HRC^{70} tri V

High temperature, modulating Heat Pump

Installation and User manual

HRC^{70} 40 kW tri V
Ref. 151475

HRC^{70} 60 kW tri V
Ref. 151485

HRC^{70} 80 kW tri V
Ref. 151495

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Made in France

CE

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1 - SAFETY

Danger resulting from improper qualifications

- Any work carried out by an unqualified person can result in damage to the installation or in physical injury.
  Do not perform maintenance on this appliance unless you are a qualified professional.
- If the appliance is malfunctioning or not working, cut the electricity supply to the electrical components and seek advice from a qualified professional.

Danger resulting from improper use

This appliance should not be used by anyone (including children under the age of 8 years old) with reduced physical, sensory or mental capabilities, or by anyone with insufficient experience or knowledge of the appliance; unless they are being supervised by someone who is responsible for their safety and in possession of the operating instructions of the appliance, or if they have been instructed in the proper use and in the risks of operating the appliance.

Children must not play with the appliance. Cleaning and maintenance of the appliance must not be undertaken by children without supervision.

Applicable areas of use

The appliance is intended for use an appliance for the production of domestic hot water: it must be connected to a heating installation, and while complying with the instructions, connected to the drinking water network.

The intended use of the appliance includes the following points:

- Following the instructions for operating, installing and maintaining this appliance and all of its components.
- Ensuring the compliance of the appliance to all inspection and maintenance conditions which are listed in this manual.

Danger of death by electrocution

- Touching live electrical wires can cause severe bodily injury, and lead to death by electrocution. All installation and maintenance work must be carried out with the appliance switched off and by a qualified professional. Before carrying out any work on the appliance:
  - Cut-off the electricity supply.
  - Ensure that there is no possibility of the power supply becoming active again.
  - Wait at least 5 minutes for the capacitors to lose their charge.
- Do not get water on any of the control or electrical components. Always disconnect the appliance from the electricity supply before carrying out work on any of the electrical components.

Danger of death if the pressure relief valves are missing or defective

A defective pressure relief valve may prove dangerous and could lead to burns or other injuries by, for example, the pipes bursting.

The information presented in this document does not contain all of the schematic diagrams needed for a professional installation of the pressure relief valves.

- Install the necessary pressure relief valves on the circuit.
- Inform the user concerning the function and the placement of the pressure relief valves.
- Respect all applicable national and international regulations, standards and decrees.

Risk of material damage

The heat pump can only work when filled with water. Never switch on the appliance if it is not completely filled with water and purged of air.

Rules and regulations (decrees, standards, laws)

Once the appliance is installed and switched on, all decrees, directives, technical rules, safety measures and standards, must be respected in their current version in effect.

The electrical supply must conform to all applicable regulations in the country of installation, as well as the NFC 15-100 standard.

- A method of disconnection ensuring a complete cut-off must be installed in the fixed piping to conform to installation regulations (do not use a movable outlet).
- Protect the appliance with a 2-pole circuit breaker with a minimum contact opening of 3 mm and must be grounded.
- The devices for electrical cut-off must remain accessible.
- Water may drain from the discharge pipe of the pressure limiting device. This pipe should be kept open to open air.
- The pressure relief valve is mounted on the condenser. Ensure that the drainage is properly oriented to prevent water from leaking onto the electrical components.

WARNING

Do not use any means to speed up the defrosting the defrosting process or to clean, other than those recommended by the manufacturer.

The appliance must be stored in a room which does not contain a perpetual flame or other source of ignition (for example: open flame, gas powered appliances or electric radiators in use).

This product is not intended to be operated at an altitude greater than 2000 m.

Maintenance - Troubleshooting

Maintenance and cleaning of the pilot must be carried out at least once a year by a qualified professional.

REFRIGERANT CIRCUIT

- **Any intervention on the refrigeration circuit must be made by a qualified person who holds a Category I, II or III (piping or container) certificate of fitness. The category of equipment is available on the declaration of conformity for PAC.**

Refrigerant R290, contained in the heat pump circuit, does not pose an environmental hazard but is flammable.

→ Refrigerant R290 is odourless.

→ Do not damage the refrigeration circuit tubes.

→ Do not handle flame or other flammable sources inside the device.

→ In the event of a leakage of the refrigerant, unplug the plug, ventilate the room and contact the customer service.

→ Do not pierce or burn the appliance: the recovery of the fluid is mandatory in case of intervention on the refrigeration circuit.

2 - PLEASE READ IMMEDIATELY

2.1 - Important information

This technical installation manual forms part of the appliance which it refers to. In order for the warranty to be valid, the instructions must be read prior to using the appliance.

The safety advice and instructions provided in this manual must be strictly respected.

Our society is not liable for any damages caused from not following the instructions provided, or improper handling, installation or use.

This technical installation manual can be modified without prior notice.

RECOMMENDATIONS FOR ELECTRICAL INSTALLATION

• It is the responsibility of the installer and of the client to ensure that the appliance is compatible with the power grid before connecting the HRC^{70} Heat Pump (see the electricity provider information form in the Appendix)

• The power grid impedance value must be less than the Heat Pump impedance Z_{max} value (see § «Connecting the HRC^{70} Heat Pump to the power supply»).

• If the electrical installation standards are not respected there could be irreversible damages to the HRC^{70} Heat Pump which are not covered by the manufacturer's warranty.

RECOMMENDATIONS FOR HYDRAULIC INSTALLATION

• Clean and flush the hydraulic heating circuit before connecting the appliances (Heat Pump and Pilot).

• The appliance only works when filled with water. Never switch the appliance on if it is not properly filled with water and purged of air.

• The filter valve ensures the protection of the Heat Pump. An annual inspection of the condition of the filter must be carried out.

• It is recommended to carry out periodic inspections for sludge and limescale and to clean when necessary. The appliance must always be switched off before any cleaning is undertaken.

• Always switch off the appliance before working on any of the electrical components.
Caution: The fan may continue turning through inertia even when the appliance is switched off. Wait for the fan to stop before working on the appliance.

• Never get water on the control components or electrical parts. Always switch off the appliance before cleaning.

The high temperature Heat Pump absorbs the calories present in exterior air, and transforms them into useful energy which is then transferred to the heating water for your home. We cannot be held responsible for any other usage of the appliance.

The safety advice and instructions present in this document must be strictly respected.

Before making any connections to the installation, make sure the appliances are compatible with the installation.

Before switching on the appliance, check that the network voltage to be applied to the appliance is the same as the one on the rating plate of the appliance.

Before undertaking any maintenance work, handling, or in the case of the appliance not functioning or malfunctioning, always disconnect the appliance from the power supply and seek advice from a technician or specialist.

We cannot be held liable for damages caused by not following the instructions provided, nor any problems or errors caused from improper handling, improper installation, or misuse.

The installation and operating instructions are subject to change without prior notice.

2.2 - Safety advice and instructions

- The Heat Pump must only be installed outside.
- This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or by persons lacking experience or knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety.
- **It is forbidden to install the heat pump inside a room, unless the installation in an enclosed space complies with standard NF EN 378.**
- The Heat Pump operates using an air temperature range of -20°C to 40°C. When the temperature falls below -20°C, the installation no longer heats using the Heat Pump, but using the back-up.
- It is FORBIDDEN :
  - to operate the Heat Pump using air intake containing solvents or explosive materials.
  - to use air intake containing grease, dust, or aerosol particles.
  - to connect vented exhaust hoods to the appliance.
- Use of the appliances are **FORBIDDEN** if the installation is not filled with water.
- All work must be carried out by a qualified professional with the appliance switched off.

• This appliance must be installed in accordance with national electrical installation regulations. Check that the appliance is equipped with a properly sized and properly connected grounding cable.

This CE approved unit is in compliance with the following standards:

- Low voltage 2006/95/CEE (standard EN 60.335.1).
- Electromagnetic compatibility 2004/108/CEE (standard EN 55014.1 / EN 55014.2).

The HRC^{70} Heat Pump uses R290 refrigerant fluid. Given the flammable nature of the fluid, any work on the refrigerant circuit must be done with appropriate materials and by conforming to all regulations in effect. In case of handling of fluid (recovery, evacuation or refilling), the appliance must be switched off. Do not smoke or light any flame (e.g. lighter, blowtorch) when handling refrigerant fluid. If work must be carried out on the refrigerant circuit using a flame (blowtorch) the refrigerant circuit must first be evacuated and replaced with a nitrogen atmosphere.

• The appliance should be cleaned carefully so as not to damage its electronics from the outside. The use of a high pressure cleaner is **PROHIBITED**.

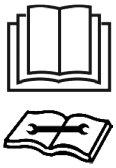
2.3 - Document retention

Pass on this manual and all other applicable documents to the system user.

The system user should retain these manuals for future reference.

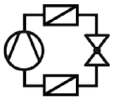
2.4 - Symbols used

Identifies important warnings and recommendations.



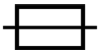
Consult the installation manual before all work on the product: handling, installation, use and maintenance.

Contains controlled substances, do not dispose of in the garbage. In case of disposal, please respect the regulations for the recovery of electrical and electronic equipment.



Type and refrigerant charge.
PS High: Max high service pressure
PS Low: Max low service pressure

Heating capacity :
nom: nominal
max: maximal



Max current protection (A)

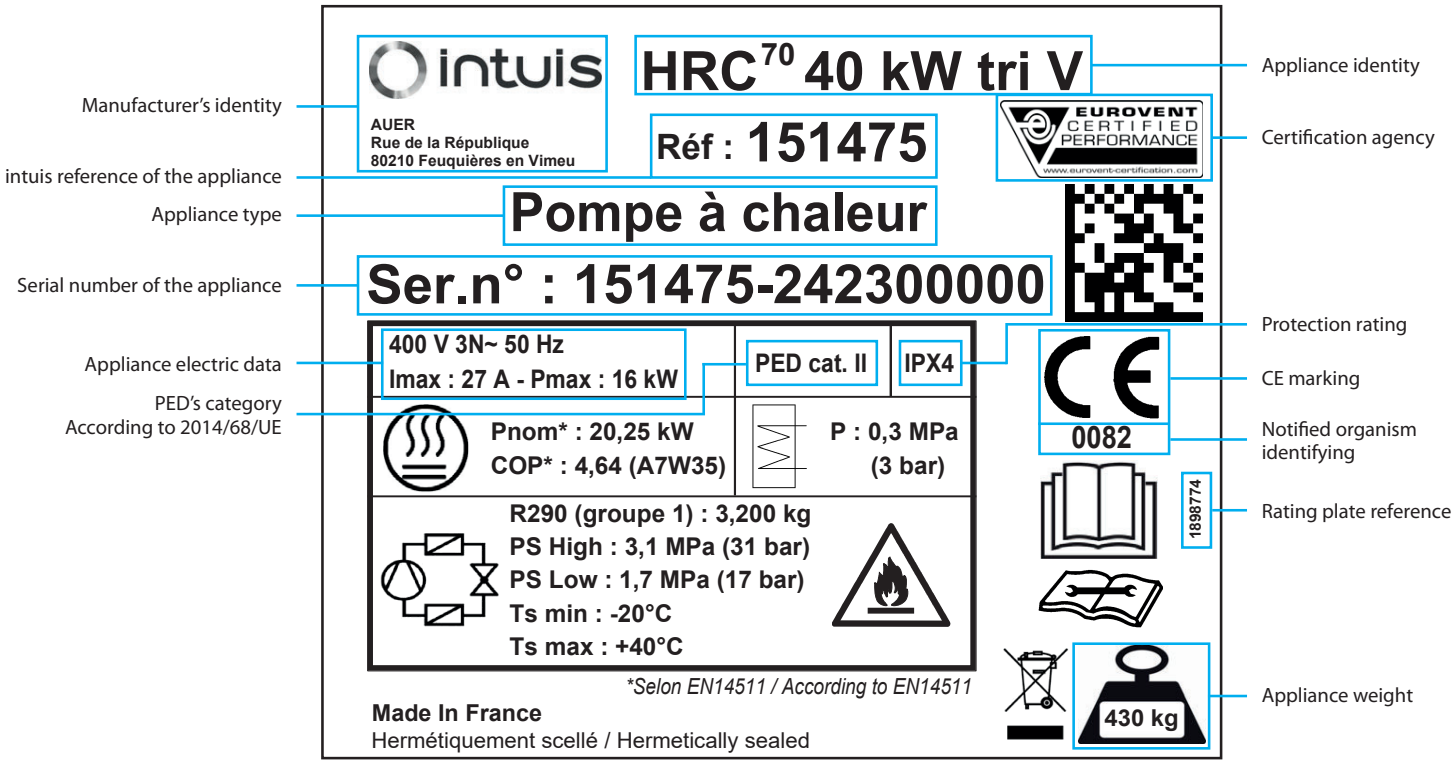
Caution : contains a flammable refrigerant fluid.
Please make sure to respect the installation and handling precautions.

Classification of the refrigerant used in the heat pump (R290/Propane)

2.5 - Abbreviations and acronyms

DHW ..... Domestic Hot Water
DCW ..... Domestic Cold Water
T° ..... Temperature
HP ..... Heat Pump

2.6 - Rating plate

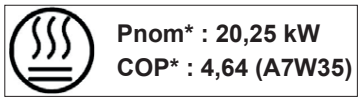


Description :

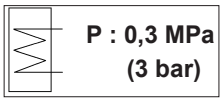
Serial number of the appliance

151475 - 24 23 00000

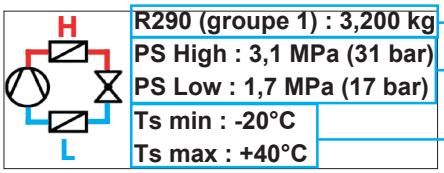
- 151475 : Reference of the appliance
- 24 : Year of manufacture 20**24**
- 23 : Week of manufacture
- 00000 : Appliance number in the series



Nominal performances
According to EN 14511



Maximum hydraulic system pressure

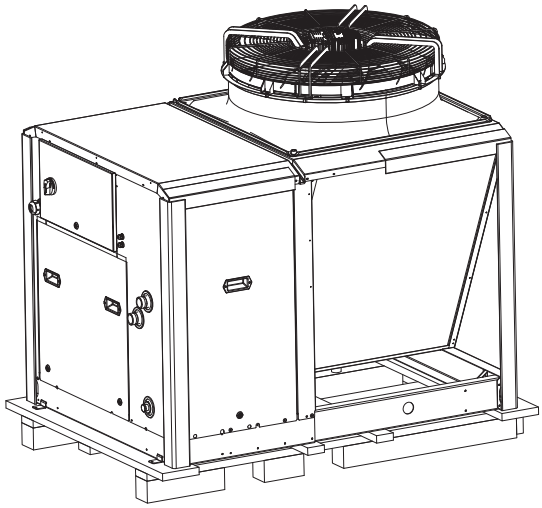


Note :
The rating plate shown above in the manual, corresponds to that of a HRC70 40 kW tri V. Do not use this information for the HRC70 60 and 80 kW tri V. Please refer directly to the appliance's rating plate.

2.7 - Delivery terms and conditions

In general, the material is transported at the recipient's own risk.

It is important to verify that all of the elements have been received and that no damage has been sustained during transport upon receipt of the appliance and before beginning the installation procedures.



2.8 - Storage and transport

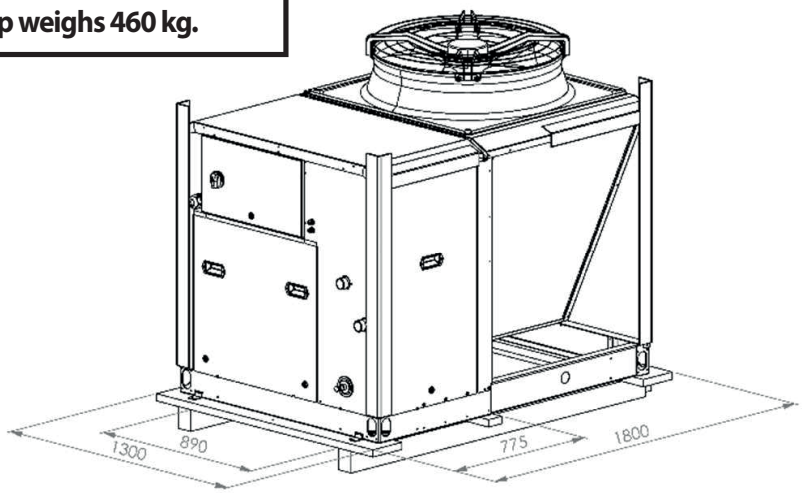
Admissible storage and transport temperatures of the appliance are between -20°C and +60°C.

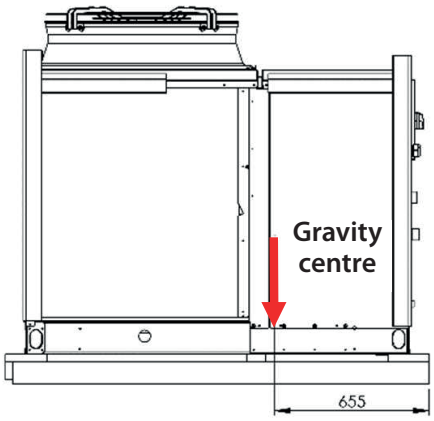
2.8.1 - General information

The appliances must be stored and transported packaged and on their wooden pallets, in a vertical position, and completely empty of water.

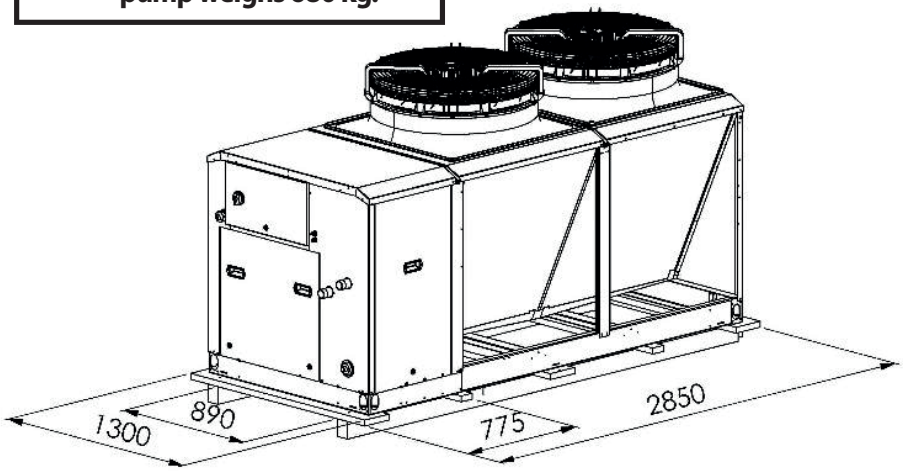
2.8.2 - Handling instruction

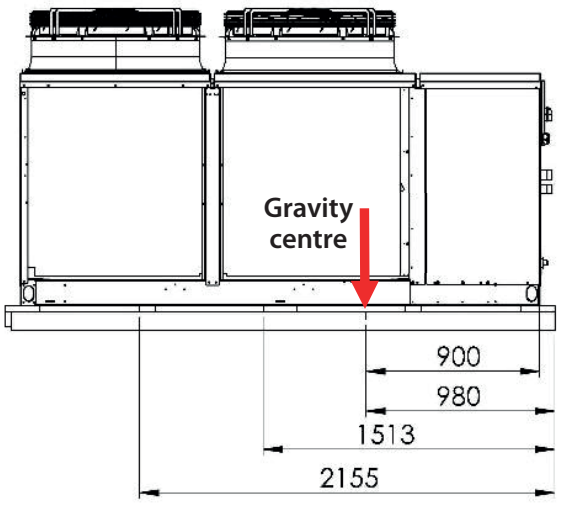
The HRC[70] 40 kW tri V heat pump weighs 460 kg.





The HRC[70] 80 kW tri V heat pump weighs 680 kg.





2.8.3 - Transport using a pallet truck

HRC^{70} 40 kW tri V

The forks must be at least 1150 mm long.
Only the HRC^{70} 40 kW tri V heat pump can be transported on its side.

Only the HRC^{70} 40 kW tri V heat pump can be transported on its side.

HRC^{70} 80 kW tri V

The forks must be at least 1550 mm long.

2.8.4 - Transport by forklift truck

The forklift truck can only be transported through the opening on the transport pallet (on the compressor side). It is important to maintain a low lifting and moving speed, as the heat pump can easily lose its balance due to the length of the product.

HRC^{70} 40 kW tri V

The forks must be at least 1150 mm long.

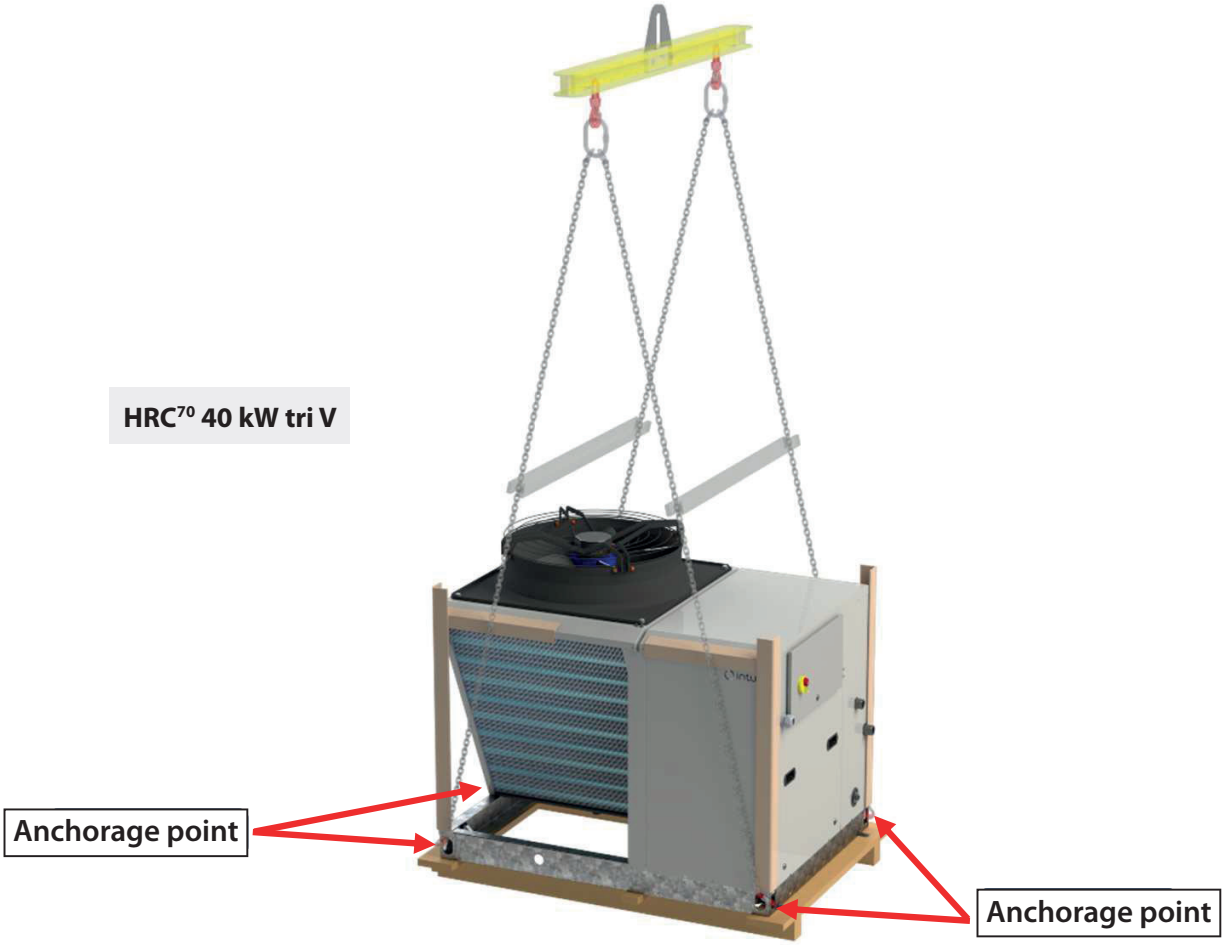
HRC^{70} 80 kW tri V

The forks must be at least 1550 mm long.

2.8.5 - Cranage transport

The heat pump can also be lifted using the four hooking holes located at each corner of the heat pump.

HRC^{70} 40 kW tri V



HRC^{70} 80 kW tri V

3 - INTRODUCTION

3.1 - Standard configuration

The unit consists of an indoor module (high-temperature monobloc heat pump, preferably installed outdoors. If the machines are installed inside a building, the installation must comply with standard NF EN 378, an acoustic study is strongly recommended before installing the machines, and it is **compulsory** to sheathe them to extract the air) and a hydraulic pilot ensuring hydraulic decoupling with the existing installation. This pilot **should only be** installed indoors.

The air to water Heat Pump, draws calories from the exterior air and transfers them to the heating water circuit with high energy efficiency.

The Pilot ensures the regulation and hydraulic distribution of the installation.

A circulator is built into the heat pump. It supplies water flow from the heat pump to the pilot.

The cylinder built into the pilot provides hydraulic decoupling between the heat pump and the heating circuit(s).

In the case of connection to a back-up boiler, it is used to load the decoupling tank directly.

3.2 - Operation

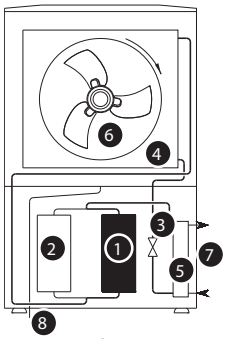
The Heat Pump is a closed and pressurised system in which the refrigerant serves as the medium for transferring energy.

A safety pressure switch is used on the refrigeration circuit, it is located on the high pressure part of the circuit at the output of the compressors. It is a dry contact that when the pressure becomes too high (> 31 bar) opens. Once opened, it cuts the power to the compressors, independently of the electronics and thus protects all circuit components.

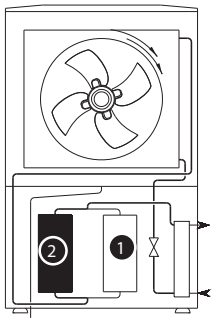
The evaporator (❹) is a cooling exchanger which draws calories from the air.

The humidity in the air condenses on contact with the cold surface, and forms condensation (evacuation in (❽)).

