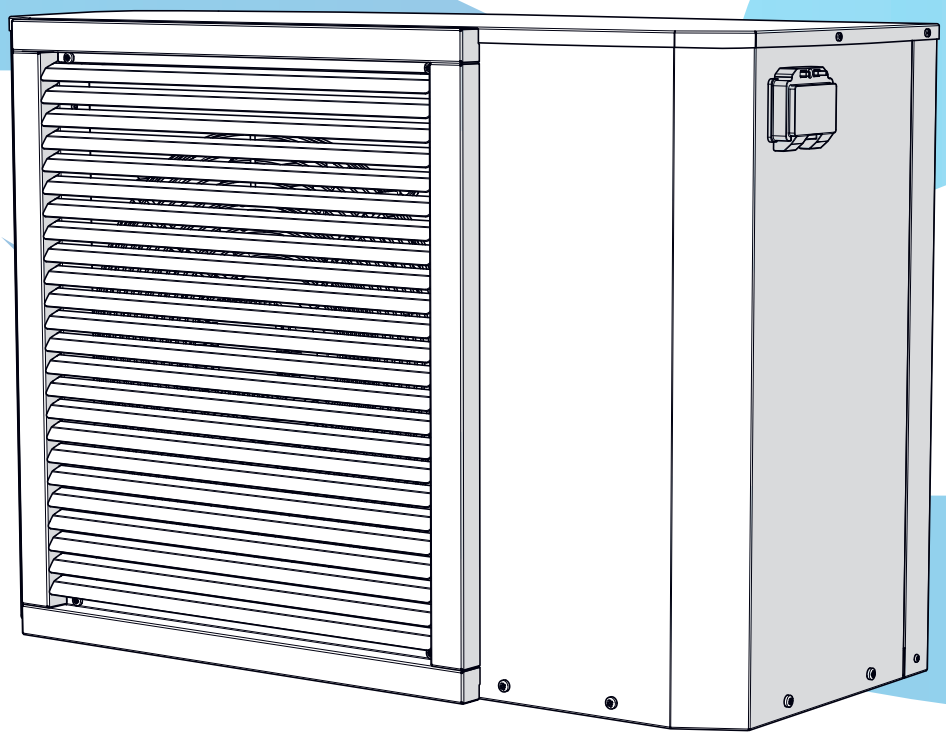
thermics

Installation Manual

LYRA 2T



Reversible heat pump with inverter technology

LYRA

EN-GB *Translation of the Original Instructions*

Rev. 0.0

Dear Customer,
Thank you for choosing a Thermics energie machine, an innovative, modern and quality product that will ensure your well-being, silence operation and safety for a long time.
This instruction manual contains important indications and suggestions that must be observed in order to make the installation and use of the machine as easy as possible.

Thank you again.
Thermics energie

CONTENTS

1 Introduction

1.1 Purpose of the manual

The purpose of this manual is to provide the customer with all the information necessary to use and operate the machine correctly, independently and safely.
The manual contains information on the safety, technical aspects, operation, maintenance and transport of the following machines:

LYRA 2T - Reversible heat pump with inverter technology

Correct use and maintenance contribute to good operation and a longer life cycle of the machine.
For any doubt or further information, please contact your nearest service centre or the manufacturer's after-sales service directly.

1.1.1 Storage

The manual must be kept with care and in the immediate vicinity of the machine, far from liquids and anything else that could compromise its readability, and must be available for consultation at any time.
The manual and the Declaration of Conformity are an integral part of the machine and must therefore accompany it throughout its entire life cycle.
Parts of this documents must not be removed, torn or arbitrarily modified.
If the manual is lost or illegible, request a copy to the Manufacturer.

1.1.2 Updating the manual

The information, descriptions and illustrations contained in this manual reflect the state of the art at the time the machine was placed on the market.
The Manufacturer, in its constant commitment to improve its products and/or for market reasons, reserves the right to make, at any time, modifications to the machines for technical or commercial reasons without prior notice and without legitimising the Purchaser to terminate the contract.
In the event that, due to modifications to the machine installed at the Customer's facility, it is necessary to integrate, modify and/or update the contents of this manual, the Manufacturer shall provide the updated and revised chapters.
It is the responsibility of the user, following the instructions accompanying the updated documentation, to replace all copies held with the updated ones.

1.1.3 Confidentiality

The technical information (texts, drawings and illustrations) contained in this manual is the property of **THERMICS** and must be treated as confidential.
It is strictly forbidden to disclose, reproduce or translate, even partially, this document without the written permission of **THERMICS**.

1.1.4 Recipients

This manual is intended for personnel who carry out the following operations on the machine:

- transport and handling;
- installation;
- use;
- adjustments;
- cleaning;
- maintenance and repair;
- demolition and disposal.

WARNING!

Make sure that operators do not intervene outside their specific areas of competence and responsibility.

IMPORTANT

This manual shall not in any way replace the specific technical training that operators must have previously received on similar machines or that they may attend on this machine under the guidance of qualified personnel.

1.2 Symbols

For the safety of persons and property, a special symbol has been used in this documentation to allow readers to focus on hazardous conditions, warnings or relevant information:

DANGER!
PAY UTMOST ATTENTION TO THE TEXT BLOCKS MARKED WITH THIS SYMBOL.
Danger with risk of injury or death.
Accident prevention regulations for the operator.

WARNING!
Possibility of causing damage to the machine and/or its components.
Pay attention.

IMPORTANT
Warning or note about key functions or useful information about the current operation.

1.2.1 Illustrations

The illustrations in this publication are current as of the date of issue.
In light of continuous technical or commercial updates, components may be mounted on the machine described in this manual, whose external shape may be different from that illustrated. Nevertheless, this does not affect such components' functionality and possibility of adjustment.
In case of doubt, contact the manufacturer directly for any further information.

1.3 General warnings

1.3.1 Allowed use

- Please read this booklet carefully.
- The documentation supplied with the unit must be handed over to the owner who must keep it carefully for future maintenance or servicing.
- The company shall not be liable for any damage to persons, animals or property arising from installation, adjustment and maintenance mistakes, improper use or a partial or superficial reading of the information provided herein; moreover, in view of the constant improvement of the products, the company reserves the right to modify the specified data at any time and without notice and declines all responsibility for any inaccuracies in this booklet, if due to printing or transcription errors.
- The machines are designed for heating and/or cooling water. A different use, not expressly authorised by the manufacturer, is to be considered improper and therefore not allowed.
- The location, hydraulic, cooling and electrical systems must be determined by the system designer considering both the merely technical requirements and any local legislation in force and specific authorisations.
- All works must be carried out by qualified, experienced personnel aware of the relevant regulations in force in the various countries.
- Upon delivery of the goods by the carrier, check the integrity of both the packaging and the units. If there is any damage or missing components, indicate it on the delivery note and forward a formal complaint to the company by fax or registered mail within 8 days from the date of good reception.
- The warranty does not apply if:
  - the personnel authorised by the company does not attend the machine start-up;
  - the above indications are not respected.

1.3.2 Remarks

- Pay particular attention to the use instructions preceded by the words "danger", "warning" or "important" because failure to respect them may lead to damage to the machine and/or people and property.
- The manufacturer declines all responsibility for any damage due to improper use of the machine, partial or superficial reading of the information provided herein.
- The machine must be installed in such a way that maintenance and/or repair operations are possible.
- The machine warranty does not cover the costs for ladders, scaffolding or other lifting systems that may be necessary to carry out works under warranty.
- The manufacturer does not provide drawings or specifications of connection systems.
- Any deviation from the prescriptions contained in this manual must be validated in writing by the manufacturer's technical support.
- For any faults not mentioned in this manual, please contact the Customer Service immediately.

1.3.3 User information

- Keep this manual and the wiring diagram in a place accessible to the operator.
- Make a note of the unit's identification information so you can give it to the service centre if you have to request assistance (see the section "*Machine identification*" in the Technical and Maintenance Manual).
- It is recommended to keep track of the works carried out on the unit to make the troubleshooting activity easier.
- In case of failure or malfunction:
  - check the type of alarm to report it to the service centre;
  - switch off the unit immediately without resetting the alarm;
  - contact an authorised service centre;
  - require the use of original spare parts.
- Ask the installer to be trained on:
  - power on/off;
  - shutting down the machine for long periods;
  - maintenance;
  - what to do/not to do in case of failure.

1.3.4 Fluorinated greenhouse gases

The product contains fluorinated greenhouse gases.

1.3.5 Warning sticker

A self-adhesive safety warning label has been attached to the product. The warning label indicates the rules that should be followed regarding the R32 refrigerant. The warning sticker must not be removed.

Symbol	Meaning
	Warning of flammable substances in relation to R32 refrigerant.
	Read the instructions.

2 Safety regulations

DANGER!

The machine has been designed and built according to appropriate safety standards. Before using the machine, carefully follow all the precautions and instructions provided in the manual to avoid accidents.

2.1 General safety rules

The use of products that use electricity and water involves compliance with certain basic safety rules such as the ones provided below:

- Children and unattended disabled persons are not allowed to use the machine.
- Do not touch the machine if you are barefoot and have wet or damp body parts.
- Any cleaning operation is prohibited without first disconnecting the power supply by turning the main switch of the system to "off".
- It is forbidden to modify the safety or adjustment devices without the authorisation and instructions of the machine manufacturer.
- It is forbidden to pull, disconnect or twist the electrical cables coming out of the machine, even if it is disconnected from the power supply.
- It is forbidden to open the access doors to the internal parts of the machine, if the system has not been switched off by means of the main switch.
- It is forbidden to climb on the machine with your feet, sit and/or lean against any type of object.
- It is forbidden to spray or throw water directly on the machine.
- The packaging material (cardboard, staples, plastic bags, etc.) may not be dispersed or left within the reach of children, as it may be a potential source of danger.
- Observe the safety distances between the machine and other equipment or structures to ensure sufficient access space to the unit for maintenance and/or servicing as indicated in this manual.
- Power supply of the machine: the machine must be powered by means of electrical cables with a section suitable for the power of the unit and the power supply voltage values must correspond to those indicated for the respective machines; all the machines must be connected to earth as per the regulations in force in the various countries.
- The hydraulic connection must be carried out according to the instructions in order to ensure the correct operation of the machine.
- During the cold season, if the machine is not working, empty all the hydraulic circuits of the machine to prevent them from freezing.
- Handle the machine with the utmost care and avoid damaging it.
- Glycol solution: the heat exchangers' antifreeze alarms are set based on the mixture declared at the start-up. Breakages due to inadequate mixing or mixture not maintained over time are not covered by the manufacturer's warranty.
- Installation room: some machine components generate heat during operation.
- The installation room must ensure adequate ventilation and proper dissipation of the heat produced.

DANGER!

Indicates a situation that could result in death or serious injury.

DANGER: ELECTROCUTION HAZARD

Indicates a situation in which there is a risk of electrocution.

DANGER: RISK OF BURNS / SCALDS

Indicates a situation where extremely high or extremely low temperatures may cause burns / scalds.

DANGER: EXPLOSION HAZARD

Indicates a situation that may result in an explosion.

WARNING

Indicates a situation that could result in death or serious injury.

WARNING!

FLAMMABLE MATERIAL

WARNING!

Indicates a situation that could result in minor or moderate injury.

CAUTION

Indicates a situation that could cause damage to equipment or property.

INFORMATION

Provides helpful tips or additional information.

WARNING!

For further information, please see the Installer and User Reference Guide.

2.1.1 For the installer

DANGER: RISK OF BURNS / SCALDS

- **DO NOT touch the refrigerant line, water line or internal parts during or immediately after use. They may be very hot or very cold. Wait until they have returned to normal temperature. If you have to touch them, wear protective gloves.**
- **DO NOT touch coolant that has been spilt.**

WARNING

Failure to install or connect the equipment or the accessories properly may result in electrical shocks, short circuits, leaks, fire or other damage to the equipment.
Use ONLY accessories, optional devices and spare parts manufactured or approved by Daikin.

WARNING

Ensure that the installation, testing and materials used comply with the relevant legislation (in addition to the instructions in the Daikin documentation).

WARNING

Tear up and dispose of plastic packaging so that no one, especially children, can play with them. Possible choking hazard.

WARNING

Take appropriate measures to ensure that he unit is not used as a shelter by small animals. Small animals that come into contact with electrical parts can cause malfunctions, smoke or fire.

WARNING

Wear appropriate personal protective equipment (protective gloves, safety glasses,etc.) when carrying out installation, maintenance or repair work on the system.

WARNING

DO NOT touch the air intake or the aluminium fins of the unit.

WARNING

- **DO NOT place objects or equipment on the unit.**
- **DO NOT sit, climb or stand on the unit.**

2.1.2 Place of installation

- Allow sufficient clearance around the unit for repairs and air circulation.
- Ensure that the installation site is able to withstand the weight and the vibration of the unit.
- Make sure that the area is well ventilated. DO NOT obstruct any cooling vents.
- Make sure that the unit is level. DO NOT install the unit in places where the following conditions exist:
- Potentially explosive atmospheres.
- Machinery that emits electromagnetic waves. Electromagnetic waves may interfere with the control system and causing the equipment to malfunction.
- In places where there is a risk of fire due to the leakage of flammable gases (e.g. thinners or petrol), carbon fibres, flammable dust.
- In places where corrosive gases are produced (example: sulphuric acid gas). The corrosion of copper pipes or welded parts may cause the refrigerant to leak.

2.1.3 Refrigerant — in case of R32

If applicable. For further information, see the installer's reference guide for your application.

DANGER: EXPLOSION HAZARD

Emptying – Refrigerant leakage. If you want to drain the system and there is a leak in the cooling circuit:

- **DO NOT use the unit's automatic emptying function, which can collect all the refrigerant from the system in the outdoor unit. Possible consequence: Compressor self-ignition and explosion due to air entering the compressor while it is in operation.**
- **Use a separate recovery system so that the unit's compressor DOES NOT have to be used.**

WARNING

During testing, NEVER pressurize the product above the maximum permissible pressures (as indicated on the unit identification plate).

WARNING

Take adequate precautions in the event of refrigerant leakage. Ventilate the area immediately in the event of a refrigerant gas leak. Possible hazards:

- **Excessive concentrations of refrigerant in a closed environment may cause oxygen deficiency.**
- **Toxic gases may be produced if the refrigerant gas comes into contact with naked flames.**

WARNING

ALWAYS recover the refrigerant. DO NOT discharge directly into the environment. Use a vacuum pump to empty the unit.

WARNING

Make sure there is no oxygen in the system. Refrigerant must ONLY be loaded after checking for leaks and vacuum drying have been carried out.
Possible consequence: self-ignition and explosion of the compressor due to air entering the compressor while it is in operation.

