

Pompe de căldură aer-apă cu ventilatoare axiale

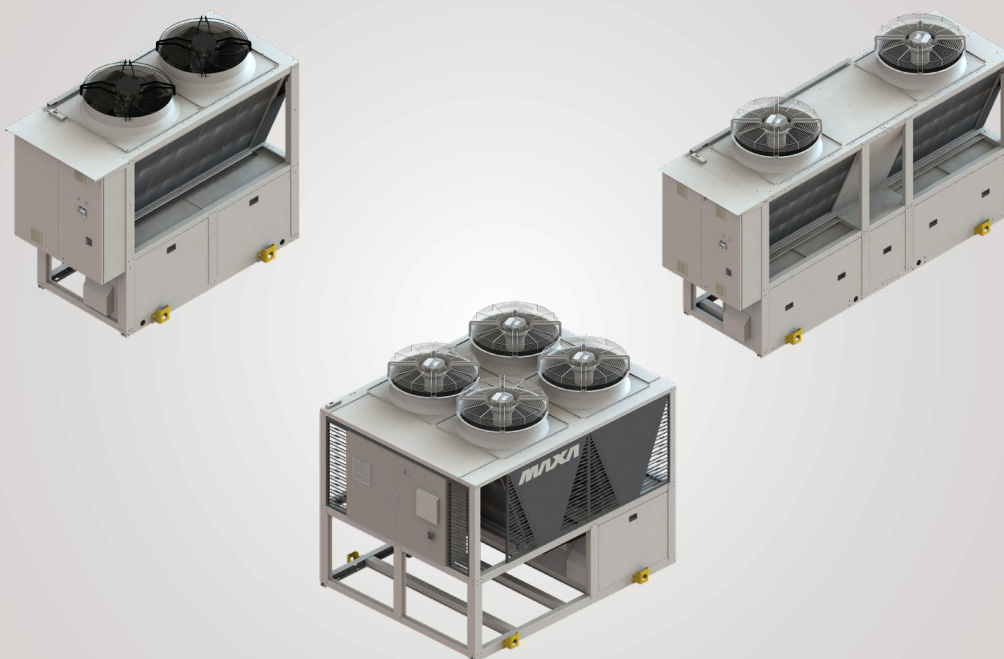
Manual Utilizator-Instalator

Modele

HWA2-AH 0270

HWA2-AH 0280

HWA2-AH 0290



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Contents

1. PURPOSE AND CONTENTS OF THE MANUAL.....	6
1.1 HOW TO KEEP THE MANUAL.....	6
1.2 GRAPHIC SYMBOLS USED IN THE MANUAL.....	6
2. NORMATIVE REFERENCES	6
3. PERMITTED USE.....	7
4. GENERAL SAFETY REGULATIONS	8
4.1 WORKERS' HEALTH AND SAFETY	8
4.2 PERSONAL PROTECTIVE EQUIPMENT	9
4.3 SAFETY SIGNS	10
4.4 WARNING LABELS.....	10
4.5 REFRIGERANT SAFETY DATA SHEET.....	11
4.6 SPECIFIC R290 GAS WARNINGS.....	12
4.7 INSTRUCTIONS FOR EVACUATION AND CHARGING WITH R290	12
4.8 R290 GAS DISPOSAL	13
4.9 SAFETY REQUIREMENTS FOR THE TRANSPORT AND STORAGE OF R290 UNITS	13
5. INSTALLATION	13
5.1 GENERAL INFORMATION.....	14
5.2 TRANSPORT AND STORAGE TEMPERATURE LIMITS.....	15
5.3 LIFTING AND HANDLING.....	15
5.3.1 LIFTING MODE.....	16
5.3.2 DAMAGE TO THE UNIT	17
5.4 POSITIONING AND MINIMUM TECHNICAL CLEARANCES.....	17
5.5 DANGER AND SAFETY ZONES	19
5.5.1 FREE-FIELD GROUND INSTALLATION.....	20
5.5.2 GROUND INSTALLATION IN FRONT OF A WALL.....	21
5.5.3 GROUND INSTALLATION IN A CORNER	21
5.5.4 FLAT ROOF INSTALLATION	22
5.5.5 MULTIPLE INSTALLATION	22
5.6 DIMENSIONS	23
5.6.1 MODELS HWA2-AH 0270 / 0280 / 0290.....	23
5.7 CENTER OF GRAVITY AND ANTI-VIBRATION DAMPERS POSITIONING	23
5.7.1 MODELS 0270 / 0280 / 0290	24
5.8 ACCESS TO THE INTERNAL PARTS.....	25
5.8.1 ACCESS INSIDE THE UNIT.....	25
5.8.2 TEMPERATURE SENSOR LOCATIONS	25
5.9 MACHINE CHARGING PROCEDURE.....	26
5.10 PLUMBING CONNECTIONS.....	28
5.10.1 SYSTEM WATER CHARACTERISTICS.....	29
5.10.2 PLUMBING DIAGRAM INSIDE UNIT	29
5.10.3 CONDENSATE DRAINAGE SYSTEM.....	31
5.10.4 CONDENSATE DRAIN PANS FOR HEAT EXCHANGE COILS.....	31
5.10.5 SYSTEM CHARGE	32
5.10.6 SYSTEM DISCHARGE	32

5.10.7	AIR VALVE.....	32
5.10.8	DEAERATOR.....	33
5.10.9	ANTIFREEZE DRAIN VALVE.....	33
5.10.10	MINIMUM WATER FLOW RATE AND WATER VOLUME.....	34
5.10.11	FROST RISK	34
5.11	FUNCTIONAL DIAGRAMS.....	34
5.12	ELECTRICAL CONNECTIONS	36
5.12.1	ACCESS TO THE ELECTRICAL PANEL.....	37
5.12.2	POWER SUPPLY	38
5.12.3	PROTECTIVE DEVICES	38
5.12.4	USER TERMINAL BLOCK.....	39
5.12.5	REFRIGERANT LEAK DETECTION SENSOR	40
5.12.6	CABLE ENTRY	42
5.12.7	SMART GRID READY	42
5.12.8	CONTROL LOGICS	43
5.12.9	FUSES.....	43
6.	STARTUP.....	43
6.1	SWITCHING ON THE UNIT	44
7.	INSTRUCTIONS FOR THE USER	44
8.	SHUTDOWNS FOR LONG PERIODS	44
9.	MAINTENANCE AND PERIODIC CHECKS	45
9.1	GENERAL INFORMATION.....	47
9.1.1	CLEANING THE FINNED COILS TREATED WITH THE ANTI-CORROSION METHOD... 47	
9.2	CLEANING THE EXTERNAL SURFACES.....	47
9.3	SENSOR REPLACEMENT AND SAFETY CHAIN VERIFICATION	47
9.3.1	SENSOR REPLACEMENT.....	47
9.4	EXTRAORDINARY MAINTENANCE.....	50
10.	DECOMMISSIONING.....	51
11.	RESIDUAL RISK.....	52
12.	TECHNICAL DATA.....	56
12.1	HEAT PUMP TECHNICAL SHEET	56
12.2	UNIT AND AUXILIARY ELECTRICAL DATA.....	58
13.	OPERATING LIMITS.....	59
13.1	EVAPORATOR WATER FLOW RATE.....	59
13.2	COOLING WATER PRODUCTION (SUMMER MODE)	59
13.2.1	HOT WATER PRODUCTION (WINTER MODE)	59
13.3	AMBIENT AIR TEMPERATURE AND SUMMARY TABLE	60
14.	USER INTERFACE - CONTROLLER	63
14.1	MENU	64
14.2	SETPOINT MENU	64
14.3	ALARM MENU [ERR].....	64
15.	TROUBLESHOOTING	65

The manual of the HWA2 units contains all the instructions on optimal machine use to safeguard the operator's safety.

1. PURPOSE AND CONTENTS OF THE MANUAL

This manual provides basic information as to the selection, installation, operation and maintenance. It is intended for the operators of the appliance and it enables them to use the equipment efficiently, even if they do not have any previous specific knowledge.



CAUTION: Although this manual is designed for the end user, some of the operations described are only be carried out by qualified personnel who have completed technical or skilled manual training to perform this particular work. They must also keep themselves properly updated with courses recognised by the competent authorities. These tasks include: installation, routine and extraordinary maintenance, decommissioning of the appliance and any other operation indicated "by qualified personnel".

When installation and/or maintenance operations are completed, the qualified operator must correctly inform the end user regarding the use and the necessary routine maintenance of the appliance.

It is the responsibility of the operator to submitting all of the documentation necessary (including this manual) and of explaining that it all must be kept carefully, in the vicinity of the appliance and always available.

The manual describes the machine at the moment it was sold. It must therefore be considered adequate with respect to the state-of-the-art in terms of potentiality, ergonomics, safety and functionality.

The company also performs technological upgrades and does not consider itself obliged to update the manuals of previous machine versions which could even be incompatible. Please refer to the manual supplied with the unit installed.

It is recommended to follow the instructions contained in this manual, especially those concerning safety and routine maintenance.

1.1 HOW TO KEEP THE MANUAL

The manual must always be present with the machine to which it refers. It must be placed in a safe place, protected from dust, humidity and easily accessible to the operator, who must necessarily consult it in case of doubt about the use of the machine.

The company also makes technological improvements and is not obliged to update machine manuals of previous versions that may be incompatible. We also decline any responsibility for possible inaccuracies in the manual if due to printing or transcription errors.

Any updates that are sent to the customer must be kept as an annex 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 units.

1.2 GRAPHIC SYMBOLS USED IN THE MANUAL



Indicates potentially hazardous situation for people and/or the proper functioning of the unit.



Indicates prohibited operations.



Indicates important information that the operator has to follow in order to guarantee the correct operation of the unit in complete safety.

2. NORMATIVE REFERENCES

The units HWA2 are designed in compliance with the following directives and harmonized standards on the safety of machinery:

- European Directives 2014/68/EU, 2006/42/EC, 2014/30/EU, 2011/65/EU
- Standards EN 378-1:2016 + A1:2020, EN 378-2:2016, EN 378-3:2016 + A1:2020
- Standards EN 12735-1:2020, EN 12735-2:2024, EN 14276-1:2020, EN 14276-2:2020, EN ISO 13585:2012, UNI EN 13134:2002, EN 13136:2013+A1:2018
- Standards UNI EN ISO 12100:2010, UNI ISO/TR 14121-2:2012, UNI EN ISO 13857:2020
- Standards EN 60204-1:2018, EN 62233:2008 + AC:2008, EN IEC 61439-1:2021
- Standards EN IEC 61000-6-2:2019, EN IEC 61000-6-4:2019, EN IEC 61000-3-11:2019, EN 61000-3-12:2011 /A1:2024

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

- European Directive 2009/125/EC and subsequent implementing measures.
- Regulation EU 2017/1369
- Regulation EU No. 2281/2016
- Regulation EU No. 813/2013
- Standards EN 14511-1:2022, EN 14511-2:2022, EN 14511-3:2022, EN 14511-4:2022
- Standard EN 14825:2022
- Standards UNI EN ISO 9614-1:2009, EN 12102:2022

3. PERMITTED USE

- The company excludes any contractual and extra contractual liability for damage 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 contained 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 permitted to connect the flow of heated water from the machine directly to the taps of the sanitary circuit. This fluid is not intended for sanitary use and must not be ingested.

- The location, hydraulic and electrical installation must be determined by the system designer and must take into consideration technical requirements, current local legislation and specific authorisations.



The execution of all works must be carried out by experienced and qualified personnel, knowledgeable of the applicable regulations in force in the country where the installation is performed, in accordance with EN 378-4. Personnel must also be aware of the physical properties and specific hazards associated with handling R290 refrigerant, as well as the required equipment and personal protective equipment (PPE). Each operator must also possess the qualification levels and overall competencies defined by EN ISO 13313.

- 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 equipment is intended to be used by experienced or trained users.
- Direct interaction with the unit by persons with electrically controlled medical devices, such as pacemakers, is prohibited, as harmful interference may result. It is recommended that an adequate distance be maintained from the installation site of the unit, as indicated by the medical system used.
- This device is intended for use by experienced or trained users in shops, light industry and farms, or for commercial use by non-experts.
- The appliance may be used by children at least 8 years old and by persons with reduced physical, sensory or mental capabilities or without experience or the necessary knowledge as long as they are supervised or after they themselves have received instructions on the safe use of the appliance and understand the relevant dangers. Children must not play with the appliance. The cleaning and maintenance which the user is expected to carry out on the unit cannot be done by children without supervision.
- Direct interaction with the unit by persons with electrically controlled medical devices, such as pacemakers, is prohibited, as harmful interference may result. It is recommended that an adequate distance be maintained from the installation site of the unit, as indicated by the medical system used.



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



Users of metallic prostheses should exercise caution when interacting with the unit.

4. GENERAL SAFETY REGULATIONS

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.



CAUTION: The machine operates with R290 refrigerant, which is a class A3 flammable refrigerant (according to ASHRAE 34 classification). In the event of a leak, the escape of refrigerant gas into the environment can lead to the formation of a flammable atmosphere.

No smoking and no use of open flames or fires in the vicinity of the machine (for specific warnings, refer to Chapters 5.4 and 5.5).

DANGER: Risk of death or serious personal injury if the instructions related to fire or explosion hazards contained in this manual are not followed.

CAUTION: Any routine or extraordinary maintenance operation must be carried out with the machine stopped and disconnected. Always check that there is no voltage: there is a risk of death by electrocution if you come into contact with live electrical parts.

For installations in environments where external temperatures may fall below 0°C, freezing of certain components may occur when the unit is not operating. Ensure that, in the event of frost risk, the heating system remains in continuous operation and that all areas are adequately heated. If continuous operation cannot be guaranteed, the heating system must be drained by a qualified technician.

Do not insert your hands, screwdrivers, spanners or any other tools into moving parts.

The machine responsible person and maintenance personnel must receive adequate training and instruction to perform their tasks safely.

Operators must be familiar with the personal protective equipment and the accident-prevention rules laid down in national and international laws and regulations.



Do not remove and/or tamper with any safety device.

Do not allow children or unassisted disabled persons to use the appliance.

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

Do not perform any cleaning operation when the master switch is 'ON'.

Do not pull, detach or twist the appliance's electric cables, even if it is disconnected from the power supply.

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

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 a hazard.

4.1 WORKERS' HEALTH AND SAFETY

The European Union has issued directives on the safety and health of workers, including 89/391/EEC, 89/686/EEC, 2009/104/EC, 86/188/EEC, and 77/576/EEC, as well as subsequent amendments, which every employer is obliged to comply with and ensure compliance. Please be reminded that:



Do not tamper with or replace parts of the machine without the express authorisation of the manufacturer. These interventions relieve the manufacturer of any civil or criminal liability.



The unit contains flammable refrigerant gas R290. Any refrigerant leakage can generate a flammable atmosphere. Always carry out a careful fire and explosion risk evaluation.



The use of components, consumables, or spare parts other than those recommended by the manufacturer may pose a risk to operators and/or damage the unit.

	Keep the workplace clean, tidy and free of objects that may limit free movement. The workplace must be adequately lit for the intended operations. Insufficient or excessive lighting may cause risks.
	Ensure that adequate ventilation of working areas is always guaranteed and that extraction systems are continuously operational, in good condition, and compliant with applicable legal requirements.
	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.
	During installation and maintenance of the unit, make sure to maintain a posture that does not cause fatigue. Check the weight before moving any component.

The unit works with R290 refrigerant, which is a refrigerant gas with a low greenhouse effect (GWP 0.02). R290 is a hydrocarbon with a low environmental impact and is not included in the list of fluorinated substances that comply with the requirements of EU Regulation 2024/573 called “F-GAS” (mandatory in the European area).

Gaseous R290 refrigerant is heavier than air; if released into the environment, it tends to accumulate in low-ventilation areas. Inhalation may cause dizziness and a sensation of suffocation and, if in contact with open flames or hot objects, may generate toxic gases (refer to the refrigerant safety data sheet).

Pay attention to the fact that refrigerant R290 is odourless.

For any operation on the heat pump system:

	Wear the appropriate PPE (specifically gloves and goggles).
	Ensure that the workplace is well ventilated. Do not work in closed rooms or ditches with insufficient air circulation.
	Do not work on the refrigerant in the vicinity of hot parts or naked flames.
	Check that there is no voltage and ensure that the unit cannot be reconnected to the power supply during operation.
	Avoid any leakage of refrigerant into the environment and pay particular attention to accidental leaks from pipes and/or fittings even after the system is emptied.
	Ensure that there is a fire extinguisher near the unit.

4.2 PERSONAL PROTECTIVE EQUIPMENT

During operation and maintenance of the units, the use of personal protective equipment must be ensured, including:

	Clothing: Maintenance technicians and operators must 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 get caught or sucked into airflows. Use antistatic clothing (ESD).
	Wear safety shoes with non-slip soles, especially in rooms with slippery floors. Use antistatic footwear (ESD).
	Gloves: Protective gloves must be worn during cleaning and maintenance. Wear antistatic gloves (ESD).
	R290 gas explosimeter: During routine and extraordinary maintenance operations, each operator must be equipped with an R290 refrigerant gas explosimeter to verify the possible presence of gas in the air. The explosimeter must not represent a possible ignition source, and its sensitivity must be such as to trigger an alarm when a concentration of 20% of the lower flammability limit (LFL) is reached. Do not carry electronic devices (e.g. mobile phones, computers, etc.) in the vicinity of the product before evaluating the possible presence of refrigerant in the environment.



Mask and goggles: A respiratory protection mask and protective goggles must be used during cleaning operations.



Personal protective equipment must be checked periodically and comply with the refrigerant gas R290.

4.3 SAFETY SIGNS

Personnel must adhere to the following safety signs on the unit:



Generic hazard.



Dangerous electric voltage.



Presence of moving parts.



Surfaces which can cause injuries.



Boiling surfaces which can cause burns.



Fire hazard.

4.4 WARNING LABELS

Warning labels containing essential product safety information are affixed both to the external panels and to the internal parts of the unit. The main symbols shown on the labels are as follows:



Flammable substance symbol (ISO 7010-W021).



Read the warnings and technical instructions in the manual (ISO 7000-1659).



Open flames are prohibited (ISO 7010-P003).



No smoking (ISO 7010-P002).

Note that the essential warning and safety symbols are also shown on the packaging of each unit.

4.5 REFRIGERANT SAFETY DATA SHEET

Name:	R290
HAZARDS IDENTIFICATION	
Main hazards:	Highly flammable gas. Vapours are heavier than air and can cause asphyxiation due to reduced oxygen levels.
Specific hazards:	Contact with the liquid can cause ice burns.
FIRST AID MEASURES	
General information:	In high concentrations it can cause asphyxia. Symptoms may include loss of mobility and/or consciousness. In low concentrations it may have a narcotic effect.
Inhalation:	Move the victim to an uncontaminated area while wearing self-contained breathing apparatus. Use oxygen or artificial respiration if necessary. Keep the patient lying down and warm. Call a doctor.
Eye contact:	Carefully rinse with plenty of water for at least 15 minutes.
Skin contact:	Wash immediately with plenty of water for at least 15 minutes. Immediately remove contaminated clothing.
FIRE FIGHTING MEASURES	
Extinguishing media:	Water spray, dry powder.
Specific hazards:	Exposure to flames may cause the vessel to rupture or explode.
Specific methods:	Cool down the containers with a water spray from a safe position. Stop the product leakage if possible. Use water spray, if possible, to abate the fumes. Move the vessels away from the area of the fire if this can be done without posing any risks.
ACCIDENTAL LEAKAGE MEASURES	
Personal precautions:	Try to stop the leak. Evacuate personnel to safe areas. Eliminate the ignition sources. Ensure proper ventilation. Avoid entering sewers, basements, excavations and areas where accumulation can be dangerous. Use personal protective equipment. Remain upwind.
Environmental precautions:	Try to stop the leak.
Cleaning methods:	Ventilate the area.
HANDLING AND STORAGE	
Handling: technical measures/precautions:	Ensure sufficient air exchange and/or suction in the working area. Do not smoke. Keep away from sources of ignition (including electrostatic charges). Use only appropriate equipment, suitable for the product.
Advice for safe use:	Do not inhale the gas.
Storage:	Close carefully and store in a cool and well ventilated area. Storage containers should be checked periodically. Do not store with other oxidants in general or other combustible substances. Containers must not be stored in conditions that could lead to corrosion. All electrical equipment in the storage area should be compatible with the risk of forming an explosive atmosphere.
EXPOSURE CONTROLS/PERSONAL PROTECTION	
Control parameters:	OEL: data not available. DNEL: data not available. PNEC: data not available.
Respiratory protection:	Filter masks can be used if the ambient conditions and duration of use are known.
Eye protection:	Safety goggles.
Hand protection:	Work gloves.
Hygiene measures:	Do not smoke.
PHYSICAL AND CHEMICAL PROPERTIES	
Colour:	Colourless.
Odour:	Odourless.
Boiling point:	-42.1 °C at atm press.
Flash point:	470°C
Relative gas density (air=1)	1,50
Relative liquid density (water=1)	0,58
Solubility in water:	75 mg/l.
STABILITY AND REACTIVITY	
Stability:	Stable under normal conditions.
Materials to avoid:	Air, oxidising agents. Keep away from heat sources/sparks/open flames/heated surfaces.
Hazardous decomposition products:	Under normal conditions of storage and use, dangerous decomposition products should not be generated.
TOXICOLOGICAL INFORMATION	
Acute toxicity:	CL50/inhalation/4 hours/on rat = 20000 ppm.
Local effects:	No known effect.
Long term toxicity:	No known effect.
ECOLOGICAL INFORMATION	
Global warming potential GWP (R744=1):	0,02
Ozone Depletion Potential ODP (R11=1):	0
Notes on disposal:	Refer to the supplier's gas recovery programme. Avoid direct discharge into the atmosphere. Do not discharge where accumulation may be dangerous. Ensure that the emissions limits required by local regulations or specified in authorizations are not exceeded.