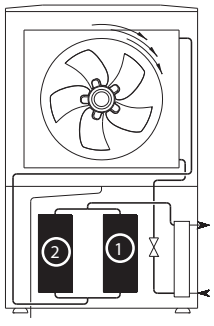
The condenser (❺), a plated heat exchanger which is hydraulically linked to the heating installation (❼), via the Pilot, enables to heat the water in the heating circuit, and in turn enables the heating of the building.



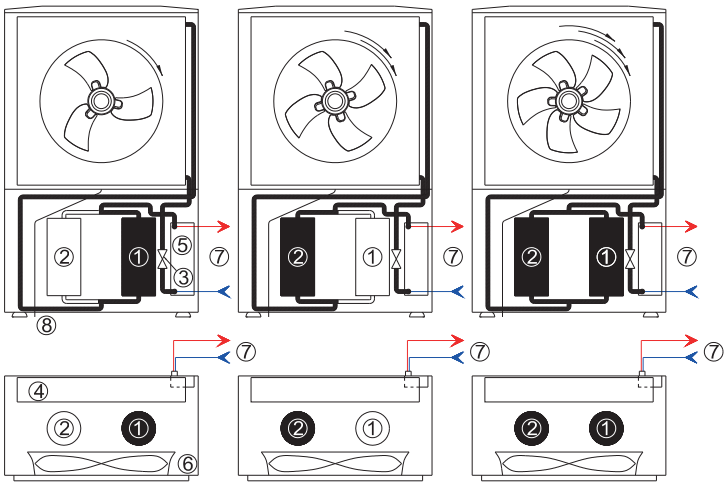
Mid-season only compressor (1) is used, the fan(6) operates at speed 1.



In cold weather only compressor (2) is used, the fan (6) operates at speed 2.

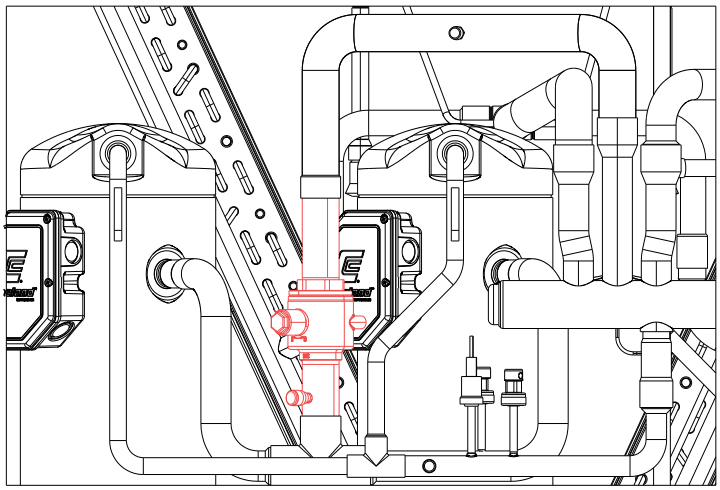


In extreme cold both compressors (1) and (2) are used at the same time, the fan (6) operates at speed 3.



1	:	*Compressor 1*	5	:	*Condenser*
2	:	*Compressor 2*	6	:	*Fan*
3	:	*Expansion valve*	7	:	*Outlet / inlet towards heating installation*
4	:	*Evaporator*	8	:	*Condensates drainage*

3.3 - Shut-off valve



The HRC[70] 40 kW tri V only has a shut-off valve for manufacturing the product on the assembly line. **This valve must never be closed. Any damage to the machine caused by tampering with this valve will invalidate the machine warranty.**

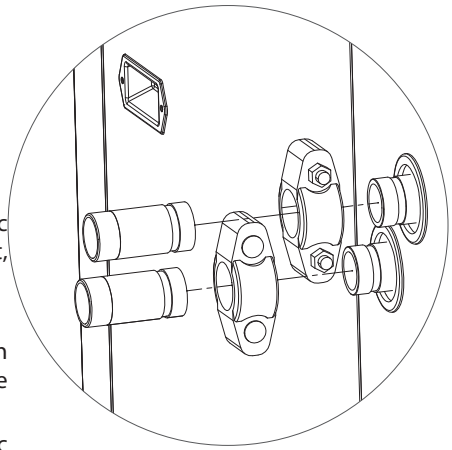
4 - INSTALLATION

4.1 - Installing the Heat Pump

The Heat Pump must always be transported in a vertical position, including during installation.

Because of its heavy weight, it must be handled and transported using suitable means.

Do not handle the unit by the hydraulic connections or the various covers.
Installation must be carried out by a qualified installer, taking all necessary precautions to avoid any risk of accidents or of material damage.



Victaulic assembly installation:

Instruction de montage sur «www.victaulic.com»

The HRC[70] 40 kW tri V has Victaulic hydraulic connections. To connect hydraulically to it, please follow the 4 steps described below:

Step 1: Lubrication with silicone grease.

Step 2: Threading: Position the clamp on the heat pump socket as far as the seal stop.

Step 3: Assemble: Position the Victaulic adaptor in the clamp until the seal stops.

Step 4: Tighten: Using a spanner, alternately tighten the jaw on one side and then the other (never tighten to the stop on one side only) until the upper half-jaw comes to rest against the lower half-jaw.

The two hydraulic clamps and adapters are located in the hydraulic kit inside the heat pump (see diagram *§ Anti-vibration support - Spring*) with the two spring reinforcements and the 50 m BUS link.

4.1.1 - General

Always make sure the heat exchanger fins are protected when handling the appliance.

The Heat Pump must be handled with caution and without being subjected to impacts, especially when placing on the ground.

The Heat Pump must be installed on a hard and stable base, which is sufficiently raised from ground level to avoid risks of damage in case of flooding or snow.

- **The Heat Pump is designed to be installed OUTSIDE exclusively.**
- **Any installation in an ENCLOSED SPACE MUST comply with standard NF EN 378 (emergency ventilation, installation of a gas detector, etc.). An acoustic study is STRONGLY recommended.**
- **DO NOT RESTRICT air intake or ventilation exhaust. NO OBJECT should impede the flow of air over the heat exchanger, or the renewal of air. The Heat Pump should be placed OUT OF THE WAY OF PREVAILING WINDS.**

.../...

.../...

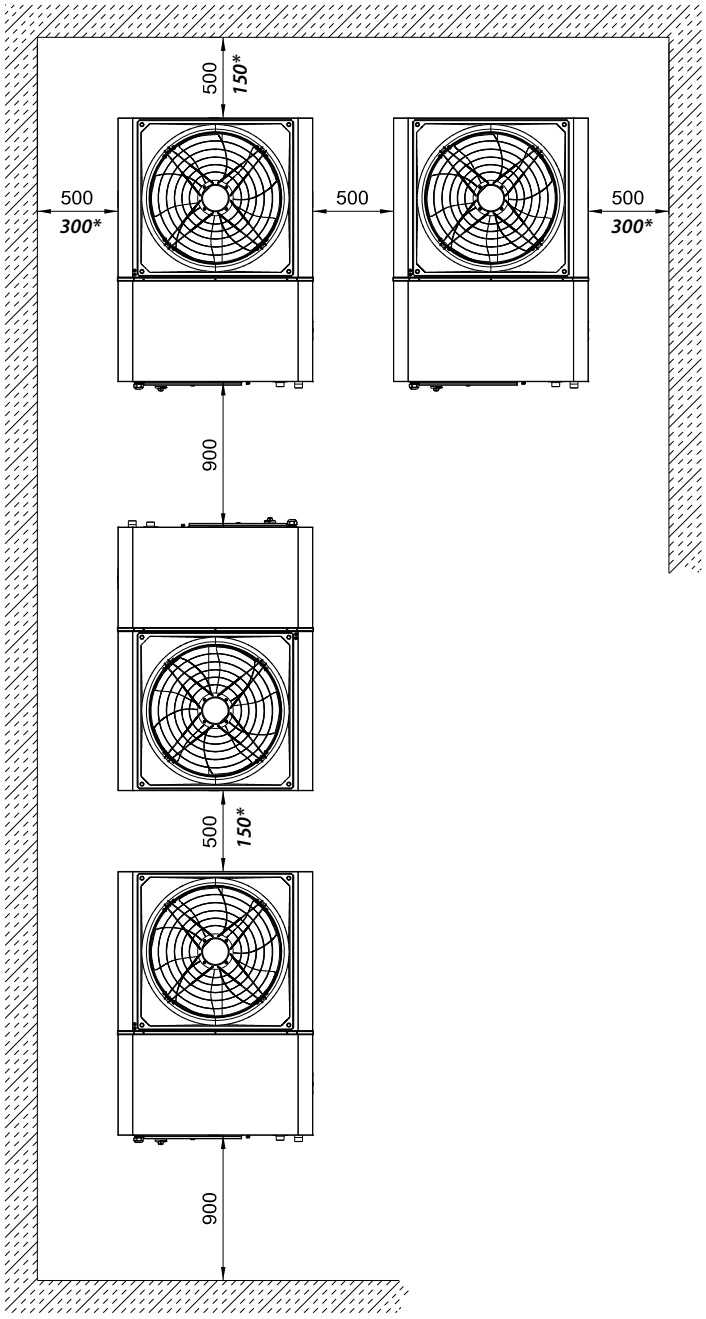
- **DO NOT INSTALL the Heat Pump NEAR SOURCES OF EXCESSIVE HEAT, COMBUSTIBLE MATERIALS, OR NEAR VENTILATION POINTS of adjacent buildings.**
- **DO NOT INSTALL the Heat Pump NEAR A KITCHEN OR WORKSHOP exhaust ducts; this can result in a mixture of oil and air settling onto the heat exchanger fins which could hamper its performance.**
- **DO NOT INSTALL the Heat Pump in an area with FLAMMABLE GAS, ACIDIC SUBSTANCES, OR ALKALINE which could cause irreversible damage to the copper-aluminium heat exchanger.**
- **AVOID INSTALLING the Heat Pump in a location subject to NOISE REVERBERATION such as near windows or near the corners of buildings.**
- **As the condensates draining trough slopes downward, the Heat Pump must be installed on a LEVEL BASE.**
- **The HEAT PUMP must be EASILY ACCESSIBLE so as to facilitate access for inspections and maintenance.**

4.1.2 - Placement

The heat pump is designed to be installed preferably outdoors, with a clear space around the appliance, in an area free from excessive dust. Under no circumstances should it be installed in a closed room, without emergency ventilation in the event of the presence of propane gas in the room (see standard NF EN 378).
It is designed to operate in the rain, but can also be installed under a well-ventilated shelter (with a large opening to ensure air flow to the fan intake and discharge).

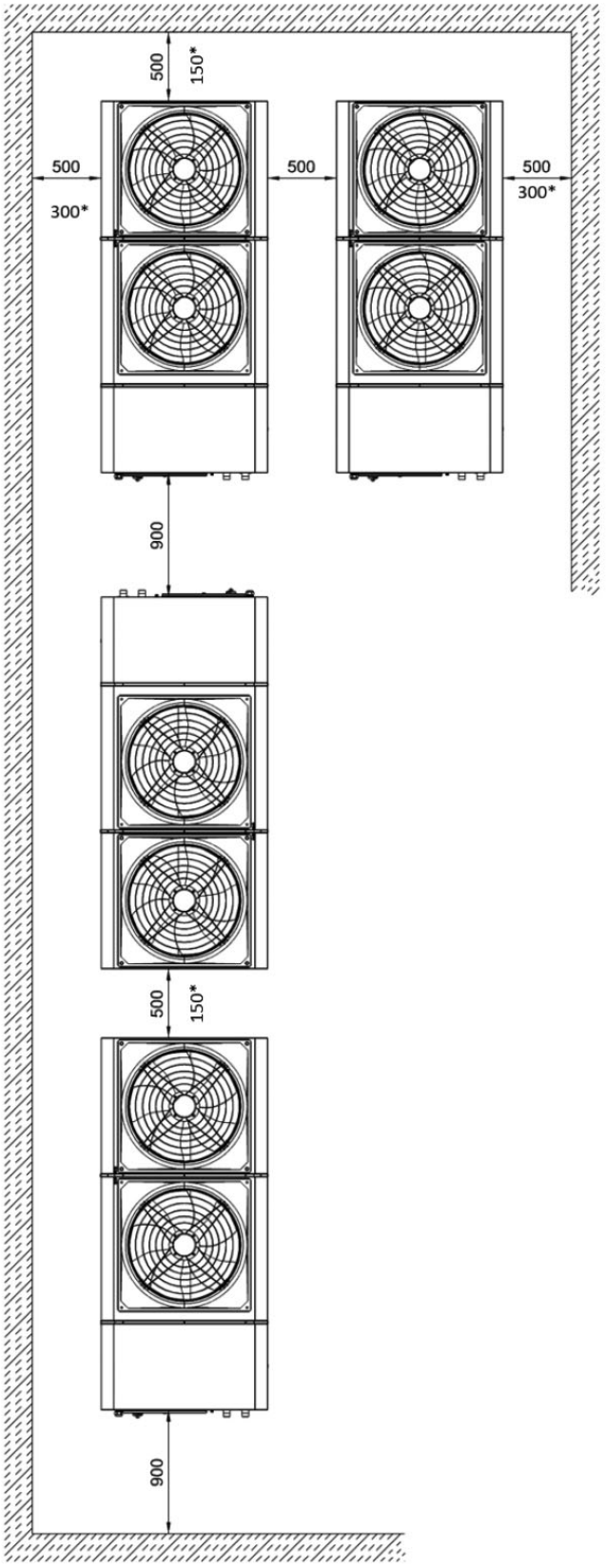
In regards to the fan, the free space from any obstacles must be at least 1 metre.

Minimum distances to respect for proper installation of the HRC[70] 40 kW heat pump: (mm) :



The dimensions shown are the minimum distances recommended for working on the product.
Dimensions marked with an asterisk «*» are the minimum dimensions required for the system to operate correctly.

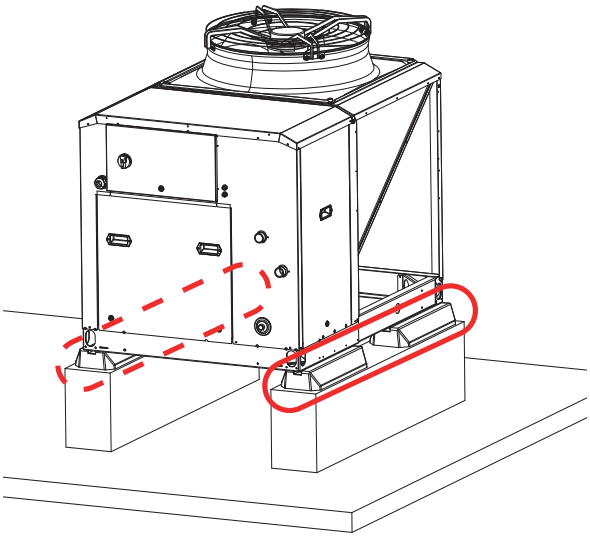
Minimum distances to respect for proper installation of the HRC[70] 60 kW and HRC[70] 80 kW heat pump: (mm) :

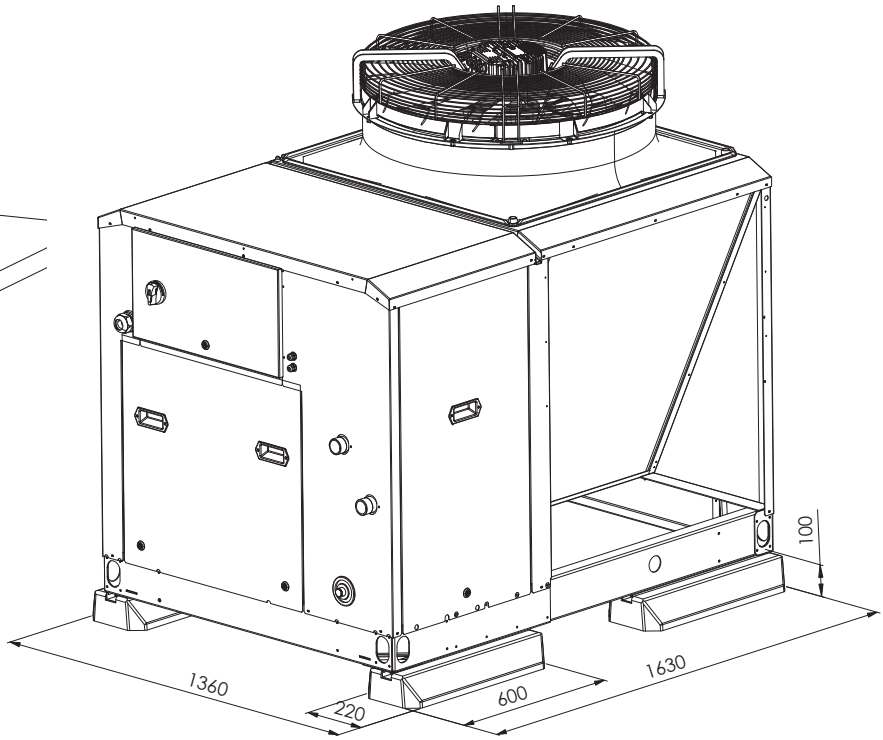


4.1.2.1 - Anti-vibration support - Rubber foot

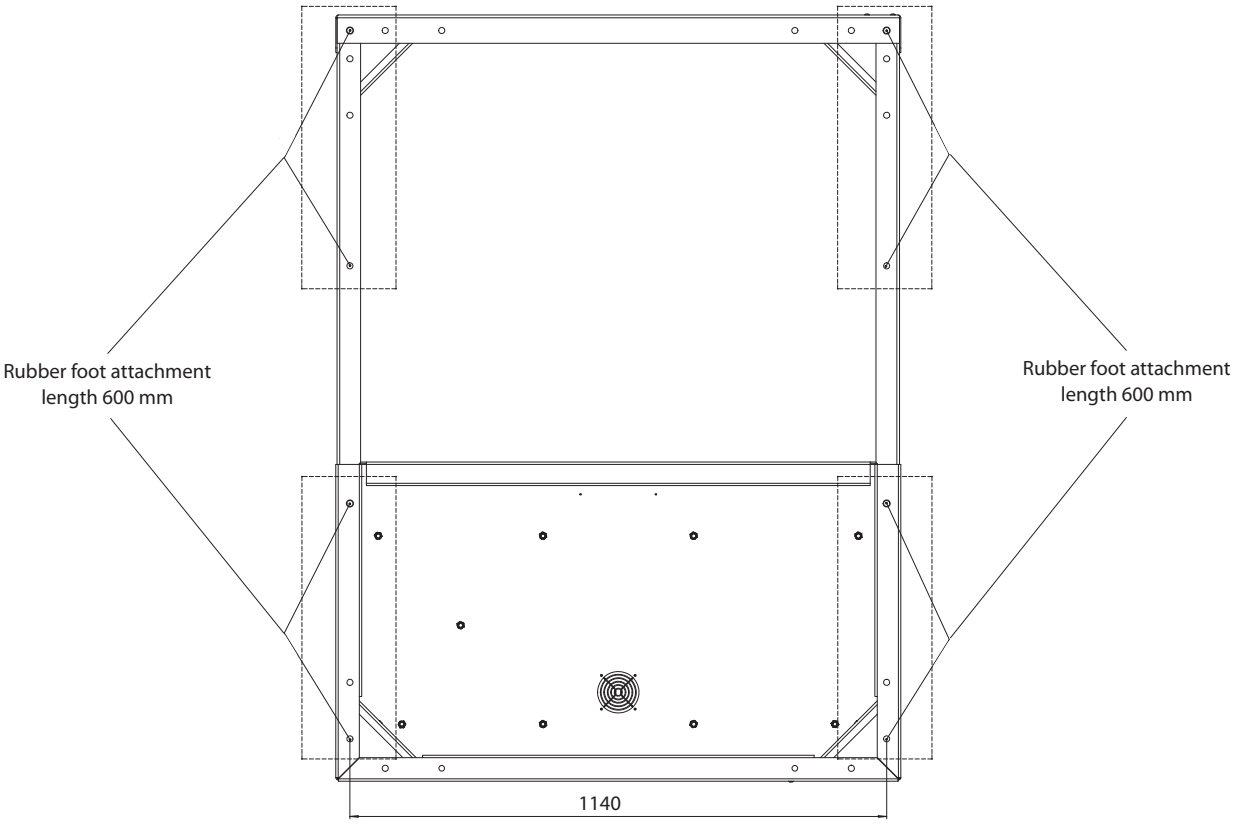
4.1.2.1.1 - Rubber foot for HRC^{70} 40 kW tri V

Mounting on rubber foot kit :



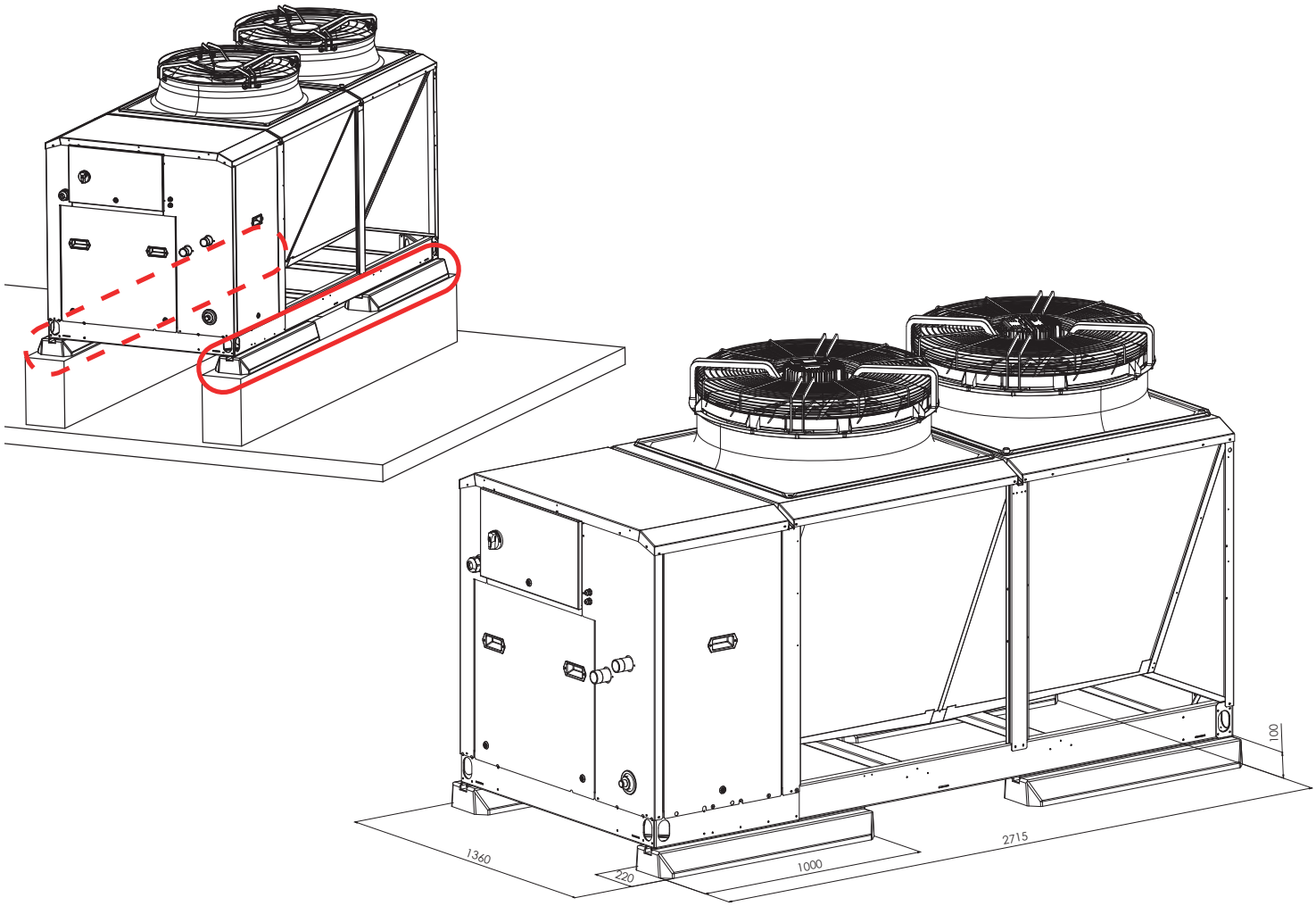


The stringers are lengthwise (rubber foot kit length 600 mm) - **Ref. 754603**.

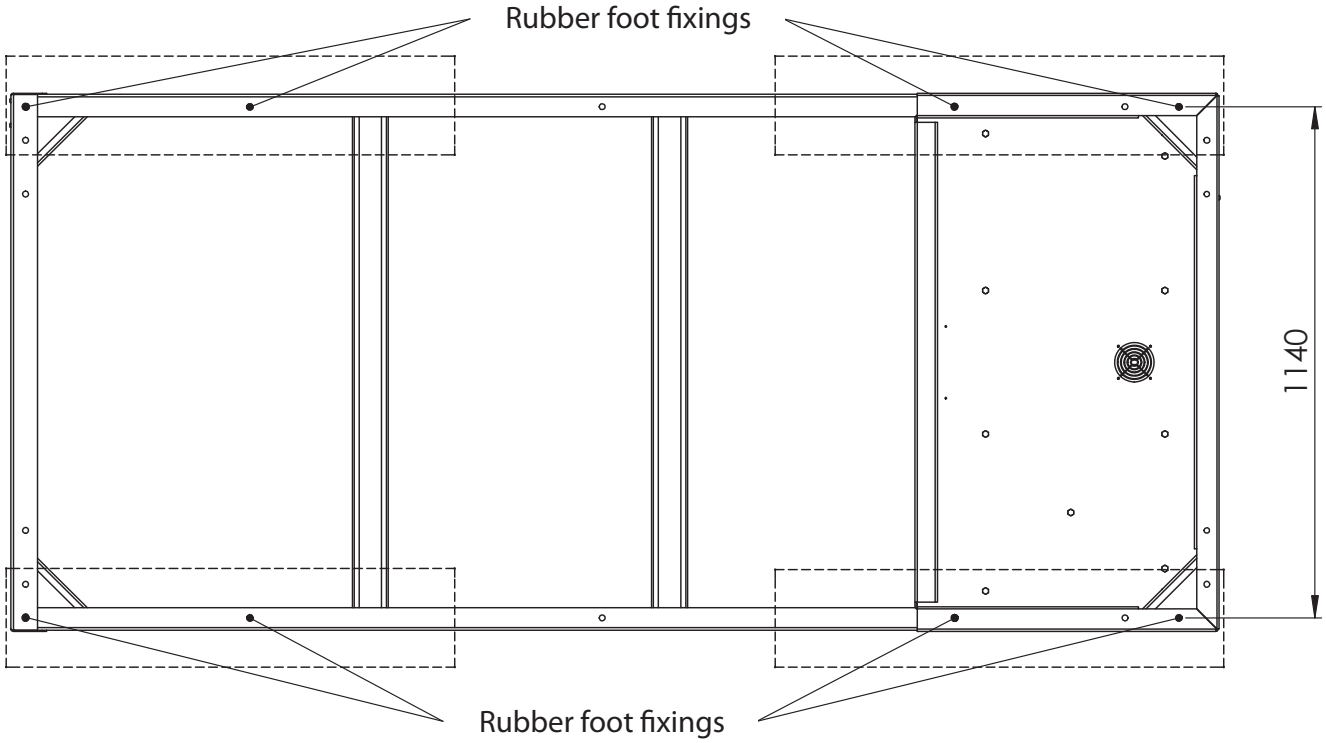


4.1.2.1.2 - Rubber foot for HRC^{70} 80 kW tri V

Mounting on rubber foot kit :



The stringers are lengthwise (1000 mm rubber foot kit) - **Ref. 754604**.



