Tau SKY Hi HP

EN

Installation, use and maintenance manual

29-08-2022

BlueBox by Swegon

WESTERN™ AIRCONDITIONING WARMTEPOMPEN

THANK YOU

Thank you for choosing our product.

It is the result of many years' experience and careful design and has been built with first-class quality materials and advanced technologies.

Declaration or certificate of conformity also guarantees that the equipment meets the requirements of the European Machinery Safety Directive.

The quality level is constantly monitored, and therefore our products are synonymous with Safety, Quality and Reliability.

Changes considered necessary for product improvement may be made to the stated data at any time without any obligation to give prior notice.

Thank you again

Read this manual carefully before installing, testing or starting this unit.

Give this manual and all complementary documentation to the operator of the system who will be responsible for keeping them so they are always available if needed.

The images and drawings contained herein are examples only.

Contents

1 INTRODUCTION

1.1 Conformity

With regard to relevant regulations and directives, see the declaration of conformity that is an integral part of the manual.

1.2 Description

1.2.1 Symbols

A description of the main symbols used in this manual and on the labels affixed to the unit is given below.

Danger symbol; take extreme care.

Danger symbol; moving mechanical parts.

Danger symbol; live parts.

Warning symbol; important information

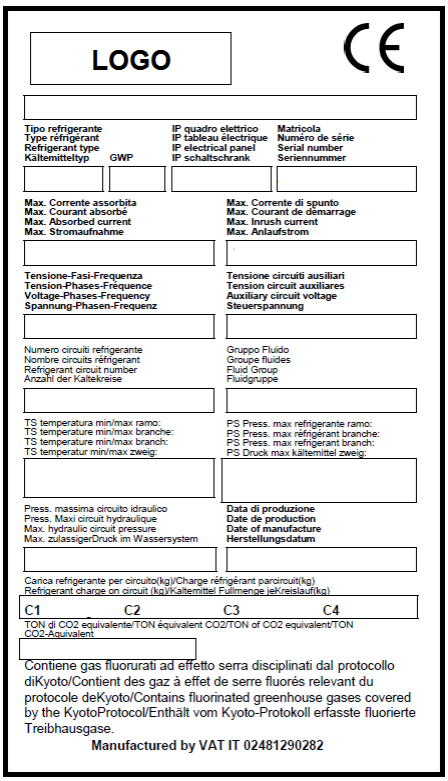
Note symbol; suggestions and advice

1.2.2 Labels

For the constructional features, available models and technical data, please refer to the Technical Catalogue.

The model, serial number, features, power supply voltage and so on are shown on the labels affixed to the unit (the following illustrations are shown only as an example).

The serial number is stamped on the ID plate of the external unit.



The Manufacturer adopts a continuous development policy and, in this perspective, reserves the right to make changes and improvements to the documentation and to the units without prior notice.

The Technical Catalogue, the labels placed directly on the unit and the various diagrams referred to below, must be considered an integral part of this manual.

Do not remove or alter the labels placed on the unit.

2 SAFETY

2.1 General safety precautions

A space of about 3 metres around the unit is identified as external danger zone.

If the unit is positioned in an unprotected place that can be reached by unqualified persons, access to this area must be prohibited by special guarding.

The equipment operator is responsible for complying with regulatory obligations.

The equipment operator is the person who has actual control over the technical operation and free access, which means the possibility of monitoring its components and their operation and the possibility of granting access to third parties.

The equipment operator has the power to decide on technical modifications, checks and repairs.

The equipment operator may give instructions to employees or to external companies for carrying out maintenance and repair operations.

Access to the unit must be granted exclusively to technicians authorised by the equipment operator.

The equipment must be installed and maintained or repaired by staff and contractors who hold a relevant certificate issued by a certification body. Within Europe, the certification body must be designated by a member state to certify compliance with the requirements laid down in Regulation (EU) No 517/2014 of the European Parliament and of the Council of 16 April 2014 on fluorinated greenhouse gases and repealing Regulation (EC) No 842/2006 Text with EEA relevance.

Any operator gaining access to the unit must be authorised and qualified as specified by Annex HH of IEC 60335-2-40:2018, by local legislations and, with respect to europen standards, by EN 378-4 and EN 13133 ", additionally, they must have proper knowledge to perform all the activities required throughout the service life of the machine.

Access to the unit requires that the closing panels, where fitted, are removed.

On no account must unqualified personnel be allowed to enter the unit and no one should be allowed to enter before the power to it has been turned off.

The user can interact with the unit only through the control and external OK signals.

Only authorised knowledgeable personnel may access the unit in compliance with safety in the workplace regulations. At European level, refer to Council Directive 89/391/EEC of 12 June 1989 on the introduction of measures to encourage improvements in the health and safety of workers at work.

Also, knowledge and understanding of the manual are indispensable for reducing risks and for improving the health and safety of workers.

The operator who enters the unit must have sufficient knowledge to perform the various activities throughout the technical life of the machine.

The operator must know what to do when faced with possible anomalies, malfunctions or conditions of danger to himself or others, and in any case, he must comply with the following instructions:

Do not do anything that goes beyond your duties and technical knowledge.

Inform the manager immediately and do not take personal initiatives.

Before carrying out any work on the unit, make sure you have turned off the power supply to it. Refer to the section on maintenance work.

In units with capacitors and/or inverters, certain components can remain live for several minutes even after having turned off the main switch.

Wait 10 minutes before working on the electrical parts of the unit.

Circuits supplied from external sources (made with orange cable) can remain live even after the power supply to the unit has been turned off.

Work on the unit only if there is sufficient lighting for the type of work to be carried out.

Failure to comply with the instructions in this manual and any modifications made to the unit without prior written consent, will immediately void the warranty.

The law regulating the use of stratospheric ozone depleting substances prohibits the release of refrigerant gases into the environment and obliges owners to recover and return them to the dealer or take them to special collection centres at the end of their operational life.

The refrigerant contained in the refrigerant circuit is included among the substances subject to special control regulations provided for by law and must therefore be disposed of as indicated above.

Particular care should be taken during maintenance operations in order to reduce refrigerant leaks as much as possible.

2.1.1 Discharge of the safety valves

If present on the refrigerant circuit, installation requirements and/or national regulations lay down that the discharge of the safety valves must be routed to the outside.

The conveying must be done with a pipe whose diameter must be at least that of the valve outlet, and the weight of the pipe must not be borne by the valve.

Always direct the discharge to areas where the jet cannot cause harm to anyone.

Risk of burns following contact with hot and cold parts.

2.2 Basic rules

All the units are designed and built in compliance with Directive 2014/68/EU of the European Parliament and of the Council of 15 May 2014 on the approximation of the laws of the Member States relating to pressure equipment.

To ensure maximum safety, in order to prevent possible risks, follow the instructions below:

- this product contains pressurised vessels, live components, moving mechanical parts and very hot and cold surfaces that, in certain situations, can pose a risk: all maintenance work must be carried out by skilled personnel equipped with the necessary qualifications in accordance with current regulations. Before carrying out any operation, make sure that the personnel in charge has full knowledge of the documentation supplied with the unit.
- always have a copy of the documentation near the unit.
- The operations indicated in this manual must be integrated with the procedures indicated in the user instruction manuals of the other systems and devices incorporated in the unit. The manuals contain all the necessary information for safely managing the devices and the possible operating modes.
- use suitable protection (gloves, hard hat, protective glasses, safety shoes, etc.) for all maintenance or control operations carried out on the unit.
- Do not wear loose clothing, ties, chains, watches, etc., which can get caught in the moving parts of the unit.
- always use tools and protective equipment in excellent condition.
- The compressors and delivery gas pipes are at high temperature. Therefore, when working in the immediate vicinity, be careful to avoid touching any components of the unit without suitable protection.
- do not work in the discharge trajectory of the safety valves.
- if the units are positioned in unprotected places which can easily be reached by unqualified persons, suitable protection devices must be installed.
- the user must consult the installation and use system manuals, incorporated and attached to this manual.
- there may be potential risks that are not obvious. Warnings and signals are therefore displayed on the unit.
- Do not remove the warnings.

It is expressly forbidden to:

- remove or disable the safety guards;
- tamper with and/or modify, even partially, the safety devices installed on the unit.

If there are alarm warnings and consequent tripping of the safety devices, the user must call in skilled maintenance technicians to fix the problem immediately.

An accident can lead to serious injury or death.

The safety devices must be tested according to the guidelines in this manual.

The manufacturer does not assume any liability for damage/injury to persons, pets or objects arising from the re-use of individual parts of the unit for functions or assembly situations different from the original ones. Tampering with/unauthorised replacement of one or more parts of the unit is prohibited.

The use of accessories, tools or consumables other than those recommended by the Manufacturer relieves the latter from civil and criminal liability.

Deactivation and scrapping of the unit must be carried out only by suitably trained and equipped personnel.

The units do not fall within the scope of Directive 2014/34/EU of the European Parliament and of the Council, of 26 February 2014, on the approximation of the laws of the Member States relating to equipment and protective systems intended for use in potentially explosive atmospheres.

2.2.1 Water flow rate at the heat exchangers

It is necessary to ensure that the water flow rate during operation is no higher than 1.5 times and no lower than 0.5 times the nominal flow rate of the unit stated in the Technical Catalogue.

It is necessary to ensure that the water flow rate during operation is the nominal flow rate of the unit stated in the Technical Catalogue.

In any case, refer to the specific Technical Catalogue for the allowed conditions for water flow in and out of the exchangers.

2.2.2 Water composition

Dissolved substances in the water can cause corrosion in the heat exchangers.

It is mandatory to make sure the parameters of the water comply with the following table:

Description	Values
Total hardness	2,0 ÷ 6,0 °f
Langelier index	- 0,4 ÷ 0,4
pH	7,5 ÷ 8,5
Electrical conductivity	10÷500 µS/cm
Organic elements	-
Hydrogen carbonate (HCO3-)	70 ÷ 300 ppm
Sulphates (SO42-)	< 50 ppm
Hydrogen carbonate / Sulphates (HCO3-/SO42-)	> 1
Chlorides (Cl-)	< 50 ppm
Nitrates (NO3-)	< 50 ppm
Hydrogen sulphide (H2S)	< 0,05 ppm
Ammonia (NH3)	< 0,05 ppm
Sulphites (SO3), free chlorine (Cl2)	< 1 ppm
Carbon dioxide (CO2)	< 5 ppm
Metal cations	< 0,2 ppm
Manganese ions (Mn++)	< 0,2 ppm
Iron ions (Fe2+, Fe3+)	< 0,2 ppm
Iron + Manganese	< 0,4 ppm
Phosphates (PO43-)	< 2 ppm
Oxygen	< 0,1 ppm

ppm = mg/l

The use of water with values above the limits stated in the table will immediately void the warranty.

It is mandatory to include a system for eliminating possible organic substances in the water that could pass through the filter and settle in the heat exchangers, which would lead to malfunctioning and/or breakage over time.

The use of water containing organic substances will immediately void the warranty.

2.2.3 Minimum water content in the system

For correct operation of the unit, it is necessary to ensure a buffering on the system such as to comply with the minimum operating time considering the greater between the minimum OFF time and the minimum ON time.

In short, these contribute to limiting the number of times the compressors are switched on per hour and to preventing undesired deviations from the set point of the delivered water temperature.

The following experimental formula allows the minimum cold-side and hot-side water volume of the system to be calculated:

The following experimental formula allows the minimum water volume of the system to be calculated:

$$v = \frac{P_{tot}}{N} \cdot 1000 \cdot \frac{\Delta\tau}{\Delta T \cdot \rho \cdot Cp} \cdot Fm + P_{tot} \cdot K_1$$

where

v = Minimum water content of the system [l]

Ptot = Total refrigeration capacity [kW]

N = N° of capacity reduction steps

Δτ = Time interval – the greater between minimum OFF time and minimum ON time [s]

ΔT = Allowed differential on the water temperature [°C](unless specified, this is 2.5°C)

ρ = Water density 1000 [kg / ³]

Cp = Specific heat of water 4.186 [kJ / (kg°C)]

Fm = Q factor: experimental factor, different from 1 for some types of unit

K1 = Experimental multiplying constant depending on the type of compressor

With some terms grouped together, the formula can be rewritten as follows:

$$v = \frac{P_{tot}}{N} \cdot K \cdot Fm + P_{tot} \cdot K_1$$

If the carrying fluid consists of mixtures of water-glycol (ethylene or propylene), the density and specific heat values must consequently be adjusted.

For units with scroll compressor, the constants used in the formula assume the following values:

K [l/kW]	17,2
N	For units with compressor without inverter = 1
	For units with compressor with inverter = 3
Fm	1
K1	0,25

The constant K considers that the maximum between the minimum ON and OFF time is Δτ=180s.

2.2.4 Installing the flow switch

The units are shipped from the factory with the flow switch installed.

The arrow on the switch must be aligned with the water flow.

2.2.5 Unit operating in heat pump mode

The performance of units in heat pump operation goes down as the external air temperature falls.

The units are fitted with an antifreeze heater to heat the plate heat exchanger and the bottom of the external coil.

This heater gets started when the external air temperature drops below the setpoint temperature of the thermostat that controls heater operation.

2.2.6 Operation with water to the evaporator at low temperature

With temperatures below 5°C, it is mandatory to work with water and anti-freeze mixtures, and also change the safety devices (anti-freeze, etc.), which must be carried out by qualified authorised personnel or by the manufacturer.

The glycol percentage by weight is determined based on the desired temperature of the chilled water (see table).

Minimum ambient temperature or liquid outlet temperature (°C)	**0**	**-5**	**-10**	**-15**	**-20**	**-25**	**-30**	**-35**	**-40**
Freezing point (°C)	-5	-10	-15	-20	-25	-30	-35	-40	-45
Antifreeze	% by weight								
Ethylene glycol	6	22	30	36	41	46	50	53	56
Propylene glycol	15	25	33	39	44	48	51	54	57

If ambient temperatures are expected to be lower than the freezing point of water, it is essential to use anti-freeze mixtures in the above-mentioned percentages.

2.2.7 Operation in heat pump mode with low temperature water

The standard units are not designed to operate in heat pump mode with water temperatures that are too low (refer to the Techical Catalogue for the limits).

2.2.8 Condensate drain (only for heat pump units)

In heat pump units, condensate is drained through a series of openings located at the base of the external unit. We recommend placing the unit carefully and in such way that condensate is not drained in pedestrian transit areas as this would pose the risk of condensate freezing if the external air temperature is low and the surface to become slippery.

2.2.9 Warnings concerning flammable refrigerants

Units with mildly flammable refrigerants (A2L), such as R32, shall be installed in accordance with the European standards and regulations and with the local regulations, where applicable.

The information below is provided in accordance with standard IEC 60335-2-40:2018 and its annexes and clauses (here in after “Annex” and “Clause”) and it has been taken from the English version of the standard, which is the document to be referenced.

(Annex DD.2) Do not use means to accelerate the defrosting process or to clean, other than those recommended by the manufacturer.

The external unit shall be stored in a room without continuously operating ignition sources (for example: open flames, an operating gas appliance or an operating electric heater).

Do not pierce or burn.

Be aware that refrigerants may not contain an odour.

(Annex DD.3.1) General

Installation shall be implemented in accordance with the European standards and regulations and with the local regulations, where applicable.

The external unit shall be installed outdoors. Installation indoors or in confined spaces shall in no case be admitted.

The refrigerant charge of the external unit is specified in the unit ID plate.

(Annex DD.3.2) Unventilated areas

The external unit shall be stored in a room with a min. floor area (Amin) suitable for a flammable refrigerant. The min. floor area “Amin” shall be calculated in accordance with the existing regulations and Clause GG.2 to standard IEC 60335-2-40:2018. If multiple units are stored in one room, the min. floor area shall be calculated in function of the total number of units simultaneously stored, therefore considering the total refrigerant charge. The refrigerant charge of each unit is listed in the technical specification plate affixed on the unit and on its packaging.

The room where units are stored shall be free of open flames or other potential ignition sources (e.g. operating electric heaters, appliances producing electric arches or surfaces with a temperature exceeding X °C, where X is the surface temperature defined in sect. 22.117 of standard IEC 60335-2-40:2018).

The external unit shall be stored so as to prevent mechanical damage from occurring, as it may cause breakage or refrigerant leaks.

(Annex DD.3.3) Qualification of workers

Any operation concerning the installation, maintenance, repair, disassembly and dismantling of the unit shall be carried out by qualified personnel, in accordance with Annex HH to standard IEC 60335-2-40:2018, who hold a valid certificate in compliance with the existing standards.

The above-mentioned operations include:

- breaking into the refrigerating circuit;
- opening of sealed components;
- opening of ventilated enclosures.

(Annex DD.4) Information on servicing

(Annex DD.4.1) General

(Annex DD.4.2) Checks to the area

Prior to beginning work on systems containing flammable refrigerants, safety checks in the area are necessary to ensure that the risk of ignition is minimised. For repair to the refrigerating system, DD.4.3 to DD.4.7 shall be completed prior to conducting work on the system.

(Annex DD.4.3) Work procedure

Work shall be undertaken under a controlled procedure so as to minimise the risk of a flammable gas or vapour being present while the work is being performed.