4.6 SPECIFIC R290 GAS WARNINGS

The R290 refrigerant gas:

- is odourless;
- is highly flammable (Class A3 refrigerant), but only if an ignition is present;
- it may cause an explosion, but only if a given concentration in air is reached.

The following instructions must be followed:

- do not smoke near the unit;
- affix a no smoking sign near the unit;
- do not inhale the gas;
- install the unit in an outdoor area respecting the required clearances and danger zones indicated in this manual;
- do not drill or burn the unit;
- do not place the unit near ignition sources, such as open flames, electric heaters, light switches, sockets, lamps or other permanent ignition sources;
- any extraordinary maintenance or repairs on the unit must be carried out by specialised technicians or qualified personnel who are properly trained with specific skills in handling flammable refrigerant gases, in accordance with local laws;
- After installation of the unit and before carrying out any maintenance work, ensure that no measurable concentration of R290 gas is present in the hazard area around the unit, by means of a leak detection test.

4.7 INSTRUCTIONS FOR EVACUATION AND CHARGING WITH R290

Vacuum, charging and refrigerant gas recovery procedures may only be carried out by specialised technicians or qualified personnel who are properly trained with specific skills in handling flammable refrigerant gases, in accordance with local laws. Follow the requirements below:

- ensure that other types of refrigerant do not contaminate the R290 (the minimum purity of the refrigerant gas used for charging operations must be at least 99.5%);
- for refrigerant gas recovery, use cylinders with a left-hand connection and appropriate pitch. The maximum charging capacity must be 0.42 kg/L;
- before charging the refrigerant gas, carry out three flushing cycles with pressurised nitrogen followed by a proper vacuum procedure;
- keep the gas cylinder in a vertical position when charging;
- Charge the unit with the quantity specified on the technical nameplate;
- Use work equipment suitable for operation with flammable gases (refer to chapter 5.9 for further information). Keep the work area well ventilated at all times and use R290 gas detection devices.
- do not charge more refrigerant gas than necessary. Note that the performance of HWA2 units is very sensitive to the quantity of gas charged, so a charging error can lead to malfunctions or even unit shutdown. It is recommended to charge the unit using calibrated scales with a reading resolution of at least one tenth of a gram;
- once charging is complete, conduct a leak test prior to the running test;
- conduct a second leak test once all the previous operations have been completed.



CAUTION: Each unit is equipped with two charging ports (see refrigerant circuit diagram for their location) to enable charging and discharging operations of the refrigerant circuit. The maximum tightening torque of the charging ports is 0.5 Nm.



CAUTION: The unit is supplied already charged with the refrigerant gas required for its correct operation. If recharging is required, after maintenance operations or in the event of a leak, follow the procedures described in Chapter 5.9.



CAUTION: During the unit charging procedure, take care to avoid any possible refrigerant gas leaks, which could ignite and cause a fire. Always perform a risk assessment and implement the necessary preventive measures.

4.8 R290 GAS DISPOSAL

The procedures described below may only be performed by specialised technicians or qualified personnel who are properly trained with specific skills in accordance with local laws:

- do not discharge the gas in areas where there is a risk of explosive mixtures forming with air. The gas should be disposed of in a suitable torch with a flashback arrestor. Follow current regulations regarding the disposal of refrigerant gases. Contact the supplier if operating instructions are considered necessary;
- only use equipment approved for use with R290 refrigerant;
- when removing and disposing of the refrigerant, ensure that no air enters where the refrigerant is present (refrigerant circuit, cylinders or other containers for transporting the refrigerant).



CAUTION: During refrigerant recovery and disposal procedures, take care to avoid any possible refrigerant gas leaks, which could ignite and cause a fire.

4.9 SAFETY REQUIREMENTS FOR THE TRANSPORT AND STORAGE OF R290 UNITS

Before opening the unit's packaging, check for gas leaks in the area using an appropriate gas detector. Ensure there are no ignition sources near the unit.

Do not smoke near the unit;

Units must be transported and stored in accordance with current national regulations. Specifically, according to the provisions of ADR, which regulates the transport of goods by road and rail in Europe, the maximum total quantity per transport unit in terms of net mass in kg for flammable gases is 333. In addition, for road transport, use vehicles that are preferably open or equipped with a ventilation system and operated by trained personnel.

The units are R290 heat pumps and, according to the European Agreement concerning the International Carriage of Dangerous Goods by Road (ADR), are assigned UN number 3358 (REFRIGERATING MACHINES containing flammable, non-toxic, liquefied gas). As the refrigerant charge is less than 12 kg per circuit, compliance with the ADR requirements is not necessary.

For prerequisites on the transport by sea of equipment charged with flammable refrigerant, refer to the International Maritime Dangerous Goods Code (IMDG), and for transport by air check the regulations prescribed by the International Air Transport Organisation (IATA).

If the unit must be stored for medium- to long-term periods, observe the following precautions:

- if stored in a closed location, leave the machine in a dedicated place that is always dry, cool, well ventilated and protected from possible ignition sources, direct sunlight or other heat sources. We also recommend using one flammable gas detection sensor every 36-40 m². Always refer to national regulations;
- if stored in an open area, observe the minimum safety distances from drains, cisterns, sewers and other underground areas, in accordance with current national regulations;
- do not remove covers and packaging;
- ensure that all panels are correctly mounted;
- do not obstruct the openings and holes made in the machine panels;
- avoid cleaning the unit with aggressive detergents or chemicals;
- We recommend removing any heating water inside the unit to prevent possible corrosion or, in cold climates, damage to components caused by freezing.



CAUTION: When transporting and storing the unit, beware of possible refrigerant gas leaks that could start a fire.

5. INSTALLATION



CAUTION: All the operations described below must be carried out by **QUALIFIED PERSONNEL** only. Before carrying out any operation on the unit, ensure the power supply is disconnected. Also ensure, by means of appropriate locks, that the power cannot be accidentally switched on again until all operations have been completed.

5.1 GENERAL INFORMATION

When installing or working on the refrigeration circuit, it is necessary to scrupulously comply with the regulations in this manual, observe the instructions on the unit and in any case apply all necessary precautions. Failure to comply with the instructions may lead to dangerous situations.



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

The company must be informed of the extent of the damage within 8 days. The customer must prepare a written report in the event of significant damage.



The units are designed for outdoor installation. In the event of unit downtime, the ambient outdoor temperature must under no circumstances exceed 46°C. Above this value, the unit is no longer covered by the applicable regulations on the safety of pressure equipment.



The installation site must be completely free of fire hazards. All necessary measures must therefore be taken to prevent the risk of fire at the installation site (See section 5.5 for more details). The appliance must not be placed in the vicinity of open flames, ignition sources or heat sources. The wall of the buildings adjacent to the unit must have an adequate fire resistance class, in order to contain any fire that may develop inside the rooms. However, it is good practice to keep a fire extinguisher near the unit.



The unit must be installed in order to allow maintenance and repair. The warranty does not cover costs for platforms or other handling equipment needed for any work.



The unit must be installed in a restricted area, clearly marked with appropriate signage, and accessible only to qualified personnel.



The unit must be installed at a safe distance from any lightning protection system or other structures that may attract lightning strikes, and must not be electrically bonded to them.



All maintenance and inspection operations must be carried out only by QUALIFIED PERSONNEL (EN 378-4). All equipment used during maintenance operations must be compatible with R290 refrigerant.



Before carrying out any operation on the unit, make sure that the power supply is disconnected and cannot be switched on again accidentally.



Exercise extreme caution when working inside the electrical panel, as some parts of the circuit remain permanently live. The relevant cables are orange in colour.



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



The device must be installed outdoors, in a location free from continuous ignition sources (for example, open flames, operating gas appliances, or operating electric heaters). Refer to Section 5.5.



Do not perforate or burn. Do not make mechanical modifications to the unit.



Inside the unit, there are moving components. Exercise extreme caution when working near them, even when the power supply is disconnected. In particular, take care with the fan blades when removing the protective grilles. Do not touch or insert any objects into moving parts.



The compressor heads and discharge piping are usually at very high temperatures. The compressor suction-side piping, on the other hand, can reach very low temperatures. Uninsulated piping may cause burns or frost injuries: handle these components only when their temperature is close to ambient conditions.

	Take particular care when working near the condensing coils. The aluminium fins are very sharp and can cause serious injuries.
	After the maintenance operations, close the panels by fixing them with screws.
	Cable ducts and electrical conduits to the machine must not contain potential ignition sources.
	After maintenance or replacement of components, reconnect the cables in the same position as in the factory.
	Routine maintenance operations may be performed with the machine charged. However, in the case of extraordinary operations, repairs, or replacement of mechanical components, or heavy work in the vicinity of the machine (for example, construction sites), ensure that the machine is evacuated of refrigerant gas or moved to a safe area (in accordance with Section 5.5).
	The insulating materials are not self-extinguishing: remove them if necessary when performing service work on the unit.
	Do not remove, replace or make illegible the adhesive labels on the unit and packaging. Do not cover the labels after installation of the unit.

5.2 TRANSPORT AND STORAGE TEMPERATURE LIMITS

Minimum transport/storage temperature [°C]	-10°C
Maximum transport/storage temperature [°C]	50°C

5.3 LIFTING AND HANDLING

Handling must be carried out by qualified personnel, adequately equipped and using equipment suitable for the weight and dimensions of the unit, in compliance with the applicable health and safety regulations. It is recommended to:

1. check the weight on the unit's technical label or in the technical data table;
2. check that when moving the unit there are no uneven paths, ramps, steps, doors which could destabilise the movement and damage the unit;
3. ensure the unit remains in a horizontal position while it is being moved;
4. during handling, do not make any sudden, abrupt manoeuvres in order not to destabilise the unit;
5. before handling the unit, check that the equipment is suitable for lifting and preserving the integrity of the unit;
6. check the unit centre of gravity and align it with lifting point;
7. only perform lifting operations using one of the listed methods;
8. ensure the unit is stable before starting handling.

Note that the weight of the unit is concentrated more on the side of the refrigeration circuit: take into consideration the weight distribution of the machine when transporting it manually with cables, in order not to lift excessive loads and avoid damage or personal injury.

For weight and center of gravity data for the various models and accessories, refer to section 5.7.

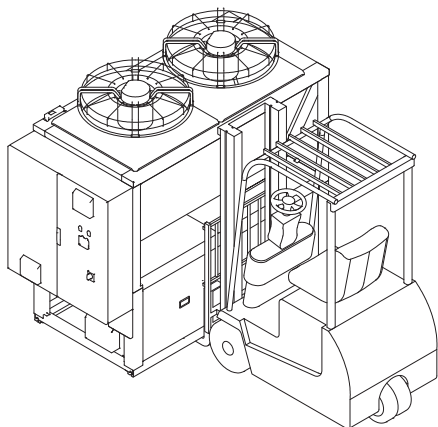
We recommend removing the packaging only after the machine has been placed in the actual installation location. Dispose of the different packaging materials in accordance with national regulations.

	Before commissioning, carefully inspect the unit and packaging for damage or refrigerant leakage.
	Do not proceed with the start-up of the unit if damage was found during transport. Immediately inform the Company of the problem. The company is not liable for any damage to the product caused by handling and transporting the unit in a manner not in accordance with this manual and the regulations in force.

5.3.1 Lifting mode

Only perform lifting operations using one of the methods listed below:

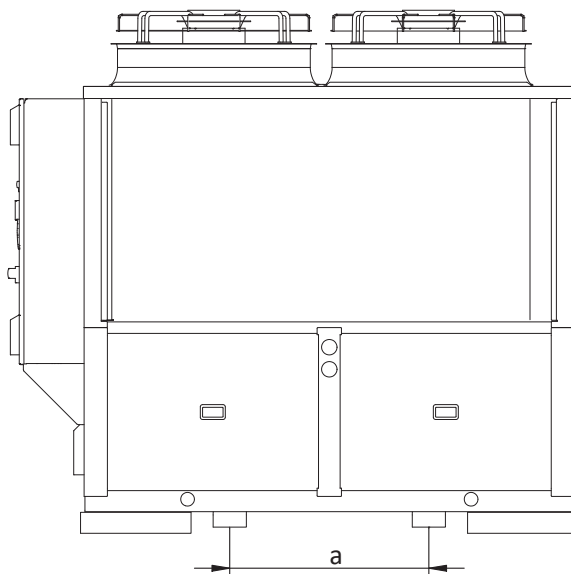
- forklift truck;
- thick lifting tubes according to EN 355 and EN 10297-1, thick lifting tubes according + ropes/chains;
- lifting slings (available as an accessory) + ropes/chains + sling bar. Ensure that the lifting ropes are tensioned gradually and check that they are correctly positioned.

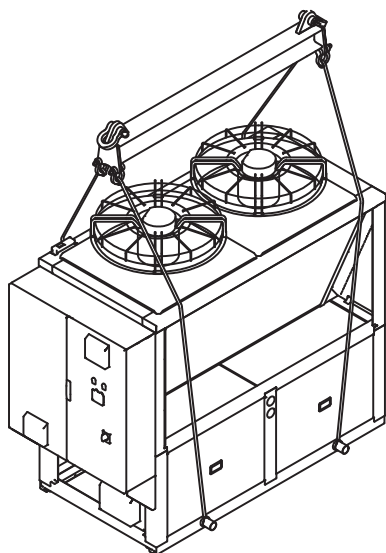


Lifting with a forklift truck.

Warning – To avoid damage to the unit, the forklift forks must have a minimum spacing (a) of:

- 750 mm for single-circuit units;





Lifting with ropes / bands.

5.3.2 Damage to the unit

In the event that the product is damaged during handling, storage or transport (e.g. due to dropping), follow the procedure described below:

1. take the damaged unit outside.
2. enclose a zone of at least 3 m around the unit, within which there must be no manholes, drains, wells, depressions or other connections to underground areas.
3. ensure that there is no ignition source from the newly defined work area.
4. check for possible refrigerant leaks using a leak detector.
5. if necessary, remove the product packaging.
6. Recover the refrigerant gas as described in chapter 5.9.

For further clarification, contact a technical support centre.

5.4 POSITIONING AND MINIMUM TECHNICAL CLEARANCES

All models in the HWA2 series are designed and constructed for outdoor installation. The company is not liable for any damage to property, animals and/or persons resulting from failure to comply with the instructions on installing the unit given in this manual.

It is good practice to create an adequately sized support base for the unit. The units transmit a small amount of vibrations to the ground: however, it is advisable to place anti-vibration mounts between the base frame and the supporting surface. It is preferable to install the unit away from places sensitive to noise and vibration (e.g. windows and glass panes).

Always conduct an environmental impact assessment based on the power and sound pressure data given in chapter and the sound emission limits according to the unit's installation area, with reference to the DPCM of 14/11/1997. An assessment must also be conducted if the unit is installed near workers, according to LEG. DEC. 81/2008 Art. 189 and subsequent amendments.



The unit is designed for installations in class III (see specifications and definitions given in EN 378-3 and Clause 5.3 of EN 378-1) with access category "b" (supervised access; see Clause 5.11 of EN 378-1). Installation with access category "a" (general access) is not permitted, as the unit charge is > 5 kg per circuit.



As this is an occupied area with supervised access (category "b"), appropriate measures must be implemented to restrict access to authorised personnel only.



The installation location must be selected in compliance with the refrigerant charge limits specified in EN 378-1, Annex C.

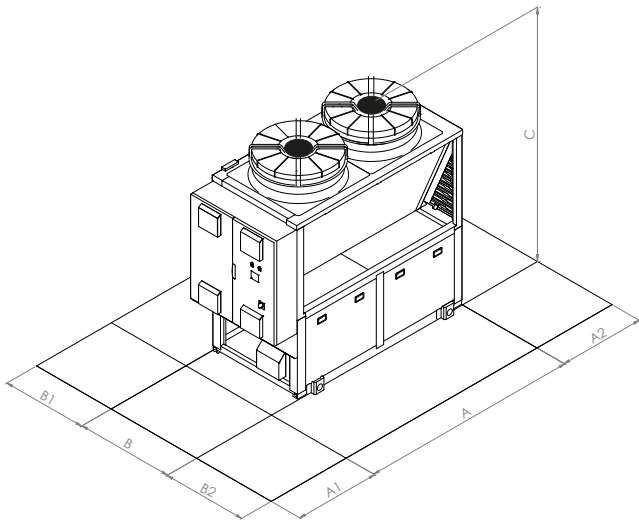


Suspended installation is forbidden.

	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 to the 12. The supporting surface must not be tilted to ensure the unit works properly and does not tip over. The supporting surface must not be smooth, to avoid water/ice deposits which are potential sources of danger.
	The unit's installation site must be free from foliage, dust, etc., which could clog or cover the coils. Installation in areas subject to water stagnation or fall, for example from gutters, should be avoided. Also avoid areas subject to snow accumulation (such as corners of buildings with sloping roofs). Also avoid positioning near lightning towers or other objects that can attract an electric shock.
	It is recommended to ensure sufficient air exchange to dilute the R32 gas in case of accidental leakage, to avoid the formation of explosive atmospheres. For this reason, a minimum distance must be maintained (depending on the unit) from openings or wells, where the gas could accumulate.
	The units are suitable for installation in urban, industrial, coastal and rural areas. If the unit is installed in an environment with aggressive atmospheres, the air drawn in by the fan may contain substances that can cause damage to the panels, grilles and internal components of the unit. In this case, the service life of the unit will be limited.
	Do not install the unit under roofs of any kind, such as roofs, canopies and similar.
	Do not install the unit below ground level (such as cellars, underground car parks, basement or underground work rooms, etc.).

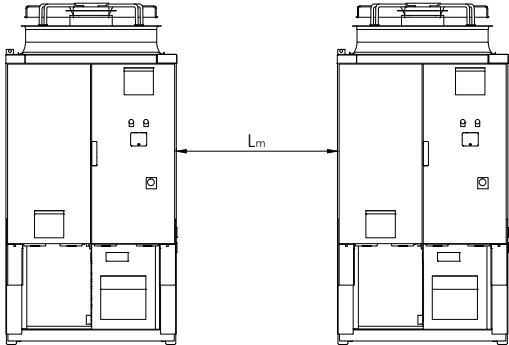
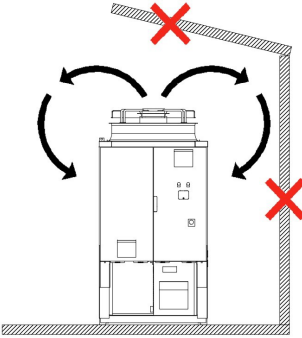
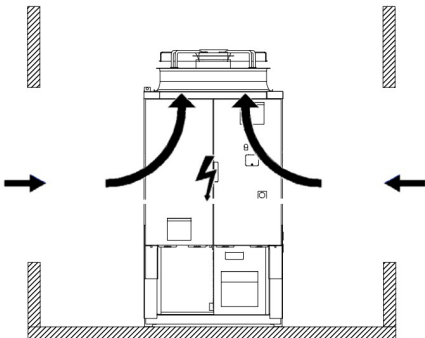
It is very important to avoid recirculation between suction and discharge, otherwise the performance of the unit will deteriorate or even interrupt normal operation.

This is why the minimum clearances shown below must be strictly guaranteed.



Model		A1	A2	B1	B2
HWA2-AH	mm	1200	1200	1200	1200

	For installations in locations with strong winds, please refer to the area classification according to the Beaufort scale. If the value is > 7 (strong wind, average wind speed = 13.9-17.1 m/s) it is strictly necessary to keep the fan powered at all times, thus preventing unintentional fan rotation.
	If the unit is installed at a distance of less than 1 km from coastal and maritime areas, the presence of salt and sand in the air greatly increases the likelihood of corrosion. Install the unit so that it is protected from direct sea wind if necessary, provide windbreaks on site (observing the minimum distances indicated).

In the case of side-by-side units, the minimum distance L_{min} between them is 2,2 m.	
Avoid covering with canopies or placing near plants or walls to prevent air recirculation.	
In the event of winds stronger than 13.9-17.1 m/s the use of wind barriers is recommended.	

5.5 DANGER AND SAFETY ZONES

Units of the HWA2 series contain R290 refrigerant gas. As this gas is heavier than air, in the event of a leak it tends to accumulate in recesses, ground depressions, or underground areas.

During installation, the hazard and safety zones specified in this manual must be strictly observed.

These zones have been defined in accordance with EN 60079-10-1 by evaluating different scenarios and estimating:

- a refrigerant leak rate from 0.1 to 3 g/s
- an air velocity from 0.1 to 0.5 m/s

The resulting area classification is:

- Zone type (lower degree of dilution): 2
- Gas group and temperature class: IIA T2.

Our risk analysis has defined an EPL (Equipment Protection Level) Gc in accordance with EN 60079-14.

A **danger zone** is defined as a area around the machine in which, in the event of a refrigerant gas leak, a flammable atmosphere is formed for a short time, within which it is necessary to implement all the precautions described in the manual. In the absence of specific standards or regulations, when using the unit in an industrial or working environment, the classification of explosion hazard locations should be carried out as per the ATEX Directive 2014/34/UE and Directive 89/391/EEC of 12 June 1989 on the introduction of measures to encourage improvements in the safety and health of workers at work.



The areas reported in the following chapters are based on conservative assumptions, considering an air velocity of 0.1 m/s and the most severe leakage scenario applicable to the unit. Any reductions in safety distances must be justified by a specific risk analysis carried out by the designer in accordance with EN 60079-10-1, under their full responsibility.

There must NOT be any ignition sources in the danger zones, including:

- flammable gases and sprays, self-igniting powders;
- electrical equipment that is not suitable for use in potentially explosive areas (zone 2);
- Open flames, hot surfaces (maximum surface temperature 360°C), and hot work operations are prohibited; smoking, including electronic cigarettes, must also be prohibited.
- sparks, electrostatic charges, direct and indirect lightning effects, eddy currents and cathodic protection;
- ignition sources due to remote processes (ionising and non-ionising radiation);
- permanent electrical sources (switches, lamps, etc.) or other possible triggers;

In addition, the danger zones must NOT:

- contain potentially dangerous areas or elements such as wells, manholes, openings to the sewage system and other openings to underground places and premises (e.g. garages), river drains, power lines, flammable deposits, electrical installations, etc.;
- include doors, windows or glass panes, to prevent the possible return of the gas inside the building;
- extend towards neighbouring residential properties, parking areas, public access sites, roads or railways.

