phase, the indications contained in UNI EN ISO 14738 regarding workstations on the machinery were followed and the lifting limits imposed by UNI ISO 11228-1 were evaluated.</b>  |
|  | <b>Make sure to maintain, during the installation and maintenance of the unit, a posture that does not cause fatigue. Check the weight, before moving any component.</b>   |

The unit works with R32 refrigerant, which is included in the list of greenhouse gases (GWP 675) which are subject to the requirements in EU regulation n. 517/2014 called "F-GAS" (mandatory in the European zone). Among the provisions of this regulation, it sets forth that operators working on systems running with greenhouse gases be in possession of a certification, issued or acknowledged by the competent authorities, attesting that they have passed a test authorising them to perform this work. In particular

- Up to 3kg total refrigerant in the appliance: category 2 certification.
- 3 kg and more total refrigerant in the appliance: category 1 certification.

The gaseous form of R32 refrigerant is heavier than air and if released into the environment, most of it tends to concentrate in poorly ventilated areas. Inhaling it can cause dizziness and sensations of suffocation and can develop lethal gas if in contact with naked flames or hot objects (see the refrigerant's safety data sheet).

Pay attention to the fact that refrigerant fluids can be odourless.

For any operation on the heat pump system:

|   |  |
|---|--|
|  | <b>Wear the appropriate PPE (specifically gloves and goggles).</b>   |
|   | <b>Make sure that the workplace is well ventilated. Do not work in closed environments or ditches with little air circulation.</b>   |
|   | <b>Do not operate on the refrigerant in the vicinity of hot parts or naked flames.</b>   |
|   | <b>Do not release the refrigerant into the environment and pay special attention to accidental leakage from pipes and/or fittings even after having emptied the plant.</b> |
|   | <b>Make sure there is a fire extinguisher near the unit.</b>   |

## 4.2 PERSONAL SAFETY EQUIPMENTS

When operating and maintaining the units, please use the following personal protective equipment.

|   |  |
|---|--|
|  | <b>Protective clothing: Service man or who operates on the plant systems should wear protective clothing that does not leave parts of the body uncovered, as during maintenance it is possible to come into contact with hot or sharp surfaces. Avoid clothes that can become entangled or drawn in by air flows</b> |
|  | <b>Wear safety shoes with non-slip soles, especially in rooms with slippery floor.</b>   |
|  | <b>Gloves: Protection gloves should be used during maintenance or cleaning operations.</b>   |

|   |   |
|---|---|
|  | <p><b>Mask and goggles: Respiratory protection (mask) and eye protection (goggles) should be used during cleaning and maintenance operations.</b></p> |
|  |   |

### 4.3 SAFETY SYMBOLS

The safety signs indicated on the unit which should be respected:

|  |  |
|--|--|
|   | <p><b>General hazards.</b></p>                               |
|   | <p><b>Electric shock hazard.</b></p>                         |
|   | <p><b>Presence of moving organs.</b></p>                     |
|   | <p><b>Presence of surfaces that may cause injuries.</b></p>  |
|  | <p><b>Presence of hot surfaces that can cause burns.</b></p> |

## 4.4 REFRIGERANT SAFETY DATA SHEET

|   |  |
|---|--|
| <b>Name:</b>                                      | R410A (50% Difluoromethane (R32); 50% Pentafluoroethane (R125).  |
| <b>RISKS INDICATIONS</b>                          |  |
| <b>Major risks:</b>                               | Asphyxia   |
| <b>Specific risks:</b>                            | The rapid evaporation may cause freezing.  |
| <b>FIRST AID</b>                                  |  |
| <b>General information:</b>                       | Never give anything by mouth to an unconscious person.   |
| <b>Inhalation:</b>                                | Move to fresh air.<br>Oxygen or artificial respiration if necessary.<br>Do not administer adrenaline or similar drugs.   |
| <b>Eyes contact:</b>                              | Rinse carefully with water for at least 15 minutes and consult a doctor.   |
| <b>Contact with skin:</b>                         | Wash immediately with plenty of water.<br>Take off immediately the contaminated clothing.  |
| <b>FIRE PREVENTION</b>                            |  |
| <b>Extinguishing Media:</b>                       | Whatever.  |
| <b>Specific risks:</b>                            | Increasing in pressure.  |
| <b>Specific methods:</b>                          | Use water spray to cool containers.  |
| <b>ACCIDENTAL RELEASE ACTIONS</b>                 |  |
| <b>Personal precautions:</b>                      | Evacuate personnel to safe areas.<br>Provide adequate ventilation.<br>Use personal protective equipment.   |
| <b>Environmental precautions:</b>                 | Evaporate.   |
| <b>Cleaning method:</b>                           | Evaporate.   |
| <b>HANDLING AND STORAGE</b>                       |  |
| <b>Manipulation Action/technical precautions:</b> | Provide sufficient air exchange and/or suction in work places.   |
| <b>Recommendations for safe use:</b>              | Do not breathe vapors or aerosol.  |
| <b>Storage:</b>                                   | CClose tightly and store in a cool, dry and well ventilated place.<br>Store in original container. Incompatible products: explosive, flammable materials, Organic peroxide.  |
| <b>EXPOSURE CONTROL / PERSONAL PROTECTION</b>     |  |
| <b>Control parameters:</b>                        | AEL (8-h e 12-h TWA) = 1000 ml/m <sup>3</sup> for each of the two components.  |
| <b>Respiratory protection:</b>                    | For rescue and maintenance operation in storage tanks use self-contained respirator apparatus.<br>The vapors are heavier than air and can cause suffocation by reducing oxygen available for breathing.                        |
| <b>Eyes protection:</b>                           | Safety glasses.  |
| <b>Protection of hands:</b>                       | Rubber gloves.   |
| <b>Hygiene measures:</b>                          | Do not smoke.  |
| <b>PHYSICAL AND CHEMICAL PROPERTIES</b>           |  |
| <b>Color:</b>                                     | Colorless.   |
| <b>Odor:</b>                                      | Light.   |
| <b>Boiling point:</b>                             | -52.8°C at atmospheric pressure.   |
| <b>Lighting point:</b>                            | It does not ignite.  |
| <b>Density:</b>                                   | 1.08 kg/l at 25°C.   |
| <b>Solubility in water:</b>                       | Negligible.  |
| <b>STABILITY AND REACTIVITY</b>                   |  |
| <b>Stability:</b>                                 | No reactivity when used with the appropriate instructions.   |
| <b>Materials to avoid:</b>                        | Highly oxidizing materials. Incompatible with magnesium, zinc, sodium, potassium and aluminum.<br>The incompatibility is more serious if the metal is present in powdered form or if the surfaces were, recently, unprotected. |
| <b>Decomposition products</b>                     | These products are halogenated compounds, hydrogen fluoride, carbon oxides (CO, CO <sub>2</sub> ) and carbonyl halides   |
| <b>TOXICOLOGICAL INFORMATION</b>                  |  |
| <b>Acute toxicity:</b>                            | (R32) LC50/ inhalation /4 hours/on rat >760 ml/l<br>(R125) LC50/ inhalation /4 hours/on rat >3480 mg/l   |
| <b>Local effects:</b>                             | Concentrations substantially above the TLV may cause narcotic effects.<br>Inhalation of decomposed products of high concentrations may cause respiratory failure (pulmonary edema).  |
| <b>Long term toxicity:</b>                        | Did not show any carcinogenic potential, teratogenic or mutagenic effects in animal experiments.   |
| <b>ECOLOGICAL INFORMATION</b>                     |  |
| <b>Global Warming Potential GWP (R744=1):</b>     | 2088   |
| <b>Ozone Depletion Potential ODP (R11=1):</b>     | 0  |
| <b>Disposal considerations:</b>                   | Usable with reconditioning.  |

## 4.5 R410A GAS DISPOSAL

The procedures described below may only be performed by skilled technicians or qualified personnel:

- do not dispose of the gas in areas at risk of explosive mixtures forming with air. The gas should be disposed of in an appropriate torch with backfiring stop device. Contact the supplier should you require operating instructions.

## 5. INSTALLATION



**WARNING:** All the operation described below must be done by **QUALIFIED PERSONNEL ONLY**. Before any operation on the unit, make sure that power is disconnected. Also make sure that power cannot be accidentally switched back on until all the operations are over, by means of specific locks.

### 5.1 GENERALITY

When installing or servicing the unit, it is necessary to strictly follow the rules listed in this manual, to conform to all the specifications of the labels on the unit, and to take any possible precautions. Not observing the rules reported on this manual can create dangerous situations.



After receiving the unit, immediately check its integrity. The unit left the factory in perfect condition; any eventual damage has to be questioned to the carrier and recorded on the Delivery Note before signing it.

The company should be informed, within 8 days, of the extent of the damage. The Customer should prepare a written statement of any severe damage.



**WARNING:** The units are designed for outdoor installation. The outdoor ambient temperature shall not exceed 49°C. Above this value, the unit is no longer covered by the directives in force in the area of pressure equipment.



**WARNING:** The installation place must be without any fire risks. Therefore all the necessary measures should be adopted in order to prevent the risk of fire at the installation place. The appliance must not be placed near naked flames and ignition sources or heat sources.



**WARNING:** The unit should be installed so that adequate clearance is available for maintenance and repair. The warranty does not cover costs related to platforms or handling equipment necessary for any maintenance.



**WARNING:** The unit must be installed in a confined area, indicated by special signs and accessible only by qualified personnel.



**WARNING:** The unit must be installed far and not connected to any lightning towers or other objects/constructions that may attract discharge.



All maintenance and testing operations should be carried out only by **QUALIFIED PERSONNEL**.



Before any operation on the unit, make sure the power supply is disconnected.



Do not use equipment to speed up the defrost process or for cleaning except for those recommended by the manufacturer.



Do not perforate or burn.



**WARNING: MOVING PARTS, RISK OF DEATH.**  
Disconnect the power supply and ensure that the fan is stopped before opening the front panel.



The top part and discharge pipes of the compressor operate at high temperatures.



Be careful when working near condensing coils.  
The aluminum fins are very sharp and can cause serious injuries.



After the maintenance operations, tightly close the panels with the fastening screws.

## 5.2 TEMPERATURE LIMITS FOR TRANSPORT AND STORAGE

|  |        |
|--|--------|
| Transport/storage minimum temperature [°C] | -10 °C |
| Transport/storage maximum temperature [°C] | 49°C   |

## 5.3 LIFTING AND HANDLING

The handling must be performed by qualified personnel, properly equipped with appropriate tools to the weight and the encumbrance of the unit, in compliance with safety regulations of accident preventing.

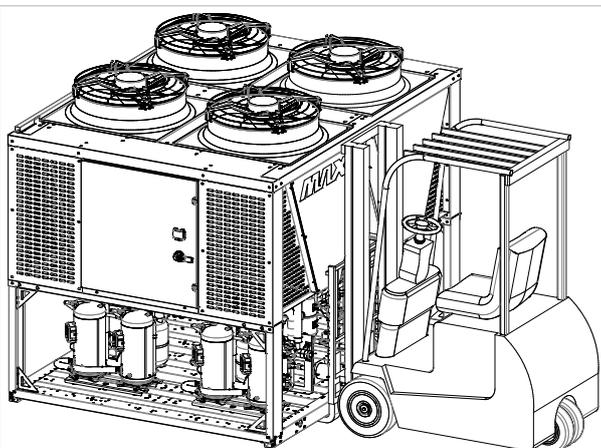
Hints:

1. Check the weight of the unit and the capacity of the lifting device.
2. check moving the unit there are no disconnected paths, ramps, steps, doors that could affect the movement and damage the unit;
3. make sure the unit stands while moving;
4. before moving the unit verify that the equipment is suitable for lifting and preserving the integrity of the unit
5. the center of gravity and the lifting point should be aligned.
6. perform lifting only by one of the listed procedures;
7. before beginning moving the unit make sure that it is in the state of stable equilibrium.

### 5.3.1 Lifting mode

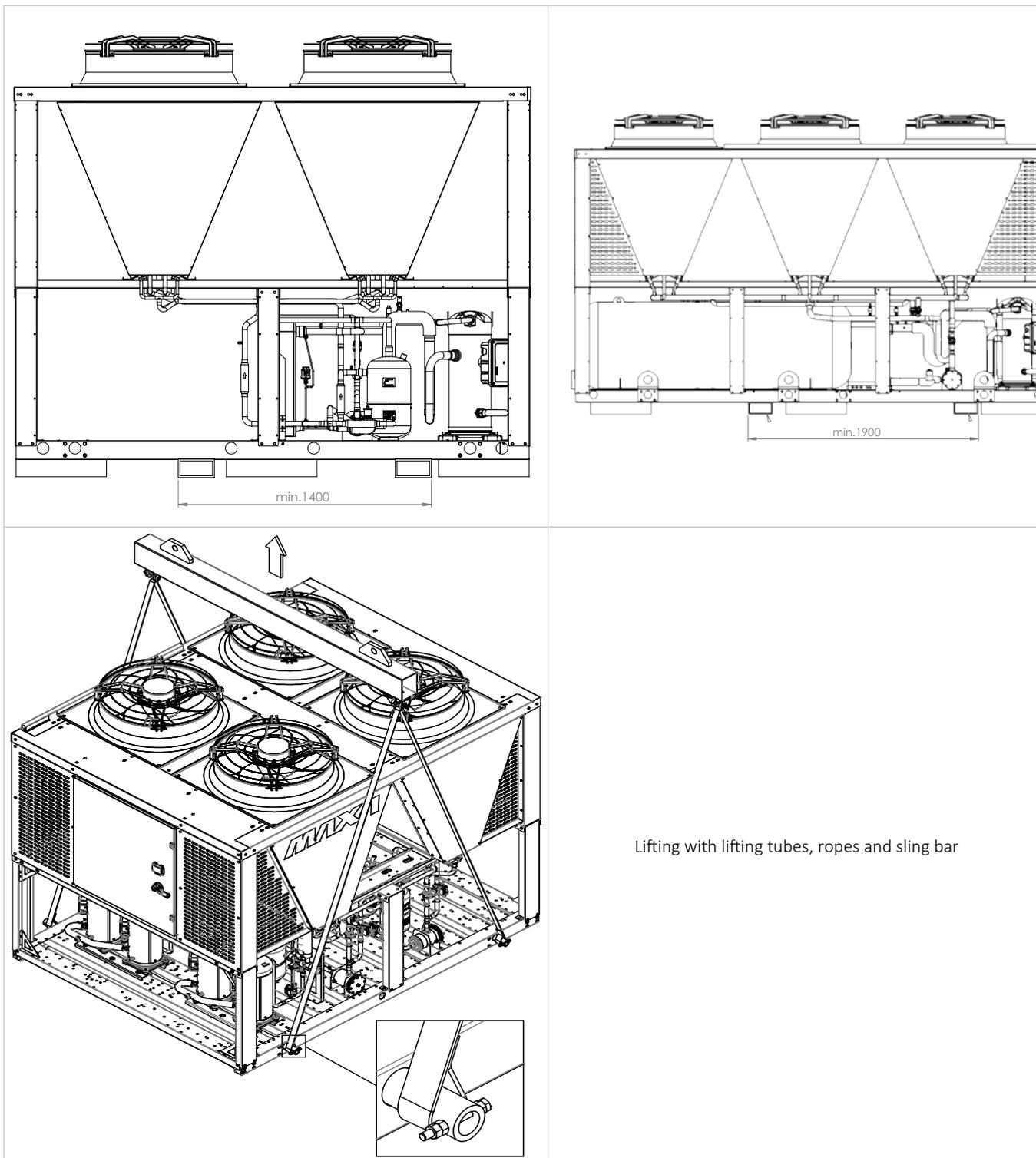
Following lifting moes are allowed:

- forklift
- thick lifting tubes according to EN 355 and EN 10297-1, thick lifting tubes according + ropes/chains;
- lifting slings (available as an accessory) + ropes/chains + sling bar. Bring gradually the lifting straps into tension and check their correct positioning.



Lifting with a forklift

Warning - to avoid damages to the unit, the fork of the forklift must have a minimum distance of :  
1400 mm for units with 2-4 fans,  
1900 mm for units with 3-6 fans



#### 5.4 POSITIONING AND MINIMUM TECHNICAL CLEARANCES

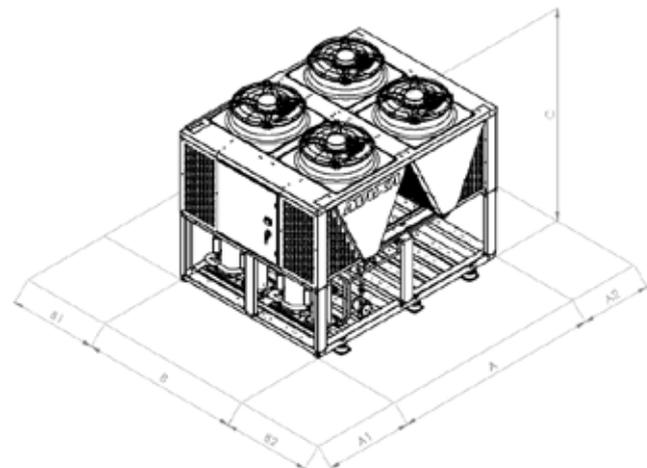
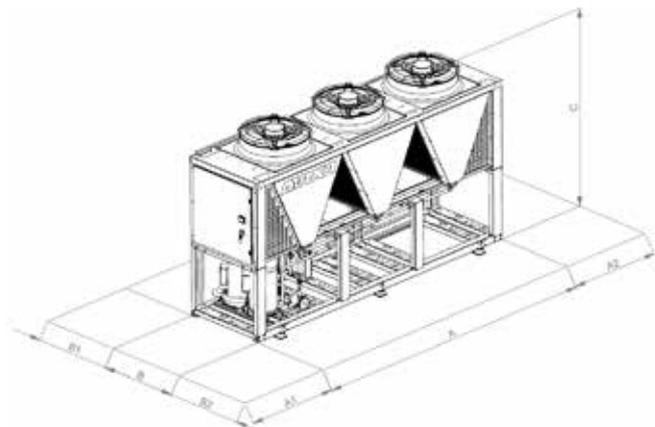
The models are all designed for outdoor installations. It is advisable to realize a supporting basement, with adequate size similar to unit footprint.

The unit vibration level is very low: it is advisable however, to fit a rigid rubber band between basement and unit base-frame.

- |  |  |
|--|--|
|  | <p>The support plane must have enough capacity to support the unit weight, which can be checked both on the technical label on the unit and on this technical manual under "Technical data" chapter.<br/>The support plane mustn't be inclined to ensure the unit works properly and avoid a possible overturning.<br/>The support plane mustn't be smooth, to avoid water/ice deposit as potential sources of danger.</p>   |
|  | <p>Unit installation place must be free from foliage, dust, etc., which could clog or cover the coil.<br/>Installation in areas subject to water stagnation or fall, for example from gutters, should be avoided.<br/>Also avoid areas subject to snow accumulation (such as corners of buildings with sloping roofs). In case of installation in areas subject to snowfall, place the unit on a base raised from the ground by 20-30 cm, so as to prevent the formation of snow accumulations around the machine.</p> |

 Installation of the unit under roofs of any kind, such as roofs, canopies and the like, should be avoided.