(Annex DD.4.4) General work area

All maintenance staff and others working in the local area shall be instructed on the nature of the work being carried out. Work in confined spaces shall be avoided.

(Annex DD.4.5) Checking for presence of refrigerant

The area shall be checked with an appropriate refrigerant detector prior to and during work, to ensure the technician is aware of potentially toxic and flammable atmospheres.

Ensure that the refrigerant or leak detection equipment being used is suitable for use with the refrigerant applicable to the unit, i.e. non-sparking, adequately sealed or intrinsically safe.

(Annex DD.4.6) Presence of fire extinguisher

If any hot work is to be conducted on the unit requiring an increase in the temperature of parts of the unit (e.g. brazing), appropriate fire extinguishing equipment shall be available to hand. Have a dry powder or CO2 fire extinguisher adjacent to the refrigerant charging area.

(Annex DD.4.7) No ignition sources

No person carrying out work in relation to a unit shall use any sources of ignition in such a manner that it may lead to the risk of fire or explosion. All possible ignition sources, including cigarette smoking, should be kept sufficiently far away from the site of installation, repairing, removing and disposal of the unit, during which flammable refrigerant can possibly be released to the surrounding space. Prior to work taking place, the area around the unit is to be surveyed to make sure that there are no flammable hazards or ignition risks. “No Smoking” signs shall be displayed.

(Annex DD.4.8) Ventilated area

Ensure that the area is in the open or that it is adequately ventilated before breaking into the system or conducting any hot work. A degree of ventilation shall continue during the period that the work is carried out. The ventilation should safely disperse any released refrigerant and preferably expel it externally into the atmosphere.

(Annex DD.4.9) Checks to the refrigerating equipment

Where electrical components are being changed, they shall be fit for the purpose and to the correct specification. At all times the manufacturer's maintenance and service guidelines shall be followed. If in doubt consult the manufacturer's technical department for assistance.

The following checks shall be applied to installations using flammable refrigerants (some parts are only applicable to refrigerant containing units or components installed inside the building):

- the charge size is in accordance with the room size within which the refrigerant containing parts are installed;
- the ventilation machinery and outlets are operating adequately and are not obstructed;
- if an indirect refrigerating circuit is being used, the secondary circuit shall be checked for the presence of refrigerant;
- marking to the unit and components continues to be visible and legible. Markings and signs that are illegible shall be corrected;
- refrigeration pipe or refrigerant containing components are installed in a position where they are unlikely to be exposed to any substance which may corrode refrigerant containing components, unless the components are constructed of materials which are inherently resistant to being corroded or are suitably protected against being so corroded.

(Annex DD.4.10) Checks to electrical components

Repair and maintenance to electrical components shall include initial safety checks and component inspection procedures. If a fault exists that could compromise safety, then no electrical supply shall be connected to the circuit until it is satisfactorily dealt with. If the fault cannot be corrected immediately but it is necessary to continue operation, an adequate temporary solution shall be used. This shall be reported to the owner of the unit so all parties are advised.

Initial safety checks shall include:

- that capacitors are discharged: this shall be done in a safe manner to avoid possibility of sparking;
- that no live electrical components and wiring are exposed while charging, recovering or purging the system;
- that there is continuity of earth bonding.

(Annex DD.5) Repairs to sealed components

(Annex DD.5.1)

During repairs to sealed components, all electrical supplies shall be disconnected from the unit being worked upon prior to any removal of sealed covers, guards, etc.

If it is absolutely necessary to have an electrical supply to the unit during servicing, then a permanently operating form of refrigerant leak detection shall be located at the most critical point to warn of a potentially hazardous situation.

(Annex DD.5.2)

Particular attention shall be paid to the following to ensure that by working on electrical components, the casing is not altered in such a way that the level of protection is affected.

This shall include damage to cables, excessive number of connections, terminals not made to original specification, damage to seals, incorrect fitting of glands, etc.

Ensure that apparatus is mounted securely.

Ensure that seals or sealing materials have not degraded such that they no longer serve the purpose of preventing the ingress of flammable atmospheres. Replacement parts shall be in accordance with the manufacturer's specifications.

(Annex DD.5) Repairs to intrinsically safe components

Do not apply any permanent inductive or capacitance loads to the circuit without ensuring that this will not exceed the permissible voltage and current permitted for the equipment in use.

Intrinsically safe components are the only types that can be worked on while live in the presence of a flammable atmosphere. The test apparatus shall be at the correct rating.

Replace components only with parts specified by the manufacturer. Other parts may result in the ignition of refrigerant in the atmosphere from a leak.

(Annex DD.7) Cabling

Check that cabling will not be subject to wear, corrosion, excessive pressure, vibration, sharp edges or any other adverse environmental effects. The check shall also take into account the effects of ageing or continual vibration from sources such as compressors or fans.

(Annex DD.8) Detection of flammable refrigerants

Under no circumstances shall potential sources of ignition be used in the searching for or detection of refrigerant leaks. A halide torch (or any other detector using a naked flame) shall not be used.

The following leak detection methods are deemed acceptable for systems containing flammable refrigerants.

Electronic leak detectors shall be used to detect flammable refrigerants, but the sensitivity may not be adequate, or may need re-calibration (detection equipment shall be calibrated in a refrigerant-free area). Ensure that the detector is not a potential source of ignition and is suitable for the refrigerant used.The leak detection system shall be set at a percentage of the refrigerant LFL and it shall be calibrated to the refrigerant employed; the appropriate percentage of gas (25% maximum) shall be confirmed.

Leak detection fluids are suitable for use with most refrigerants but the use of detergents containing chlorine shall be avoided as the chlorine may react with the refrigerant and corrode the copper pipe-work.

Note. Examples of leak detection fluids are:

- bubble method;
- fluorescent method agents.

If a leak is suspected, all naked flames shall be removed/extinguished.

If a leakage of refrigerant is found which requires brazing, all of the refrigerant shall be recovered from the system, or isolated (by means of shut off valves) in a part of the system remote from the leak. Removal of refrigerant shall be according to Annex DD.9.

(Annex DD.9) Removal and evacuation

When breaking into the refrigerant circuit to make repairs – or for any other purpose – conventional procedures shall be used. However, it is important that best practice is followed since flammability is a consideration.

The following procedure shall be adhered to:

- remove refrigerant;
- purge the circuit with inert gas (optional for A2L);
- evacuate (optional for A2L);
- open the circuit by cutting or brazing.

The refrigerant charge shall be recovered into the correct recovery cylinders. For units containing flammable refrigerants other than A2L the system shall be “flushed” with OFN to render the unit safe. This process may need to be repeated several times. Compressed air or oxygen shall not be used for purging refrigerant systems.

For units containing flammable refrigerants, other than A2L refrigerants, refrigerants purging shall be achieved by breaking the vacuum in the system with oxygen-free nitrogen and continuing to fill until the working pressure is achieved, then venting to atmosphere, and finally pulling down to a vacuum. This process shall be repeated until no refrigerant is within the system. When the final oxygen-free nitrogen charge is used, the system shall be vented down to atmospheric pressure to enable work to take place. This operation is absolutely vital if brazing operations on the pipe-work are to take place.

(Annex DD.10) Charging procedures

In addition to conventional charging procedures, the following requirements shall be followed.

- Ensure that contamination of different refrigerants does not occur when using charging equipment. Hoses or lines shall be as short as possible to minimise the amount of refrigerant contained in them.
- Cylinders shall be kept in an appropriate position according to the instructions.
- Ensure that the refrigerating system is earthed prior to charging the system with refrigerant.
- Label the system when charging is complete (if not already).
- Extreme care shall be taken not to overfill the refrigerating system.

Prior to recharging the system it shall be pressure-tested with the appropriate purging gas. The system shall be leak-tested on completion of charging but prior to commissioning. A follow up leak test shall be carried out prior to leaving the site.

(Annex DD.11) Decommissioning

Before carrying out this procedure, it is essential that the technician is completely familiar with the unit and all its detail. It is recommended good practice that all refrigerants are recovered safely. Prior to the task being carried out, an oil and refrigerant sample shall be taken in case analysis is required prior to re-use of reclaimed refrigerant.

a) Become familiar with the equipment and its operation.

b) Isolate system electrically.

c) Before attempting the procedure, ensure that:

- mechanical handling equipment is available, if required, for handling refrigerant cylinders;
- all personal protective equipment is available and being used correctly;
- the recovery process is supervised at all times by a competent person;
- Label the system when charging is complete (if not already).
- recovery equipment and cylinders conform to the appropriate standards.

d) Pump down refrigerant system, if possible.

e) If a vacuum is not possible, make a manifold so that refrigerant can be removed from various parts of the system.

f) Make sure that cylinder is situated on the scales before recovery takes place.

g) Start the recovery machine and operate in accordance with instructions.

h) Do not overfill cylinders (no more than 80 % volume liquid charge).

i) Do not exceed the maximum working pressure of the cylinder, even temporarily.

j) When the cylinders have been filled correctly and the process completed, make sure that the cylinders and the equipment are removed from site promptly and all isolation valves on the equipment are closed off.

k) Recovered refrigerant shall not be charged into another refrigerating system unless it has been cleaned and checked.

(Annex DD.12) Labelling

Equipment shall be labelled stating that it has been de-commissioned and emptied of refrigerant. The label shall be dated and signed. For appliances containing flammable refrigerants, ensure that there are labels on the equipment stating the equipment contains flammable refrigerant.

(Annex DD.13) Recovery

When removing refrigerant from a system, either for servicing or decommissioning, it is recommended good practice that all refrigerants are removed safely.

When transferring refrigerant into cylinders, ensure that only appropriate refrigerant recovery cylinders are employed. Ensure that the correct number of cylinders for holding the total system charge are available. All cylinders to be used are designated for the recovered refrigerant and labelled for that refrigerant (i.e. special cylinders for the recovery of refrigerant). Cylinders shall be complete with pressure-relief valve and associated shut-off valves in good working order. Empty recovery cylinders are evacuated and, if possible, cooled before recovery occurs.

The recovery equipment shall be in good working order with a set of instructions concerning the equipment that is at hand and shall be suitable for the recovery of flammable refrigerants. In addition, a set of calibrated weighing scales shall be available and in good working order. Hoses shall be complete with leak-free disconnect couplings and in good condition. Before using the recovery machine, check that it is in satisfactory working order, has been properly maintained and that any associated electrical components are sealed to prevent ignition in the event of a refrigerant release. Consult manufacturer if in doubt.

The recovered refrigerant shall be returned to the refrigerant supplier in the correct recovery cylinder, and the relevant waste transfer note arranged. Do not mix refrigerants in recovery units and especially not in cylinders.

If compressors or compressor oils are to be removed, ensure that they have been evacuated to an acceptable level to make certain that flammable refrigerant does not remain within the lubricant. The evacuation process shall be carried out prior to returning the compressor to the suppliers. Only electric heating to the compressor body shall be employed to accelerate this process.

When oil is drained from a system, it shall be carried out safely.

2.3 Noise

The starting of the unit, with activation of its components, emits a noise whose intensity varies depending on the operating level.

The correct location choice and the correct installation prevent the unit causing annoying noise due to resonances, reflections and vibrations.

2.4 Residual risks

The unit uses technical means suitable for protecting people, animals and things against hazards that cannot reasonably be eliminated or sufficiently reduced through design.

The presence of an operator is not required for normal operation of the unit. The change from the "OFF" state to the "ON" state, and vice versa, of the unit can be carried out remotely or through the display, without having to enter areas at risk.

Access restriction is part of correct installation to eliminate residual risks during normal operation.

Removal of the restrictions gives access to cold parts, hot parts and sharp edges.

When the electrical boxes and the electrical control panel are open, live parts can be accessed.

Do not:

- remove or disable the safety guards;
- tamper with and/or modify, even partially, the safety devices installed on the unit.

In heat pump operation, during defrost cycles, the water drips onto the ground when the frost melts off the coils.

If the water is not properly drained, when the ambient temperatures are sub-zero, dangerous sheets of ice are formed.

Limit access to the area to prevent accidents.

2.5 Safety information on the refrigerant fluid

This product contains fluorinated greenhouse gases included in the Kyoto protocol. Do not release these gases into the atmosphere.

Type of refrigerant: R32.

GWP value: 677. Based on "IPCC Fifth Assessment Report".

GWP is the global warming potential.

The quantity of refrigerant fluid is indicated in the unit data label. Periodic inspections are necessary to check for refrigerant fluid leaks in accordance with local and/or European regulations.

The refrigerant fluid is classified in group 1 (hazardous fluids), pursuant to standard EN378, safety class A2L (mildly flammable). Refer to the local laws and regulations for unit installation with refrigerant fluid falling within this class.

2.5.1 Hazards and health consequences

If accidentally released, rapid evaporation of the liquid can cause freezing.

In case of contact with the liquid:

- defrost the various part with water;
- remove clothing carefully;
- rinse thoroughly with water.

Contaminated clothing and shoes should be washed before reuse.

High vapour concentrations can cause headaches, dizziness, drowsiness and nausea, and may lead to unconsciousness and cardiac arrhythmia.

If inhaled move the victim to fresh air. Artificial respiration and/or oxygen may be necessary. Call a doctor immediately.

In case of contact with eyes, remove contact lenses. Rinse immediately with plenty of water, holding the eyelids open, for at least 15 minutes.

The safety data sheet drawn up by the producer of the refrigerant can be obtained from the manufacturer of the unit.

3 RECEIVING THE PRODUCT AND STORAGE

3.1 Reception

On receiving the unit, check that it is undamaged, bearing in mind that it left the factory in perfect condition.

Report any signs of damage immediately to the transporter and make a note of these on the Delivery Sheet before signing it.

The relevant sales department or the manufacturer should be informed of the extent of the damage as soon as possible.

The Customer must draw up a written and photographic report concerning any and all significant damage.

Disposal of the packing material is the responsibility of the consignee and must be carried out in compliance with the regulations in force in the country in which it is carried out.

3.2 Transport

The unit is sent from the factory using suitable vehicles, with correct locking in order to prevent any possibility of movement whilst in transit by road that may damage it or cause accidents.

If there is to be trans-shipment to other vehicles to continue the journey, it is essential to adopt all necessary measures for ensuring the correct safety conditions, with regard to the vehicles used and the anchorage, in order to prevent damage.

If the unit is to be transported over uneven roads, the manufacturer must be informed beforehand so that suitable measures can be taken in order to prevent damage to the unit.

If it is to be transported by container, make sure it is correctly anchored.

With reference to road, sea/ocean or air freight, refer to the ADR, IMDG, IATA codes, etc. in place at the time of transport.

Before organising the freight, the Manufacturer shall notify the quantity and type of refrigerant filled in the machine.

Units with mildly flammable refrigerants (A2L), such as R32, shall be hauled in accordance with the European standards and regulations and the local regulations, where applicable.

3.3 Handling

Before each unit handling operation, check that the lifting capacity of the machinery used is compatible with the weight of the unit.

Handling must be carried out by adequately equipped qualified personnel.

In all lifting operations, make sure the unit is firmly secured in order to prevent accidental falls or overturning.

Lifting must be carried out by qualified and authorised personnel taking the necessary precautions; if carried out incorrectly, lifting can cause serious damage and physical injury.

The handling operations must be carried out slowly and sudden manoeuvres and knocks must be avoided.

Do not, under any circumstances, stand or pass under or near the unit when it is lifted off the ground. Use only the lifting system designed and prepared for the unit.

During unloading and positioning of the unit, great care must be taken to prevent sudden or violent manoeuvres, and the components of the unit must not be used as lifting points.

Make sure the machinery and lifting ropes are of suitable size and capacity and strictly follow their operating instructions. Use only equipment that is in excellent working order.

All work on the unit, including unpacking and connections, must be carried out with the unit resting on the ground.

Refer, in any case, to the lifting instructions provided with the unit.

The units are dispatched screwed onto anti-overturning boards. To unload them from the vehicle, use a forklift truck or a crane.

If a forklift truck is used, insert the forks under the unit on the longer side where the boards are fixed, with the forks as far apart as possible, until they protrude from the back of the base, and keep the centre of gravity of the unit centred between the forks (Fig. B.1).

As the unit-carrying pallet is not supplied with an anti-overturning board, great attention must be paid when lifting the unit and handling it with a forklift truck to prevent it from overturning.

If a crane is used, the unit must be slung with slings of suitable lifting capacity.

It is mandatory to use a lifting beam adjusted to the width of the unit in order to ensure lifting stability. Also, suitable protective devices must be placed on the upper edges to prevent the slings from coming into contact with the unit.

Before sliding out the pallet, remove the screws fixing it to the unit.

Make sure that the unit does not slip and slide out of the forks during lifting operations.

3.4 Storage

Units are suitable for storage both indoors and outdoors.

Units with mildly flammable refrigerants (A2L), such as R32, shall be stored in accordance with the European standards and regulations, as well as the local regulations, where applicable. The manufacturer of the refrigerant unit (or simply the unit) shall in no way be liable for events resulting from storage e siting against the above-mentioned European and local standards and regulations.