CAUTION

- **To prevent compressor failure, DO NOT exceed specified refrigerant charge.**
- **If the cooling system has to be opened, it MUST be done in accordance with current legislation.**

CAUTION

Make sure that the refrigerant piping is installed in accordance with the relevant regulations. The relevant standard in Europe is EN378.

CAUTION

Make sure that the pipes are not subjected to any stress.

CAUTION

Once all the piping has been connected, make sure that there are no gas leaks.
Use nitrogen to check for gas leaks.

DANGER: ELECTROCUTION HAZARD

- **SWITCH OFF all electrical power before removing the cover of the electrical panel, before connecting electrical cables or touching electrical parts.**
- **Before carrying out any work, disconnect the power supply for at least 10 minutes and measure the voltage at the terminals of the main circuit capacitors or the electrical components. The voltage MUST be less than 50 V DC before the electrical components can be touched. See the wiring diagram for the location of the terminals.**
- **DO NOT touch electrical components with wet hands.**
- **DO NOT leave the unit unattended if the service cover has been removed.**

WARNING

- **ONLY use copper conductors.**
- **Make sure that the wiring of the installation complies with the applicable regulations.**
- **All wiring of the installation MUST be carried out according to the wiring diagram supplied with the product.**
- **DO NOT pinch or squeeze cable bundles and make sure that they DO NOT come into contact with pipes or sharp edges. Make sure that the terminal connections are not subjected to external pressure.**
- **Make sure that the earth cable is installed. DO NOT use a mains pipe, surge suppressor, or telephone earth to ground the unit. Incomplete earthing may result in electric shocks.**
- **Make sure that you use a dedicated power circuit. DO NOT use a power supply shared with other equipment.**
- **Make sure you install the required fuses or circuit breakers.**
- **Make sure that you install the earth leakage circuit breaker. Failure to comply with these instructions may result in electric shock or fire.**
- **When installing the earth leakage circuit breaker, check that it is compatible with the inverter (resistant to high-frequency electrical disturbances) to prevent the earth leakage circuit breaker from tripping unnecessarily.**

WARNING

- **When the electrical work has been completed, make sure that each electrical component and the terminal inside the electrical components box are securely connected.**
- **Make sure that all covers are closed before starting the unit.**

- If recharging is necessary, refer to the data plate of the unit. The type of refrigerant and the quantity required are indicated on it.
- This unit has been charged with refrigerant at the factory and depending on the size and length of the pipework, it may need to be topped up for certain systems.
- ONLY use tools that are suitable for the type of refrigerant used in the system, to ensure pressure resistance and to prevent foreign matter from entering the system.
- Please note that R32 refrigerant is ODOURLESS.

2.2 Ensuring safety in the workplace

Validity: Wall mounting

- Make sure there is safe access to the wall mounting position.
- Fall protection equipment should be installed if work has to be carried out on the product at a height of more than 3 m.
- Comply with local laws and regulations.

Validity: Flat roof installation

- Ensure safe access to the flat roof.
- In addition to the distance necessary to work on the product, maintain a safety distance of 2 m from the fall-hazard zone. Do not enter the safety zone.
- Alternatively, install a technical fall protection device, such as a railing, in the area where there is a risk of falling.
- Alternatively, install a technical protection system, such as scaffolding or protective nets.
- Keep a safe distance from roof hatches or skylights on the flat roof.
- When carrying out work, make any roof hatches and the skylights on the flat roof safe so that they cannot be accessed or fallen into, e.g. with a bar.

2.3 Risks

The product contains R32 refrigerant, which should not be allowed to escape into the atmosphere.
R32 is a fluorinated greenhouse gas covered by the Kyoto Protocol with a GWP of 675 (GWP = Global Warming Potential).
If it is released into the atmosphere, it has an effect that is 675 times greater that of the natural greenhouse gas CO2.
Before disposing of the product, the refrigerant contained in it should be transferred to a suitable container and then recycled or disposed of in accordance with the regulations in force.

- Ensure that any installation, maintenance or other work on the refrigerant circuit is carried out exclusively by a qualified and certified technician wearing the appropriate personal protective equipment.
- Ensure that the refrigerant contained in the product is disposed of or in accordance with the regulations by a qualified and certified technician.

3 Reception and handling

3.1 Handling with packaging

WARNING!

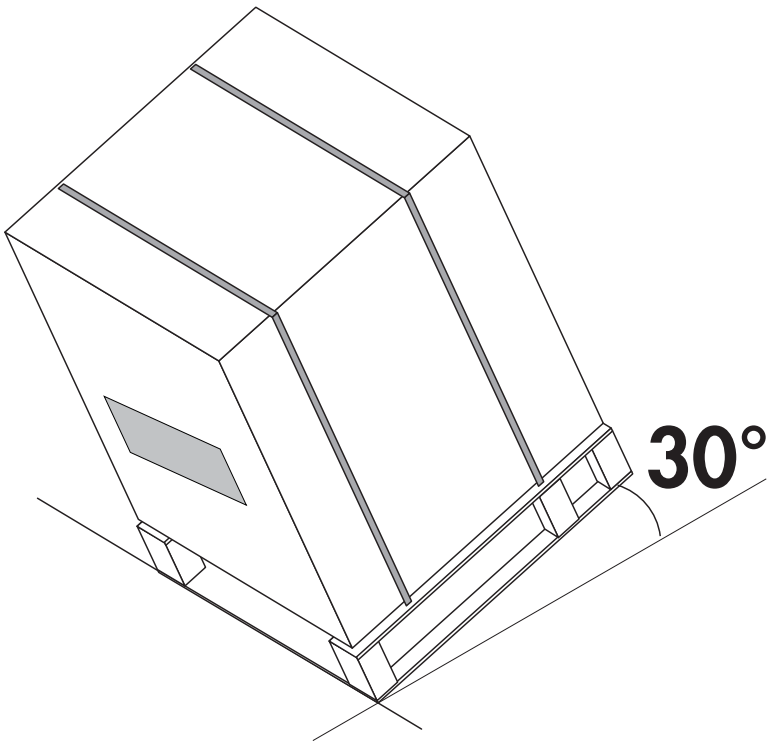
Use spacers to avoid damaging .

WARNING!

with the vibration dampers already installed; handle the units carefully to avoid damaging them.

WARNING!

During handling, it is forbidden to exceed the maximum permitted inclination of 30°.

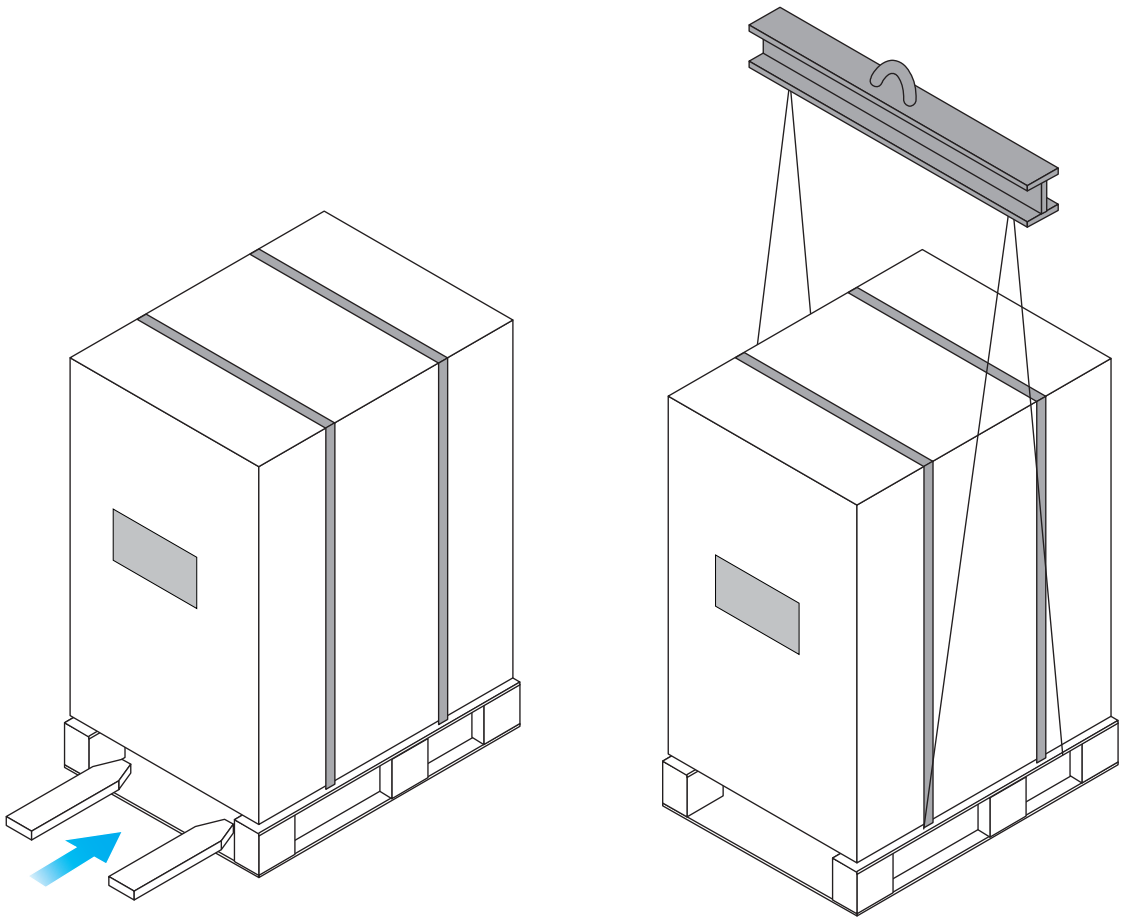


Lifting with forks

- Insert the forks from the side so as not to damage the panels.

Lifting with crane

- Position the lifting belts as shown in the figure.



3.2 Verification of packaging

Before accepting the received goods, please check that:

- the machine has not been damaged during transportation;
- the material delivered corresponds to that indicated on the transport document by comparing the data with the packing plate.

In case of damage or faults:

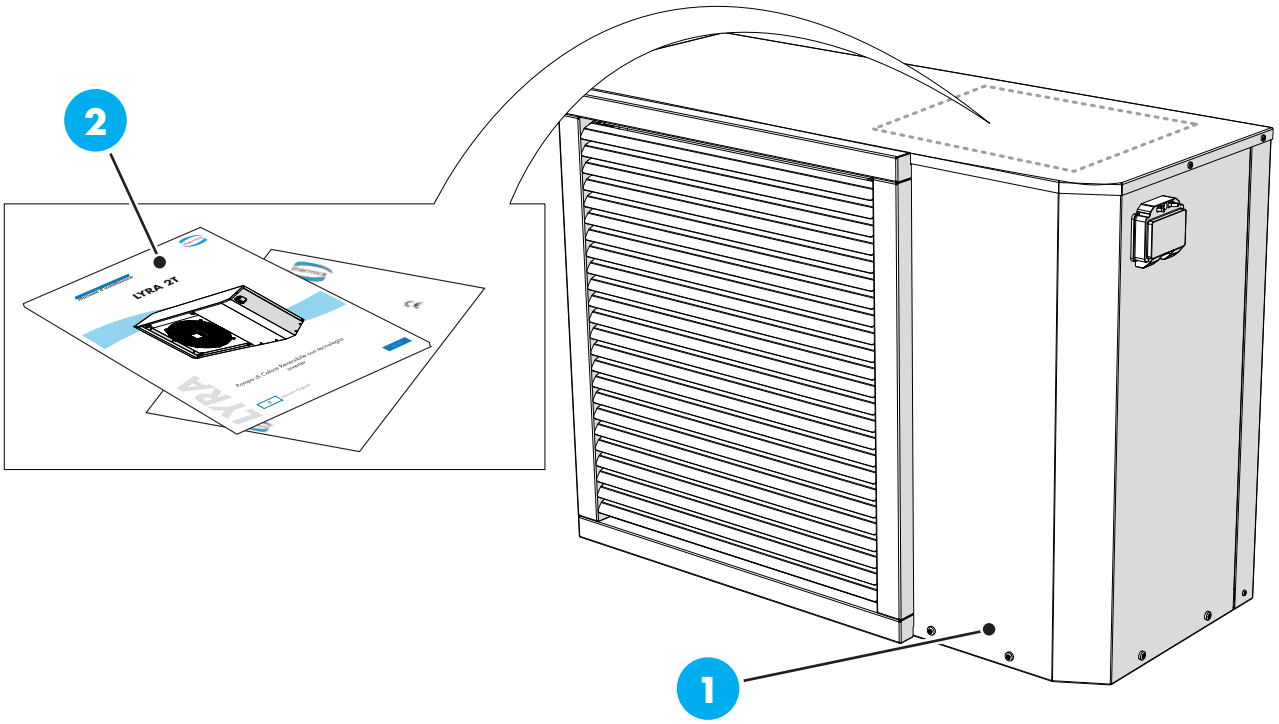
- immediately note down the damage on the transport document and write: "Delivery accepted with reserve due to noticeable missing parts/transport damage";
- complain by sending an PEC e-mail and registered letter with advice of receipt to the carrier and the supplier.

3.3 Packaging content

THE STANDARD SUPPLY INCLUDES:

1	Heat pump
2	Technical documentation

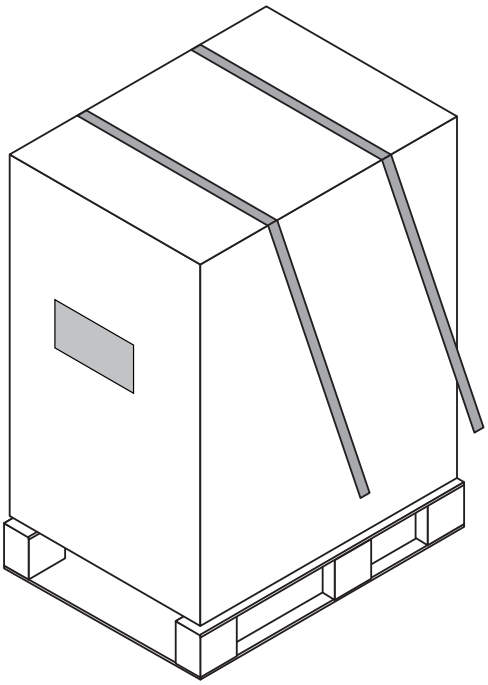
WARNING!
Keep the manual in a dry place, to avoid deterioration, for at least 10 years for future reference.