The re-circulation of the discharged air should be avoided; failure to observe this point will result in poor performance or activation of safety controls. For these reasons it is necessary to observe the following clearances:

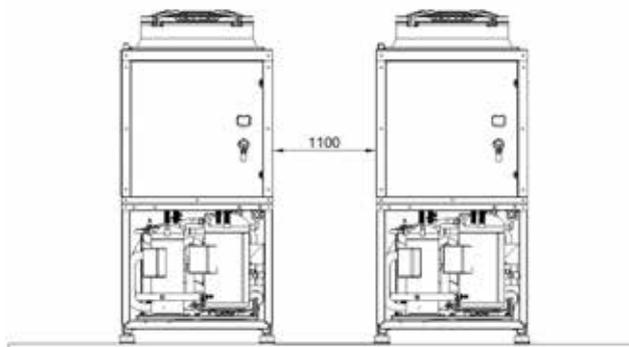


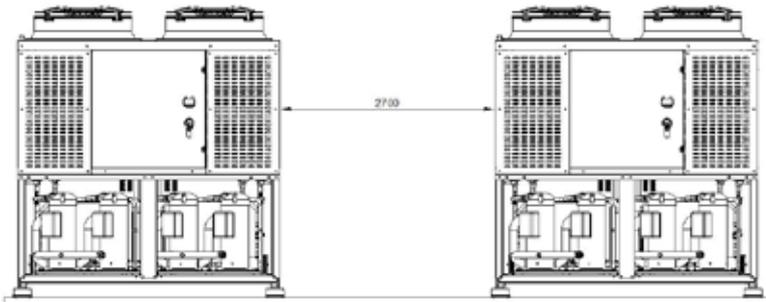
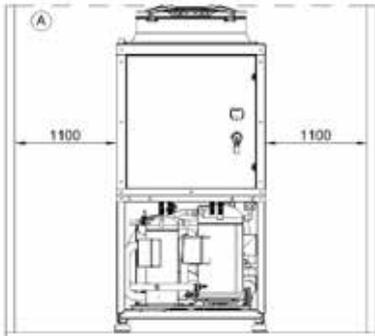
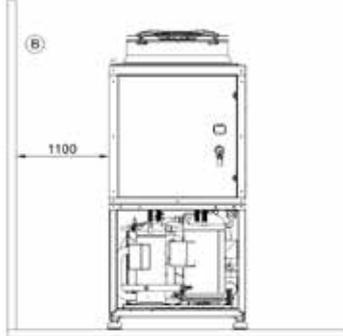
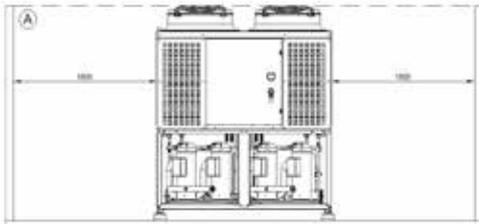
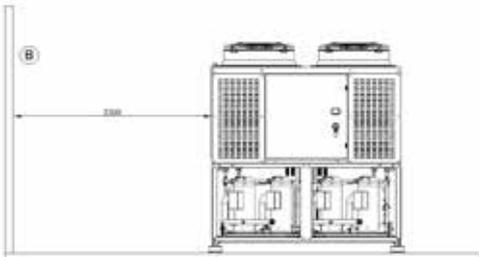
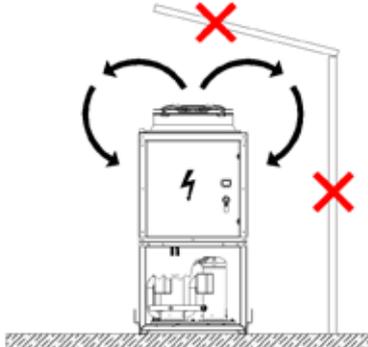
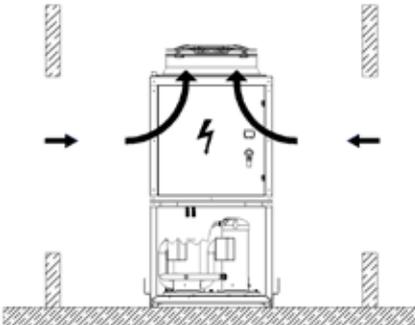
| Model    |    | A1   | A2  | B1   | B2   |
|----------|----|------|-----|------|------|
| HWA1-A   | mm | 1000 | 800 | 1000 | 1000 |
| HWA1-A/H | mm | 1000 | 800 | 1000 | 1000 |

 For strong wind installation place refer to the classification of the area according to the Beaufort table. If the value is > 7 (strong wind, average wind speed = 13,9-17,1 m/s) it is strictly necessary to keep the fan always powered, thus preventing involuntary rotation of the same.

In the case of two units installed in a free field, it is recommended to maintain a minimum distance between the units of

1100 mm for units with width 1100 mm:  
 HWA1-A 02106, 02120, 02128, 02140, 04155, 04177, 04184  
 HWA1-A/H 02109, 02121, 02142, 02148, 02160



|  |  |  |
|--|--|--|
| <p>2700 mm for units with width 2200 mm:<br/>                 HWA1-A 04209, 04239, 04258, 04305, 04349<br/>                 HWA1-A/H 04176, 04199, 04215, 04237, 04273, 04304, 04345</p>   |    |  |
| <p>Units with width 1100 mm:<br/>                 HWA1-A 02106, 02120, 02128, 02140, 04155, 04177, 04184<br/>                 HWA1-A/H 02109, 02121, 02142, 02148, 02160<br/>                 In the case of units surrounded by walls or obstacles of equal height (CASE A), the installation must take place at a distance of not less than 1100 mm on both sides while if the wall or single obstacle is greater than the height of the Height units (CASE B) use a minimum clearance of 1100 mm or contact MAXA sales technical support.</p>     |     |   |
| <p>Units with width 2200 mm:<br/>                 HWA1-A 04209, 04239, 04258, 04305, 04349<br/>                 HWA1-A/H 04176, 04199, 04215, 04237, 04273, 04304, 04345<br/>                 In the case of units surrounded by walls or obstacles of equal height (CASE A), the installation must be carried out at a distance of not less than 1800 mm on both sides while if the wall or single obstacle is greater than the height of the Height units (CASE B) use a minimum clearance of 2300 mm or contact MAXA sales technical support.</p> |    |  |
| <p>Any covering over the unit or locating near trees (even if they partially cover the unit) should be avoided in order to allow the air recirculation.</p>  |  |  |
| <p>In the event of winds stronger than 13,9-17,1 m/s (strong wind according to the beaufort scale) the use of wind barriers is recommended.</p>  |  |  |

Please always carry out an environmental impact assessment based on the power and sound pressure data provided in Technical data chapter and the sound emission limits based on the unit's installation area, with reference to Italian DPCM (Prime Minister's Decree) of 14/11/1997. An assessment must also be made if the unit is installed close to workers, according to Italian Legislative Decree 81/2008 Art. 189 and subsequent amendments.

## 5.5 DIMENSIONS

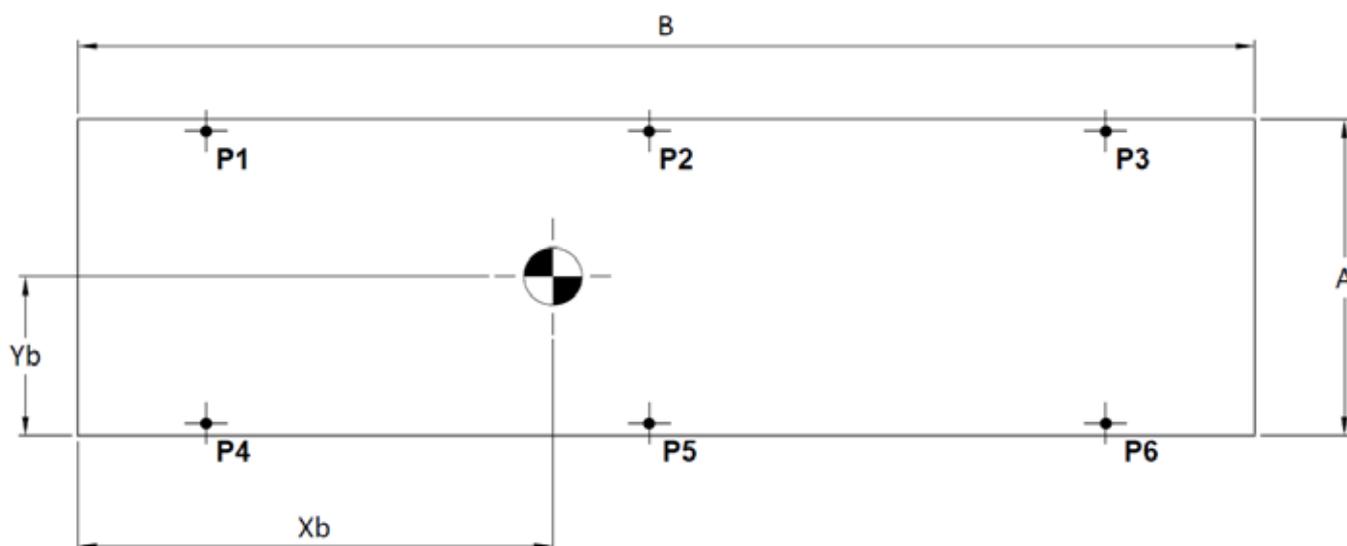
The dimensions of the standard and super silent (SSL) versions are reported in the below tables.

| Model HWA1-A | Length A [mm] | Width B [mm] | Height C [mm] | Height [mm] Versions "SSL" and "C" | Max Height Packing [mm] | Max Height Versions "SSL" or "C" Packing [mm] |
|--------------|---------------|--------------|---------------|------------------------------------|-------------------------|---|
| 02106        | 2860          | 1100         | 2350          | 2415                               | 2430                    | 2495  |
| 02120        | 2860          | 1100         | 2350          | 2415                               | 2430                    | 2495  |
| 02128        | 2860          | 1100         | 2350          | 2415                               | 2430                    | 2495  |
| 02140        | 4060          | 1100         | 2350          | 2415                               | 2430                    | 2495  |
| 04155        | 4060          | 1100         | 2350          | 2415                               | 2430                    | 2495  |
| 04177        | 4060          | 1100         | 2350          | 2415                               | 2430                    | 2495  |
| 04184        | 4060          | 1100         | 2350          | 2415                               | 2430                    | 2495  |
| 04209        | 2860          | 2200         | 2350          | 2415                               | 2430                    | 2495  |
| 04239        | 2860          | 2200         | 2350          | 2415                               | 2430                    | 2495  |
| 04258        | 2860          | 2200         | 2350          | 2415                               | 2430                    | 2495  |
| 04305        | 4060          | 2200         | 2350          | 2415                               | 2430                    | 2495  |
| 04349        | 4060          | 2200         | 2350          | 2415                               | 2430                    | 2495  |

| Modello HWA1-A/H | Length A [mm] | Width B [mm] | Height C [mm] | Height [mm] Versions "SSL" and "C" | Max Height Packing [mm] | Max Height Versions "SSL" or "C" Packing [mm] |
|------------------|---------------|--------------|---------------|------------------------------------|-------------------------|---|
| 02109            | 2860          | 1100         | 2350          | 2415                               | 2430                    | 2495  |
| 02121            | 2860          | 1100         | 2350          | 2415                               | 2430                    | 2495  |
| 02142            | 4060          | 1100         | 2350          | 2415                               | 2430                    | 2495  |
| 02148            | 4060          | 1100         | 2350          | 2415                               | 2430                    | 2495  |
| 02160            | 4060          | 1100         | 2350          | 2415                               | 2430                    | 2495  |
| 04176            | 2860          | 2200         | 2350          | 2415                               | 2430                    | 2495  |
| 04199            | 2860          | 2200         | 2350          | 2415                               | 2430                    | 2495  |
| 04215            | 2860          | 2200         | 2350          | 2415                               | 2430                    | 2495  |
| 04237            | 2860          | 2200         | 2350          | 2415                               | 2430                    | 2495  |
| 04273            | 4060          | 2200         | 2350          | 2415                               | 2430                    | 2495  |
| 04304            | 4060          | 2200         | 2350          | 2415                               | 2430                    | 2495  |
| 04345            | 4060          | 2200         | 2350          | 2415                               | 2430                    | 2495  |

## 5.6 BARYCENTRE AND DAMPERS LOCATION

In the following tables, we report the position of the barycentre of each machine, with reference to the dimensions shown in the image. It's important to distinguish between the standard version and the complete hydraulic circuit with double pump and tank version.



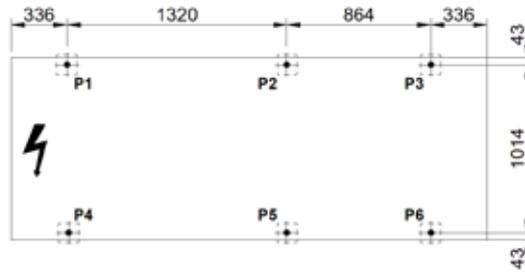
| Model HWA1-A | Version  | Shipping weight [kg] | Operating weight [kg] | A [mm] | B [mm] | Xb [mm] | Yb [mm] |
|--------------|----------|----------------------|-----------------------|--------|--------|---------|---------|
| 02106        | Standard | 1080                 | 1090                  | 1100   | 2860   | 1070    | 575     |
|              | /PDAP/SI | 1310                 | 1710                  |        |        | 1418    | 587     |

| Model HWA1-A | Version  | Shipping weight [kg] | Operating weight [kg] | A [mm] | B [mm] | Xb [mm] | Yb [mm] |
|--------------|----------|----------------------|-----------------------|--------|--------|---------|---------|
| 02120        | Standard | 1080                 | 1090                  | 1100   | 2860   | 1069    | 576     |
|              | /PDAP/SI | 1360                 | 1760                  |        |        | 1409    | 583     |
| 02128        | Standard | 1090                 | 1100                  | 1100   | 2860   | 1105    | 562     |
|              | /PDAP/SI | 1360                 | 1760                  |        |        | 1422    | 577     |
| 02140        | Standard | 1510                 | 1520                  | 1100   | 4060   | 1617    | 555     |
|              | /PDAP/SI | 1870                 | 2590                  |        |        | 2064    | 581     |
| 04155        | Standard | 1620                 | 1630                  | 1100   | 4060   | 1670    | 541     |
|              | /PDAP/SI | 1920                 | 2350                  |        |        | 2046    | 516     |
| 04177        | Standard | 1620                 | 1630                  | 1100   | 4060   | 1667    | 531     |
|              | /PDAP/SI | 1930                 | 2360                  |        |        | 2036    | 514     |
| 04184        | Standard | 1620                 | 1630                  | 1100   | 4060   | 1667    | 531     |
|              | /PDAP/SI | 1930                 | 2360                  |        |        | 2036    | 514     |
| 04209        | Standard | 1950                 | 1960                  | 2200   | 2860   | 1128    | 1119    |
|              | /PDAP/SI | 2230                 | 2760                  |        |        | 1391    | 1177    |
| 04239        | Standard | 1960                 | 1970                  | 2200   | 2860   | 1151    | 1118    |
|              | /PDAP/SI | 2300                 | 2840                  |        |        | 1386    | 1168    |
| 04258        | Standard | 1960                 | 1980                  | 2200   | 2860   | 1148    | 1102    |
|              | /PDAP/SI | 2310                 | 2840                  |        |        | 1402    | 1165    |
| 04305        | Standard | 2670                 | 2690                  | 2200   | 4060   | 1538    | 1096    |
|              | /PDAP/SI | 3140                 | 3870                  |        |        | 1991    | 1203    |
| 04349        | Standard | 2850                 | 2870                  | 2200   | 4060   | 1465    | 1106    |
|              | /PDAP/SI | 3400                 | 4120                  |        |        | 1949    | 1195    |

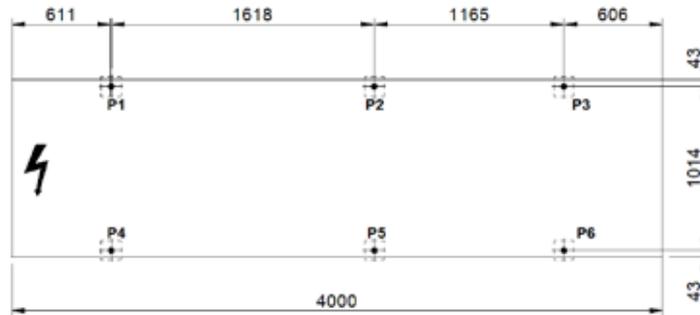
| Model HWA1-A/H | Version  | Shipping weight [kg] | Operating weight [kg] | A [mm] | B [mm] | Xb [mm] | Yb [mm] |
|----------------|----------|----------------------|-----------------------|--------|--------|---------|---------|
| 02109          | Standard | 1180                 | 1190                  | 1100   | 2860   | 968     | 571     |
|                | /PDAP/SI | 1410                 | 1810                  |        |        | 1386    | 584     |
| 02121          | Standard | 1210                 | 1220                  | 1100   | 2860   | 1090    | 529     |
|                | /PDAP/SI | 1440                 | 1840                  |        |        | 1378    | 538     |
| 02142          | Standard | 1470                 | 1480                  | 1100   | 4060   | 1621    | 544     |
|                | /PDAP/SI | 1770                 | 2480                  |        |        | 2101    | 582     |
| 02148          | Standard | 1530                 | 1540                  | 1100   | 4060   | 1641    | 544     |
|                | /PDAP/SI | 1880                 | 2600                  |        |        | 2068    | 573     |
| 02160          | Standard | 1530                 | 1540                  | 1100   | 4060   | 1639    | 553     |
|                | /PDAP/SI | 1890                 | 2600                  |        |        | 1701    | 566     |
| 04176          | Standard | 2030                 | 2040                  | 2200   | 2860   | 1203    | 1121    |
|                | /PDAP/SI | 2380                 | 2910                  |        |        | 1324    | 1136    |
| 04199          | Standard | 2060                 | 2070                  | 2200   | 2860   | 1200    | 1046    |
|                | /PDAP/SI | 2370                 | 2900                  |        |        | 1451    | 1171    |
| 04215          | Standard | 2100                 | 2110                  | 2200   | 2860   | 1185    | 1095    |
|                | /PDAP/SI | 2440                 | 2970                  |        |        | 1426    | 1201    |
| 04237          | Standard | 2130                 | 2140                  | 2200   | 2860   | 1180    | 1105    |
|                | /PDAP/SI | 2460                 | 3000                  |        |        | 1293    | 1120    |
| 04273          | Standard | 2680                 | 2700                  | 2200   | 4060   | 1694    | 1096    |
|                | /PDAP/SI | 3190                 | 3910                  |        |        | 1812    | 1115    |
| 04304          | Standard | 2880                 | 2900                  | 2200   | 4060   | 1559    | 1138    |
|                | /PDAP/SI | 3360                 | 4090                  |        |        | 1974    | 1233    |
| 04345          | Standard | 2900                 | 2930                  | 2200   | 4060   | 1605    | 1069    |
|                | /PDAP/SI | 3450                 | 4180                  |        |        | 1776    | 1105    |

The ideal installation positions of the dampers for each type of machine are shown in the below images.

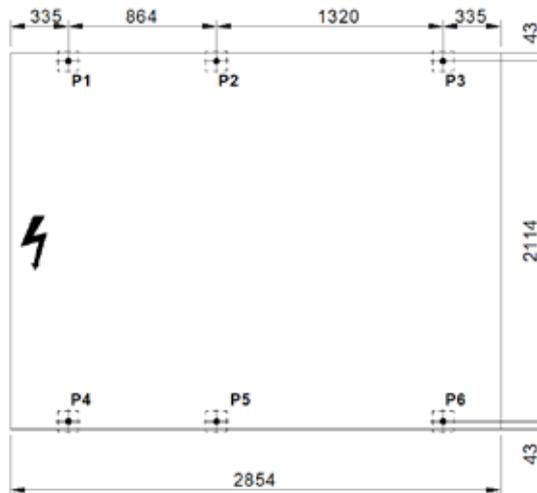
2 fans units: HWA1-A/H 02109, 02121, HWA1-A 02106, 02120, 02128



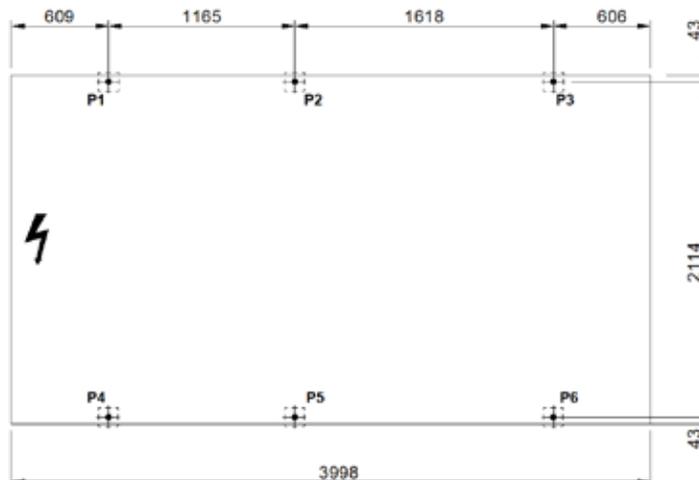
3 fans units: HWA1-A/H 02142, 02148, 02160, HWA1-A 02140, 04155, 04177, 04184



4 fans units: HWA1-A/H 04176, 04199, 04215, 04237, HWA1-A 04209, 04239, 04258



6 fans units: HWA1-A/H 04273, 04304, 04345, HWA1-A 04305, 04349



### 5.7 HYDRAULIC CONNECTIONS

The hydraulic connections have to be installed in accordance with national and/or local regulations; the pipes can be made up of steel. The pipes have to be accurately sized as a function on the nominal water flow of the unit and on the hydraulic pressure drops of the hydraulic circuit. All the hydraulic connections must be insulated with closed-cell material with a proper thickness. The chiller should be connected to piping using grooved joints. It's recommended to install in the hydraulic circuit the following components:

- Hole's thermometers for the hydraulic circuit's temperature measurement.
- Manual gate valves to intercept the unit from the hydraulic circuit.
- Y-shaped metallic filter and dirt separator (mounted on the return pipe from the plant circuit) with a metallic mesh not higher than 1mm. (obligatory to maintain the validity of the guarantee).
- Loading group and discharge valve, where it's required.

|  |  |
|--|--|
|  | <b>WARNING:</b> Make sure that, when determining the pipe sizes you should exceed the maximum head loss on the plant side, please refer to the technical data given in the relative table.(see useful head).   |
|  | <b>WARNING:</b> check, at start-up, the absence of leakage at the junction points between the pipes, possibly caused by gasket break / misalignment / non-tightening<br>In this regard, in the technical buletin are reported the recommended tightening torques.  |
|  | <b>WARNING:</b> create a suitable drain for safety valve.  |
|  | <b>WARNING:</b> An air vent valve should always be installed at high point of the system.  |
|  | <b>WARNING:</b> In the models of the series without storage tank, the integrated expansion vessel is not included on the plant side. The real capacity of the plant circuit should be verified by the installer for providing an expansion tank with adequate volume.  |
|  | <b>WARNING:</b> The return pipe from the plant circuit should be in correspondence with the label: "WATER INLET", otherwise the evaporator may freeze.   |
|  | <b>WARNING:</b> It is required to install a metallic filter with mesh not larger than 1mm and a dirt separator on the return pipe from the plant circuit with label "WATER INLET". The warranty will no longer be valid if the metallic filter or dirt separator are not installed. The filter and the dirt separator should be kept clean, so make sure that is clean after the installation of unit, and then check it periodically. |
|  | <b>WARNING:</b> All the units are standard supplied with a factory-mounted differential pressure switch. Should the differential pressure switch be altered, removed, the warranty will no longer be valid. Please refer to the wiring diagram for the differential pressure switch electric connections. Never jumper connections of the differential pressure switch in the terminal block.  |



The heating system and the safety valves must comply with the requirements of standard EN 12828.