When the units are temporarily stored indoors, the precautions illustrated in the section on unit safety must be taken. The unit must be stored in accordance with the existing standards.

If the units are stored outdoors, the packaging must be removed before storage. The packaging is made with cardboard that is not resistant to the weather agents and to high levels of moisture.

The temperature range admitted for storage is shown in the unit ID plate. The existence of moisture is admitted provided that no condensation is formed.

The unit must be placed on a flat surface that is suitable for bearing its weight, in order to avoid deformation of the structure with consequent possible breakage.

4 ECODESIGN CONFORMITY

4.1 Documentation supplied with the product

Listed below are the documents supplied with the machine according to its type, with particular reference to conformity with Directive 2009/125/EC of the European Parliament and of the Council, of 21 October 2009, regarding the establishment of a framework for drafting specifications for the eco-friendly design of energy-related products, and relevant Regulations (hereinafter "Ecodesign").

These documents may or may not be binding depending on the country of installation.

Conformity of the units with the directives and standards in force in the European Union is broken down into the following cases, with regard to applicability of Ecodesign:

1. Units conforming to all EC requirements including the Ecodesign Directive;
2. Units exempt from the Ecodesign Directive and in general conforming to all EC requirements;
3. Partly completed machine;
4. Units conforming to all EC requirements except for the Ecodesign Directive.

4.1.1 Units conforming to all EC requirements including the Ecodesign Directive

Application of the Ecodesign Directive depends on the type of unit.

The CE marking is present.

The units can be put on the market in any country.

More specifically, they are allowed to be put on the market in member countries of the European Union (hereinafter "EU").

Putting the units on the market in the EU entails installation and running of the unit within this scope.

Putting the units on the market in the EU is bound by the effective dates required by each Regulation.

The EC Declaration of Conformity (hereinafter "EC Declaration") is supplied with the unit:

- irrespective of the destination country;
- according to the relevant Regulation, the EC Declaration is supplemented by one or more attached documents, also called product fiches (hereinafter "Attached Document");
- where envisaged, the Attached Document is always supplied irrespective of the destination country.

Units involved:

- chillers (with or without free-cooling mode);
- reversible heat pumps (cooling / heating), including multifunction units;
- non-reversible heat pumps (heating only) where applicable.

4.1.2 Units exempt from the Ecodesign Directive and in general conforming to all EC requirements

Units for which conformity with the Ecodesign Directive is not necessary.

All the points described in the first paragraph apply, with the exceptions stated below.

The EC Declaration is not accompanied by Attached Documents.

Units involved:

- non-reversible heat pumps (heating only) where applicable with Pdesign>400kW.
- chillers in general used for “Process” applications with water delivery temperature > 12°C or between -8°C and +2°C (extremes excluded).

4.1.3 Partly completed machine

Units for which conformity with the Ecodesign Directive must be related to a 'partly completed machine plus remote heat exchanger' system. Otherwise, the unit conforms to all EC requirements.

All the points described in the first paragraph apply, with the exceptions stated below.

The EC Declaration is not accompanied by Attached Documents

Conformity with the Ecodesign Directive depends on the combination of partly completed machine plus remote heat exchanger and is therefore the responsibility of the person who makes the selection and combination at the installation stage.

Units involved:

- chillers or reversible units with remote source heat exchanger;
- chillers or reversible units with remote user heat exchanger.

4.1.4 Applicable Documents envisaged with regard to the type of unit

A table summarising the applicable documents with regard to the type of unit is shown below.

Table (a)

Type of unit	Regulation	Supplied Attached Documents, reference parameter	
CE unit	2016/2281	SEER/ηsc LT	
CE unit	2016/2281	SEER/ηsc MT	
CE unit	2016/2281	SEER/ηsc LT	SEPR HT
CE unit	2016/2281	SEER/ηsc MT	SEPR HT
CE unit	2013/813	SCOP/ηsh (1)	Eco-label (2)
CE unit/exempt from Ecodesign	not applicable	none	
CE partly completed machine	2016/2281 or 2013/813	none	

(1) SCOP/ηsh LT or MT as required by Regulation 2013/813.

(2) Where provided for by Regulation 2013/811, applies to heat pumps with Pdesign <70kW.

4.1.5 Efficiency parameters required for conformity

To avoid ambiguity, this chapter identifies efficiency parameters with the acronyms indicated below.

Regulation 2016/2281 envisages conformity according to the following efficiency parameters:

- ηsc low temperature: user-side inlet/outlet temperatures 12/7°C; identified in this document as SEER/ηsc LT;
- ηsc medium temperature: user-side inlet/outlet temperatures 23/18°C; identified in this document as SEER/ηsc MT;
- SEPR HT.

Regulation 2013/813 envisages conformity according to the following efficiency parameters:

- ηsh low temperature: user-side inlet/outlet temperatures 30/35°C, average climate design conditions; identified in this document as SCOP/ηsh LT;
- ηsh medium temperature: user-side inlet/outlet temperatures 47/55°C, Average climate design conditions; identified in this document as SCOP/ηsh MT; this applies as regards models that can operate with delivery temperature ≥ 52°C at a source temperature of -7°C db/-8°C wb (air-water unit) (10°C inlet for water unit) in the aforesaid climate profile.

For each unit, the composition of the Attached Document(s) is predefined and comes under one of the cases in table (a); therefore, more specifically:

- if the type of unit and/or the expected operating condition are exempt from conformity, the EC Declaration will in any case be accompanied by Attached Document(s) according to table (a);
- in any case, the operating temperatures specified when ordering do NOT determine the type of Attached Document supplied.

4.2 Conformity of the application

The applications allowed as regards the documentation supplied with the unit are indicated below. This applies only in the case of units intended for installation and operation in the European Union.

The customer is required to select the unit with regard to the expected operating condition and the Ecodesign conformity required for that condition.

The documentation available during pre-sale enables the unit to be selected, ordered and purchased correctly for this purpose.

Table (b) indicates the type of conformity required according to the operating condition.

Conformity is to be verified during selection/pre-sale and will be certified by the Attached Document supplied with the unit.

The applications are defined by the Regulations as follows:

1. "Comfort" = application intended for the thermal comfort of people;
2. "Process" = application intended for cooling an appliance or a refrigeration system, whose aim is not to ensure cooling of a room for the thermal comfort of people.

A table summarising the Ecodesign Conformity required with regard to operating condition is shown below.

Table (b)

Operation / Water delivery temperature (LWT cooling), °C		Conformity	Notes
1) Comfort, cooling-only	< 18	SEER/ηsc LT	(1)
2) Comfort, cooling-only	≥ 18	SEER/ηsc MT	--
3) Process, cooling-only	+2 ≤ LWT ≤ 12	SEPR HT	--
4) Process, cooling-only	> 12	none	--
5) Process, cooling-only	-8 < LWT < 2	none	--

(1) - All the more so, SEER/ηsc MT conformity is also valid.

In the "Process, cooling only" case with delivery temperature between -8°C and +2°C (point 5 of table (b)), no type of conformity is required if the unit can operate only at delivery temperatures strictly higher than -8°C.

Operation / Unit: type and Pdesign, kW		Conformity
6) Comfort, heating + cooling	≤ 400kW	SCOP/ηsh
7) Comfort, heating + cooling	> 400kW	see point 1 or 2
8) Heating	heating-only unit ≤ 400kW	SCOP/ηsh
9) Heating	heating-only unit > 400kW	none

Operating conditions other than those indicated are not allowed because they may be in conflict with the issued Ecodesign conformity.

As regards the pre-sale stage, the Manufacturer reserves the right to consider and, if necessary, implement devices for specific operating conditions.

The customer (or the installer or the system operator) is responsible for the adopted operating condition and its consistency with the Ecodesign conformity issued by the Manufacturer.

The Manufacturer refuses all liability arising from improper use of the machine and more specifically from operation in temperature conditions not allowed by the technical documentation.

See also the "Intended use" and "Unintended use" paragraphs of the "Product description" chapter.

5 PRODUCT DESCRIPTION

5.1 Intended use

These units are made for cooling and/or heating (heat pump version) heat-carrying fluid and they are generally used in applications in the air conditioning and refrigeration sector.

Their use is recommended within the operating limits indicated in the Technical Catalogue.

Use outside the operating limits stated in the Technical Catalogue will cause the unit to stop.

5.2 Unintended use

The unit must not be used:

- in an explosive atmosphere;
- in a flammable atmosphere;
- in extremely dusty environments;
- in an environment that is not compatible with the stated IP protection rating;
- by untrained personnel;
- in a way that does not comply with the regulations in force;
- with incorrect installation;
- with power supply defects;
- with total or partial failure to comply with the instructions;
- with lack of maintenance and/or use of non-original spare parts;
- with inefficient safety components.
- with modifications or other work not authorised by the Manufacturer.

5.3 Control and safety devices

The unit is integrally managed by an electronic microprocessor control that, through the various temperature and pressure sensors installed in the unit, keeps its operation within the safety limits.

All the parameters involved with control of the unit are shown in the “Control Manual” that is an integral part of the documentation of the unit.

The manual fully describes the logic with which the checks of the unit take place during the various operating stages.

The devices are shown in the Technical Catalogue.

5.4 Principles of operation

The principle of these units is based on using the vapour compression refrigeration cycle, characterized by 4 phases (compression, condensation, throttling and evaporation).

This cycle produces the transfer of heat from a fluid at lower temperature to a fluid at higher temperature, which is the opposite of what happens naturally.

In our specific case, these units consist of a refrigerant circuit that cools the water of a hydraulic circuit inside a heat exchanger (“evaporator”) and rejects the heat through an air heat exchanger (“condenser”). This happens in units intended for operation in cooling mode.

In units in heat pump operation, where hot water is produced, there is cycle reversal that reverses the function of the two heat exchangers so that the water heat exchanger becomes the condenser and the air heat exchanger becomes the evaporator.

Refer to Fig. B.4 for the diagram illustrating the unit operating principle.

5.5 Structure

The frame is made of galvanized sheet-iron coated with polyester powder, which makes it highly resistant to weather conditions. The cover of the unit is made of stainless steel. All screws and bolts are painted or made of stainless steel. Some panels have an internal insulation made of closed-cell heat- and noise-insulating material.

The panels can be removed easily to allow full access to internal components.

5.6 Specifications

Air-condensed water chiller unit with “scroll” o “rotary” compressors, directly coupled axial or radial fans and dry-expansion plate evaporators.

5.7 Control panels

This line of units can be controlled with two electronic microprocessor controllers: a base controller (V5+) and an advanced controller (V6).

The next sections describe the basic operations which both controllers perform, including unit start and stop, operating mode switching from cooling to heating and vice versa (in units fitted with a heat pump), and setpoint editing.

For the other operations, refer to the manual of the control that is an integral part of the documentation of the unit.

5.7.1 Base controller (V5+)

The following instructions are for the main screen of the control, which is displayed in normal operating conditions.

5.7.1.1 Switching the unit on/off

Normally, the units are shipped with standard programming for switching on and off from the keypad. The following instructions refer to this configuration.

Go to the controller display (Fig. B.2) and press the “ON/OFF” switch to switch the unit ON. The display shows the setpoint and the controlled temperature: an icon also appears in the top part of the display indicating the operating mode of the unit.

The unit actually gets started only if the remote ON/OFF digital input is closed.

Press the “ON/OFF” button again to switch the unit OFF: the setpoint, temperature and icons disappear, and this indicates that the unit is off.

The unit does not switch off instantly after the “ON/OFF” button is pressed. Switch-off occurs according to the times set in the controller so that safe unit operation is guaranteed.

If time bands have been enabled, the unit switches on/off according to the time bands set in the unit.

5.7.1.2 Operating mode switching

Tap the “Mode” button to switch to a different operating mode and select the desired mode among those featured: heating, cooling and automatic.

Operating mode switching can only occur if the unit is ON and controlled according to the water temperature. Operating mode switching in units controlled according to ambient temperature occurs automatically in function of the ambient temperature.

The configuration of both the unit and system affects the active operating modes.

The timing for operating mode switching is determined by the unit controller in function of the previous operating mode and the new selected mode.

No effect will be produced by tapping the “Mode” button if the unit is operating in domestic hot water production mode.

5.7.1.3 Setpoint viewing and editing

Unit with single working mode (heating only or cooling only or domestic hot water only) and water temperature control

If the unit is controlled according to the water temperature (“Water temperature” symbol displayed), the following procedure must be followed to edit the setpoint of the output water temperature from the system: press the “SET” button until the symbol of the operating mode flashes, set the desired temperature using the “Arrow Up” and “Arrow Down” buttons, and finally press SET to confirm.

Unit with multiple working mode (heating, cooling, domestic hot water) and water temperature control

If the unit is controlled according to the water temperature (“Water temperature” symbol displayed), the following procedure must be followed to edit the setpoint of the output water temperature from the system: press the “SET” button until the symbol of the operating mode flashes, set the desired temperature using the “Arrow Up” and “Arrow Down” buttons, and finally press SET to confirm. Repeat the operation to set the desired temperature in the other operating modes featured; every time, press SET to confirm and to move on to the next mode.

The cooling, heating and domestic hot water modes have different setpoints.

If the climate curve is active in heating mode, the setpoint is calculated in function of the climate curve, and not the stored setpoint.

Unit with ambient temperature control

If the unit is controlled according to the ambient temperature (“Water temperature” symbol not displayed), the following procedure must be followed to edit the setpoint of the ambient temperature output from the system: press the “SET” button until the symbol of the operating mode flashes, set the desired temperature using the “Arrow Up” and “Arrow Down” buttons, and finally press SET to confirm.

5.7.2 Advanced controller (V6)

As an alternative to the base controller, this line of units can be controlled by a programmable microprocessor controller featuring a user interface that comes in the form of an advanced touch screen control panel.

5.7.2.1 Switching the unit on/off

Normally, the units are shipped with standard programming for switching on and off from the keypad. The following instructions refer to this configuration.

Go to the controller display (Fig. B.3) and press the “ON/OFF” icon to switch the unit ON. Then press OK to confirm the following message. The “ON/OFF” icon turns cyan to indicate that the unit is ON.

The unit actually gets started only if the remote ON/OFF digital input is closed.

Press the icon one more time to switch off the unit, followed by the OK button to confirm the following message. The icon turns grey to indicate that the unit is OFF.

If time bands have been enabled, the unit switches on/off according to the time bands set in the unit.

5.7.2.2 Operating mode switching

Operating mode switching from cooling to heating occurs differently, according to the unit configuration.

If the unit is controlled according to the water temperature, tap the “MODE” icon to switch to a different mode and select the desired operating mode among those featured.

If the unit is controlled according to ambient temperature, the operating mode is switched automatically, based on the temperature in the room where the ambient temperature probe is installed.

5.7.2.3 Setpoint viewing and editing

If the unit is controlled according to the ambient temperature, the relevant setpoint is edited as follows: touch the value alongside the “ROOM” icon and press the “+” and “-” buttons to edit the setpoint.

If the unit is controlled according to the water temperature:

- to view and edit the setpoint in zone 1, touch the value alongside the “ZONE 1” icon and press the “+” and “-” buttons to edit the setpoint;
- to view and edit the setpoint in zone 2, touch the value alongside the “ZONE 2” icon and press the “+” and “-” buttons to edit the setpoint;
- to view and edit the setpoint of domestic hot water, touch the value alongside the “DHW” icon and press the “+” and “-” buttons to edit the setpoint.

If the unit is controlled according to the ambient temperature, the relevant setpoint is edited as follows: touch the value alongside the “ROOM” icon and press the “+” and “-” buttons to edit the setpoint.

5.8 Wiring diagram

The wiring diagram is an essential part of the documentation and is present inside each unit.

It is essential to refer to this document if you are unsure about anything or need further explanations regarding the auxiliary electrical connections and power connections as well as for the electrical specifications.

In particular, refer to the wiring diagram as regards the possibility of remotely managing the functionalities that contemplate this.

5.9 Cables supplied with the unit

The cables listed below are supplied with the unit and they must be used for unit installation.

Description	Cable label(s)	Quantity for base controller V5+	Quantity for advanced controller V6
Domestic hot water output temperature probe	TW	1	1
Hot/cold water output temperature probe	TC	0	1
Cold water output temperature probe	TC	1	0
Hot water output temperature probe	TH	1	0
Ambient temperature probe	TR	1	1
Water temperature probe in temperature zone 1	TV1	0	1
Water temperature probe in temperature zone 2	TV2	0	1
Extension cable for temperature probes	None	4	5
Communication cable for temperature probes and signals between outdoor and indoor units	None	1	1
Data communication cable between internal and external units	A-B	1	1
Integrated pump power cord P0	P0-PN	1	1
PWM signal cable for integrated pump P0	IN-OUT-GND	0	1
Cable for unit ON/OFF from digital input	None	1	0
Cable for summer-winter mode switching from digital input	None	1	0

The cables supplied with the machine are 10 m long.

If the cables supplied with the unit are not long enough, the connections must be made exclusively using the cable types specified in the table below.