A **safety zone** extending beyond the danger zone must also be identified. Within the safety zone, in the event of a refrigerant leak, the concentration of the gas in the air is typically below the critical levels for the formation of flammable or hazardous atmospheres. The following provisions must be complied with:

- prevent accumulation and stagnation in underground spaces, drains, manholes, cellars, etc.;
- do not place building vents inside or near the safety zone;
- do not use naked flames and other direct heat sources.

In any case, comply with national and local regulations on the installation of machinery (where applicable) in order to prevent the formation of fire hazards and to prevent gases from seeping underground into openings to the ground or floors below.

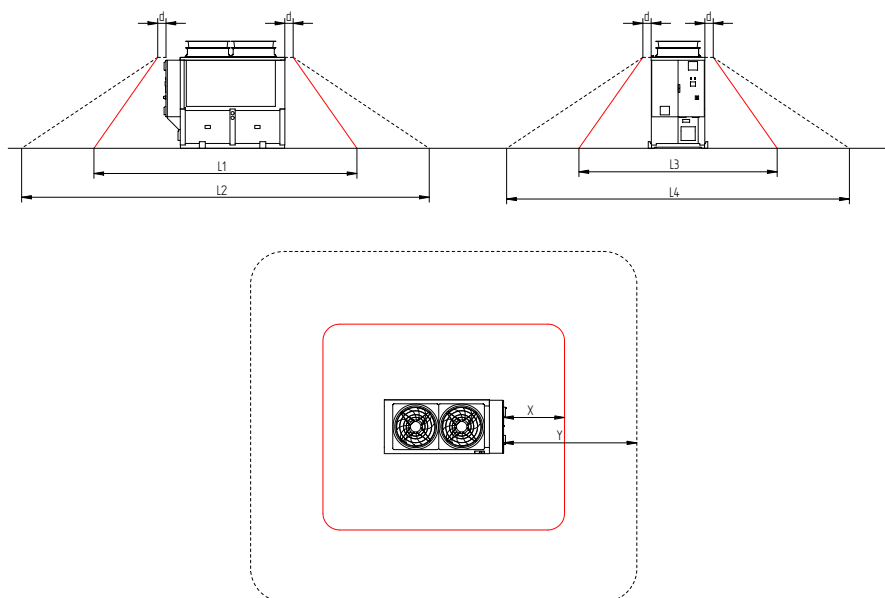
No structural modifications may be made in the danger and safety zones that would alter their extent or change the behaviour of the air-refrigerant mixture.

Do not tamper with, alter, remove or compromise, even partially, the functionality of the devices, guards and provisions provided for the safety of property and persons.

Various types of outdoor installation are considered in this manual, as indicated in the following paragraphs.

5.5.1 Free-field ground installation

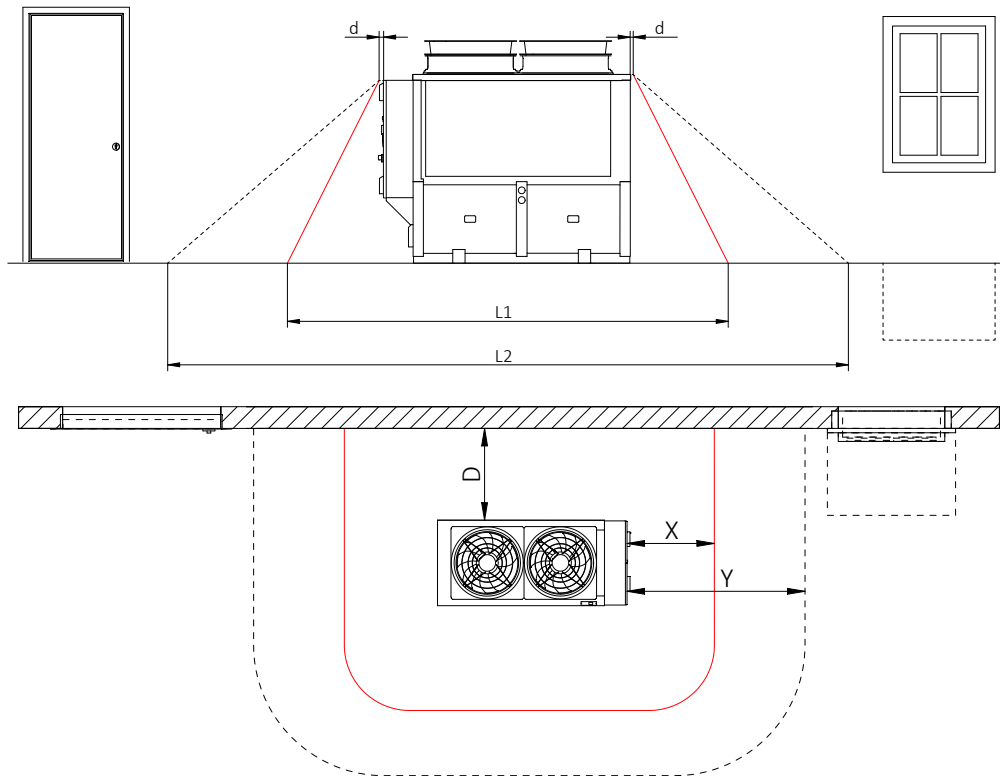
For units installed on free-field terrain, the danger (continuous red line) and safety zones (dashed black line) are shown in the figures below:



MODEL HWA2		X	Y	L1	L2	L3	L4	d
0270 / 0280 / 0290	mm	1500	3000	5600	8600	4100	7100	250

5.5.2 Ground installation in front of a wall

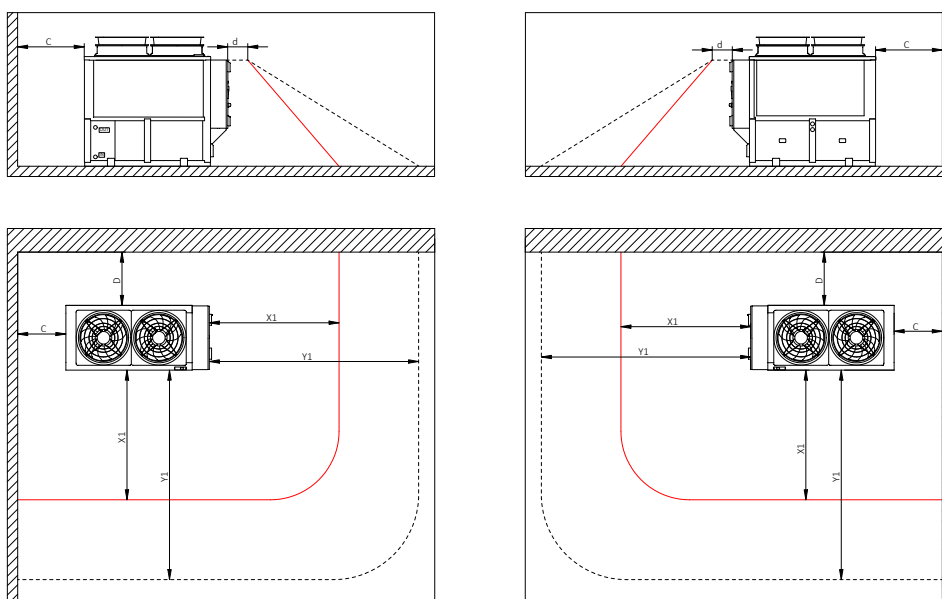
For units installed on the ground in front of a wall, the danger (continuous red line) and safety zones (dashed black line) are shown in the figures below:



MODEL HWA2		X	Y	L1	L2	D	d
0270 / 0280 / 0290	mm	1500	3000	5600	8600	1500	250

5.5.3 Ground installation in a corner

For units installed on the ground in a corner, the danger (continuous red line) and safety zones (dashed black line) are shown in the figures below:



MODEL HWA2		X1	Y1	C	D	d
0270 / 0280 / 0290	mm	2800	4300	1200	1500	250

5.5.4 Flat roof installation

The installation configuration on a flat roof is similar to that on free-field terrain, although some additional aspects must be considered:

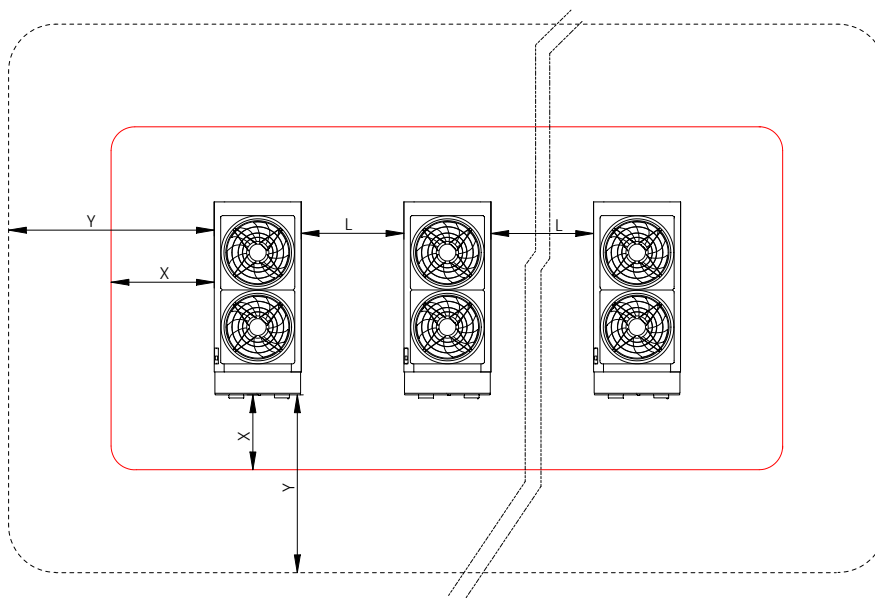
- place the machine at a sufficient distance from side walls and protrusions, which must therefore be beyond the safety zone;
- ensure that the structure of the building's roof is solid;
- choose a location where no snow, dust or foliage can accumulate;
- pay attention to noise emissions and maintain an adequate distance from surrounding buildings;
- if high air velocities are detected, install the protections listed in the previous chapter.

5.5.5 Multiple installation

When installing several machines side by side, follow the above configurations and, in addition, maintain a buffer of L between each machine.

As an example, see the following buffer zones (danger and safety) for a generic number "n" units installed on free-field terrain:

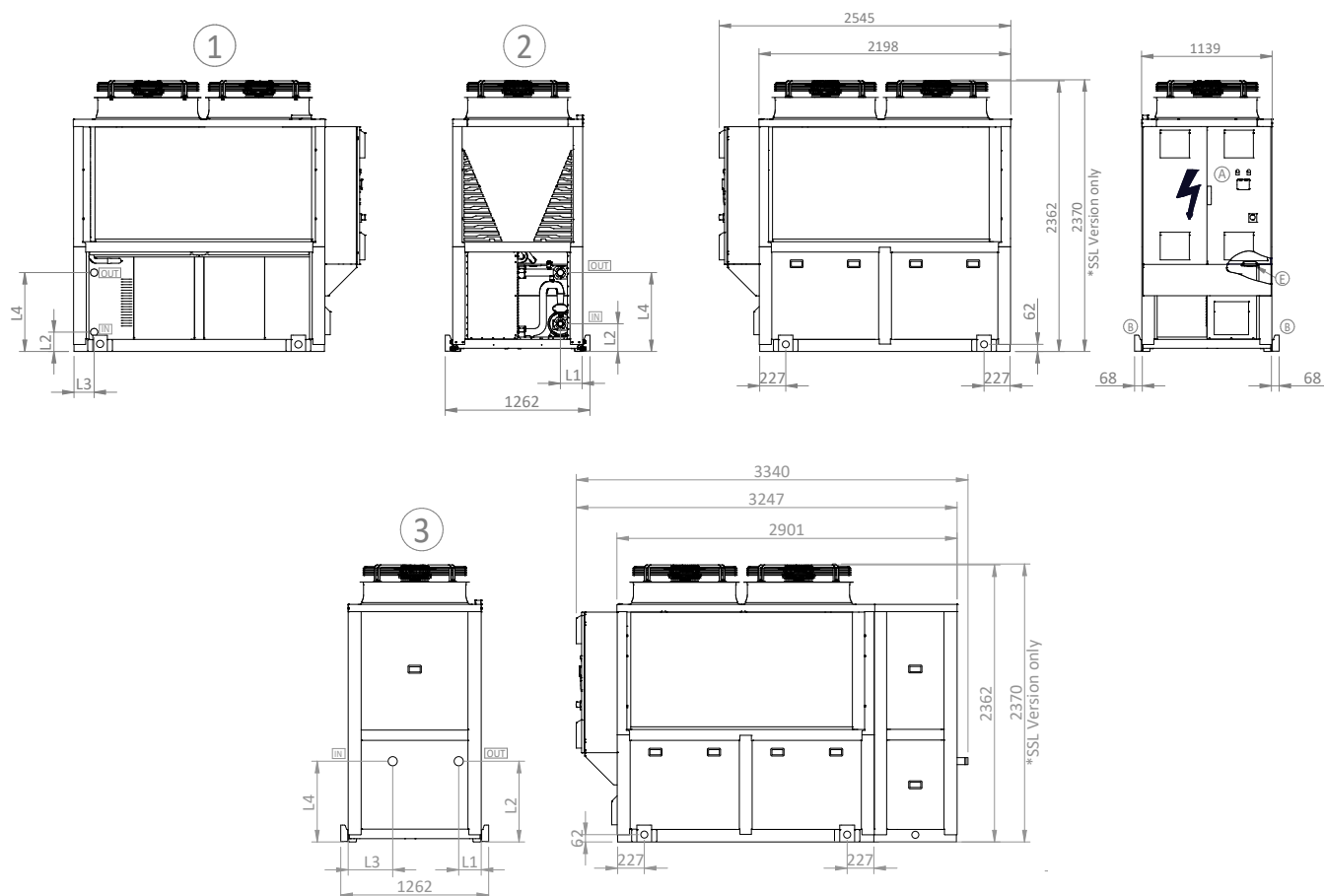
For other types of installation not covered in this manual, contact technical support. If in doubt about the installation of the units, request a technical assessment by the fire brigade or a fire prevention expert.



MODEL HWA2		X	Y	L
0270 / 0280 / 0290	mm	1500	3000	2200

5.6 DIMENSIONS

5.6.1 Models HWA2-AH 0270 / 0280 / 0290



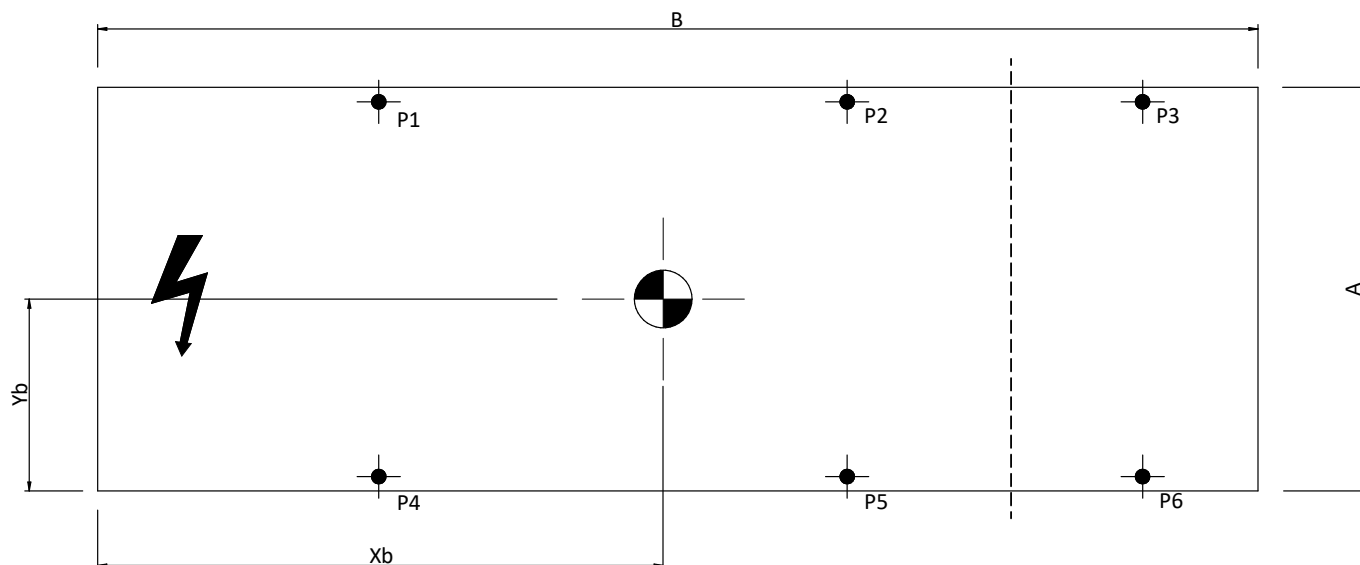
Legend	
Electrical panel	A
Lifting bracket	B
Power supply input	E
* Accessory	
** Standard version height; for SSL: see table	

Version	L1 [mm]	L2 [mm]	L3 [mm]	L4 [mm]	IN / OUT
1 Standard	-	170	176	690	2" Victaulic
2 Single pump – Dual pump	190	245	-	170	
3 Single pump – dual pump with tank	190	690	370	690	

5.7 CENTER OF GRAVITY AND ANTI-VIBRATION DAMPERS POSITIONING

The center of gravity position of each unit is indicated in the tables, with reference to the dimensions shown in the figure. A distinction is made between the standard unit, the unit equipped with a hydronic kit, and the unit with both hydronic kit and tank installed.

5.7.1 Models 0270 / 0280 / 0290



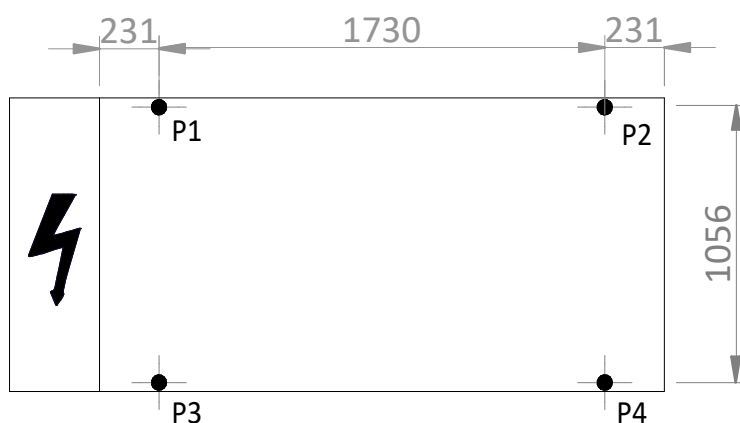
Model HWA2-A	Version	A [mm]	B [mm]	Xb [mm]	Yb [mm]
0270 / 0280 / 0290	Standard	1262	2545	1170	450
	PS/PSI/PSAP/PSIAP/PD/PDAP			1220	485
	PS/PSI/PSAP/PSIAP/PD/PDAP -SI		3340	1530	490

Model HWA2-AH	Version	A [mm]	B [mm]	Xb [mm]	Yb [mm]
0270 / 0280 / 0290	Standard	1262	2545	1210	450
	PS/PSI/PSAP/PSIAP/PD/PDAP			1260	485
	PS/PSI/PSAP/PSIAP/PD/PDAP -SI		3340	1535	495

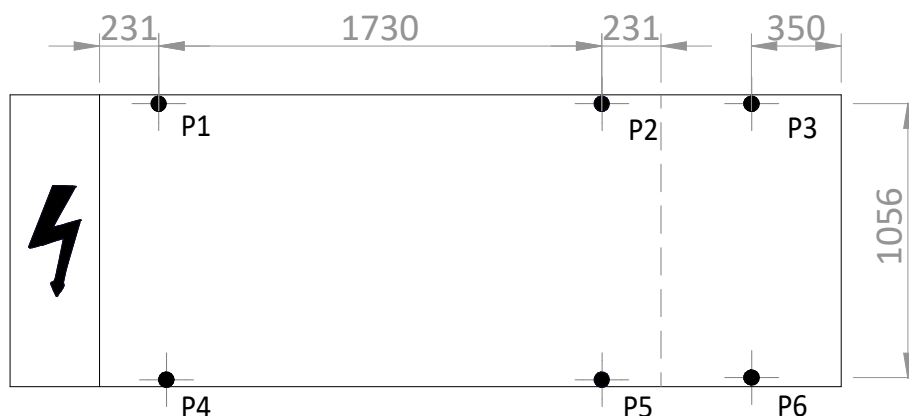
Version	Models	Standard	with pump / dual pump	with pump / dual pump and tank
HWA2-A 0270 / 0280 / 0290	Shipping weight [kg]	860	950	1150
	Operating weight [kg]	870	960	1510
HWA2-AH 0270 / 0280 / 0290	Shipping weight [kg]	960	1060	1260
	Operating weight [kg]	970	1070	1600

The installation positions of the anti-vibration mounts for each unit configuration are shown in the following figures.