### 5.7.1 Characteristics of water of the plant circuit

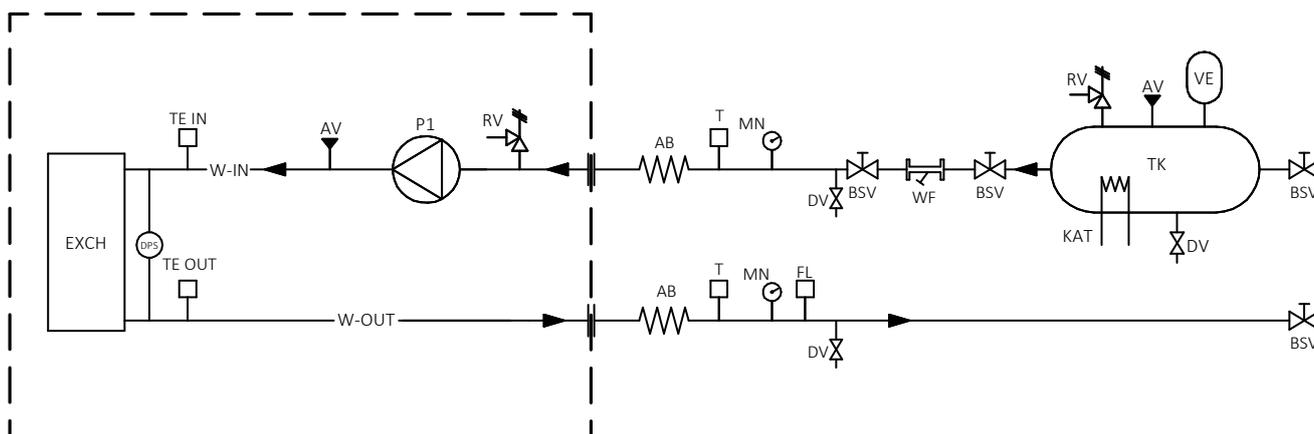
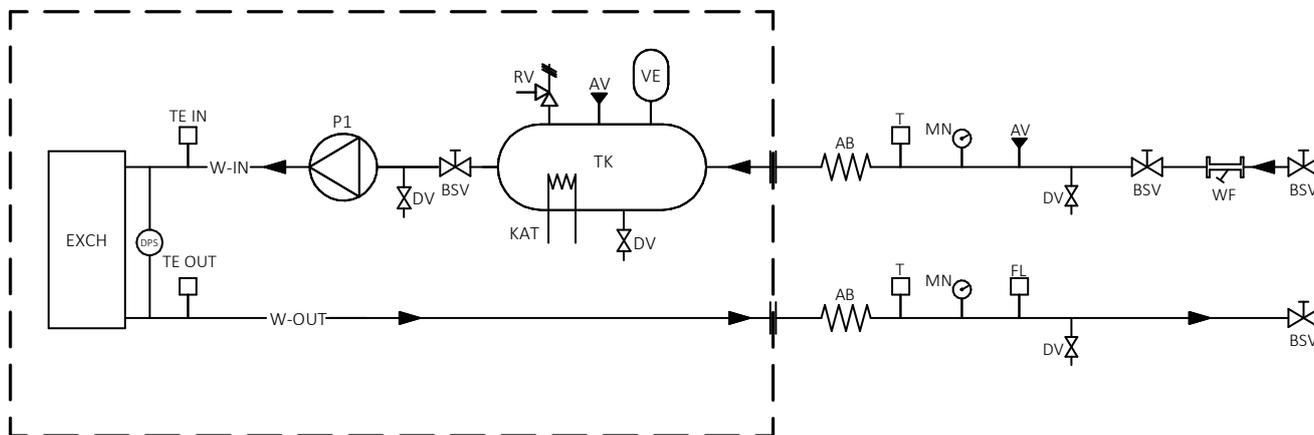
To ensure the correct operation of the unit, the water should be adequately filtered (see what is reported at the beginning of this paragraph) and that the amounts of dissolved substances should be minimal. The maximum permitted values are given here below.

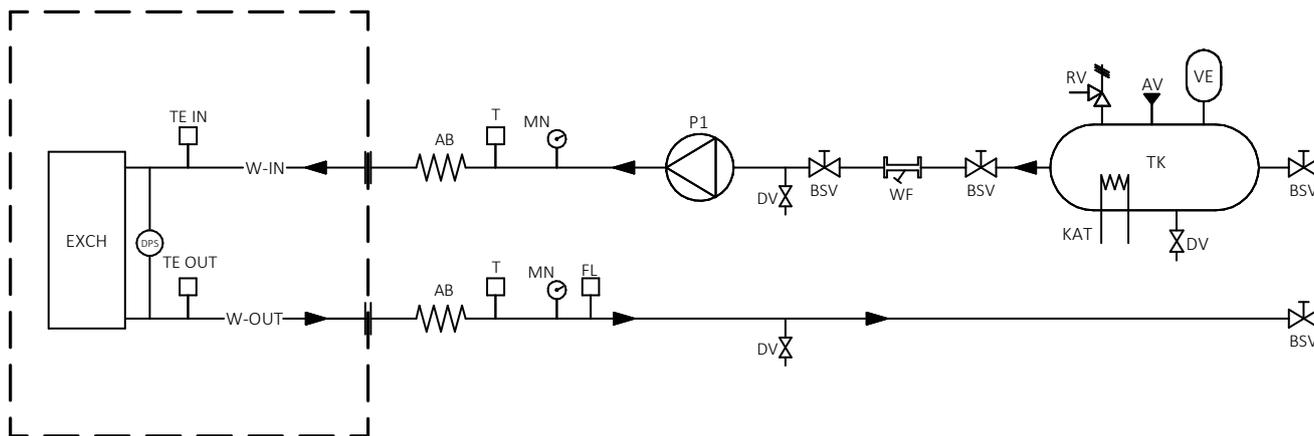
| CARATTERISTICHE CHIMICO-FISICHE MASSIME CONSENTITE PER L'ACQUA DI IMPIANTO |                      |
|--|----------------------|
| PH   | 7,5 - 9              |
| Electrical conductivity  | 100 - 500 $\mu$ S/cm |
| Total hardness   | 4,5 – 8,5 dH         |
| Temperature  | < 65°C               |
| Oxygen content   | < 0,1 ppm            |
| Maximum glycol content   | 50 %*                |
| Phosphates (PO4)   | < 2ppm               |
| Manganese (Mn)   | < 0,05 ppm           |
| Iron (Fe)  | < 0,3 ppm            |
| Alkalinity (HCO3)  | 70 – 300 ppm         |
| Chloride ions (Cl-)  | < 50 ppm             |
| Sulfate ions (SO4)   | < 50 ppm             |
| Sulfide ion (S)  | None                 |
| Ammonium ions (NH4)  | None                 |
| Silica (SiO2)  | < 30 ppm             |

\* For unit with hydronic kit keep attention to max. glycol content in the plant: if it is over 40% use TE1 accessory (special pump gasket seal for glycol concentration over 40%).

### 5.7.2 Hydraulic diagram inside the unit

Herein below the hydraulic diagrams for connection to the unit, are respectively for units equipped with PS/SI hydronic kit (pump and tank), units equipped with PS kit (single pump) and unit without hydronic kit.





| Legenda |                               |        |                                |
|---------|-------------------------------|--------|--------------------------------|
| EXCH    | Plate heat exchanger          | TK     | Storage tank                   |
| DPS     | Differential pressure switch  | AV     | Air vent valve                 |
| T       | Temperature sensor            | VE     | Expansion vessel               |
| P1      | Pump                          | MN     | Manometer                      |
| DV      | Discharge valve               | FL     | Flow switch                    |
| BSV     | Shut-off valve                | WF     | Water filter                   |
| RV      | Relief valve                  | W-IN   | User's water inlet             |
| KAT     | Tank's electric heater        | W-OUT  | User's water outlet            |
| TE IN   | Plant inlet temperature probe | TE OUT | Plant outlet temperature probe |
| AB      | Dampers                       |        |                                |

In each unit equipped with a hydronic kit with tank (PS/SI, PSAP/SI, PD/SI, PDAP/SI configurations), the expansion vessel and safety valve are included. The expansion vessel is single or double depending on the size of the unit. The main features are indicated below:

- diaphragm resistant to peaks of 130°C;
- pre-charge pressure 2.5 bar;
- glycol percentage up to 100%;
- maximum pressure 10 bar.

| HWA1-A                      | 02106 | 02120 | 02128 | 02140 | 04155 | 04177 | 04184 | 04209 | 04239 | 04258 | 04305 | 04349 |
|-----------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Number of expansion vessels | 1     | 1     | 1     | 2     | 1     | 1     | 1     | 1     | 1     | 1     | 2     | 2     |
| Expansion vessel volume [l] | 25    |       |       |       |       |       |       |       |       |       |       |       |

| HWA1-A/H                    | 02109 | 02121 | 02142 | 02148 | 02160 | 04176 | 04199 | 04215 | 04237 | 04273 | 04304 | 04345 |
|-----------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Number of expansion vessels | 1     | 1     | 2     | 2     | 2     | 1     | 1     | 1     | 1     | 2     | 2     | 2     |
| Expansion vessel volume [l] | 25    |       |       |       |       |       |       |       |       |       |       |       |

In each unit equipped with a hydronic kit without tank (PS, PSAP, PD, PDAP configurations), a safety valve with 6 bar opening pressure is included all the same.

### 5.7.3 Drainage system

The condensate draining which can leach from the pipes of hydraulic and refrigerant circuits, and, for heat pump version, the generated water during defrosting cycles, is free to fall on the support plan of the unit, because of the absence of a containment base. For this reason water is discharged directly to the ground.

**FOR THE HEAT PUMP UNITS, ESPECIALLY IN VERY COLD CLIMATE REGIONS, IT'S RECOMMENDED TO INSTALL ELEVATION SUPPORTS IN ORDER TO ALLOW ICE FORMATION UNDER THE UNIT WITHOUT DAMAGING IT BY FREEZING.**

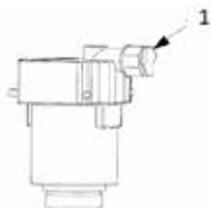


**WARNING: water (possible ice in winter) could settle on the basis of the supporting structure and around the unit, resulting in a slip/fall hazard.**

### 5.7.4 Plant circuit loading/unloading

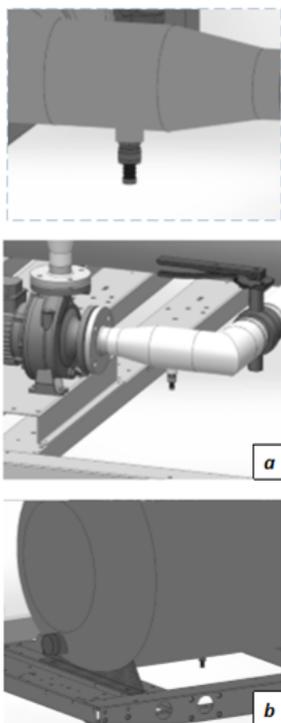


- WARNING:** Verify all the charging/topping up operations.
- WARNING:** Before beginning the charging/topping up operation of the plant circuit, disconnect the unit from the electric power supply.
- WARNING:** The charging/topping up of the plant circuit must always be done under controlled conditions of pressure (1-3 bar). Make sure that you have installed on the line of charging/topping up a pressure reducer and a relief valve.
- WARNING:** The water on the charging/topping up pipe must be suitably pre-filtered from any impurities and suspended particles. Make sure that you have installed a cartridge filter removable and a dirt separator.
- WARNING:** regularly check and vent the air built up in the system.



During the operations of charging/topping up, the plugs of the air vent valves must be partially unscrewed to allow air to flow freely out of the valves.

(1) Plug of the air vent valve



You can use the service valve, when it is necessary to refill the plant or adapt the concentration of glycol. Unscrew the plug (cap) of the service valve and connect to the hose a pipe of 14 mm (inner diameter) connected to the water network, and then fill the system by unscrewing the knurled nut. When the operation is concluded, retighten the knurled nut and screw on the plug. In any case, we recommend you to use for the water loading of the plant an external tap whose arrangement is by the installer.

This valve has a different location depending on the hydronic kit:

Absence of hydronic kit - tap not present;

Hydronic kit with single/double pump — valve along the intake section of the pump (picture a);

Hydronic kit with single/double pump + tank — valve under the tank (picture b).

To perform one of the aforementioned operations, unscrew the tap of the service valve and connect a 14 mm tube (internal diameter) connected to the water supply to the hose connector, then load the system by unscrewing the appropriate ring nut. After the operation, retighten the ring nut and screw the cap back on. In any case, it is recommended to use an external tap to load the system, the preparation of which is the responsibility of the installer.

When it is required to top up the circuit or to adapt the glycol level, please use the service valve. Unscrew and remove the cap from the service valve (A) and connect a 14 or 12 mm pipe (inside diameter - check the valve model installed on your unit), connected to the water mains, to the hose connector and then drain the circuit by unscrewing the specific ring nut (B). After the end of the operation, retighten the ring nut (B) and screw the cap back on (A). In any case it is recommended to use an external valve to fill the system which can be set up by the installer.



When it is necessary to unload the plant, close at first the inlet and outlet manual gate valves (not supplied) and then remove the pipes that are disposed externally on the water inlet and on the water outlet in order to spill away the liquid contained in the unit (in order to make easy the operation, it is recommended to install externally two draining valves, on the water inlet and on the water outlet, between the unit and the manual gate valves).

### 5.7.5 Air vent valve

The unit is fitted with an air venting valve to automatically remove air that has built up in the circuit, preventing undesirable effects such as premature corrosion and wear, lower performance and low exchange output. The device also features a safety function because, in the event of exchanger breakdown, it allows the refrigerant gas to escape outside, preventing it from being conveyed to the internal terminals. The valve can be kept in a closed position by closing the plug on the drain; by loosening the plug, the valve remains in open position and air is discharged automatically.



### 5.7.6 Flow rate and minimum volume of water

The design flow rate must be in accordance with the values reported in the tables of chapter 11 TECHNICAL DATA and guaranteed with variable plant conditions. The previous chapter also reports the minimum water content, which should be respected in order to prevent the continuous compressors' switching on and off.

### 5.7.7 Risk of frost

In case external temperatures close to 0°C, preventive measures should be taken to avoid freezing of the water in the plant circuit. It is possible to mix the water with glycol, use heating cables under the insulation in order to protect the pipes or discharge the water from the plant circuit in case of long stops.

If glycol is added, it is important to ensure that it is not corrosive and is compatible with the components of the hydraulic circuit. In the presence of glycol-water mixtures the performance of the units differs from those declared and must be reviewed using appropriate corrective factors depending on the amount of the added glycol. These coefficients are reported in the Technical Bulletin of the series in question.

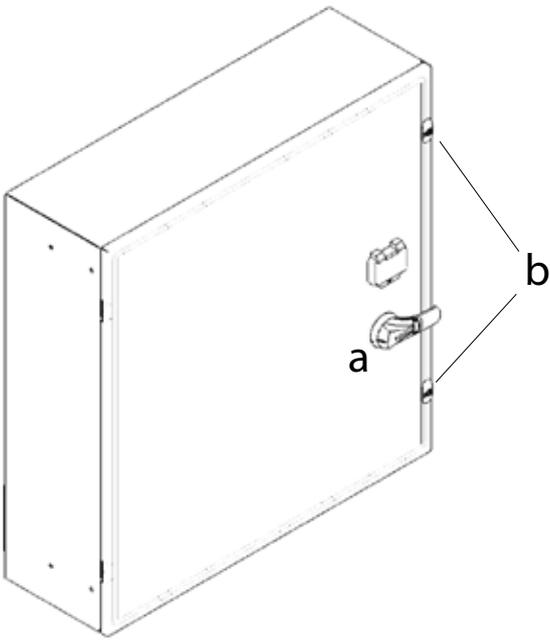
## 5.8 ELECTRICAL CONNECTIONS

Check that the power supply matches the unit's electric nominal data (voltage, phases, frequency) displayed on the rating plate on the unit's side panel. The electric power connections must be made in accordance to the wiring diagram enclosed with the unit and in conformity with national and international standards (providing general circuit breaker, residual current devices for each line, proper earthing of the plant, etc.).

|  |   |
|--|---|
|  | <b>WARNING: Before starting any operation, make sure that the power supply is disconnected.</b>   |
|  | <b>WARNING: Respect the minimum clearances to perform wiring.</b>   |
|  | <b>WARNING: The installer is responsible for the disconnection system (e.g. general circuit breaker) upstream of the electrical connections of the unit.</b>  |
|  | <b>WARNING: The supply voltage's fluctuations cannot exceed ±10% of the nominal value. If this tolerance should not be respected, please contact our technical department. The power supply must comply with the limits mentioned, otherwise the warranty will expire immediately.</b>  |
|  | <b>WARNING: If the supply cable is damaged, it must be replaced by qualified personnel, in order to prevent any risk.</b>   |
|  | <b>WARNING: Any devices placed nearby can cause / suffer electromagnetic disturbances to / from the unit. Be aware of this risk at the installation site. It is recommended to electrically power the unit with an adequate line and protections and use an independent cable duct.</b> |
|  | <b>WARNING: The remote control panel is connected to the chiller by 4 cables with a cross-section of 1.5 mm<sup>2</sup>. The power cables must be separate from the remote control cables. Maximum distance 50 metres.</b>  |
|  | <b>WARNING: remote control panel cannot be installed in an area with strong vibrations, corrosive gases, excess dirt or high humidity. Vacate the area near cooling.</b>  |

### 5.8.1 Access to electrical panel

The steps for getting access to the electrical panel are detailed below:

|   |   |  |
|---|---|--|
| <ol style="list-style-type: none"> <li>1. Turn the disconnecter switch to break the voltage</li> <li>2. Use a special key to unlock the door closures.</li> </ol>   |   |  |
| <p><b>The above-mentioned operations must be carried out with the machine off and power disconnected (by means of the specific disconnecter applied by the installer). Operations carried out by qualified personnel.</b></p> |   |  |
| <p><b>Remove the cover without taking off the fairlead support plate.</b></p>   |   |  |
|    | <p>a = Disconnecter knob<br/>b = Door closures</p>  |  |
|   | <p><b>At the end of the work, close all the removed covers using the proper provided screws and with the gaskets (if provided).</b></p> |  |

### 5.8.2 Power supply

|   |  |
|---|--|
|  | <p><b>The electrical wiring to the terminal blocks has to be done only by qualified personnel.</b></p>   |
|  | <p><b>Make sure to install an adequate ground connection, incomplete grounding can cause electric shock. The manufacturer cannot be held responsible for any damage caused by failure or ineffective earthing.</b></p> |

The power cables, electrical protections and line fuses must be sized in accordance with what is reported in the unit's wiring diagram and in the electrical data contained in the technical characteristics table.

Use a dedicated power line, do not power the appliance through a line to which other users are connected. Fasten the power cables securely and make sure they do not come into contact with sharp corners. Use double insulated cables with copper wires.

The ground connection must be carried out first during the connection phase, vice versa it must be removed last when the unit is disconnected. In the event of any loosening of the power cable, it must be ensured that the tension of the active conductors takes place before that of the ground wire.

A main switch or a disconnection device with adequate breaking capacity must be installed on the power supply line, which has a separation of the contacts in all the poles. The differential protection switch must be compatible with inverter appliances, it is recommended to install a type B differential switch, the installation of a different type switch could give rise to untimely trips.

The following table shows the recommended cable sections for a maximum length of 30 m. In any case, depending on type of installation, the location and the length of the cables (be it less than or greater than 30 m), the electrical system designer will make an appropriate choice.

| Power supply | Model        | Recommended cable section (max length 30 m) | Recommended tightening torque on main disconnecter [Nm] |
|--------------|--------------|---|---|
| 400V / 3ph   | HWA1-A 02106 | 5x16  | 20  |
| 400V / 3ph   | HWA1-A 02120 | 5x16  | 20  |

| Power supply | Model          | Recommended cable section<br>(max length 30 m) | Recommended tightening torque<br>on main disconnector [Nm] |
|--------------|----------------|--|--|
| 400V / 3ph   | HWA1-A 02128   | 5x16   | 20   |
| 400V / 3ph   | HWA1-A 02140   | 5x25   | 20   |
| 400V / 3ph   | HWA1-A 04155   | 5x25   | 20   |
| 400V / 3ph   | HWA1-A 04177   | 3x35+2x25                                      | 20   |
| 400V / 3ph   | HWA1-A 04184   | 3x35+2x25                                      | 20   |
| 400V / 3ph   | HWA1-A 04209   | 3x35+2x25                                      | 20   |
| 400V / 3ph   | HWA1-A 04239   | 3x50+2x25                                      | 20   |
| 400V / 3ph   | HWA1-A 04258   | 3x50+2x25                                      | 20   |
| 400V / 3ph   | HWA1-A 04305   | 3x70+2x35                                      | 20   |
| 400V / 3ph   | HWA1-A 04349   | 3x95+2x50                                      | 20   |
| 400V / 3ph   | HWA1-A/H 02109 | 5x16   | 20   |
| 400V / 3ph   | HWA1-A/H 02121 | 5x16   | 20   |
| 400V / 3ph   | HWA1-A/H 02142 | 5x16   | 20   |
| 400V / 3ph   | HWA1-A/H 02148 | 5x25   | 20   |
| 400V / 3ph   | HWA1-A/H 02160 | 5x25   | 20   |
| 400V / 3ph   | HWA1-A/H 04176 | 3x35+2x25                                      | 20   |
| 400V / 3ph   | HWA1-A/H 04199 | 3x35+2x25                                      | 20   |
| 400V / 3ph   | HWA1-A/H 04215 | 3x35+2x25                                      | 20   |
| 400V / 3ph   | HWA1-A/H 04237 | 3x50+2x25                                      | 20   |
| 400V / 3ph   | HWA1-A/H 04273 | 3x50+2x25                                      | 20   |
| 400V / 3ph   | HWA1-A/H 04304 | 3x70+2x35                                      | 20   |
| 400V / 3ph   | HWA1-A/H 04345 | 3x95+2x50                                      | 20   |

The units comply with the electromagnetic compatibility specifications, however the designer of the electrical system must fulfil appropriate assessments to ensure the absence of interference.