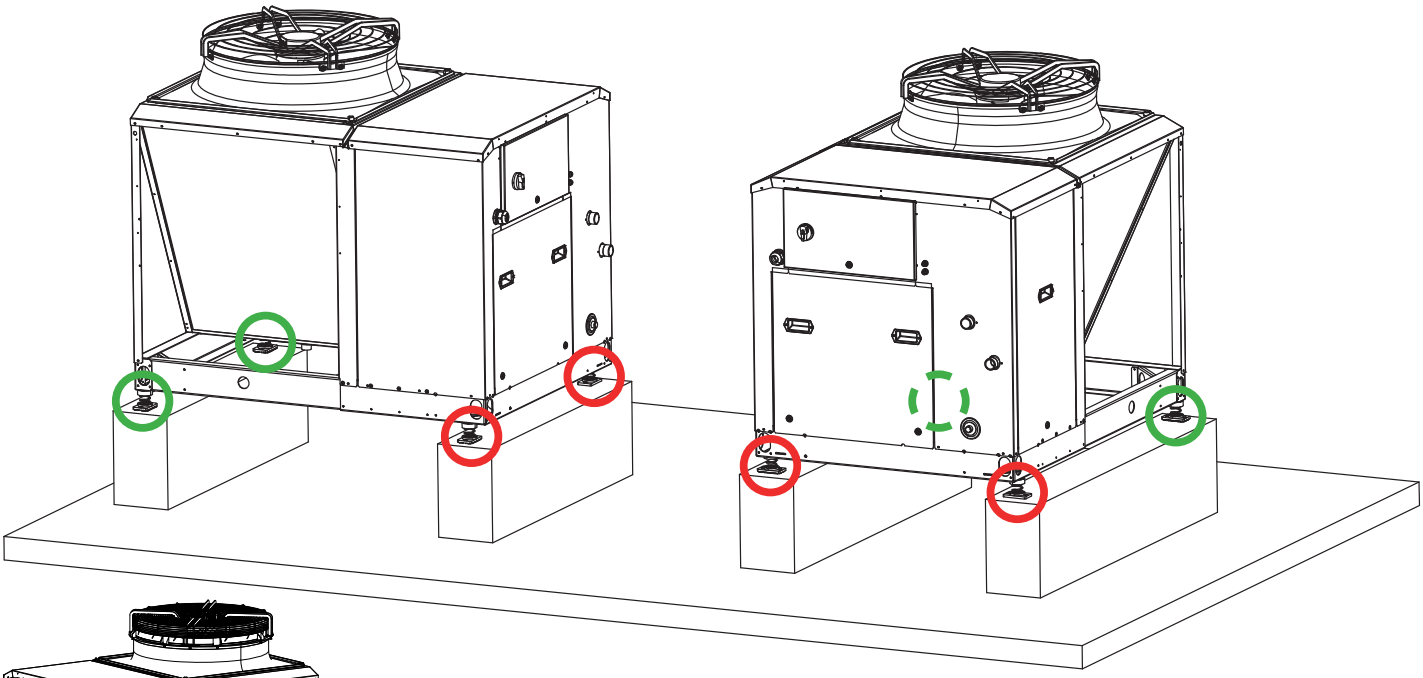
4.1.2.2 - Anti-vibration support - Spring

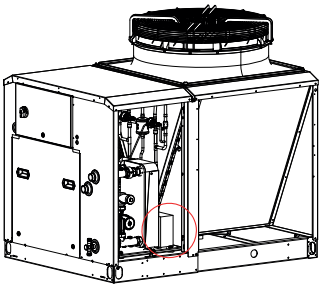
4.1.2.2.1 - Springs for HRC[70] 40 kW tri V

The kit includes four springs:
- 2 x **EMCSFr30** : to be placed on the compressor side (see illustration below, in red);
- 2 x **EMCSFr13** : to be placed on the fan side (see illustration below, in green).

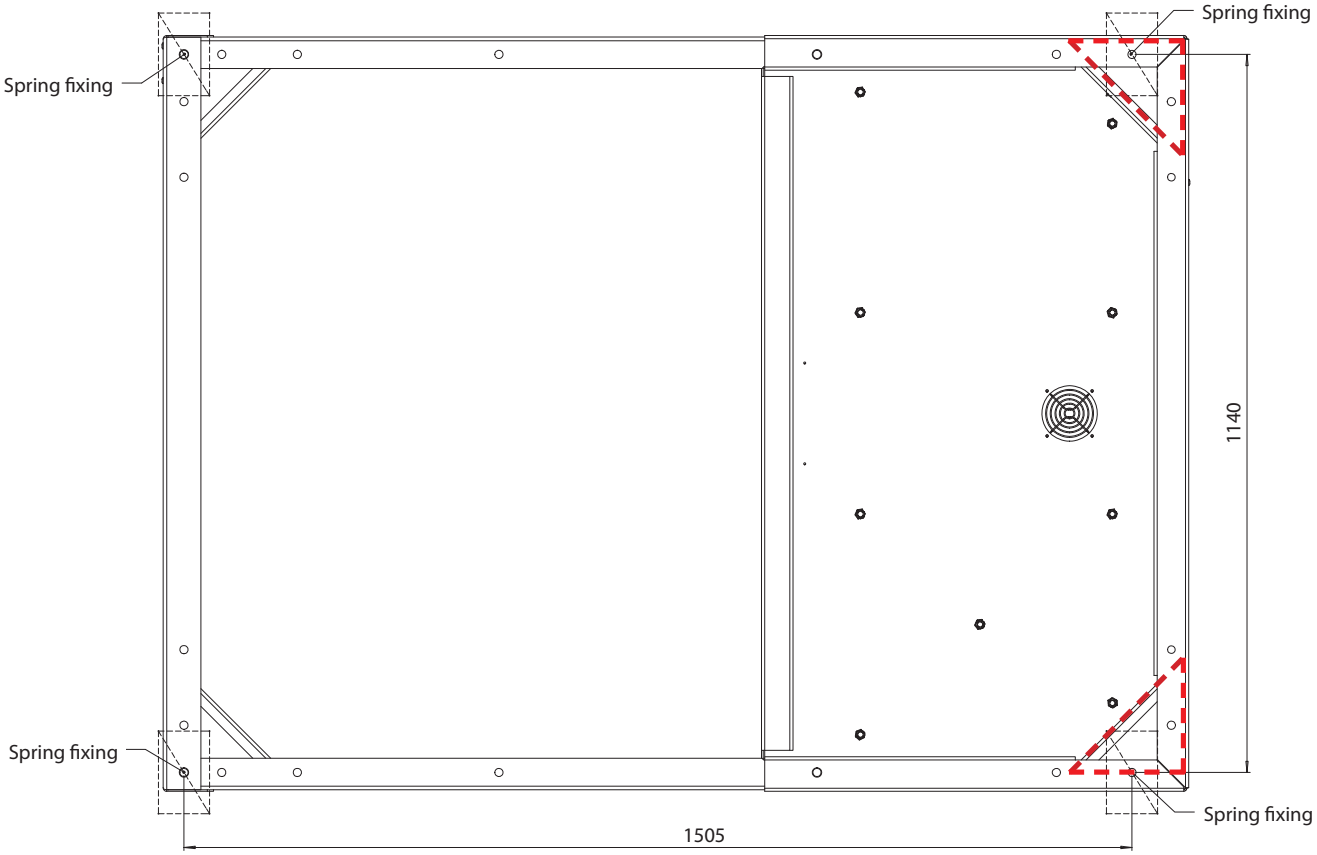
	Dimensions (L x H x P) in mm	Stiff	Drilling
EMCSFr13	*105 x 81 x 65*	*14 daN/mm*	*2 x Ø 9 mm Centre-to-centre: 80 mm*
EMCSFr30	*105 x 81 x 65*	*24 daN/mm*	

Mounting on spring kit - Ref. 754605 :





The two reinforcements (see illustration below, dotted red) are placed with the hydraulic adapters in the kit inside the heat pump. (See diagram below). They must be fitted (on the compressor side) before the springs are installed on the heat pump.

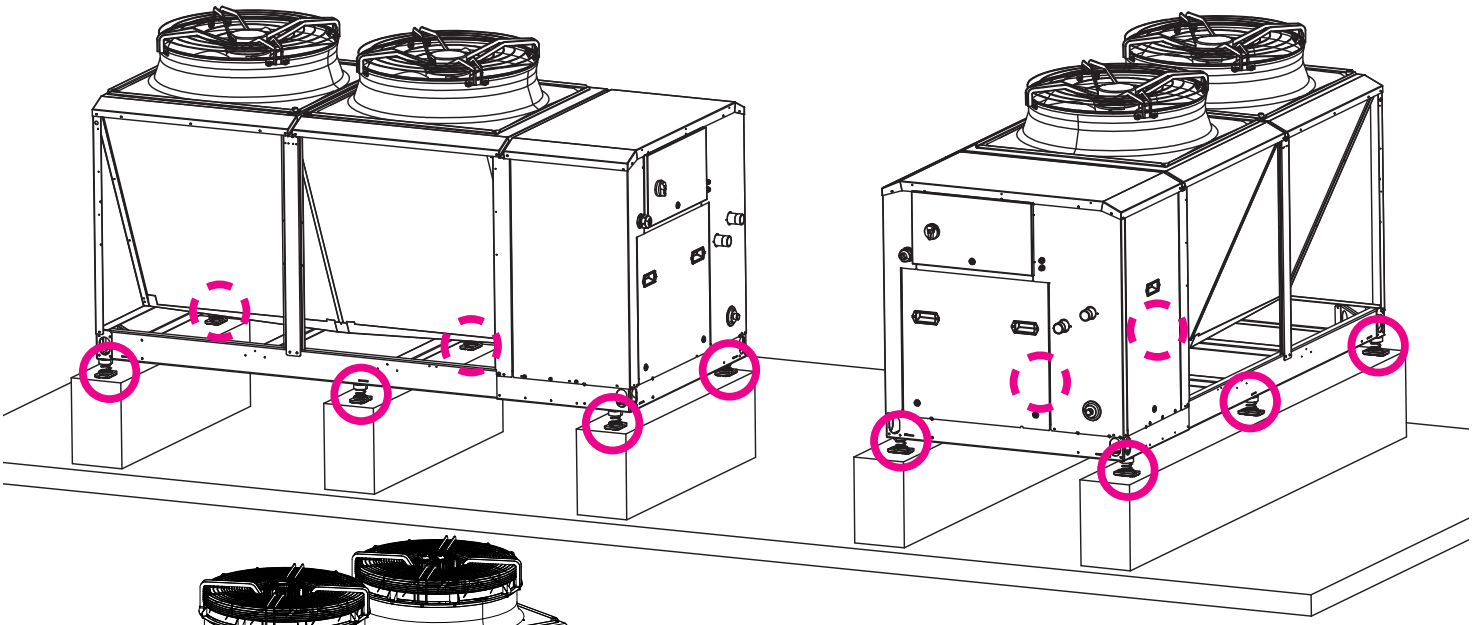


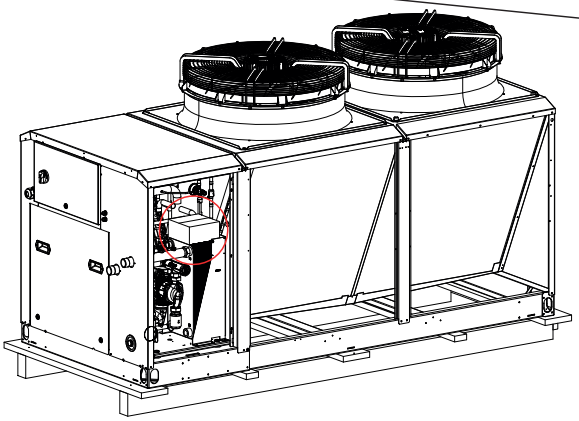
4.1.2.2.2 - Springs for HRC^{70} 80 kW tri V

The kit includes six identical springs : **EMCSFr22** (see illustration below, in fuchsia).

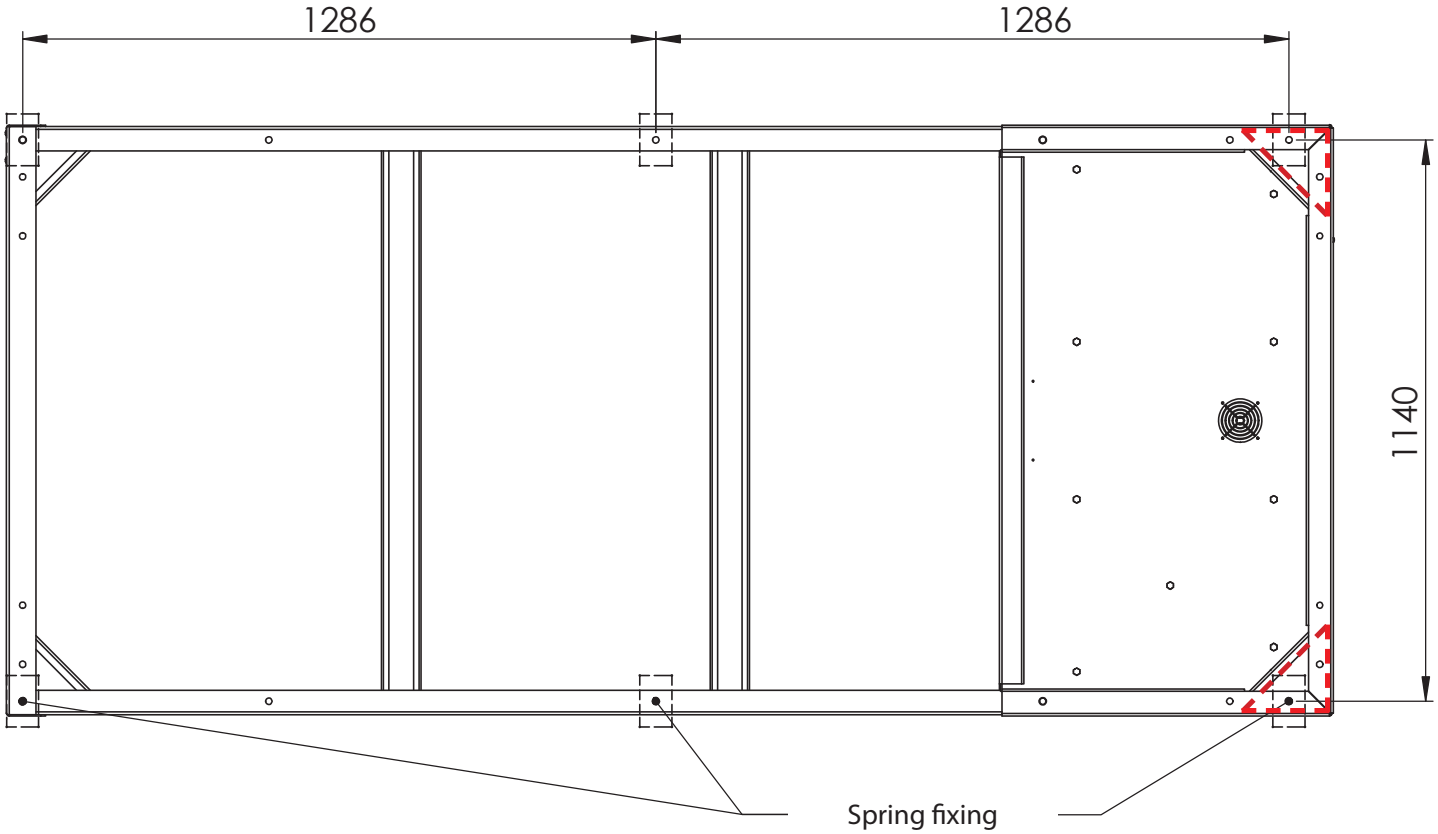
	Dimensions (L x H x P) in mm	Stiff	Drilling
EMCSFr22	*105 x 81 x 65*	*22 daN/mm*	*2 x Ø 9 mm Centre to centre: 80 mm*

Mounting on spring kit - Ref. 754606 :





The two reinforcements (see illustration below, dotted red) are placed with the hydraulic adapters in the kit inside the heat pump. (See diagram below). They must be fitted (on the compressor side) before the springs are installed on the heat pump.

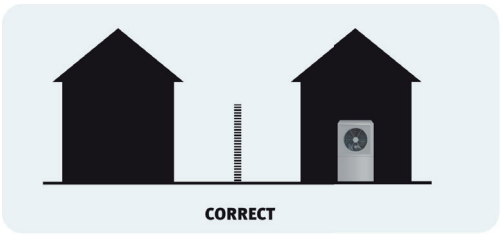


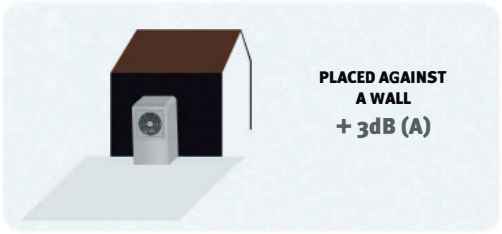
4.1.3 - Noise levels

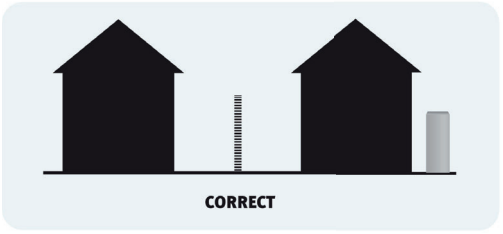
The Heat Pump is equipped with a large diameter fan so as to allow for an appropriate air flow rate. This flow rate can rise up to 12000 m^3/h for the HRC[70] 40 kW heat pump and the double that for the HRC[70] 80 kW heat pump. The fan speed is adjustable to limit the noise level.

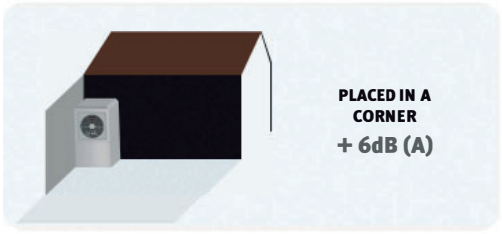
Depending on the installation conditions, the noise levels may be different, in particular if the walls closest to the Heat Pump cause a reverberation and amplification of noise.

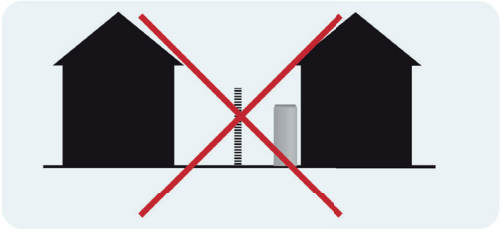
The diagrams below show different installation examples for different placements.

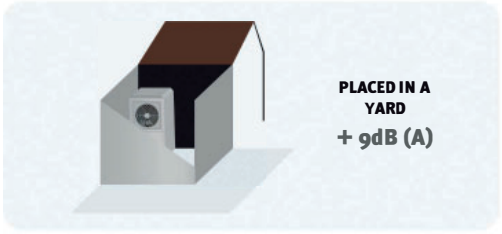


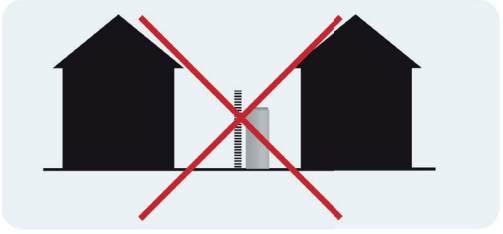


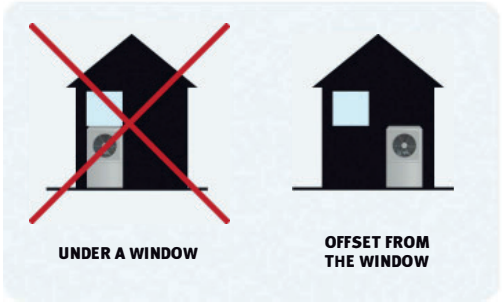


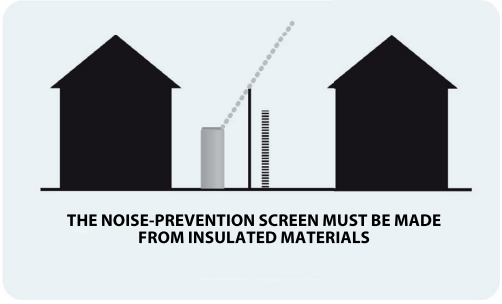






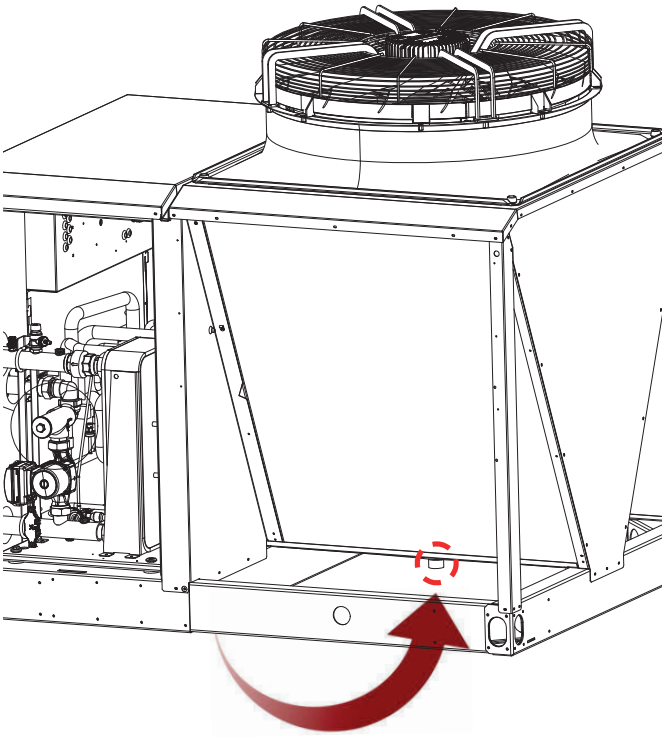






4.1.4 - Condensates drainage

The condensate drain for the HRC[70] 40 kW - 60 kW - 80 kW is located under the heat pump. A G1"F connection is located in the centre of the condensate tray. Condensate can drain freely or be connected to a draining surface. In the latter case, ensure that the drain is kept frost-free (optional defrosting cord - **Ref. 751004**).



Note :
Condensate must not run off into passageways (risk of freezing).

4.2 - Hydraulic installation

It is MANDATORY to read the additional document concerning the quality of water used for filling the installation. This document is included with this manual as well as in the packet with the warranty information.

This document also contains information which is PERTINENT to the WARRANTY of the material.

The heat pump must be hydraulically decoupled.

Under no circumstances should the hydraulic connection be made rigidly to the heat pump. The hydraulic kit ref. 755833 (optional) is designed for this purpose.

4.2.1 - Hydraulic connections on the installation

In order to ensure that fluids can circulate properly, it is advisable to check that the sizing of piping in the circuit is appropriate between the Heat Pump and the Pilot.

The HRC[70] 40/60/80 kW Heat Pump is intended for with a large variety of heating installations due to its power level.

The circulator(s) included in the heat pump provide the flow rate required to transmit power to the pilot.

The connection between the heat pump and the pilot must be sized to ensure the correct flow rate between these two elements.

4.2.2 - Sizing of the Heat Pump circuit

A sufficient flow rate must be ensured so that the temperature difference between the flow and return of the heat pump does not exceed 8°C during operation (carry out a test measurement when the HRC[70] heat pump is in heating mode and the operating mode is set):

Heat pump model	40 kW	60 kW	80 kW
Minimum nominal flow rate	4700 l/h	7700 l/h	11000 l/h
Maximum pressure	3 bar	3 bar	3 bar

«Hydraulic sizing» in the installation manual

The hydraulic cross-section of the connection between the heat pump and the decoupling cylinder must be sufficient. For this, refer to the pilot part supplied with the heat pump.

4.2.3 - Pressure-relief valves

The Heat Pump and the Pilot are both equipped with pressure-relief valves.
The pressure-relief valve on the Heat Pump sets the maximum acceptable pressure in the installation (3 bar when hot). The maximum service pressure on the Heat Pump must, consequently be lower than 3 bar.

Example : If the Heat Pump is positioned 5m below the Pilot, the pressure reading on the Pilot would be 0.5 bar less than the real pressure of the water in the Heat Pump. In this case, the maximum service pressure for the Pilot would be 2,5 bar. Therefore it would be advisable to fill the heating circuit at an intermediary pressure (between 2 and 2.5 bar).

In case of operating with a back-up boiler, these pressure-relief valves **MUST** be installed in addition to the ones which the boiler is already equipped with (set at 3 bar).

The connections and the evacuation conduits for the pressure-relief valves must be made from materials which are resistant to high temperatures and corrosion.