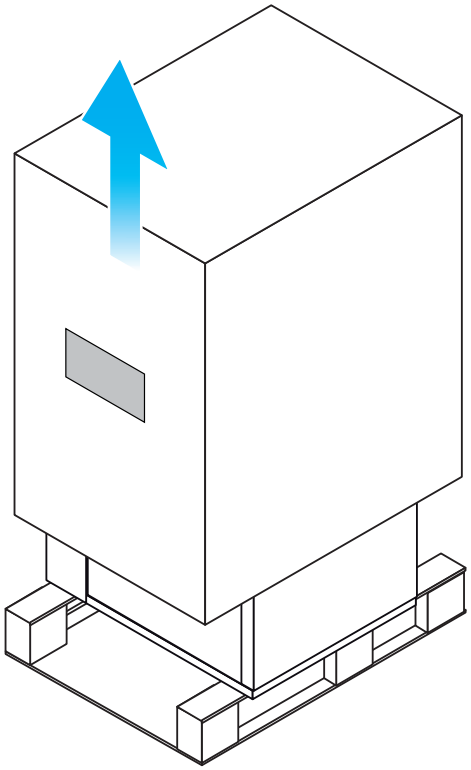


LYRA 2T | RECEPTION AND HANDLING

3.4 Removing the packaging

- Cut the fixing straps.
- Remove the top part by lifting it upwards.
- Remove any protective inserts.
- Remove the transparent film that wraps the machine.





3.5 Handling without packaging

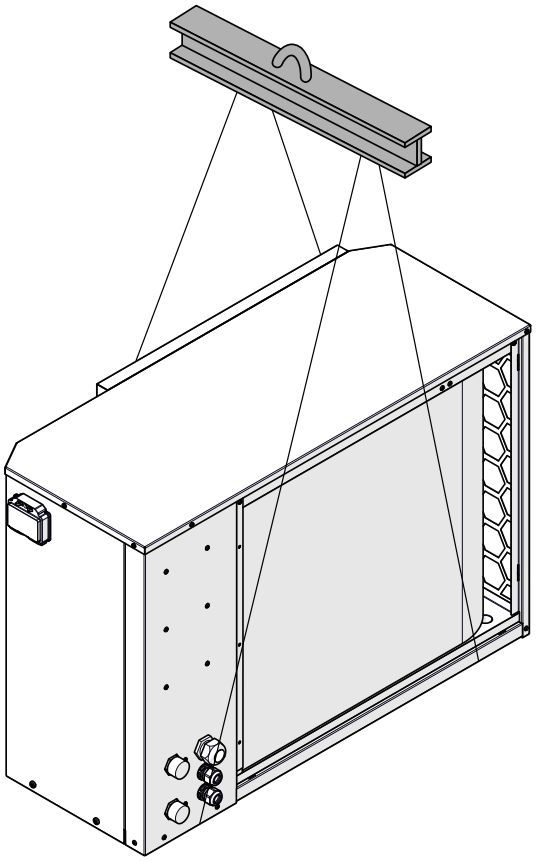
Use handling equipment suitable for the machine weight.

DANGER!

The unit is supplied with the vibration dampers already installed; handle the unit carefully to avoid damaging them.

DANGER!

Use spacers to prevent damage to the unit.



4 Mounting

4.1 Recommended equipment

To install the machine it is advisable to use the following equipment:

- set of cross-head and slotted screwdrivers;
- cutting nippers;
- scissors;
- set of open end wrenches and pipe wrenches;
- ladder;
- hydraulic material for sealing the threads;
- electrical equipment for connections;
- cut-resistant protective gloves.
- Use only equipment and tools approved for use with R32 refrigerant.
- Only use refrigerant cylinders that are properly labelled.

4.2 Total refrigerant charge

The outdoor unit is filled at the factory with 1.60 kg of refrigerant.
Depending on the length of refrigerant piping, up to 0.48 kg of additional refrigerant may be added during installation.
The total amount of refrigerant allowed is limited and depends on the minimum size of the room where the indoor unit is installed.
The minimum size of the room where the indoor unit is installed is indicated in the installation instructions of the unit. With a total fill volume of 1.84 kg, the size of the room in which the unit is to be installed has to be considerably larger.

4.3 Conditions regarding the place of installation

DANGER!

Easily flammable liquids and materials (e.g. petrol, solvents, cleaning agents, paints or paper) can lead to explosions and fires. Do not store or use these substances or materials in the boiler room or in the immediate vicinity of the heating system.

WARNING!

Inappropriate operating conditions may result in damage to the system and make it unsafe to use. Comply with the permissible ambient temperatures specified in these operating instructions. Avoid causing pollution due to halogenated hydrocarbons (e.g. those found in paints, detergents and solvents). Avoid prolonged periods of high humidity, e.g. from drying laundry.

4.4 Permissible ambient temperatures in the place of installation

WARNING!

Ambient temperatures outside the specified range may cause the appliance to malfunction. Make sure that temperature in the place of installation is within the range specified. In order to avoid malfunctions, ensure that the ambient temperature is between 0°C and +35°C.

4.5 System inspection

DANGER!
Current regulations require the heating system to be inspected before commissioning. The inspection must be carried out by a qualified technician.

Fill in the following check list on the installation data:

System

	Description	Notes	Signature	Date
□	Washed system			
□	Vented system			
□	Impurity filter			
□	Cut-off and drain valve			
□	Set filling flow rate			

Electricity

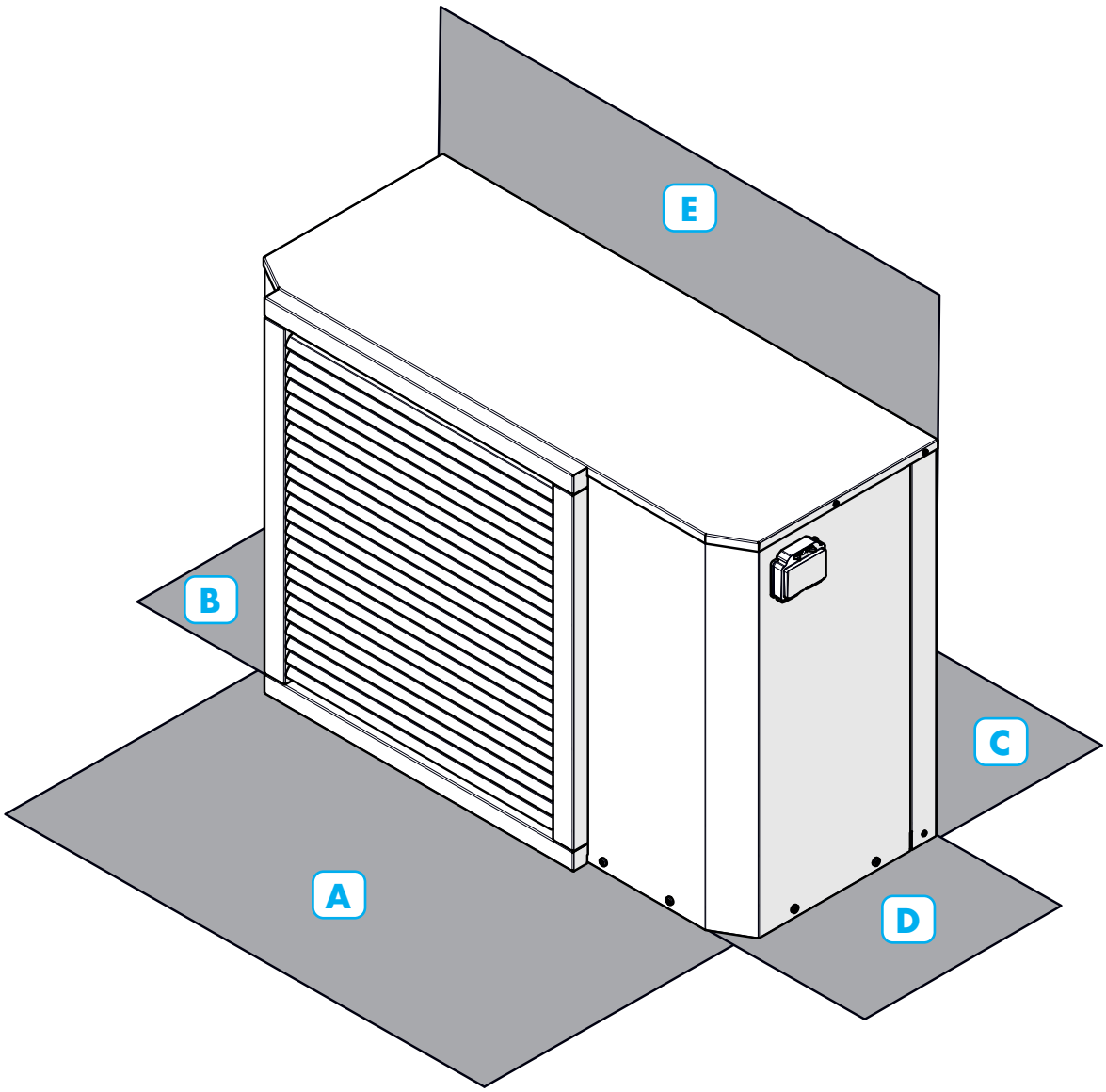
	Description	Notes	Signature	Date
□	Home fuses			
□	Safety switch			
□	Differential switch			
□	Communication cable connected (if any)			
□	Connections			
□	Main voltage			
□	Phase voltage			

Miscellaneous

	Description	Notes	Signature	Date
□	Condensate water pipe			
□	Condensate water pipe insulation, thickness			
□	Cooling pipes according to the procedure indicated (if present).			

4.6 Verification of functional spaces

The installation of the machine must allow specialised and authorised personnel to easily perform maintenance activities while respecting both the safety distances between the units and the other equipment and the technical spaces indicated in the table.

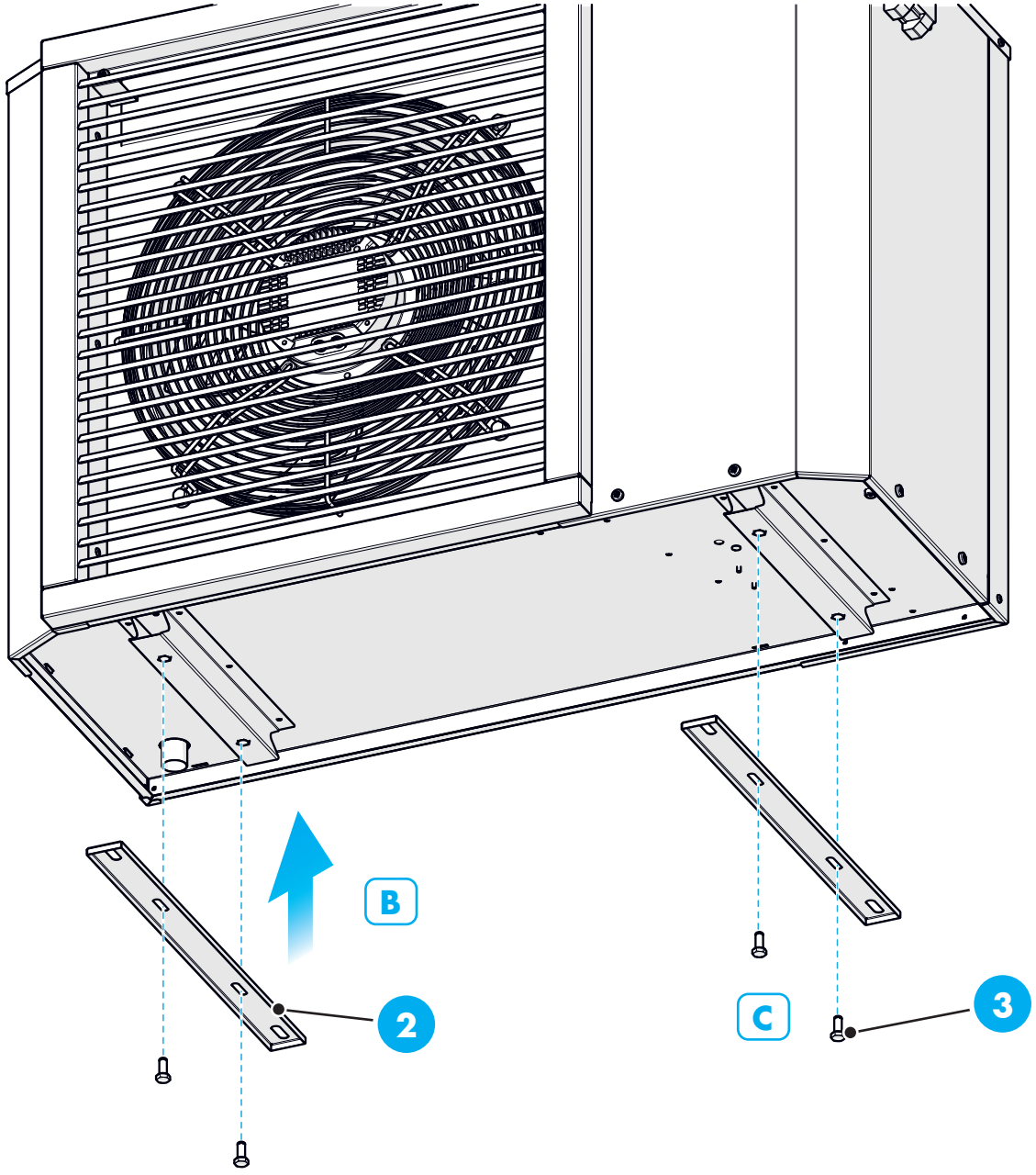


	A	B	C	D	E
LYRA 2T 6 kW 2T MB	2000	500	300	800	300
LYRA 2T 8 kW 2T MB	2000	500	300	800	300
LYRA 2T 12 kW 2T MB	2000	500	500	800	300
LYRA 2T 14 kW 2T MB	2000	500	500	800	300

4.7 Unit positioning

The anti-vibration mountings (1) are supplied separately (if requested when placing the order) and must be fitted by the installer.

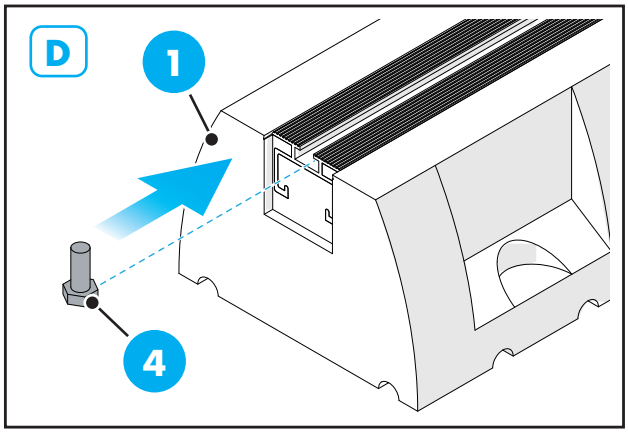
- The mounting kit is used to attach the anti-vibration mountings to the machine.
- Raise the machine (A) in order to insert (B) the fixing plates (2).
- Insert (C) the screws (3).