### 5.8.3 User terminal block

**Only qualified personnel can carry out the electrical wiring to the terminal block.**

The connection terminal block can be accessed by opening the electrical panel door as indicated in the dedicated paragraph. The connections to the terminal block must be connected according to the following notes.

The following connections are standard. Further connections are reported the manual of the on-board controller (see “USER’S AND INSTALLER’S ALLOWED CONFIGURATIONS TABLES”), depending on the configurations adopted.

**WARNING: it is important to keep the high voltage cables separated from the very low voltage ones**

#### HWA1-A

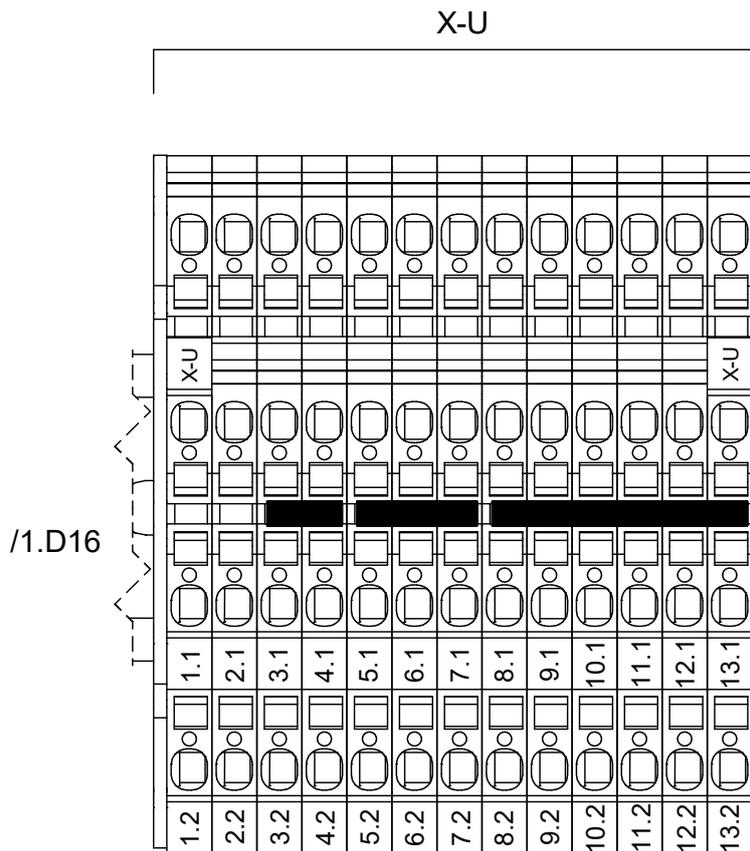
| TERMINAL | CONNECTION   | TYPE                            |
|----------|--|---------------------------------|
| XU-1.1   | Modbus RTU+ signal connection for remote control panel | Communication Modbus RS RTU 485 |
| XU-1.2   | Modbus RTU- signal connection for remote control panel |                                 |
| XU-2.1   | RTU Modbus GND connection for remote control panel     |                                 |
| XU-4.1   | Remote on/off input                                    | Voltage-free digital input      |
| XU-4.2   |  |                                 |
| XU-5.1   | Plant remote sensor (TE IMP1)                          | Analog input                    |
| XU-5.2   |  |                                 |

| TERMINAL     | CONNECTION                     | TYPE           |
|--------------|--------------------------------|----------------|
| XU-6.1       | Double set point (2 SP1)       | Digital input  |
| XU-6.2       |                                |                |
| XU-8.1/8.2   | Signal on compressor           | Digital output |
| XU-9.1/9.2   | Double set point signalization |                |
| XU-10.1/10.2 | Alarm signalization            |                |
| XU-11.1/11.2 | Bypass solenoid                |                |

**HWA1-A/H**

| TERMINAL     | CONNECTION   | TYPE                            |
|--------------|--|---------------------------------|
| XU-1.1       | Modbus RTU+ signal connection for remote control panel   | Communication Modbus RS RTU 485 |
| XU-1.2       | Modbus RTU- signal connection for remote control panel   |                                 |
| XU-2.1       | RTU Modbus GND connection for remote control panel   |                                 |
| XU-2.2       | Free   |                                 |
| XU-3.1       | Remote on/off input<br>(Closed = unit is ON / open = unit is off)  | Voltage-free digital input      |
| XU-3.2       |  |                                 |
| XU-4.1       | Input of summer/winter mode remote commutation (to activate the function see the relevant paragraph in the MCO manual) |                                 |
| XU-4.2       |  |                                 |
| XU-5.1       | Plant remote temperature sensor (TE IMP1)  | Analog input                    |
| XU-5.2       |  |                                 |
| XU-6.1       | Double set point (2 SP1)   | Digital input                   |
| XU-6.2       |  |                                 |
| XU-7.1       | Free   |                                 |
| XU-7.2       |  |                                 |
| XU-8.1/8.2   | Internal use (HWA1-A/H unit)   | Digital outputs                 |
|              | Signal on compressor (HWA1-A unit)   |                                 |
| XU-9.1/9.2   | Internal use (HWA1-A/H)  |                                 |
|              | Double set point signalization (HWA1-A unit)   |                                 |
| XU-10.1/10.2 | Season mode signalization (HWA1-A/H 02109, 02121 units)  |                                 |
|              | Internal use (HWA1-A/H except the units 02109, 02121)  |                                 |
|              | Alarm signalization (HWA1-A units)   |                                 |
| XU-11.1/11.2 | Internal use (HWA1-A/H)  |                                 |
|              | Signalization of lock-out of the machine (HWA1-A units)  |                                 |
| XU-12.1/12.2 | Signalization of defrosting cycle (HWA1-A/H units)   |                                 |
| XU-13.1/13.2 | Signalization of double set point (units: unità HWA1-A/H 02109, 02121)   | Analog or digital input         |
|              | Season signalization (units: HWA1-A/H excluding 02109, 02121)  | Analog input                    |

Terminal block

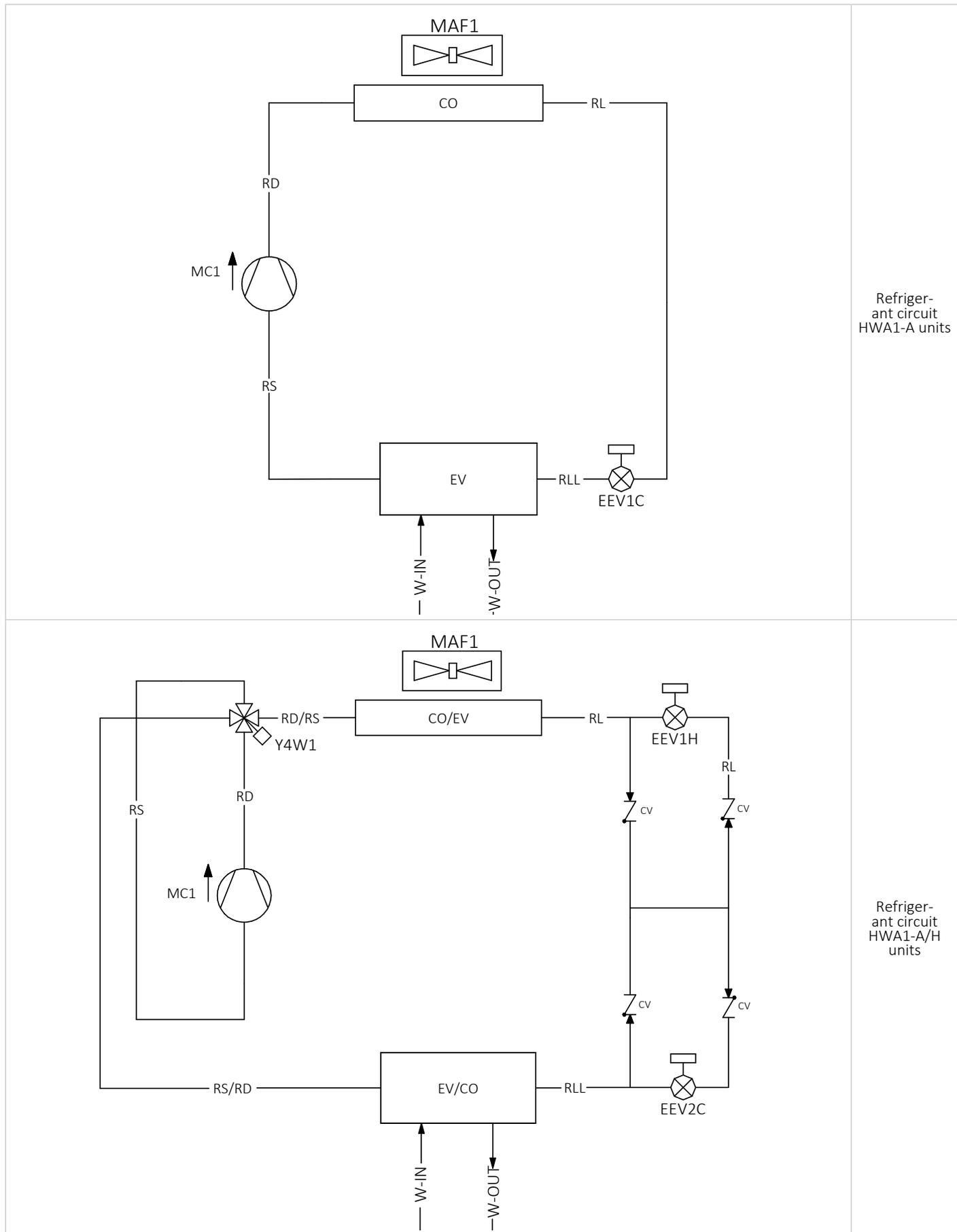


5.8.4 Control logics

For further information on the control logics, please refer to the relative manual which can be requested from CAT or the manufacturer.

### 5.9 REFRIGERANT CIRCUIT

Herein below are reported the conceptual diagrams of chillers and heat pumps.



| LEGENDA        |  |       |                                  |
|----------------|--|-------|----------------------------------|
| MC1            | Compressor   | W-IN  | User's water inlet               |
| CO             | CHILLER'S CONDENSER                                | W-OUT | User's water outlet              |
| EV             | CHILLER'S EVAPORATOR                               | MAF1  | Axial fan motor                  |
| CO/EV          | Condenser in chiller operation                     | RD    | Discharge line                   |
| EV/CO          | Evaporator in chiller operation                    | RL    | Liquid line                      |
| Y4W1           | 4-WAY reversing cycle valve                        | RLL   | Laminated liquid line            |
| EEV1C<br>EEV2C | Electronic expansion valve for chiller operation   | RS    | Suction line                     |
| EEV1H          | Electronic expansion valve for heat pump operation | RS/RD | Chiller operation suction line   |
| CV             | Non-return valve                                   | RD/RS | Chiller operation discharge line |

## 6. START UP

Before start-up:

- Check out the availability of the supplied wiring diagrams and manuals of the installed appliance.
- Check out the availability of the electrical and hydraulic diagrams of the plant in which the unit is installed.
- Check that the shut-off valves of the hydraulic circuits are open.
- Verify that the hydraulic circuit has been charged under pressure and air vented.
- Check out that all hydraulic connections are properly installed and all indications on unit labels are respected.
- Make sure that measures have been taken to discharge condensate.
- Check if all power cables are properly connected and all terminals are tightly fixed.
- Check if the electrical connections are performed according to the norms in force including the grounding connection.
- Check if the voltage is that shown in the unit labels.
- Make sure the voltage is within the limits ( $\pm 5\%$ ) of tolerance range.
- Check if the electric heaters of the compressors are powered correctly.
- Make sure that there is no refrigerant leak.
- Be sure that all the cover panels are installed in their proper positions and locked with fastening screws before start up.



**WARNING:** The unit must be connected to the electrical network and should be in **STAND-BY mode (powered)** closing the general switch in order to make operating the crankcase heaters of the compressor for a minimum of 12 hours before start up. (The electric heaters are automatically powered when the main switch is turned off). The crankcase heaters are working properly if, after some minutes, the temperature of crankcase's compressor is about  $10^{\circ}\text{C} \div 15^{\circ}\text{C}$  higher than ambient temperature.

**WARNING:** check that the weight of the pipes does not bear upon the machine structure.

**WARNING:** Never switch off the unit (for a temporary stop) by switching off the main switch: this component should be used to disconnect the unit from the power supply only for lengthy stoppages (e.g. seasonal stoppages). Besides, failing the power supply, the crankcase's heaters are not supplied thus resulting in a possible breakdown of the compressors once the unit is switched on.

**WARNING:** Do not modify the internal wiring of the unit otherwise the warranty will terminate immediately.

**WARNING:** The summer/winter operating mode, available only for heat pumps, has to be selected at the beginning of the related season. Frequent and sudden changes of these seasonal operating modes have to be avoided in order to prevent severe damages to compressors.

**WARNING:** When you first install and start-up the unit make sure that the unit is working properly in both cooling and heating modes.

### 6.1 POWERING-ON THE UNIT

For powering ON the appliance, rotate the outer handle of the disconnecter to the ON position (indicated with "I"). The display on the machine is turned on only if the phase sequence is correct (verification to be done during initial startup). Between a shutdown and subsequent power on, wait a minimum time of 1 minute.

## 7. INDICATIONS FOR THE USER

It's important to take note of the identification data of the unit in order to provide them to the Technical Assistance Service in case of assistance request.



The identification plate fixed on the unit shows the technical specifications and the performance of the equipment. In case of manumission, removal or deterioration, please ask a duplicate to the Technical Assistance Service

The manumission, removal or damaging of the nameplate makes difficult any operation of installation, maintenance and spare parts request.

It is recommended to keep track of assistance operations that are executed on the unit; this will make easy searching any troubleshooting.

In case breakdown or malfunction situations:

- check the type of alarm to communicate it to the service center;
- contact an authorized service center;
- if required by the service center, turn off the unit immediately without resetting the alarm;
- ask the use of original spare parts.

## 8. SHUTDOWNS FOR LONG PERIODS

The shutdown mode of the plant depends on the site of application and the time the plant is expected to be shut down. If the unit is equipped with the antifreeze system, even when off (system on unit at “off” position), the anti-freeze system remains in operation if the continuity of electrical supply to the appliances is guaranteed.

If the system is expected to remain idle for a long period of time, it is recommended to empty the liquid from the system unless there is an adequate amount of glycol.

To switch off the unit completely after having emptied the system:

- Turn off the unit by placing the switch of each unit to "OFF" position.
- Close the water valves.
- Place the general differential circuit breaker to "OFF" position (if installed upstream of the system).

|   |   |
|---|---|
|  | If the temperature drops below 0°C there is a serious risk of frost: add a mixture of water and glycol in the plant, otherwise drain the hydraulic circuits of the plant and of the heat pump.  |
|  | WARNING: When the ambient temperature becomes lower than -20°C, if the unit equipped with water pump is turned off and disconnected from power supply even for short periods, in such case, it's necessary to discharge the plant circuit and the hydraulic circuit of the unit from the mixture of water and glycol. Otherwise, the circulator may be irreversibly damaged.  |
|  | WARNING: with water temperatures below than +5°C, although the transient operation is not guaranteed regarding the limits set out. Before you turn the unit on after a long off period, make sure that the temperature of the mixture of water and glycol is higher than or at least equal to +5°C.<br>In the versions designed for low temperature operation (-8 ° C ÷ + 4 ° C), the concentration of glycol present and the relative freezing point must always be checked. Below this temperature it is forbidden to start the unit. |

## 9. PERIODICAL CONTROLS AND MAINTENANCE

|   |  |
|---|--|
|  | WARNING: All the operations described in this chapter HAVE TO BE CARRIED OUT BY TRAINED STAFF ONLY. Before any operation or before entering the inner components of the unit make sure that the power supply is disconnected.  |
|  | Maintenance must only be carried out in weather conditions suitable for the operations envisaged.  |
|  | The use of a lock-valve is strongly recommended for maintenance (access valve to the refrigeration circuit) for coupling with hoses (whip), in order to avoid gas leaks and risk of burns.   |
|  | WARNING: it is possible that a certain quantity of oil from the compressor is deposited in the pipes of the refrigeration circuit, especially by bends. In case of maintenance operations in which it is necessary to unsolder the pipes, it is strongly recommended to proceed with the cutting of the same and not with the desoldering with a torch, as the flame triggers any oil present. |
|  | It is forbidden to load refrigeration circuits with a refrigerant other than that indicated on the identification plate. Using a different refrigerant can cause serious damage to the compressor.   |
|  | It's forbidden to use oils other than those specified in this manual. The use of different oil can cause serious damage to the compressor.   |
|  | WARNING: MOVING PARTS, RISK OF DEATH.<br>Disconnect the power supply and ensure that the fan is stopped before opening the front panel.  |
|  | The temperatures of heads and exhaust piping of the compressor are usually high.   |

|   |   |
|---|---|
|  | <b>Be careful when working near condensing coils.</b><br>The aluminum fins are very sharp and can cause serious injuries.   |
|  | <b>Always use appropriate personal protective equipment.</b>  |
|  | <b>After the maintenance operations, pay attention to the correct tightening of the cable gland designed for the passage of the electric power cable.</b>   |
|  | <b>After the maintenance operations, pay attention to the correct tightening of the cable gland designed for the passage of the electric power cable.</b>   |
|  | <b>It is recommended to have specialised personnel perform periodical inspections and maintenance. The EU regulation n.517/2014 establishes that users must perform regular inspections on the plants, checking water tightness and eliminating any leaks as quickly as possible. Verify the mandatory nature and the documentation required in regulation n.517/2014 and its subsequent amendments or repeals.</b> |

The following are the recommended (R) and mandatory (M) activities for correct operation of the unit. The mandatory activities must be carried out by an authorised customer service which issues a corresponding certificate. Failure to comply with these activities will entail forfeiture of the warranty and could considerably shorten the service life of your product.

| OPERAZIONE  | R / M | 1 month | 4 month | 6 months | 12 months |
|---|-------|---------|---------|----------|-----------|
| Loading of the water circuit  | R     | x       |         |          |           |
| Presence of bubbles in the water circuit.   | R     | x       |         |          |           |
| Check if the safety and control devices work correctly.   | M     | x       |         |          |           |
| Check if there is oil leakage from compressor in the refrigerant circuit.   | R     | x       |         |          |           |
| Check if there is any water leakage from the hydraulic circuit.   | R     | x       |         |          |           |
| Check the proper working of the differential pressure switch.   | M     | x       |         |          |           |
| Check that the crankcase electric heaters are properly supplied and functioning.  | R     | x       |         |          |           |
| Clean the metallic filters of the hydraulic circuit.  | M     | x       |         |          |           |
| Clean the finned coil by means of compressed air or water jet.  | R     |         | x       |          |           |
| Check if all the terminals on the electric board as well as on the terminals of the compressor are properly fixed.  | M     |         | x       |          |           |
| Check the tightening of hydraulic connections.  | R     |         | x       |          |           |
| Check the tightening and the balancing of the fan blades.   | R     |         | x       |          |           |
| Clean the air filters in the electrical panel or replace them if necessary.(when present)   | M     |         | x       |          |           |
| If the voltage is correct and phase imbalance (no load and with load)   | R     |         |         | x        |           |
| Check the correct electric absorption   | R     |         |         | x        |           |
| Check the refrigerant charge and any leaks  | M     |         |         | x        |           |
| Check the operating pressure, and superheat and sub-cooling   | R     |         |         | x        |           |
| Check of the efficiency of circulation pump   | R     |         |         | x        |           |
| If the unit is to be out of service for a long period, drain the water from the pipes and the heat exchanger. This operation is indispensable if, during the shutdown period, ambient temperatures are expected to be below the freezing point of the fluid used. | M     |         |         | x        |           |
| Check for corrosion/oxidation   | R     |         |         |          | x         |
| Check panel fastening   | R     |         |         |          | x         |
| Check the water quality (see Features of the circuit water chapter) and the concentration of glycol   | M     |         |         | x        |           |
| Check the pressure drop of any filter driers on the liquid line.  | R     |         |         | x        |           |
| Check the safety valve on the hydronic side according to EN 806-5.  | R     |         |         | x        |           |

|   |   |
|---|---|
|  | <b>ATTENTION: the unit is fitted with safety valves that limit the overpressure of the refrigerant circuit. These devices require specific inspection frequency, in order to check that they are intact and working properly. Each country in the European Union has established the inspection frequency; in Italy, for example, Decree no. 329 of 2004 set the following frequency:<br/>every 4 years operating check<br/>every 10 years integrity check.</b><br>It is recommended to check the inspection frequency set out by the relevant legislation if the unit is not installed in Italy. |
|---|---|

## 9.1 CLEANING OF THE FINNED CONDENSER

It is important to follow the instructions below in order to perform a proper cleaning:

- a) Remove dirt from the surface. Deposits like leaves, fibers, etc. must be removed using a vacuum cleaner (use a brush or other soft accessory, be careful to avoid rubbing with metal or abrasive parts). In case of using compressed air, it is necessary to pay attention to keep the air flow always perpendicular to the surface of the condenser to avoid bending the aluminum fins. Be careful not to bend the fins with the nozzle of the compressed air lance.
- b) Rinse with water. It is possible to use chemical substances (specific detergents for finned condensers). Rinse by do running the water inside each single passage of the fins, until they are perfectly clean. Be careful to direct the water jet perpendicular to the surface of the condenser for not to bend the aluminium fins. Avoid hitting the condenser with the water hose. It is recommended not to place your thumb on the end of the rubber pipe to obtain the desired pressure of water jet instead of using special nozzles that could hit the condenser and damage it.