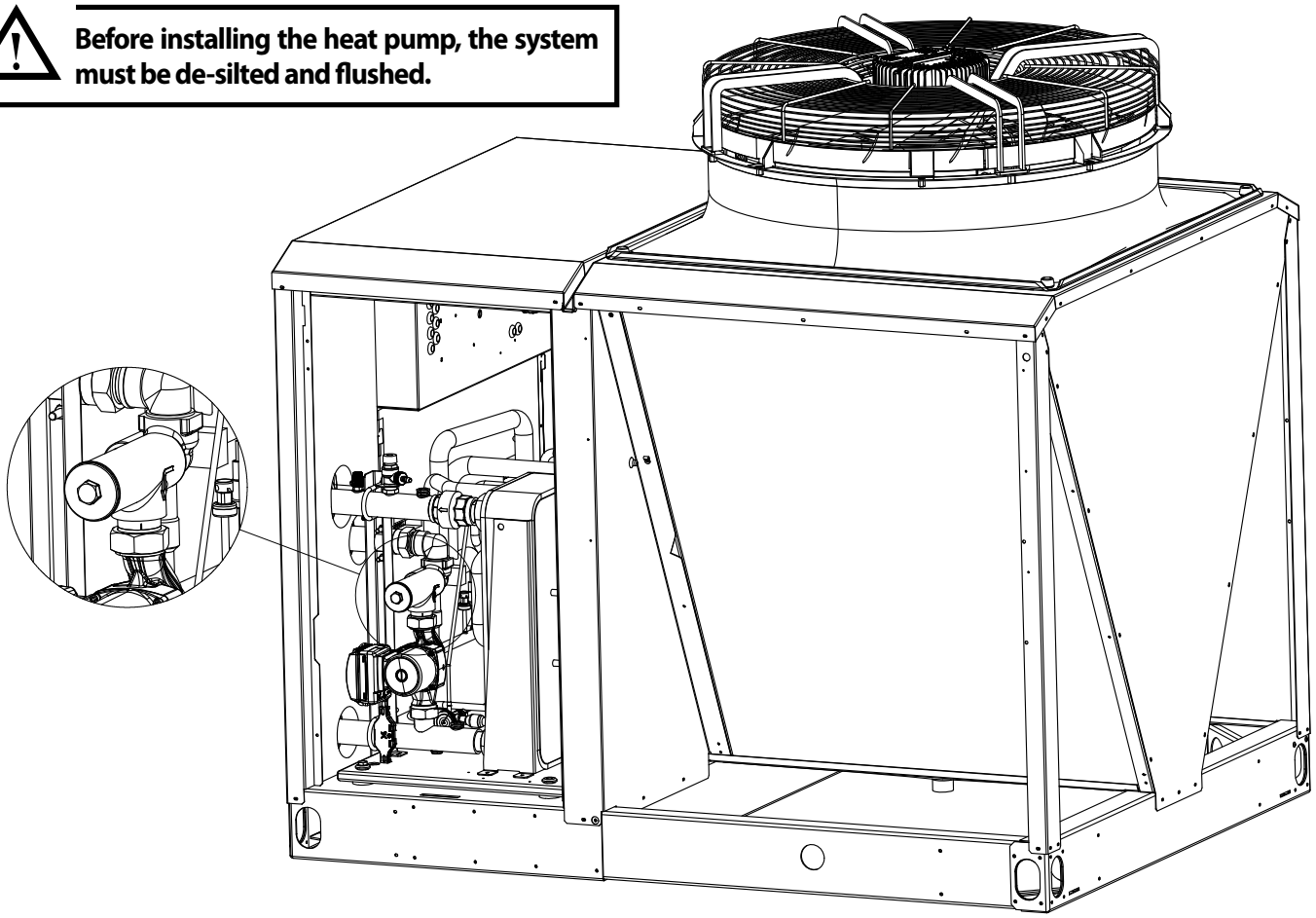
4.2.4 - Heat Pump water inlet filter (supplied)

A 500 µm sieve filter (or two for HRC[70] 60 and 80 kW tri V) is installed in the heat pump.

- Do not change the connection direction.
- Observe the direction of flow of the filter (arrow).
- Clean the filter at least once a year (do not use tools that could damage the sieve).

Clean the filter several times when starting up the heat pump circulator (take care to stop the heat pump circulator when cleaning).

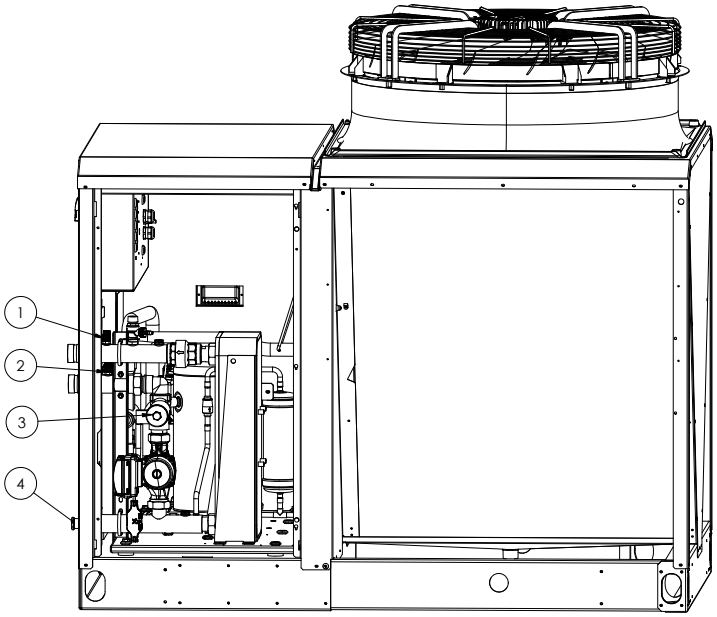
Before installing the heat pump, the system must be de-silted and flushed.



Note :
Shut-off valves must be installed at the heat pump's inlet/outlet manifolds.

4.2.4.1 - Filter maintenance

- Shut down the system.
- Close the flow and return valves.
- Relieve the pressure by opening the bleed taps ① and ②.
- Open the plug ④ to bleed water from the circuit.
- Open the filter ③.
- Remove and clean the strainer.
- Refit the sieve and close the filter.
- Refit the plug ④.
- Close the tap ② and open the return circuit valve.
- Close the tap ① once all the air has been evacuated.
- Open the flow circuit valve.
- Restart the system.



4.2.5 - Back-flow prevention device

French law (articles 16.7 and 16.8 of the "Règlement Sanitaire Départemental") stipulates that a type CA back-flow prevention device must be installed. This device must be at different, non-regulated pressure zones, in accordance with the NF EN 14367 standard. This is also an obligatory requirement in other countries, which makes it important to verify the current laws and standards in effect in the country of installation and ensure that your installation is in compliance with them. The back-flow prevention device is designed to prevent incoming heating water from entering the drinking water circuit. It must be connected to the mains drainage system.

4.2.6 - Purging the heating circuit(s)

All necessary measures must be taken to ensure that the installation can be continuously degassed. Automatic air purging valves should be placed at each high point of the installation, and manual air purging valves should be installed on each radiator.

4.2.7 - Expansion vessel

An expansion vessel needs to be installed onto the heating circuit.

See Appendix A6 for information on proper sizing of the expansion vessel.

4.2.8 - Frost protection and water treatment

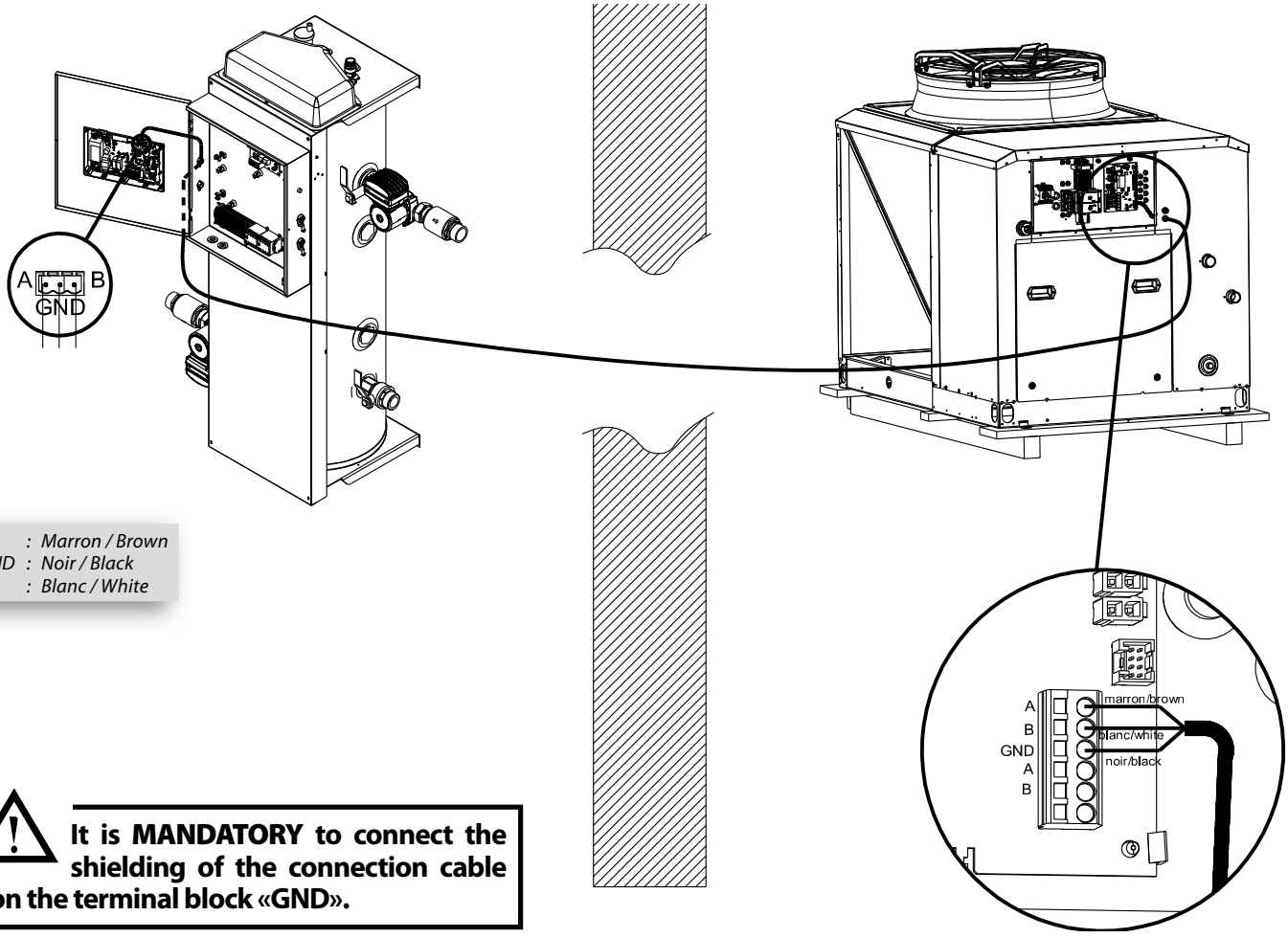
See the recommendation in Annexes A4 and A5.

4.3 - Electrical control connections

The Heat Pump is pre-equipped with a non-polarised, 2-core sheathed cable (communication bus). This 10 metres cable is supplied with, and already connected to, the Heat Pump. It must be connected to the Pilot.

If the connection needed is longer than 10 m replace this cable with a 20 m cable which is available to order (**Ref. 753102**).
If the connection needed is longer than 20 m replace this cable with a 50 m cable which is available to order (**Ref. 754103**).

For heat pumps supplied with a ZéPAC pilot, a 50 metre bus cable is supplied with the pilot.



A : Marron / Brown
GND : Noir / Black
B : Blanc / White

It is MANDATORY to connect the shielding of the connection cable on the terminal block «GND».

- Cut the bus link to the right length : **LOOPS ARE FORBIDDEN.**

4.4 - Connecting to the power supply

Ensure that the power supply is sufficient to supply both the Heat Pump and the electrical back-up if necessary, taking into account any other domestic usage of electricity.
Connection to the power supply for each appliance must be done by a qualified professional with the mains power switched off.

The rules and regulations in the country of installation MUST be respected (standard C15-100).

- **The electrical lines for general power supply to the circuits must be made in compliance with your country's current rules and regulations (standard C15-100).**
- **Standard C15-100 determines the cable section to be used based on acceptable currents.**
- **Standard C15-100 determines the cable section to be used based on the following elements :**
  - **Nature of the conductor :**
    - **type of insulation, number of strands, etc.**
  - **Installation mode :**
    - **influence of conductor and cable groups;**
    - **ambient temperature;**
    - **tightly or non-tightly installed;**
    - **length of cables, etc.**

- **During transport, the electrical connections may be subject to accidental loosening.**
- **To eliminate any risk of abnormal heating, it is necessary to ensure the placement of the Faston type electrical connections are secure and tighten the screw connections.**

See § «Spare parts - electrical boxes»

Each appliance is delivered from the factory completely pre-wired. However, it is necessary to connect the following elements to the relevant terminals:

- The electrical supply of the power circuit for each appliance separately : the Heat Pump.
- The 2-core sheathed (+ ground) connecting cable (10 m length supplied) between the Heat Pump and the Pilot.

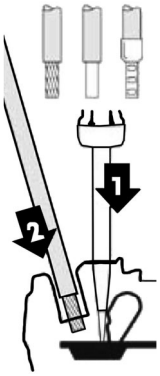
Under no circumstances will the manufacturer be held liable for any problems which may arise due to improper installation, choice of power supply cable, or measures used for installation.

Terminal strips

Their terminal strips are spring-loaded «Cage Clamps».

For handling, use the following :

- for 2,5 mm² control terminals power terminals (tetra), use a 3,5 x 0,5 mm flat-head screwdriver.
- for 10 mm² mains power terminals (single-phase), use a 5,5 x 0,8 mm flat-head screwdriver.



1 : Insert the screwdriver into the flap just above or below the identification number.

2 : Insert the wire into the «CAGE CLAMP» when the flap is open.

3 : Remove the screwdriver.

Note :
The wires must be stripped to the following lengths :
- for the 2,5 mm² control terminals: between 10 and 12 mm;
- for the mains power terminal between 18 and 20 mm.

4.4.1 - Proximity switch

The HRC[70] 40/60/80 kW heat pump is fitted with a proximity switch. The heat pump is supplied with electricity by connecting the four conductors to the switch (three phases + neutral). The stripping length (or crimped end length) for this connection is 12 mm. Use a 6.5 mm slotted screwdriver or Pozidriv 2. Each conductor should be tightened to 4.5 N.m. Once the conductors have been connected, be sure to replace the terminal covers supplied.

4.4.2 - Recommendations for connecting the system to the power supply

Check :

- **The power consumption**
- **Number and thickness of the power supply cables**
- **Fuse or circuit breaker ratings**

The power supply must come from an electrical protection and sectioning device which complies with all current rules and regulation in effect in the country of use.

This CE-approved unit complies with all the essential requirements of the following directives:

- Low voltage n°2006/95/CE
- Electromagnetic compatibility n° 2004/108/CE

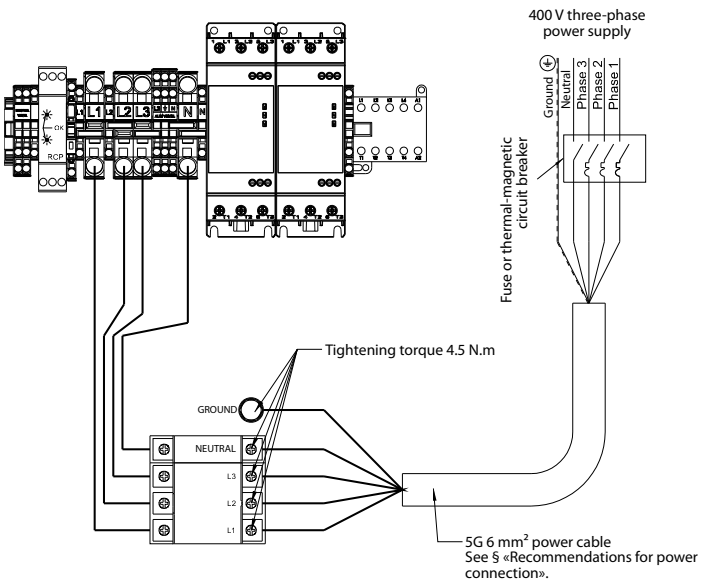
Ensure that the installation is equipped with a properly sized and connected grounding cable.

Ensure that the voltage and frequency of the general power supply fits requirements.

The acceptable variation in voltage is:

230 V +/- 10% 50 Hz for single-phase models
400 V +/- 10% 50 Hz for three-phase models

See Appendix A2 for components adapted to the heat pump.



4.4.3 - Connecting the heat Pump to the power supply

ELECTRICAL INSTALLATION RECOMMENDATIONS

- **It is the responsibility of the installer and of the client to ensure that the appliance is compatible with the power grid before connecting the HRC[70] Heat Pump (see the electricity provider information form in the Appendix)**
- **If the electrical installation standards are not respected there could be irreversible damages to the HRC[70] Heat Pump which are not covered by the manufacturer's warranty.**

The HRC[70] Heat Pump is CE-marked. It is compliant with French standard NF C15-100 as well as European standards EN 61000-3-3 and EN 61000-3-11, among others.

It is equipped with a progressive start-up, which limits the current at start-up to 60 A in three-phase.

The power supply cable should be sized carefully according to the following factors:

- Maximum current required ;
- Distance between the HRC[70] Heat Pump and the power supply ;
- Overall protection ;
- The neutral operating system.

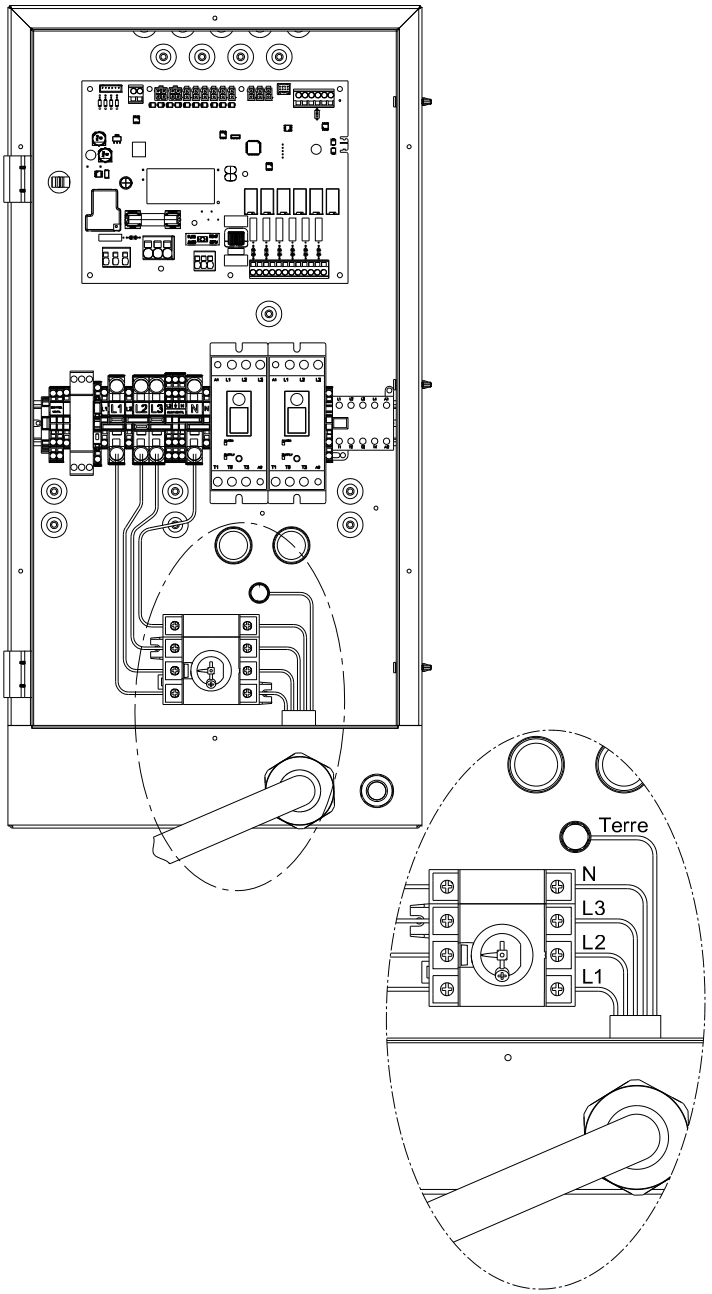
Make sure to strip the cable before placing it into the terminals, and make sure that the copper is in good condition.

If the power supply cable is damaged, it must be replaced by a qualified professional to avoid any risk of danger.

To access the terminal blocks, open the side enclosure by turning the switch.

The power supply cable passes through the external cable gland.

Power cable tightening torque: 4.5 N.m

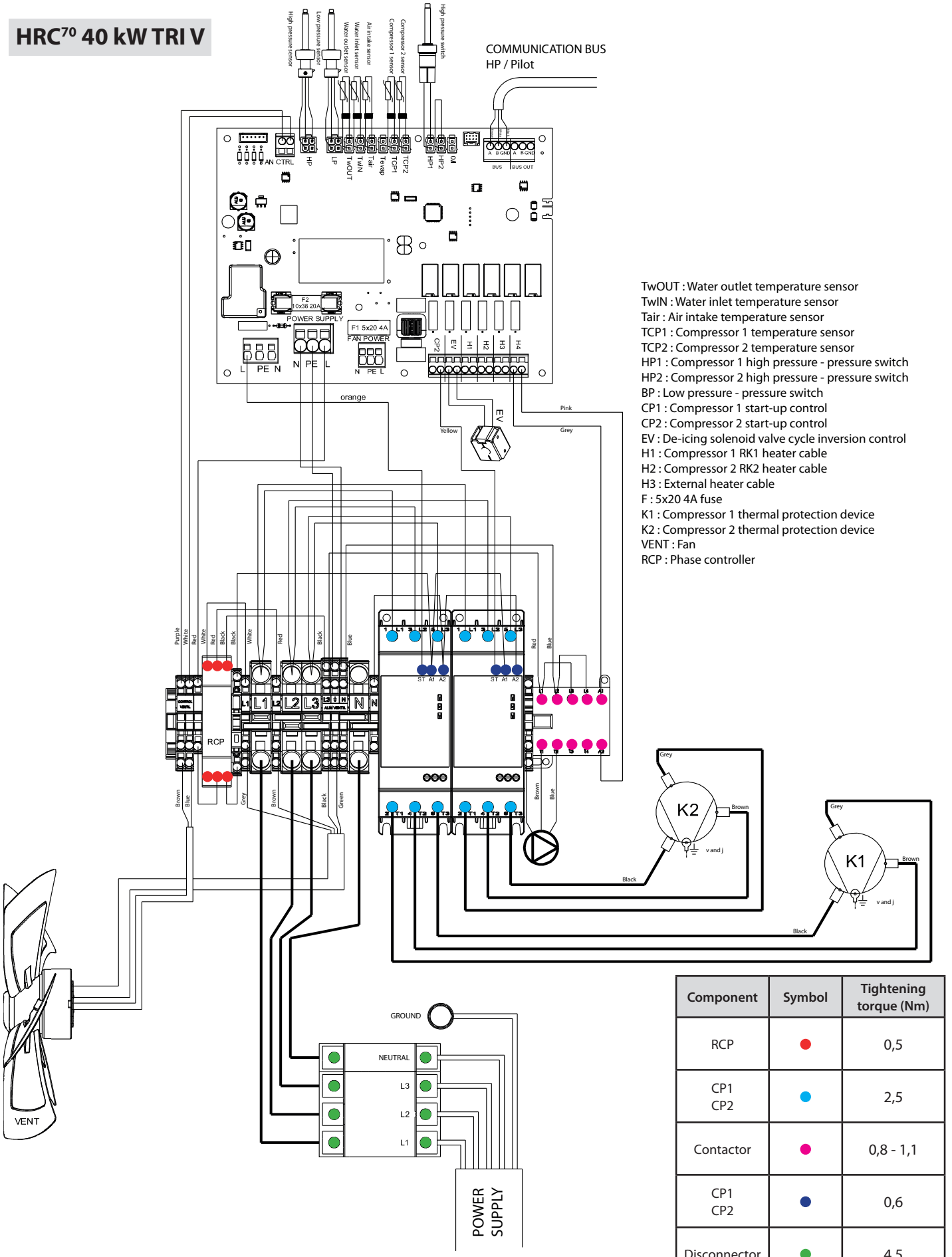


HRC[70] Heat Pump model	HRC[70] 40 kW tri V	HRC[70] 60 kW tri V	HRC[70] 80 kW tri V
Power supply voltage	400 V three-phase	400 V three-phase	400 V three-phase
Maximum power consumption	17,6 kVA or 18,8 kVA **	*In progress*	43,1 kVA or 45,6 kVA **
Maximum current requirements	26,3 A or 28,1 A **	*In progress*	62,2 A or 65,9 A**
Maximum current at start-up	54 A	90 A	115 A
Presence of a progressive starter for the compressor	Standard	Standard	Standard
Heat Pump regulation mode	Fixed speed	Fixed speed	Fixed speed
Number of power stages	2	2	2
Circuit breaker dimensions (1)	32 A three-phase	48 A three-phase	63 A three-phase 80 A three-phase (**)
Power supply by phase (2)	6 mm² mini	16 mm²	16 mm² mini
Number of conductors (2)	4 x 6 mm² + T mini (*)	4 x 16 mm² + T (*)	4 x 16 mm² + T mini (*)

(1) D-curve tetra-polar general circuit breaker.
(2) The figures given here are for informational purposes only. They must be checked an modified if necessary, according to conditions of installation and the current rules and regulations in effect. If the length of the cable exceeds 15 m, or if the network is susceptible to a drop in voltage of more than 10 V, use a thicker cable.
(*) The width of the ground cable must be equal to the thickest power supply cable.
(**) Ducted heat pumps.