Standard unit



Unit with hydronic kit



5.8 ACCESS TO THE INTERNAL PARTS

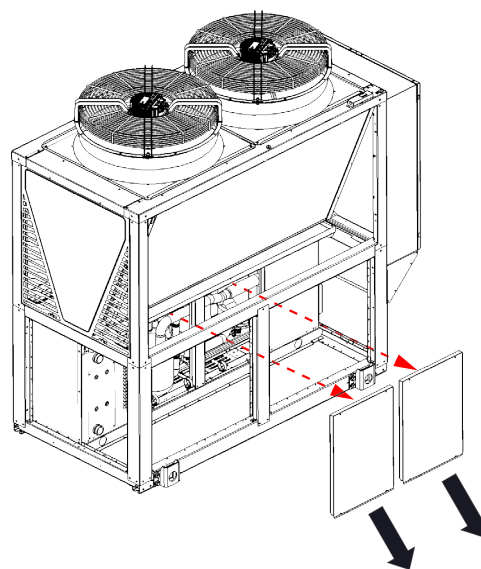
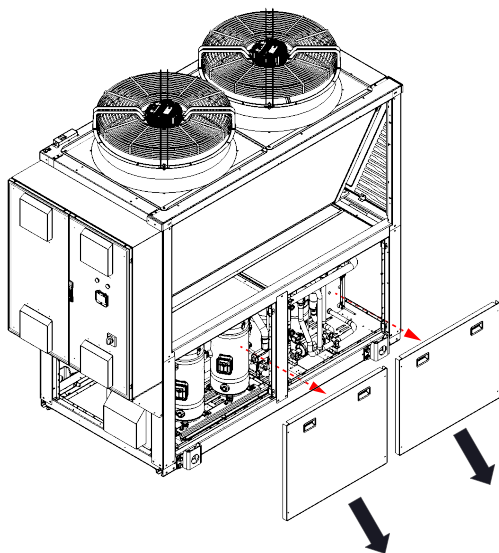
5.8.1 Access inside the unit

For maintenance and/or inspection of any part of the refrigerant circuit, access to the interior of the unit is required by removing the panels enclosing the refrigeration components. Simply unscrew the fixing screws of the rear panels and remove them from their seats. For units equipped with the tank kit, both side panels of the additional extension are also removable.

The hydronic section is always accessible, except when the anti-intrusion grille accessory is installed. In this case, the grilles must be removed to access the hydraulic components.



When the electrical panel covers are removed, the gas extraction fan remains partially accessible. Pay attention to the risk of shearing and/or entanglement. ALWAYS reinstall the covers once the required maintenance operations have been completed.

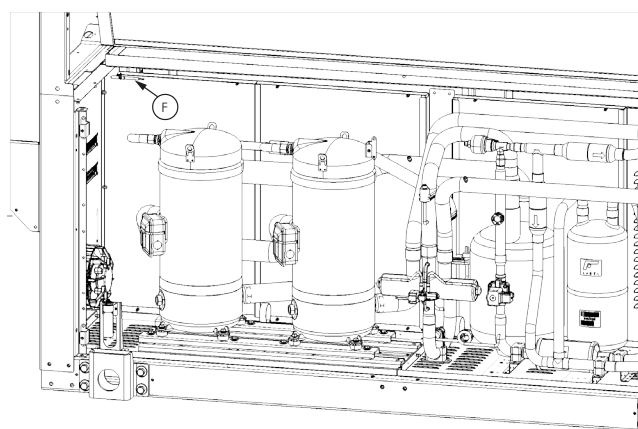
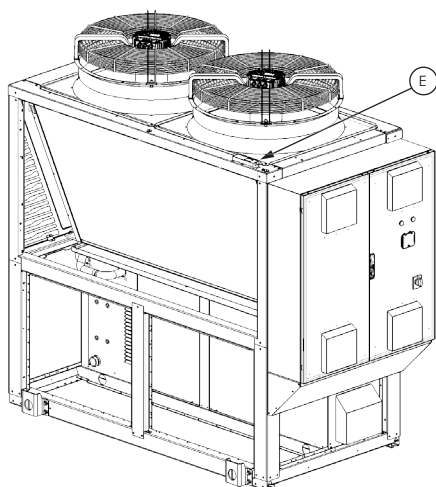
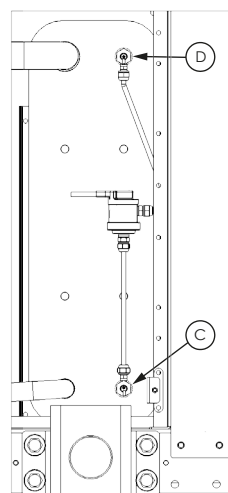
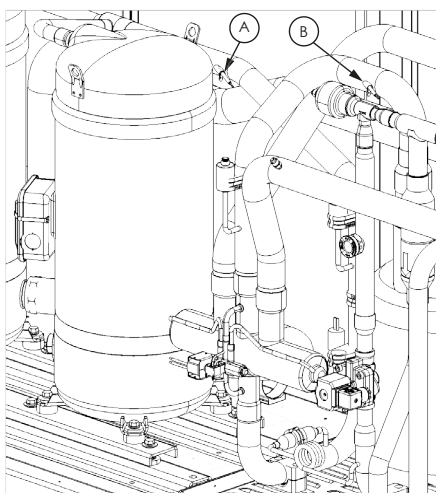


For access to the electrical panel, refer to chapter 5.12.1.

5.8.2 Temperature sensor locations

Five temperature sensors are installed inside the unit: the water return and supply sensors (positions C, D), the compressor suction and discharge sensors (positions A, B), while the outdoor air sensor (position E) is mounted on a dedicated support. The compressor piping sensors are secured to their respective wells using clips.

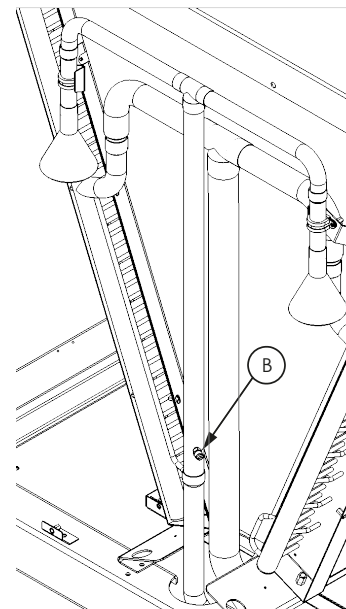
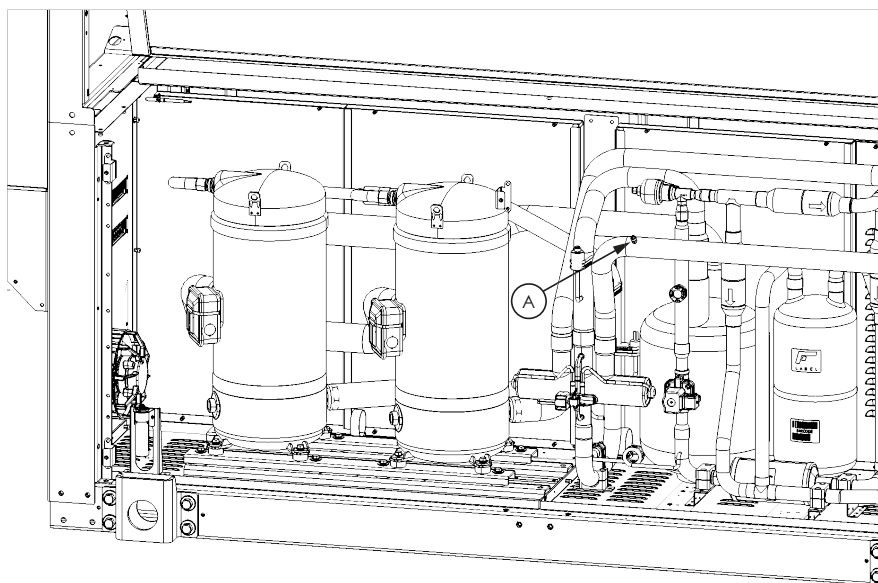
An additional temperature sensor is installed in the compressor compartment (F), which activates the fan when a high temperature is detected inside the compartment.



5.9 MACHINE CHARGING PROCEDURE

The unit is supplied already charged with refrigerant gas. If it needs topping up, after maintenance or a leak, follow the steps listed below in this exact order:

- Before carrying out any intervention, perform a risk assessment and delimit the work area. Ensure that no potential ignition sources are present. The minimum area should extend 3 m around the unit and must not include manholes, drains, or other depressions where refrigerant gas may accumulate.
- Display hazard warning signs and prevent access by unauthorized personnel;
- Use the PPE specified in this manual and suitable personal equipment for the intervention. Such equipment includes:
 1. Explosimeter, to check for the presence of hydrocarbons in the environment (to be used before and while working on the system).
 2. Appropriate hoses for the type of compressor oil.
 3. Approved non-sparking equipment.
 4. Non-sparking sockets.
 5. Antistatic footwear and clothing (ESD).
 6. ATEX torch.
 7. Fittings for minimum emissions.
 8. Pin extractor.
 9. CO₂ extinguisher.
- Connect a hose to the circuit charging port (positions A and B in the figure) and completely recover the refrigerant gas. Use a suitable recovery unit (ATEX certified). To avoid contaminating the recovered gas, evacuate the hoses and recovery equipment before use. Regularly check the condition of seals and filters. It is recommended to remove the valve core using a valve core removal tool to significantly reduce evacuation and charging times.



- Flush the circuit by introducing nitrogen and raising the pressure to 4–5 bar. Discharge the nitrogen away from heat sources, ignition sources, wells, and other potential accumulation points;
- Evacuate the system to an absolute pressure not exceeding 200 Pa. During this phase, use an ATEX-certified fan to prevent refrigerant gas accumulation in the work area. Direct the airflow toward an area free of ignition sources.
- Repeat this flushing and evacuation cycle at least three times.
- Perform a deep vacuum on the circuit. The vacuum cycle must include an evacuation phase followed by a standing phase, allowing the system to reach equilibrium. The absolute pressure at the end of the process must not exceed 150 Pa. To ensure optimum unit performance, the vacuum procedure must be carried out carefully and accurately.
- Before performing the vacuum operation, ensure that the vacuum pump oil is clear and free from bubbles to prevent non-condensable gases or contaminants from entering the system. Use an ATEX-certified vacuum pump.
- Connect a hose to the charging port and charge the refrigerant slowly and carefully. Do not charge more refrigerant than required: the R290 charge must correspond to the value specified in the technical documentation. Use calibrated ATEX-certified scales with a resolution of at least 0.1 g. If available, the use of cylinder heating blankets is recommended to speed up the charging process.
- Once the required charge has been introduced, reinstall the valve core in the charging port and disconnect the equipment used.
- Verify system tightness by monitoring for refrigerant leaks using a suitable leak detector.

Failure to comply with the rules set out in this manual may result in:

- malfunctions and reduced machine performance;
- Refrigerant gas leaks, with the possible formation of a hazardous explosive atmosphere;
- Damage to components or piping (e.g. freezing).



CAUTION: All machine charging/discharging operations must be carried out by **QUALIFIED PERSONNEL (EN 378-4)**.



CAUTION: During charging/discharging operations, there is always a risk of refrigerant gas leakage and thus the formation of flammable atmospheres. Take the utmost care to ensure that no refrigerant gas is present in the environment before and during each operation.

5.10 PLUMBING CONNECTIONS

Hydraulic connections must be carried out in accordance with applicable national or local regulations; piping may be made of steel. The piping must be carefully sized according to the unit nominal water flow rate and the pressure losses of the hydraulic circuit. All hydraulic connections must be insulated using closed-cell insulation material of suitable thickness. The chiller must be connected to the piping system using new flexible joints; reused joints are not permitted. The following components are recommended for installation in the hydraulic circuit:

- Well thermometers to monitor the circuit's temperature.
- Manual gate valves to isolate the chiller from the water circuit.
- Y-type metal filter or dirt separator (installed on the system return pipe), with a mesh size not exceeding 1 mm.
- Charging group and exhaust valve where necessary.

	When selecting components and piping, verify the compatibility of materials with the working fluid, paying particular attention in the case of water-glycol mixtures.
	When sizing the piping, ensure that the maximum system-side pressure drop specified in the technical data table in chapter 12 is not exceeded.
	At start-up, check for the absence of leaks at pipe joints, which may be caused by gasket failure, misalignment, or insufficient tightening. In this regard, the recommended tightening torque values are provided in the technical bulletin.
	Provide a suitable drain for the water safety valve.
	An automatic air vent must be installed at the highest point of the system.
	CAUTION: The expansion vessel, if present on the unit (check the hydraulic diagram), has a limited capacity. It is the installer's responsibility to check that the expansion vessel is adequate for the actual capacity of the system, otherwise an additional expansion vessel must be provided.
	CAUTION: Place the return pipe from the system at the "WATER INLET" label, otherwise the evaporator may freeze.
	CAUTION: It is mandatory to install a metal filter (with mesh no larger than 1 mm) on the return pipe from the system labeled "WATER INLET". Alternatively, it is possible to install a dirt separator that guarantees a filtration degree of no more than 1 mm; in this case is not necessary to install the Y-filter. If the metal strainer or dirt separator is not installed in the system, the warranty shall be immediately void. The strainer (or dirt separator) must be kept clean; therefore, it must be ensured that they remain clean after unit installation and are inspected periodically.
	All units are supplied with a differential pressure switch (factory-installed). If the differential pressure switch is tampered with or removed, the warranty shall be considered void. Refer to the wiring diagram supplied with the unit for connection of the differential pressure switch. Never bridge the differential pressure switch terminals in the terminal block.
	The heating system and the safety valves must comply with the requirements of standard EN 12828.

5.10.1 System water characteristics

To guarantee proper unit operations, the water must be appropriately filtered (see the instructions at the start of this paragraph) and the amount of dissolved substances must be minimal. The maximum permitted values are shown below:

MAXIMUM CHEMICAL-PHYSICAL PROPERTIES ALLOWED FOR THE SYSTEM WATER	
PH	7,5 – 9
Electrical conductivity	100 – 500 µS/cm
Total hardness	4.5 – 8.5 dH
Temperature	≤ 78 °C
Oxygen content	< 0,1 ppm
Max glycol quantity (*)	50 %
Phosphates (PO ₄)	< 2 ppm
Manganese (Mn)	< 0.05 ppm
Iron (Fe)	< 0.3 ppm
Alkalinity (HCO ₃)	70 – 300 ppm
Chloride ions (Cl ⁻)	< 50 ppm
Sulphate ions (SO ₄)	< 50 ppm
Sulphide ions (S)	None
Ammonium ions (NH ₄)	None
Silica (SiO ₂)	< 30 ppm

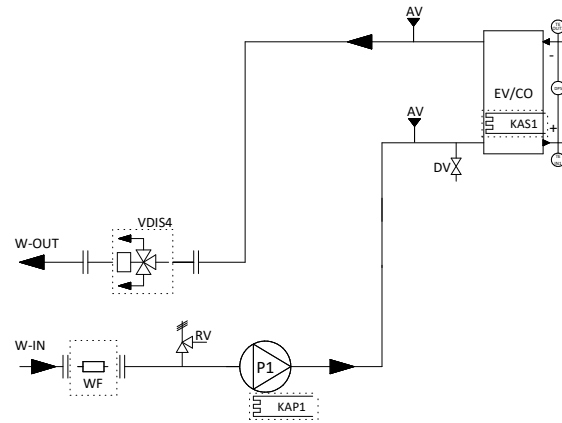
(*) For units equipped with a hydronic kit, pay attention to the maximum glycol concentration allowed in the system.

5.10.2 Plumbing diagram inside unit

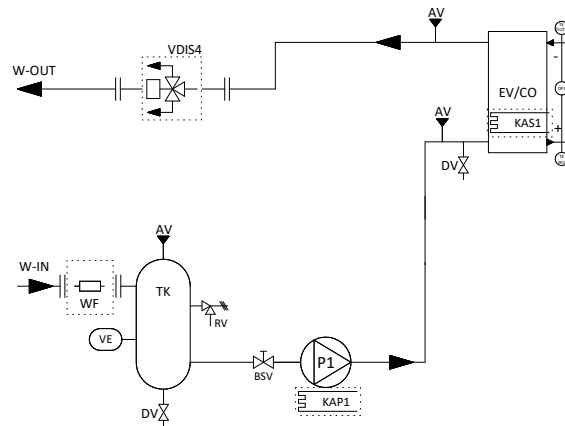
The hydraulic connection diagrams for all available unit versions are shown below, together with the legend applicable to all diagrams.

Legend			
EV/CO	Plate heat exchanger	WF	Y-filter*
DV	Discharge valve *	DPS	Differential pressure switch
RV	Safety valve *	W-IN	Water input
BV	Shut-off valve *	W-OUT	Water output
KAS1	Heat exchanger resistance *	VDIS4	3-way valve *
KAP1	Pump resistance *	CV	Non-return valve *
BSV	Shut-off valve	P	Pump *
VE	Expansion vessel *	AV	Automatic air vent valve *
TE IN	Return temperature sensor	TE OUT	Supply temperature sensor
*	Optional (depending on the selected hydro-nic kit)	TK	Tank *
---	Separately supplied accessory to be installed outside the unit		

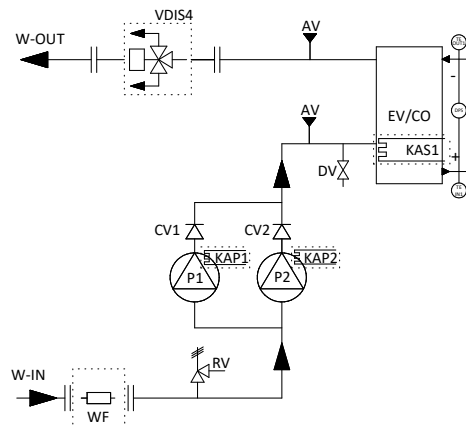
HWA2-AH - Single pump version



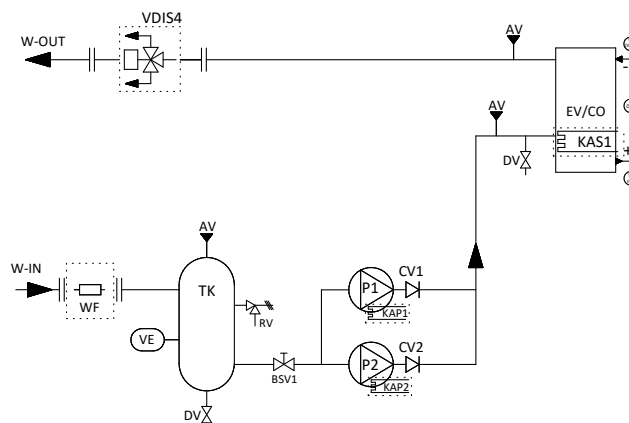
HWA2-AH - Single pump version with tank



HWA2-AH - Dual pump version



HWA2-AH - Dual pump version with tank



Every unit equipped with a hydronic kit and tank includes an expansion vessel and a safety valve with an opening pressure of 6 bar.

Main characteristics of the expansion vessel:

- Operating temperature: -10 / +99 °C;
- Pre-charge pressure: 1.5 bar;
- Glycol concentration: up to 50%
- Maximum pressure: 10 bar
- Volume: 24 liters

Every unit equipped with a hydronic kit without a tank also includes a safety valve with an opening pressure of 6 bar.

5.10.3 Condensate drainage system

As the pipes are properly insulated, condensate formation is minimal and does not result in water accumulation inside the refrigeration compartment. All heat pump units are provided with drain holes in the base frame to allow condensate drainage onto the ground surrounding the unit.



Do not obstruct the holes in the base for condensate drainage.

In particularly cold climates, installation on raised supports is recommended to prevent unit damage due to ice formation.



WARNING: A limited amount of water (possibly ice during the winter period) from the condensate drainage system may accumulate near the unit, creating a risk of slipping/falling.

In the event of a leak, refrigerant gas may escape from the unit through the openings in the base panel. Therefore, it is recommended to always direct condensate drainage toward an open area near the unit (within the hazardous zone defined in chapter 5.5). For ground-mounted installations, condensate may also be discharged into a gravel or crushed stone drainage bed.

5.10.4 Condensate drain pans for heat exchange coils

Heat pump units are equipped with a condensate collection pan to collect water generated during the defrost cycle. Thanks to the pan slope, the water is directed toward a drain outlet, which should be connected to a suitable drainage system.

To prevent ice formation caused by water accumulation and stagnation in the drain pan and drain line when the outdoor temperature falls below 5 °C, installation of an electric heater (accessory) is mandatory. The heater is sized to prevent ice formation in the pan and in the initial section of the drain line.



The installation of any supplementary heaters provided by the customer shall comply with ATEX regulations if such heaters remain energised in the event of a refrigerant leak.



Installation of the electric heater in the condensate drain pan is mandatory for all units installed in environments where the temperature may fall below 5 °C, in order to prevent ice formation.



It is mandatory to keep the drain pan and drain outlet clean, removing leaves or any debris that could cause blockage.



The drain piping must be installed in accordance with the instructions provided in chapter 5.5.



A trap or equivalent solution must be provided to prevent propane, in the event of a leak, from being conveyed into gullies or other underground drainage systems.

5.10.5 System charge



CAUTION: Supervise all charging/top-up operations.

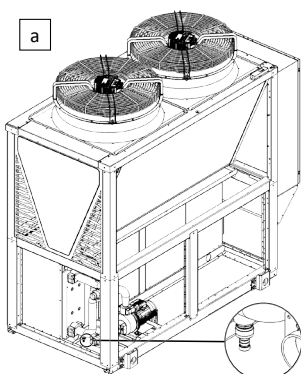
CAUTION: Before charging/topping up the system, disconnect power to the units.

CAUTION: The system must always be charged/topped up under controlled pressure (max. 1 bar). Ensure that a pressure reducer and safety valve are installed on the charging/top-up line.

CAUTION: The water in the charging/top-up line must be properly pre-filtered from impurities and suspended particles. Ensure that a removable cartridge filter and a dirt separator are installed.

CAUTION: Regularly check and vent the air built up in the system.

CAUTION: Install an automatic air valve at the highest point of the system.

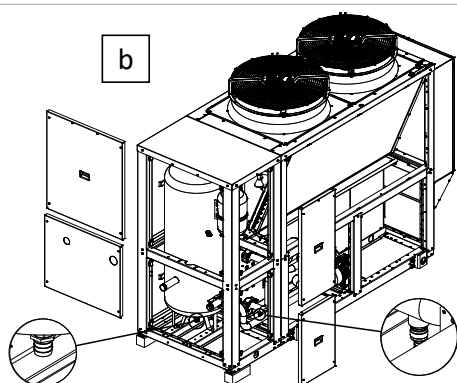


For system filling, it is recommended that the installer provide an external filling valve.

Only units equipped with a hydronic kit include an integrated valve, which can be used for system filling, draining the water contained in the system, or adjusting the water/glycol mixture.