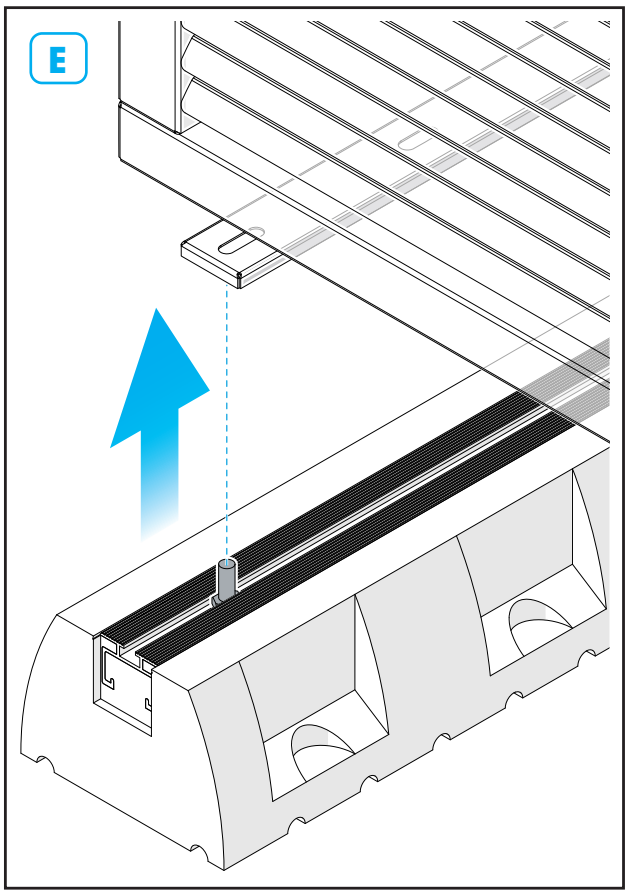


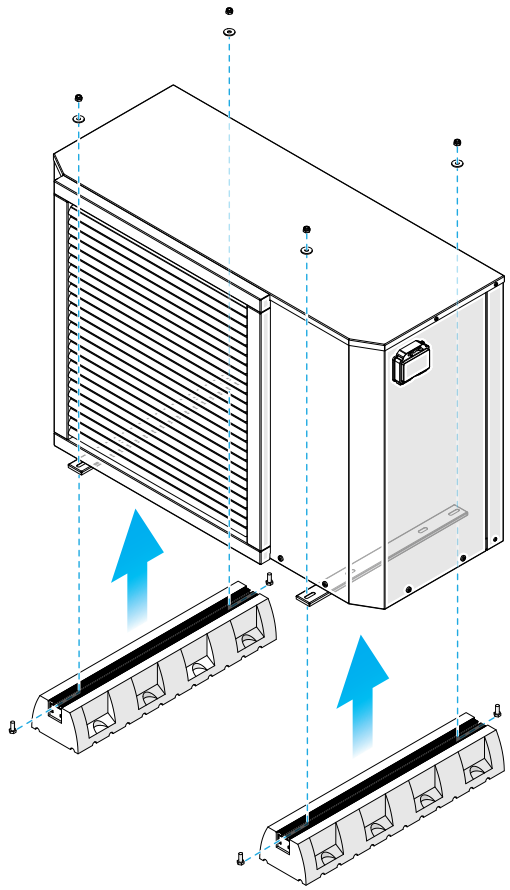
- Insert (D) the head of the fixing screw (4) into the aluminium guide of the anti-vibration mounting (E).
- Once the anti-vibration mounting (1) is in position, tighten (F) with the washer (5) and the bolt (6).

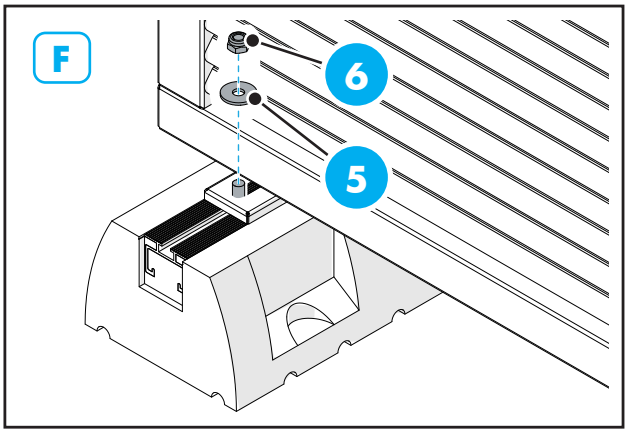
DANGER!

Check that the table supports the machine weight.









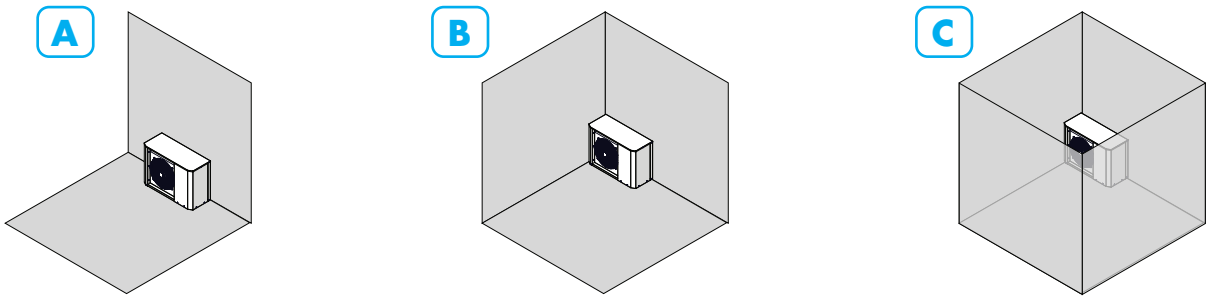
4.8 Noise control

During installation, take into account the effect that the position of the machine will have on the noise emitted. Position the machine as far away from walls as possible. The noise level increases according to the place of installation as illustrated below:

- **A.** Module positioned against a wall: +3 dB(A)
- **B.** Module positioned in a corner: +6 dB(A)
- **C.** Module positioned in a confined indoor space: +9 dB(A)

IMPORTANT

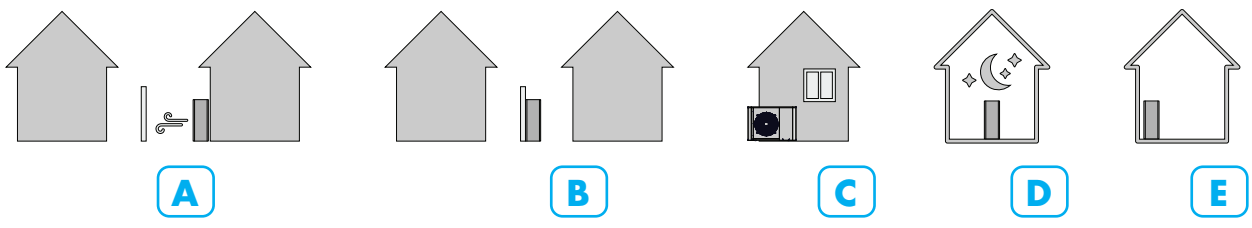
Avoid placing the module near the bedroom area and a terrace.
Do not install the module in front of a wall.



4.9 Where not to install

It is strictly prohibited to install the equipment with the:

- **A.** Ventilation directed towards neighbouring properties
- **B.** Module positioned at the edge of the property
- **C.** Module positioned under a window
- **D.** Module placed near the bedroom area
- **E.** Module installed in front of a wall



4.10 Recommendations and suggestions

In order to limit acoustic disturbances and vibrations, we suggest that you do the following:

- Install the module outdoors on a metal frame or on an inertia base. The weight of this base must be at least twice the weight of the module.
- Use modified bushes or sleeves for passing the refrigerant connections through walls.
- Use flexible and anti-vibration materials for fixing.
- Use vibration-damping devices on coolant connections, such as rings, plates, or elbow joints.
- It is also recommended to use sound absorbing devices such as:
  - wall absorbers to install on the wall behind the module
  - acoustic screen: the surface area of the screen must be larger than the size of the external module and must be positioned as close as possible to it, while still allowing free air circulation The screen must be made of suitable materials, such as soundproofing bricks, concrete blocks covered with sound-absorbing materials or natural screens such as earth.

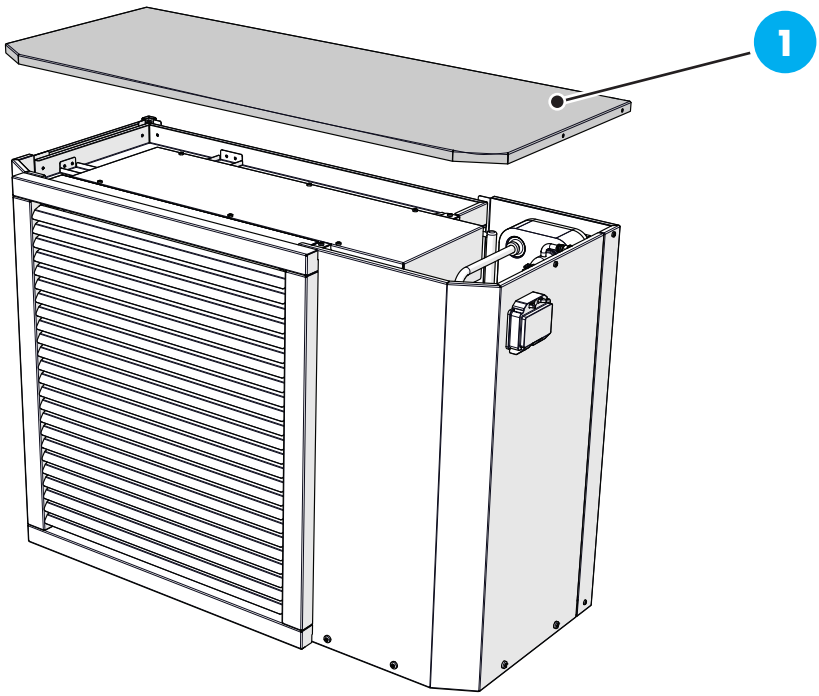
4.11 Access to internal parts

DANGER!
Before removing the side panels, make the hydraulic connections.

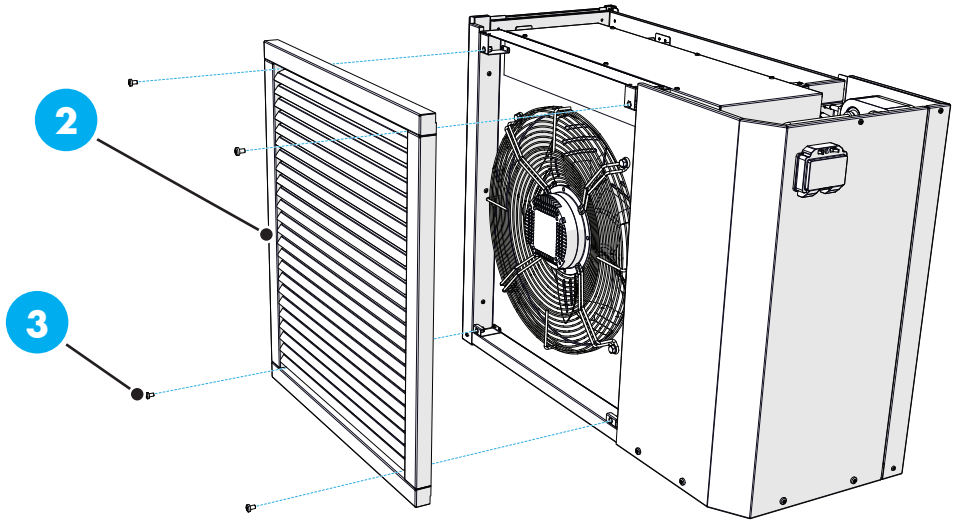
DANGER!
When removing the Control Panel dashboard, pay attention to the connection cable.

To access the internal parts, remove the panel of the concerned area (A-B):

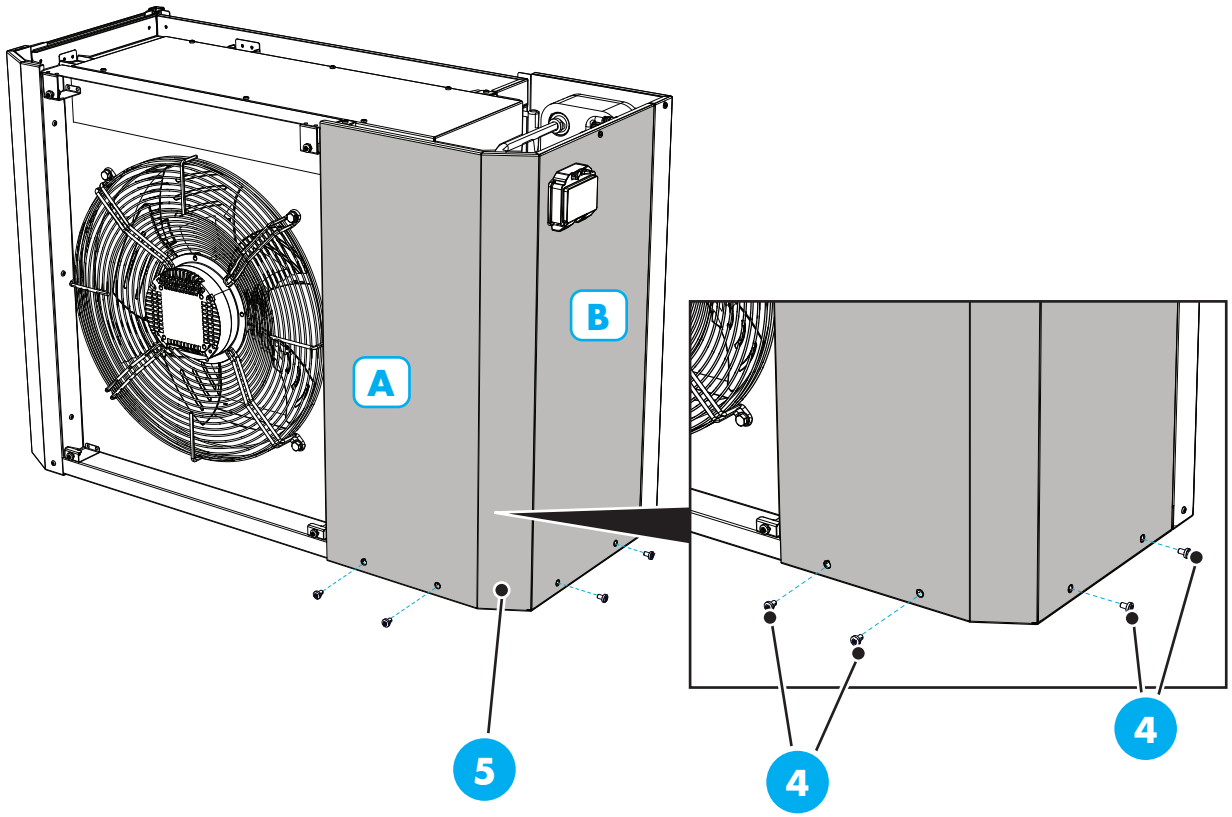
- remove the upper panel (1) by loosening the retaining screws;