Tightening torques for wiring diagram components :

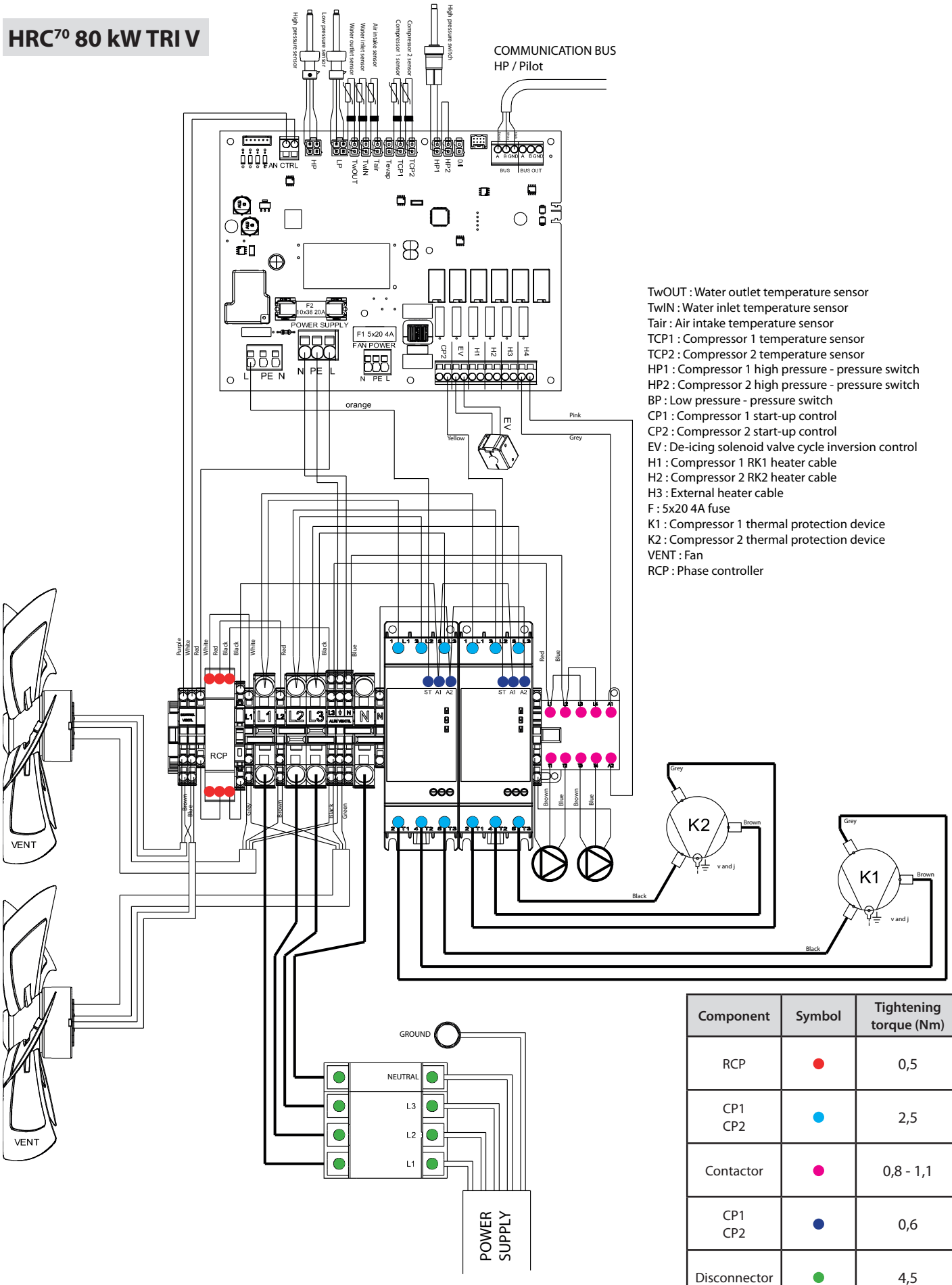
HRC^{70} 40 kW TRI V



TwOUT : Water outlet temperature sensor
TwIN : Water inlet temperature sensor
Tair : Air intake temperature sensor
TCP1 : Compressor 1 temperature sensor
TCP2 : Compressor 2 temperature sensor
HP1 : Compressor 1 high pressure - pressure switch
HP2 : Compressor 2 high pressure - pressure switch
BP : Low pressure - pressure switch
CP1 : Compressor 1 start-up control
CP2 : Compressor 2 start-up control
EV : De-icing solenoid valve cycle inversion control
H1 : Compressor 1 RK1 heater cable
H2 : Compressor 2 RK2 heater cable
H3 : External heater cable
F : 5x20 4A fuse
K1 : Compressor 1 thermal protection device
K2 : Compressor 2 thermal protection device
VENT : Fan
RCP : Phase controller

Component	Symbol	Tightening torque (Nm)
RCP	●	0,5
CP1 CP2	●	2,5
Contactor	●	0,8 - 1,1
CP1 CP2	●	0,6
Disconnector	●	4,5

HRC^{70} 80 kW TRI V

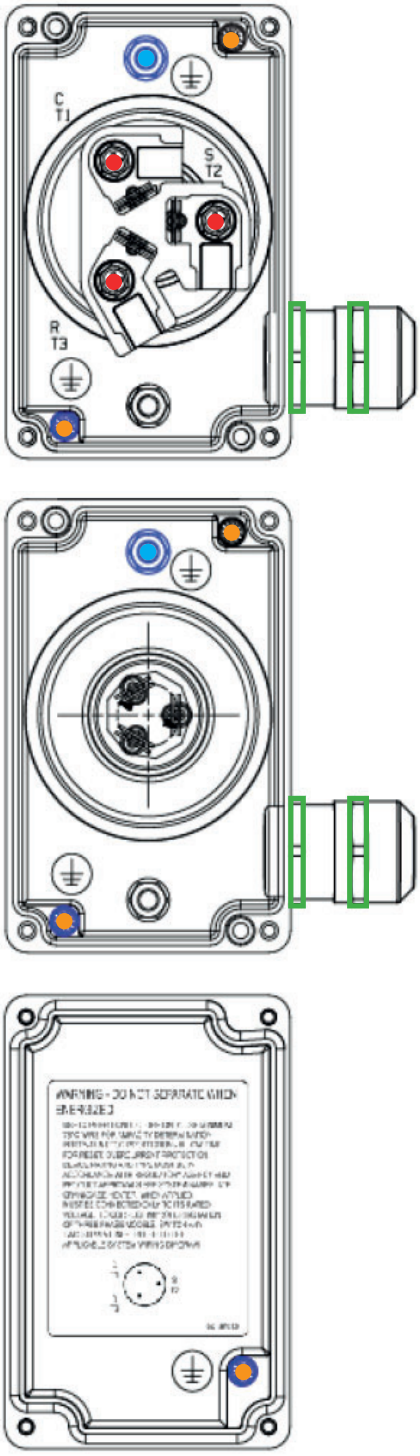


TwOUT : Water outlet temperature sensor
TwIN : Water inlet temperature sensor
Tair : Air intake temperature sensor
TCP1 : Compressor 1 temperature sensor
TCP2 : Compressor 2 temperature sensor
HP1 : Compressor 1 high pressure - pressure switch
HP2 : Compressor 2 high pressure - pressure switch
BP : Low pressure - pressure switch
CP1 : Compressor 1 start-up control
CP2 : Compressor 2 start-up control
EV : De-icing solenoid valve cycle inversion control
H1 : Compressor 1 RK1 heater cable
H2 : Compressor 2 RK2 heater cable
H3 : External heater cable
F : 5x20 4A fuse
K1 : Compressor 1 thermal protection device
K2 : Compressor 2 thermal protection device
VENT : Fan
RCP : Phase controller

Component	Symbol	Tightening torque (Nm)
RCP	●	0,5
CP1 CP2	●	2,5
Contactor	●	0,8 - 1,1
CP1 CP2	●	0,6
Disconnector	●	4,5

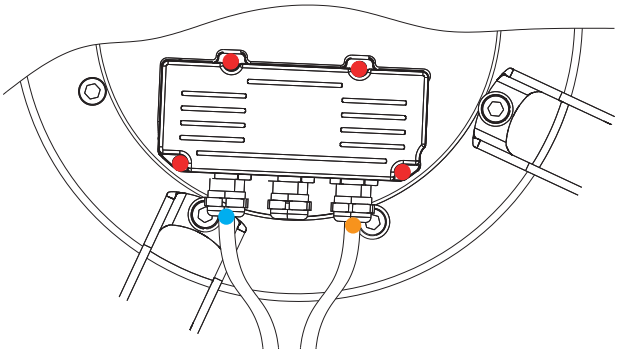
Compressor tightening torques :

Location	Symbol	Tightening torque (Nm)
Screw	●	1,4 - 1,7
Grounding nuts	●	4 - 4,4
Grounding screw	●	1,8 - 2
Cable gland	●	9,8 - 10

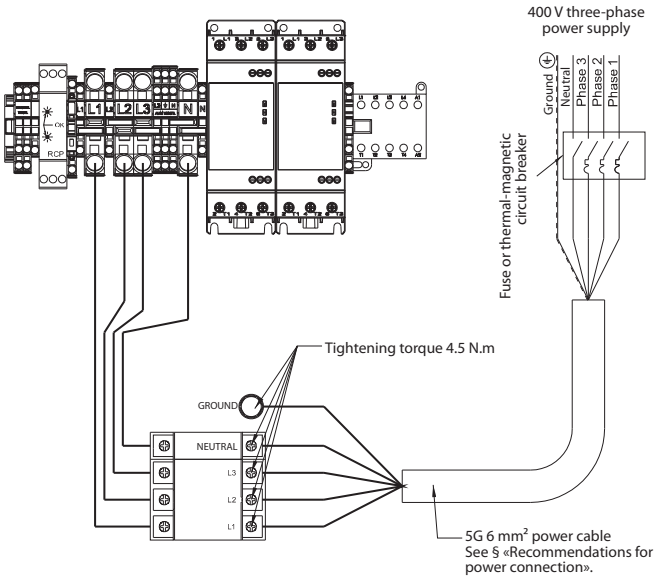


Fan tightening torques :

Location	Symbol	Tightening torque (Nm)
Vis torx	●	2,5 Nm ±0,2
Presse-étoupe 4-6 mm câbles de commande	●	6 Nm ±0,6
Presse-étoupe 8-12 mm câbles de puissance	●	6 Nm ±0,6



4.4.4. - HRC^{70} Heat pump: 400 V three-phase connection



- **Three-phase monitor relay for 40/60/80 kW HRC^{70} Heat Pump.**

A phase monitor relay is installed to prevent phase failure, which could damage the compressors. If the phases are reversed, it will stop the power supply to the Heat Pump.

CORRECT WIRING

INCORRECT WIRING

In the case of INCORRECT WIRING :

Caution: never work with live voltage!

If the phase order is reversed, or there is a phase missing, the relay cuts the power supply to the circuit board. A «BUS Err» error message will appear. This is indicated on the phase monitor relay by the orange light at the top being off and the green light at the bottom being on. To correct the error, reverse the two phases on the mains power terminal.

When the Pilot is switched on, a «BUS Err» error message will be displayed. Reverse the two phases on the three-phase power cable of the Heat Pump. Switch the power back on and check the voltage on each phase.

4.4.5 - Electrical protection of the compressors

The HRC[70] Heat Pump is equipped with progressive starters to limit the intensity of the current when the motor starts-up, in compliance with the limits set by the NF C 15 100 standard, which is: 60 A per phase in three-phase.

The electrical protection devices for the compressors constantly monitor the current and voltage. In case of over-voltage, under-voltage, or an abnormally high current, the compressor is stopped.

Progressive starter for the 40-60-80 kW three-phase HRC[70] Heat pump.

The progressive start-up device also serves to control the phases (phase order or missing phase, which could damage the compressor).

If the order of phases is reversed or if there is a missing phase, the relay cuts the power supply to the compressor. This error is indicated by the LED light flashing every second.

This progressive starter monitors the supply voltage. If it is insufficient, the compressor is stopped or does not start. The fault is signalled (see table §Progressive starter faults).

In the event of a fault on the compressor, over-current or short-circuit or a fault in the soft starter itself, the fault is indicated by flashing (see table in §Progressive starter faults).

LED status : **POWER** - **RUN** - **ALARM**

LED	Status	Description
POWER	OFF	Auxiliary power supply (A1-A2) not present
	▬	Presence of an auxiliary power supply (A1-A2)
RUN	OFF	Engine shutdown
	▪ ▪ ▪ ▪	Rampe in progress
	▬	Full voltage (ON/OFF, top of ramp)
ALARM	OFF	No active alarm
	▪ ▪ ▪ ▪	Alarm active. The number of flashes identifies the type of alarm in progress. (See below)

4.4.5.1 - Progressive starter faults

LED alarm indicator	Alarm code	Potential causes	Actions to be undertaken
Flashing **1 flash**	**A01**	Lack of power	• Check the three-phase mains voltage • Check the tightness of the lugs from the box input to the starters • Contact intuis
Flashing **2 flashes**	**A02**	Phase loss	• Check the three-phase mains voltage • Check the tightness of the lugs from the box input to the starters • Contact intuis
Flashing **3 flashes**	**A03**	Wrong phase frequency	• Check the three-phase mains voltage • Check the tightness of the lugs from the box input to the starters • Contact your electricity provider
Flashing **4 flashes**	**A04**	Incorrect power supply frequency	• Contact an approved intuis technical centre • Contact your electricity provider
Flashing **5 flashes**	**A05**	Supply voltage outside authorised operating range	• Check the three-phase mains voltage • Contact your electricity provider to ensure that the electrical network is correctly sized
Flashing **6 flashes**	**A06**	Progressive starter thermal protection	• Check the three-phase mains voltage • Check the tightness of the lugs from the box input to the starters • Contact intuis
Flashing **7 flashes**	**A07**	Temperature sensor defect	• Check the three-phase mains voltage • Check the tightness of the lugs from the box input to the starters • Contact intuis
Flashing **8 flashes**	**A08**	Bypass relay failure	• Check the three-phase mains voltage • Check the tightness of the lugs from the box input to the starters • Contact intuis
Flashing **9 flashes**	**A09**	System error	• Check the three-phase mains voltage • Check the tightness of the lugs from the box input to the starters • Contact intuis

4.5 - Aeraulics and ducted heat pumps

They can be ducted. To do this, three ventilation parameters (*P381*, *P382* and *P383*) must be changed to secure the airflow required for the heat pump to operate correctly.

<table>
<tr><td rowspan="3">Pressure drop (Pa)
- Upstream
+ Downstream</td><td colspan="2">HRC[70] 40 kW tri V</td><td colspan="2">HRC[70] 60 kW tri V</td><td colspan="2">HRC[70] 80 kW tri V</td></tr>
<tr><td colspan="2">DUNLI fan
EC180-A800-C02 074-05S-F-502</td><td colspan="2">/</td><td colspan="2">DUNLI fan
EC180-A800-C02 074-05S-F-502</td></tr>
<tr><td>First floor</td><td>Second floor</td><td>First floor</td><td>Second floor</td><td>First floor</td><td>Second floor</td></tr>
<tr><td></td><td>P381</td><td>P382 et P383</td><td>P381</td><td>P382 et P383</td><td>P381</td><td>P382 et P383</td></tr>
<tr><td>10</td><td rowspan="2">40</td><td rowspan="3">60</td><td rowspan="21" colspan="2">In progress</td><td>40</td><td rowspan="3">65</td></tr>
<tr><td>20</td><td rowspan="2">45</td></tr>
<tr><td>30</td><td rowspan="2">45</td></tr>
<tr><td>40</td><td rowspan="4">65</td><td rowspan="3">50</td><td rowspan="3">70</td></tr>
<tr><td>50</td><td rowspan="3">50</td></tr>
<tr><td>60</td></tr>
<tr><td>70</td><td rowspan="3">70</td><td rowspan="2">55</td><td rowspan="3">75</td></tr>
<tr><td>80</td><td rowspan="2">55</td></tr>
<tr><td>90</td><td rowspan="2">60</td></tr>
<tr><td>100</td><td rowspan="3">60</td><td rowspan="4">75</td><td rowspan="4">80</td></tr>
<tr><td>110</td><td rowspan="2">65</td></tr>
<tr><td>120</td><td rowspan="2">65</td></tr>
<tr><td>130</td><td rowspan="4">80</td><td rowspan="4">70</td><td rowspan="4">85</td></tr>
<tr><td>140</td><td rowspan="2">70</td></tr>
<tr><td>150</td></tr>
<tr><td>160</td><td rowspan="3">75</td><td rowspan="3">85</td><td rowspan="3">75</td><td rowspan="3">90</td></tr>
<tr><td>170</td></tr>
<tr><td>180</td><td rowspan="3">80</td><td rowspan="3">80</td></tr>
<tr><td>190</td><td rowspan="3">90</td><td rowspan="3">95</td></tr>
<tr><td>200</td><td>85</td><td>85</td></tr>
</table>

If the heat pump is connected to a ventilation duct (ducted heat pump), a decoupling device must be provided/designed for this air connection. Under no circumstances should the airflow connection be made rigidly to the heat pump, to avoid any vibration being transmitted to the airflow system.

5 - MAINTENANCE AND TROUBLESHOOTING

• In order to ensure the best performance results from your HRC[70] Heat Pump it should be subject to regular maintenance.
• An annual maintenance check is recommended to be carried out by a qualified professional on the hydraulic heating circuit.
• Any work on the refrigerant circuit must be carried out by a person with a brazing qualification appropriate to the appliance category (see appliance rating plate).
• Always switch the appliance off before opening it.

5.1 - General information

After the appliance has been operating for a few days, it is advised to check that the water circuit is properly sealed, and that condensates are draining properly.

Note :
In case of maintenance work or decommissioning of an appliance, please respect all environmental protection instructions concerning recovery, recycling, and disposal of consumables and components.

5.2 - Maintenance on the hydraulic circuit

Inspection of the water circuit consists of removing sludge, checking the filters, and stopping up any leaks that may have appeared. Clean or replace clogged or dirty filters.

From time to time check that the condensates are draining properly:

- Check that the drain hole is not blocked.
- Clean the condensate drip tray, which may contain deposits carried along by the intake air (the condensate drip tray can be checked and cleaned by partially removing one of the fans. Be careful with the evaporator fins when cleaning).

The heat pump is supplied as a free-flow unit. If a drain pipe is fitted, check that it is draining properly and clean and unblock it if necessary.

Check that the pressure-relief valve is properly sealed. It should not leak if the water pressure is under 3 bar.

5.3 - Maintenance on the heat pump

The HRC[70] Heat Pump contains R290 refrigerant fluid. It is not subject to regulations concerning greenhouse gasses.

However, it is still recommended to carry out periodic (at least once per year) cleaning of the evaporator fins if it is obstructed by dust or leaves : this should be done using a vacuum cleaner or by spraying with water.

The heat pump contains category II piping and category II or III containers. **Periodic inspection of the equipment must be carried out by an authorised person.**

HRC[70] heat pumps must be inspected at intervals of **no more than 48 months.**

The equipment category is available on the heat pump declaration of conformity.

Contents of the periodic inspection :

- Documentary check of the operating file
- External visual inspection of the pressure equipment to detect any defects in the insulation:
  - o Ice on the surface;
  - o Condensation with run-off;
  - o External shocks.
- Any defects in the wall of non-insulated equipment:
  - o Atmospheric corrosion (no loss of thickness). Rust bloom corrosion is accepted as it does not cause any loss of thickness.
  - o External impact;
  - o Evidence of refrigerant or oil leakage.
- Any defect in the equipment support.
- Any abnormal vibration.
- Checks on safety accessories: Check that they correspond to the declaration of conformity.
- Check characteristics with maximum permissible conditions (PS, TS).
- Check HP safety pressure switches identified as safety accessories:
  - o No trace of tampering with the setting device.
  - o Visual check (condition of electrical contacts, condition of covers).

Never clean the finned heat exchanger with high-pressure cleaning equipment as it could damage the fins.

In case of repair work on the HRC[70] Heat Pump, the refrigerant circuit, or the electrical box, it is important to follow the following instructions:

- Any work on the refrigerant circuit must be undertaken by a qualified professional with a category 1 certificate of aptitude. It is forbidden to release gas from the refrigerant circuit into the atmosphere, and it is obligatory to recover the refrigerant before undertaking any work on the circuit.
- The HRC[70] Heat pump uses R290 refrigerant fluid. Given the flammable nature of this fluid, any work on the refrigerant circuit must be carried out using suitable equipment which complies with the current rules and regulations in effect. When handling the fluid (recovery, draining, or refilling), the appliance must be disconnected from the power supply. Do not smoke. Do not generate any flame (lighter, blowtorch) while handing the fluid. If work is necessary on the refrigerant circuit using a flame (blowtorch), the refrigerant circuit must be emptied and replaced with nitrogen.
- The area must be monitored with a propane detector before, during and after any work on the refrigerant circuit.
- If work is carried out on the refrigerant circuit in a closed space, the room must be ventilated so that the refrigerant can be dissipated and evacuated to the outside.
- If hot work is to be carried out on refrigeration equipment or its associated parts, suitable fire protection equipment must be made available. A dry powder or CO_2 fire extinguisher must be available nearby.

5.4 - Register

The heat pump must be monitored by a register when it is installed by the installer. This log must include the list from a) to g) below.

Where the refrigerant charge exceeds 3 kg, a register must be prepared when the system is installed by the installer. This record must be regularly updated as specified in EN 378-4.
As a minimum, the following information should be recorded in the logbook.

a) Details of all maintenance and repairs;

b) The quantities, the nature of the refrigerant (new, reused, recycled, reclaimed) that was charged at each intervention, the quantities of refrigerant that were transferred at each intervention (see also EN 378-4);

c) The results of any analysis of a reused refrigerant;

d) The origin of the refrigerant reused;

e) Modifications and replacements of system components;

f) The results of all routine periodic tests;

g) Significant periods of non-use.

Note :
For refrigeration systems using fluorinated greenhouse gases, the requirements for the register are specified in Regulation (EU) No 517/2014.

5.5 - Maintenance of the electrical components

• Always disconnect the appliance from the power supply before accessing the electrical terminals.
• Do not get water on any of the electrical components.

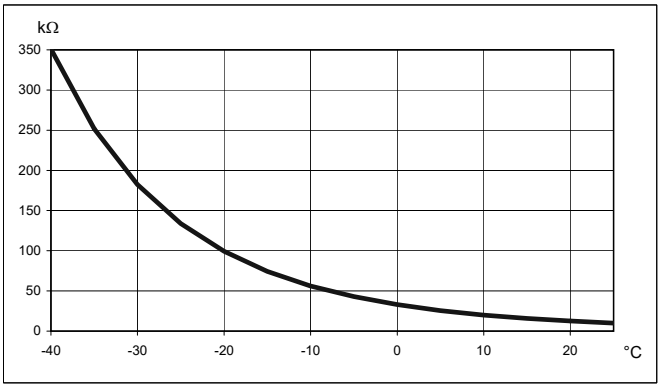
- Check on both the HRC[70] Heat Pump and the HRC[70] Pilot that the electrical supply cables are properly connected to the terminals.
- Check the electrical connections for oxidization or overheated sections.
- Check the tightness of the cables on the compressor starters.
- Clean any dust from the electrical box and check the connections.
- Check that the ground cable is properly connected.

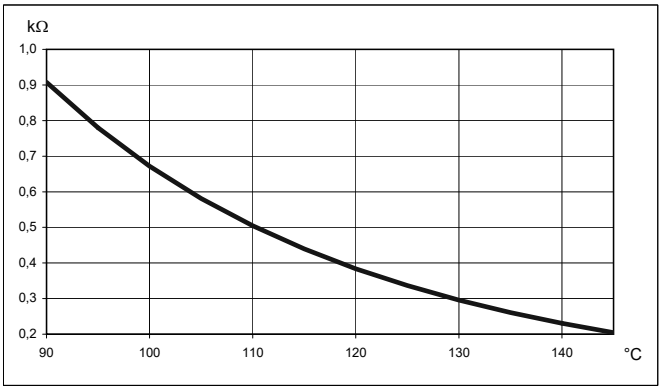
5.6 - Decommissioning and disposal

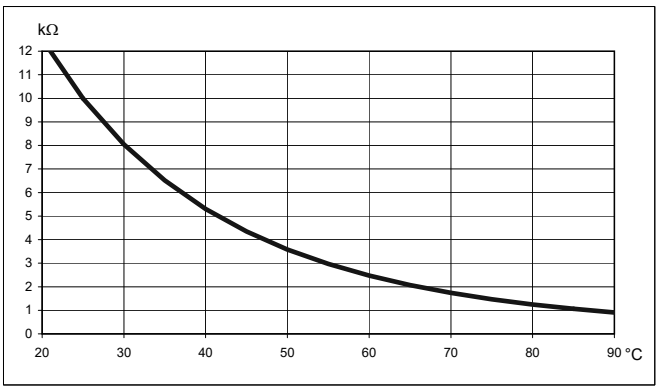
In accordance with current laws, no equipment must be disposed of without refrigerant gas, recyclable metallic parts, and the oil contained in the compressors having been recovered beforehand.