The valve location depends on the hydronic kit configuration:

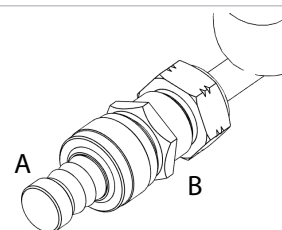
- No hydronic kit → valve not provided
- Hydronic kit with single/double pump → valve installed on the pump suction line (see figure a)
- Hydronic kit with single/double pump and tank → valve installed on the pump suction line and an additional valve located below the tank (see figure b)



5.10.6 System discharge

If the unit needs to be drained completely, first close the manual inlet and outlet gate valves (not provided) and then detach the pipes on the outside of the water inlet and outlet to drain liquid from the unit (to make this operation easier, we recommend installing two drain valves between the unit and the manual gate valves on the outside of the water inlet and outlet).

If system adjustment or glycol concentration adjustment is required, the service valve may be used. Unscrew the service valve cap (A) and connect a 14 mm or 12 mm hose (internal diameter – verify the valve model installed on the unit) to the hose fitting and to the water supply network. Then fill the system by loosening the dedicated ring nut (B). Once the operation is complete, tighten the ring nut (B) and reinstall the cap (A). In any case, the use of an external filling valve, provided by the installer, is recommended for system filling.



5.10.7 Air valve

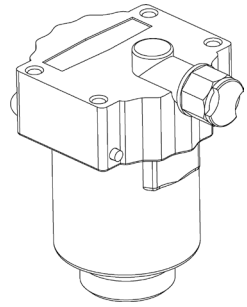


The air vent valve is installed only on units equipped with a hydronic kit.

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 performs a safety function: in the event of heat exchanger failure, it allows the refrigerant gas to be discharged to the outdoor air, preventing its transfer to the indoor terminals. However, this function alone is not sufficient to guarantee complete safety; therefore, additional protection measures (such as an air separator or hydraulic circuit decoupling) are recommended.

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.



If you notice a water leak, you must replace the component by unscrewing it with a spanner, as shown in the image below.



5.10.8 Deaerator



WARNING: In the event of heat exchanger failure, propane may mix with the secondary fluid and be carried into the conditioned spaces. The unit is not inherently protected against this risk. It is the responsibility of the system designer to assess the hazard and implement suitable design measures to minimize this event.

Among the available accessories, an air separator suitably sized to separate any propane that may mix with the secondary fluid in the event of a heat exchanger failure is available. The installation position must be between the unit outlet and the point where the piping enters enclosed spaces. Please note that the area surrounding this component must be treated as a hazardous zone, and the same precautions required for unit installation must be adopted. Installation close to the unit is recommended to optimize hazardous and safety zones.

An alternative solution for ensuring the safety of occupied spaces is to hydraulically separate the unit secondary circuit from an additional circuit dedicated to transporting the heated fluid indoors, by installing an additional plate heat exchanger between the two circuits.

Refer to the installation positions shown in the drawing in the following chapter. The diagram is for illustrative purposes only and is not intended as a system construction drawing.

5.10.9 Antifreeze drain valve



WARNING: If the unit is locked out due to activation of the R290 sensor, the heat pump is completely disconnected from the electrical supply; therefore, any anti-freeze kits are also deactivated. Under these conditions, combined with low outdoor air temperatures ($< 5^{\circ}\text{C}$), the water inside the circuit may freeze, causing damage to piping and components, such as the heat exchanger. If installed in locations where the temperature drops below 5°C , the installation of antifreeze drain valves in the system is mandatory.



The antifreeze drain valves must be installed outdoors, in the coldest part of the system exposed to freezing risk, and must be installed on both pipes to ensure better drainage flow.

Installation rules:

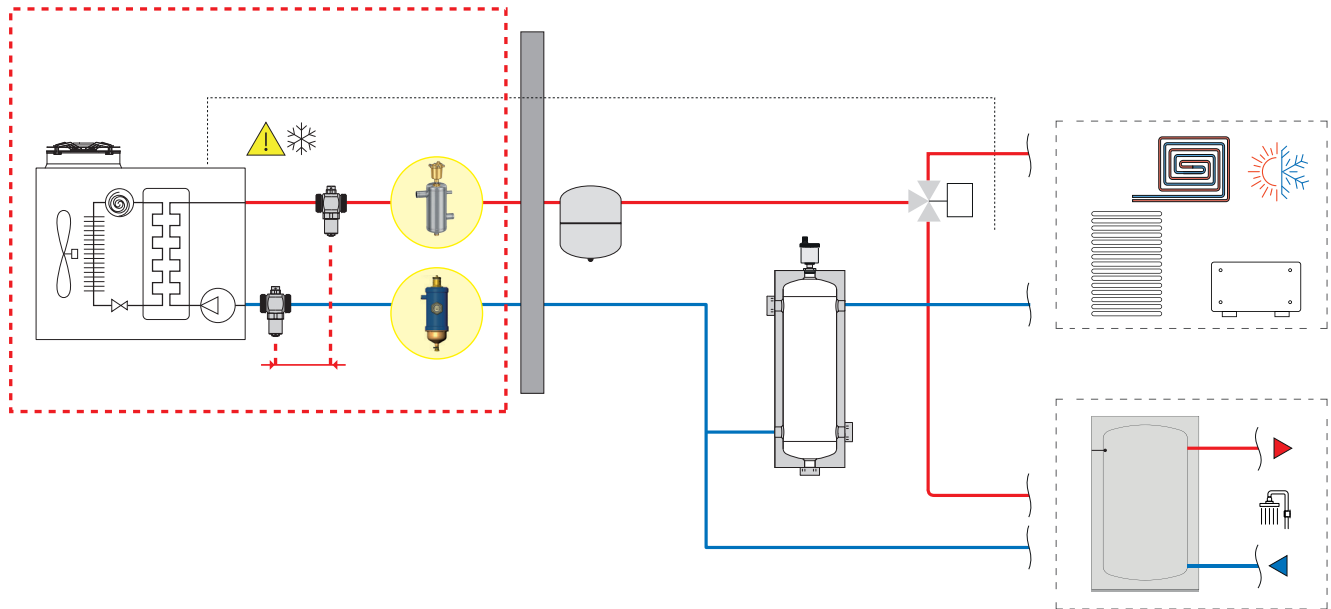
- Maintain a minimum clearance of 15 cm from the ground to prevent any ice column forming underneath from obstructing water discharge from the valve.
- Maintain a minimum distance of 20 cm between the antifreeze valves.
- The device must be installed only in a vertical position to ensure that discharged water can flow freely downward.
- Avoid siphon connections that may create hazardous water stagnation.



It is recommended to keep the system permanently pressurized, even during device drainage, to ensure the proper operation of the antifreeze drain valve.

For proper system operation, the valve must be left free from insulation.

If installed in an open-air environment, the antifreeze valve must be protected from rain, snow, and direct sunlight.



Illustrative diagram only – not intended for construction purposes.

5.10.10 Minimum water flow rate and water volume

The design water flow rate must comply with the values specified in the tables in chapter 12 and must be maintained even under varying system operating conditions. The same chapter also specifies the minimum water content required to prevent frequent compressor start-stop cycling.

5.10.11 Frost risk

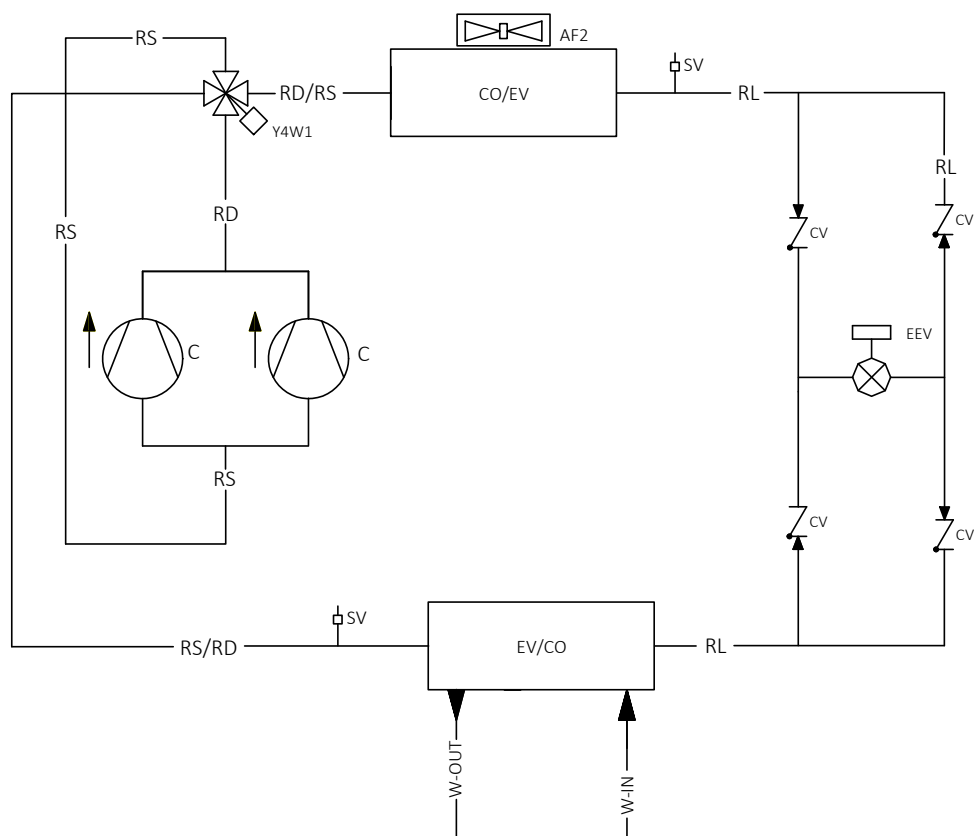
When outdoor temperatures are close to 0°C, preventive measures must be adopted to avoid freezing of the system water. Water may be mixed with glycol, piping may be protected with heating cables installed under the insulation, or the system may be drained in case of long shutdown periods.

When glycol is added, it must be ensured that it is non-corrosive and compatible with the hydraulic circuit components. In the presence of water-glycol mixtures, unit performance will differ from the declared values and must be corrected using appropriate adjustment factors depending on the glycol concentration used. These coefficients are provided in the Technical Bulletin of the relevant series.

5.11 FUNCTIONAL DIAGRAMS

Below are the conceptual diagrams of the chiller and heat pump version and the legend for all diagrams.

LEGEND			
C	FIXED-SPEED COMPRESSOR	KAS	SUCTION LINE
CO/EV o CO	CONDENSER (IN CHILLER OPERATION)	RD	DELIVERY LINE
EV/CO o EV	EVAPORATOR (IN CHILLER OPERATION)	RD/RS	DISCHARGE/SUCTION LINE
EEV	ELECTRONIC EXPANSION VALVE	RS/RD	SUCTION/DISCHARGE LINE
AF	AXIAL FAN	RL	LIQUID LINE
SV	SERVICE CONNECTION	RLL	SERVICE CONNECTION
CV	NON RETURN-VALVE	W-IN	SYSTEM WATER INLET LINE
Y4W	4-WAY CYCLE REVERSING VALVE	W-OUT	SYSTEM WATER OUTLET LINE

Circuit diagram HWA2-AH

Component numbering criteria in the refrigerant circuit and in the electrical diagrams supplied with the unit.

The numbering of components shown in the refrigerant circuit diagram and in the related documentation follows a structured logic to facilitate identification. Each code consists of:

- A letter identifying the component type (e.g. C = compressor, V = valve, etc.)
- Two numbers separated by a dot, with the following meaning:
 - The first number indicates the refrigerant circuit number
 - The second number represents the sequential number of the component within that circuit.

Examples:

C1.1 → Compressor 1 of refrigerant circuit 1

C1.2 → Compressor 2 of refrigerant circuit 1

C2.1 → Compressor 1 of refrigerant circuit 2

This convention applies to all system components, enabling immediate identification of each component and its corresponding circuit.

5.12 ELECTRICAL CONNECTIONS

Verify that the power supply matches the unit's nominal data (voltage, phases, frequency) indicated on the rating plate located on the unit side frame. The electrical connection must be carried out in accordance with the wiring diagram supplied with the unit and in compliance with local and international standards (provide a main circuit breaker, differential protection for each line, proper system grounding, etc.).

	Before starting any operation, make sure that the power supply is disconnected.
	The minimum clearances specified in chapter 5.4 must be maintained to allow electrical connections to be carried out.
	Some parts of the unit remain under voltage even when the disconnect switch is in the OFF position. A main power supply disconnecting device, lockable in the open position, must be installed upstream of the unit to prevent unintentional operation during maintenance activities.
	CAUTION: The installer is responsible for the disconnection system (e.g. general circuit breaker) upstream of the electrical connections of the unit.
	The supply voltage must not vary by more than $\pm 10\%$ of the nominal value. Please contact the electricity provider if this tolerance is not met. The power supply must comply with the limits mentioned, otherwise the warranty is immediately void. Phase imbalance must not exceed 2%.
	If the power supply cable is damaged, it must be replaced by qualified personnel (EN 378-4) in order to prevent any risk.
	Any appliances 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.
	The power supply wiring and the connections between the unit and the system must be carried out in accordance with CEI EN 60079-14.
	Pay attention to all openings located near the unit, such as power cable ducts and inspection pits, as they may act as accumulation zones in the event of an R290 leak. Seal such openings using suitable fire-resistant thermosetting sealants, then proceed with resin sealing. For inspection pits, provide sand filling treatment.
	All electrical components have been designed to operate in an environment where R290 gas may be present. Any physical damage, tampering, or modification may create a fire hazard.
	Do not tamper with the cable fixing. Do not disconnect the electrical panel connectors.

For the correct wiring diagram, refer to the documentation supplied with the unit.

Unit size	Wiring diagram code
0270 / 0280 / 0290	FF0270XXXabcd

XXXX – variable numbers.

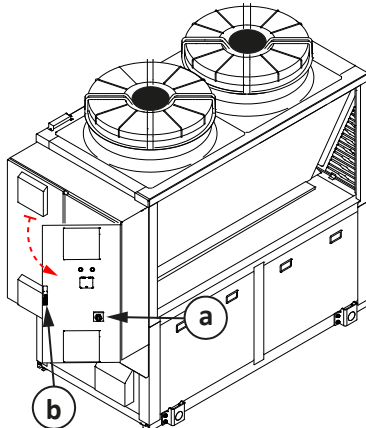
The code varies depending on the installed accessories in positions a, b, and c. The legend is provided below:

Position (a/b/c)	Accessory	Number
a	HWA2-AH	2
b	-	1
b	Soft-starter	2
c	-/PS/PSAP/PD/PDAP	1
c	PSI	2
d	-	1
d	Fan EC / EC-CC	2
d	SSL	3

5.12.1 Access to the electrical panel

The procedure for accessing the electrical panel is described below.

	Before carrying out any operation, always verify that no R290 leaks are in progress and that no stagnant R290 accumulation is present in the work area. R290 is a highly flammable gas; the presence of vapors may generate hazardous explosive atmospheres.
	Do not tamper with the electrical panel membranes or cable glands, as this may compromise the protection rating and system safety.
	WARNING: Exercise extreme caution when working inside the electrical panel, as some circuit parts remain permanently energized. These cables are identified by their orange color.
	During operations with the electrical panel doors open, ensure that the doors are securely held in a stable position to prevent accidental closing.

1. Turn the disconnect switch handle. 2. Using the appropriate key, unlock the door latches (one or two depending on the model).		
	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.	
a = Disconnect switch handle b = Door latches When the work is complete, replace all the removed covers with all the screws and seals provided (if any).		

5.12.2 Power supply

	Electrical connections must only be carried out by QUALIFIED PERSONNEL in accordance with current regulations.
	Make sure to install a proper earth connection; an incomplete earth connection can lead to electric shocks. The manufacturer cannot be held liable for any damage arising from failure to earth or ineffective earthing.
	The unit is designed for connection to a TN(S) three-phase power supply system. In the case of TN-C systems, the supply system must be converted to TN-S before connection to the unit. For installations on TT systems, a residual current device must be provided for protection against indirect contact. Refer to chapter 5.10.3.

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

Use a dedicated power supply line; do not power the unit through a line shared with other loads. Secure the power cables properly and ensure they do not come into contact with sharp edges. Use double-insulated cables with copper conductors. For unit power supply, cables with at least FG16 characteristics or higher are recommended (H07RN-F is recommended).

If cables are installed in sections exposed to weather conditions, use UV-resistant cables or route them inside appropriate protective conduits.

The earth connection must be made first when connecting, and must be removed last when disconnecting the unit. If the power cable becomes loose, the active conductors must be tensioned before the earth wire.

Provide cable routing through the building wall towards the unit. Depending on the installation type, physical layout, and cable length (either less or more than 10 m), the system designer is responsible for selecting the appropriate electrical system sizing.

5.12.3 Protective devices

On the power supply line upstream of the unit, it is mandatory to install electrical isolation devices sized according to the unit nameplate data:

- install a type B residual current circuit breaker with overcurrent protection, sensitive to all currents, with a trip threshold of 300 mA and a breaking capacity of at least 10 kA.

The table below shows the recommended cable cross-sections for a maximum length of 30 m. In any case, depending on installation type, physical layout, and cable length (either less or more than 30 m), the system designer is responsible for selecting the appropriate sizing.

Connect to the copper busbar using M8 screws, strength class 8.8 with washer; refer to tightening torque in the table.

Power supply	Model	Recommended cable cross-section (maximum length 30 m).	Recommended torque for copper bars [Nm]
400Vac / 3ph	0270	*3x35 + 1G16	18-20
400Vac / 3ph	0280	*3x35 + 1G16	18-20
400Vac / 3ph	0290	*3x35 + 1G16	18-20

(*) H07RN-F cable, fixed installation in air at -25 / +60°C.

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

During installation, the system designer must size the external protection devices considering a short-circuit current (I_{cc}) greater than 10 kA.

	CAUTION: The leakage current is greater than 10mA. It is mandatory to follow the installation rules given in chapter 8.2.6 of IEC 60204-1:2016 / EN 60204-1:2018.
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5.12.4 User terminal block

The connection terminal block is located under the machine cover. For access, see the instructions. The terminal block must be connected respecting the notes below.

The connections shown below are standard. Other connections are given in the MCO manual of the on-machine control (see "USER AND INSTALLER CONFIGURATION TABLES"), according to the configurations adopted.



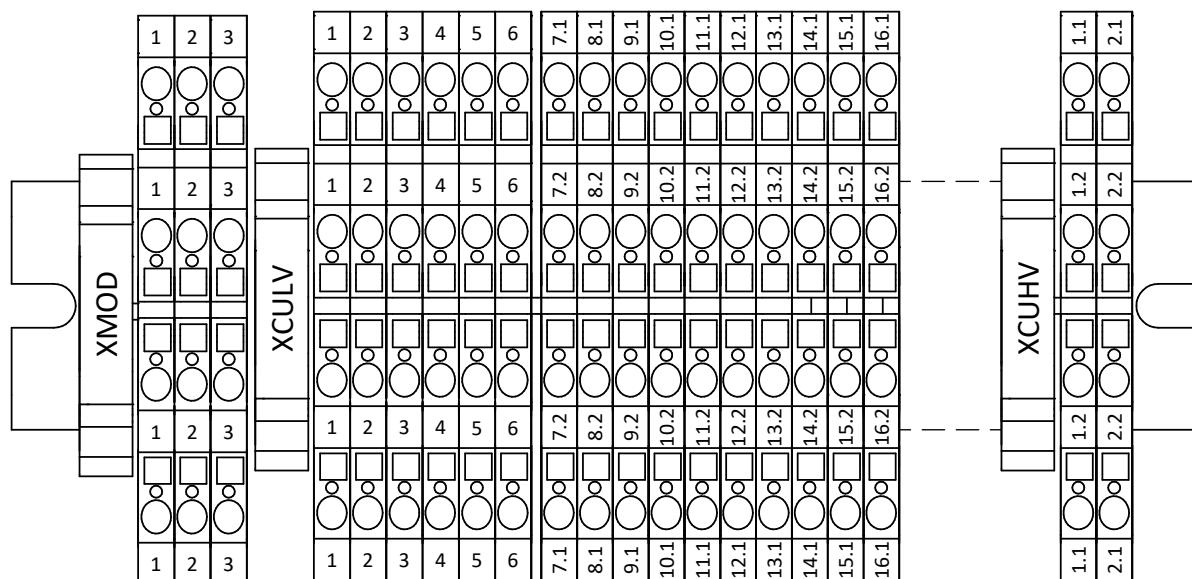
In the event of replacement, secure the cables using cable ties in the designated fastening system. Any tampering may compromise the safety of the electrical panel in the event of an R290 leak.

Terminal block models 0270 / 0280 / 0290

XMOD		
Terminal	Connection	Type
1	EEBUS connection	GND
2		RTU - (B)
3		RTU + (A)

XCULV		
Terminal	Connection	Type
1	Modbus communication RS RTU RS 485	Primary Modbus RTU GND Remote Keypad
2		Primary Modbus RTU - Remote Keypad
3		Primary Modbus RTU + Remote Keypad
4	Modbus communication RS RTU RS 485	Primary Modbus RTU + Remote Keypad
5		Secondary Modbus RTU - Remote Keypad
6		Secondary Modbus RTU + Remote Keypad
7.1 / 7.2	Connection for sensor alarm signaling	Under-voltage output 24V
8.1 / 8.2	Connection for sensor warm-up/fault signaling	Under-voltage output 24V
9.1 / 9.2	Storage tank / DHW / remote sensor (to activate the function see the relevant section in the MCO manual)	Analogue input
10.1 / 10.2	DHW valve control (to activate the function see the relevant section in the MCO manual)	Analogue input
11.1 / 11.2	Remote on/off input (closed = machine on / open = machine off)	Voltage-free digital input
12.1 / 12.2	Remote summer/winter mode selection (to activate the function see the relevant section in the MCO manual)	Voltage-free digital input
13.1 / 13.2	Secondary setpoint	Voltage-free digital input
14.1 / 14.2	Available	Voltage-free digital input
15.1	Available	GND
15.2	Available	Voltage input (ST11/DI10)
16.1	Available	+5Vdc
16.2	Available	\

XCUHV		
Terminal	Connection	Type
1.1	External pump control (if the hydronic kit is not installed)	Digital output – 230 Vac
1.2		N
2.1	DHW valve control	Digital output – 230 Vac
2.2		N



5.12.5 Refrigerant leak detection sensor

Each unit is equipped with an autonomous refrigerant detection system inside the refrigeration circuit compartment to monitor any possible gas leakage. In units with a hydronic kit with pump, a second refrigerant detection sensor is installed to protect the hydraulic circuit.