### 9.1.1 Cleaning finned coils treated with the anti-corrosion method

The anti-corrosion treatment applied to the finned coils (available as an alternative to the standard coils) guarantees protection against aggressive atmospheres.

The cleaning frequency depends on the environmental conditions and is up to the common sense of the maintenance staff. When oxidising dust or grease particles are observed on the coil surface, cleaning is recommended. In general, in a slightly polluted atmosphere, it is recommended to carry out the cleaning procedures every three months.

Washing should be carried out preferably with hot water (40-60°C) and detergent with neutral pH, using a high pressure system. Rinse with plenty of cold water (50 l/m2).

If the maintenance staff notices that the protective cover is missing on the edge of the fins, please contact the nearest service centre to reapply the cover and fully restore the corrosion protection.



**WARNING: Do not clean the coil using high-pressure cleaners so as not to apply excessive pressure which could cause irreparable damage. Damage caused by cleaning with unsuitable chemical substances or excessively high water pressure will not be recognised under warranty.**

**WARNING: The aluminium fins are thin and sharp. Pay the utmost attention and use appropriate PPE to avoid cuts and abrasions. Cover your eyes and face appropriately to avoid squirting water and filth while blowing. Wear waterproof shoes or boots and clothing covering your entire body.**

**For units installed in an aggressive atmosphere with a high rate of fouling, cleaning of the coil should be part of the routine maintenance programme. On this type of installation, all dust and particles deposited on the batteries must be removed as soon as possible by periodic cleaning in accordance with the above instructions.**

## 9.2 CLEANING OF EXTERNAL SURFACES

The sheets of the outer casing must be properly cleaned to avoid the accumulation of dust / dirt, preventing the onset of corrosion. The painting ensures resistance to atmospheric agents but it is good practice to make sure to remove any dirt present, cleaning the surfaces with neutral detergent and water, especially if the unit is installed in places with an aggressive atmosphere (high level of pollution, salt , etc).

## 9.3 EXTRAORDINARY MAINTENANCE

Any work of extraordinary maintenance must be carried out by authorized service center.

Some extraordinary maintenance works may involve the replacement of broken components, which may have significant mass. Below is the list of components (standard and optional) and the approximate weight for each piece (take into consideration that any residues of oil, liquid gas, water can increase the weight). Consult the table before the maintenance phase (or refer to the label of the component itself) and choose the equipment / posture most suitable for the work to be carried out taking into account the load limits imposed by the technical standards and the state of health and ability of the worker himself.

| Weight [kg]                 | HWA1-A    |         |         |         |         |         |         |         |         |         |         |         |         |
|-----------------------------|-----------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
|                             | Component | 02106   | 02120   | 02128   | 02140   | 04155   | 04177   | 04184   | 04209   | 04239   | 04258   | 04305   | 04349   |
| Compressor                  | 90        | 90      | 90      | 177     | 66      | 90      | 90      | 90      | 90      | 90      | 177     | 177     |         |
| Plate heat exchanger        | 32        | 32      | 43      | 36      | 39      | 46      | 46      | 46      | 60      | 82      | 82      | 82      |         |
| Desuperheater               | 16        | 12      | 12      | 16      | 12      | 12      | 12      | 14      | 14      | 14      | 16      | 16      |         |
| Microchannel heat exchanger | 31        | 31      | 31      | 31      | 39      | 39      | 39      | 31      | 31      | 31      | 31      | 31      |         |
| Pump                        | 22        | 22      | 22      | 48      | 48      | 48      | 48      | 48      | 48      | 48      | 60      | 85      |         |
| Tank                        | 60        | 60      | 60      | 85      | 60      | 60      | 60      | 60      | 60      | 60      | 85      | 85      |         |
| Std fan/ SSL version        | 46 / 24   | 46 / 24 | 46 / 24 | 46 / 24 | 46 / 24 | 46 / 24 | 46 / 24 | 46 / 24 | 46 / 24 | 46 / 24 | 46 / 24 | 46 / 24 | 46 / 24 |

| Weight [kg]          | HWA1-A/H  |         |         |         |         |         |         |         |         |         |         |         |         |
|----------------------|-----------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
|                      | Component | 02109   | 02121   | 02142   | 02148   | 02160   | 04176   | 04199   | 04215   | 04237   | 04273   | 04304   | 04345   |
| Compressor           | 90        | 90      | 90      | 177     | 177     | 66      | 90      | 90      | 90      | 177     | 177     | 190     |         |
| Plate heat exchanger | 32        | 32      | 36      | 36      | 39      | 46      | 46      | 46      | 60      | 60      | 82      | 82      |         |
| Desuperheater        | 10        | 10      | 12      | 12      | 14      | 10      | 10      | 10      | 10      | 14      | 14      | 16      |         |
| Cu-Al heat exchanger | 36        | 41      | 30      | 36      | 36      | 56      | 56      | 68      | 68      | 56      | 68      | 68      |         |
| Liquid receiver      | 19        | 19      | 16      | 21      | 21      | 11      | 11      | 16      | 16      | 14      | 16      | 16      |         |
| Liquid separator     | 12        | 12      | 21      | 21      | 21      | 12      | 12      | 12      | 12      | 21      | 21      | 26      |         |
| Pump                 | 22        | 22      | 22      | 48      | 48      | 48      | 48      | 48      | 48      | 48      | 60      | 85      |         |
| Tank                 | 60        | 60      | 85      | 85      | 85      | 60      | 60      | 60      | 60      | 85      | 85      | 85      |         |
| Std fan/ SSL version | 46 / 24   | 46 / 24 | 46 / 24 | 46 / 24 | 46 / 24 | 46 / 24 | 46 / 24 | 46 / 24 | 46 / 24 | 46 / 24 | 46 / 24 | 46 / 24 | 46 / 24 |

### 10. DISPOSAL PROCEDURE

Once the unit reaches the end of its life cycle and needs to be removed or replaced, the below operations should be respected,

- The refrigerant has to be recovered by trained people and sent to proper collecting centre, according to the procedures indicated in Regulation No. 517/2014 on fluorinated greenhouse gases;
- any antifreeze additives in the water circuit must be recovered and disposed of properly;
- Compressors' lubricating oil has to be collected and sent to proper collecting centre;
- electronic components such as regulators, drivers and inverters must be disassembled and sent to collection centres;
- the frame and the various components, if not serviceable any longer, have to be dismantled and divided according to their nature, particularly copper and aluminium, which are present in conspicuous quantity in the unit.

These operations allow easy material recover and recycling process, thus reducing the environmental impact, in accordance with the provisions of Directive 2012/19 / EU on waste electrical and electronic equipment (RAEE).

The user is responsible for the proper disposal of this product, according to national regulations in the country of destination of the appliance. For more information you should contact the Installation Company or local competent authority.

|   |   |
|---|---|
|    | <b>An incorrect decommissioning of the appliance may create serious environmental damage and endanger people's safety. Therefore, it is recommended that the unit be disposed only by authorised persons with technical training who have attended training courses acknowledged by the competent authorities.</b>  |
|   | <b>It is required to follow the same precautions described in the previous paragraphs.</b>  |
|   | <b>Pay special attention during disposal of the refrigerant gas.</b>  |
|   | <b>The illegal disposal of the product by the end user leads to the application of the penalties in accordance with the law in the country where the disposal takes place.</b>  |
|  | <b>The crossed-out bin symbol applied on the appliance indicates that the product, at the end of its useful life, must be collected separately from other solid/municipal waste. The units are manufactured in accordance with the EC directive on waste of electric/electronic equipment and the harmful effects of incorrect disposal are provided in the user/installer manual. The manufacturing company or its importer/retailer is available to respond to any requests for additional information.</b> |

### 11. RESIDUAL RISKS

The residual risks related to handling, installation and normal operation of the unit are shown below. Any failure by the user and installer to comply with the instructions / indications given in the manual (for which the references are given in the table) entails the persistence of these risks, which cannot be eliminated by the manufacturer, who has already adopted all the necessary design measures because each risk is minimized.

| Danger  | Indication / Instruction  | Residual risk   | User / Activity |                    |                   |                  |                       |
|---|---|---|-----------------|--------------------|-------------------|------------------|-----------------------|
|   |   |   | Operator        |                    |                   | User             |                       |
|   |   |   | Transport phase | Installation phase | Maintenance phase | Unit interaction | Normal unit operation |
| Mechanical: crushing caused by the possible instability of the unit during handling                     | The procedures for correct unit handling and installation are indicated on the user-installer manual under chapter 5, with indication of the center of gravity, of the lifting points and equipment. Protection devices use is also recommended as required by current regulations. | Failure by the installer to comply with the installation procedures.  | X               | X                  |                   |                  |                       |
| Mechanical: crushing caused by the possible instability of the unit.                                    | The procedures for proper unit installation are indicated on user-installer manual under chapter 5.   | Failure by the installer to comply with the installation procedures.  |                 | X                  | X                 |                  |                       |
| Mechanical: Cutting / sectioning / shearing caused by the fan not protected against accidental contacts | The user-installer manual under chapter 9 contains specific warnings, also relating to the routine maintenance phases.  | Removal of the protection grid by the user or maintenance technician. |                 |                    | X                 | X                |                       |

| Danger   | Indication / Instruction  | Residual risk  | User / Activity |                    |                   |                  |                       |
|--|---|--|-----------------|--------------------|-------------------|------------------|-----------------------|
|  |   |  | Operator        |                    |                   | User             |                       |
|  |   |  | Transport phase | Installation phase | Maintenance phase | Unit interaction | Normal unit operation |
| Entanglement caused by the fan not protected against accidental contacts   | The user-installer manual under chapter 9 contains specific warnings, also relating to the routine maintenance phases.  | Removal of the protection grid by the user or maintenance technician.  |                 |                    | X                 | X                |                       |
| Mechanical: cutting / abrasion due to contact with the heat exchange coil  | The user-installer manual under chapter 9 contains specific warnings to be taken into consideration when working near the battery.  | Failure to observe the warnings in the manual and on the label.  |                 |                    | X                 | X                |                       |
| Mechanical: slipping / falling caused by ice / water near the unit as a result of water leaks  | In the user-installer manual under paragraph 5.8 is recommended to pay attention to the conveyance of the safety valve and in paragraph 5.4 there are indications regarding the surface on which the unit rests. During maintenance, the use of PPE and the possible removal of all water residues near the machine after intervention is recommended.. | Failure to comply with the instructions given in the manual.   |                 |                    | X                 | X                |                       |
| Mechanical: cut / abrasion caused by the presence of edges on the external casing of the machine and / or screws protruding both outside and inside the unit | The correct maintenance procedures are indicated in the user-installer manual under chapter 9. Paragraph 4.2 recommends the use of the necessary personal protective equipment.   | Failure to comply with the procedures and / or failure to use PPE by the maintenance technician.   |                 |                    | X                 | X                |                       |
| Mechanical: projection of parts or fluids caused by exceeding the operating pressure limits.   | The correct maintenance procedures are indicated in the user-installer manual under chapter 9. Paragraph 4.2 recommends the use of the necessary personal protective equipment.   | Simultaneous damage to both types of protection devices.   |                 |                    | X                 | X                |                       |
| Electrical: electrocution / shock / burn caused by contact with live parts   | The safety measures to be taken in case of maintenance, cleaning or checking of the unit are indicated in the user-installer manual under chapter 9. Any intervention must only be carried out by qualified personnel and with the machine switched off.  | Failure to comply with the procedures by the maintenance technician or irresponsible behavior by the user.   |                 |                    | X                 | X                |                       |
| Electrical: effects on medical implants (pacemakers) caused by electromagnetic phenomena   | The user-installer manual in chapter 3 states the prohibition of direct interaction with the unit by people with electrically controlled medical devices, such as pacemakers. It is recommended to keep a distance from the installation site of the unit as indicated by the medical system used.  | Failure to comply with the instructions given in the manual.   |                 |                    | X                 | X                |                       |
| Electrical: Fire causes short circuit or electric arc  | The correct installation procedures are indicated in the user-installer manual under chapter 5. In case of maintenance, the use of the necessary personal protective equipment is recommended.  | The possibility of triggering cannot be eliminated but its probability of occurrence is reduced. With the measures taken, the spread of the fire is reduced. |                 |                    | X                 | X                |                       |
| Electrical: projection of particles and emission of harmful chemicals as a result of electrical overload   | Chapter 9 in the user-installer manual indicates that maintenance must be carried out with machine off.   | Failure to comply with the instructions given in the manual.   |                 |                    | X                 | X                |                       |
| Thermic: burning / scalding from contact with hot surfaces   | The user-installer manual in chapter 9 indicates the safety measures to be adopted in case of maintenance, cleaning or control of the unit and the personal protective equipment to be equipped.  | Failure to comply with the procedures and / or failure to use PPE by the maintenance technician.   |                 |                    | X                 | X                |                       |

| Danger   | Indication / Instruction   | Residual risk   | User / Activity |                    |                   |                  |                       |   |
|--|--|---|-----------------|--------------------|-------------------|------------------|-----------------------|---|
|  |  |   | Operator        |                    |                   | User             |                       |   |
|  |  |   | Transport phase | Installation phase | Maintenance phase | Unit interaction | Normal unit operation |   |
| Caused by noise: Discomfort caused by the noise of the unit during operation   | In the user-installer manual in chapter 5 suspended installation is prohibited and an environmental impact assessment is requested based on the installation area of the unit, even in the case of installation close to workers.  | Failure to observe the actions recommended in the manual and the study of the environmental impact.               |                 |                    |                   |                  |                       | X |
| Cause by vibration: Discomfort caused by unit vibrations during operation  | In the user-installer manual under chapter 5 suspended installation is prohibited and the use of anti-vibration mounts is recommended.   | Failure to observe the actions recommended in the manual and the study of the environmental impact.               |                 |                    |                   |                  |                       | X |
| Caused by radiation: electromagnetic radiation that the unit generates during operation  | -  | No one  |                 |                    |                   |                  |                       | X |
| Generated by materials / substances: infections caused by bacteria potentially present in the carrier fluid (technical water)                | The use of personal protective equipment is recommended in the user-installer manual under paragraph 4.2. The safety data sheet for the refrigerant (paragraph 4.4) and specific warnings (paragraph 4.5) are also shown.  | Failure to comply with the procedures by the maintenance technician.  |                 |                    | X                 | X                |                       |   |
| Generated by materials / substances: fire / explosion causes gas classified as slightly flammable  | The user-installer manual under chapter 5 contains specific indications about unit installation place and protection devices.  | Failure to comply with the indications relating to the place of installation and adequate maintenance procedures. |                 |                    | X                 |                  |                       | X |
| Generated by materials / substances: infections caused by bacteria potentially present in the carrier fluid (technical water)                | The permitted uses of the unit are listed in the user-installer manual under chapter 3.  | Failure to comply with the instructions given in the manual.  |                 |                    | X                 |                  |                       | X |
| Generated by materials / substances: burn caused by the presence of oil inside the refrigeration circuit, triggered by a flame welding torch | The use of personal protective equipment is recommended in the user-installer manual under paragraph 4.2.<br>Under chapter 9 it is advisable, in the case of maintenance that involves desoldering the tubes, to proceed with cutting them, as the flame of the torch for desoldering triggers any oil present.                              | Failure to comply with the instructions given in the manual.  |                 |                    | X                 |                  |                       |   |
| Generated by materials / substances: burn / scald from escaping refrigerant  | The safety measures to be adopted in case of maintenance, cleaning or control of the unit and the personal protective equipment to be equipped are indicated in the user-installer manual under chapter 9.   | Failure to comply with the instructions given in the manual.  |                 |                    | X                 |                  |                       | X |
| Generated by materials / substances: pollution due to inappropriate disposal   | The instructions for correct disposal are given in the user-installer manual under chapter 10.   | Failure to comply with the instructions given in the manual.  |                 |                    |                   |                  |                       |   |
| Ergonomic: fatigue / musculoskeletal disorders caused by exertion during maintenance / installation  | Under paragraph 4.1, the user-installer manual recommends compliance with current regulations (international and local) regarding workers health and safety. During maintenance, it is advisable to keep a posture that does not cause fatigue and to check the weight of the component before proceeding with its handling (paragraph 9.3). | Failure to comply with the instructions given in the manual.  |                 | X                  | X                 |                  |                       |   |
| Generated by unit use environment: Slipping / falling caused by ice / water near the unit due to condensate drain / defrost                  | Under paragraph 5.8.5 the user-installer manual indicates about condensate drain system, recommending that you pay attention to the danger of slipping.  | Failure to comply with the instructions given in the manual.  |                 |                    | X                 | X                |                       |   |

| Danger   | Indication / Instruction  | Residual risk  | User / Activity |                    |                   |                  |                       |
|--|---|--|-----------------|--------------------|-------------------|------------------|-----------------------|
|  |   |  | Operator        |                    |                   | User             |                       |
|  |   |  | Transport phase | Installation phase | Maintenance phase | Unit interaction | Normal unit operation |
| Generated by unit use environment: unexpected events as a result of malfunctions due to water / snow / humidity.                                       | In the user-installer manual under chapter 9 it is recommended to pay attention to the correct tightening of the cable gland designed for the passage of the electric power cable and to the reassembly of all the sheets, in particular those of the electrical panel, in order to maintain the degree of declared protection.   | Failure to comply with the procedures by the maintenance technician.   |                 |                    | X                 | X                |                       |
| Generated by unit use environment: lightning that can potentially hit the unit   | In the user-installer manual under chapter 9 it is recommended to carry out maintenance only in weather conditions suitable for the operations envisaged. It is also indicated that the installation site must be sufficiently far from lightning rods or objects that could attract the lightning (par. 5.3). The unit must be electrically connected to a system that complies with the regulations in force. | Failure to comply with the instructions given in the manual.   |                 |                    | X                 | X                |                       |
| Generated by unit use environment: electromagnetic disturbances caused by interference between devices placed near the machine and the machine itself. | In the user-installer manual under paragraph 5.9 is recommended to power the unit via a dedicated line and protections. It is also recommended to use an independent cable duct in order to remove the possibility of interaction with other devices.   | Failure to comply with the recommendations regarding the electrical system.  |                 |                    |                   |                  | X                     |
| Generated by unit use environment: possibility of breakage of components / supports caused by corrosion and oxidation                                  | The user-installer manual under chapter 9 contains specific warnings on maintenance and cleaning to be carried out on the surfaces of the sheets and heat exchange coils. The technical bulletin provides advice on the treatments to choose based on the environmental conditions.   | Failure to comply with cleaning and maintenance and / or incorrect assessment of the atmospheric agents that characterize the installation site. |                 |                    | X                 | X                |                       |