5.7 - Sensor data curve charts

5.7.1 - Air intake sensor - Sensors installed on compressors 1 and 2 - Input and output capacitor sensor



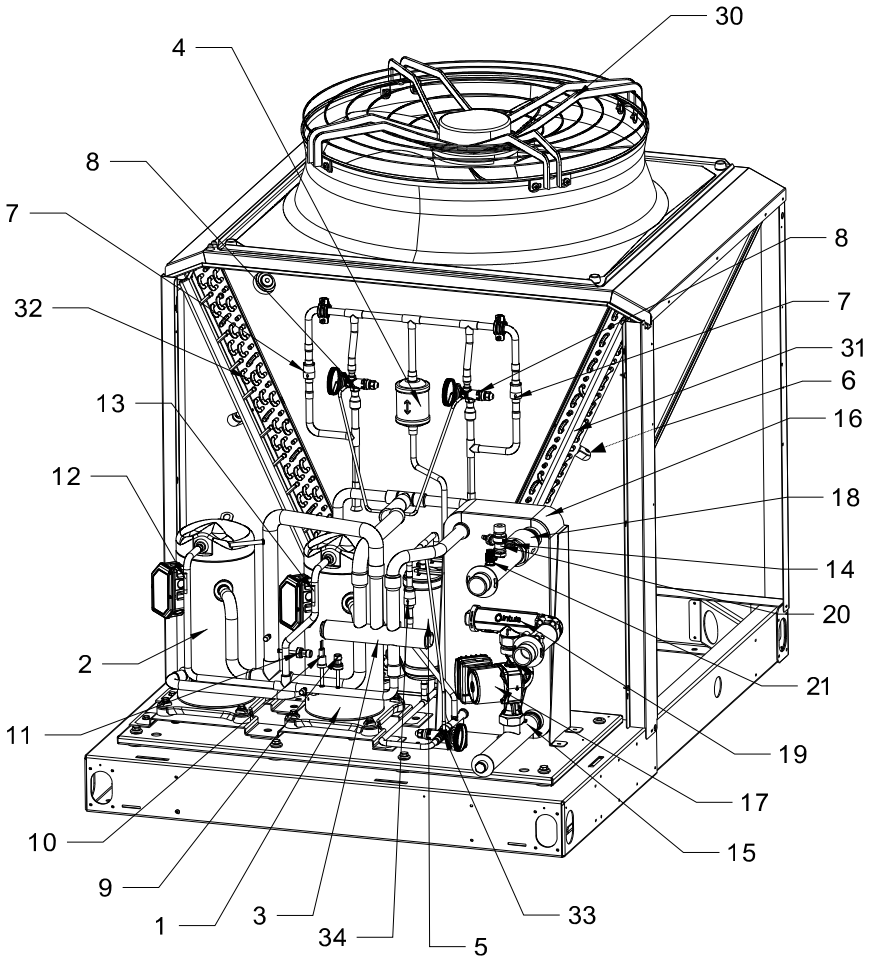




Temp. (°C)	Sensor value (KOhms)	Temp. (°C)	Sensor value (KOhms)	Temp. (°C)	Sensor value (KOhms)	Temp. (°C)	Sensor value (KOhms)
-40	351.078	10	20.017	60	2.472	110	0.504
-35	251.277	15	15.768	65	2.068	115	0.439
-30	182.451	20	12.513	70	1.739	120	0.384
-25	133.827	25	10.000	75	1.469	125	0.336
-20	99.221	30	8.045	80	1.246	130	0.296
-15	74.316	35	6.514	85	1.061	135	0.261
-10	56.202	40	5.306	90	0.908	140	0.231
-5	42.894	45	4.348	95	0.779	145	0.204
0	33.024	50	3.583	100	0.672		
5	25.607	55	2.968	105	0.581		

6 - LIST OF SPARE PARTS

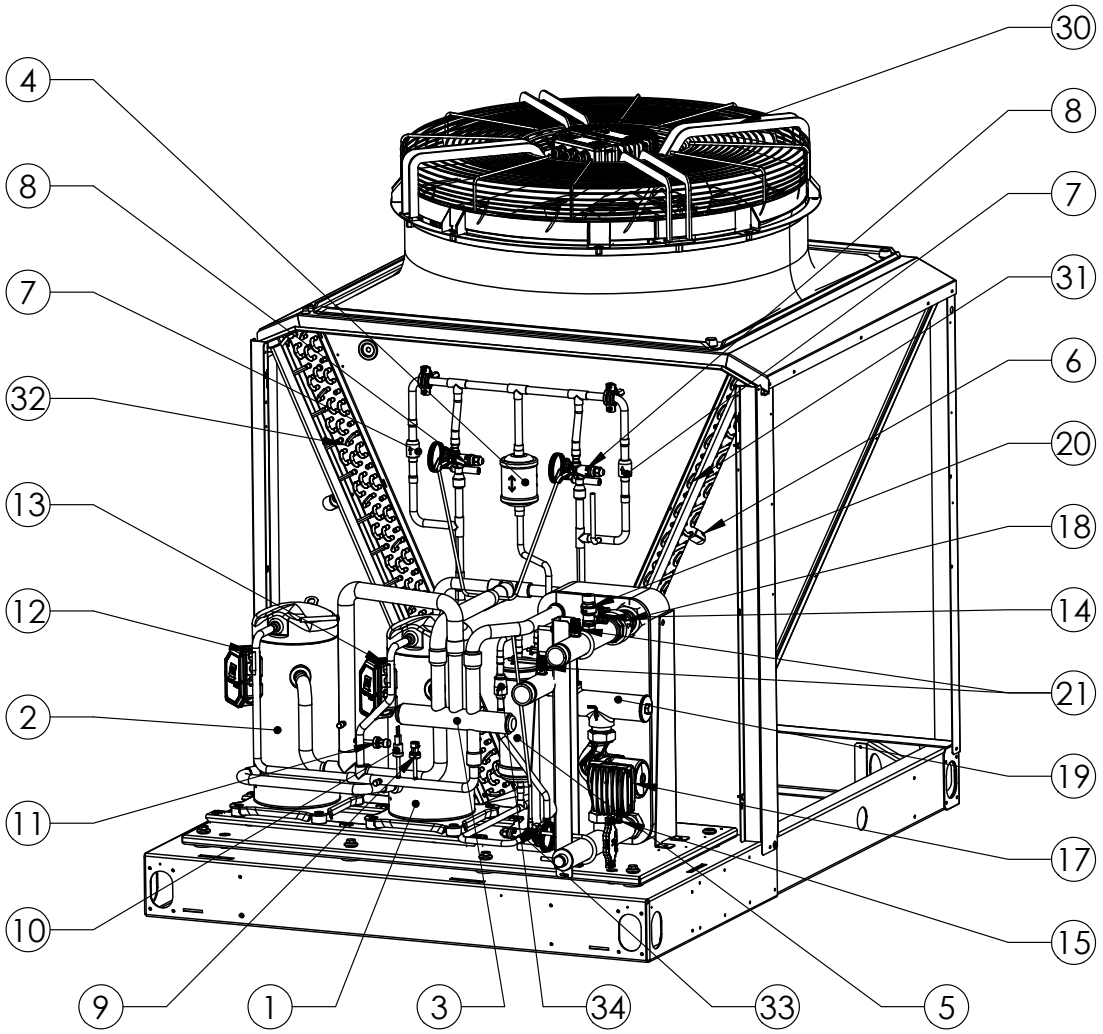
6.1 - HRC[70] 40 kW tri V /1 heat pump



Mark	Reference HRC[70] 40 kW tri V /1	Description	Mark	Reference HRC[70] 40 kW tri V /1	Description
1	B1244518	Compressor CP1	15	B1244575	Temperature sensor lg 1200 mm (Water inlet)
2	B1244518	Compressor CP2	16	B1473177	Plated heat exchanger
3	B1472811	4-way valve kit	17	B1244972	Circulator
4	B1473151	Dehumidifying filter	18	B1239287	Check valve
5	B1473149	Liquid reservoir	19	B1472997	Filter sieve
6	B1244522	Outdoor sensor - lg 900 mm	20	B1239094	Pressure-relief valve set at 3 bar
7	B1473185	Valve	21	B1239089	Drain valve
8	B1473179	Hot pressure reducer	30	B1242094	Fan Ø 800
9	B1239268	High pressure sensor	31	B1473168	Right evaporator
10	B1239211	High pressure switch	32	B1473167	Left evaporator
11	B1239225	Low pressure sensor	33	B1473113	Cold pressure reducer
12	B1244552	Temperature sensor lg 900 mm (CP2)	34	B1473184	Valve
13	B1244834	Temperature sensor lg 700 mm (CP1)	Not visible	B4995686	Wiring kit
14	B1244577	Temperature sensor lg 700 mm (Water outlet)			

Note : Availability of spare parts :
Spare parts which belong our products are available during 10 years, from the end of the mass production, except from an event beyond our control.

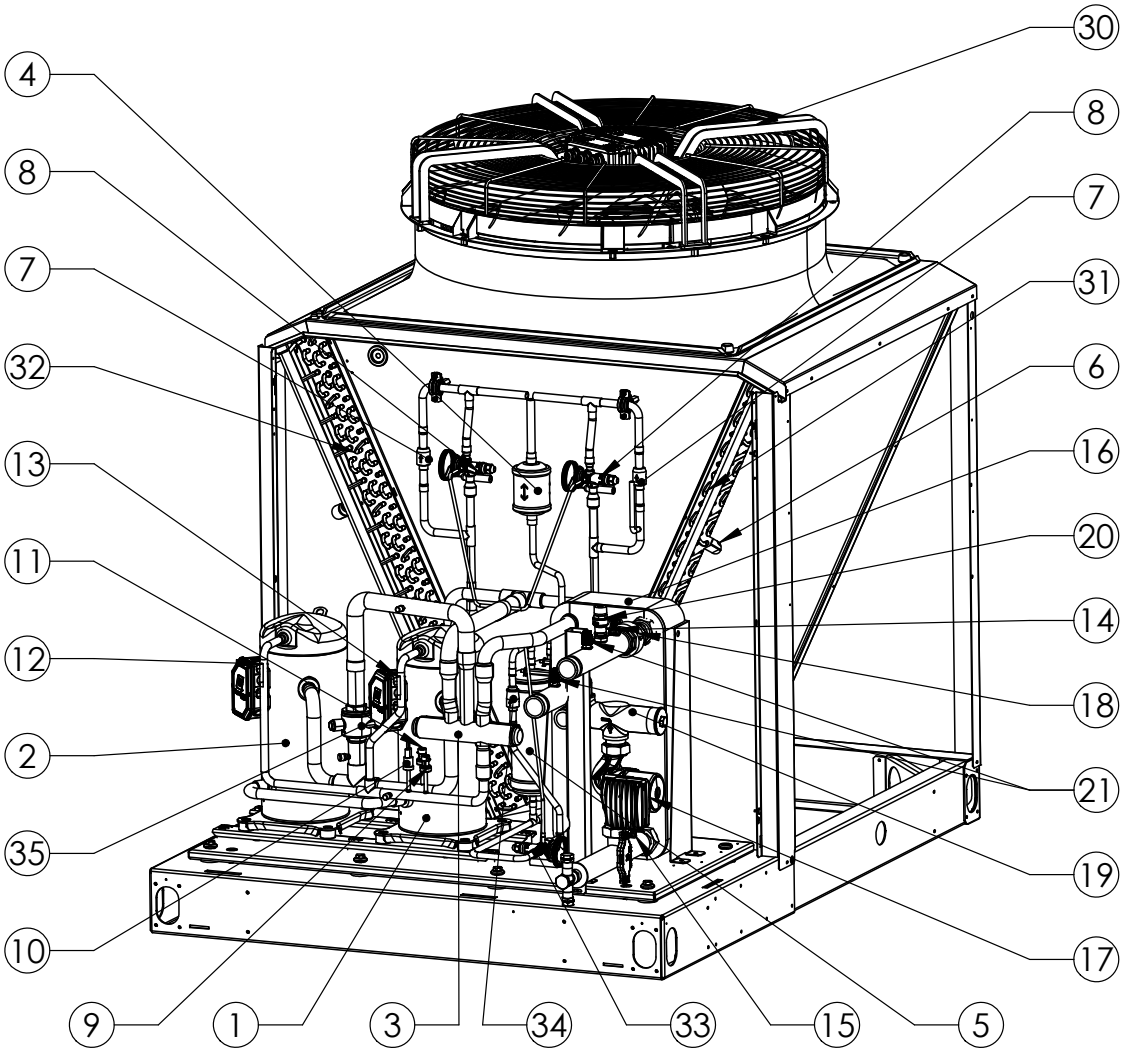
6.2 - HRC^{70} 40 kW tri V /2 heat pump



Mark	Reference HRC^{70} 40 kW tri V /2	Description	Mark	Reference HRC^{70} 40 kW tri V /2	Description
1	B1244518	Compressor CP1	15	B1244575	Temperature sensor lg 1200 mm (Water inlet)
2	B1244518	Compressor CP2	16	B1473177	Plated heat exchanger
3	B1472811	4-way valve kit	17	B1244972	Circulator
4	B1473151	Dehumidifying filter	18	B1239287	Check valve
5	B1473149	Liquid reservoir	19	B1472997	Filter sieve
6	B1244522	Outdoor sensor - lg 900 mm	20	B1239094	Pressure-relief valve set at 3 bar
7	B1473185	Valve	21	B1239089	Drain valve
8	B1473179	Hot pressure reducer	30	B1242094	Fan Ø 800
9	B1239268	High pressure sensor	31	B1473168	Right evaporator
10	B1239211	High pressure switch	32	B1473167	Left evaporator
11	B1239225	Low pressure sensor	33	B1473113	Cold pressure reducer
12	B1244552	Temperature sensor lg 900 mm (CP2)	34	B1473184	Valve
13	B1244834	Temperature sensor lg 700 mm (CP1)	Not visible	B4995686	Wiring kit
14	B1244577	Temperature sensor lg 700 mm (Water outlet)			

Note : Availability of spare parts :
Spare parts which belong our products are available during 10 years, from the end of the mass production, except from an event beyond our control.

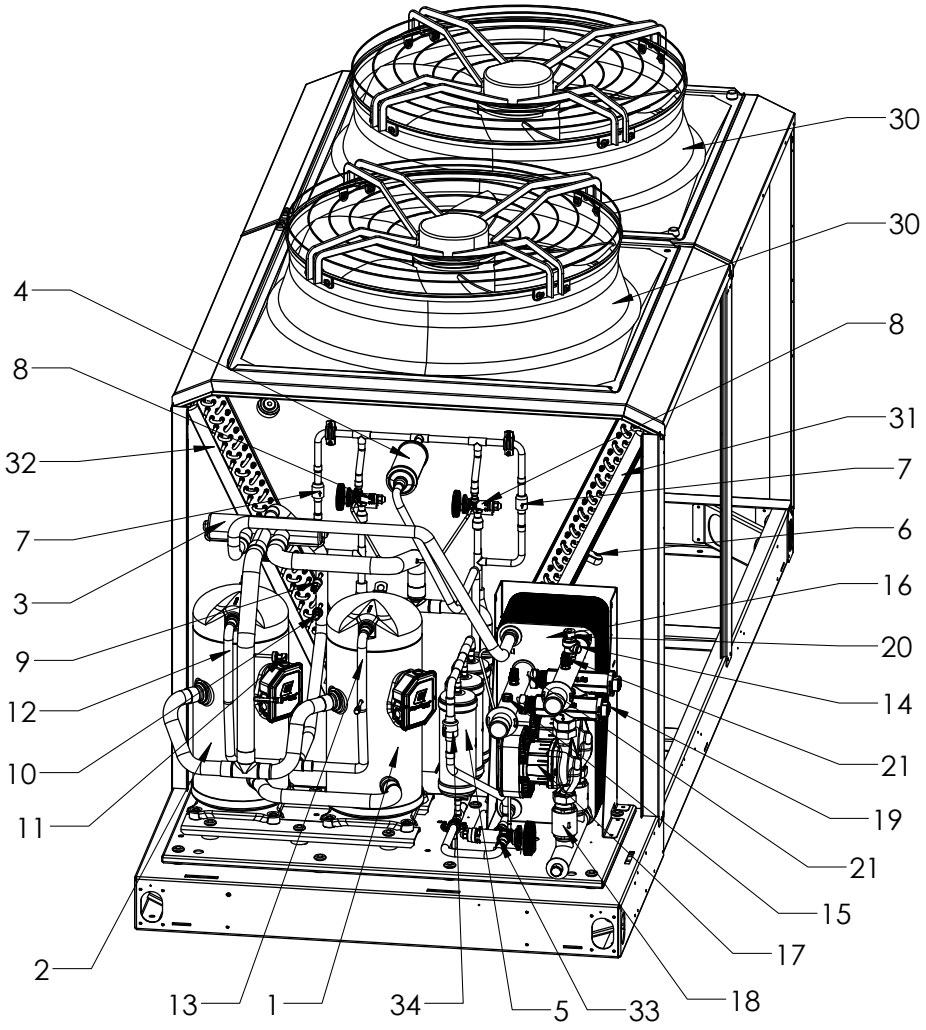
6.3 - HRC[70] 40 kW tri V /3 heat pump



Mark	Reference HRC[70] 40 kW tri V /3	Description	Mark	Reference HRC[70] 40 kW tri V /3	Description
1	B1244518	Compressor CP1	15	B1244575	Temperature sensor lg 1200 mm (Water inlet)
2	B1244518	Compressor CP2	16	B1473177	Plated heat exchanger
3	B4995942	4-way valve kit	17	B1244972	Circulator
4	B1473151	Dehumidifying filter	18	B1239287	Check valve
5	B1473149	Liquid reservoir	19	B1472997	Filter sieve
6	B1244522	Outdoor sensor - lg 900 mm	20	B1239094	Pressure-relief valve set at 3 bar
7	B1473185	Valve	21	B1239089	Drain valve
8	B1473179	Hot pressure reducer	30	B1242094	Fan Ø 800
9	B1239268	High pressure sensor	31	B1473168	Right evaporator
10	B1239211	High pressure switch	32	B1473167	Left evaporator
11	B1239225	Low pressure sensor	33	B1473113	Cold pressure reducer
12	B1244552	Temperature sensor lg 900 mm (CP2)	34	B1473184	Valve
13	B1244834	Temperature sensor lg 700 mm (CP1)	35	B1473264	Shut-off valve
14	B1244577	Temperature sensor lg 700 mm (Water outlet)	Not visible	B4995686	Wiring kit

Note : Availability of spare parts :
Spare parts which belong our products are available during 10 years, from the end of the mass production, except from an event beyond our control.

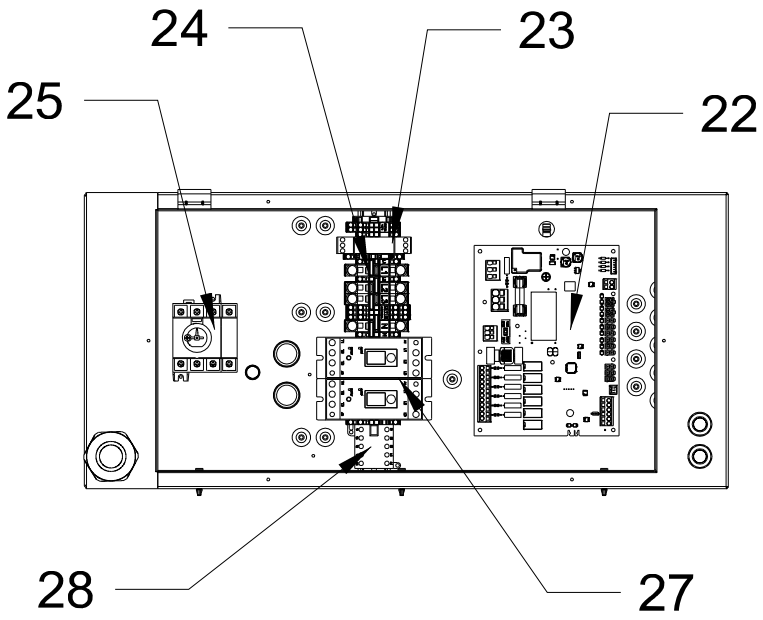
6.4 - HRC^{70} 80 kW tri V heat pump

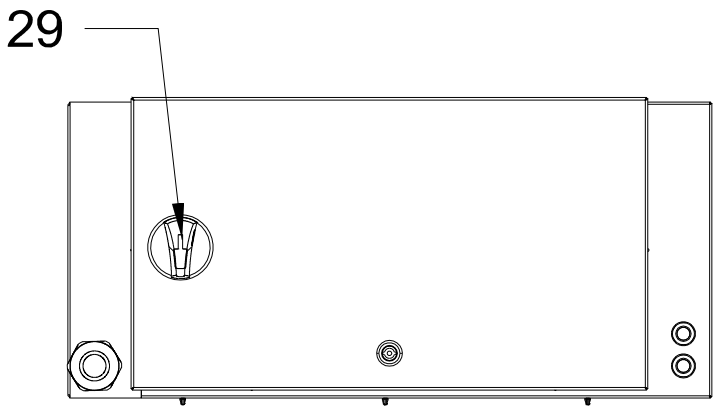


Mark	Reference HRC^{70} 80 kW tri V	Description	Mark	Reference HRC^{70} 80 kW tri V	Description
1	B1242060	Compressor CP1	15	B1244575	Temperature sensor lg 1200 mm (Water inlet)
2	B1242060	Compressor CP2	16	B1473152	Plated heat exchanger
3	B1473086	4-way valve kit	17	B1242073	Circulator
4	B1473212	Dehumidifying filter	18	B1239202	Check valve
5	B1473149	Liquid reservoir	19	B1472997	Filter sieve
6	B1244522	Outdoor sensor - lg 900 mm	20	B1239094	Pressure-relief valve set at 3 bar
7	B1473185	Valve	21	B1239089	Drain valve
8	B1473187	Hot pressure reducer	30	B1242094	Fan Ø 800
9	B1239268	High pressure sensor	31	B1473128	Right evaporator
10	B1239211	High pressure switch	32	B1473129	Left evaporator
11	B1239225	Low pressure sensor	33	B1473188	Cold pressure reducer
12	B1244552	Temperature sensor lg 900 mm (CP2)	34	B1473185	Valve
13	B1244834	Temperature sensor lg 700 mm (CP1)	Not visible	B4995686	Wiring kit
14	B1244577	Temperature sensor lg 700 mm (Water outlet)			

Note : Availability of spare parts :
Spare parts which belong our products are available during 10 years, from the end of the mass production, except from an event beyond our control.

6.5 - Electrical boxes





Mark	HRC[70] 40 kW tri V	HRC[70] 60 kW tri V	HRC[70] 80 kW tri V	Description
22	B4995719	*In progress*	B4995719	Heat pump C9+ Circuit board replacement kit
23	B1943123		B1943123	Three-phase starter controller
24	B1243147		B1243147	4A Fuse 5x20
25	B4995283		B4995283	Disconnecting kit
26	B1242083		B1242070	Three-phase starter
27	B1242083		B1242070	Three-phase starter
28	B1243561		B1243561	Contactor
29	B1244911		B1244911	Operating button

	Reference on electrical wiring diagram	
Screw-in electrical connections	RCP	Phase relay controller
	KMC1	Compressor 1 contactor
	KMC2	Compressor 2 contactor
	BUS	2-core sheathed cable
Electrical connections using Faston terminals	K1	Compressor 1
	K2	Compressor 2

7 - WARRANTY

The warranty covers the HRC[70] Heat Pump for a period of two (2) years, starting from the date the appliance was activated, if the warranty form was sent back to the manufacturer, or failing that, from the date the appliance was manufactured.

If the appliance was installed by a manufacturer-approved technical centre, you will be entitled to an additional year on your warranty. A comprehensive warranty will apply for the first year (parts, labour and on-site support) followed by two more years of coverage for parts only.

The appliance is guaranteed against all manufacturing defects, provided that it was installed according to the instructions provided in this manual and in compliance with all current rules and regulations in the country of installation. All electrical connections should comply with the C15-100 standard.

Under no circumstances does a defective part warrant the replacement of the whole appliance.

The warranty only applies to parts which we identify as having been defective at manufacture. If necessary, the part or product should be returned to the manufacturer, but only with prior agreement from our technical department. Labour, transport, and packaging costs are the responsibility of the user. Repairs on a device will not result in compensation.

The warranty on replacement parts ends at the same time as the warranty of the appliance.
The warranty only applies to the appliance and its components and excludes any part or installation external to the appliance: electrical parts, hydraulic components, etc...

The warranty will not apply in the absence of, insufficient, or improper, maintenance of the appliance.

It is essential to carry out regular annual maintenance on the appliances and on the installation to ensure sustained use and durability. This maintenance should be carried out by your installer, or by a manufacturer-approved technical centre. In the absence of regular maintenance the warranty is rendered null and void.

Any work on the refrigerant circuit must be carried out by a person with a brazing qualification appropriate to the appliance category (see appliance nameplate). Refrigerant must not be vented to the atmosphere. Refrigerant must be recovered before any work is carried out on the circuit.

The HRC[70] Heat Pump uses R290 refrigerant fluid. Given the flammable nature of the fluid, any work on the refrigerant circuit must be done with appropriate materials and conforming to all regulations in effect.

If an appliance is presumed to be the cause of any damage, it must not be moved or tampered with before an expert assessment has been carried out.

7.1 - Limitations of warranty

7.1.1 - General information

The warranty does not apply to defects or damage caused by situations or events such as:
- Misuse, abuse, negligence, improper transport or handling.
- Incorrect installation, or installation which has been carried out without following the instructions in the manual and user guide.
- Insufficient maintenance.
- Modifications or changes carried out on the appliance.
- Impacts from foreign objects, fire, earthquakes, floods, lightning, ice, hailstones, hurricanes or any other natural disaster.
- Movement, imbalance, collapse or settling of the ground or the structure where the appliance is installed.
- Any other damage which is not due to defects in the product.

We do not guarantee against variations in the colour of the appliance or damage caused by air pollution, exposure to chemical elements, or changes brought about by adverse weather conditions.

The products are not guaranteed against dirt, rust, grease or stains which occur on the surface of the appliance. We are not responsible for any variations in colour.

7.1.2 - Cases (not limited to) for exclusion from warranty

7.1.2.1 - Water from the heating circuit

Cases (not limited) for exclusion from warranty:
- Not rinsing the heating circuit
- Using rain or well-water
- Not treating the water for filling the heating circuit according to the instructions in the installer instruction manual.

7.1.2.2 - Handling

Cases (not limited) for exclusion from warranty:
- Any damage sustained by impacts or falls during handling after delivery from the factory.
- Deterioration in the condition of the appliance after handling where the instructions in the manual have not been followed.
- Deterioration of the **HRC[70] Heat Pump** because it was leaning or laid flat.

7.1.2.3 - Placement

Cases (not limited to) for exclusion from warranty :
- Placement of the **HRC[70] Pilot** in a location where it could be subject to ice/frost or other adverse weather conditions.
- Absence of frost protection for the appliances in the installation.
- Placement of the Heat Pump on a surface which cannot support the weight of the appliance, or installation of the HRC[70] Pilot on a vertical surface which is not appropriate for the weight of the appliance.
- Not respecting the horizontal positioning of the Heat Pump.
- Not positioning the appliance in accordance with the instructions in the installer manual.

Costs incurred due to access difficulties are not the manufacturer's responsibility.

7.1.2.4 - Electrical connections

Cases (not limited) for exclusion from warranty:
- Faulty electrical connection which does not conform to the national standards in effect.
- Not following the electrical connection diagrams provided in the installer manual.
- Electrical supply being significantly over- or under- the required voltage.
- Not respecting the supply cable sections.
- Absence of, or insufficient electrical protection throughout the appliance (fuses / circuit breaker, grounding…).