The sensors must be replaced every 5 years.

The detector operates automatically and independently; therefore, no user intervention is required. Two indicator lights are installed on the unit's electrical panel door, showing the operating status of the unit (see table in the following section).

Condition	Unit LEDs Active	Unit Energised?	Duration	Actions to be implemented
Initial start-up or power-up		NO	2 min	Wait until the preheating period has been completed.
Normal operation	-	YES	-	Normal unit temperature control operation.
Fault		NO	-	1. Manually check the area for refrigerant leaks – do not introduce potential ignition sources near the unit. 2. Disconnect and reconnect the power supply. 3. Contact an authorised service centre.
Alarm threshold reached (LFL ≥ 20%)		NO	-	1. Manually check the area for refrigerant leaks – do not introduce potential ignition sources near the unit. 2. Automatic reset occurs when the refrigerant concentration falls below the intervention threshold. 3. Contact an authorised service centre.



WARNING: In the event of sensor failure, immediately contact the manufacturer. Do not operate the unit if the sensor is faulty or defective.



WARNING: If the sensor is activated, some parts of the electrical panel remain energised even though the unit display is switched off. Take all necessary precautions and wear the appropriate personal protective equipment (PPE). Before carrying out any maintenance work on the electrical panel, place the isolator switch in the "OFF" position.

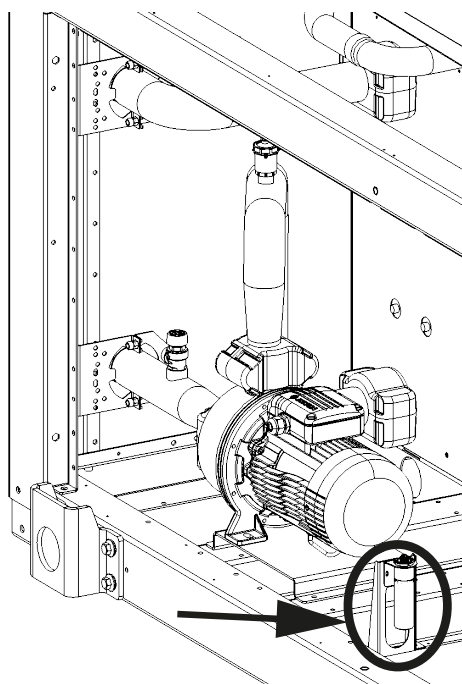
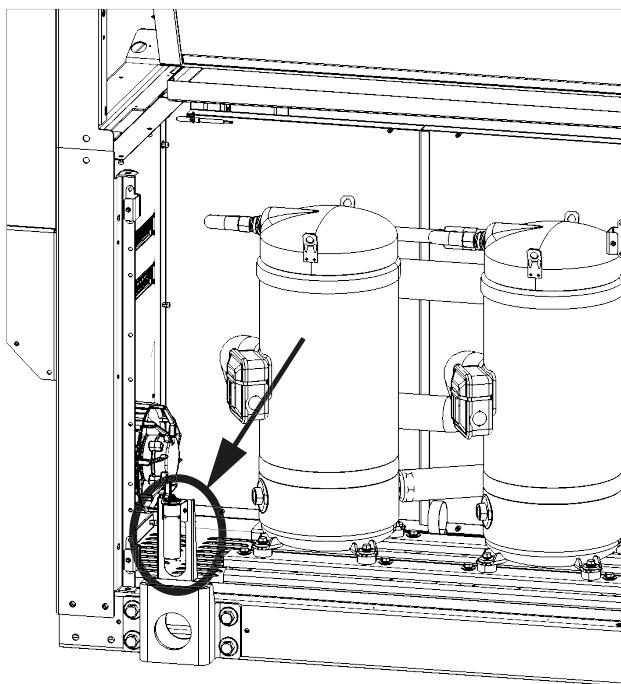


WARNING: In the event of a shutdown caused by sensor activation, always check for the presence of refrigerant gas in the surrounding area using a suitably calibrated R290 leak detector. Only after verifying that no gas is present within the unit hazard and safety zones may the sensor be manually reset.

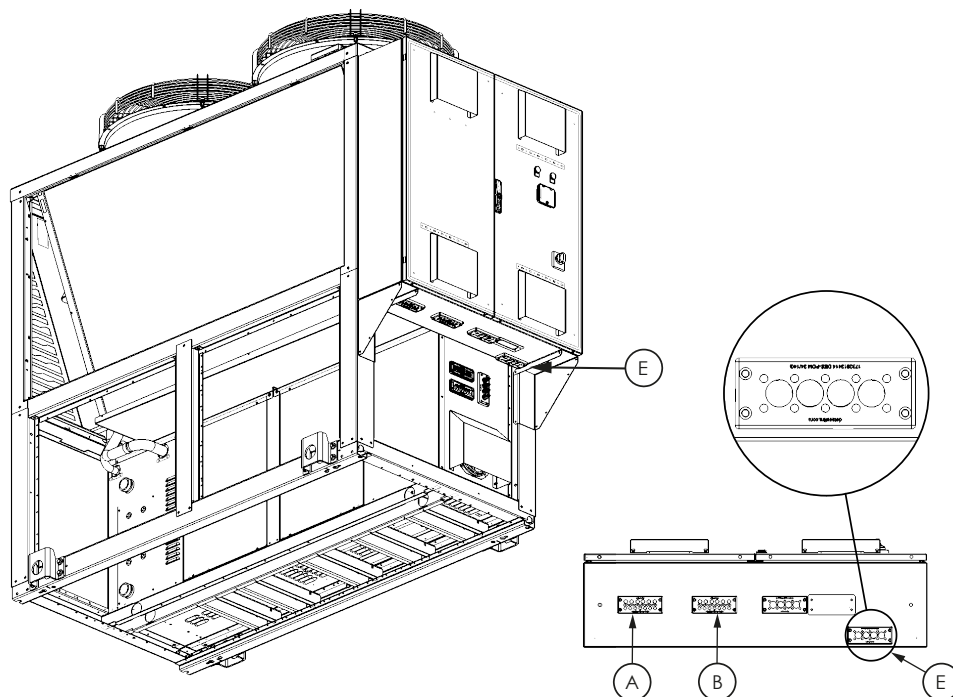
	It is forbidden to disconnect the sensor from the unit or modify its position. The sensing head must always be oriented vertically downward.
	Do not drill into or mechanically modify the sensor enclosure.
	The sensor must be kept free from liquids, dust and other contaminants. Periodically inspect the sensing head for deposits that could obstruct its operation and, if necessary, clean the sensor using a damp cloth or an antistatic cloth. The gas detector shall be cleaned in such a manner that no risk of ignition is created. Cleaning the sensor with compressed air is prohibited. In the event of suspected sensor damage, contact a qualified service centre for inspection and recalibration of the device.
	The sensor calibration and service life are guaranteed for 5 years. Replace the sensor every 5 years. Carry out an annual verification of the safety chain. Refer to chapter 9.3.
	If an R290 leak is detected by the sensor, the extraction fan is automatically activated. The extraction fan may discharge a potentially flammable mixture of air and R290 to the outside; therefore, the safety zones specified in chapter 5.5 must be strictly observed.
	The extraction fan is also activated when the internal temperature exceeds 45°C, in order to ensure adequate cooling of the technical compartment.

The sensor positions are shown in the following images:

0270 / 0280 / 0290



5.12.6 Cable entry



Use the following guidelines for cable routing:

Position E: power supply cable entry

Position A: Modbus and/or signal cable entry

Position B: when available, these can be used for external I/O connections. For the list, refer to Chapter 5 “System Resources” of the controller manual MCO2***.

5.12.7 Smart Grid Ready

HWA2 heat pumps are Smart Grid Ready (SG Ready) certified, a label introduced by the German Heat Pump Association (BWP) that identifies heat pumps capable of communicating with the public electricity grid via the SG Ready interface. This allows the electricity provider an efficient load management for grid support: in case of electricity peaks or shortages, the grid operator can give the input to heat pumps equipped with SG Ready logic to temporarily switch off or on, achieving intelligent utility control.

Heat pumps, regardless of current demand, can in fact store excess electricity in the form of thermal energy (e.g. in a hot water accumulator or a dedicated tank) and use it to satisfy heat demand, as well as being switched off in a targeted manner to mitigate consumption peaks. The SG Ready interface can be used by grid operators to control the device or to increase self-consumption in combination with a photovoltaic system. To enable the SG Ready function, the grid provider's SG Ready cables must be connected to the user board's terminals ID2, C (digital input reference ID2 = SG Ready 1) and AI8, C (digital input reference ID9 = SG Ready 2). Depending on the states of the two digital inputs for the SG Ready function, the unit is able to cover four operating states (heating and/or DHW mode):

Digital inputs		Description
ID 2 (SG Ready 1)	ID9 (SG Ready 2)	
Closed	Open	OFF command The heat pump remains in the forced-off condition.
Open	Open	Normal operation.
Open	Closed	ON command The heat pump increases the set point by an offset, applying it only when the compressor and/or thermoregulation is running.
Closed	Closed	Forcing command ON The heat pump immediately forces an offset set point increase, regardless of the compressor status.

The operating states OFF, ON and forced ON can be set by the grid provider for a maximum time of 2 hours, after which the unit reverts to normal regulation.



CAUTION: If the power grid to which the unit is connected is set up as a smart grid, the SG Ready function can be configured according to the MCO manual and the wiring diagram.

Heat pumps labelled "SG Ready" are a step towards electricity supply optimisation and are eligible for further funding in some EU member states.

5.12.8 Control logics

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

5.12.9 Fuses

Details of the type and rated characteristics of fuses can be found on the machine label and on the circuit diagrams.

6. STARTUP

Before startup:

- Check that the diagrams and manuals of the installed machine are available.
- Check the availability of wiring and plumbing diagrams of the system to which the machine is connected.
- Check that the shut-off valves of the water circuits are open.
- Verify that the hydraulic system has been filled under pressure and properly air-vented. To facilitate this operation, follow the forced venting procedure described in the Control Manual; it may be necessary to repeat the procedure several times depending on the system characteristics.
- Check that all water connections are correctly installed and that all instructions on the rating plates are complied with.
- Ensure that provisions have been made for condensate drainage.
- Check the electrical connection and correct fastening of all the terminals.
- Check if the electrical connections are performed according to the norms in force including the grounding connection.
- The voltage must be as stated on the nameplate of the unit.
- Make sure that the electric voltage is within the tolerance limits ($\pm 10\%$).
- Check that the electric heaters of the compressors are properly powered.
- Check that there are no refrigerant leaks. Each operator must be equipped with personal R290 gas detection devices or sensors.
- Before switching the unit on, check that all panels are positioned correctly and secured with the appropriate screws.
- During unit start-up, verify that no more than one defrost cycle is activated within the first 35 minutes of operation. The occurrence of multiple consecutive defrost cycles may indicate improper sizing of the unit relative to the heating load required by the application.



WARNING: The unit must be connected to the power supply and placed in STAND-BY mode (energized) by closing the main switch at least 12 hours before start-up, to allow the crankcase heaters to properly warm the compressor crankcase (the heaters are automatically energized when the switch is closed). The heaters operate correctly if, after a few minutes, the compressor crankcase temperature is $10\div 15^{\circ}\text{C}$ higher than the ambient temperature.

CAUTION: Check that the weight of the pipes does not weigh on the machine structure.

CAUTION: Never use the master switch to stop the unit temporarily, this must only be used to disconnect the unit from the power supply for long downtimes (e.g. seasonal stops etc.). Furthermore, without power, the crankcase heaters will not be powered with the risk of breaking the compressors when the unit is switched on.

CAUTION: Do not modify the electrical connections of the unit otherwise the warranty will be immediately void.

WARNING: Summer/Winter operation must be selected at the beginning of the corresponding season. Frequent and sudden changes of this operating mode must be avoided to prevent damage to the compressors.

CAUTION: When installing and starting up for the first time, make sure that the machine operates correctly in both heating and cooling mode.

6.1 SWITCHING ON THE UNIT

To power the unit electrically, turn the external disconnect switch handle to the ON position (marked "I"). The onboard display will switch on only if the phase sequence is correct (to be checked during initial start-up)

Wait at least 1 minute between switching off and the next start-up.

The display is powered only after the refrigerant leak detection sensor has completed its warm-up cycle and is operating correctly (approximately 2 minutes).

7. INSTRUCTIONS FOR THE USER

Note down the identification data of the unit so that it can be provided to technical support in the event of a service request.



The identification plate applied to the machine shows all the technical and performance data of the appliance. In case of tampering, removal or deterioration, request a duplicate from Technical Support.

Tampering, removal and deterioration of the identification plate makes any installation, maintenance and spare parts request difficult.

We recommend keeping track of the interventions carried out on the unit so as to make any troubleshooting easier.

In case of failure or malfunctioning:

- check the type of alarm triggered to report it to technical support;
- contact an authorised service centre;
- if requested by the service centre, immediately deactivate the unit without resetting the alarm;
- require the use of original spare parts.

8. SHUTDOWNS FOR LONG PERIODS

The system shutdown procedures depend on the application site and the expected duration of the system downtime. If the unit is equipped with an anti-freeze system, it remains active even when the unit is switched off (system "OFF" position on the unit controller).



The anti-freeze system remains in operation if continuity of power supply to the appliances is guaranteed.



The leak detection system remains operational provided that electrical power supply continuity to the equipment is maintained.

If the system is expected to remain idle for a long period, we recommend emptying the liquid from the system unless there is an adequate amount of glycol.

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

- Switch off the units by setting each device's switch to the "OFF" position.
- Close the water valves.
- Set the main residual current device (installed upstream of the system) to the "OFF" position.



WARNING: Before starting the unit, ensure that the water inlet temperature is above the minimum start-up value specified in the operating envelopes in chapter 13.4.



If the temperature drops below zero there is a serious danger of frost: provide a mixture of water and glycol in the system, otherwise drain the water system and the circuits of the heat pump.



WARNING: If the ambient temperature drops below -20°C and a unit equipped with an onboard pump is switched off and de-energized, even for short periods, the system and the unit hydraulic circuit must be drained of the water/glycol mixture. Failure to do so may cause irreversible damage to the pump.



CAUTION: Even the transient operation, with water temperatures below +5°C is not guaranteed on the basis of the limits established. Before you turn the unit back on after a long period of inactivity, make sure that the temperature of the fluid is higher than or at least equal to +5°C. 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. MAINTENANCE AND PERIODIC CHECKS

	All operations described in this chapter must be carried out exclusively by QUALIFIED PERSONNEL (EN 378-4) . The end user is not permitted to perform any modification, repair, or maintenance work on the product. Before performing any intervention on the unit or accessing internal parts, make sure you have disconnected the power.
	The sensor must be replaced every 5 years. The safety chain verification must be carried out every 12 months.
	Before starting any work, safety checks must be performed to ensure that the risk of ignition is minimized. The work must be carried out according to a controlled procedure to minimize the risk of flammable gas or vapor being present during the operation. The area must be checked with a suitable refrigerant gas detector before and during the work.
	During any work carried out on the machine, the operator must always use a personal explosimeter for detecting the refrigerant gas R290, calibrated to a maximum threshold of 20 %LFL (this device must be compliant for use in fire risk zones and not be a source of ignition).
	Maintenance must only be carried out in weather conditions suitable for the intended operations.
	For maintenance, the use of a lock-valve is strongly recommended (refrigerant circuit access valve) for connecting to hoses (hose), in order to avoid gas leaks and risk of burns.
	A certain amount of compressor oil may accumulate in the refrigerant piping, especially at bends. During maintenance operations requiring pipe disconnection, it is strongly recommended to cut the pipes rather than desolder them using a torch, as the flame may ignite any oil present.
	During maintenance operations, when the unit is disconnected from the electrical supply, the onboard gas detection sensor is also de-energized. Therefore, each operator must be equipped with a personal explosimeter for R290 refrigerant gas detection, calibrated to a maximum threshold of 20 %LFL (the device must be suitable for use in fire-hazard areas and must not constitute an ignition source).
	Do not fill the refrigerant circuits with a refrigerant other than that indicated on the identification plate. Using a different refrigerant can cause serious damage to the compressor.
	Do not use oils other than those indicated in this manual. Using a different oil can cause serious damage to the compressor.
	Moving parts – risk of death. Before opening the front panel, disconnect the power supply and verify that the extraction fan installed in the technical compartment has come to a complete stop.
	The compressor heads and discharge pipes are at quite high temperatures.
	Take particular care when working near the condensing coils. The aluminium fins are very sharp and can cause serious injuries.
	Always use appropriate personal protective equipment.
	After the maintenance operations, close the panels by fixing them with screws. Take particular care to ensure the electrical panel box is closed correctly].



After maintenance work, pay attention to the correct positioning of the electrical cables in the respective cable glands of the user board case.



In the event of work/building work in the vicinity of the unit, consider whether it is necessary to switch off the unit, drain it of refrigerant or install suitable protection. If the product is in an area where vehicles are operating, install adequate collision protection.



It is recommended to have specialised personnel perform periodical inspections and maintenance. EU regulation 2024/573 establishes that users must perform regular inspections on the systems, checking water tightness and eliminating any leaks as quickly as possible. Check the mandatory and necessary documentation on regulation 2024/573 and its subsequent amendments or repeal.

Schedule all maintenance activities necessary for the safety of the unit. The recommended (R) and mandatory (M) activities for proper unit operation are set out below. The mandatory activities must be carried out by an authorised customer service which issues a corresponding certificate. Failure to comply with these activities will void the warranty and could considerably shorten the service life of your product.

OPERATION	M / R	1 mon-th	4 mon-ths	6 mon-ths	12 mon-ths
Filling the water circuit.	R	x			
Presence of bubbles in the water circuit.	R	x			
Check the safety and control devices work correctly.	M	x			
Check that there are no oil leaks from the compressor.	R	x			
Check that there are no water leaks in the water circuit.	R	x			
Check that the water-side safety valve drain pipes and condensate drain pan outlets are clear and free from obstructions.	M	x			
Check that the differential pressure switch operates correctly.	M	x			
Check that the crankcase heaters are powered and running.	R	x			
Clean the metal filters of the water circuit.	M	x			
Clean the finned coil with compressed air or water jet.	R		x		
Check that the electrical terminals both inside the electrical panel and in the terminal boards of the compressor are well tightened.	M		x		
Tightening of plumbing connections.	R		x		
Factory tightening torques.	M				x
Check fixing and balancing of the fans.	R		x		
Clean the air filters in the electrical panel or replace them if necessary (when present).	M		x		
Correct supply voltage and phase imbalance (no-load and under-load conditions).	R			x	
Correct absorption.	R			x	
Check the refrigerant charge and any leaks.	M			x	
Check the operating pressure, superheating and sub-cooling.	R			x	
Circulation pump efficiency.	R			x	
If the unit is to be out of service for a long period, drain the water from the pipes and heat exchanger. This operation is essential if, during seasonal stoppages, ambient temperatures are expected to go below the freezing point of the fluid used.	M			x	
Check for corrosion/oxidation.	R				x
Check panel fastening.	R				x
Check water quality (see chapter 5.10.1) and glycol concentration, if applicable.	M			x	
Check the pressure drops of any filter driers on the liquid line.	R			x	
Check the hydronic side safety valve according to EN 806-5.	R			x	
Clean the sensor using a damp cloth.	R			x	
Check the operation of the extraction fan installed in the technical compartment.	M				x
Check the propane sensor safety chain.	M				x

9.1 GENERAL INFORMATION

To correctly clean the coil, follow the instructions below:

- Remove surface dirt. Deposits such as leaves, fibres etc. should be removed using a vacuum cleaner (use a brush or other soft accessory and avoid rubbing against metal or abrasive parts). If compressed air is used, care must be taken to keep the airflow perpendicular to the surface of the coil to avoid bending the aluminium fins. Take care not to bend the fins with the compressed air nozzle.
- Rinse. Rinse with water. It is possible to use chemical substances (specific detergents for finned coils). Rinse the coils by letting the water run inside each individual passage of the fins, until they are perfectly clean. Pay attention to direct the water jet perpendicular to the surface of the coil in order not to bend the aluminium fins. Do not strike the coil with the water hose. Apply your thumb at the end of the hose to increase the pressure of the water jet instead of using specific nozzles which could damage the coil.

9.1.1 Cleaning the 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 frequency of cleaning depends on the environmental conditions and is left to the common sense of maintenance personnel. When oxidizing dust or grease particles are observed on the coil surface, cleaning is recommended. In general, in a slightly polluted atmosphere, we recommend carrying out the cleaning treatment every three months.

Washing should be carried out with preferably hot water (40-60°C) and detergent with neutral pH, while rinsing is carried out with plenty of fresh water (50 l / m²).

If maintenance personnel notice there is no protective cover on the edge of the fins, contact the nearest service centre in order to reapply the cover and fully restore the corrosion protection.



WARNING: Do not use high-pressure washers to clean the coil, as excessive pressure may cause irreversible damage. Damage resulting from cleaning with unsuitable chemical products or excessive water pressure will not be covered.

WARNING: The aluminum fins are thin and sharp. Wear appropriate PPE to prevent cuts and abrasions. Properly protect the eyes and face against water and debris during blow-cleaning operations. Wear waterproof shoes or boots and clothing that fully covers the body.

For units installed in aggressive atmospheres with a high fouling rate, cleaning of the coil must be part of the routine maintenance programme. In these types of installations, all of the dust and particles deposited on the coils must be removed as soon as possible through regular cleaning according to the methods shown above.