**12. TECHNICAL DATA**
**12.1 CHILLER TECHNICAL SHEET**

| Technical specifications               |  | Unit   | HWA1-A model                |                             |                             |                                   |                                   |                                   |
|--|--|--------|-----------------------------|-----------------------------|-----------------------------|-----------------------------------|-----------------------------------|-----------------------------------|
|  |  |        | 02106                       | 02120                       | 02128                       | 02140                             | 04155                             | 04177                             |
| Cooling                                | Cooling capacity (1)   | kW     | 105                         | 119                         | 130                         | 139                               | 155                               | 176                               |
|  | Total power input (1)  | kW     | 33,5                        | 38,3                        | 44,2                        | 44,3                              | 49,9                              | 56,7                              |
|  | EER (1)  | W/W    | 3,13                        | 3,10                        | 2,93                        | 3,15                              | 3,11                              | 3,10                              |
|  | Cooling capacity (2)   | kW     | 139                         | 155                         | 164                         | 185                               | 204                               | 230                               |
|  | Total power input Potenza (2)                                | kW     | 35,7                        | 40,8                        | 46,8                        | 47,5                              | 52,9                              | 60,9                              |
|  | EER (2)  | W/W    | 3,88                        | 3,79                        | 3,50                        | 3,89                              | 3,87                              | 3,77                              |
|  | SEER (3)   | W/W    | 4,13                        | 4,12                        | 4,11                        | 4,27                              | 4,11                              | 4,11                              |
|  | IPLV (9)   |        | 4,99                        | 5,09                        | 4,71                        | 5,02                              | 5,13                              | 5,13                              |
|  | Cooling capacity (8)   | kW     | 61,9                        | 70,6                        | 77,8                        | 82,0                              | 91,5                              | 103                               |
|  | Total power input (8)  | kW     | 29,9                        | 34,1                        | 39,3                        | 39,5                              | 45,4                              | 50,8                              |
|  | EER (8)  | W/W    | 2,07                        | 2,07                        | 1,98                        | 2,08                              | 2,02                              | 2,04                              |
|  | Water flow (1)   | l/s    | 5,0                         | 5,7                         | 6,2                         | 6,5                               | 7,2                               | 8,4                               |
| Press. drop on use-side heat exch. (1) | kPa  | 17,5   | 20,7                        | 16,1                        | 27,8                        | 21,1                              | 16,7                              |                                   |
| Compressor                             | Type   |        | SCROLL                      |                             |                             |                                   |                                   |                                   |
|  | Refrigerant oil type (type)                                  |        | Emkarate RL 32 3MAF         |                             |                             |                                   |                                   |                                   |
|  | Nr compressors   | Nr     | 2                           | 2                           | 2                           | 2                                 | 4                                 | 4                                 |
|  | Capacity steps Std   | Nr     | 2                           | 3                           | 2                           | 3                                 | 4                                 | 4                                 |
|  | Oily charge (Circuit 1)                                      | l      | 4,44 + 4,44                 | 4,44 + 4,44                 | 4,44 + 4,44                 | 6,3 + 4,44                        | 3,25 + 3,25                       | 4,44 + 4,44                       |
|  | Oil charge (Circuit 2)                                       | l      | -                           | -                           | -                           | -                                 | 3,25 + 3,25                       | 3,25 + 3,25                       |
|  | Refrigerant circuits   | Nr     | 1                           | 1                           | 1                           | 1                                 | 2                                 | 2                                 |
| Refrigerant                            | Type   |        | R410A                       |                             |                             |                                   |                                   |                                   |
|  | Refrigerant charge (Circuit 1) (4)                           | kg     | 10,5                        | 10,5                        | 10,5                        | 15                                | 13,0                              | 13,0                              |
|  | Refrigerant charge (Circuit 2) (4)                           | kg     | -                           | -                           | -                           | -                                 | 10,5                              | 10,5                              |
|  | Quantity of CO2 equivalent (4)                               | ton    | 21,9                        | 21,9                        | 21,9                        | 31,3                              | 49,1                              | 49,1                              |
|  | Design pressure (high/low)                                   | bar    | 40,5/4                      | 40,5/4                      | 40,5/4                      | 40,5/4                            | 40,5/4                            | 40,5/4                            |
| External zone fan motors               | Fan motors type  |        | AXIAL                       |                             |                             |                                   |                                   |                                   |
|  | Nr of fans   | Nr     | 2                           | 2                           | 2                           | 3                                 | 3                                 | 3                                 |
|  | Rated power (1)  | kW     | 1,5                         | 1,5                         | 1,5                         | 1,4                               | 1,4                               | 1,4                               |
|  | Max power input  | kW     | 3,8                         | 3,8                         | 3,8                         | 5,7                               | 5,7                               | 5,7                               |
|  | Max input current  | A      | 3,9                         | 3,9                         | 3,9                         | 3,9                               | 3,9                               | 3,9                               |
|  | Standard air flow  | l/s    | 10614                       | 10714                       | 11143                       | 14649                             | 14467                             | 15868                             |
| Internal heat exchanger                | Internal Heat exchanger type                                 |        | PHE - PLATE                 |                             |                             |                                   |                                   |                                   |
|  | Nr of internal H-exchangers                                  | Nr     | 1                           | 1                           | 1                           | 1                                 | 1                                 | 1                                 |
|  | Water content  | l      | 6,87                        | 6,87                        | 9,90                        | 7,88                              | 9,30                              | 11,40                             |
| Hydraulic circuit                      | Max pressure on water-side                                   | bar    | 12                          | 12                          | 12                          | 12                                | 12                                | 12                                |
|  | Max pressure on hydronic kit side (relief valve calibration) | bar    | 6                           | 6                           | 6                           | 6                                 | 6                                 | 6                                 |
|  | Water connections  |        | 2" 1/2                      | 2" 1/2                      | 2" 1/2                      | 2" 1/2                            | 3"                                | 3"                                |
|  | Min content of water plant (5)                               | l      | 427                         | 535                         | 535                         | 699                               | 409                               | 533                               |
| Sound levels                           | Sound power (6)  | dB (A) | 86 std/<br>85 SL/<br>83 SSL | 86 std/<br>85 SL/<br>83 SSL | 87 std/<br>86 SL/<br>84 SSL | 87 std/<br>86 SL/<br>84 SSL       | 87 std/<br>86 SL/<br>84 SSL       | 88 std/<br>87 SL/<br>85 SSL       |
|  | Sound pressure (7)   | dB (A) | 54 std/<br>53 SL/<br>51 SSL | 54 std/<br>53 SL/<br>51 SSL | 55 std/<br>54 SL/<br>52 SSL | 54,9 std/<br>53,9 SL/<br>51,9 SSL | 54,9 std/<br>53,9 SL/<br>51,9 SSL | 55,9 std/<br>54,9 SL/<br>52,9 SSL |
| Electrical data                        | Power supply   |        | 400V/3P/50Hz                |                             |                             |                                   |                                   |                                   |
|  | Max power input (no access. version)                         | kW     | 48,9                        | 55,0                        | 61,1                        | 66,9                              | 82,4                              | 87,4                              |
|  | Max curr. input (no access. version)                         | A      | 83,0                        | 93,4                        | 103,8                       | 113,5                             | 139,9                             | 148,3                             |
|  | Max start-up curr. (no access. version)                      | A      | 285,6                       | 332,3                       | 342,7                       | 358,1                             | 279,9                             | 350,9                             |
| Dimensions and weights                 | A - Length   | mm     | 2860                        | 2860                        | 2860                        | 4060                              | 4060                              | 4060                              |
|  | B - Width  | mm     | 1100                        | 1100                        | 1100                        | 1100                              | 1100                              | 1100                              |
|  | C - Height   | mm     | 2350                        | 2350                        | 2350                        | 2350                              | 2350                              | 2350                              |
|  | Shipping net weight  | kg     | 1080                        | 1080                        | 1090                        | 1510                              | 1620                              | 1620                              |
|  | Weight in operation  | kg     | 1090                        | 1090                        | 1100                        | 1520                              | 1630                              | 1630                              |

| Technical specifications               |  | Unit   | HWA1-A model                      |                                   |                                   |                                   |                                   |                                   |
|--|--|--------|-----------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|
|  |  |        | 04184                             | 04209                             | 04239                             | 04258                             | 04305                             | 04349                             |
| Cooling                                | Cooling capacity (1)   | kW     | 182                               | 208                               | 238                               | 257                               | 305                               | 348                               |
|  | Total power input (1)  | kW     | 62,9                              | 67,1                              | 76,8                              | 88,5                              | 98,3                              | 112                               |
|  | EER (1)  | W/W    | 2,90                              | 3,10                              | 3,10                              | 2,90                              | 3,10                              | 3,10                              |
|  | Cooling capacity (2)   | kW     | 239                               | 277                               | 314                               | 333                               | 405                               | 458                               |
|  | Total power input Potenza (2)                                | kW     | 67,8                              | 71,6                              | 81,9                              | 94,6                              | 105                               | 121                               |
|  | EER (2)  | W/W    | 3,52                              | 3,87                              | 3,84                              | 3,52                              | 3,85                              | 3,78                              |
|  | SEER (3)   | W/W    | 4,10                              | 4,14                              | 4,24                              | 4,10                              | 4,16                              | 4,12                              |
|  | IPLV (9)   |        | 4,95                              | 4,99                              | 4,94                              | 4,37                              | 4,92                              | 5,05                              |
|  | Cooling capacity (8)   | kW     | 109                               | 123                               | 144                               | 158                               | 184                               | 211                               |
|  | Total power input (8)  | kW     | 55,8                              | 59,7                              | 68,8                              | 79,4                              | 88,5                              | 101                               |
|  | EER (8)  | W/W    | 1,95                              | 2,06                              | 2,09                              | 1,99                              | 2,08                              | 2,10                              |
|  | Water flow (1)   | l/s    | 8,7                               | 9,9                               | 11,4                              | 12,3                              | 14,7                              | 16,6                              |
| Press. drop on use-side heat exch. (1) | kPa  | 19,1   | 24,8                              | 34,2                              | 35,4                              | 32,0                              | 28,8                              |                                   |
| Compressor                             | Type   |        | SCROLL                            |                                   |                                   |                                   |                                   |                                   |
|  | Refrigerant oil type (type)                                  |        | Emkarate RL 32 3MAF               |                                   |                                   |                                   |                                   |                                   |
|  | Nr compressors   | Nr     | 4                                 | 4                                 | 4                                 | 4                                 | 4                                 | 4                                 |
|  | Capacity steps Std   | Nr     | 4                                 | 4                                 | 6                                 | 4                                 | 6                                 | 4                                 |
|  | Oily charge (Circuit 1)                                      | l      | 4,44 + 4,44                       | 4,44 + 4,44                       | 4,44 + 4,44                       | 4,44 + 4,44                       | 4,44 + 6,3                        | 6,3 + 6,3                         |
|  | Oil charge (Circuit 2)                                       | l      | 4,44 + 4,44                       | 4,44 + 4,44                       | 4,44 + 4,44                       | 4,44 + 4,44                       | 4,44 + 6,3                        | 6,3 + 6,3                         |
|  | Refrigerant circuits   | Nr     | 2                                 | 2                                 | 2                                 | 2                                 | 2                                 | 2                                 |
| Refrigerant                            | Type   |        | R410A                             |                                   |                                   |                                   |                                   |                                   |
|  | Refrigerant charge (Circuit 1) (4)                           | kg     | 13,0                              | 13,0                              | 13,5                              | 13,5                              | 19,5                              | 20,0                              |
|  | Refrigerant charge (Circuit 2) (4)                           | kg     | 10,5                              | 13,0                              | 13,5                              | 13,5                              | 19,5                              | 20,5                              |
|  | Quantity of CO2 equivalent (4)                               | ton    | 49,1                              | 54,3                              | 56,4                              | 56,4                              | 81,4                              | 84,6                              |
|  | Design pressure (high/low)                                   | bar    | 40,5/4                            | 40,5/4                            | 40,5/4                            | 40,5/4                            | 40,5/4                            | 40,5/4                            |
| External zone fan motors               | Fan motors type  |        | AXIAL                             |                                   |                                   |                                   |                                   |                                   |
|  | Nr of fans   | Nr     | 3                                 | 4                                 | 4                                 | 4                                 | 6                                 | 6                                 |
|  | Rated power (1)  | kW     | 1,5                               | 1,4                               | 1,5                               | 1,5                               | 1,4                               | 1,5                               |
|  | Max power input  | kW     | 5,7                               | 7,6                               | 7,6                               | 7,6                               | 11,4                              | 11,4                              |
|  | Max input current  | A      | 3,9                               | 3,9                               | 3,9                               | 3,9                               | 3,9                               | 3,9                               |
|  | Standard air flow  | l/s    | 15892                             | 20647                             | 20471                             | 22231                             | 29279                             | 33255                             |
| Internal heat exchanger                | Internal Heat exchanger type                                 |        | PHE - PLATE                       |                                   |                                   |                                   |                                   |                                   |
|  | Nr of internal H-exchangers                                  | Nr     | 1                                 | 1                                 | 1                                 | 1                                 | 1                                 | 1                                 |
|  | Water content  | l      | 11,40                             | 11,40                             | 15,50                             | 22,10                             | 22,10                             | 22,10                             |
| Hydraulic circuit                      | Max pressure on water-side                                   | bar    | 12                                | 12                                | 12                                | 12                                | 12                                | 12                                |
|  | Max pressure on hydronic kit side (relief valve calibration) | bar    | 6                                 | 6                                 | 6                                 | 6                                 | 6                                 | 6                                 |
|  | Water connections  |        | 3"                                | 3"                                | 3"                                | 3"                                | 3"                                | 3"                                |
|  | Min content of water plant (5)                               | l      | 533                               | 533                               | 669                               | 669                               | 874                               | 874                               |
| Sound levels                           | Sound power (6)  | dB (A) | 88 std/<br>87 SL/<br>85 SSL       | 90 std/<br>89 SL/<br>87 SSL       |
|  | Sound pressure (7)   | dB (A) | 55,9 std/<br>54,9 SL/<br>52,9 SSL | 55,8 std/<br>54,8 SL/<br>52,8 SSL | 57,8 std/<br>56,8 SL/<br>54,8 SSL |
| Electrical data                        | Power supply   |        | 400V/3P/50Hz                      |                                   |                                   |                                   |                                   |                                   |
|  | Max power input (no access. version)                         | kW     | 90,9                              | 97,8                              | 110,0                             | 122,3                             | 146,0                             | 165,8                             |
|  | Max curr. input (no access. version)                         | A      | 154,3                             | 166,0                             | 186,8                             | 207,6                             | 247,8                             | 281,4                             |
|  | Max start-up curr. (no access. version)                      | A      | 356,9                             | 368,6                             | 425,7                             | 446,5                             | 492,4                             | 526,0                             |
| Dimensions and weights                 | A - Length   | mm     | 4060                              | 2860                              | 2860                              | 2860                              | 4060                              | 4060                              |
|  | B - Width  | mm     | 1100                              | 2200                              | 2200                              | 2200                              | 2200                              | 2200                              |
|  | C - Height   | mm     | 2350                              | 2350                              | 2350                              | 2350                              | 2350                              | 2350                              |
|  | Shipping net weight  | kg     | 1620                              | 1950                              | 1960                              | 1960                              | 2670                              | 2850                              |
|  | Weight in operation  | kg     | 1630                              | 1960                              | 1970                              | 1980                              | 2690                              | 2870                              |

**Operating conditions, in accordance with 14511:2018:**

- (1) Internal heat-exchanger water temperature = 12/7 °C, external exchanger air intake temperature 35°C
- (2) Internal heat exchanger water temperature = 23/18°C, external heat-exchanger air intake temperature 35°C.
- (3) Internal heat-exchanger water temperature reference = 12/7°C.
- (4) The data are indicative and could be subject to change. For the correct data, always refer to the technical label on the unit.
- (5) The volume indicated refers to the total required, the designer must meet it considering the quantity already present inside the unit in function of the hydronic kit chosen (please check this value in the technical data sheet).
- (6) Condition (1); this value is determined on the basis of measurements taken in accordance with the UNI EN ISO 9614-1.
- (7) This value is calculated from the sound power level using ISO 3744: 2010, referred to 10 m distance from the unit.
- (8) Cooling "BT version": Outdoor air temperature 35°C, Internal heat exchanger water temperature = -3/-8°C. Fluid mixed with ethylene glycol

at 35%.

(9) Calculated using AHRI 551/591 (SI) standard.

**N.B. The performance data are indicative and could be subject to change. In addition, the performances declared in (1), (2) and (8) refer to the instantaneous power according to UNI EN 14511. The declared data in (3) are determined according to UNI EN 14825.**

## 12.2 HEAT PUMP TECHNICAL SHEET

**Operating conditions, in accordance with 14511:2018:**

(1) Internal heat-exchanger water temperature = 12/7 ° C, external heat exchanger air intake temperature 35°C.

(2) Internal heat exchanger water temperature = 23/18°C, external heat-exchanger air intake temperature 35°C.

(3) Internal exchanger water temperature = 30/35 ° C, air temperature entering the external exchanger = 7 ° C D.B./6°C W.B.

(4) Internal exchanger water temperature = 40/45 ° C, air temperature entering the external exchanger = 7 ° C D.B./6°C W.B.

(5) Internal heat-exchanger water temperature reference = 12/7°C.

(6) Average climatic conditions; T<sub>biv</sub>=-7°C, internal heat exchanger water temperature = 30/35°C

(7) The data are indicative and could be subject to change. For the correct data, always refer to the technical label stuck on the unit.

(8) The volume indicated refers to the total required, the designer must meet it considering the quantity already present inside the unit in function of the hydronic kit chosen (please check this value in the technical data sheet).

(9) Condition (1); this value is determined on the basis of measurements taken in accordance with the UNI EN ISO 9614-1.

(10) This value is calculated from the sound power level using ISO 3744: 2010, referred to 10 m distance from the unit.

**N.B. The performance data are indicative and could be subject to change. In addition, the performances declared in (1), (2), (3) and (4) refer to the instantaneous power according to UNI EN 14511. The declared data in (5), (6) are determined according to UNI EN 14825.**

| Technical specifications               |  | Unit   | HWA1-A/H model              |                             |                                   |                                   |                                   |                                   |
|--|--|--------|-----------------------------|-----------------------------|-----------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|
|  |  |        | 02109                       | 02121                       | 02142                             | 02148                             | 02160                             | 04176                             |
| Cooling                                | Cooling capacity (1)                                       | kW     | 103                         | 113                         | 132                               | 138                               | 148                               | 165                               |
|  | Total power input (1)                                      | kW     | 33,8                        | 38,9                        | 41,3                              | 44,4                              | 49,8                              | 52,6                              |
|  | EER (1)  | W/W    | 3,05                        | 2,90                        | 3,19                              | 3,11                              | 2,97                              | 3,14                              |
|  | Cooling capacity (2)                                       | kW     | 139                         | 151                         | 177                               | 188                               | 202                               | 224                               |
|  | Total power input (2)                                      | kW     | 36,5                        | 42,7                        | 44,1                              | 47,7                              | 53,0                              | 55,7                              |
|  | EER (2)  | W/W    | 3,81                        | 3,53                        | 4,01                              | 3,94                              | 3,82                              | 4,01                              |
|  | SEER (5)   | W/W    | 4,35                        | 4,36                        | 4,38                              | 4,73                              | 4,50                              | 4,61                              |
|  | Cooling capacity (11)                                      | kW     | 63,0                        | 68,4                        | 78,9                              | 82,4                              | 90,6                              | 97,4                              |
|  | Total power input (11)                                     | kW     | 30,2                        | 34,8                        | 37,6                              | 40,1                              | 44,8                              | 48,7                              |
|  | EER (11)   | W/W    | 2,09                        | 1,97                        | 2,10                              | 2,05                              | 2,02                              | 2,00                              |
| Water flow (1)                         | l/s  | 4,9    | 5,4                         | 6,3                         | 6,6                               | 7,1                               | 7,9                               |                                   |
| Press. drop on use-side heat exch. (1) | kPa  | 21,7   | 20,1                        | 26,5                        | 24,3                              | 20,2                              | 21,7                              |                                   |
| Heating                                | Heating capacity (3)                                       | kW     | 113                         | 125                         | 148                               | 154                               | 166                               | 188                               |
|  | Total power input (3)                                      | kW     | 27,6                        | 30,9                        | 36,6                              | 37,7                              | 41,4                              | 46,0                              |
|  | COP (3)  | W/W    | 4,09                        | 4,05                        | 4,04                              | 4,08                              | 4,01                              | 4,08                              |
|  | Heating capacity (4)                                       | kW     | 108                         | 120                         | 142                               | 148                               | 160                               | 179                               |
|  | Total power input (4)                                      | kW     | 32,9                        | 37,5                        | 43,9                              | 45,3                              | 49,4                              | 55,9                              |
|  | COP (4)  | W/W    | 3,30                        | 3,20                        | 3,22                              | 3,26                              | 3,23                              | 3,21                              |
|  | SCOP (6)   | W/W    | 3,72                        | 3,77                        | 3,62                              | 3,69                              | 3,68                              | 3,90                              |
|  | Water flow (4)   | l/s    | 5,20                        | 5,78                        | 6,80                              | 6,96                              | 7,68                              | 8,62                              |
|  | Press. drop on use-side heat exch. (4)                     | kPa    | 24,2                        | 22,9                        | 30,6                              | 28,4                              | 24,0                              | 26,6                              |
| Water heating energy eff. 35°C/55°C    | classe   | A+/A+  | A+/A+                       | A+/A+                       | A+/A+                             | A+/A+                             | A++/A+                            |                                   |
| Compressor                             | Type   |        | SCROLL                      |                             |                                   |                                   |                                   |                                   |
|  | Refrigerant oil (type)                                     |        | Emkarate RL 32 3MAF         |                             |                                   |                                   |                                   |                                   |
|  | Number   | Nr     | 2                           | 2                           | 2                                 | 2                                 | 2                                 | 2                                 |
|  | Capacity steps Std   | Nr     | 2                           | 3                           | 2                                 | 3                                 | 3                                 | 4                                 |
|  | Oil charge (Circuit 1)                                     | l      | 4,44 + 4,44                 | 4,44 + 4,44                 | 4,44 + 4,44                       | 6,3 + 4,44                        | 6,3 + 4,44                        | 3,25 + 3,25                       |
|  | Oil charge (Circuit 2)                                     | l      | -                           | -                           | -                                 | -                                 | -                                 | 3,25 + 3,25                       |
|  | Refrigerant circuits                                       | Nr     | 1                           | 1                           | 1                                 | 1                                 | 1                                 | 2                                 |
| Refrigerant                            | Type   |        | R410A                       |                             |                                   |                                   |                                   |                                   |
|  | Refrigerant charge (Circuit 1) (7)                         | kg     | 26,5                        | 27,0                        | 34,5                              | 42,0                              | 40,0                              | 22,0                              |
|  | Refrigerant charge (Circuit 2) (7)                         | kg     | -                           | -                           | -                                 | -                                 | -                                 | 22,0                              |
|  | Quantity of CO2 equivalent (7)                             | ton    | 55,3                        | 56,4                        | 72,0                              | 87,7                              | 83,5                              | 91,9                              |
|  | Design pressure (high/low)                                 | bar    | 40,5/2,5                    | 40,5/2,5                    | 40,5/2,5                          | 40,5/2,5                          | 40,5/2,5                          | 40,5/2,5                          |
| External zone fan motors               | Type   |        | ASSIALE                     |                             |                                   |                                   |                                   |                                   |
|  | Number of fans   | Nr     | 2                           | 2                           | 3                                 | 3                                 | 3                                 | 4                                 |
|  | Rated power (1)  | kW     | 1,4                         | 1,4                         | 1,4                               | 1,4                               | 1,4                               | 1,4                               |
|  | Max power input  | kW     | 3,80                        | 3,80                        | 5,70                              | 5,70                              | 5,70                              | 7,60                              |
|  | Max input current  | A      | 3,9                         | 3,9                         | 3,9                               | 3,9                               | 3,9                               | 3,9                               |
|  | Standard air flow  | l/s    | 10021                       | 9984                        | 15109                             | 15088                             | 15045                             | 20954                             |
| Internal heat exchanger                | Internal heat exchanger type                               |        | PHE - A PIASTRE             |                             |                                   |                                   |                                   |                                   |
|  | Number of internal heat exchanger                          | Nr     | 1                           | 1                           | 1                                 | 1                                 | 1                                 | 1                                 |
|  | Water content  | l      | 6,87                        | 6,87                        | 7,88                              | 7,88                              | 8,89                              | 11,40                             |
| Hydraulic circuit                      | Max pressure on water side                                 | bar    | 12                          | 12                          | 12                                | 12                                | 12                                | 12                                |
|  | Max press. on hydronic kit side (relief valve calibration) | bar    | 6                           | 6                           | 6                                 | 6                                 | 6                                 | 6                                 |
|  | Water connections  |        | 2" 1/2                      | 2" 1/2                      | 2" 1/2                            | 2" 1/2                            | 2" 1/2                            | 3"                                |
|  | Min content of water plant (8)                             | l      | 490                         | 630                         | 630                               | 820                               | 820                               | 480                               |
| Sound levels                           | Sound power (9)  | dB (A) | 88 std/<br>87 SL/<br>84 SSL | 88 std/<br>87 SL/<br>84 SSL | 88 std/<br>87 SL/<br>84 SSL       | 88 std/<br>87 SL/<br>84 SSL       | 88 std/<br>87 SL/<br>84 SSL       | 89 std/<br>88 SL/<br>85 SSL       |
|  | Sound pressure (10)  | dB (A) | 56 std/<br>55 SL/<br>52 SSL | 56 std/<br>55 SL/<br>52 SSL | 55,9 std/<br>54,9 SL/<br>51,9 SSL | 55,9 std/<br>54,9 SL/<br>51,9 SSL | 55,9 std/<br>54,9 SL/<br>51,9 SSL | 56,9 std/<br>55,9 SL/<br>52,9 SSL |
| Electrical data                        | Power supply   |        | 400V/3P/50Hz                |                             |                                   |                                   |                                   |                                   |
|  | Max power input (no access. version)                       | kW     | 48,9                        | 55,0                        | 63,1                              | 66,9                              | 73,0                              | 87,9                              |
|  | Max curr. input (no access. version)                       | A      | 83,0                        | 93,4                        | 107,1                             | 113,5                             | 123,9                             | 149,2                             |
|  | Max start-up curr. (no access. version)                    | A      | 285,6                       | 332,3                       | 346,0                             | 358,1                             | 368,5                             | 289,2                             |
| Dimensions and weights                 | A - Length   | mm     | 2860                        | 2860                        | 4060                              | 4060                              | 4060                              | 2860                              |
|  | B - Width  | mm     | 1100                        | 1100                        | 1100                              | 1100                              | 1100                              | 2200                              |
|  | C - Height   | mm     | 2350                        | 2350                        | 2350                              | 2350                              | 2350                              | 2350                              |
|  | Shipping net weight  | kg     | 1180                        | 1210                        | 1470                              | 1530                              | 1530                              | 2030                              |
|  | Weight in operation  | kg     | 1190                        | 1220                        | 1480                              | 1540                              | 1540                              | 2040                              |