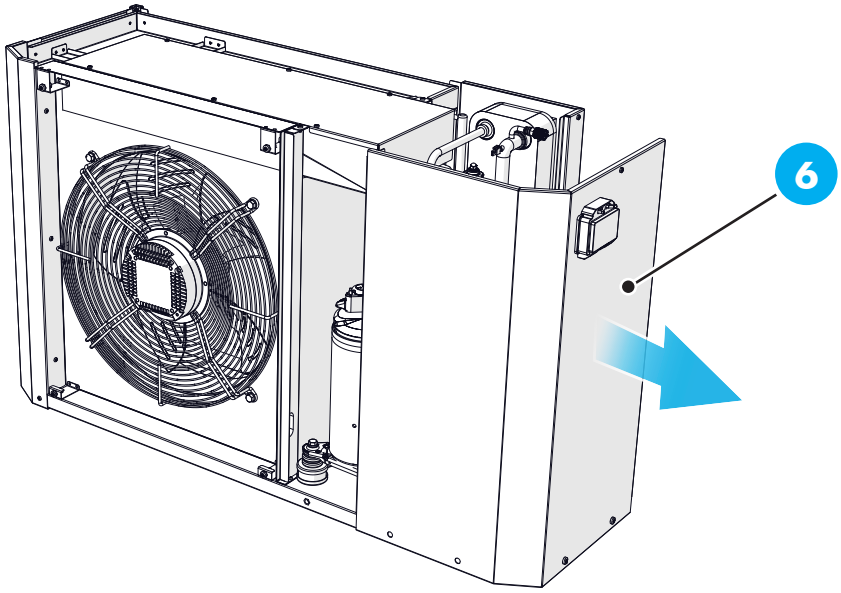
- remove the grille (2) by loosening the screws (3);



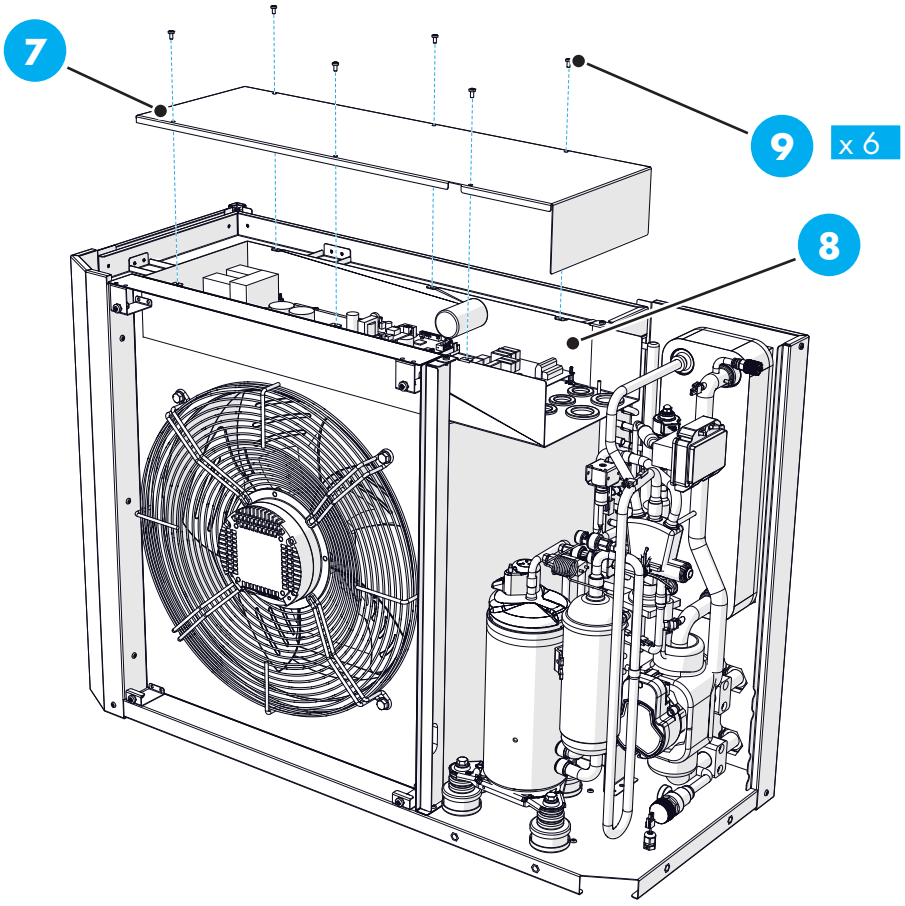
- loosen the screws (4) at the bottom of the panel (5);



- disengage the panel (6) by sliding it outwards;

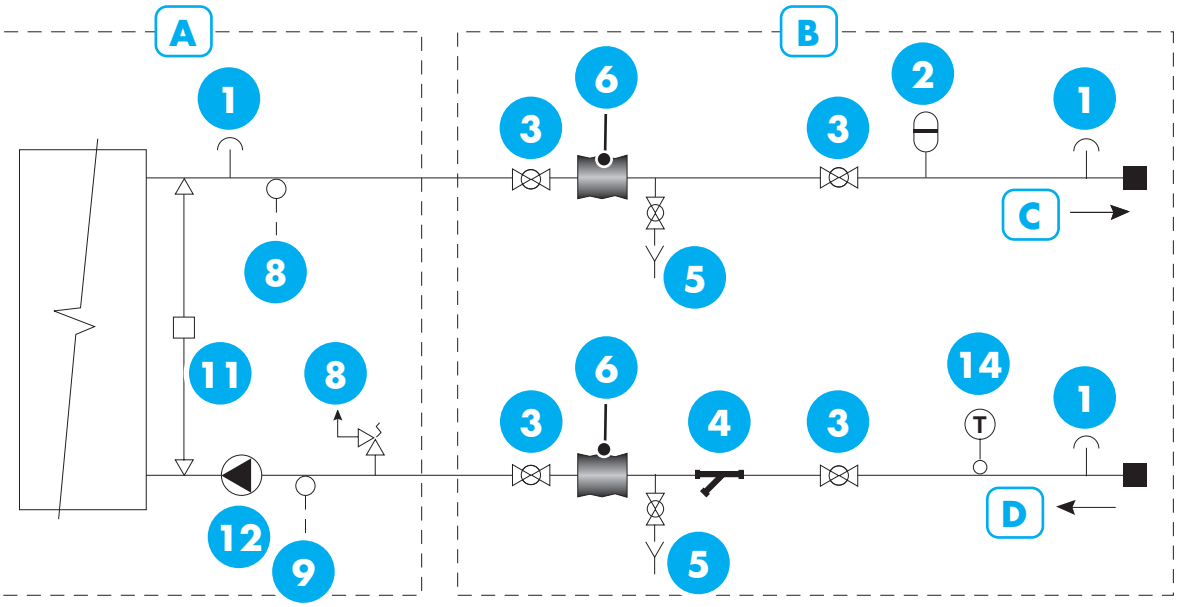


- remove the panel (7) of the electrical panel (8) by loosening the screws (9).



4.12 Hydraulic diagrams

System side hydraulic connections



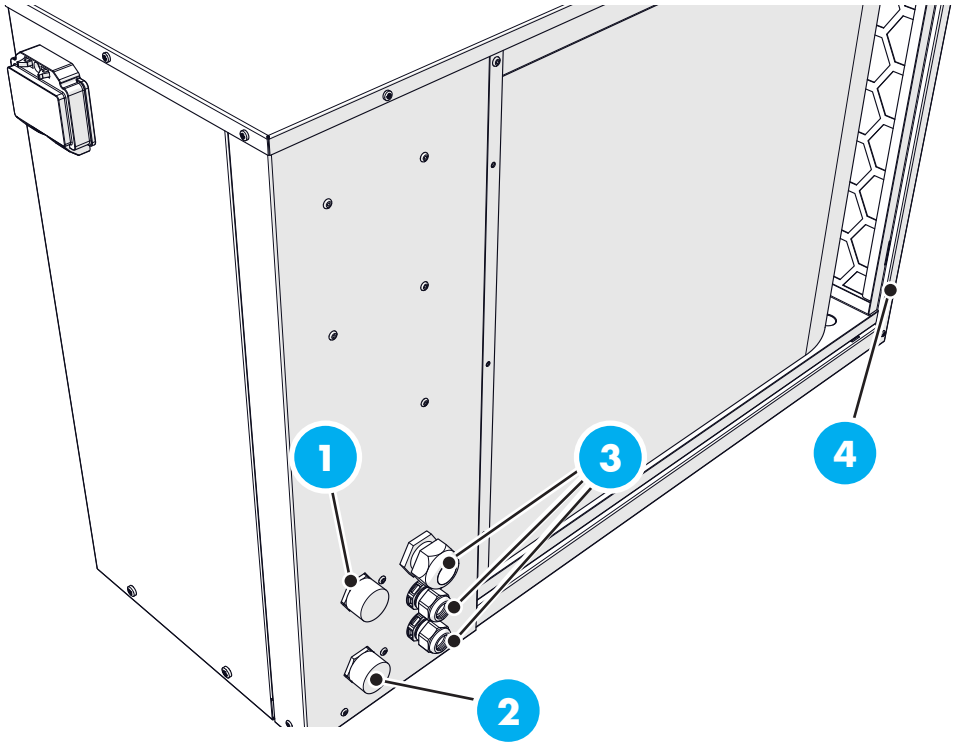
KEY TO HYDRAULIC CONNECTIONS

A	Connections by the manufacturer	**C**	System flow
B	Connections by the installer	**D**	System return line

KEY TO HYDRAULIC CONNECTIONS

1	Vent valve	**8**	Safety valve
2	Expansion vessel	**9**	Temperature probe
3	Shut-off cock	**10**	Discharge
4	Mesh filter	**11**	Differential pressure switch
5	Drain cock	**12**	Circulation pump
6	Vibration damper	**13**	Pressure gauge
7	Filling cock	**14**	Temperature gauge

4.13 Machine connections



KEY	
1	System outlet
2	System inlet
3	Cable glands
4	Condensate drain

4.13.1 Propylene glycol solution

PROPYLENE GLYCOL SOLUTION

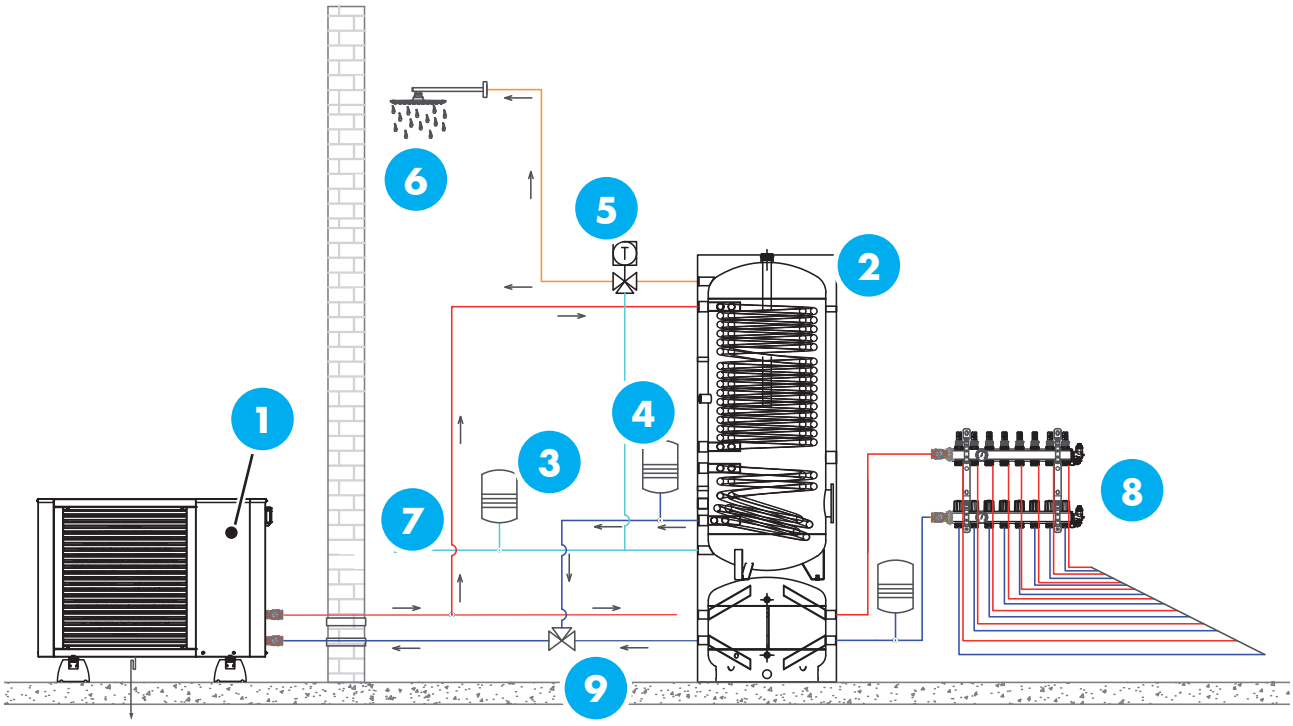
Data	0	-3	-7	-12	-18	-20

PERCENTAGE OF PROPYLENE GLYCOL BY WEIGHT

	0	10%	20%	30%	36%	40%
cPf	1	0.99	0.985	0.98	0.97	0.965
cQ	1	1.02	1.04	1.075	1.11	1.14
cdp	1	1.07	1.11	1.18	1.22	1.24

- **cPf:** Cooling capacity correction factor
- **cQ:** Flow rate correction factor
- **cdp:** Pressure drop correction factor

4.13.2 Example of connection diagram



KEY

1	LYRA 2T	**6**	Utilities
2	Boiler ACS300/ATEC100 DUO - 2 coils	**7**	Cold water inlet
3	DHW expansion vessel	**8**	System
4	System expansion vessel	**9**	3-Way valve
5	Thermostatic mixer		

4.14 Hydraulic connection

DANGER!
The pipes must be installed in accordance with the prevailing standards and directives.

- The machine can operate at a maximum return temperature of 55°C and at a heat pump outlet temperature of 65°C on the system side.
- The machine is not equipped with hydraulic side cut-off valves. They must be installed to facilitate any future maintenance work.
- The return flow temperature is limited by the return flow sensor.

4.14.1 Water volumes

The water volume required for optimal machine operation (avoiding short operating times and enabling defrosting) varies depending on the machine model.
A minimum available water volume of 8 litres per size number is recommended.
conditions.
For example for LYRA 2T

8 litres x 8 = 64 litres

WARNING!
Pipes must be discharged before the heat pump is connected so that any type of contaminant does not damage the components.