Cable description	Cable type
Data communication cable between internal and external units	2-wire, shielded - YSLCY 0.25mm^2
Communication cable for temperature probes and signals between outdoor and indoor units	8-wire, shielded - YSLCY 0.25mm^2
Extension cable for temperature probes	2-wire - YSLY 0.5mm^2
Integrated pump power cord P0	2-wire, shielded - YSLY 1 mm^2
PWM signal cable to integrated pump P0 (where fitted)	3-wire, shielded - YSLY 0.25 mm^2

The max. length admitted for cables is 20 m.

Cables must be suitable for installation outdoors and must provide resistance to UV rays; alternatively, cables must be run in dedicated electrical cable conduits or ducts.

The cables must not be installed directly in the ground or in concrete.

The operating temperature of the cables must be between -40°C and +80°C.

The cables must be joined in compliance with the law, pursuant to the regulations in place in the country where they are installed. The quick connectors on the temperature probes supplied with the unit must be removed before the cables are joined.

The connections must be made in compliance with the wiring diagrams of the unit.

6 INSTALLATION

During installation or whenever work must be carried out on the unit, it is essential to strictly follow the instructions in this manual, comply with the directions on the unit and in any case take all necessary precautions.

The pressures in the refrigerant circuit and the electrical components can create risky situations during installation and maintenance work.

6.1 Dimensions and weight

In order to correctly position the unit, in compliance with its size, weight and distance requirements, please refer to the dimensional drawing supplied with the unit documentation.

6.2 Installation site

The following should be taken into account to establish the best place to install the unit and the relevant connections:

- size and origin of the hydraulic piping;
- location of the power supply;
- accessibility for maintenance or repair operations;
- load-bearing capacity of the support surface;
- ventilation of the air-cooled condenser;
- orientation and exposure to solar radiation. Keep the condensing coil out of direct sunlight as far as possible;
- direction of prevailing winds. Do not position the unit in a such way that prevailing winds can cause air recirculation at the condensing coil;
- type of surface. Do not position the unit on dark coloured surfaces (e.g. tarred surfaces) so as to avoid overtemperatures during use;
- possible reflections, resonances and acoustic interactions with elements outside the unit.

It is obligatory to observe the clearances specified in the dimensional diagram of the unit.

If the unit is installed in particularly windy areas, windbreaks must be installed to prevent malfunctioning of the unit.

During the defrost cycle, units in heat pump operation allow water to flow out that freezes with sub-zero temperatures. Although the unit is installed perfectly horizontal, make slopes in the support surface to direct the defrost water into drains, wells or in any case to places where there is no danger of accident.

In areas where there are heavy snowfalls, the place of installation must be chosen so that the snow cannot in any way interfere with the operation of the unit:

- build a wide canopy;
- build a base;
- install the unit in a fairly high position off the ground so that it will not be covered with snow.

To make installation easier, the option “Base frame (H=500 mm) with rubber anti-vibration mounts” is available in the catalogue.

6.3 Installation

The units are shipped from the factory already tested and only need electrical and hydraulic connections for installation.

6.3.1 External positioning

The external unit must be installed at a height of at least 200 mm from ground level. If the place of installation is snowy and the possibility exists for snow to build up on the ground, the min. installation height specified in diagram C.2 must be respected. A base frame option of adequate height is provided for this purpose. The frame is assembled as instructed below (Appendix F).

Alternatively, a support frame (Fig. B.10) may be used having the features below:

- it must be flat, horizontal and capable of bearing at least 5 times the weight of the unit;
- it must be anchored to the ground;
- it must be capable of resisting wind-induced forces and moments;
- it must be at least 300 mm longer and wider than the unit;
- it must have a min. height of 200 mm from ground level in snow-free areas and 500 mm in snowy areas.

An alternative may be to use suitable wall-mounted brackets, provided that the brackets are horizontal and capable, together with the anchoring system and the wall, of bearing at least 5 times the weight of the unit.

Although the units transmit low levels of vibration to the ground, it is advisable to lay a strip of hard rubber between the base frame and the support surface. If better isolation is required, it is advisable to use anti-vibration mounts.

In the event of installation on roofs or intermediate floors, the unit and pipes must be isolated from the walls and ceilings.

External units should not be positioned near private offices, bedrooms or areas where low sound emissions are required.

It is also advisable not to install the units in narrow passages or small spaces, in order to avoid reverberations, reflections, resonances and acoustic interactions with elements outside the unit.

Units equipped with standard coils (copper-aluminium) should not be installed in an environment where there is an aggressive chemical atmosphere, in order to avoid the risk of corrosion.

Special attention should be given to atmospheres containing sodium chloride, which make corrosion due to galvanic currents more likely to occur. Based on this, units with untreated coils must under no condition be installed in marine environments, close to animal farms or in highly polluted areas.

6.3.2 Base frame assembly procedure (option)

The base frame is supplied as an option for external unit installation. The dimensions (mm) of the base frame vary according to the size of the unit:

- sizes 6-9-12: fig. F.1;
- sizes 15-19: fig. F.2.

The frame is adjustable in height and the value indicated with acronym AH shows the feet height adjustment range (mm).

The frame is supplied disassembled. The fitter is responsible for frame assembly. Below is a list of the frame components.

Component	Quantity	Notes
Rubber anti-vibration mount	4	Ø 60 mm with 2 threaded pins M8
Leg	2	-
Cross beam	4	-
Adjustable metal foot	4	Base, Ø 76 mm
Nut, M8	8	-
Bolt, M6x20	12	-
Expansion screws, M6x20	8	-
Spring washers, Ø 6 mm	12	-
Small flat washers, Ø 6 mm	12	External diameter, Ø 19 mm
Large flat washers, Ø 8.9 mm	8	External diameter, Ø 31.7 mm

The frame installation surface must be perfectly flat.

The frame installation surface must be capable of supporting at least 5 times the unit weight.

Screws, bolts and nuts must be tightened properly before the unit is installed on the frame. Check the tightening level periodically.

The frame must be anchored to the ground at all required points.

Below are the instructions for frame assembly.

1. Screw the 4 metal adjustable feet to the frame legs (Fig. F.3).
2. Adjust the feet until they are all at the same height: use a tape measure to check the height. Then tighten the nuts in the feet using a spanner to lock them in place at the desired height (Fig. F.4).
3. Install two cross beams - one for each frame leg - and tighten the screws to the legs (Fig. F.5).
4. Use a tape measure to measure the distance between the external unit mounts on the long side of the unit - the distance to be measured is that between the centres of the slots (Fig. F.6).
5. Join the legs using the cross beams. Adjust the cross beams making sure that the distance between the centres equals the distance between the mounts of the external unit (Fig. F.7).
6. After cross beam adjustment, secure the beams using screws, washers and nuts and tighten them properly (Fig. F.8).
7. Install the 4 rubber anti-vibration mounts (two on each side) on the slots in the frame. Secure them from the bottom using nuts and washers, without tightening them all the way down (Fig. F.9).
8. Use a tape measure to measure the distance between the external unit mounts on the short side of the unit - the distance to be measured is that between the centres of the slots (Fig. F.6). Set the anti-vibration mounts at the measured distance (Fig. F.10).
9. Tighten the nuts of the anti-vibration mounts using a socket spanner (Fig. F.11).
10. Put the frame in place in the installation area and mark the position of the holes for the frame feet on the installation surface (Fig. F.12).

Check that the min. distances for external unit installation, as specified in section “External unit positioning” in this manual, are complied with.

11. Pierce the surface at the marked points with the help of a drill with a Ø 8 mm bit (Fig. F.13).
12. Fit the expansion anchors in the holes drilled on the surface. Place the frame so that the holes in the feet match the anchors. Secure the frame to the ground by tightening the expansion screws to the anchors (Fig. F.14).
13. Lift the external unit with the help of suitable lifting equipment and place it on the anti-vibration mounts (Fig. F.15).

For unit lifting operations refer to the section titled “Handling” in this manual.

14. Secure the external unit to the anti-vibration mounts using nuts and washers and tighten the nuts properly with a spanner (Fig. F.16).

After unit installation, use a bubble level to check that the unit is perfectly horizontal.

6.3.3 Internal unit positioning

When provided, the internal unit must be installed inside the building. It must be wall-mounted using the support bracket supplied with the unit. The place of installation must be dry, properly ventilated and duly lighted.

No volatile and/or corrosive substances and no flammable liquids or gas must be stored in the vicinity of the unit.

The internal unit must be installed near the external unit at such distance that the max. length of the electric cables connecting the internal and external units is not exceeded. The min. installation distances of the internal unit (Fig. C.4) must be complied with.

The wall must be capable of bearing at least 5 times the weight of the unit. If the wall is made of wood, wood screws must be used in place of expansion anchors.

Considering the dimensions and weight of the unit, this operation must be carried out by two operators.

6.3.4 Option: IP55 box for indoor unit installation

The option “IP55 electrical box for base/advanced controller” is used to help outdoor installation of an indoor unit.

The ambient conditions required for installation must comply with the following temperature and humidity range: -10°C ÷ +45°C, 20% RH ÷ 90% RH non condensing.

The option consists of an IP55 electrical box and it must be installed near the outdoor unit using the wall-mounting brackets supplied with the unit and at such distance that the max. length of the electric cables connecting the indoor and outdoor units is not exceeded.

The box is suitable for outdoor installation as its protection level is IP55. However, it must be protected against the elements and in particular against rain and direct sun radiation with the help, for instance, of a suitable shelter (roofing).

When the box is installed, compliance should be ensured with the min. distances required for indoor units (Fig. C.4).

The wall must be capable of bearing at least 5 times the total weight of the electrical box and the unit.

Considering the dimensions and weight of the electrical box and the indoor unit, this operation must be carried out by at least two operators.

The indoor unit must be anchored to the bottom plate in the box using the supplied inserts and screws.

The cables coming out of the box must be run exclusively through the cable glands located on the bottom of the box, after which they must be properly secured.

If the cable glands do not provide for tight enough mechanical sealing, the cables must be secured inside the box (using clamps, for instance).

This option is supplied with a pre-installed ventilation and heating system that is controlled by a thermostat.

The “WiFi” antenna must be secured outside the box. Use the supplied extension for connection.

It is prohibited to drill additional holes or openings to run the cables, as well as to change the structure or the seals in the box.

Do not obstruct the grilles of the ventilation system featured in the box as this may cause an excessive increase of the temperature and humidity in the box.

Use the terminals featured in the terminal box for the power supply and consult the “Electrical connections” chapter.

6.3.5 Anti-vibration mounts

In order to reduce vibrations transmitted to the structure, it is advisable to install the unit on rubber or spring anti-vibration mounts, supplied as an accessory and to be requested when placing the order.

The dimensional diagram with footprint shows the position and load of each anti-vibration mount.

The anti-vibration mounts must be fixed on before positioning the unit on the ground.

To install the anti-vibration mounts, see the instructions attached to the accessory.

When fixing the anti-vibration mounts, the unit should be lifted off the ground by no more than 200 mm and no parts of the body should be placed under the unit.

6.3.5.1 Rubber anti-vibration mounts

The anti-vibration mount consists of an upper metal bell in which there is a screw for fixing it to the base of the unit. The anti-vibration mount is fixed to the base through the two holes on the flange. The flange of the anti-vibration mount bears a number (45,60,70 ShA) that identifies the hardness of the rubber support.

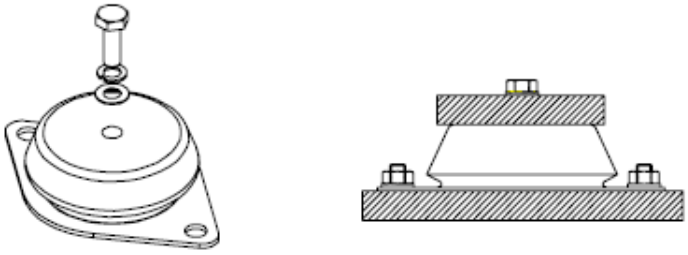


Fig. 1 Rubber/metal anti-vibration mounts

6.3.6 Noise attenuation

The units are designed and built paying particular attention to keeping down noise emission during operation.

Correct installation for both the place and the components, as shown in the relevant chapter, prevents resonances, reflections and vibrations that can be particularly bothersome.

If, after following the instructions above, further attenuation is required, the use of acoustic barriers is a valid solution.

It is essential to be careful that any work done to soundproof the unit does not affect its correct installation or its correct operation.

Do not restrict the service spaces and do not install covers that may create recirculation between the air supply line and the intake line.

6.3.7 Minimum distances

The service spaces to be guaranteed are shown on the dimensional drawings of the unit.

It is essential to ensure an adequate volume of air in both the intake line and the delivery line of the external coil.

It is very important to avoid recirculation between suction and delivery, as this would lower the performance of the unit or even stop its normal operation.

The presence of very high walls near the unit will impair its correct operation.

In configurations with external units installed side by side, the min. distance between two units must be as shown in Fig. C.2.

In any case, we recommend leaving a large enough space between the units to allow removal of their larger components, if necessary.

6.4 Possible system layouts

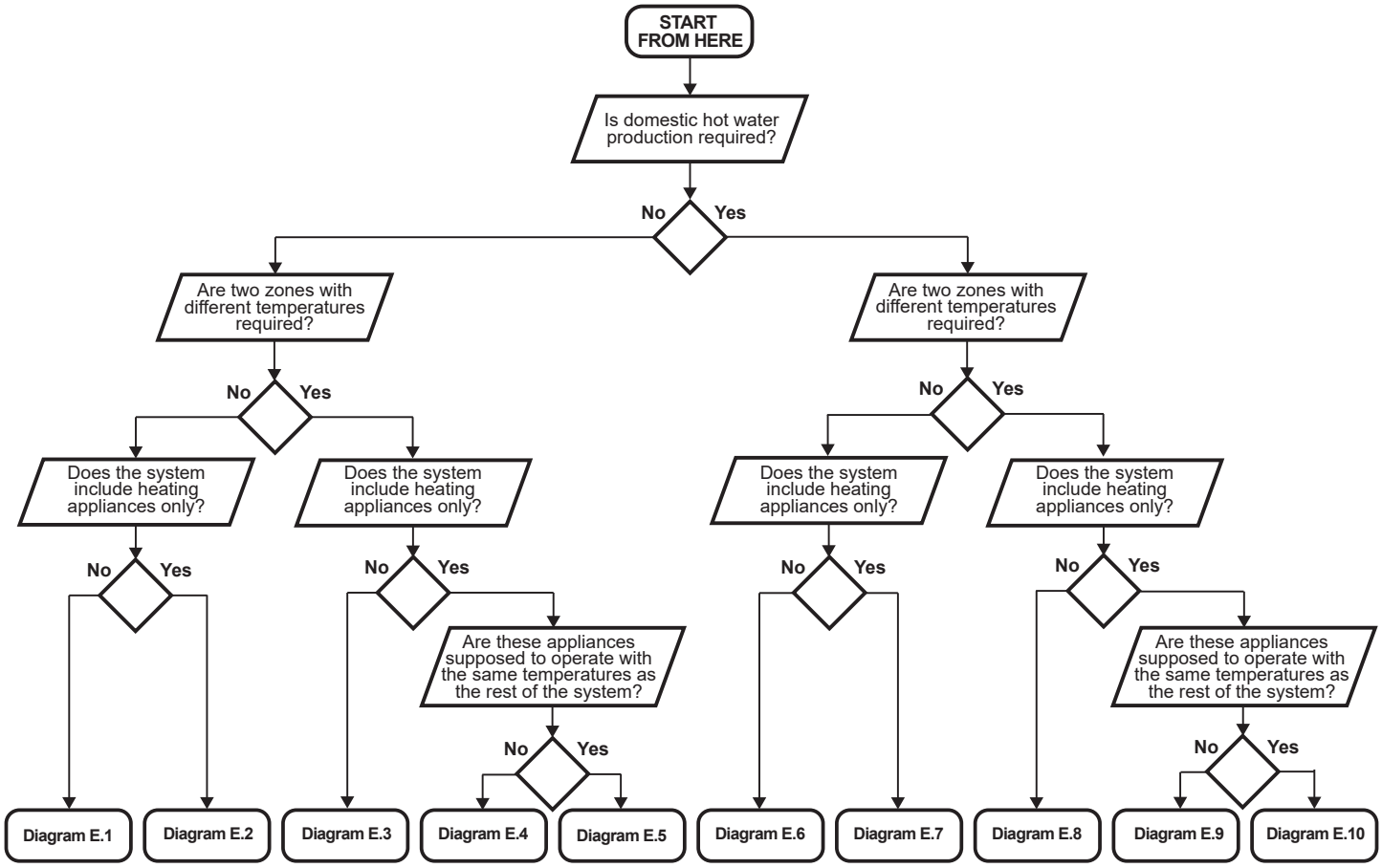
The controller is characterised by such flexibility that units may be combined with different systems, ranging from easy systems with one single temperature zone to more complex systems with two temperature zones and domestic hot water production.

Appendix E to this manual lists some possible system layouts.

Layouts are given as examples only. The system must be sized correctly and implemented in accordance with the standards existing in the country where the unit is installed and following the best practices.

The recommended system layout diagram is attached for each layout. Some base controller parameters then need to be set up, consistently with the system layout and the electrical connections. Please find the relevant information in the controller Service Manual.

The flow chart below is useful to identify the type of system that best suits your requirements.