7.1.2.5 - Hydraulic connections

Cases (not limited) for exclusion from warranty:
- Reversed the inlet/outlet connections.
- Water pressure over 2,5 bars.
- Absence of, improper mounting of, or obstruction of pressure-relief valves.
- External corrosion due to piping being improperly sealed, or due to condensates not draining properly.
- Inappropriate connection for the draining and recovery of condensates.
- Installation which does not comply with the instructions provided in the installer manual.

7.1.2.6 - Accessories

The warranty does not cover faults or defects resulting from:
- Installation of accessories which do not comply with our recommendations.
- The use of accessories which do not come from the manufacturer of the appliance.

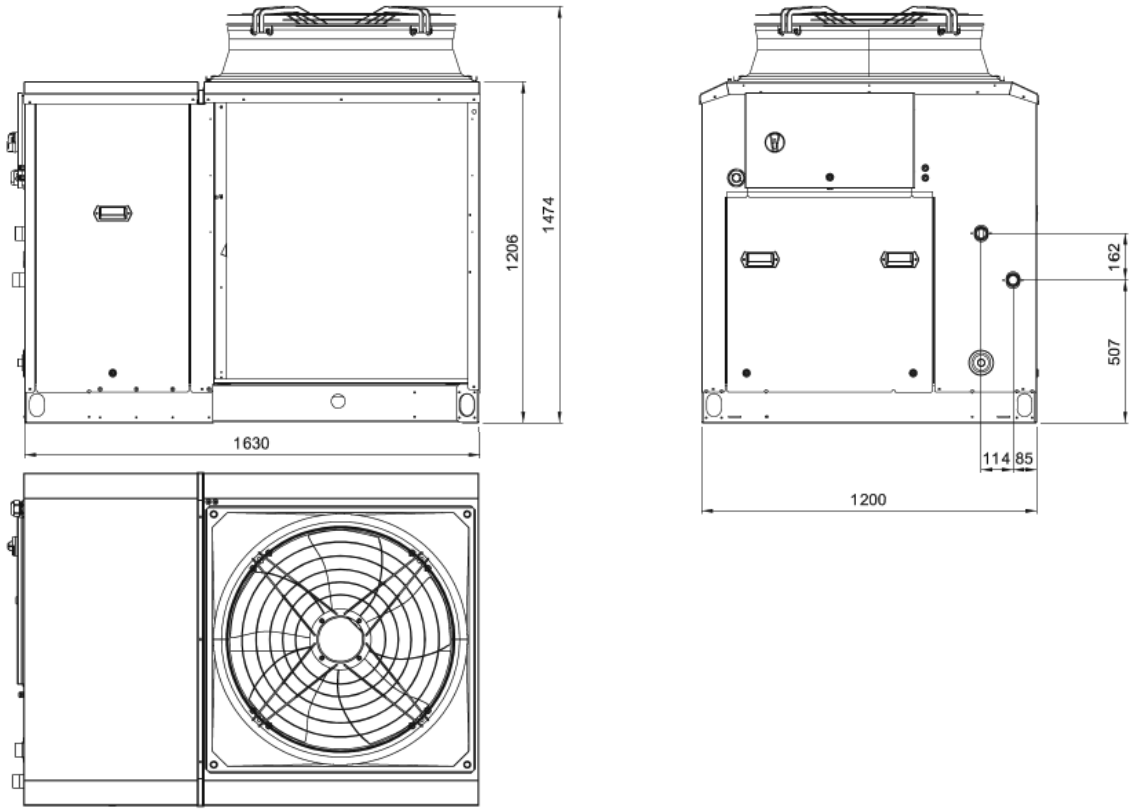
7.1.2.7 - Maintenance

Cases (not limited) for exclusion from warranty:
- Not respecting the maintenance instructions provided in the installer manual.
- Not maintaining :
  . the evaporator
  . the condensates drainage system
- Not using parts issued by the manufacturer.
- Outer casing and bodywork being subjected to any external damage.
- Abnormal sludge levels.
- Not cleaning the protective filters.

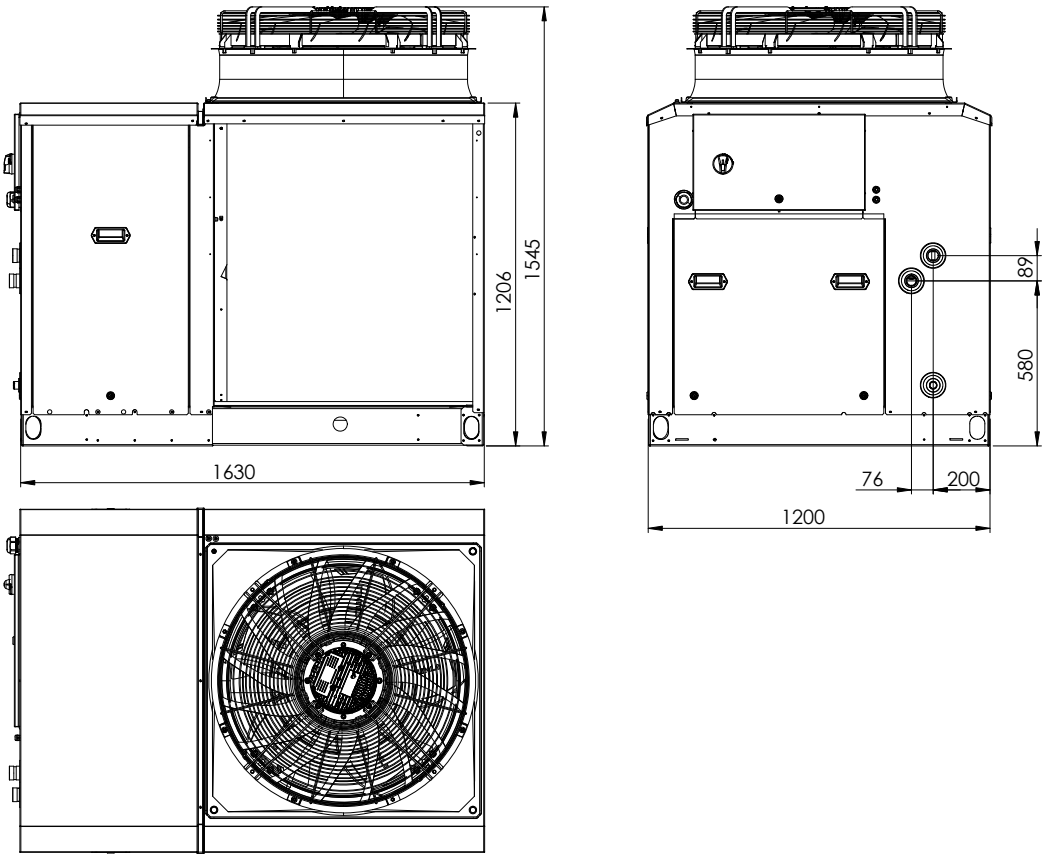
APPENDICES

A1 - Dimensions

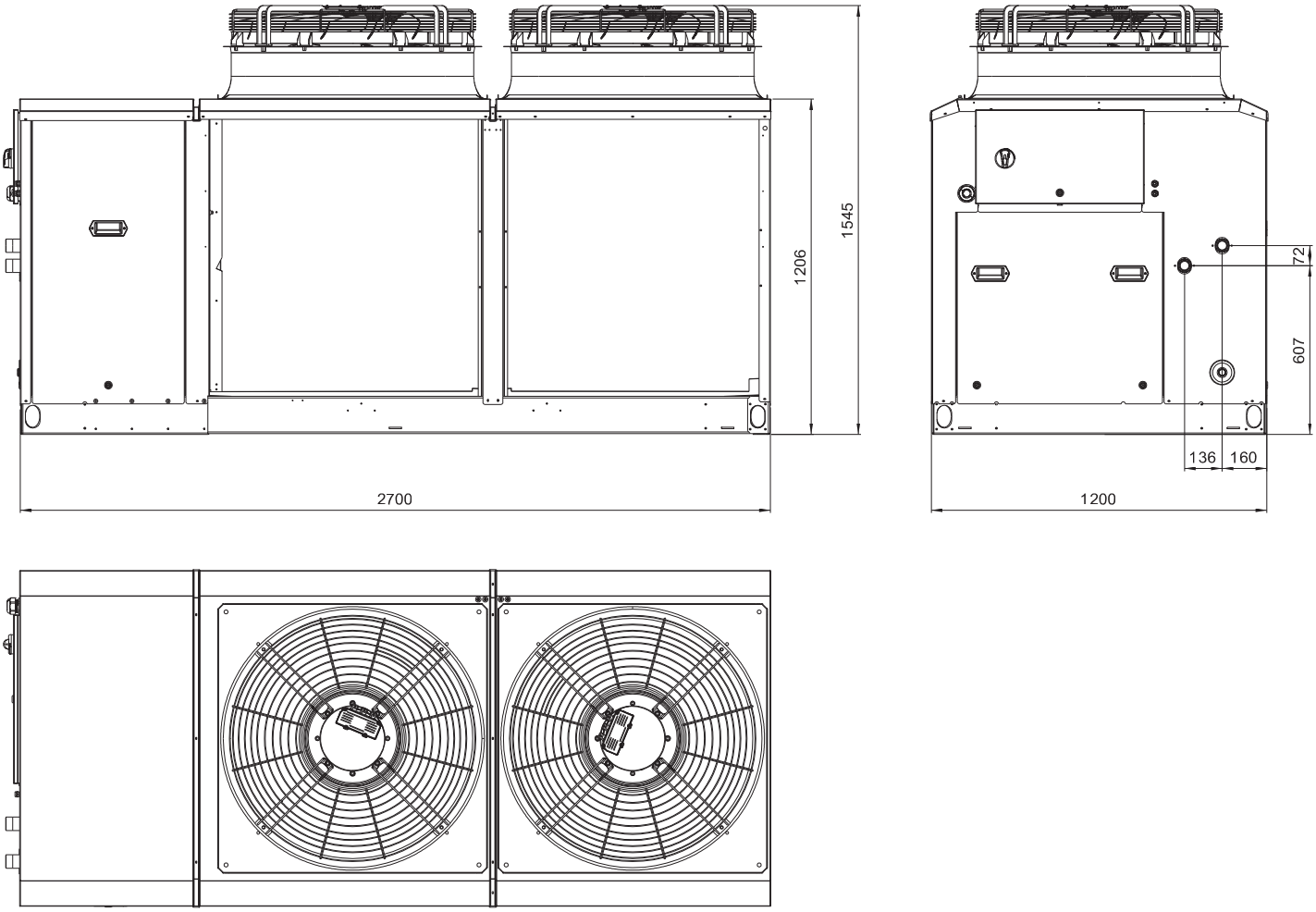
A1.1 - HRC70 40 kW tri V /1 heat pump dimensions



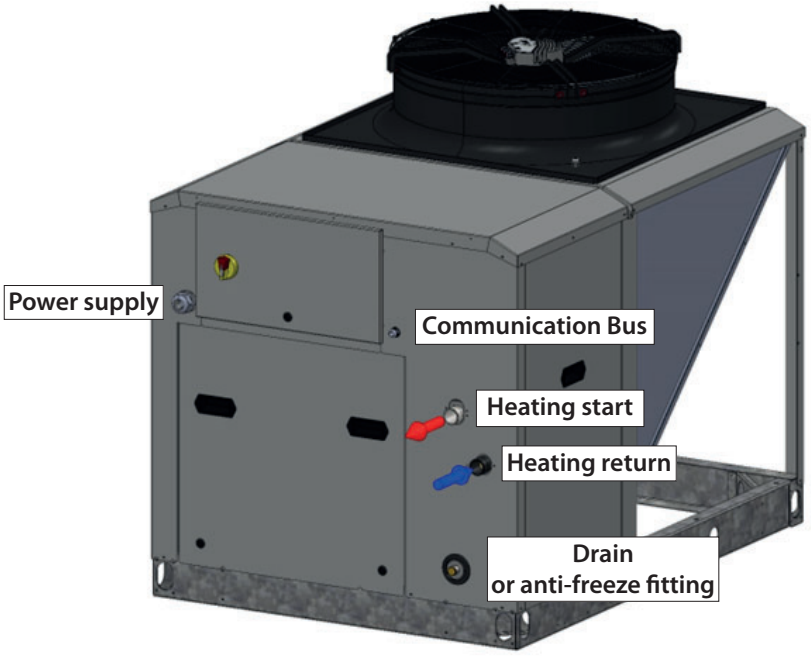
A1.2 - HRC70 40 kW tri V /2 and /3 heat pump dimensions



A1.3 - HRC[70] 80kW tri V heat pump dimensions



A1.4 - Appliance connections



A2 - Technical specifications

A2.1 - General characteristics

	HRC^{70} 40 kW tri V	HRC^{70} 60 kW tri V	HRC^{70} 80 kW tri V
Maximum temperature	70°C	70°C	70°C
R290 refrigerant fluid	3,200 kg	*In progress*	4,500 kg
Maximal pressure of the refrigerant circuit	Low pressure : 17 bar High pressure : 31 bar	Low pressure : 17 bar High pressure : 31 bar	Low pressure : 17 bar High pressure : 31 bar
Exterior air temperature range	-20°C / +40°C	-20°C / +40°C	-20°C / +40°C
Electrical power supply	3~ / 400 V / 50 Hz	3~ / 400 V / 50 Hz	3~ / 400 V / 50 Hz
Maximum current called for	26,3 A ** or 28,1 A ***	*In progress*	62,2 A ** or 65,9 A ***
Maximum start-up current	54 A	90 A	115 A
Progressive starter	Standard	Standard	Standard
Head protection (D-curve)	32 A tetrapolar	48 A tetrapolar	63 A tetrapolar ** or 80 A tetrapolar ***
Minimum width of power supply cables	5 G 6 mm^2 mini*	*In progress*	5 G 16 mm^2 mini*
Material	Steel	Steel	Steel
Dimensions L x H x P (mm)	1630 x 1545 x 1200	*In progress*	2700 x 1545 x 1200
Dimensions with packaging L x H x P (mm)	1800 x 1705 x 1300	*In progress*	2850 x 1705 x 1300
Weight when empty	425 kg	*In progress*	645 kg
Nominal water flow rate	4700 l/h	7700 l/h	11000 l/h
Hydraulic connection	40/49 mm Connection Victaulic/Grooved (G 1"½M delivered il the electrical box)	*In progress*	40 / 49 mm (G 1"½M)
Maximum hydraulic pressure	3 bar	3 bar	3 bar
Ø of condensates drainage	G 1"F	G 1"F	G 1"F
Air flow rate	6000 to 12000 m^3/h	8000 to 16000 m^3/h	12000 to 24000 m^3/h
Anti-vibration support - Springs	Option - **Ref. : 754605**	*In progress*	Option - **Ref. : 754606**
Anti-vibration support - Rubber foot	Option - **Ref. : 754603**	*In progress*	Option - **Ref. : 754604**
Sound pressure level at 1m Power stage 1 / 2	52 / 61 dB(A) **	*In progress*	52,5 / 57 dB(A) **

Subject to distance between power supply and heat pump ; dimensioning according to NFC 15-100; UTE 15-105.

*** Unsheathed heat pumps*

**** Ducted heat pumps*

A2.2 - Performances

	Outdoor air temp	HRC70 40 kW tri V				HRC70 60 kW tri V				HRC70 80 kW tri V			
		Water temperature				Water temperature				Water temperature			
		30/35	40/45	47/55	55/65	30/35	40/45	47/55	55/65	30/35	40/45	47/55	55/65
MAX heating capacity*	**20 °C**	43,00	42,25	41,50	40,50					83,00	81,50	80,00	77,00
Heating capacity nominal**		24,58	22,58	21,78	20,36					53,85	48,81	46,73	42,45
Nominal COP***		5,38	4,27	3,68	2,94					4,85	3,84	3,30	2,67
MAX heating capacity*	**15°C**	40,25	39,00	38,00	37,00					81,00	79,00	77,50	74,00
Heating capacity nominal**		23,41	21,50	20,74	19,39					52,28	46,48	44,48	40,82
Nominal COP***		5,29	4,19	3,43	2,78					4,75	3,75	3,15	2,56
MAX heating capacity*	**12 °C**	37,00	36,25	35,50	34,50					79,50	77,50	75,50	73,00
Heating capacity nominal**		22,36	20,58	19,79	18,81					49,72	45,58	43,14	40,58
Nominal COP***		5,11	3,97	3,29	2,69					4,64	3,69	3,07	2,55
MAX heating capacity*	**7°C**	36,50	35,00	34,00	33,00					76,00	74,50	73,00	70,50
Heating capacity nominal**		20,25	19,55	18,86	18,47					45,92	42,88	41,22	39,49
Nominal COP***		4,64	3,84	3,20	2,70					4,24	3,50	2,97	2,52
MAX heating capacity*	**2 °C**	32,00	31,00	30,00	29,00					68,50	66,00	63,50	61,50
Heating capacity nominal**		16,15	15,83	15,82	15,33					34,68	33,74	32,51	31,42
Nominal COP***		3,52	3,02	2,56	2,20					3,21	2,79	2,42	2,09
MAX heating capacity*	**-7 °C**	30,00	29,00	28,00	27,50					54,00	53,00	52,00	51,50
Heating capacity nominal**		26,38	25,46	24,72	24,14					52,37	51,80	51,48	51,16
Nominal COP***		2,93	2,50	2,19	1,98					2,73	2,34	2,13	1,91
MAX heating capacity*	**-10 °C**	26,00	25,00	24,00	23,00					52,00	51,00	50,00	49,00
Heating capacity nominal**		23,66	23,25	22,56	21,85					50,70	49,98	49,00	48,02
Nominal COP***		2,43	2,24	1,89	1,70					2,59	2,22	1,97	1,81
MAX heating capacity*	**-15°C**	23,00	22,00	21,25	20,50					49,00	48,00	47,00	46,00
Heating capacity nominal**		21,39	20,46	19,98	19,48					47,07	46,53	45,56	45,08
Nominal COP***		2,34	2,09	1,78	1,67					2,46	2,11	1,89	1,72
MAX heating capacity*	**-20 °C**	19,50	18,50	17,50	17,00 (1)					45,00	44,00	43,00	42,50 (1)
Heating capacity nominal**		18,33	17,39	16,63	16,15 (1)					43,88	43,12	42,14	41,65 (1)
Nominal COP***		2,08	1,84	1,56	1,48 (1)					2,16	1,88	1,63	1,52 (1)

***** *Max heating capacity without de-icing.*
*** Rated power determined in accordance with standard EN14511.*
**** Unsheathed heat pumps*
(1) Water regime 50/60

A3 - EU declaration

This device complies with international electrical safety standards IEC 60335-1, IEC 60335-2-40. The CE marking on the device certifies its compliance with the following Community Directives, of which it meets the essential requirements:

- Low Voltage Directive (LV): 2014/35 / EU.
- Electromagnetic Compatibility Directive: (EMC): 2014/30 / EU.
- Ecodesign Directive applicable to energy-related products: 2009/125 / EC.
- Limitation of Hazardous Substances (ROHS): 2011/65 / EU.
- European pressure equipment Directive : 2014/68/UE.

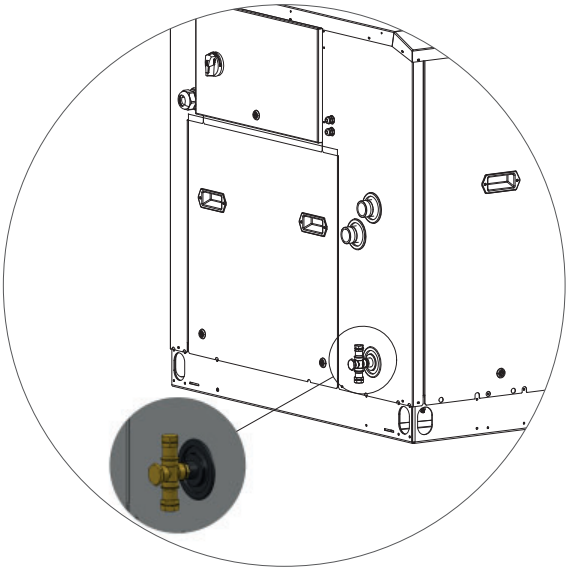
A4 - Frost protection

In cases where the HRC70 Heat Pump cannot operate (exterior temperature is outside of the operating range), and a back-up is authorised (boiler or electrical), it will automatically be protected from frost or ice as the circulator pump will operate and draw heat from the heating circuit which has its temperature maintained by the HRC70 Pilot's electrical back-up or back-up boiler.

The water temperature remains over 7°C.

We recommend installing two frost protection valves (see diagram opposite) for better protection of the machine in the event of a power cut and frost.

Diameter of frost protection tapping: ½''.



In all cases the piping must be properly insulated.

Underground piping should be installed within protective guttering.

However, in the case of installation without a back-up, or if the HRC70 Pilot or HRC70 Heat Pump is being switched off during the winter months (ex.: Accidental stop, secondary residence, etc...), an additional anti-freeze protection is necessary.

Apply glycol to the heating circuit (with a minimum concentration of 25% glycol) or make sure to have hydraulic circuit draining measures in place for the HRC70 Heat Pump and its accessories (described above).

A5 - Treatment of the water in the heating circuit

It is MANDATORY to read the additional document concerning the quality of water used for filling the installation. This document is included with this manual as well as in the packet with the warranty information.

This document also contains information which is PERTINENT to the WARRANTY of the material.

A5.1 - Preparation of the hydraulic circuit (rinsing)

Before installing the HRC[70] Pilot and the HRC[70] Heat Pump, it is necessary to rinse the installation with an appropriate product.

This permits the elimination of all traces left from soldering, soldering fluxes, grout, grease, sludge, metallic particles, etc..in radiators, underfloor heating, etc...

This prevents any of the above-mentioned waste from getting into the HRC[70] Heat Pump heat exchanger, or from obstructing the filter installed on the incoming water inlet.

A5.2 - Filling water

The materials used for producing a heating circuit are of different natures. Instances of corrosion may occur through galvanic coupling in both new and existing installations.

The filling of the heating circuit must be done only with untreated water (no water softener) from the drinking water network. **Filling with water from any other source (well water, rain water etc...) will render the warranty null and void.**

A5.3 - Treatment of the heating circuit

Central heating installations must be cleaned in order to eliminate debris (copper, filings, soldering waste) related to the set-up of the installation or from chemical reactions between the metals.

Furthermore, it is important to **protect the central heating installations from risks of corrosion, limescale, and microbiological development** through use of a corrosion inhibitor which is suitable for all kinds of installations (steel or cast-iron radiators, PEX underfloor heating).

PRODUCTS USED FOR THE TREATMENT OF HEATING WATER MUST BE APPROVED BY THE LOCAL OR NATIONAL PUBLIC HYGIENE AND HEALTH AUTHORITY.

We recommend the use of products in the **SENTINEL** range for preventative and curative treatment of the heating circuit.

• For new installations : (less than 6 months old):

- Clean the installation with a universal cleaner to eliminate the debris from the installation (copper, fibres, soldering fluxes)
  *Example : **SENTINEL X300** or **SENTINEL X800**.*
- Thoroughly rinse the installation until the water runs clear, with no traces of impurities left.
- Protect the installation against corrosion with a corrosion inhibitor, example: **SENTINEL X100**. Or against corrosion and freezing with an inhibitor with an anti-freeze additive. *Example : **SENTINEL X500** or **SENTINEL R600**.*

• For existing installations:

- Desludge the installation with a desludging product to eliminate any sludge from the installation. *Example : **SENTINEL X400** or **SENTINEL X800**.*
- Thoroughly rinse the installation until the water runs clear, with no traces of impurities left.
- Protect the installation against corrosion with a corrosion inhibitor, example: **SENTINEL X100**. Or against corrosion and freezing with an inhibitor with an anti-freeze additive. *Example : **SENTINEL X500** or **SENTINEL R600**.*

Corrosion inhibitor :
- protects against the formation of limescale
- prevents «pinhole» type corrosion
- prevents, in new installations, the formation of sludge and the proliferation of bacteria (in low temperature networks: algae)
- prevents the formation of hydrogen
- eliminates the sound of the generators

Treatment products from other manufacturers can be used if they guarantee that the product is appropriate for all the materials used in the appliance and offers efficient resistance to corrosion. To find this information refer to their user manual.

A5.4 - Protection from freezing

In cases where the HRC[70] Heat Pump cannot operate (exterior temperature is outside of the operating range), and a back-up is authorised (boiler or electrical), it will automatically be protected from frost or ice as the circulator pump will operate and draw heat from the heating circuit which has its temperature maintained by the HRC[70] Pilot's electrical back-up or back-up boiler.

However, in the case of installation without a back-up, or if the HRC[70] Pilot or HRC[70] Heat Pump is being switched off during the winter months (ex. Accidental stop, secondary residence, etc...), an additional anti-freeze protection is necessary to prevent having to drain the hydraulic circuit of the Heat Pump located outside of the building.

For anti-freeze product, use «mono-propylene glycol» with an added corrosion inhibitor.

Do not use mono-ethylene glycol (toxic product)

Choose the % of glycol based on the minimum exterior temperature to protect the water circuit from freezing (the concentration should not be under 25%) :

Outdoor temperature (°C)	-10	-15	-20	-25
% of glycol needed	25	30	35	40

When using a concentrated protect which needs to be diluted with water, mix the water + anti-freeze + inhibitor mixture together prior to inserting it into the installation.

RENDERING THE WARRANTY NULL AND VOID

All deterioration of the appliance due to an inappropriate quality of water and/ or the presence of corrosion in the absence of treatment products as described above, and/or an improper purging of air of the installation will render the warranty to be null and void.

- **Regularly check the pH level and % of glycol in the installation.**
- **Never top-up the glycol in your installation without measuring the pH to check that the drop in glycol % is not due to a deterioration of the glycol.**
- **When the pH is acidic (<7) replace all of the glycol after having already drained and rinsed the installation.**

A6 - Sizing the expansion vessel

• For a heating system with radiators.
The expansion vessel fitted to the boiler may be sufficient.
However, check that the capacity of the existing vessel matches the total volume of the installation (take into account the 60L of the HRC^{70} Pilot tank when calculating the total volume of the installation, not forgetting the volume of any buffer tank).