| Technical specifications               |  | Unit   | HWA1-A/H model                    |                                   |                                   |                                   |                                   |                                   |
|--|--|--------|-----------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|
|  |  |        | 04199                             | 04215                             | 04237                             | 04273                             | 04304                             | 04345                             |
| Cooling                                | Cooling capacity (1)                                       | kW     | 187                               | 208                               | 225                               | 260                               | 289                               | 325                               |
|  | Total power input (1)                                      | kW     | 59,4                              | 67,2                              | 77,5                              | 80,6                              | 92,9                              | 112                               |
|  | EER (1)  | W/W    | 3,15                              | 3,10                              | 2,90                              | 3,22                              | 3,10                              | 2,90                              |
|  | Cooling capacity (2)                                       | kW     | 252                               | 282                               | 301                               | 351                               | 388                               | 434                               |
|  | Total power input (2)                                      | kW     | 63,8                              | 71,6                              | 83,2                              | 87,0                              | 101                               | 122                               |
|  | EER (2)  | W/W    | 3,95                              | 3,94                              | 3,62                              | 4,04                              | 3,86                              | 3,56                              |
|  | SEER (5)   | W/W    | 4,64                              | 4,71                              | 4,53                              | 4,65                              | 4,73                              | 4,42                              |
|  | Cooling capacity (11)                                      | kW     | 111                               | 129                               | 140                               | 155                               | 177                               | 203                               |
|  | Total power input (11)                                     | kW     | 54,3                              | 60,0                              | 69,4                              | 72,3                              | 84,2                              | 99,9                              |
|  | EER (11)   | W/W    | 2,04                              | 2,15                              | 2,02                              | 2,14                              | 2,10                              | 2,03                              |
|  | Water flow (1)   | l/s    | 8,9                               | 10,0                              | 10,8                              | 12,4                              | 13,8                              | 15,5                              |
| Press. drop on use-side heat exch. (1) | kPa  | 26,5   | 24,7                              | 27,2                              | 18,8                              | 24,9                              | 17,9                              |                                   |
| Heating                                | Heating capacity (3)                                       | kW     | 207                               | 223                               | 246                               | 286                               | 316                               | 356                               |
|  | Total power input (3)                                      | kW     | 50,7                              | 54,8                              | 61,1                              | 69,2                              | 78,3                              | 88,5                              |
|  | COP (3)  | W/W    | 4,09                              | 4,07                              | 4,02                              | 4,13                              | 4,04                              | 4,02                              |
|  | Heating capacity (4)                                       | kW     | 198                               | 214                               | 237                               | 273                               | 303                               | 344                               |
|  | Total power input (4)                                      | kW     | 61,5                              | 66,0                              | 74,0                              | 83,8                              | 94,7                              | 108                               |
|  | COP (4)  | W/W    | 3,22                              | 3,24                              | 3,20                              | 3,26                              | 3,20                              | 3,20                              |
|  | SCOP (6)   | W/W    | 3,84                              | 3,96                              | 4,00                              | 3,92                              | 3,95                              | 4,01                              |
|  | Water flow (4)   | l/s    | 9,54                              | 10,29                             | 11,38                             | 13,13                             | 14,59                             | 16,57                             |
|  | Press. drop on use-side heat exch. (4)                     | kPa    | 31,9                              | 27,6                              | 30,5                              | 22,9                              | 29,1                              | 22,3                              |
|  | Water heating energy eff. 35°C/55°C                        | classe | A++/A+                            | A++/A+                            | A++/A+                            | A++/A+                            | A++/A+                            | A++/A+                            |
| Compressor                             | Type   |        | SCROLL                            |                                   |                                   |                                   |                                   |                                   |
|  | Refrigerant oil (type)                                     |        | Emkarate RL 32 3MAF               |                                   |                                   |                                   |                                   |                                   |
|  | Number   | Nr     | 4                                 | 4                                 | 4                                 | 4                                 | 4                                 | 4                                 |
|  | Capacity steps Std   | Nr     | 6                                 | 4                                 | 6                                 | 5                                 | 5                                 | 5                                 |
|  | Oil charge (Circuit 1)                                     | l      | 4,44 + 3,25                       | 4,44 + 4,44                       | 4,44 + 4,44                       | 6,3 + 4,44                        | 6,3 + 6,3                         | 6,3 + 6,3                         |
|  | Oil charge (Circuit 2)                                     | l      | 4,44 + 3,25                       | 4,44 + 4,44                       | 4,44 + 4,44                       | 4,44 + 4,44                       | 4,44 + 4,44                       | 4,44 + 4,44                       |
|  | Refrigerant circuits                                       | Nr     | 2                                 | 2                                 | 2                                 | 2                                 | 2                                 | 2                                 |
| Refrigerant                            | Type   |        | R410A                             |                                   |                                   |                                   |                                   |                                   |
|  | Refrigerant charge (Circuit 1) (7)                         | kg     | 18,0                              | 25,5                              | 28,5                              | 43,0                              | 47,0                              | 50,0                              |
|  | Refrigerant charge (Circuit 2) (7)                         | kg     | 18,0                              | 24,0                              | 28,5                              | 36,0                              | 34,0                              | 30,0                              |
|  | Quantity of CO2 equivalent (7)                             | ton    | 75,2                              | 103,4                             | 119,0                             | 165,0                             | 169,1                             | 167,0                             |
|  | Design pressure (high/low)                                 | bar    | 40,5/2,5                          | 40,5/2,5                          | 40,5/2,5                          | 40,5/2,5                          | 40,5/2,5                          | 40,5/2,5                          |
| External zone fan motors               | Type   |        | ASSIALE                           |                                   |                                   |                                   |                                   |                                   |
|  | Number of fans   | Nr     | 4                                 | 4                                 | 4                                 | 6                                 | 6                                 | 6                                 |
|  | Rated power (1)  | kW     | 1,4                               | 1,4                               | 1,4                               | 1,4                               | 1,4                               | 1,4                               |
|  | Max power input  | kW     | 7,60                              | 7,60                              | 7,60                              | 11,40                             | 11,40                             | 11,40                             |
|  | Max input current  | A      | 3,9                               | 3,9                               | 3,9                               | 3,9                               | 3,9                               | 3,9                               |
|  | Standard air flow  | l/s    | 20888                             | 20815                             | 20738                             | 31370                             | 31264                             | 31109                             |
| Internal heat exchanger                | Internal heat exchanger type                               |        | PHE - A PIASTRE                   |                                   |                                   |                                   |                                   |                                   |
|  | Number of internal heat exchanger                          | Nr     | 1                                 | 1                                 | 1                                 | 1                                 | 1                                 | 1                                 |
|  | Water content  | l      | 11,40                             | 11,40                             | 15,50                             | 15,50                             | 22,10                             | 22,10                             |
| Hydraulic circuit                      | Max pressure on water side                                 | bar    | 12                                | 12                                | 12                                | 12                                | 12                                | 12                                |
|  | Max press. on hydronic kit side (relief valve calibration) | bar    | 6                                 | 6                                 | 6                                 | 6                                 | 6                                 | 6                                 |
|  | Water connections  |        | 3"                                | 3"                                | 3"                                | 3"                                | 3"                                | 3"                                |
|  | Min content of water plant (8)                             | l      | 610                               | 610                               | 780                               | 1020                              | 1020                              | 1290                              |
| Sound levels                           | Sound power (9)  | dB (A) | 89 std/<br>88 SL/<br>85 SSL       | 89 std/<br>88 SL/<br>85 SSL       | 90 std/<br>89 SL/<br>86 SSL       | 90 std/<br>89 SL/<br>86 SSL       | 91 std/<br>90 SL/<br>87 SSL       | 92 std/<br>91 SL/<br>88 SSL       |
|  | Sound pressure (10)  | dB (A) | 56,9 std/<br>55,9 SL/<br>52,9 SSL | 56,9 std/<br>55,9 SL/<br>52,9 SSL | 57,9 std/<br>56,9 SL/<br>53,9 SSL | 57,8 std/<br>56,9 SL/<br>53,9 SSL | 58,8 std/<br>57,8 SL/<br>54,8 SSL | 59,8 std/<br>58,8 SL/<br>55,8 SSL |
| Electrical data                        | Power supply   |        | 400V/3P/50Hz                      |                                   |                                   |                                   |                                   |                                   |
|  | Max power input (no access. version)                       | kW     | 92,8                              | 97,8                              | 110,0                             | 123,8                             | 139,8                             | 160,1                             |
|  | Max curr. input (no access. version)                       | A      | 157,6                             | 166,0                             | 186,8                             | 210,2                             | 237,4                             | 271,8                             |
|  | Max start-up curr. (no access. version)                    | A      | 360,2                             | 368,6                             | 425,7                             | 454,8                             | 482,0                             | 597,2                             |
| Dimensions and weights                 | A - Length   | mm     | 2860                              | 2860                              | 2860                              | 4060                              | 4060                              | 4060                              |
|  | B - Width  | mm     | 2200                              | 2200                              | 2200                              | 2200                              | 2200                              | 2200                              |
|  | C - Height   | mm     | 2350                              | 2350                              | 2350                              | 2350                              | 2350                              | 2350                              |
|  | Shipping net weight  | kg     | 2060                              | 2100                              | 2130                              | 2680                              | 2880                              | 2900                              |
|  | Weight in operation  | kg     | 2070                              | 2110                              | 2140                              | 2700                              | 2900                              | 2930                              |

**12.3 ELECTRICAL DATA OF THE UNITS AND AUXILIARY ELEMENTS**

|                                  |        |               |
|----------------------------------|--------|---------------|
| Power supply of the unit         | V/~/Hz | 400/3PH+PE/50 |
| Onboard controller power supply  | V/~/Hz | 12/1/50       |
| Remote controller's power supply | V/~/Hz | 12/1/50       |
| Fan motors power supply          | V/~/Hz | 400/3PH+PE/50 |

Note: Electric data may change for updating. It is therefore necessary to refer always to the technical data label attached on right-side panel of the unit.

| Dimensions  | Unit | HWA1-A/H model |       |       |       |       |       |
|---|------|----------------|-------|-------|-------|-------|-------|
|   |      | 02109          | 02121 | 02142 | 02148 | 02160 | 04176 |
| <b>F.L.A. Input current input at the maximum allowable conditions</b> |      |                |       |       |       |       |       |
| F.L.A. Compressor 1   | A    | 38,2           | 48,6  | 48,6  | 65,4  | 65,4  | 34,0  |
| F.L.A. Compressor 2   | A    | 38,2           | 38,2  | 48,6  | 38,2  | 48,6  | 34,0  |
| F.L.A. Compressor 3   | A    | -              | -     | -     | -     | -     | 34,0  |
| F.L.A. Compressor 4   | A    | -              | -     | -     | -     | -     | 34,0  |
| F.L.A. Fan motors   | A    | 6,6            | 6,6   | 9,9   | 9,9   | 9,9   | 13,2  |
| <b>L.R.A. Startup current (locked rotor)</b>                          |      |                |       |       |       |       |       |
| L.R.A. Compressor 1   | A    | 240,8          | 287,5 | 287,5 | 310,0 | 310,0 | 174,0 |
| L.R.A. Compressor 2   | A    | 240,8          | 240,8 | 287,5 | 240,8 | 287,5 | 174,0 |
| L.R.A. Compressor 3   | A    | -              | -     | -     | -     | -     | 174,0 |
| L.R.A. Compressor 4   | A    | -              | -     | -     | -     | -     | 174,0 |
| <b>Whole unit</b>   |      |                |       |       |       |       |       |
| Max power input   | kW   | 48,9           | 55,0  | 63,1  | 66,9  | 73,0  | 87,9  |
| Max current input   | A    | 83,0           | 93,4  | 107,1 | 113,5 | 123,9 | 149,2 |
| L.R.A.  | A    | 285,6          | 332,3 | 346,0 | 358,1 | 368,5 | 289,2 |
| F.L.A.  | A    | 83,0           | 93,4  | 107,1 | 113,5 | 123,9 | 149,2 |
| F.L.I.  | kW   | 41,7           | 44,7  | 47,3  | 50,7  | 56,9  | 60,6  |

| Dimensions  | Unit | HWA1-A/H model |       |       |       |       |       |
|---|------|----------------|-------|-------|-------|-------|-------|
|   |      | 04199          | 04215 | 04237 | 04273 | 04304 | 04345 |
| <b>F.L.A. Input current input at the maximum allowable conditions</b> |      |                |       |       |       |       |       |
| F.L.A. Compressor 1   | A    | 38,2           | 38,2  | 48,6  | 65,4  | 65,4  | 82,6  |
| F.L.A. Compressor 2   | A    | 34,0           | 38,2  | 38,2  | 48,6  | 65,4  | 82,6  |
| F.L.A. Compressor 3   | A    | 38,2           | 38,2  | 38,2  | 38,2  | 38,2  | 38,2  |
| F.L.A. Compressor 4   | A    | 34,0           | 38,2  | 48,6  | 38,2  | 48,6  | 48,6  |
| F.L.A. Fan motors   | A    | 13,2           | 13,2  | 13,2  | 19,8  | 19,8  | 19,8  |
| <b>L.R.A. Startup current (locked rotor)</b>                          |      |                |       |       |       |       |       |
| L.R.A. Compressor 1   | A    | 240,8          | 240,8 | 287,5 | 310,0 | 310,0 | 408,0 |
| L.R.A. Compressor 2   | A    | 174,0          | 240,8 | 240,8 | 287,5 | 310,0 | 408,0 |
| L.R.A. Compressor 3   | A    | 240,8          | 240,8 | 240,8 | 240,8 | 240,8 | 240,8 |
| L.R.A. Compressor 4   | A    | 174,0          | 240,8 | 287,5 | 240,8 | 287,5 | 287,5 |
| <b>Whole unit</b>   |      |                |       |       |       |       |       |
| Max power input   | kW   | 92,8           | 97,8  | 110   | 124   | 140   | 160   |
| Max current input   | A    | 157,6          | 166,0 | 186,8 | 210,2 | 237,4 | 271,8 |
| L.R.A.  | A    | 360,2          | 368,6 | 425,7 | 454,8 | 482,0 | 597,2 |
| F.L.A.  | A    | 157,6          | 166,0 | 186,8 | 210,2 | 237,4 | 271,8 |
| F.L.I.  | kW   | 68,2           | 76,8  | 89,1  | 92,6  | 107   | 130   |

| Dimensions  | Unit | HWA1-A model |       |       |       |       |       |
|---|------|--------------|-------|-------|-------|-------|-------|
|   |      | 02106        | 02120 | 02128 | 02140 | 04155 | 04177 |
| <b>F.L.A. Input current input at the maximum allowable conditions</b> |      |              |       |       |       |       |       |
| F.L.A. Compressor 1   | A    | 38,2         | 38,2  | 48,6  | 38,2  | 34,0  | 38,2  |
| F.L.A. Compressor 2   | A    | 38,2         | 48,6  | 48,6  | 65,4  | 34,0  | 38,2  |
| F.L.A. Compressor 3   | A    | -            | -     | -     | -     | 31    | 31,0  |
| F.L.A. Compressor 4   | A    | -            | -     | -     | -     | 31    | 31,0  |
| F.L.A. Fan motors   | A    | 6,6          | 6,6   | 6,6   | 9,9   | 9,9   | 9,9   |
| <b>L.R.A. Startup current (locked rotor)</b>                          |      |              |       |       |       |       |       |
| L.R.A. Compressor 1   | A    | 240,8        | 240,8 | 287,5 | 240,8 | 174,0 | 240,8 |
| L.R.A. Compressor 2   | A    | 240,8        | 287,5 | 287,5 | 310,0 | 174,0 | 240,8 |
| L.R.A. Compressor 3   | A    | -            | -     | -     | -     | 140,0 | 140,0 |
| L.R.A. Compressor 4   | A    | -            | -     | -     | -     | 140,0 | 140,0 |
| <b>Whole unit</b>   |      |              |       |       |       |       |       |
| Max power input   | kW   | 48,9         | 55,0  | 61,1  | 66,9  | 82,4  | 87,4  |
| Max current input   | A    | 83,0         | 93,4  | 103,8 | 113,5 | 139,9 | 148,3 |
| L.R.A.  | A    | 285,6        | 332,3 | 342,7 | 358,1 | 279,9 | 350,9 |
| F.L.A.  | A    | 83,0         | 93,4  | 103,8 | 113,5 | 139,9 | 148,3 |
| F.L.I.  | kW   | 42,6         | 48,5  | 55,6  | 56,3  | 63,9  | 72,7  |

| Dimensions  | Unit | HWA1-A model |       |       |       |       |       |
|---|------|--------------|-------|-------|-------|-------|-------|
|   |      | 04184        | 04209 | 04239 | 04258 | 04305 | 04349 |
| <b>F.L.A. Input current input at the maximum allowable conditions</b> |      |              |       |       |       |       |       |
| F.L.A. Compressor 1   | A    | 38,2         | 38,2  | 38,2  | 48,6  | 48,6  | 65,4  |
| F.L.A. Compressor 2   | A    | 38,2         | 38,2  | 48,6  | 48,6  | 65,4  | 65,4  |
| F.L.A. Compressor 3   | A    | 34,0         | 38,2  | 38,2  | 48,6  | 48,6  | 65,4  |
| F.L.A. Compressor 4   | A    | 34,0         | 38,2  | 48,6  | 48,6  | 65,4  | 65,4  |
| F.L.A. Fan motors   | A    | 9,9          | 13,2  | 13,2  | 13,2  | 19,8  | 19,8  |
| <b>L.R.A. Startup current (locked rotor)</b>                          |      |              |       |       |       |       |       |
| L.R.A. Compressor 1   | A    | 240,8        | 240,8 | 240,8 | 287,5 | 287,5 | 310,0 |
| L.R.A. Compressor 2   | A    | 240,8        | 240,8 | 287,5 | 287,5 | 310,0 | 310,0 |
| L.R.A. Compressor 3   | A    | 174,0        | 240,8 | 240,8 | 287,5 | 287,5 | 310,0 |
| L.R.A. Compressor 4   | A    | 174,0        | 240,8 | 287,5 | 287,5 | 310,0 | 310,0 |
| <b>Whole unit</b>   |      |              |       |       |       |       |       |
| Max power input   | kW   | 90,9         | 97,8  | 110   | 122   | 146   | 166   |
| Max current input   | A    | 154,3        | 166,0 | 186,8 | 207,6 | 247,8 | 281,4 |
| L.R.A.  | A    | 356,9        | 368,6 | 425,7 | 446,5 | 492,4 | 526,0 |
| F.L.A.  | A    | 154,3        | 166,0 | 186,8 | 207,6 | 247,8 | 281,4 |
| F.L.I.  | kW   | 78,7         | 85,3  | 97,0  | 112   | 125   | 143   |

## 13. OPERATING LIMITS

### 13.1 EVAPORATOR WATER FLOW RATE

The nominal water flow rate is referred to a  $\Delta T=5^{\circ}\text{C}$ , between the evaporator's inlet and outlet temperatures. The allowed maximum water flow rate is that corresponding to  $\Delta T=3^{\circ}\text{C}$ , the allowed minimum water flow rate is that corresponding to  $\Delta T=8^{\circ}\text{C}$ , at the standard rating conditions as indicated in technical sheet.