Units featuring an advanced controller (V6) are designed to control all the recommended system layouts. On the other hand, units featuring a base controller (V5+) are only designed to control recommended system layouts with reference “E.1” and “E.6”.

6.5 Hydraulic connections

When preparing to connect the hydraulic circuit for the evaporator (refer to the diagrams included in the manual), it is good practice to comply with the following instructions and in any case to follow national or local regulations.

Fit the pipes to the unit using flexible couplings in order to prevent transmission of vibrations and compensate thermal expansion. (Proceed on the pumps unit in the same way).

Install the following components on the pipes:

- Temperature and pressure indicators for normal maintenance and control of the unit.
- Wells on the inlet and outlet pipes for temperature measurements, if temperature indicators are not present.
- Shut-off valves (ball gate valves) to isolate the unit from the hydraulic circuit.
- metal mesh filter with a mesh size no larger than 1 mm, situated on the exchanger inlet pipe, to protect the exchanger from slag or impurities in the pipes.
- Air valves, to be placed in the highest parts of the hydraulic circuit, to allow the non-condensable gases to be bled off.
- Expansion vessel and automatic charging valve for maintaining system pressure and to compensate thermal expansion.
- Drain valves, so that the system can be emptied for maintenance operations or seasonal stops.

It is mandatory to comply with the above requirements to facilitate the hydraulic connection operations and the maintenance operations.

If supplied with the unit, it is mandatory to install the flow switch at the chilled water outlet connection. If the flow switch is not installed, the warranty is voided immediately.

It is mandatory to fit the metal mesh filter on the water inlet pipe. If the metal filter is not fitted, the warranty is voided immediately.

If integration with another heat source is planned, make sure water circulation through the unit does not exceed 65°C.

If it does, the high pressure switch and the safety valve of the unit will operate.

Fig. B.11 exemplifies the hydraulic connection of the unit to a system.

It is essential for the water to come in at the connection indicated in the dimensional diagram and with the relevant label on the unit.

If it does not, there would be a risk of the evaporator being frozen since the antifreeze probe control would be thwarted.

The hydraulic circuit must be made in such a way as to ensure a constant flow of water to the exchanger in all operating conditions.

If this is not done, there will be a risk of refrigerant returning to the liquid state at the compressor inlet, with the danger of it breaking.

Operation with a variable water flow rate at the user-side exchanger is allowed only if the inverter pump is integrated in the unit (and therefore supplied by the manufacturer) and if the hydraulic circuit is made in accordance with the manufacturer's specific instructions.

The controller of units installed in systems for the production of domestic hot water is designed to control a diverter valve.

In case the heating cables are arranged on the outdoor unit, they must be wound around the inlet and outlet water pipes and the pipes must be insulated thereafter.

6.6 Electrical connections

All electrical operations must be carried out by personnel having the necessary legal requirements, and trained and informed on the risks connected with these operations.

The sizing and characteristics of the power lines and relevant components must be determined by staff qualified to design electrical systems, following the international and national regulations of the place of installation of the units in conformity with the regulations in force at the time of installation.

To install components outside the unit, you must refer to the wiring diagram supplied with the unit.

The wiring diagram, along with the manuals, must be kept carefully and made available for future work on the unit.

Overview:

- The electrical connections must comply with the information shown in the wiring diagram attached to the unit and the regulations in force in the place of installation.
- grounding is required by law;
- The installer must connect the earth cable to the PE terminal on the earth bar situated in the electrical control panel.
- Make sure the power supply voltage corresponds to the rated data of the unit (voltage, number of phases, frequency) stated on the plate on the unit.
- the standard power supply voltage (see specific wiring diagram) must not fluctuate by more than ±10% and the unbalance between phases must always be less than 2%. If this does not occur, contact our technical department to choose suitable protection devices.
- Make sure the power line is correctly connected with a clockwise phase sequence.
- The control circuit power supply is taken from the power line via a transformer situated in the electrical control panel; the control circuit is protected by fuses.

A disconnect switch needs to be installed on the power line of the unit, in compliance with the laws existing in the place of installation.

To fix the power cable, use power cable fixing systems that resist tensile and torsional stresses.

The weight of the cables must not be borne by the electrical connection system.

Make sure no voltage is present before carrying out any operation on electrical parts.

The cross-section of the cable and the line protection devices must correspond to those indicated in the wiring diagram.

The connections to the electrical control panel must be made maintaining the stated IP protection rating.

If you use a residual current device to protect the power line, in units with inverter, use type "B" or "B+" residual current devices, with minimum tripping threshold of 300 mA and delayed tripping.

If the circulation pumps are not installed on the unit, potential free contacts are available as accessory for controlling the external pumps.

If the potential free contacts for controlling the circulation pumps are present, connect the pumps as shown in the wiring diagram.

The electrical connections to potential-free contacts, which are powered by external sources, must be suitably protected against overcurrent and earth faults.

The circuit of the potential-free contacts inside the electrical control panel is made using orange cable.

Power must be supplied to the internal and external units independently. Provision must be made for suitable electric protections to the power level and the current absorbed by each unit.

The electric heaters in the external unit must be energised by mean of a connection between the terminals provided in the internal unit and the terminals provided in the external unit.

Run the cables in both the internal and external units using the cable glands provided in each unit. Make sure that they are properly tight (Fig. B.12). Different cable glands must be used for power cables, for signal cables and for probe cables. Tighten the cables using the terminals installed in the units. The requirement is to tighten the cable sheath and not each individual wire (Fig. B.13).

The temperature probes that are supplied with the unit must be installed at the position required to fulfil their function. For instance, the temperature probe measuring cold/hot water must be fitted on the water pipe coming out of the external unit, making sure that the probe is properly isolated in order to prevent heat exchange with the surrounding air, which may affect the temperature reading process. An extension cable is supplied for each temperature probe that is equipped with quick connectors at its ends. This probe is to be installed as shown in Fig. B.14.

The wiring diagrams are provided in Appendix D to this manual.

Unit size	External unit diagram
6-9-12	OU 6-9-12
15-19	OU 15-19

Controller type	Internal unit diagram
Base controller V5+	IU V5+
Advanced controller V6	IU V6

Be careful when connecting the probes to the terminals: the water input temperature probe (TUI) and the water output temperature probe (TUO) in the external unit must be connected to the correct terminals, according to the controller type fitted. Refer to the wiring diagram of the controller.

6.7 Vacuum and refrigerant charge

Units are supplied filled with the ideal amount of refrigerant, as listed in the table below.

Size	Refrigerant charge [kg]
TAU SKY Hi HP 6	0.9
TAU SKY Hi HP 9	1.4
TAU SKY Hi HP 12	1.8
TAU SKY Hi HP 15	2.55
TAU SKY Hi HP 19	3.2

6.8 WiFi module configuration (applies to advanced controller V6 only)

The WiFi module is designed for the connection of units featuring an advanced controller (V6) to an Internet data network in order to implement remote monitoring and to use the application for remote control of the unit.

WiFi module installation and configuration require that the unit operating data be visible to the Manufacturer, Fitter and the authorised Service Centre. Data shall be used for monitoring purposes and shall not be transferred to third parties.

For correct system operation the WiFi network signal must be strong and stable at the point of installation of the WiFi module.

A computer provided with a WiFi connection or a smartphone is required for WiFi module configuration.

1. Check that the WiFi module is connected, as shown in the wiring diagram of the unit, and it is powered (“Power” LED on).
2. Enable the WiFi option in the computer or smartphone, go to the WiFi setup menu and find network “USR-W600” (Fig. G.1).
3. Connect your device to this network. No password is required for connection.
4. When the connection is live, open a browser (Google Chrome, Mozilla Firefox, Internet Explorer) and key in the following address “10.10.100.254” in the address bar. Log in with username “admin” and password “admin” (Fig. G.2).
5. The setup page below opens. Click “English” on the top right-hand side to switch to English (Fig. G.3).
6. Access the menu “WiFi settings”: go to item “WiFi Work Mode” and set “STA Mode”, then confirm your selection (Fig. G.4).
7. Press the button “Search” to find the WiFi network you will connect to (Fig. G.5).
8. Select the WiFi network to connect to and press “OK” (Fig. G.6).
9. If the WiFi network requires entry of an access password, set the password in “STA password” and then press “Save” (Fig. G.8).
10. Tap the “Trans Setting” menu and set the following in the “Socket B Connect Setting” field:
    - protocol: TCP-IP;
    - port: 18899;
    - server IP address: www.myheatpump.com.

Press “Save” to save the entered parameters (Fig. G.9).

11. If the entered parameters have been saved correctly, a screen pops up where restart of the WiFi module is requested. Press “Restart” to restart the module (Fig. G.10). A screen pops up at the end of the restart process to confirm that the module has been restarted (Fig. G.11).
12. After restart, the 3 LEDs must be on in the WiFi module (Fig. G.12).
13. Access the “User manager” menu from the unit display and log in using a fitter password (Fig. G.13). Refer to the controller Service Manual for the password.
14. Access the menu “Other options” and go to page 4 of 6 to enable the WiFi module and to accept the WiFi module settings (Fig. G.14).

The unit can now be monitored remotely. Remote monitoring requires connecting to website www.myheatpump.com and entering the username and password provided by the fitter for log in.

7 COMMISSIONING

7.1 Preliminary operations

Make sure the main disconnect switch is in the OFF position.

If the pumps of the unit are not locked, electrically isolate them by operating the protective devices, to prevent automatic starting, in the event of antifreeze function activation, during the preliminary operations.

Restore functional conditions only on starting.

To avoid damage to the mechanical seals, do not start the circulation pump before completely filling the system with water.

If a pump has to be replaced, after replacing it, make sure the valves are open and the pump is full of water before enabling its operation.

Before filling the hydraulic system, check that the drain valve is closed and that all the air valves are open.

Open the shut-off devices of the system and start to fill it by slowly opening the water filling valve.

When water begins to come out through the air valves, close them and continue filling until the pressure value envisaged for the system is reached.

The unit should only be started up by qualified personnel authorised by the manufacturer.

All the units are pre-charged with refrigerant gas, so the refrigerant circuit is pressurised.

Check:

- that the electrical connection has been made correctly and that all terminals are properly tightened;
- that the voltage on the terminals is the same as specified in the unit ID plate; If frequent voltage fluctuations are experienced, contact our engineering department in order to choose suitable protective devices.
- that the gas pressure in the refrigerant circuit is shown on the pressure gauge (where fitted) or on the controller display;
- that there are no refrigerant fluid leaks, using a leak detector, if necessary (the presence of oil stains may be a sign of refrigerant leaks);

Be careful with the electrical checks and use only suitable tools.

Position the master switch of the unit to ON and check on the display of the control that the unit is OFF in order to prevent it from starting.

Where they are fitted, check that the heaters in the compressor crankcase are powered correctly.

The heaters in the compressor crankcase are switched on when the master disconnect switch is closed: this must be done at least 12 hours before starting the unit.

To check that the heaters are working correctly, check that the lower part of the compressors is hot and in any case at a temperature of 10 - 15 °C above ambient temperature.

Check:

- that the hydraulic connections have been made properly, according to the instructions given on the inlet / output plates and that a mechanical filter has been installed at the unit's inlet (a mandatory component, whose absence will invalidate the warranty);
- that the hydraulic system has been vented, eliminating any excess air, loading it gradually and opening the venting devices on the top;
- that the pump has been bled properly;
- that the installer has organised a storage tank with the appropriate capacity for the volume of the system's water.

7.1.1 Checking the pre-charge of the expansion vessel

The values of the pre-charge pressure and the maximum pressure at which it can operate are stated on the label present on the expansion vessel.

The pre-charge pressure of the expansion vessel must be adjusted to the hydraulic pressure at the point of installation. At the time of installing the unit, make sure the pre-charge value is equal to the hydrostatic pressure value at the point of installation increased by a precautionary pressure value (at least 0.3 bar), to ensure there are no areas under vacuum in the system.

$$pVE = 0{,}3 + \frac{Hmax}{9.81}$$

where

- pVE: new pre-charge pressure of the expansion vessel [barg]
- Hmax: difference in level between the highest point of use and the installation level of the unit [m]

If the calibration value obtained from the calculation is lower than the pre-charge value stated on the label, keep the existing pre-charge value.

The maximum value of the pre-charge pressure corresponds to the calibration pressure of the safety valve.

The checking of the pre-charge must be done for each installed vessel

7.1.2 Checking the volume of the expansion vessel

As the pre-charge pressure increases, the maximum volume of the system supported by the expansion vessel supplied as standard, decreases.

$$VI = VVE\ /Ce \cdot \left[1 - \frac{1 + pVE}{1 + pVS}\right]$$

where

- VI: volume of the system supported by the expansion vessel [l]
- VVE: volume of the expansion vessel [l]
- Ce: expansion coefficient of water
- pVE: pre-charge pressure of the expansion vessel [barg]
- pVS: calibration pressure of the safety valve [barg]

If the actual volume of the system is higher than this maximum value, an additional expansion vessel of adequate volume must be installed.

After filling the hydraulic circuit, the pressure at the expansion vessel must be just a little higher than the pre-charge pressure.

If there are points of use placed at levels lower than the level at which the unit is installed, check that the point of use is able to withstand the maximum pressure that can be generated.

7.2 First starting

When the unit is started for the first time, some important tests and checks must be done.

7.2.1 Hydraulic tests

So that the unit can operate, the external OK signal device must be closed (refer to the wiring diagram provided with the unit).

The external OK signal device must be short-circuited if not needed for system requirements.

Water circulation can be managed by the control of the unit or by a control outside the unit.

If water circulation is controlled by an external control, the pump must be started before the unit starts and stopped after the unit stops.

We advise an advance on starting and a delay on stopping of at least 5 minutes.

Before starting the unit, make sure the system has been bled correctly.

Before starting the unit, make sure the pump has been bled to prevent damage to the hydraulic seals.

For units equipped with pump unit, check that the pumps controlled with direct starting are rotating in the correct direction.

Start the unit by acting on the user interface of the control.

Check for correct operation of the water flow switch by closing the shut-off valve on the unit output line. The alarm must be displayed on the user interface.

If not, restore correct operation.

Reopen the valve, reset the alarm and restart the unit.

For units equipped with pump, if the pump is noisy and it is not possible to adjust the pressure by acting on its control, close the delivery valve until normal operation has been restored. This can occur when the head loss of the system differs considerably from the discharge head of the pump.

For pumps/circulators that include delivery pressure adjustment, work on the adjustment as described in the next chapters.

If there is a water leak on first start-up, it could be a problem with bedding in of the mechanical seal. We therefore advise pressurizing the pump body 2 or 3 times by closing and opening the delivery valve so as to correctly bed in the seal.

If this operation does not solve the problem, contact the technical support department.

7.2.2 Functional tests

With the starting of the unit, a few seconds after the starting of the pump, if managed by the controller, the compressor will start according to the request of the thermoregulation.

The end user is required to keep a register of the unit (not supplied), which will allow a record to be kept of the work carried out on the unit. This will make it easier to appropriately organize the work to facilitate the checks and the prevention of malfunctions.

State the following in the register: the type of refrigerant, the date and type of work done (routine maintenance or repair), description of the work with any parts replaced, measures implemented, the operator who carried out the work and his qualification.

7.3 Calibration of safety components

Any work on the unit must be carried out by qualified authorised personnel. Incorrect calibration values can cause serious damage to the unit and harm people.

The control and safety equipment is calibrated and tested in the factory before the unit is shipped.

However, after the unit has been started, the safety devices must be checked (only the high and low pressure switches).

However, after the unit has been started, the safety devices must be checked (only the high pressure switches).

The checks must be carried out as described in the "Periodic checks" chapter.

The calibration values are shown in the table

Control and safety components	Activation set point	Differential	Reset
High-pressure switch	42,0 barg	10,8 barg	Automatic

7.4 Checks during operation

With the circuit operating at 100% and stable at working conditions near the nominal ones, check:

- that the electrical absorption of the unit is close to the data shown in the wiring diagram. Considerably different values may be due to the reduced capacity operation of the unit, at working conditions very different from nominal ones, or to the malfunctioning of one or more components.
- that the difference in water temperature seen between the inlet and outlet of the unit falls within the allowed range given in the Technical Catalogue.
- Higher values indicate that there is a reduced flow rate of water through the unit. In this case, it is necessary to check for closed or partially closed shut-off devices in the hydraulic circuit and check the characteristics of the pumps and that they are working correctly.
- Lower values indicate that the water flow rate through the unit is too high. In this case, the water flow rate through the system must be reduced by acting on the control switch (if any) of the pumps or by partially closing the shut-off device placed at the outlet of the unit.
- that the difference between the condensing temperature and the air temperature is less than 25°C;
- If it is higher, check that all the fans are turning correctly and that there are no parts obstructing the condensing coil.
- the superheating value of the suction gas. The optimal value must be between 4 and 7°C;
- the subcooling value of the liquid leaving the condenser. The optimal value must be between 5 and 10 °C.

7.5 Alarms and malfunctions

Possible malfunctions will trigger the protective devices and safety devices of the unit before serious faults occur.

All the “warnings” and “alarms” are recorded in the memory of the control and displayed on the display of the unit.