4.14.2 Heating fluid circuit

- Vent the heat pump through the manual valves located on each water circuit. If there is an automatic breather valve, make sure it is operating correctly.
- Install the impurity filter.
- All external pipes shall be thermally insulated with pipe insulation material at least 19 mm thick.
- Install the cut-off and drain valves so that the machine can be emptied in the event of a prolonged power supply interruption.
- The connecting pipes must be provided with shut-off cocks and anti-vibration joints, which have the function of damping vibrations and prevent them from propagating to the system.
- An appropriately sized expansion tank and an additional safety valve (3 bar) must be installed on each water circuit.

4.14.3 Plant pump

The system pump is powered and controlled by the internal control panel.
The machine features an integrated anti-freezing function and therefore must not be switched off in conditions with a risk of freezing.
At temperatures below +2°C the filling pump works periodically to prevent the water from freezing in the primary circuit.
The function also protects against excessive temperatures within the flow circuit.

4.14.4 Water quality - recommendations

In order to maintain the functionality and durability of the internal components as well as the performance of the unit, please follow the recommendations below.

Firstly, you should try to prevent corrosion, which is a complex process that depends on the interaction of the different materials with the various chemicals dissolved in the water.

The standard UNI 8065:1989 specifies the chemical and chemical-physical parameters of water in heating systems for domestic use:

For hot water heating systems, the standards specifies the following characteristics for the water in the circuit.

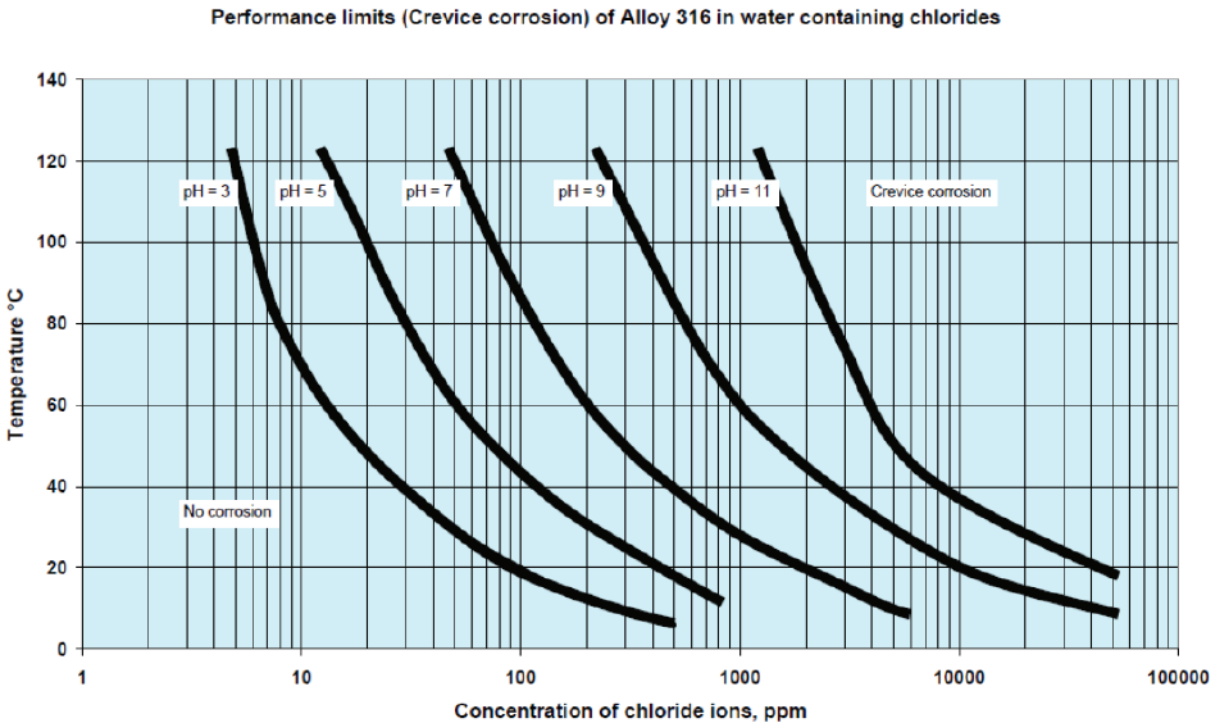
Circuit water characteristics

Appearance	Preferably clear
pH	Higher than 7 (for radiators with aluminium or light alloy elements the pH should also be less than 8)
Conditioners	Present within the concentrations specified by the manufacturer
Iron (as Fe)	<0.5 mg/kg (higher values of iron are due to corrosion that should be eliminated)
Copper (as Cu)	<0.1 mg/kg (higher values of copper are due to corrosion that should be eliminated)

The quality of the water should be periodically checked using the Ryznar (RSI) and Langelier (LSI) indices, which should be within the limits and values indicated below:

- Water temperature (°C)
- Fixed residue (mg/l)
- Ca2+ as CaCO3 (mg/l)
- Alkalinity as CaCO3 (mg/l)

Element/compound/property	*Value/Unit*
pH	7.5 – 9.0
Conductivity	< 500 µS/cm
Hardness	4.5 – 8.5 dH°
Free chlorine	< 1.0 ppm
Ammonia (NH3)	< 0.5 ppm
Sulphate (SO42-)	< 100 ppm
Hydrogen carbonate (HCO3-)	60 – 200 ppm
(HCO3-) / (SO4-2)	> 1.5
(Ca + Mg) / (HCO3-)	> 0.5
Chloride (Cl-)	In accordance with the following graph
Oxygen	< 0.02 mg/l

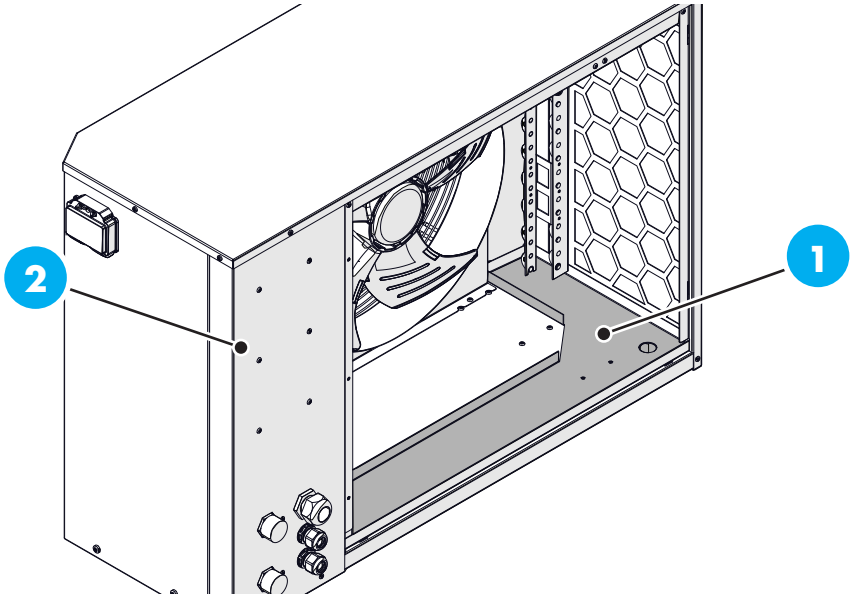


It is also recommended that you follow the guidelines outlined in standard VDI 2035 "Guideline for the prevention of damage in water heating installations" designed to prevent the presence of oxygen in the water.

- Keeping the pH within the limits indicated above prevents the formation of magnetite. It is recommended to use chemical inhibitors suitable for this purpose.
- Magnetite forms because of corrosion that forms due to the action of oxygen in a closed circuit. If it is present in high quantities, it is probably because there is a leak in the circuit that allows it to get in.

4.15 Connecting the condensate drain

The condensate water tank (1) collects and eliminates most of the condensate water produced by the heat pump (2).



WARNING!

For the heat pump to function, the condensate water must be regularly removed and the condensate water drain must be correctly positioned so as not to damage the house. The condensate flow must be checked regularly, especially in the autumn. Perform cleaning when necessary.

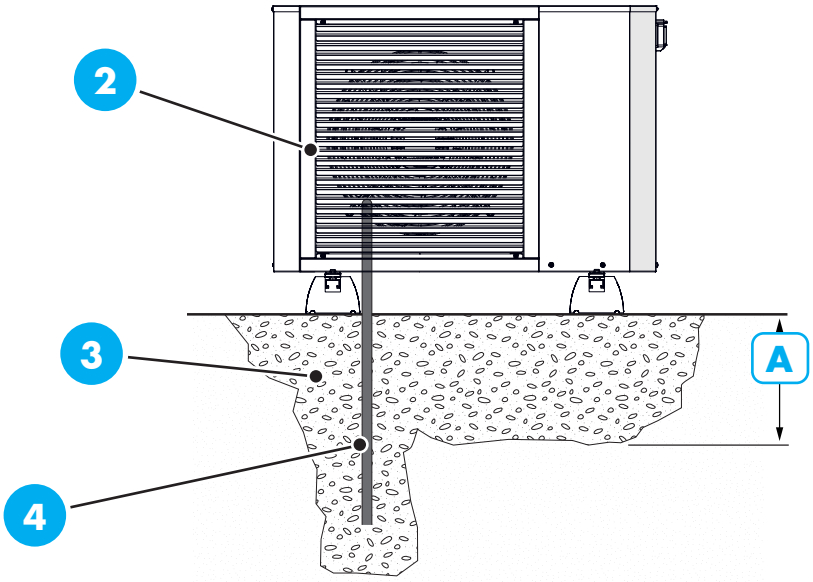
IMPORTANT

The pipe with heating cable for draining the condensate tank is not included.

- Condensate water collected in the tank (up to 50 litres/24 hours) must be conveyed to an appropriate drain by means of a pipe; it is recommended to use the shortest possible external path.
- The pipe section of the pipe subject to frost must be heated by means of the heating cable.
- Direct the tube downwards.
- The condensate pipe outlet must be positioned at a depth or an internal point protected from frost (in accordance with local laws and regulations).
- Use a siphon for installations where air can circulate in the condensate water pipe.
- The insulation must adhere to the lower part of the condensate water tank.

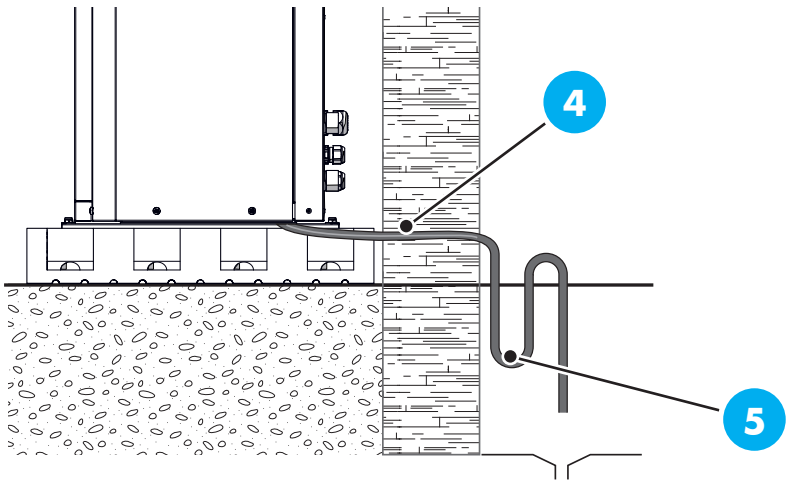
4.15.1 Condensation water diversion

- If the house has a cellar, the stone box (3) must be positioned so that the condensate water does not affect the house. Alternatively, the stone box (3) can be placed directly under the heat pump (2).
- The outlet of the condensate water pipe (4) must be located at a depth protected from frost (A).



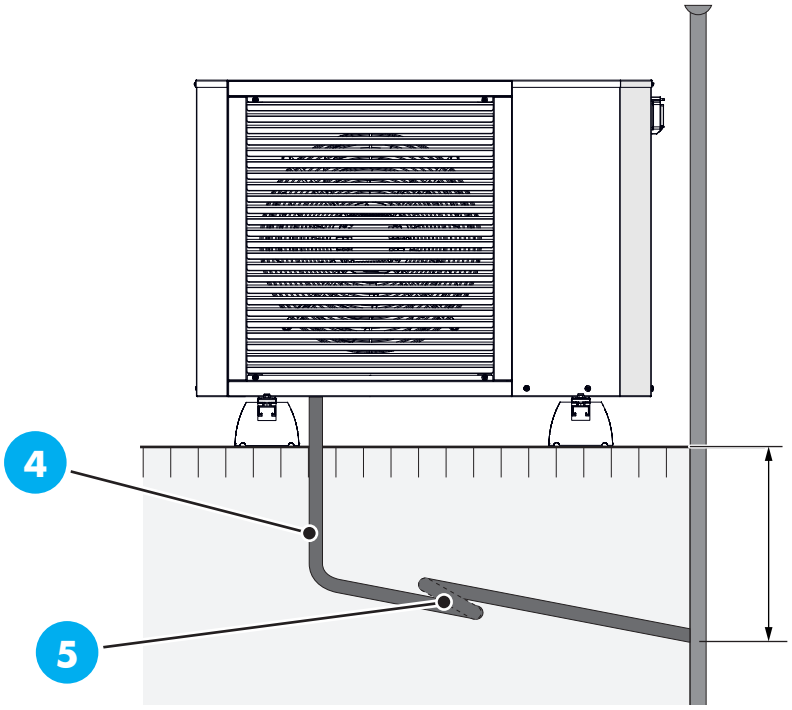
4.15.2 Internal drain

- The condensate water is directed to an internal drain (in accordance with local laws and regulations).
- The condensate water pipe (4) must be equipped with a siphon (5) to prevent air circulation inside the pipe.



4.15.3 Drain into the gutter pipe

- The outlet of the condensate water pipe (4) must be located at a depth protected from frost.
- Direct the tube downwards.
- The condensate water pipe (4) must be equipped with a siphon (5) to prevent air circulation inside the pipe.



4.16 Power supply connection

- Connect the cable to the terminals inside the electrical panel by passing it through the appropriate cable glands located on the lower part of the panel.
- Refer to the attached wiring diagrams for connections.
- In order to select the correct cross section of the machine's power cables, refer to the information in paragraph "4.18 Consumptions".

DANGER!

The heat pump must not be connected without the permission of the electricity supply company and must be connected under the supervision of a qualified electrician.

DANGER!

The unit does not include a circuit breaker on the input power supply.
The power cable of the heat pump must be connected to a thermal-magnetic circuit breaker with a break gap of at least 3 mm. If the building is equipped with an earthed residual-current circuit breaker, the heat pump must have a separate switch. The earthed residual-current circuit breaker must be a type B device that is sensitive to direct currents and have a rated trip current not exceeding 30 mA. If possible, it should also have the following characteristics:
1. Adjustable trip threshold
2. Adjustable trip delay
3. Be dedicated to the heat pump only.
The input power supply must be 400 V 3 N~ 50 Hz through a power distribution unit with thermal-magnetic protection.
For 230 V~ 50 Hz the input power supply must be 230 V~ 50 Hz through electrical panel with thermal-magnetic protection.