**Insufficient values of water flow may produce too low evaporating temperatures according to the operating status with the intervention of safety devices which would stop the unit and, in some particular cases, the water can freeze in the evaporator coil which can breakdown the refrigeration circuit**

We enclosed below a most accurate table showing the minimum water flow that should be ensured for the plate heat exchanger in order to have the proper operation of unit as a function of the model (note: the safety device is used for preventing the freezing sensor from failure in the case of insufficient water flow but it does not ensure the minimum flow rate required in order the unit can work properly).

| HWA1-A/H model   | 02109 | 02121 | 02142 | 02148 | 02160 | 04176 | 04199 | 04215 | 04237 | 04273 | 04304 | 04345 |
|--|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Minimum water flow to be assured in chiller mode (condition (1) technical sheet) [l/s] | 3,1   | 3,4   | 3,9   | 4,1   | 4,4   | 4,9   | 5,6   | 6,2   | 6,7   | 7,8   | 8,6   | 9,7   |
| Maximum water flow to be assured in chiller mode (condition (1) technical sheet) [l/s] | 8,2   | 9,0   | 10,5  | 11,0  | 11,8  | 13,2  | 14,9  | 16,6  | 17,9  | 20,7  | 23,0  | 25,8  |
| Minimum safety device water flow rate* [l/s]   | 1,72  | 1,72  | 1,96  | 1,96  | 2,20  | 2,62  | 2,62  | 2,62  | 3,44  | 3,44  | 4,55  | 4,55  |
| Maximum safety device water flow rate* [l/s]   | 1,85  | 1,85  | 2,11  | 2,11  | 2,36  | 2,81  | 2,81  | 2,81  | 3,69  | 3,69  | 4,89  | 4,89  |

| HWA1-A model   | 02106 | 02120 | 02128 | 02140 | 04155 | 04177 | 04184 | 04209 | 04239 | 04258 | 04305 | 04349 |
|--|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Minimum water flow to be assured in chiller mode (condition (1) technical sheet) [l/s] | 3,1   | 3,6   | 3,8   | 4,2   | 4,6   | 5,3   | 5,5   | 6,2   | 7,1   | 7,7   | 9,1   | 10,4  |
| Maximum water flow to be assured in chiller mode (condition (1) technical sheet) [l/s] | 8,4   | 9,5   | 10,2  | 11,1  | 12,3  | 14,1  | 14,6  | 16,6  | 19,0  | 20,5  | 24,3  | 27,8  |
| Minimum safety device water flow rate* [l/s]   | 1,72  | 1,72  | 2,43  | 1,96  | 2,18  | 2,62  | 2,62  | 2,62  | 3,44  | 4,55  | 4,55  | 4,55  |
| Maximum safety device water flow rate* [l/s]   | 1,85  | 1,85  | 2,61  | 2,11  | 2,33  | 2,81  | 2,81  | 2,81  | 3,69  | 4,89  | 4,89  | 4,89  |

\* When the flow rate drops below the indicated limit (safety device minimum water flow rate) the safety device issues an alarm, which may be reset only upon reaching the maximum indicated flow rate.

As a first approach, for units with pump and in case of absence of other detection systems, the correct flow rate to ensure the best performance of the unit can be verified with maximum speed of the circulating pump, checking with the manometers the pressure difference between the return and the water delivery on the hydraulic connections installed outside of the unit and make sure that such value is equal to or lower than the available head pressure indicated on the curves given technical manual for the respective models, (if necessary, please change the settings of the circulator, see the control manual).

### 13.2 CHILLED WATER PRODUCTION (SUMMER OPERATION)

The minimum temperature that is allowed of the user exchanger outlet is 4°C: for lowest temperatures the BT version units which guarantees the operation of the outgoing water temperatures down to -8°C. In case of lower outdoor temperatures, please contact our company for the feasibility study and evaluation of changes to be made according to your needs. The maximum temperature that can be maintained at the outlet of the evaporator is 18°C. Higher temperatures (up to a maximum of 40°C) can anyway be tolerated during transition phases and in the start-up stages of the system.

### 13.3 HOT WATER PRODUCTION (WINTER OPERATION)

Once the system is working at the right temperature, the inlet hot water temperature should not be lower than 25°C; the lowest values which are not related to transition phases or start-up stages may cause system's failure with possible damages to compressor. The maximum outlet water temperature should not exceed 58°C. At this temperature, the power consumption and performance in terms of C.O.P. are enhanced if the outdoor air temperature is higher than 5°C, even if the unit is still able to work up to the limit of -10°C (-20°C with CC accessory) with hot water production at 38°C.

For higher temperatures than those pointed out, especially if have a concomitant with the reduction of the water flow rate, it may cause abnormalities to the normal operation of the unit, or the safety devices may act in critical situations.

### 13.4 AMBIENT TEMPERATURE OPERATING LIMITS AND RECAPITULATIVE TABLE

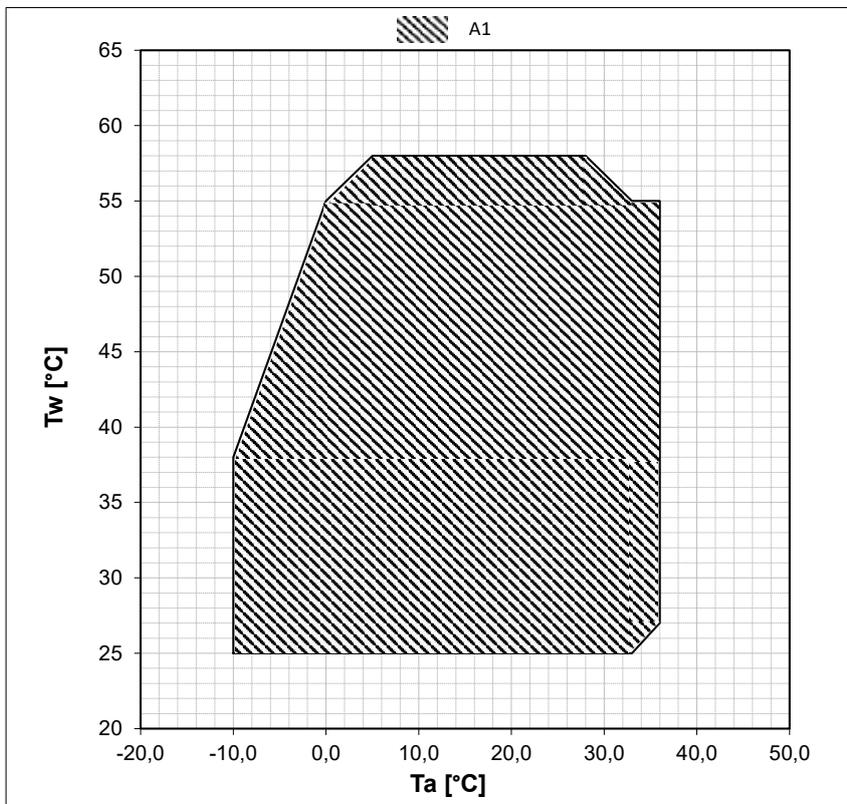
The heat pump units are designed and manufactured to operate in summer mode regime, with the condensation control. For the cooling only versions the outside air temperature can reach up to 50°C. In heating mode, the allowed range of the outdoor temperature goes from -10°C (-20°C with CC accessory) to +36°C depending on the water outlet temperature as indicated in the below tables.

#### Operating limits

| HWA1-A/H: Water chiller mode              |                                     |           |
|---|-------------------------------------|-----------|
| Ambient temperature standard version      | Min -10°C (-20°C with CC accessory) | Max +46°C |
| Water outlet temperature standard version | Min +4°C                            | Max +18°C |
| Ambient temperature (BT version)          | Min -20°C                           | Max +46°C |
| Water outlet temperature (BT version)     | Min -8°C                            | Max +18°C |
| HWA1-A/H: Heat pump mode                  |                                     |           |
| Ambient temperature                       | Min -10 °C                          | Max +36°C |
| Water outlet temperature                  | Min +25 °C                          | Max +58°C |
| HWA1-A                                    |                                     |           |
| Ambient temperature standard version      | Min -20°C                           | Max +50°C |

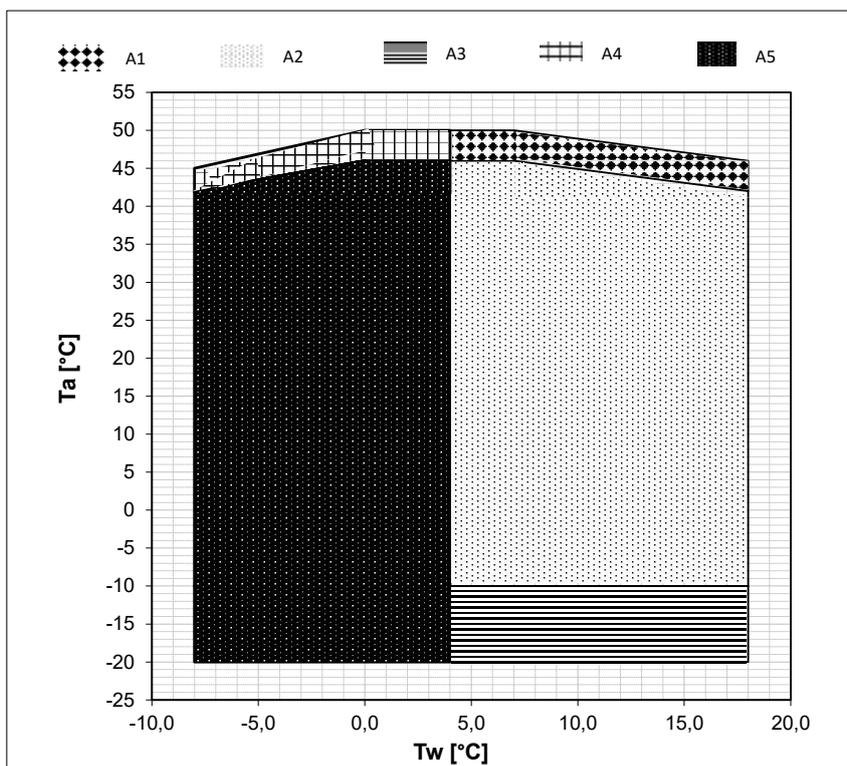
| HWA1-A                                    |           |           |
|---|-----------|-----------|
| Water outlet temperature standard version | Min +4°C  | Max +18°C |
| Ambient temperature (BT version)          | Min -20°C | Max +50°C |
| Water outlet temperature (BT version)     | Min -8°C  | Max +18°C |

## HWA1-A/H HEATING MODE



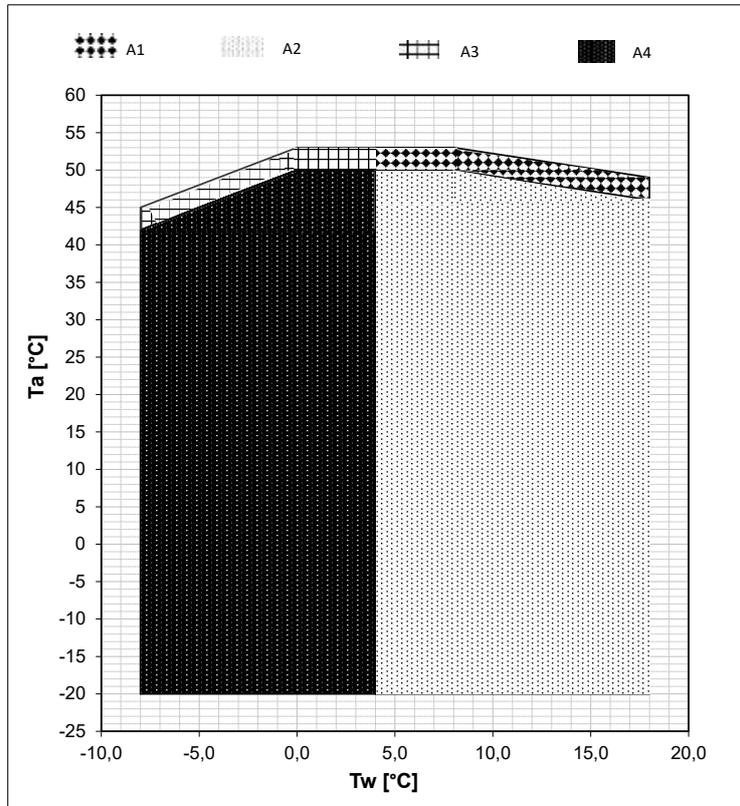
A1 = HWA1-A/H heating

## HWA1-A/H COOLING MODE



- A1 = HWA1-A/H cooling partial load
- A2 = HWA1-A/H cooling
- A3 = HWA1-A/H cooling with CC accessory up to -20°C
- A4 = HWA1-A/H BT partial load
- A5 = HWA1-A/H BT

**HWA1-A**



- A1 = HWA1-A partial load
- A2 = HWA1-A
- A3 = HWA1-A BT partial load
- A4 = HWA1-A BT

### 14. USER – ONBOARD CONTROLLER INTERFACE

The unit is equipped with the display seen below having a transparent polycarbonate hinged door and its protection rating is IP67. The interface consists of a variable text part and a series of icons identifying the operation of the unit as shown in the table below.



|  |   |
|--|---|
| Cooling mode LED: LED is ON if COOL or COOL+SAN mode is selected.  |    |
| Heating mode LED: LED is ON if HEAT or HEAT+SAN mode is selected.  |    |
| Pump LED: LED is ON if the pump is active.   |    |
| Alarm LED: LED is ON if an alarm is active.  |    |
| Defrosting LED: LED flashes to enter in defrosting mode, it is on when defrosting is in progress.                                    |  |
| Compressor LED: LED flashes if the compressor is starting, ON if the compressor is active  |  |
| DHW LED: LED flashes if DHW mode is in operation, LED is ON if COOL or COOL+SAN or HEAT+SAN mode is selected and DHW is not ongoing. |  |
| Antifreeze E-heater LED: LED is ON if the antifreeze electric heater is active.  |  |

The buttons have specific features as shown below:

|   |   |
|---|---|
| It is used to select the operating mode, and to reset the manual resetting alarms. Each time you press the Mode button, the operating mode changes as per the sequence below:<br>OFF -> COOL -> COOL+SAN* -> HEAT -> HEAT+SAN* -> OFF (*= if DHW is enabled)<br>During the parameters' setting, this button can be used to revert BACK to the previous level. |  |
| It allows you to enter the selected menu to view the subfolders or to set a value (for example the summer, winter and health set-points or the various parameters).   |  |
| UP button allows you to move up to a higher menu or to increase the value of a parameter  |  |
| DOWN button allows you to shift to a lower menu or to decrease the value of a parameter   |  |

In normal visualization, the display shows the water outlet temperature in tenths of degrees celsius or the alarm code if at least one is active. In

the case of more than one active alarm the first one will be displayed, and the second will be shown once the first one is reset. In menu mode the display is a function of the position you are in.

## 14.1 MENU

The main functions of the menus are listed below, especially when there are some unambiguous functions. The main menu manages the following items

| MENU              | LABEL | LEVEL OF PASSWORD | OTHER CONDITIONS                       |
|-------------------|-------|-------------------|--|
| Setpoint          | Set   | User              |  |
| Sensor            | tP    | Installer         | ---                                    |
| Alarms            | Err   | User              | Only in case of active alarms          |
| Digital inputs    | Id    | Installer         | ---                                    |
| Parameters        | Par   | Installer         | ---                                    |
| Password          | PSS   | User              | ---                                    |
| Operating hours   | oHr   | Installer         | ---                                    |
| USB               | USb   | Installer         | Only if the USB flash drive is present |
| Versione Firmware | Fir   | Installatore      | Versione, Revisione E Sub              |
| Storico allarmi   | Hist  | Installatore      | Solo se presenti dati nello storico    |

To enter the password menu you should introduce the relative password enable an access with a greater privilege. Once you exit completely from the menus, you lose the password privilege and needs to re-introduce it again.

## 14.2 SETPOINT MENU

You can display and change the various setpoint.

| SETPOINT | DESCRIPTION                 | UNIT | DEFAULT | RANGE           |
|----------|-----------------------------|------|---------|-----------------|
| Coo      | First setpoint in summer    | °C   | 7.0     | 25.0°C ÷ Co2    |
| Hea      | First setpoint in winter    | °C   | 45.0    | 25.0°C ÷ 55.0°C |
| Co2      | Second setpoint in summer   | °C   | 18.0    | Coo ÷ 25.0°C    |
| He2      | Second setpoint in winter   | °C   | 35.0    | 25.0°C ÷ Hea    |
| Hea2     | Secondo setpoint in Inverno | °C   | 35.0    | 25 ÷ Hea        |

## 14.3 ALARMS' MENU (ERR)

In this menu shows only the active alarms. All active alarms can be displayed. If the unit is composed of multi-circuits, then the alarms are divided by circuit (the ALCx label gives access to the alarms of circuit number x).

## 15. TROUBLESHOOTING

| PROBLEM   | CAUSE   | SOLUZIONE  |
|---|---|--|
| THE UNIT DOES NOT START   | Failure of power supply   | - Check plant voltage<br>- Check the protection devices upstream of the unit |
|   | - The main switch into OFF position<br>- Magnetothermic breaker on OFF position   | - Place the switch to the ON position  |
|   | - Damaged electronic board<br>- Damaged contactor<br>- Faulty compressor  | - Replace de damaged component   |
| POOR HEATING/COOLING CAPACITY   | - Insufficient amount of refrigerant<br>- Palnt system not properly sized   | - Check  |
| NOISY COMPRESSOR  | - Not adequately fixed<br>- Wrong installation<br>- Reversed pahses   | - Check  |
| COMPRESSOR DOES NOT RE-START BECAUSE OF PROTECTION DEVICES INTERVENTION | - Increase in discharge pressure<br>- Low inlet pressure<br>- Incorrect supply voltage<br>- Incorect wiring<br>- Incorect working conditions<br>- Thermal protection intervention | - Check  |
|   | - Damaged pressure switch   | - Replace  |
| HIGH EXHAUST PRESSURE   | - High outdoor air temperature<br>- Plant return water temperature is high<br>- Air in the hydraulic circuit<br>- Excessive refrigerant gas charge                                | - Check  |
|   | - Low air flow rate<br>- Low water flow rate  | - Check the fan and pump operation   |

| PROBLEM               | CAUSE  | SOLUZIONE                         |
|-----------------------|--|-----------------------------------|
| LOW EXHAUST PRESSURE  | <ul style="list-style-type: none"> <li>- Low outdoor air temperature</li> <li>- Low plant return water temperature</li> <li>- Residual humidity in the cooling circuit</li> <li>- Air in the hydraulic circuit</li> <li>- Insufficient refrigerant gas charge</li> </ul> | - Check                           |
| HIGH SUCTION PRESSURE | <ul style="list-style-type: none"> <li>- High outdoor air temperature</li> <li>- High plant return water temperature</li> <li>- Expansion valve remains too opened / damaged</li> </ul>  | - Check                           |
| LOW SUCTION PRESSURE  | <ul style="list-style-type: none"> <li>- Low outdoor air temperature</li> <li>- Low plant return water temperature</li> <li>- Expansion valve remains too closed / clogged/damaged</li> <li>- Dirty plate heat exchanger</li> </ul>                                      | - Check                           |
|                       | <ul style="list-style-type: none"> <li>- Low air flow rate</li> <li>- Low water flow rate</li> </ul>   | - Check the fan and pump operatio |







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