9.2 CLEANING THE EXTERNAL SURFACES

The sheets of the outer enclosure must be properly cleaned to avoid the accumulation of dust/dirt, preventing the onset of corrosion. The paint ensures resistance to atmospheric agents but it is good practice to ensure that any dirt present is removed by cleaning the surfaces with a neutral detergent and water, especially if the unit is installed in locations with an aggressive atmosphere (high level of pollution, salt, etc.).

9.3 SENSOR REPLACEMENT AND SAFETY CHAIN VERIFICATION

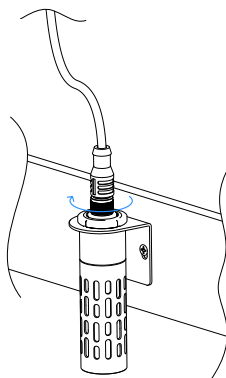
9.3.1 Sensor replacement



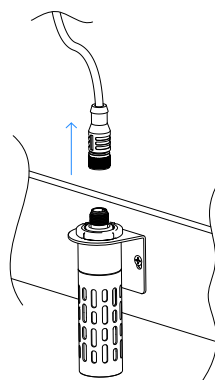
Sensor replacement must be carried out by qualified personnel only. Perform the procedure for each sensor installed on the unit.

Procedure for sensor replacement:

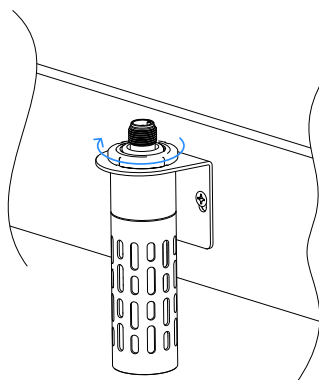
1. Disconnect the unit from the electrical power supply.
2. Wear the personal gas detector and attach it to the belt.
3. Check for any refrigerant leaks using a leak detector. If gas is detected, immediately evacuate the area and do not perform any activity until the area has been secured.
4. Unscrew the M12 cable connector counterclockwise.



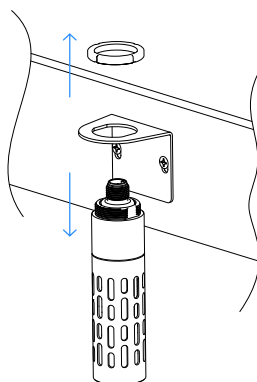
5. Remove the M12 cable from the probe.



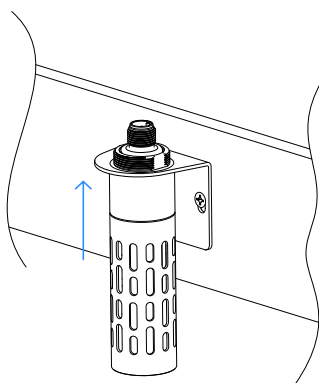
6. Unscrew the probe cylinder counterclockwise.



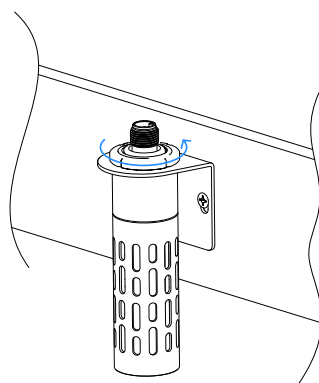
7. Remove the cylinder and the probe.



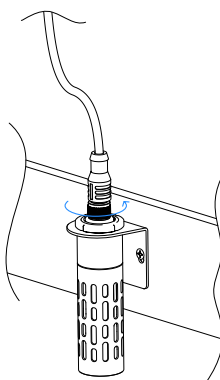
8. Install the new probe.



9. Tighten the cylinder.



10. Connect and tighten the M12 cable.



9.3.1.1 Periodic gas sensor safety chain test



Verification of the safety chain must be carried out by qualified personnel only.
Perform the test every 12 months.
Perform the test on all controllers installed in the electrical panel.

The procedure performs the following checks:

- Sequential activation of all alarm thresholds configured on the relays.
- Verification that the fault condition is correctly signalled.
- Check of correct operation of LEDs and acoustic alarm.
- Verification that the probe is valid (not expired) and passes the internal diagnostic self-test.
- Verification that the sensor reports zero in the absence of gas; the procedure is limited to a functional check and does not correct or recalibrate the measurement.
- Confirmation of correct test execution by the operator via the magnetic device.

Before starting the procedure, ensure that:

- Wear the personal gas detector and attach it to the belt.
- Check for any refrigerant leaks using a leak detector. If gas is detected, immediately evacuate the area and do not perform any activity until the area has been secured.
- Verify that the system is operating normally (no alarms, faults, or unit lockout) and that the initial warm-up and automatic test phase has been completed (2–5 minutes after start-up).
- Enable the test function via Modbus.
- Ensure the operator magnetic activator is available (contact the service centre).

Test start:

- Manual mode: apply and keep the magnet on the designated area of the controller.

During the procedure, the red and green LEDs flash alternately, while the acoustic signal emits intermittent beeps to indicate that the system is in test mode.

Test result

Test result	LED indicator		Audible alarm		System behavior
Exceeded		Green steady		2 short beeps	Returns to normal operation after 1 minute.
Failed		Red steady		5 long beeps	Indicates the fault for 1 minute before reset.



Operator confirmation: Move the magnetic key closer to and away from the reader twice within 1 minute to validate the test and system status.

Recording of test result:

The controller stores:

- Date and time of execution via internal counter.
- Result

The result is recorded with three possible values:

- **Passed:** procedure completed successfully.
- **Failed:** at least one abnormal condition detected during the test.
- **Passed and confirmed:** test passed and operator confirmation correctly received.

9.4 EXTRAORDINARY MAINTENANCE

All extraordinary maintenance work must be carried out by an authorised service centre.



All maintenance and inspection operations must be carried out only by QUALIFIED PERSONNEL (EN 378-4). All equipment used during maintenance operations must be compatible with R290 refrigerant.

Some extraordinary maintenance work may involve the replacement of broken components, which may have significant mass. Below is a list of components (standard and optional) and the approximate weight per piece (please note that any residual oil, liquid gas, water may increase the weight). Refer to the table before carrying out maintenance work (or refer to the label on the component itself) and choose the most suitable equipment/posture for the work to be carried out, taking into account the load limits imposed by technical standards and the worker's own health and capacity.

For units with dual circuit, the higher value between the component weights of the two circuits is indicated.

Weight [kg]	HWA2-AH
Component	0270 / 0280 / 0290
Compressor	77
Plate heat exchanger	28,3
Cu-Al heat exchanger coil	58
Micro-channel heat exchange coil	-
Liquid receiver	7,3
Liquid separator	15,7
Pump ON-OFF / Modulating	16,4
Standard fan / SSL	52 / 48
Electric filter	0,5
Transformer	19,5
Vacuum tank	55,2
Vacuum expansion vessel	5

10. DECOMMISSIONING

When the unit reaches the end of its life cycle and needs to be replaced, the following operations are recommended:

- the refrigerant must be recovered by specialised personnel and sent to collection points;
- any antifreeze additives in the water circuit must be recovered and disposed of properly;
- the compressors' lubricating oil must also be collected and sent to proper collection centres;
- the electronic components, such as regulators, driver boards and inverters, must be disassembled and sent to proper collection centres;
- the structure and the different components, if unusable, must be scrapped and divided according to their nature; there is especially a good amount of copper and aluminium in the machine.

These operations facilitate the recovery and recycling of substances, thereby reducing the environmental impact, in accordance with Directive 2012/19/EU on waste electrical and electronic equipment (WEEE).

The user is responsible for the proper disposal of this product, according to current national regulations in the country of use. For more information, please contact the installation company or the competent local authorities.

	Improper decommissioning of the appliance may create serious environmental damage and endanger people's safety. Therefore, it is recommended that the unit be disposed of only by authorised persons with technical training who have attended training courses acknowledged by the competent authorities.
	Follow the same precautions described in previous paragraphs.
	Take particular care while disposing of the refrigerant gas.
	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.
	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 Waste Electrical and Electronic Equipment Directive and the harmful effects of incorrect disposal are provided in the user/installer manual. The manufacturer or its importer/distributor is available to respond to any requests for additional information.

11. RESIDUAL RISK

The residual risks related to handling, installation and normal operation of the unit are listed below. Any failure by the user and installer to comply with the instructions/indications in the manual (references to which are given in the table) will result in the continuation of these risks, which cannot be eliminated by the manufacturer, who has already taken all the necessary design precautions to ensure that each risk is minimised.

Danger	Directions / Instructions	Residual risk	User / Activity				
			Operator			User	
			Transport phase	Installation phase	Maintenance phase	Interaction with the unit	Normal unit operation
Mechanical: crushing caused by the possible instability of the unit during handling.	The user-installer manual, chapter 5, provides instructions for the correct handling and installation of the unit, including the center of gravity, lifting points, and lifting equipment. The use of personal protective equipment is also recommended, in accordance with applicable regulations.	Failure by the installer to comply with the installation procedures.	X	X			
Mechanical: crushing caused by the possible instability of the unit.	The user-installer manual, chapter 5, provides instructions for the correct installation of the unit.	Failure by the installer to comply with the installation procedures.		X	X		
Mechanical hazard: cutting/shearing caused by the fan if not protected against accidental contact.	The user-installer manual, chapter 9, contains specific warnings, including those related to routine maintenance operations.	Removal of the protective grille by the user or maintenance technician. Pay attention to the technical compartment fan: it remains accessible from the inside of the unit. Refer to section 5.8.1.			X	X	
Entanglement caused by the fan not being protected against accidental contact.	The user-installer manual, chapter 9, contains specific warnings, including those related to routine maintenance operations.	Removal of the protective grille by the user or maintenance technician. Pay attention to the technical compartment fan: it remains accessible from the inside of the unit. Refer to section 5.8.1.			X	X	
Mechanical: cutting/abrasion due to contact with the heat exchanger coil.	The user-installer manual, chapter 9, contains specific warnings to be observed when working near the coil.	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.	The user-installer manual, section 5.10, recommends paying attention to the routing of the safety valve discharge, while chapter 5.4 provides instructions regarding the supporting surface of the unit. During maintenance operations, the use of PPE is recommended, together with the removal of any residual water around the unit after the intervention.	Failure to comply with the instructions given in the manual.			X	X	
Mechanical: cutting/abrasion caused by the presence of edges on the outer enclosure of the machine and/or screws protruding both outside and inside the unit.	The user-installer manual, chapter 9, provides instructions for correct maintenance procedures. Section 4.2 recommends the use of appropriate 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 user-installer manual, chapter 9, provides instructions for correct maintenance procedures. Section 4.2 recommends the use of appropriate personal protective equipment.	Failure to reinstall the panels after maintenance. Simultaneous damage to both types of protective equipment.			X	X	
Mechanical hazard: Trapping due to closure of the access panel with a person or animal inside.	The interior of the unit is clearly visible.	Lack of control at closure, but this is considered improbable considering the plan and dimensions of the unit.			X		

Danger	Directions / Instructions	Residual risk	User / Activity				
			Operator			User	
			Transport phase	Installation phase	Maintenance phase	Interaction with the unit	Normal unit operation
Mechanical hazard: pushing or impact caused by an open door moving accidentally.	Section 4.2 recommends the use of appropriate personal protective equipment. Section 5.12.1 highlights the associated risk to the operator.						
Electrical: electrocution/shock/burn caused by contact with live parts.	The user-installer manual, chapter 9, specifies the safety measures to be adopted during maintenance, cleaning, or inspection of the unit. Any intervention must be carried out only by qualified personnel and with the unit switched off.	Failure to comply with the procedures by the maintenance technician or irresponsible behaviour by the user.			X	X	
Electrical: effects on medical implants (pacemakers) caused by electromagnetic phenomena.	The user-installer manual, chapter 3, prohibits direct interaction with the unit by persons using electrically controlled medical devices, such as pacemakers. It is recommended to maintain the minimum distance from the unit installation area specified by the medical device manufacturer.	Failure to comply with the instructions given in the manual.			X	X	
Electrical: fire causes short circuit or electric arcs.	The user-installer manual, chapter 5, provides instructions for the correct installation of the unit. During maintenance operations, the use of appropriate personal protective equipment is recommended.	The risk of ignition cannot be eliminated but its probability of occurrence is reduced. With the measures adopted, the spread of the fire is reduced.			X	X	
Electrical: projection of particles and emission of harmful substances as a result of electrical overload.	The user-installer manual, chapter 9, specifies that maintenance must be carried out with the unit switched off.	Failure to comply with the instructions given in the manual.			X	X	
Thermal: burning/scalding from contact with hot surfaces.	The user-installer manual, chapter 9, specifies the safety measures to be adopted during maintenance, cleaning, or inspection of the unit, as well as the required personal protective equipment.	Failure to comply with the procedures and/or failure to use PPE by the maintenance technician.			X	X	
Noise generated: discomfort caused by noise from the unit during operation.	The user-installer manual, chapter 5, prohibits suspended installation and recommends carrying out an environmental impact assessment based on the installation area, including installations located near workers.	Failure to follow the actions recommended in the manual and the environmental impact study.					X
Generated by vibrations: discomfort caused by unit vibrations during operation.	The user-installer manual, chapter 5, prohibits suspended installation and recommends the use of anti-vibration supports.	Failure to follow the actions recommended in the manual and the environmental impact study.					X
Radiation generated: electromagnetic radiation that the unit generates during operation.	-	None.					X
Generated by materials/substances: breathing difficulties and/or damage to eyes and skin caused by possible leakage of refrigerant gas.	Section 4.2 of the user-installer manual recommends the use of personal protective equipment. The refrigerant safety data sheet (section 4.5) and specific warnings (section 4.6) are also provided.	Failure to comply with the procedures by the maintenance technician.			X	X	
Generated by materials/substances: fire/explosion causes gas classified as flammable.	The user-installer manual, chapter 5, provides specific instructions regarding the installation location of the unit and the required protective measures.	Failure to comply with instructions relating to the installation site and proper maintenance procedures.			X		X

Danger	Directions / Instructions	Residual risk	User / Activity				
			Operator			User	
			Transport phase	Installation phase	Maintenance phase	Interaction with the unit	Normal unit operation
Generated by materials/substances: infections caused by bacteria potentially present in the carrier fluid (technical water).	The user-installer manual, chapter 3, specifies the permitted uses of the unit.	Failure to comply with the instructions given in the manual.			X		X
Generated by materials/substances: burning caused by the presence of R290 dissolved in oil inside the refrigeration circuit, triggered by a welding torch flame.	The user-installer manual, section 4.2, recommends the use of personal protective equipment. Chapter 9 recommends cutting the pipes, rather than desoldering them, during maintenance operations requiring pipe removal, as the flame from the brazing torch may ignite any oil present.	Failure to comply with the instructions given in the manual.			X		
Generated by materials/substances: burning/scalding from escaping refrigerant.	The user-installer manual, chapter 9, specifies the safety measures to be adopted during maintenance, cleaning, or inspection of the unit, as well as the required personal protective equipment.	Failure to comply with the instructions given in the manual.			X		X
Generated by materials/substances: pollution due to inappropriate disposal.	The user-installer manual, chapter 10, provides instructions for proper disposal.	Failure to comply with the instructions given in the manual.					
Ergonomic: fatigue/musculoskeletal disorders caused by exertion during maintenance/installation.	The user-installer manual, section 4.1, recommends compliance with applicable health and safety regulations (both international and local). During maintenance operations, operators are advised to maintain a working posture that minimizes fatigue and to verify the weight of any component before handling it (section 9.4).	Failure to comply with the instructions given in the manual.		X	X		
Generated by the machine operating environment: slipping/falling due to ice or water near the unit caused by condensate drainage or defrosting.	The user-installer manual, section 5.10.3, describes the condensate drainage system and recommends paying attention to the risk of slipping. Section 5.10.4 specifies the correct method for routing the condensate drain pan outlets (present on heat pump units). Chapter 9 recommends periodically checking the drain pipe to ensure that it does not become obstructed.	Failure to comply with the instructions given in the manual.			X	X	
Generated by the machine's use environment: unexpected events as a result of malfunctions due to water/snow/humidity.	The user-installer manual, chapter 9, recommends checking the correct tightening of the cable gland provided for the power supply cable entry and the reassembly of all sheet metal panels, particularly those of the electrical panel, in order to maintain the declared protection rating.	Failure to comply with the procedures by the maintenance technician.			X	X	

Danger	Directions / Instructions	Residual risk	User / Activity				
			Operator			User	
			Transport phase	Installation phase	Maintenance phase	Interaction with the unit	Normal unit operation
Generated by the machine's use environment: lightning that can potentially hit the unit.	The user-installer manual, chapter 9, recommends carrying out maintenance only under weather conditions suitable for the planned operations. It also specifies that the installation site must be sufficiently distant from lightning protection towers or objects that could attract lightning strikes (section 5.1). The unit must be electrically connected to a system compliant with applicable regulations.	Failure to comply with the instructions given in the manual.			X	X	
Generated by the machine's use environment: electromagnetic disturbances caused by interference between equipment placed near the machine and the machine itself.	The user-installer manual, section 5.12, recommends supplying the unit through a dedicated electrical line and dedicated protective devices. It is also recommended to use an independent cable duct to minimize the possibility of interaction with other devices.	Failure to comply with the recommendations regarding the electrical system.					X
Generated by the machine's use environment: possibility of breakage of components/ mounts caused by corrosion and oxidation.	The user-installer manual, chapter 9, contains specific instructions regarding maintenance and cleaning of sheet metal surfaces and heat exchange coils. The technical bulletin provides recommendations on the most suitable treatments according to the environmental conditions.	Lack of cleanliness and maintenance and/or incorrect assessment of the weather conditions at the installation site.			X	X	
Generated by the operating environment of the machine: slipping/falling caused by ice/snow on the base of the unit.	The user-installer manual, section 4.2, recommends the use of personal protective equipment. The user-installer manual, chapter 9, recommends carrying out maintenance only under weather conditions suitable for the planned operations.	Lack of cleanliness and maintenance and/or incorrect assessment of the weather conditions at the installation site.			X		
Generated by the machine operating environment: heat stress caused by high temperatures inside the unit when ambient conditions are hot, the unit is operating in Chiller mode, and it is installed in a particularly sunny location.	The user-installer manual, section 4.2, recommends the use of personal protective equipment. The user-installer manual, chapter 9, recommends carrying out maintenance only under weather conditions suitable for the planned operations.	Lack of cleanliness and maintenance and/or incorrect assessment of the weather conditions at the installation site.			X		

12. TECHNICAL DATA

12.1 HEAT PUMP TECHNICAL SHEET

Performance under the following conditions, according to standard UNI EN 14511:2022:

- (1) Cooling: outdoor air temperature 35°C; in/out water temperature 12/7°C.
- (2) Cooling: outdoor air temperature 35°C; in/out water temperature 23/18°C.
- (3) Heating: outdoor air temperature 7 °C b.s. 6 °C b.u.; inlet/outlet water temp. 30/35°C.
- (4) Heating: outdoor air temperature 7 °C b.s. 6 °C b.u.; inlet/outlet water temp. 47/55°C.
- (5) Cooling: low temperature, variable output, fixed flow rate.
- (6) Heating: average climatic conditions; $T_{biv} = -4^{\circ}\text{C}$; low temperature, variable output, fixed flow rate.
- (7) Indicative data subject to change. For the correct value, always refer to the technical label 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 depending on the hydronic kit chosen (please check this value in the data sheet).
- (9) Condition (1); value determined based on measurements carried out in accordance with UNI EN ISO 9614-2, in compliance with Eurovent certification requirements.
- (10) Sound pressure: calculated value from the sound power level in accordance with ISO 3744: 2010, referred to 10 m away from the unit.
- (11) Cooling, BT version: outdoor air temperature 35 °C; water inlet/outlet temperature -3/-8 °C. Treated fluid with 35% ethylene glycol.
- (12) Heating: outdoor air temperature 7 °C D.B., 6 °C W.B.; water inlet/outlet temperature 55/65 °C.

* Outside the scope of Regulation (EU) No 811/2013

The performance data reported are indicative and may be subject to variation. Furthermore, the capacities declared in items (1), (2), (3), and (4) refer to instantaneous power in accordance with UNI EN 14511:2022. The data declared in items (5) and (6) are determined in accordance with UNI EN 14825:2022.

The performance data reported refer to the unit equipped with variable-speed fans.