DANGER!

The electrical system and any maintenance work must be carried out under the supervision of a qualified electrician. Switch off the power supply via the circuit breaker before performing any maintenance work. The system and the electrical wiring must be carried out in accordance with the prevailing national regulations.

DANGER!

High-current and signal cables must be routed through separate cable glands.

DANGER!

Avoid direct contact with the copper pipes and the compressor.

DANGER! ELECTROCUTION HAZARD

- SWITCH OFF all electrical power before removing the cover of the electrical panel, before connecting electrical cables or touching electrical parts.
- Before carrying out any work, disconnect the power supply for at least 10 minutes and measure the voltage at the terminals of the main circuit capacitors or the electrical components. The voltage MUST be less than 50 V DC before the electrical components can be touched. See the wiring diagram for the location of the terminals.
- DO NOT touch electrical components with wet hands.
- DO NOT leave the unit unattended if the service cover has been removed.

WARNING!

- ONLY use copper conductors.
- Make sure that the wiring of the installation complies with the applicable regulations.
- All wiring of the installation MUST be carried out according to the wiring diagram supplied with the product.
- DO NOT pinch or squeeze cable bundles and make sure that they DO NOT come into contact with pipes or sharp edges. Make sure that the terminal connections are not subjected to external pressure.
- Make sure that the earth cable is installed. DO NOT use a mains pipe, surge suppressor, or telephone earth to ground the unit. Incomplete earthing may result in electric shocks.
- Make sure that you use a dedicated power circuit. DO NOT use a power supply shared with other equipment.
- Make sure you install the required fuses or circuit breakers.
- Make sure that you install the earth leakage circuit breaker. Failure to comply with these instructions may result in electric shock or fire.
- When installing the earth leakage circuit breaker, check that it is compatible with the inverter (resistant to high-frequency electrical disturbances) to prevent it from tripping unnecessarily.

WARNING!

- When the electrical work has been completed, make sure that each electrical component and the terminal inside the electrical components box are securely connected.
- Make sure that all covers are closed before starting the unit.

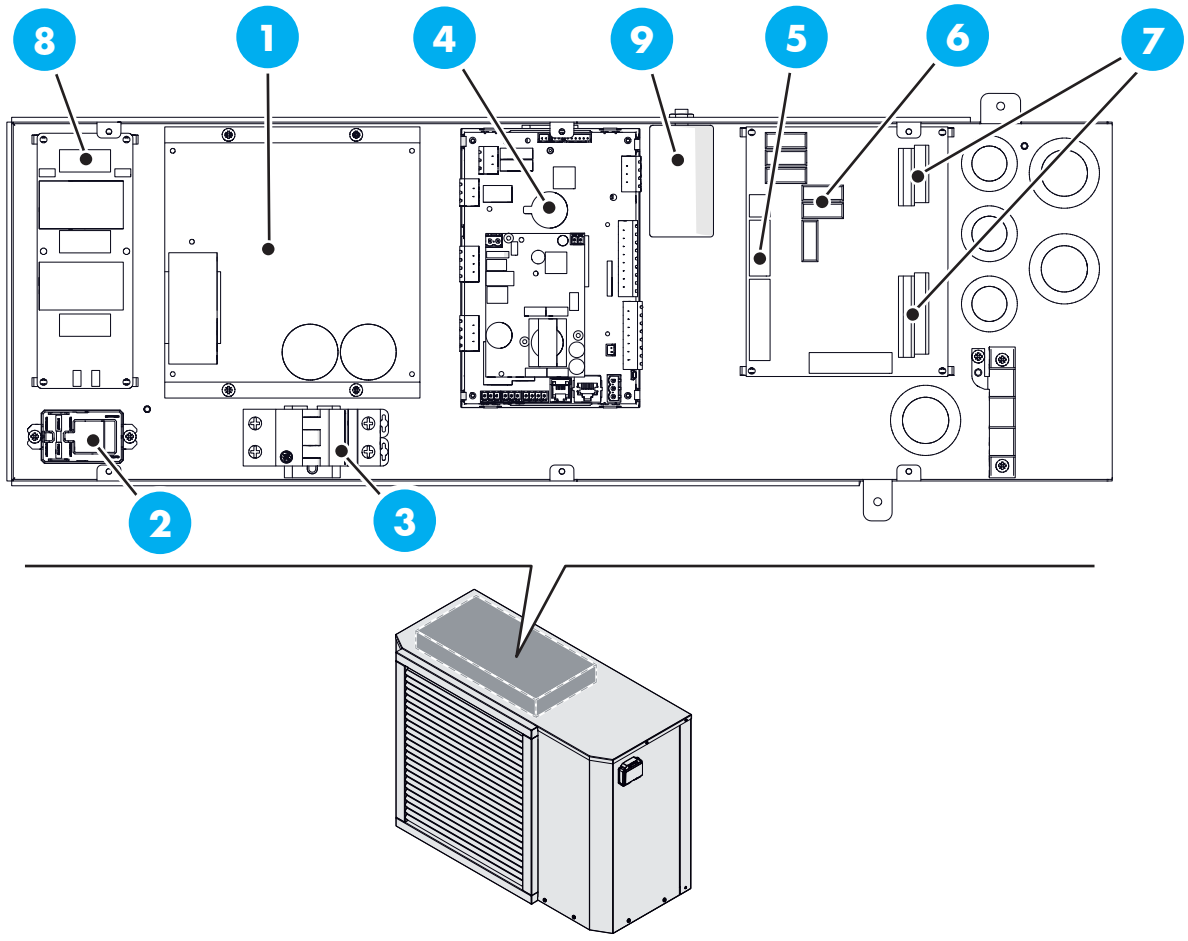
DANGER!

After about 10 minutes of heat pump operation, make sure that the screws on the power supply terminal block are tightened.

WARNING!

Check the connections, the main voltage and the phase voltage before starting the machine to avoid damage to the electronics of the air/water heat pump.

4.16.1 Connections LYRA 2T 06 kW - LYRA 2T 08 kW



CONNECTIONS

1	Compressor inverter	**6**	Fuses
2	Power relay	**7**	User terminal blocks
3	QM1- Compressor thermal-magnetic circuit breaker	**8**	Filter board
4	A3 - Controller	**9**	Mains filter
5	A5 - PCB Connections		

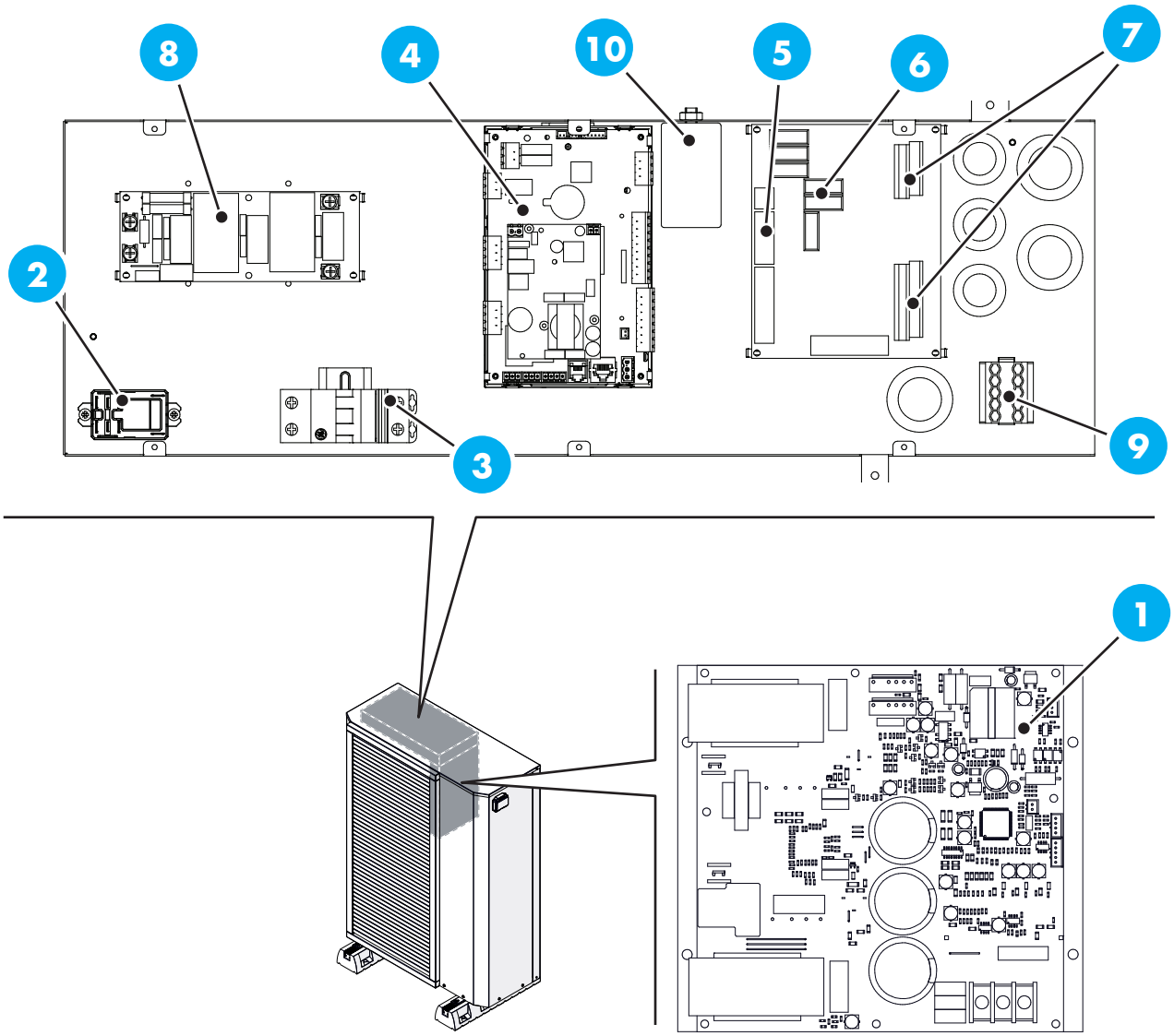
FUSE PROTECTION TERMINAL BLOCK

6	**J**	Fan protection fuse
	X	Protection fuse for system circuit circulator
	W	Controller protection fuse 230 V
	Y	Auxiliary circuit protection fuse 230 V
	XX	Auxiliary circuit protection fuse 230 V
	YY	Auxiliary circuit protection fuse 30 V

USER TERMINAL BLOCK

7	**OP** **L** **N**	Unit power connections	
	1	NC: Alternative system water source enable	
	2	NO: Alternative system water source enable	
	3	C: Contact power supply	
	4 **5**	System enable inlet	
	6 **7**	Domestic hot water storage probe	
	8 **9**	Summer / Winter season switching inlet	
	10 **11**	Enable for alternative DHW source (230 V - 1 A max)	
	12 **13**	Contact for 3-way domestic hot water valve (230V - 1A max)	
	14 **15** **16**	GND + (A) - (B)	BMS Connection (RS 485)
	17 **18** **19** **20**	GND - + VTERM	Display Connection

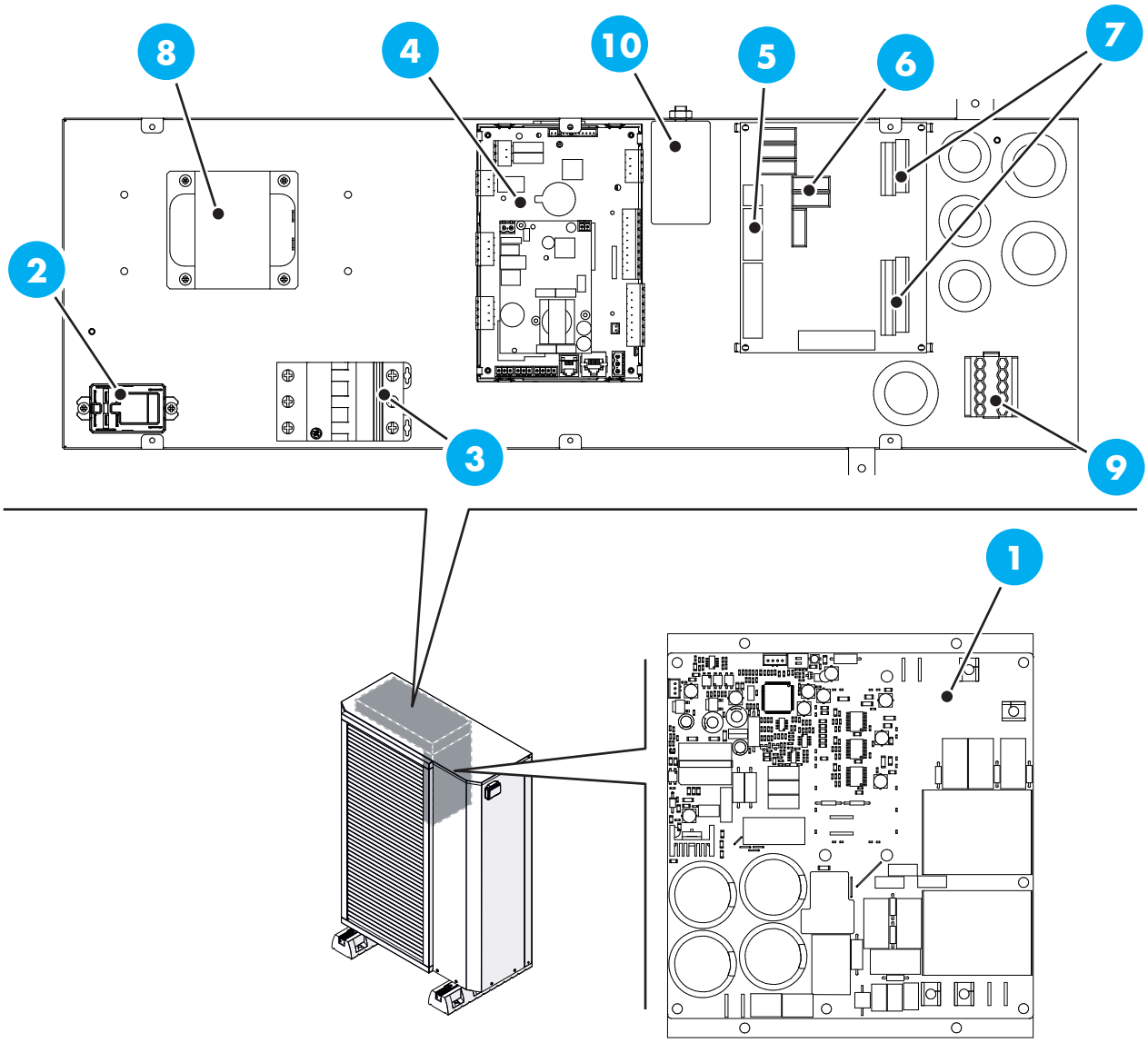
4.16.3 LYRA 2T 12 kW 230 V- LYRA 2T 14 kW 230 V