• Sizing the expansion vessel.
The volume of the expansion tank fitted to the HRC^{70} heat pump depends on the static height of the system. The pre-inflation pressure of the expansion vessel should be adjusted and it should be checked that the capacity of the vessel corresponds to the total volume of the system:

Height of installation (m)		2.5	5	7.5	10	12.5	15
Pre-charged pressure (bars) (1)		0.25	0.5	0.75	1	1.25	1.5
Volume of water in the installation covered by 1 liter of the expansion vessel (liters) (2)	25% glycol	15.9	14.5	13.0	11.6	10.1	8.7
	30% glycol	15.6	14.2	12.7	11.3	9.9	8.5
	35% glycol	14.7	13.4	12.1	10.7	9.4	8.0
	40% glycol	14.0	12.7	11.4	10.2	8.9	7.6

(1) Deflate and check pressure in expansion vessel if necessary.

(2) As a guideline, take into account:
- 11 litres per kW heating capacity for steel radiators
  + 60 litres for HRC^{70} Pilot
  + buffer tank (if applicable)
- 13 litres per kW heating capacity for cast-iron radiators
  + 60 litres for HRC^{70} Pilot
  + buffer tank (if applicable)
- 17 litres per kW heating capacity for underfloor heating
  + 60 litres for HRC^{70} Pilot
  + buffer tank (if applicable)

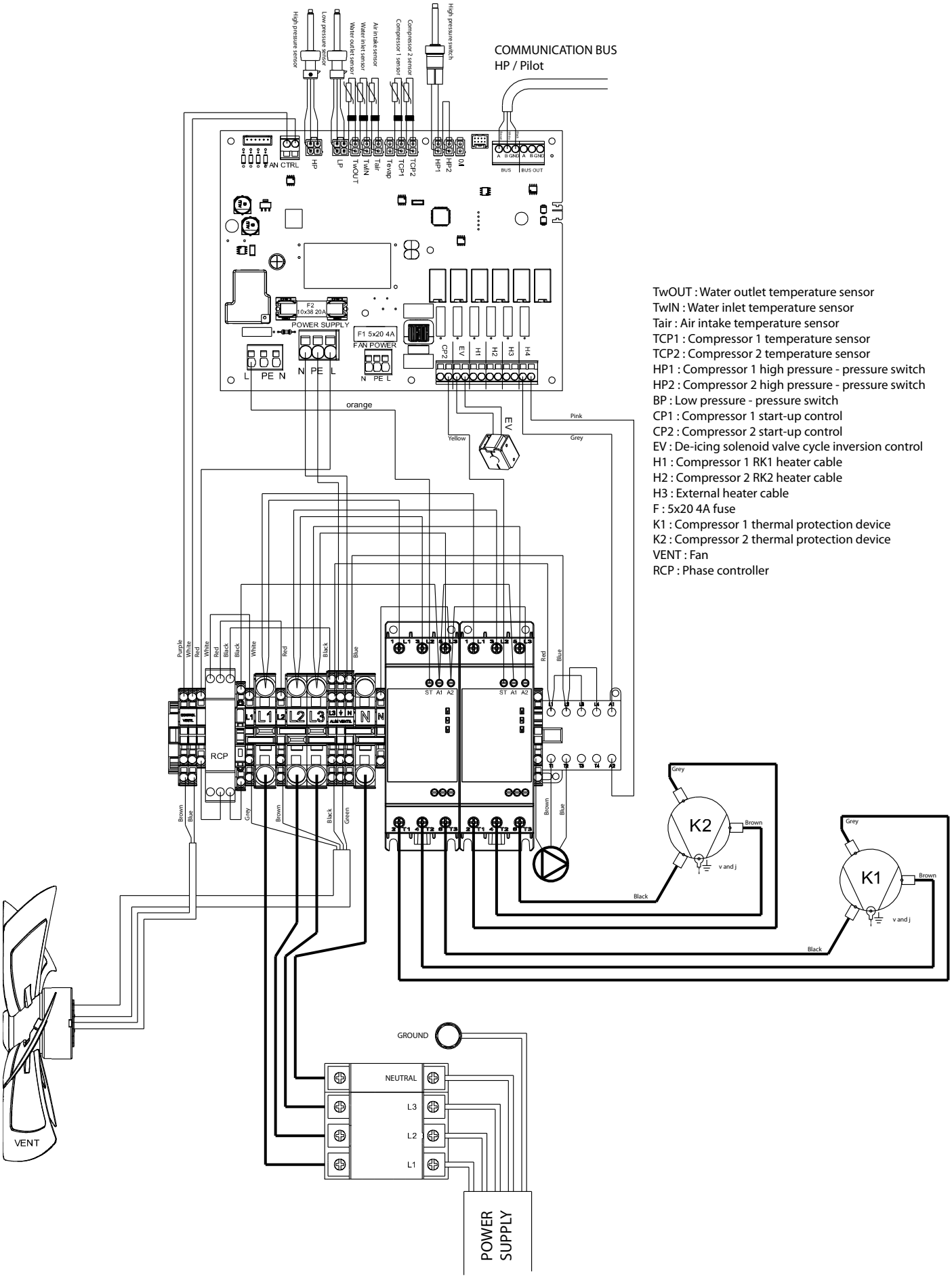
Or, if known, use the exact volume.

Example
- *Installation with 12kW cast-iron radiators*
- *Height of installation = 10m*
- *Frost/ice protection using 25% glycol*

Total volume of installation = 12 x 13 + 60 = 216 litres
1 litre of expansion vessels covers 11,6 litres of the volume of the installation, so here you would need an expansion vessel with a minimum volume of 18 litres (216 / 11,6).

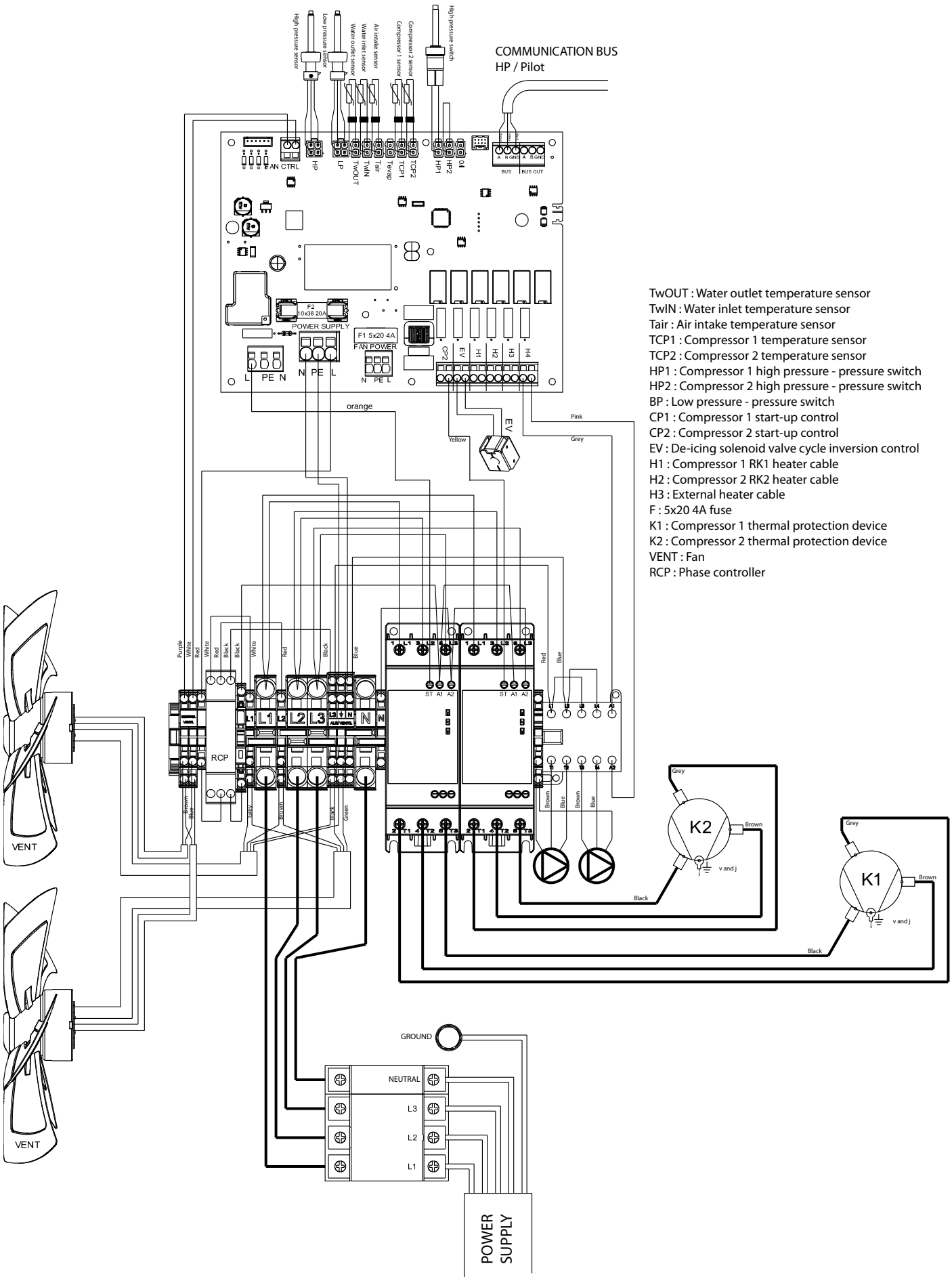
Note :
The values given here are for a radiator installation (water at 80°C). For use with an underfloor heating installation, multiply these values by 2.

A7 - HRC[70] 40 kW tri V heat pump internal wiring diagram



TwOUT : Water outlet temperature sensor
TwIN : Water inlet temperature sensor
Tair : Air intake temperature sensor
TCP1 : Compressor 1 temperature sensor
TCP2 : Compressor 2 temperature sensor
HP1 : Compressor 1 high pressure - pressure switch
HP2 : Compressor 2 high pressure - pressure switch
BP : Low pressure - pressure switch
CP1 : Compressor 1 start-up control
CP2 : Compressor 2 start-up control
EV : De-icing solenoid valve cycle inversion control
H1 : Compressor 1 RK1 heater cable
H2 : Compressor 2 RK2 heater cable
H3 : External heater cable
F : 5x20 4A fuse
K1 : Compressor 1 thermal protection device
K2 : Compressor 2 thermal protection device
VENT : Fan
RCP : Phase controller

A8 - HRC[70] 80 kW tri V heat pump internal wiring diagram



TwOUT : Water outlet temperature sensor
TwIN : Water inlet temperature sensor
Tair : Air intake temperature sensor
TCP1 : Compressor 1 temperature sensor
TCP2 : Compressor 2 temperature sensor
HP1 : Compressor 1 high pressure - pressure switch
HP2 : Compressor 2 high pressure - pressure switch
BP : Low pressure - pressure switch
CP1 : Compressor 1 start-up control
CP2 : Compressor 2 start-up control
EV : De-icing solenoid valve cycle inversion control
H1 : Compressor 1 RK1 heater cable
H2 : Compressor 2 RK2 heater cable
H3 : External heater cable
F : 5x20 4A fuse
K1 : Compressor 1 thermal protection device
K2 : Compressor 2 thermal protection device
VENT : Fan
RCP : Phase controller

A9 - Product information sheet

A9.1 - HRC[70] 40 kW tri V product information sheet

Fiche d'information technique produit (conformement au règlement UE n°811/2013, 813/2013)

Product data sheet (in accordance with EU regulation n°. 811/2013, 813/2013)

Marque / *Brand name*	**intuis**
Modèle / *Model*	**HRC[70] 40 kW tri V**

Pompe à chaleur air-eau *Air-to-water heat pump*	oui yes	Pompe à chaleur basse température *Low-temperature heat pump*	non no
Pompe à chaleur eau-eau *Water-to-water heat pump*	non no	Equipée d'un dispositif d'appoint *Equipped with a supplementary heater*	non no
Pompe à chaleur eau glycolée-eau *Brine-to-water heat pump*	non no	Dispositif de chauffage mixte par pompe à chaleur *Heat pump combination heater*	non no

Caractéristique ***Item***	**Symbole** ***Symbol***	**Unité** ***Unit***	**35°C**	**55°C**
Classe d'efficacité énergétique chauffage / *Heating seasonnal energy efficiency class*			A++	A++
Puissance de chauffage nominale / *Nominal heat output* (*1)	Prated	kW	30	30
Puissance de chauffage nominale / *Nominal heat output* (*2)	Prated	kW	30	26
Puissance de chauffage nominale / *Nominal heat output* (*3)	Prated	kW	30	28
Puissance calorifique déclarée à charge partielle pour une température intérieure de 20°C , une température extérieure Tj avec application basse et moyenne température (35°C / 55°C) et les conditions climatiques moyennes. *Declared capacity for part load at indoor temperature 20°C, outdoor temperature Tj, low and medium temperature application (35°C / 55°C) and average climate condition.*				
Tj = -7°C	Pdh	kW	24,1	25,9
Tj = +2°C	Pdh	kW	16,5	16,0
Tj = +7°C	Pdh	kW	21,3	20,4
Tj = +12°C	Pdh	kW	24,8	23,9
Tj = température bivalente / *Tj = Bivalence temperature*	Pdh	kW	24,5	24,0
Tj = température limite fonctionnement / *Tj = Operating limit temperature*	Pdh	kW	24,6	24,4
Tj = -15°C	Pdh	kW	19,9	18,5
Température bivalente / *Bivalence temperature*	Tbiv	°C	-5	
Puissance calorifique sur intervalle cyclique / *Output for cyclical interval heating mode*	Pcych	kW	-	
Coefficient de dégradation / *Degradation coefficient*	Cdh	-	0,9	
Efficacité énergétique saisonnière / *Seasonal energy efficiency* (*1)	η_s	%	153	127
Efficacité énergétique saisonnière / *Seasonal energy efficiency* (*2)	η_s	%	126	102
Efficacité énergétique saisonnière / *Seasonal energy efficiency* (*3)	η_s	%	208	177
Coefficient de performance déclaré à charge partielle pour une température intérieure de 20°C , une température extérieure Tj avec application basse et moyenne température (35°C / 55°C) et les conditions climatiques moyennes *Declared capacity for part load at indoor temperature 20°C, outdoor temperature Tj, low and medium temperature application (35°C / 55°C) and average climate condition.*				
Tj = -7°C	COPd	-	2,86	2,29
Tj = +2°C	COPd	-	3,89	3,23
Tj = +7°C	COPd	-	5,61	4,68
Tj = +12°C	COPd	-	6,42	5,76
Tj = température bivalente / *Tj = Bivalence temperature*	COPd	-	2,99	2,33
Tj = température limite fonctionnement / *Tj = Operating limit value temperature*	COPd	-	2,57	2,13
Tj = -15°C	COPd	-	2,52	2,04
Température limite de fonctionnement / O*perating limit temperature*	TOL	°C	-10	
Efficacité sur intervalle cyclique / *Cycling interval efficiency*	COPcyc	-	-	
Température maximale eau de chauffage / M*ax. temperature for the heating water*	WTOL	°C	70	
Puissance électrique consommée dans les autres modes que le mode actif / *Power consumption in modes other than active mode*				
Mode arrêt / *OFF mode*	P_{OFF}	kW	0,008	
Mode arrêt thermostat / *Thermostat-off mode*	P_{TO}	kW	0,012	
Mode veille / *Standby mode*	P_{SB}	kW	0,008	
Mode résistance de carter / *Crankcase heater mode*	P_{CK}	kW	0,012	
Dispositif de chauffage d'appoint / *Supplementary heater*				
Puissance thermique nominale d'appoint / *Nominal heat output of supplementary heater*	Psup	kW	5,4	5,6
Type d'énergie chauffage d'appoint / *Type of energy input of supplementary heater*	-	-	électrique / electric	
Autres caractéristiques / *Other items*				
Régulation de la puissance thermique / *Heating capacity control*	-	-	variable	
Consommation annuelle d'énergie / *Annual energy consumption* (*1)	Q_{HE}	kWh	15908	19088
Consommation annuelle d'énergie / *Annual energy consumption* (*2)	Q_{HE}	kWh	23018	24398
Consommation annuelle d'énergie / *Annual energy consumption* (*3)	Q_{HE}	kWh	7584	8310
Puissance sonore intérieure - extérieure / *Sound power level - indoor - outdoor*	L_{WA}	dB	- / 62	- / 61
Débit d'air nominal à l'extérieur / *Rated Air flow outdoor*	-	m^3/h	6000	

Coordonnées de contact / *Contact details*	intuis, rue de la République 80210 Feuquières-en-Vimeu

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*(*1) Conditions climatiques moyennes / Average climatic conditions*

*(*2) Conditions climatiques plus froides / Colder climatic conditions*

*(*3) Conditions climatiques plus chaudes / Warmer climatic conditions*

A9.2 - HRC[70] 80 kW tri V product information sheet

Fiche d'information technique produit (conformement au règlement UE n°811/2013, 813/2013)

Product data sheet (in accordance with EU regulation n°. 811/2013, 813/2013)

Marque / *Brand name*	**intuis**
Modèle / *Model*	**HRC[70] 80 kW tri V**

Pompe à chaleur air-eau *Air-to-water heat pump*	oui yes	Pompe à chaleur basse température *Low-temperature heat pump*	non no
Pompe à chaleur eau-eau *Water-to-water heat pump*	non no	Equipée d'un dispositif d'appoint *Equipped with a supplementary heater*	non no
Pompe à chaleur eau glycolée-eau *Brine-to-water heat pump*	non no	Dispositif de chauffage mixte par pompe à chaleur *Heat pump combination heater*	non no

Caractéristique ***Item***	**Symbole** ***Symbol***	**Unité** ***Unit***	**35°C**	**55°C**
Classe d'efficacité énergétique chauffage / *Heating seasonnal energy efficiency class*			A+	A+
Puissance de chauffage nominale / *Nominal heat output* (*1)	Prated	kW	65	62
Puissance de chauffage nominale / *Nominal heat output* (*2)	Prated	kW	74	72
Puissance de chauffage nominale / *Nominal heat output* (*3)	Prated	kW	46	44
Puissance calorifique déclarée à charge partielle pour une température intérieure de 20°C , une température extérieure Tj avec application basse et moyenne température (35°C / 55°C) et les conditions climatiques moyennes. *Declared capacity for part load at indoor temperature 20°C, outdoor temperature Tj, low and medium temperature application (35°C / 55°C) and average climate condition.*				
Tj = -7°C	Pdh	kW	53,41	51,66
Tj = +2°C	Pdh	kW	35,54	34,11
Tj = +7°C	Pdh	kW	46,05	43,73
Tj = +12°C	Pdh	kW	52,59	50,36
Tj = température bivalente / *Tj = Bivalence temperature*	Pdh	kW	52,31	50,4
Tj = température limite fonctionnement / *Tj = Operating limit temperature*	Pdh	kW	41,32	39,96
Tj = -15°C	Pdh	kW	45,97	44,46
Température bivalente / *Bivalence temperature*	Tbiv	°C	-5	
Puissance calorifique sur intervalle cyclique / *Output for cyclical interval heating mode*	Pcych	kW	-	
Coefficient de dégradation / *Degradation coefficient*	Cdh	-	0,9	
Efficacité énergétique saisonnière / *Seasonal energy efficiency* (*1)	η_s	%	138	115
Efficacité énergétique saisonnière / *Seasonal energy efficiency* (*2)	η_s	%	114	94
Efficacité énergétique saisonnière / *Seasonal energy efficiency* (*3)	η_s	%	167	147
Coefficient de performance déclaré à charge partielle pour une température intérieure de 20°C , une température extérieure Tj avec application basse et moyenne température (35°C / 55°C) et les conditions climatiques moyennes *Declared capacity for part load at indoor temperature 20°C, outdoor temperature Tj, low and medium temperature application (35°C / 55°C) and average climate condition.*				
Tj = -7°C	COPd	-	2,73	2,18
Tj = +2°C	COPd	-	3,55	2,93
Tj = +7°C	COPd	-	4,72	4,09
Tj = +12°C	COPd	-	5,72	5,15
Tj = température bivalente / *Tj = Bivalence temperature*	COPd	-	2,74	2,2
Tj = température limite fonctionnement / *Tj = Operating limit value temperature*	COPd	-	2,12	1,7
Tj = -15°C	COPd	-	2,36	1,89
Température limite de fonctionnement / O*perating limit temperature*	TOL	°C	-20	
Efficacité sur intervalle cyclique / *Cycling interval efficiency*	COPcyc	-	-	
Température maximale eau de chauffage / M*ax. temperature for the heating water*	WTOL	°C	70	
Puissance électrique consommée dans les autres modes que le mode actif / *Power consumption in modes other than active mode*				
Mode arrêt / *OFF mode*	P_{OFF}	kW	0,011	
Mode arrêt thermostat / *Thermostat-off mode*	P_{TO}	kW	0,015	
Mode veille / *Standby mode*	P_{SB}	kW	0,011	
Mode résistance de carter / *Crankcase heater mode*	P_{CK}	kW	0,015	
Dispositif de chauffage d'appoint / *Supplementary heater*				
Puissance thermique nominale d'appoint / *Nominal heat output of supplementary heater*	Psup	kW	14,14	13,44
Type d'énergie chauffage d'appoint / *Type of energy input of supplementary heater*	-	-	électrique / electric	
Autres caractéristiques / *Other items*				
Régulation de la puissance thermique / *Heating capacity control*	-	-	variable	
Consommation annuelle d'énergie / *Annual energy consumption* (*1)	Q_{HE}	kWh	37979	43601
Consommation annuelle d'énergie / *Annual energy consumption* (*2)	Q_{HE}	kWh	62557	72742
Consommation annuelle d'énergie / *Annual energy consumption* (*3)	Q_{HE}	kWh	14548	15718
Puissance sonore intérieure - extérieure / *Sound power level - indoor - outdoor*	L_{WA}	dB	- / 71	
Débit d'air nominal à l'extérieur / *Rated Air flow outdoor*	-	m^3/h	16000	

Coordonnées de contact / *Contact details*	intuis, rue de la République 80210 Feuquières-en-Vimeu

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*(*1) Conditions climatiques moyennes / Average climatic conditions*

*(*2) Conditions climatiques plus froides / Colder climatic conditions*

*(*3) Conditions climatiques plus chaudes / Warmer climatic conditions*

A10 - Electricity provider information form

This form is to given to the electricity provider for all preliminary evaluation for the installation of an HRC Heat Pump in case of an insufficient power grid.

This table contains information on both electrical and technical data about the HRC Heat Pump.

This technical data is provided in the table § «Connecting the HRC^{70} Heat Pump to the power supply ».

The electricity provider can then proceed to increase the power grid if necessary.

A10.1 - Standard form, HRC^{70} 40 kW tri V heat pump

Name of client			
Address			
Client reference number on electricity bill			
Name and address of installer (attach a copy of mandate)			
Connections	Single-phase ☐		Three-phase ☒ *
Circuit breaker	Setting : 32 A		
Heat Pump (HP)			
Type de pump	Single-phase ☐		Three-phase ☒ *
Make, model, and reference number	_____		
Type of compressor (without back-up heating)	Single-phase ☐		Three-phase ☒ *
Nominal heating capacity of the Heat Pump without elements for back-up heating (kVA)	18.4 (kVA) *		
Or	Or		
Heat Pump nominal current without elements for back-up heating (A)	27 (A) *		
Heat Pump start-up current (A)	54 (A) *		
Heat Pump impedance (Z_{max}) **declared by the manufacturer**	Phase : 0,269 (Ω) Neutral : 0,176 (Ω)		
Heat Pump power regulating mode	Fixed speed ☒		Variable speed ☐
Is there a start-up support system in place for fixed-speed systems?	Yes ☒*	No ☐*	-
Elements for heating back-up	Single-phase ☐		Three-phase ☐ *
	_____(kVA)		
*** Mandatory fields**			

A10.2 - Standard form, HRC^{70} 80 kW tri V unducted heat pump

Name of client			
Address			
Client reference number on electricity bill			
Name and address of installer (attach a copy of mandate)			
Connections	Single-phase ☐		Three-phase ☒ *
Circuit breaker	Setting : 63 A **		
Heat Pump (HP)			
Type de pump	Single-phase ☐		Three-phase ☒ *
Make, model, and reference number	_____		
Type of compressor (without back-up heating)	Single-phase ☐		Three-phase ☒ *
Nominal heating capacity of the Heat Pump without elements for back-up heating (kVA)	43,1 (kVA) *		
Or	Or		
Heat Pump nominal current without elements for back-up heating (A)	62,2 (A) *		
Heat Pump start-up curent (A)	In progress (A) *		
Heat Pump impedence (Z_{max}) **declared by the manufacturer**	Phase : _____ (Ω) Neutral : _____ (Ω)		
Heat Pump power regulating mode	Fixed speed ☒		Variable speed ☐
Is there a start-up support system in place for fixed-speed systems?	Yes ☒*	No ☐*	-
Elements for heating back-up	Single-phase ☐		Three-phase ☐ *
	_____(kVA)		
*** Mandatory fields**			

** *Unducted HP.*

A10.3 - Standard form, HRC[70] 80 kW tri V ducted heat pump

Name of client			
Address			
Client reference number on electricity bill			
Name and address of installer (attach a copy of mandate)			
Connections	Single-phase ☐		Three-phase ☒ *
Circuit breaker	Setting : 80 A ***		
Heat Pump (HP)			
Type de pump	Single-phase ☐		Three-phase ☒ *
Make, model, and reference number	_____		
Type of compressor (without back-up heating)	Single-phase ☐		Three-phase ☒ *
Nominal heating capacity of the Heat Pump without elements for back-up heating (kVA)	45.6 (kVA) *		
Or	Or		
Heat Pump nominal current without elements for back-up heating (A)	65,9 (A) *		
Heat Pump start-up curent (A)	In progress (A) *		
Heat Pump impedence (Z_{max}) **declared by the manufacturer**	Phase : _____ (Ω) Neutral : _____ (Ω)		
Heat Pump power regulating mode	Fixed speed ☒		Variable speed ☐
Is there a start-up support system in place for fixed-speed systems?	Yes ☒*	No ☐*	-
Elements for heating back-up	Single-phase ☐		Three-phase ☐ *
	_____(kVA)		
*** Mandatory fields**			

*** *Ducted HP.*

NOTES :

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