Technical characteristics		Unit of measurement	Model HWA2-AH		
			0270	0280	0290
Cooling	Cooling capacity (1)	kW	62,7	68,9	72,9
	Input power (1)	kW	19,2	21,3	23,4
	EER (1)	W/W	3,27	3,23	3,12
	Cooling capacity (2)	kW	77,3	86,2	90,6
	Input power (2)	kW	20,4	22,7	25,0
	EER (2)	W/W	3,79	3,80	3,62
	SEER (5)	W/W	4,43	4,40	4,24
	Cooling capacity (11)	kW	35,7	39,5	41,9
	Input power (11)	kW	18,10	19,8	21,2
	EER (11)	W/W	1,97	1,99	1,98
	Water flow rate (1)	l/s	3,00	3,29	3,48
	User side heat exchanger pressure drops (1)	kPa	15,4	18,5	20,6
Heating	Heating power (3)	kW	73,1	78,1	84,3
	Input power (3)	kW	17,2	17,6	19,7
	COP (3)	W/W	4,25	4,44	4,28
	Heating power (4)	kW	68,7	72,9	78,1
	Input power (4)	kW	23,1	24,0	26,4
	COP (4)	W/W	2,97	3,04	2,96
	Heating power (12)	kW	65,7	71,2	74,2
	Input power (12)	kW	26,8	27,9	30,7
	COP (12)	W/W	2,45	2,55	2,42
	SCOP (6)	W/W	3,41	3,48	3,55
	Water flow rate (3)	l/s	3,49	3,73	4,03
	User side heat exchanger pressure drops (3)	kPa	20,7	23,6	27,3
	Energy efficiency water 35°C / 55°C	Class	A+/A+	NA*	NA*
Compressor	Type		SCROLL		
	Refrigerant oil (type)		POE 160SZ		
	Number	Nr	2	2	2
	Capacity steps Std	Nr	2	3	2
	Oil charge (quantity)	l	6,6	6,6	6,6
	Refrigerant circuits	Nr	1	1	1
Refrigerant	Type		R290		
	Refrigerant charge (7)	kg	6,5	6,5	6,5
	Equivalent CO ₂ tonnes (7)	ton	0,00	0,00	0,00
	Design pressure (high/low)	bar	33/0,7	33/0,7	33/0,7
External zone fans	Type		AXIAL - EC		
	Number	Nr	2	2	2
	Nominal power input (1)	kW	1,6	1,6	1,6
	Max. power	kW	1,90	1,90	1,90
	Maximum input current	A	3,9	3,9	3,9
	Nominal air flow rate	m ³ /h	42000	42000	42000
Internal heat exchanger	Internal heat exchanger type		Plates / BPHE		
	N° internal heat exchangers	Nr	1	1	1
	Water content	l	6,70	6,70	6,70
Hydraulic circuit	Maximum water side pressure	bar	6	6	6
	Maximum pressure hydronic kit (safety valve setting)	bar	6	6	6
	Plumbing fittings		2"	2"	2"
	Minimum water volume (8)	l	600	650	700
Noise level	Sound power level (9)	dB (A)	85 std/ 84 SL/ 83 SSL	85 std/ 84 SL/ 83 SSL	85 std/ 84 SL/ 83 SSL
	Sound pressure (10)	dB (A)	53 std/ 52 SL/ 51 SSL	53 std/ 52 SL/ 51 SSL	53 std/ 52 SL/ 51 SSL
Electrical data	Power supply		400V/3P/50Hz		
	Maximum input power (without accessories)	kW	42	46	49
	Maximum input current (without accessories)	A	67	72	77
	Max starting current (without accessories)	A	196,2	235,2	240,2

12.2 UNIT AND AUXILIARY ELECTRICAL DATA

Unit power supply	V/~ /Hz	400/3PH/50Hz
On-board control circuit	V/~ /Hz	12/1/50
Remote control circuit	V/~ /Hz	12/1/50
Fans 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 sticked on right-side panel of the unit.

Parameters	Unit of measurement	Model HWA2-AH		
		0270	0280	0290
F.L.A. Maximum permissible current				
F.L.A. Compressor 1	A	29	29	34
F.L.A. Compressor 2	A	29	34	34
F.L.A. AC / EC Fans	A	9,2 / 11	9,2 / 11	9,2 / 11
L.R.A. Locked Rotor Current (starting current)				
L.R.A. Compressor 1	A	158	158	197
L.R.A. Compressor 2	A	158	197	197
L.R.A. EC Fans	A	-	-	-
Total unit				
Fully equipped version, with EC fans				
Maximum input power	kW	47	50	53
L.R.A.	A	203	242	247
F.L.A.	A	74	79	84
F.L.I.	kW	36	36	37,1

Code		Description
F.L.A.	Full Load Ampere	Maximum current draw: current required by the motor under the most severe operating conditions.
L.R.A.	Full Load Ampere	Locked Rotor Current (L.R.A.): initial current required at start-up with the rotor stationary.
F.L.I.	Full Load Input	Maximum allowable power input: maximum electrical power that the motor can draw before the protection device trip.

13. OPERATING LIMITS

13.1 EVAPORATOR WATER FLOW RATE

The nominal water flow rate refers to a temperature difference between the evaporator inlet and outlet of 5°C. The maximum permitted flow rate corresponds to a 3°C temperature difference, while the minimum corresponds to a 10°C temperature difference under nominal conditions, as reported in the technical data sheet.



Insufficient water flow rates can cause excessively low evaporation temperatures, triggering safety devices and shutting down the unit and, in some extreme cases, leading to ice formation in the evaporator and consequent serious faults in the refrigeration circuit.

For greater accuracy, tables are provided below showing the minimum flow rates to be ensured to the plate heat exchanger in order to guarantee proper operation, depending on the model (note: the safety device is intended to prevent failure of the antifreeze probe due to lack of flow, but it does not guarantee the minimum water flow rate required for correct unit operation).

Model HWA2	HWA2-AH		
	0270	0280	0290
Minimum water flow to be assured in chiller mode (condition (1) technical sheet) [l/s]	1,8	2,0	2,2
Maximum water flow to be assured in chiller mode (condition (1) technical sheet) [l/s]	4,9	5,4	5,8
Safety device trip flow rate – decreasing flow* [l/s]	1,70	1,70	1,70
Safety device trip flow rate – increasing flow* [l/s]	1,78	1,78	1,78

* When the flow rate drops below the indicated limit (safety device trip flow rate – decreasing flow), the safety device triggers an alarm, which can only be reset once the flow rate returns to the safety device trip threshold – increasing flow.



Pay attention to the pressure levels in the hydraulic system: too low values can cause the unit to malfunction.

It is good practice to periodically bleed the system, especially when significant temperature differences are observed between water inlet and outlet, as this may indicate the presence of air in the circuit, which reduces the available water flow.



ATTENTION:

In the event of a minor propane leak into the water circuit, propane may be released into the surrounding area during system venting. It is the responsibility of the system designer to assess the installation location of any additional air vents, which must be positioned in safe areas and provided with suitable warning labels indicating the hazard and requiring that no spark-generating devices be present.

13.2 COOLING WATER PRODUCTION (SUMMER MODE)

A minimum temperature of 5°C is allowed at the evaporator outlet for standard units. For BT units (low temperature) minimum temperature is -8°C. In this case glycol water must be used. A maximum temperature of 25°C can be maintained at the evaporator outlet in steady-state operation.

In case of lower air temperatures, please contact our Technical Department for feasibility assessment and evaluation of any required modifications based on application requirements.

13.2.1 HOT WATER PRODUCTION (WINTER MODE)

Once the system has reached steady-state operation, the water inlet temperature must not fall below 20°C **: lower values, not related to transient or start-up conditions, may cause system malfunctions with possible compressor damage. The maximum outlet water temperature must not exceed 78°C.

Temperatures higher than those indicated, especially in conjunction with low water flow rates, could lead to malfunctioning of the unit, or in the most critical cases safety devices could trip.



Connection of heat sources with water temperatures above 78 °C is prohibited.

Above this value, the unit is no longer covered by the applicable pressure equipment safety regulations.

When an external heat source is present, installation of a safety device compliant with the applicable regulations and suitable for ensuring safe operating conditions is mandatory.

13.3 AMBIENT AIR TEMPERATURE AND SUMMARY TABLE

Heat pump units are designed and manufactured to operate in summer conditions with condensation control. For the cooling-only version, the outdoor air temperature may reach up to 46°C. In heat pump operation, the permissible outdoor air temperature range is from -20°C to +40°C, depending on the outlet water temperature, as shown below.

** The minimum and maximum permissible temperatures depend on the outdoor air temperature. Set the desired value while taking the operating envelope into account.

Operating limits

HWA2-AH

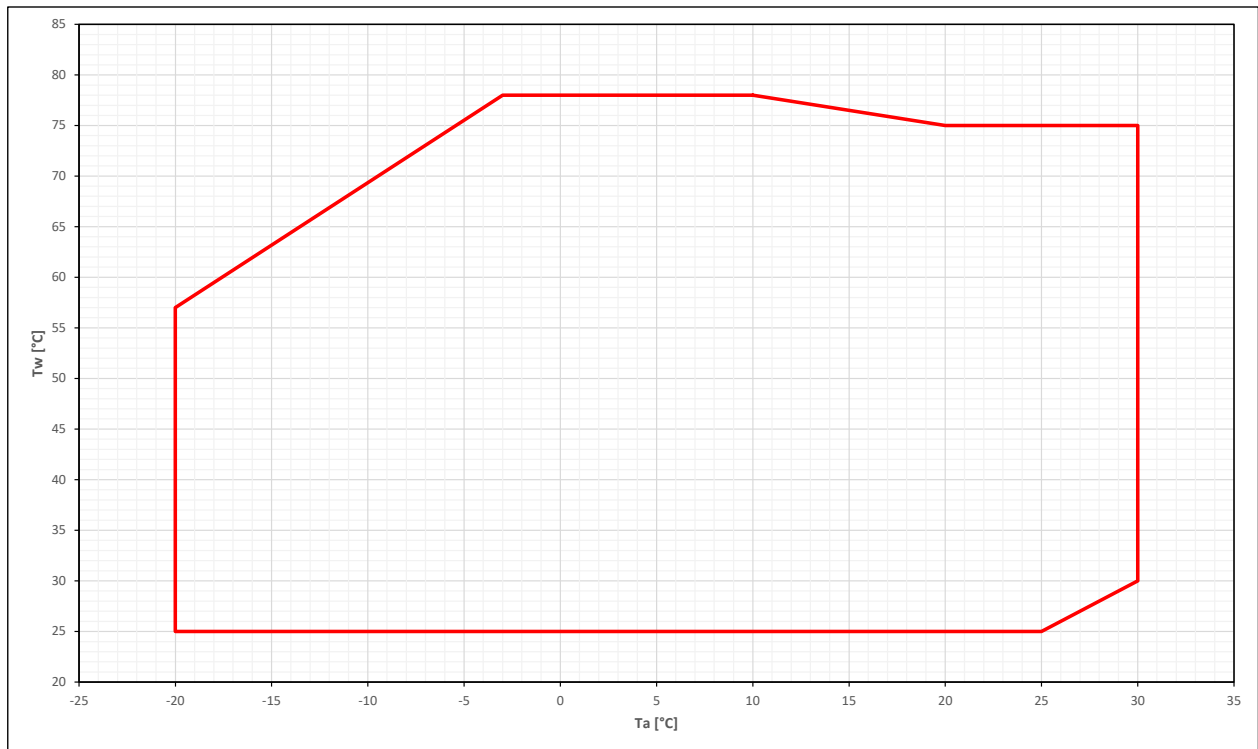
Water chiller mode		
Standard version ambient temperature.	Minimum -10°C (-20°C with CC accessory)	Maximum +46°C
Outlet water temperature standard version	Minimum +5°C	Maximum +20°C
Ambient temperature BT	Minimum -20°C	Maximum +46°C
Outlet water temperature BT	Minimum -8°C	Maximum +20°C
Heat pump mode		
Ambient temperature	Minimum -20 °C (with EC fan)	Maximum +40°C
Outlet water temperature	Minimum +25 °C	Maximum +78°C **
Heat pump mode for domestic hot water		
Ambient temperature with water at maximum +57 °C	Minimum -20 °C	Maximum +40 °C
Ambient temperature with water at maximum +65 °C	Minimum -13 °C	Maximum +40 °C
Ambient temperature with water at maximum +78 °C	Minimum -3°C	Maximum +10 °C

Altitude limit

Limit of installability	
Maximum altitude	2000 m a.s.l.
Refer to chapter 5.4 of document BTE02070100000 for capacity derating as a function of altitude.	

Graphs showing the operating limits for heating, cooling and domestic hot water production are shown below. Note that operating the unit outside the operating limits given causes blocking alarms that lead to the product shutting down, with possible damage to components and/or safety devices.

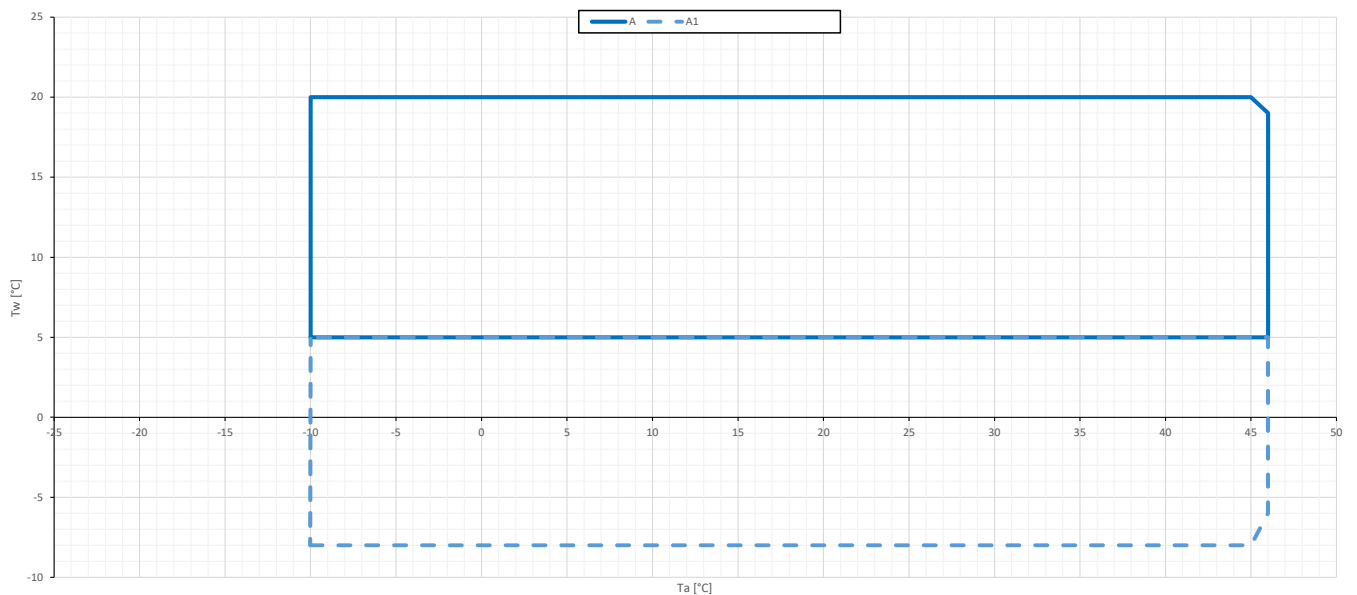
HEAT PUMP MODE



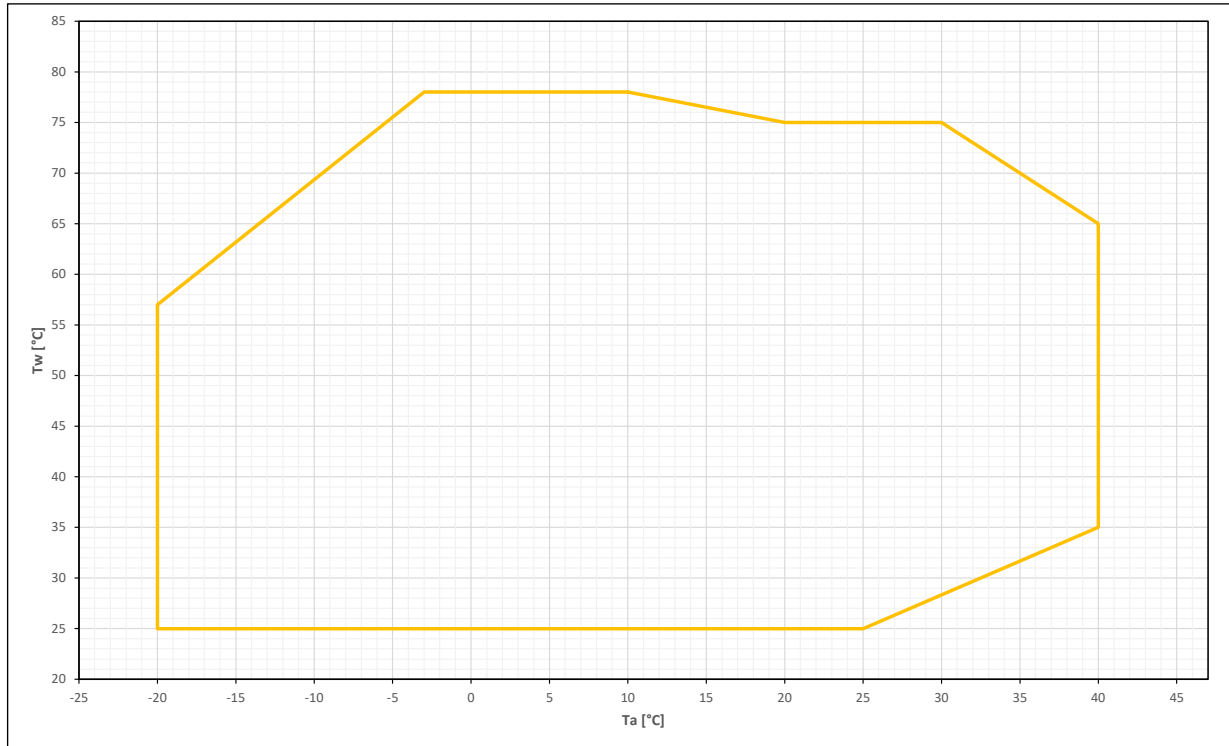
CHILLER MODE

A = Cooling

A1 = Version BT

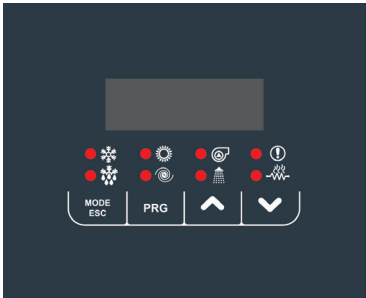
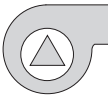
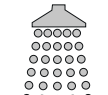


DOMESTIC HOT WATER MODE



14. USER INTERFACE - CONTROLLER

The unit includes a display placed underneath a hinged polycarbonate transparent door with a protection rating of IP67. The interface has a part with variable text and a series of icons identifying operation of the unit as shown in the table below.

	
Cooling mode led: led ON if unit is in COOL or COOL+SAN mode.	
Heating mode led: led ON if unit is in HEAT or HEAT+SAN mode	
Pump led: led ON if pump running.	
Alarm led: led ON if an alarm is triggered.	
Defrosting led: flashes to enter defrosting mode, lit when defrosting is in progress.	
Compressor led: flashes if the compressor is starting, is ON if the compressor is active.	
Domestic hot water led: flashes if domestic hot water production is in progress, is ON if COOL+SAN or HEAT+SAN mode is selected and domestic hot water production is not in progress.	
Led KA resistors: is lit if the antifreeze resistors are active.	

The buttons have the specific function described below:

Select the operating mode and manually reset any alarms. Each time you press the key you have the following sequence: OFF -> COOL -> COOL+SAN* -> HEAT -> HEAT+SAN* -> OFF (*= if enabled the sanitary) While setting the parameters, this key has the function of sending BACK by one level.	MODE ESC
Allows you to enter the selected menu to view sub-folders or to set a value (e.g. summer, winter and DHW set-points or various parameters).	PRG
The UP key is used to move to a higher menu or to increase the value of a parameter.	
The DOWN key is used to move to a lower menu or to decrease the value of a parameter.	

In standard operation, the display shows the water outlet temperature in tenths of Celsius degrees or the alarm code if at least one is active. If several alarms are triggered, the first one is displayed while the second one will be displayed as soon as the first one is reset. In menu mode, the display depends on the current position.

14.1 MENU

The following are the main features for navigating the menus, especially describing functions which are not obvious. The main menu has the following items:

MENU	LABEL	LEVEL	OTHER CONDITIONS
Setpoint	Set	User	Not accessible if connected to Hi-TV415
Password	PSS	User	---
Alarms	Err	User	Only if active alarms
Probes	tP	Installer	---
Digital inputs	Id	Installer	---
Parameter	Par	Installer	---
Hours of operation	oHr	Installer	---
Alarm log	Hist	Installer	Only if the log contains data
Firmware Version	Fir	Installer	---
USB	USb	Installer	Only with pen drive with relevant update files

The PSS menu is accessed to enter the service password and to enable access with a higher user permission. When you have exited the menus, the password must be entered once again to re-enter.

14.2 SETPOINT MENU

The various setpoints can be viewed and edited.

Set	DESCRIPTION	DEFAULT	RANGE	UNIT
Coo	First summer setpoint	7.0	5 ÷ Coo2	°C
Hea	First winter setpoint	45.0	Hea2 ÷ 60	°C
*San	Sanitary setpoint	48.0	25 ÷ 60	°C
*San2	Second Sanitary Setpoint	48.0	25 ÷ 60	°C
Coo2	Second Summer setpoint	18.0	Coo ÷ 25	°C
Hea2	Second Winter setpoint	35.0	25 ÷ Hea	°C

(*) If the DHW function is enabled

14.3 ALARM MENU [ERR]

The menu only appears if there are active alarms and lists the errors present. In the case of a multi-circuit machine, the alarms are subdivided by circuit (label ALCx grants access to the alarms of circuit number x).

15. TROUBLESHOOTING

PROBLEM	CAUSE	SOLUTION
The unit does not start	Failure of power supply	Check system voltage Check the protection systems upstream of the unit
	Unit master switch to OFF Circuit breaker OFF	Set on ON
	Damaged electronic board Damaged contactor Compressor damaged	Replace the damage component
	Sensor alarm active	Wait for the warm-up time to elapse. If the unit does not start after this period, check the indicator light; if the red light is on, move away from the unit and contact service support
Insufficient unit capacity	Insufficient amount of refrigerant Plant system not properly sized	Check
Noisy compressor	Not adequately fixed Wrong installation Reversed phases	Check
Compressor does not start because of protective devices	Increase in discharge pressure Low inlet pressure Incorrect power supply Incorrect wiring Incorrect working conditions Thermal protection intervention	Check
	Damaged pressure switch	Replace
High compressor discharge pressure	High outdoor air temperature High water return temperature Air in the hydraulic circuit Refrigerant gas charge too high	Check
	Low air flow rate Low water flow rate	Check the fan and pump operation
Low compressor discharge pressure	Low outdoor air temperature Low plant return water temperature Residual humidity in the cooling circuit Air in the hydraulic circuit Insufficient refrigerant gas charge	Check
Compressor suction pressure high	High outdoor air temperature Low plant return water temperature Expansion valve remains too opened/damaged	Check
Compressor suction pressure low	Low outdoor air temperature Low plant return water temperature Expansion valve remains too closed/clogged/damaged Dirty plate heat exchanger	Check
	Low air flow rate Low water flow rate	Check the fan and pump operation

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