Before resetting an alarm, the cause that triggered it must be found and eliminated.

An alarm going off repeatedly quickly leads to serious damage to the unit.

Refer to the manual of the control for the alarms and warnings that appear on the display of the unit.

In case of anomalies not handled by the control panel, refer to the following troubleshooting section.

This troubleshooting section does not include causes due to deliberate work or tampering or particularly serious malfunctions, for which a thorough analysis is necessary.

7.5.1 General troubleshooting

SYMPTOM	LIKELY CAUSE	POSSIBLE SOLUTION
The unit does not start, the display is off.	No mains voltage.	Check that the main disconnect switch is in the “ON” position.
		Check for voltage in the power supply line.
	No voltage to the auxiliary circuit.	Check that the protective devices upline and downline of the transformer of the auxiliary circuit are undamaged.
		Reset the triggered protective device after eliminating the cause that triggered it
The unit does not start, the display is off, the control is powered correctly.	The unit is switched off from the display and the display is disconnected or not working.	Restore the connection of the display or replace it.
The unit is operating normally, the display is off.	The connection of the display to the control is disconnected.	Restore the connection between the display and the control.
	The display is not working.	Replace the display.
The unit does not start, the display is on.	There is no 230V auxiliary power supply.	Check that the secondary circuit of the 230V transformer is intact.
		Check that the protective devices downline of the 230V transformer are intact.
Abnormal noises from the unit due to vibrations.	The weight of the unit is not distributed evenly on the base.	Correct the weight distribution of the unit by adjusting the height of the anti-vibration mounts.
Abnormal noises on the hydraulic pipes.	Operation of the system pump outside its performance curve with excessive water flow rate.	If it is not possible to work on the control of the pump, partially close the shut-off device on the delivery side of the unit until the nominal flow rate is restored.
	Presence of air in the system.	Check that the air valves are not shut off by valves.
		Vent the system.
Water leaks from the pump on first start-up	Bedding in the mechanical seal	Pressurize the pump body 2 or 3 times by closing and opening the delivery valve so as to correctly bed in the seal.

7.6 Temporary stop

The stopping of the unit for a few hours in the day “during non-working hours” or for a few days “over the weekend” is considered temporary.

The unit must be stopped using the display of the control, the external OK signal or via serial if included.

During the temporary stop, the unit must be powered correctly.

When the circulation pump is managed by the control of the unit, if the temporary stop takes place within sub-zero air temperature and the system does not have glycol fluid, make sure water circulation is guaranteed and that no taps or valves are preventing it.

If, in the previous conditions, the circulation pump is not managed by the control, the pump must always be kept running.

When the temporary stop is carried out in this way, all that needs to be done to restart the unit is to set the control to “ON”.

7.7 Stop for long periods of time

If the unit is to remain stopped for a season or for long periods of time, it is necessary to:

- turn the unit off by means of the control switch;
- disconnect the power supply using the switch / general switch of the unit;
- drain the hydraulic system (unless it contains glycol water).

This case record can in fact be traced back to the storage condition; therefore, refer to the relevant set limits.

Repeat the start-up procedure at the next restart.

If the hydraulic system is discharged during a stop of the unit, turn off the power to prevent the pump from starting, in antifreeze function, without water being present.

8 MAINTENANCE

All the operations described in this chapter must always be carried out by qualified and authorised personnel.

Before carrying out any work on the unit or accessing internal parts, make sure you have turned off the power supply to it.

The compressors and delivery pipes are very hot. Be particularly careful when working near them.

Be particularly careful when working near the finned coils as the aluminium fins are very sharp.

Do not access moving parts without guards.

In units with capacitors and/or inverters, certain components can remain live for several minutes even after having turned off the main switch.

Wait 10 minutes before working on the electrical parts of the unit.

Circuits supplied from external sources (made with orange cable) can remain live even after the power supply to the unit has been turned off.

Work on the unit only if there is sufficient lighting for the type of work to be carried out.

8.1 Adjustments

All the parameters that control the operation of the unit can be set through the user interface of the control.

Refer to the control manual should modifications be necessary, but contact the manufacturer first.

Any calibration affecting the unit safety must not be changed.

If in any case replacement becomes necessary, it is essential to use components supplied by the manufacturer (in the case of adjustable parts) or with the same sizes and characteristics (in the case of fuses).

The component of the unit that needs most care is the finned pack heat exchanger.

It is essential to keep it clean and free of dirt and/or deposits that can hinder or prevent air flow.

Regular cleaning of the surface of the coil is essential for the unit to work correctly and also increases the operating life of the exchanger and the unit.

Frequent and correct cleaning of the coils contributes to considerably reducing corrosion problems.

8.2 External cleaning

While cleaning the finned packed heat exchanger, the electrical control panel must be closed and the main disconnect switch must be locked in the "OFF" position.

Using a jet of water on the coil while it is still dirty will cause deposits and pollutants to remain inside the exchanger, which will make cleaning even more difficult. All the dirt and deposits must therefore be removed from the surface before rinsing.

For units installed in coastal or industrial areas or in areas where there are aggressive chemicals in the air, periodic rinsing with clean water is considerably beneficial and helps counter corrosive effects.

Never clean the coils with chemicals, water containing bleach or acid or basic detergents. These detergents can be difficult to rinse off and could accelerate corrosion on the joint between pipe and fin and in areas where different materials come into contact (Cu and Al).

8.2.1 Cleaning traditional finned coils in Cu/Al

Conventional pipe-fin coils can be cleaned with a vacuum cleaner or a brush with soft, non-metallic bristles.

Always clean in the direction of the fins and never perpendicularly to them. They can easily be bent and damaged.

Clean in the opposite direction to the normal air flow.

The coil can then be rinsed using only drinking water at low pressure (3-5 barg).

Rinsing must be carried out with a low pressure jet of water to avoid damaging the fins.

Never use jets of water or high-pressure compressed air to clean the coil. The force of the jet of air or water could bend the fins, with a consequent increase in aeraulic head losses on the exchanger and lowering of the performance of the unit.

8.2.2 Cleaning the plate heat exchangers

Thanks to the generally very high level of turbulence, in plate heat exchangers, a self-cleaning effect takes place in the channels.

However, in some applications the tendency to scaling and/or the formation of deposits in the heat exchanger can be very high (e.g. use of very hard water at high temperatures).

An increase in head losses on the hydraulic circuit and a decrease in temperature difference between water inlet and outlet, are a sign that the exchanger is becoming fouled.

In such cases, the heat exchanger can always be cleaned by circulating an in-situ cleaning fluid (CIP).

When carrying out the operations described here, adopt all the technical and organisational measures provided for by workplace safety laws and regulations; use the personal protective equipment in accordance with the instructions in the safety data sheets for the chemical products used.

Also, all technical and organisational measures for waste water treatment must be applied in accordance with current environmental laws and regulations.

To reduce the extent of scaling and residues, use a 5% solution of oxalic acid $(COOH)_2$ at 20°C as washing fluid: cleaning with acid solution must be carried out for no longer than 15 minutes.

After finishing cleaning with acid detergent solutions, use a 2% solution of sodium bicarbonate ($NaHCO_3$) at 20°C to neutralise the acid solution.

The flow rate of the acid and basic solution must be at least 1.5 times the operating flow rate with reverse circulation mode. Then wash with plenty of clean soft water until all traces of acid and basic solution have been removed from the heat exchanger. Any traces of acid or basic fluids left inside the heat exchanger can cause serious damage to property and people.

If it is thought that the exchangers will need to be washed regularly, installing CIP valves in the hydraulic circuits will make this operation easier.

8.3 Internal cleaning

It is essential to keep the installation site clean and tidy for correct maintenance of the unit and to keep it in good working order.

8.3.1 Cleaning the unit

Keep the inside of the electrical control panel and the compressor compartment clean.

After working on the unit, always clean the electrical control panel of any work remnants and extraneous components.

Restore the safety devices and protective devices that had to be removed in order to carry out the work.

Use a vacuum cleaner to eliminate small objects, work remnants and/or any dust.

Do not use compressed air

If you have to carry out work on compressors inside the compartment, before closing it again, check that the electrical box of the compressor is closed correctly and that any refrigerant circuit valves are in the correct state, and make sure you do not leave any materials inside the compartment.

8.4 Periodic checks

Carry out periodic checks to make sure the unit is working correctly:

OPERATION	RECOMMENDED FREQUENCY
Check the operation of all the control and safety equipment as described previously.	Monthly
Check the tightness of the electrical terminals in the electrical control panel and in the terminal boards of the compressors. The moving and fixed contacts of the contactors must be cleaned periodically and should be replaced whenever they show signs of deterioration.	Monthly
Make sure there are no oil leaks from the compressor.	Monthly
Make sure there are no water or water/glycol mixture leaks in the hydraulic circuit.	Monthly
If the unit is to remain out of service for a long time, drain the water from the pipes and the heat exchanger. This operation is necessary if ambient temperatures lower than the freezing point of the fluid used are expected during the time it is to remain stopped.	Seasonal
Check the filling of the water circuit.	Monthly
Check that the differential water pressure switch, or the flow switch (where present), is working correctly.	Monthly
If present, check the crankcase heaters of the compressors.	Monthly
Clean the metal filters in the hydraulic pipes.	Monthly
Clean the finned coil by following the instructions in the “External cleaning” section according to the type of coil installed	3 months
Check the condition, fixing and balance of the fans.	4 months
Check that the noise emitted by the unit is normal.	4 months
Replacement of sensing element in refrigerant leak detector	Every 5 years
Check that the cable glands in the unit are correctly tightened.	Yearly
Replacement of cartridge in refrigerant leak detector	400 days
Replacement of the refrigerant leak detector sensor	10 years

This planning refers to an average installation; there could be installations in which it may be necessary to increase the frequency of some checks.

Current legislation may require considerably longer intervals on periodic checks than the recommended ones, also in reference to the safety devices installed and to the refrigerant charge present, without causing the warranty on the unit to be voided.

8.5 Unscheduled maintenance

After correctly starting-up and carrying out the relevant checks, the units normally do not need any intervention by the customer service in order to check the charge of the refrigerant gas.

8.5.1 Special work

With use of the unit, particular situations may occur that require work to be carried out promptly.

The unit must be serviced, even in emergency conditions, by qualified staff and safely, following the guidelines provided in the section concerning operations on units that contain flammable refrigerants.

The presence of oil on the unit, on the pipes or on parts of the unit can be a sign of gas leaks.

Repair the leakage point and restore the charge of refrigerant gas.

In the case of small oil leaks, clean the dirty parts with absorbent cloths, otherwise recover the leaked oil with absorbent sheets. In any case, the material used must be disposed of in accordance with current rules and regulations.

Check whether it is necessary to restore the oil charge.

In the case of spillage of the water and glycol mixture of the system, stop the operation of the unit and immediately stop the supply by closing the valves to isolate the leaking part.

Prepare suitable means for containing the spillage (absorbent rolls, cloths, sheets).

As far as possible, recover the liquid with a wet vacuum cleaner.

In the event of environmental damage that will require reclamation work, inform the relevant authorities.

The recovered liquid and the material used must be disposed of in accordance with current rules and regulations.

9 DECOMMISSIONING

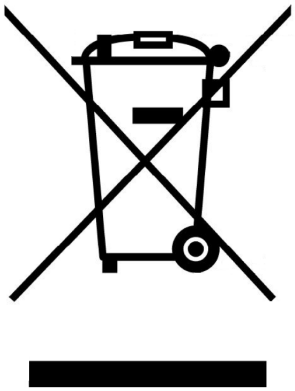
With reference to the European waste management directive, we inform you of the following:

- The owner of electrical and electronic equipment (EEE) is obliged not to dispose of it as non-separated municipal waste, and must dispose of it via separate collection through public or private waste collection systems as required by local regulations.
- The owner can return EEE to the dealer at the end of its life when purchasing equivalent new equipment.

This EEE may contain hazardous substances such as refrigerant gases, lubricating oils and accumulators or other materials, and improper or incorrect disposal of them may have adverse effects on human health and the environment.

Incorrect disposal of them also entails penalties as provided for by local regulations.

The symbol shown on the equipment, which indicates separate collection of EEE, is a crossed out wheelie bin accompanied by a solid horizontal bar and identifies that it was put on the market after 13 August 2005.



10 SYMBOLS AND ACRONYMS USED

List of hydraulic symbols used


Cooling


Water filter


Heating


Air venting


Temperature probe


Water pump


Water-side safety valve kit


Expansion vessel


Ball valve

List of display buttons in base controller (V5+)


On/Off button


Arrow Down button


Mode button

SET button


Arrow Up button


Clock button

List of symbols used in advanced controller (V6)


Ambient temperature


Domestic hot water

Area 1


Automatic mode

Area 2


On/Off

List of acronyms used

03	Plate heat exchanger
09	Water filter
2WV	2-way water valve on system side
3WV	3-way water valve on system side
4WV	4-way water valve on system side
4WVR	4-way valve in refrigerant circuit
91	Thermometer
ABN	Diverter valve
AH	Feet height adjustment range in base frame
AI	Air inlet
AO	Air outlet
CC	Serial communication cable between internal and external units
CE	Cable inlet
CO	Compressor
CWS	Mains water inlet
DHW	Domestic hot water
DHWT	Domestic hot water storage tank
DR	Water drain
DWHP	Domestic hot water circulation pump
EL	Pump
EHPS	Power cable to electric heating elements in external unit
EXV	Electronic expansion valve
FC	Fan coil heating/cooling system
FH	Radiant heating/cooling system
FL	Flow switch
GA	Flexible coupling
GR	System filling unit
HMI	Controller display
HPWI	Input water into heat pump
HPWO	Output water from heat pump
IU	Internal unit
IUPS	Power cable to internal unit
LPS	Low pressure switch
LR	Liquid receiver
MA	Water pressure gauge
OC	External unit coil
OF	External unit fan
OU	External unit
OUPS	Power cable to external unit
OWV	Water loading unit
P1	Pump 1 on system side
P2	Pump 2 on system side
PHE	Plate heat exchanger
PS	Main power supply
RA	Radiator heating system
RB	Valve
RF	Filter on refrigerant side
SA	Water-side safety valve assembly
SB	Storage tank for heating/cooling system
SC	Communication cable between internal and external units
SCC	Extension cable for temperature probes
SF	Air valve
TC	Cooling/heating water temperature probe, V6 controller
TC	Cooling water temperature probe, V5+ controller
TH	Heating water temperature probe, V5+ controller
TP	Temperature probe
TR	Ambient temperature probe
TV1	Water temperature probe in zone 1

TV2	Water temperature probe in zone 2
TW	Domestic hot water temperature probe
VE	Expansion vessel
VR	Check valve
WF	Water filter
WI	Hydraulic connection for input water
WO	Hydraulic connection for output water
WP	Water pump
WS	Communication cable shield
WWHE	Water/Water plate heat exchanger

List of symbols in internal unit exploded view V6 (A.1)

1	Control panel	5	WiFi module (option)
2	Check sheet	6	Water temperature probe
3	Master switch	7	Temperature probe in mixing valve
4	Extension cable for probes	8	Ambient temperature probe

List of symbols in internal unit exploded view V5+ (A.1bis)

1	Control panel	6	Cable gland PG
2	Front panel	7	Cable clips
3	Bottom plate	8	Checklist
4	Box	9	Teminal block
5	Hinge	-	-

List of symbols in external unit exploded view: sizes 6 (figure A.2)

1	Plate heat exchanger	13	Finned coil
2	Water flow switch	14	Thermostat
3	WATER PUMPS	15	PCB board
4	Compressor	16	Fan motor DC
5	Inductance	17	Fan impeller
6	Four-way valve	18	Air venting
7	Liquid receiver	19	Heating element
8	Pressure transducer	20	Heating element
9	Refrigerant filter	21	Heating element
10	Refrigerant filter	22	Probe on water input/output
11	Pressure transducer	23	Temperature probe in heat exchanger
12	Thermostatic expansion valve	24	Temp. probes on exhaust/intake/coil and ambient temp. probe

List of symbols in external unit exploded view: sizes 9 - 12 (figure A.3)

1	Plate heat exchanger	12	Electronic expansion valve
2	Water flow switch	13	Liquid receiver
3	Output water pipe	14	Thermostat
4	WATER PUMPS	15	Top cover
5	Compressor	16	Controller
6	Base	17	4-way valve
7	External coil	18	DC motor in fan
8	Service connection to refrigerant circuit	19	Fan impeller
9	Low pressure transducer	20	Front panel
10	High pressure transducer	21	Fan grid and nozzle
11	Refrigerant pressure gauge	22	Air venting

List of symbols in external unit exploded view: sizes 15 - 19 (figure A.4)