CONNECTIONS

1	Compressor inverter	**6**	Fuses
2	Power relay	**7**	User terminal blocks
3	B25- Compressor thermal-magnetic circuit breaker	**8**	Filter board
4	PC3 - Controller	**9**	Screw-on clamps
5	A5 - PCB Connections	**10**	Mains filter

4.16.4 LYRA 2T 12 kW 400 V- LYRA 2T 14 kW 400 V



CONNECTIONS

1	Compressor inverter	**6**	Fuses
2	Power relay	**7**	User terminal blocks
3	B32- Compressor thermal-magnetic circuit breaker	**8**	Inductor
4	PC3 - Controller	**9**	Screw-on clamps
5	A5 - PCB Connections	**10**	Mains filter

FUSE PROTECTION TERMINAL BLOCK

9	**J**	Fan protection fuse
	X	Protection fuse for system circuit circulator
	W	Controller protection fuse 230 V
	Y	Auxiliary circuit protection fuse 230 V
	XX	Auxiliary circuit protection fuse 230 V
	YY	Auxiliary circuit protection fuse 30 V

USER TERMINAL BLOCK

10	**OP** **L** **N**	Unit power connections
	1	NC: Alternative system water source enable
	2	NO: Alternative system water source enable
	3	C: Contact power supply
	4 **5**	System enable inlet
	6 **7**	Domestic hot water storage probe
	8 **9**	Summer / Winter season switching inlet
	10 **11**	Enable for alternative DHW source (230 V - 1 A max)
	12 **13**	Contact for 3-way domestic hot water valve (230V - 1A max)
	14 **15** **16**	BMS Connection (RS 485)
	17 **18** **19** **20**	Display Connection

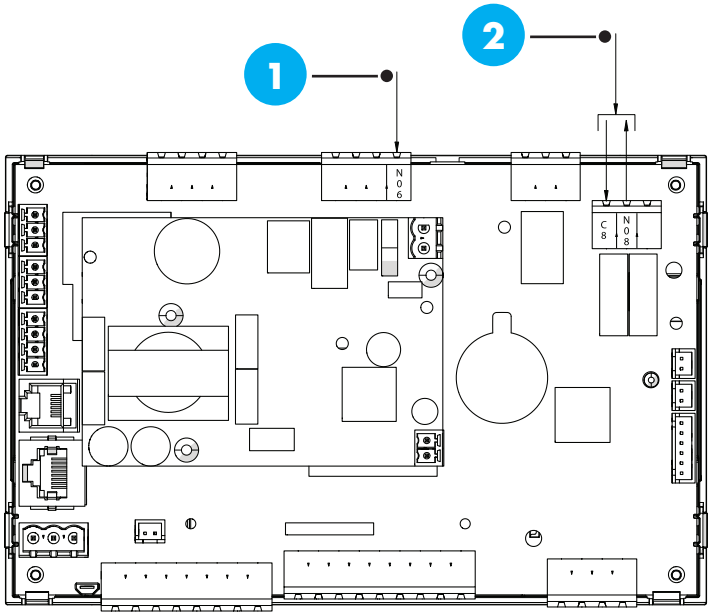
4.16.2 Optional connections

PLUS BOARD VERSION (M2 TERMINAL BLOCK)

11	**21**	FB GND
	22	FB +
	23	FB -
	24	FOR FUTURE DEVELOPMENTS
	25	
	26	
	27	
	28	Booster Pump Output (230V - 1A max)
	29	NO: Summer / Winter Output (230V - 1A max)
	30	FOR FUTURE DEVELOPMENTS
	31	
	32	
	33	
	34	C: Summer / Winter output contact power supply (230V - 1A max)

EASY BOARD VERSION (WITHOUT M2 TERMINAL BLOCK)

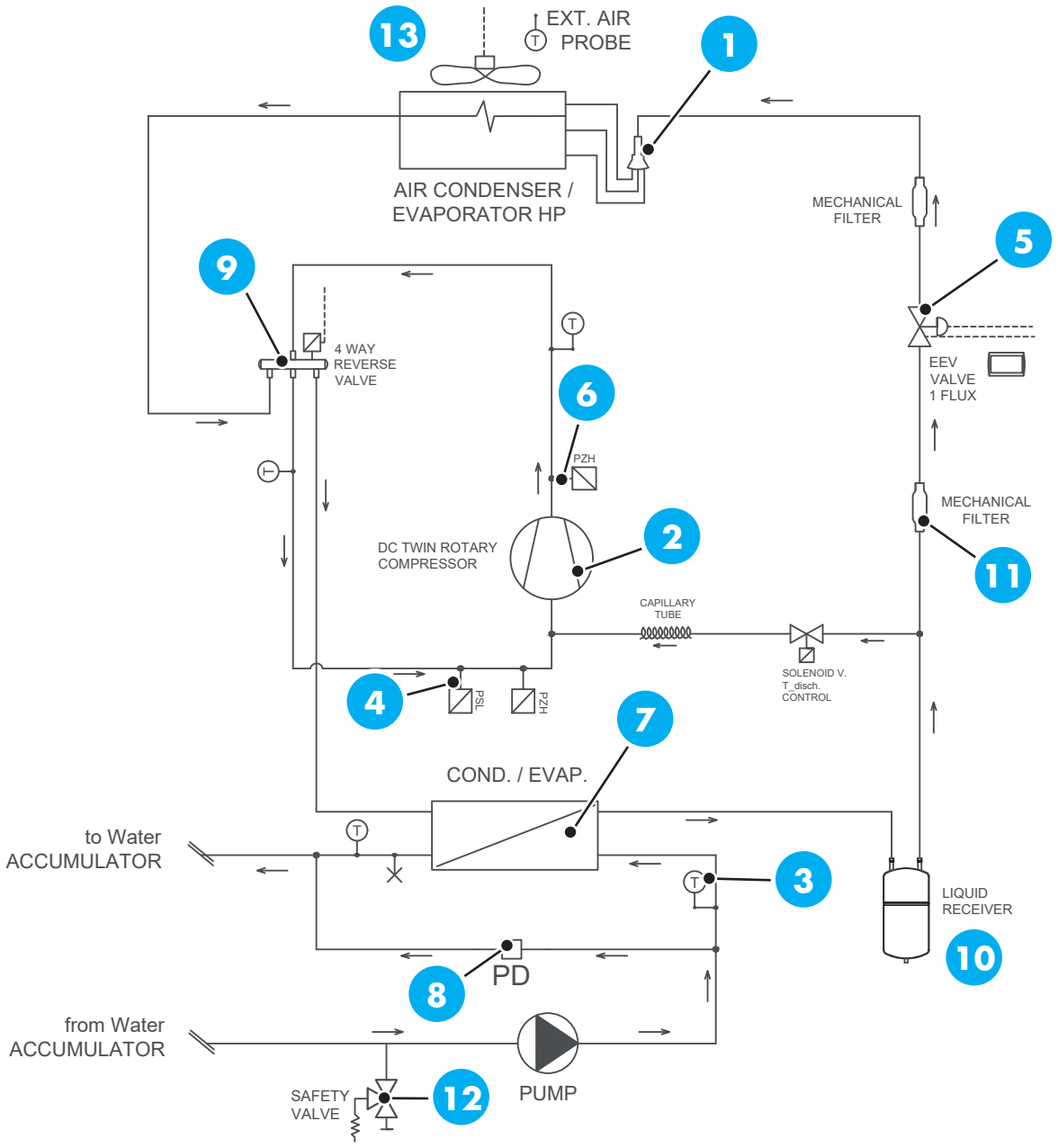
1	N06: Booster Pump Output L-NO 230V - 1A max
2	Summer / Winter Output 230V - 1A max



IMPORTANT

The maximum current indicated above should not be exceeded. It is also recommended that you use an interface relay with the specified outputs.

4.17 Cooling Circuit



KEY

1	Coil distributor	**8**	Differential pressure switch
2	Compressor	**9**	4-way valve
3	Temperature probe	**10**	Liquid receiver
4	Low pressure switch	**11**	Mechanical filter
5	Filling valve	**12**	Safety valve
6	High pressure switch	**13**	Finned heat exchanger
7	System heat exchanger		

4.18 Consumptions

MAXIMUM VALUES							
SIZES LYRA 2T		6	8	12		14	
Electrical power supply	V-Ph-Hz	230-1-50	230-1-50	230-1-50	400-3-50	230-1-50	400-3-50
Compressor	F.L.I. (kW)	2.13	2.92	4.30	4.30	5.34	5.34
	F.L.A. (A)	10.18	13.95	20.54	6.83	25.51	8.48
	L.R.A. (A)	16.00	16.00	28.00	12.00	28.00	12.00
	Cosfi	0.91	0.91	0.91	0.91	0.91	0.91
Pdc system pump	F.L.I. (kW)	0.06	0.06	0.06	0.06	0.10	0.10
	F.L.A. (A)	0.50	0.50	0.50	0.50	0.90	0.90
DHW pump	F.L.I. (kW)	0.00	0.00	0.00	0.00	0.00	0.00
	F.L.A. (A)	0.00	0.00	0.00	0.00	0.00	0.00
Fan	F.L.I. (kW)	0.12	0.12	0.23	0.23	0.23	0.23
	F.L.A. (A)	0.64	0.64	1.28	1.28	1.28	1.28
Total	F.L.I. (kW)	2.30	3.10	4.59	5.67	5.67	5.67
	F.L.A. (A)	11.31	15.09	22.32	10.66	27.69	10.66
	L.R.A. (A)	17.14	17.14	29.78	14.18	30.18	14.18

5 Commissioning

5.1 Preliminary checks

- Check the availability of diagrams and manuals of the installed machine.
- Check the availability of wiring and hydraulic diagrams of the system to which the machine is connected.
- Make sure the machine is placed on a perfectly level surface.
- Make sure that there are suitable condensate drain systems.
- Check the presence of vibration damping joints on the hydraulic pipes between the heat pump and the system.
- Check that the shut-off cocks of the hydraulic circuits are open.
- Check that the hydraulic system has been filled under pressure and vented.
- Check that the electrical and earthing connections are configured in accordance with the prevailing regulations in the machine installation country.
- Make sure that the electrical voltage is within the tolerance limit (± 10%).
- Check that the surface sump heaters (if present) have been powered for at least 2 hours before starting.

5.2 Preparing for repair and maintenance

- Follow the basic safety rules before carrying out any repairs and maintenance.
- When working in a raised position, observe the safety at work regulations.
- Only carry out work on the cooling circuit if you have specific knowledge of refrigeration and if you are competent in handling R32 refrigerant.
- When carrying out work on the cooling circuit, inform everyone who is present or working in the immediate vicinity of the nature of the work to be performed.
- Only carry out work on electrical components if you have specific electrical skills.
- Turn off the disconnect switch to the product located in the facility.
- Disconnect the product from the power supply, but ensure that the product remains earthed.
- Wear personal protective equipment and make sure you have a fire extinguisher handy.
- Only use safe equipment and tools approved for use with R32 refrigerant.
- Use a gas detector placed near the floor to monitor the atmosphere in the work area.
- Remove any sources of ignition, e.g. tools that may generate sparks.
- Protect against static discharge.
- Remove the parts of the casing.

5.3 Removing the refrigerant

1. Make sure you have the tools and equipment necessary to remove the refrigerant:
   - Suction station
   - Vacuum pump
   - Refrigerant recycling cylinder
   - Pressure gauge bridge
2. Use only equipment and tools approved for use with R32 refrigerant.
3. Use only the cylinders approved for recycling R32 refrigerant that are properly labelled and fitted with a pressure reducer or shut-off valve.
4. Only use hoses, fittings and valves that are as short as possible, airtight and in perfect condition. Use a gas leak detector to check for leaks.
5. Make sure there is adequate ventilation in the work area.
6. Make sure that the vacuum pump outlet is not close to potential ignition sources.
7. Empty the recycling cylinder. Make sure that the recycling cylinder is positioned correctly during the process.
8. Siphon the refrigerant according to the maximum capacity of the recycling cylinder and monitor the fill level using a graduated scale. Never exceed the rated pressure of the recycling cylinder.
9. Make sure that no air enters the cooling circuit, tools or equipment containing refrigerant or the recycling cylinder.
10. Connect the pressure gauge bridge to the shut-off valve maintenance fitting.
11. Open both expansion valves to ensure that the refrigerant circuit is emptied completely.
12. When the refrigerant circuit has been completely drained, immediately remove the recycling cylinders and equipment from the system.
13. Close all the shut-off valves.

6 Recycling and disposal

Ask the qualified technician who installed the product to dispose of the packaging.

PRODUCT DISPOSAL

If the product is marked with this symbol:

- Do not dispose of the product together with household waste.
- Take the product to a collection point for used electrical and electronic equipment.

DISPOSAL OF BATTERIES / RECHARGEABLE BATTERIES

If the product contains batteries / rechargeable batteries marked with this symbol:

- Take the batteries / rechargeable batteries to a collection point for used batteries/ accumulators. Prerequisite: it must be possible to remove the batteries / rechargeable batteries from the product without destroying them.
- It is a legal requirement to dispose of used batteries properly as batteries / rechargeable batteries may contain substances that are harmful to health and the environment.

6.1 Disposal of the refrigerant

The product contains R32 refrigerant.

- The refrigerant should only be disposed of by a qualified and authorized technician.
- Pay attention to the general safety instructions.

6.1.1 Disposal of packaging materials

- Dispose of the packaging properly.
- Comply with all applicable regulations.

6.2 *Disposal of packaging materials*

- Dispose of the packaging properly.
- Comply with all applicable regulations.

6.2.1 Recycling or disposal of refrigerant

DANGER!

Risk of death due to fire or explosion when transporting the refrigerant!

If the R32 refrigerant leaks during transportation, it may cause a fire hazard if mixed with air. There is a risk of fire and explosion. Toxic or corrosive substances such as carbonyl fluoride, carbon monoxide or hydrogen fluoride may be produced in the event of a fire.
Ensure that the refrigerant is properly transported.

WARNING!

Risk of damage to the environment!

The product contains R32 refrigerant, which should not be allowed to escape into the atmosphere. R32 is a fluorinated greenhouse gas covered by the Kyoto Protocol with a GWP of 675 (GWP = Global Warming Potential).

Transfer all the refrigerant contained in the product to a suitable container and then recycle or dispose of it according to the instructions.
Always ensure that the container does not contain more than one type of refrigerant.

THERMICS ENERGIE s.r.l.
Registered Office and Operational Headquarters
Via C. Pascoletti 2 - 33040 Povoletto (UD) Italy
www.thermics-energie.it
info@thermics-energie.it