1	Fan nozzle	25	Service panel
2	Front panel	26	Fixing plate 1 for terminal block
3	Fan impeller	27	Fixing plate 2 for terminal block
4	Fan motor bracket	28	Fixing plate for plate heat exchanger
5	Fan motor DC	29	Fixing plate
6	Compressor	30	Top cover
7	Base	31	Electric box cover
8	Liquid receiver	32	Electric box
9	Bulkhead	33	Column support
10	Plate heat exchanger	34	External coil
11	Four-way valve	35	Teminal block
12	Four-way valve coil	36	Terminal switch
13	Water flow switch	37	Inductance
14	Water pump	38	Outdoor board
15	Air purging valve	39	Outdoor board
16	Drainage valve	40	Outdoor board
17	Electronic expansion valve	41	Bottom tray el. heater
18	Electronic expansion valve coil	42	Compressor el. heater
19	Low pressure transducer	43	El. heater for plate heat exchanger
20	High pressor switch	44	Compressor discharge sensor
21	High pressure transducer	45	suction/coil/water inlet/water outlet
22	Cabinet for compressor	46	Ambient temperature probe
23	Cabinet cover for compressor	47	water inlet/water outlet sensor (Pt1000)
24	Back side panel	-	-

11 APPENDIXES

List of Appendixes

Appendix A – Unit exploded views

Appendix B – Images

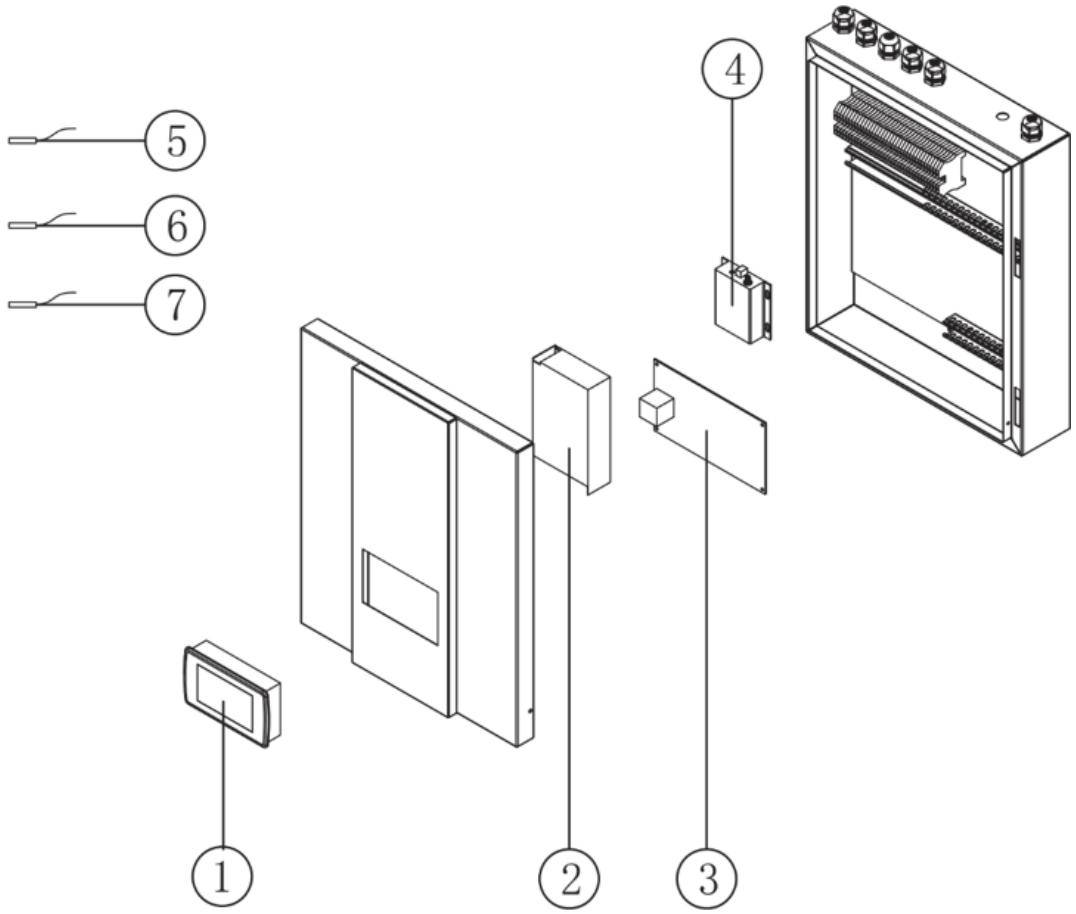
Appendix C – Unit drawings and min. installation spaces

Appendix D – Wiring diagrams

Appendix E – System diagrams

Appendix F – Base frame assembly procedure

Appendix G – WiFi module configuration



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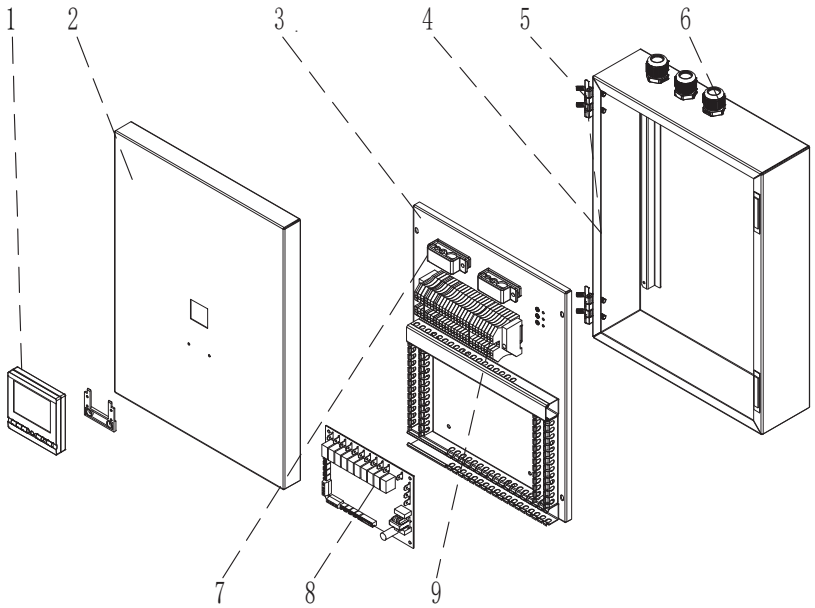
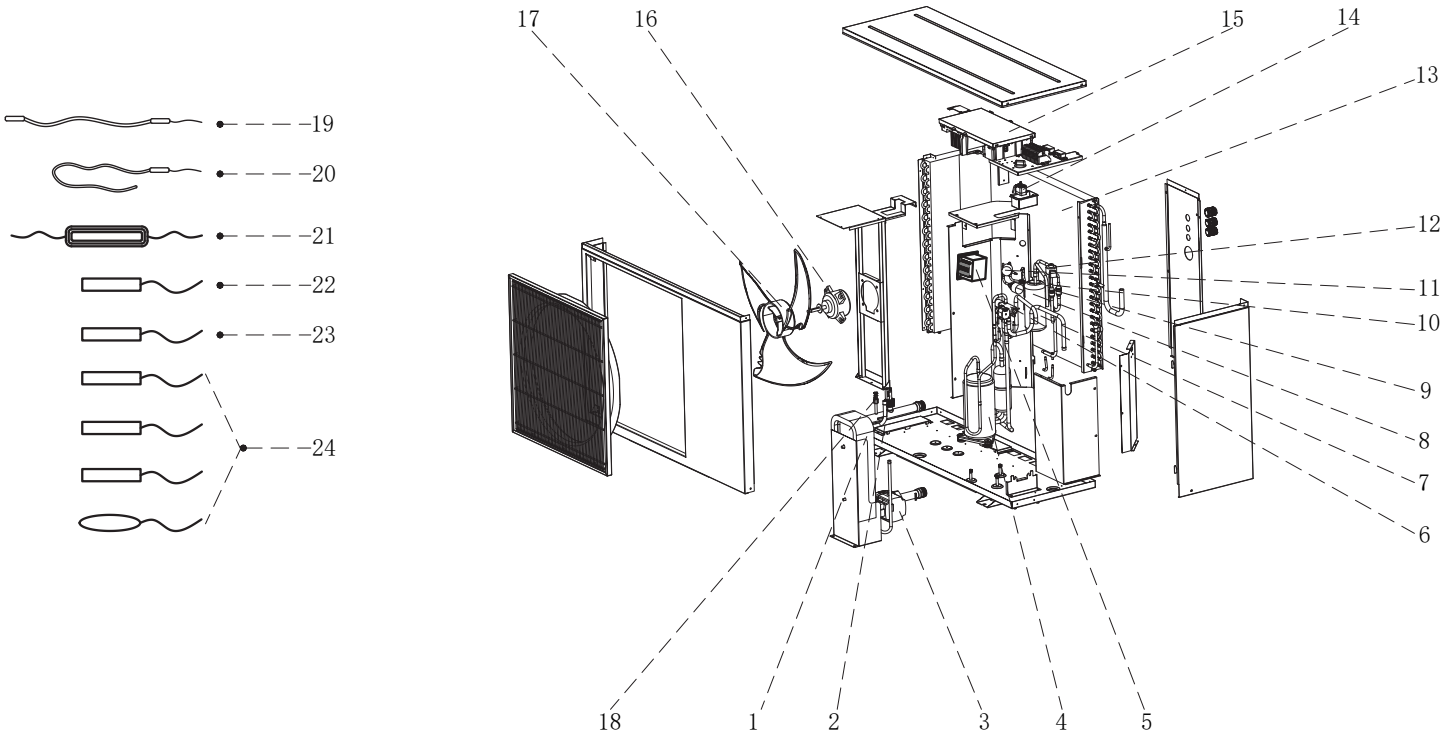


A.1 bis



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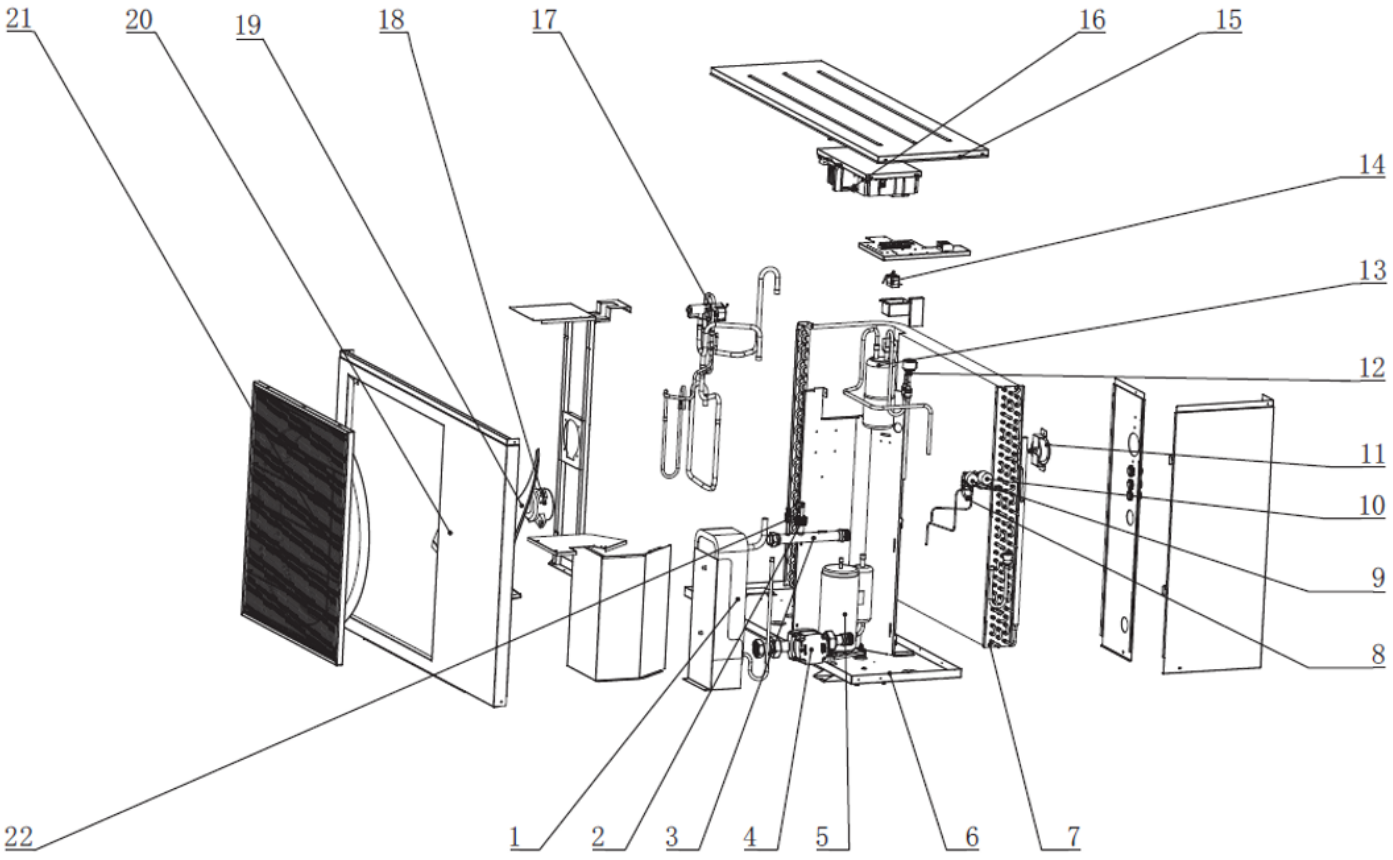

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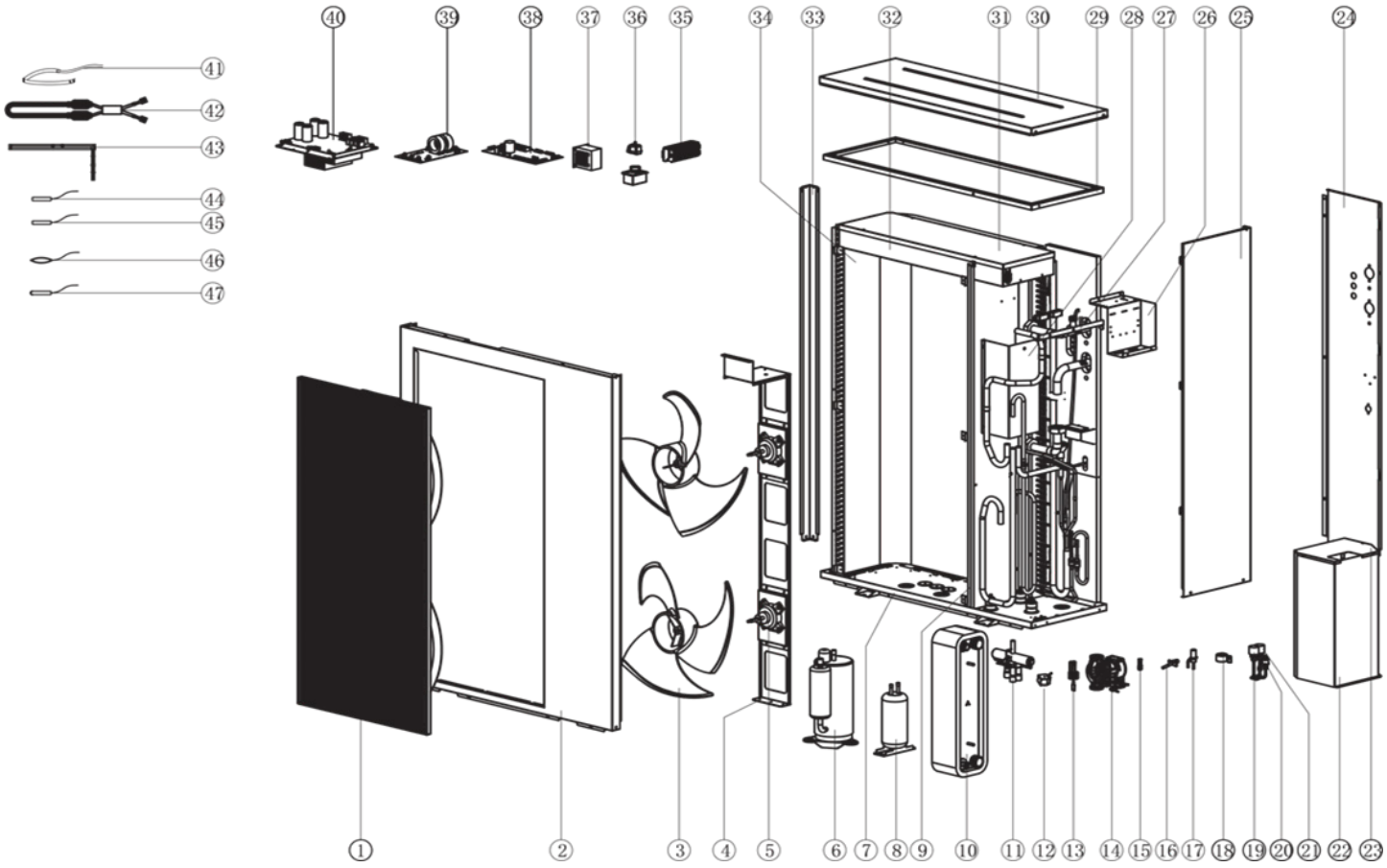
40 39 38 37 36 35 34 33 32 31 30 29 28 27 26 25 24
41
42
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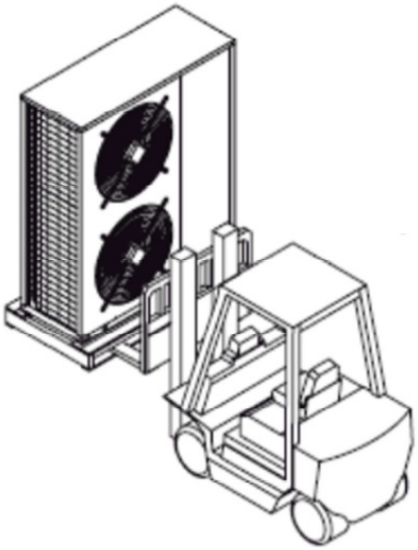
46
47
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23

A.4



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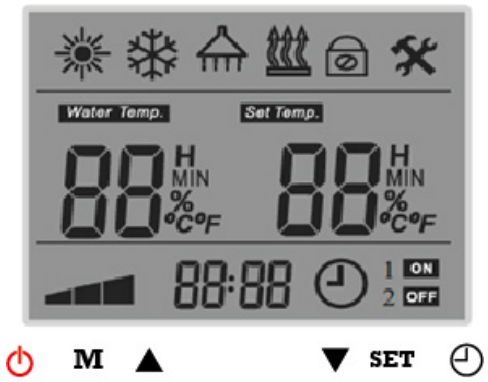

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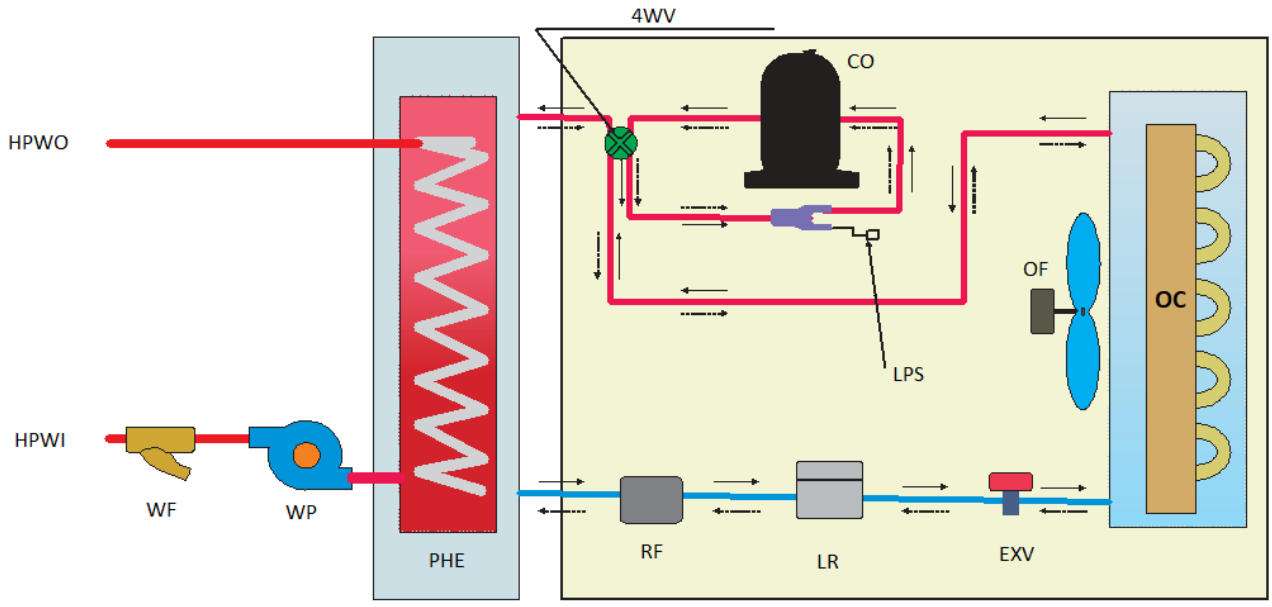

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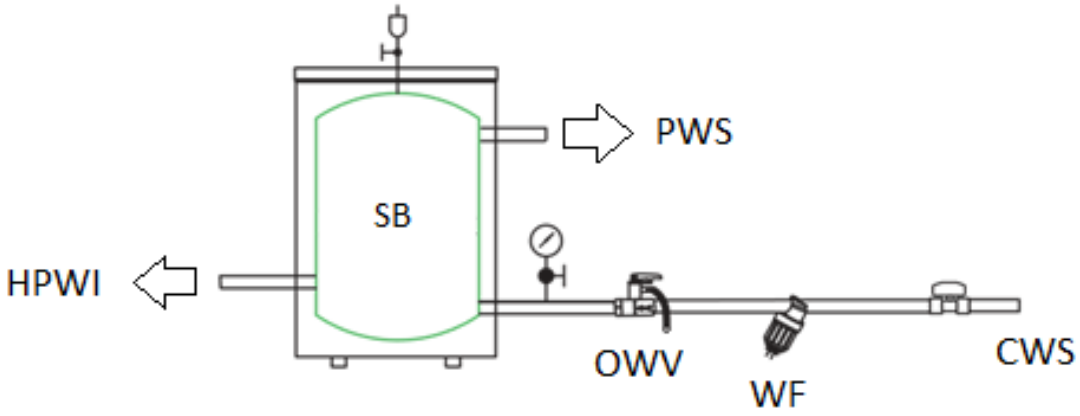
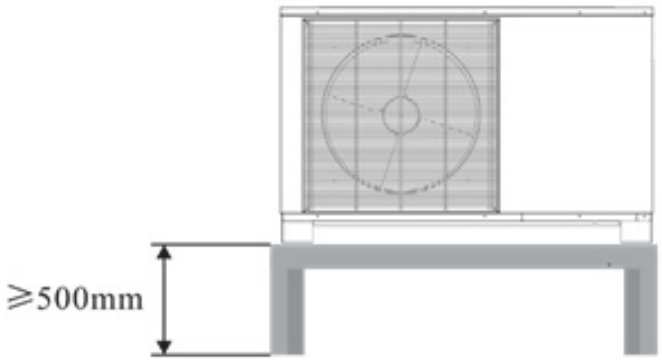

PWS
SB
HPWI
OWV
WF
CWS

B.5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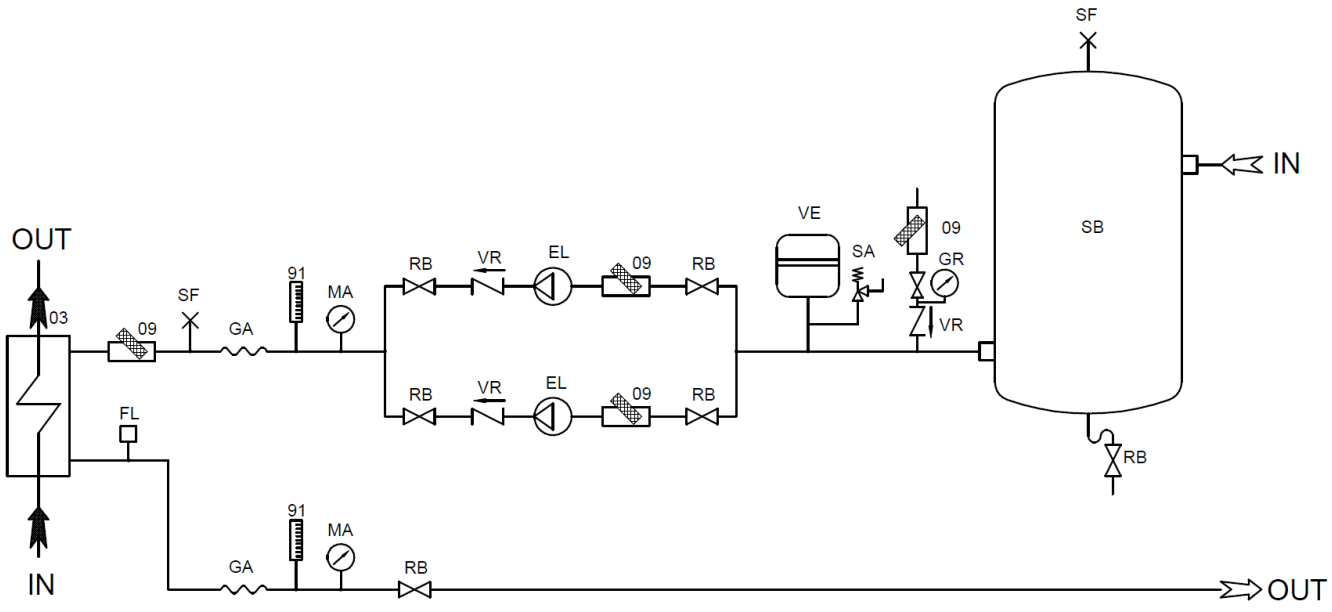
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IN
SB
OUT
VE
09
SA
GR
VR
RB
VR
EL
09
RB
03
09
SF
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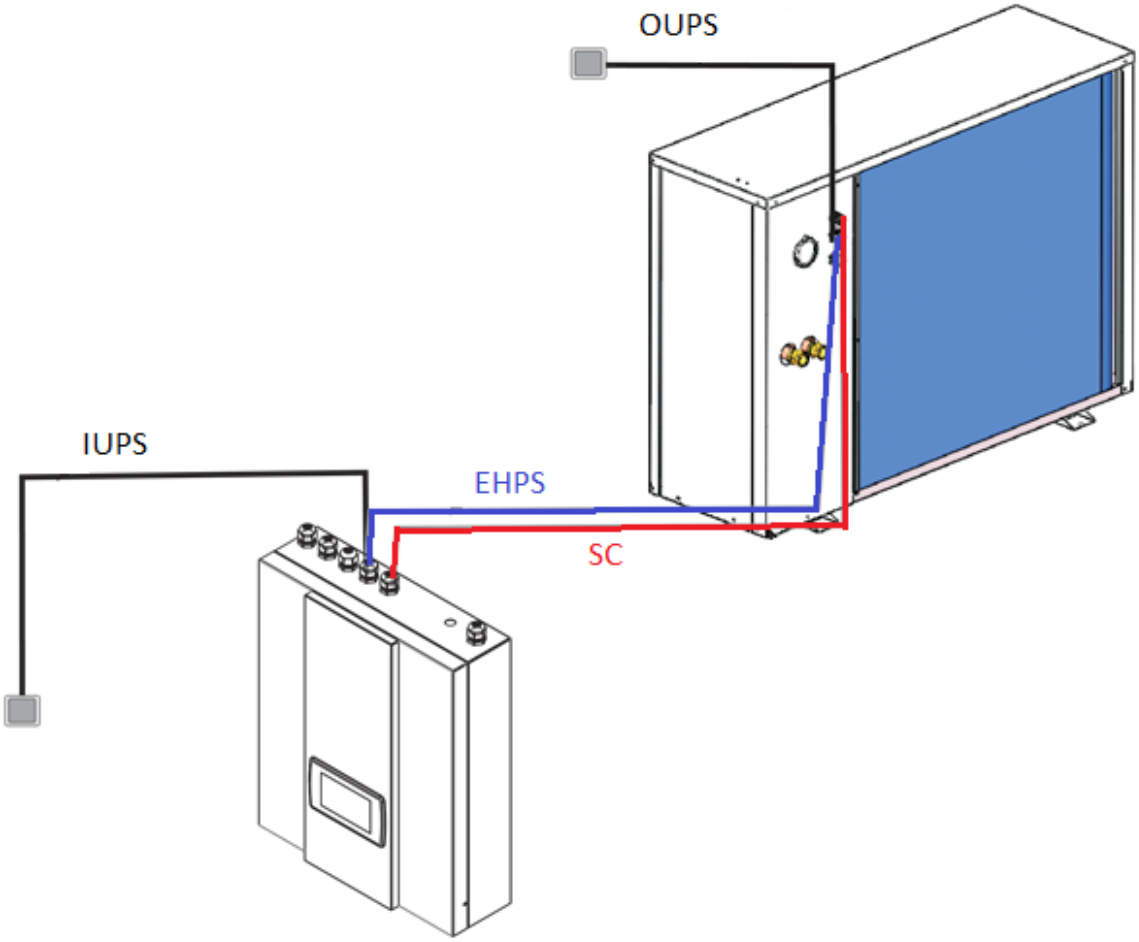
MA
RB
VR
EL
09
RB
FL
RB
91
MA
GA
RB
IN
OUT

B.11



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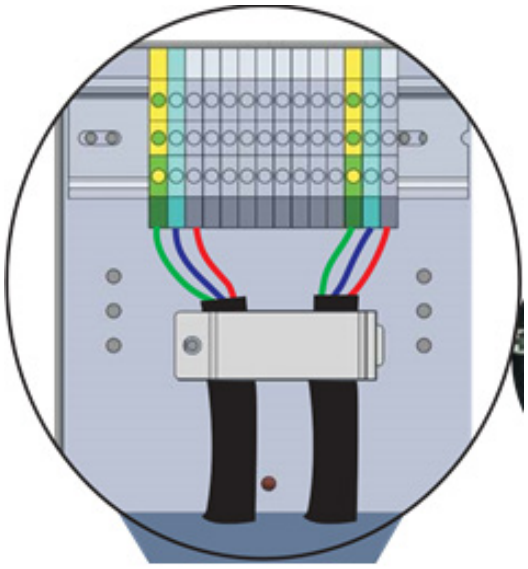

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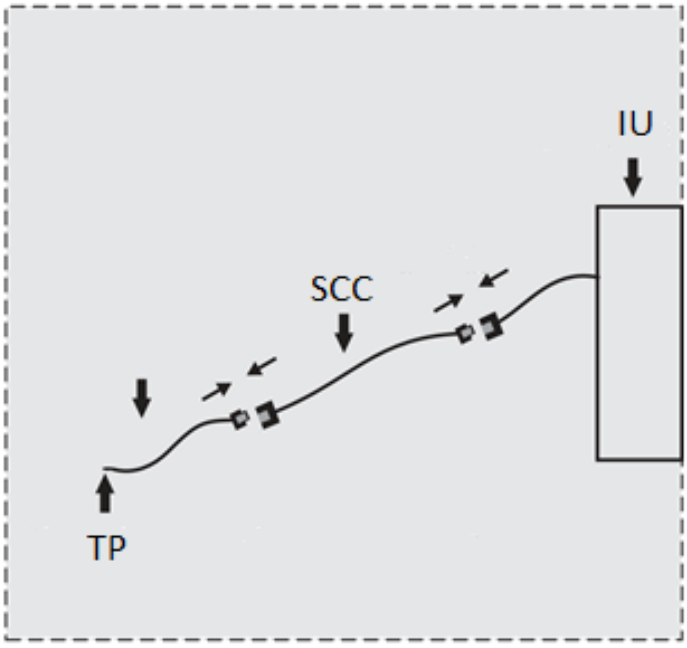

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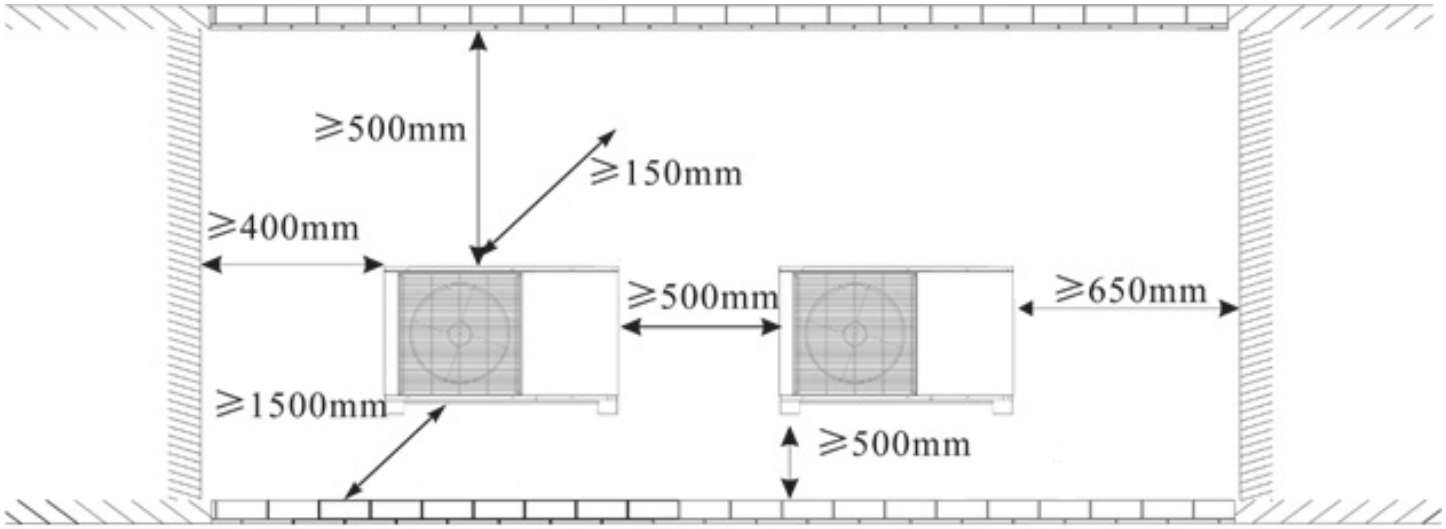
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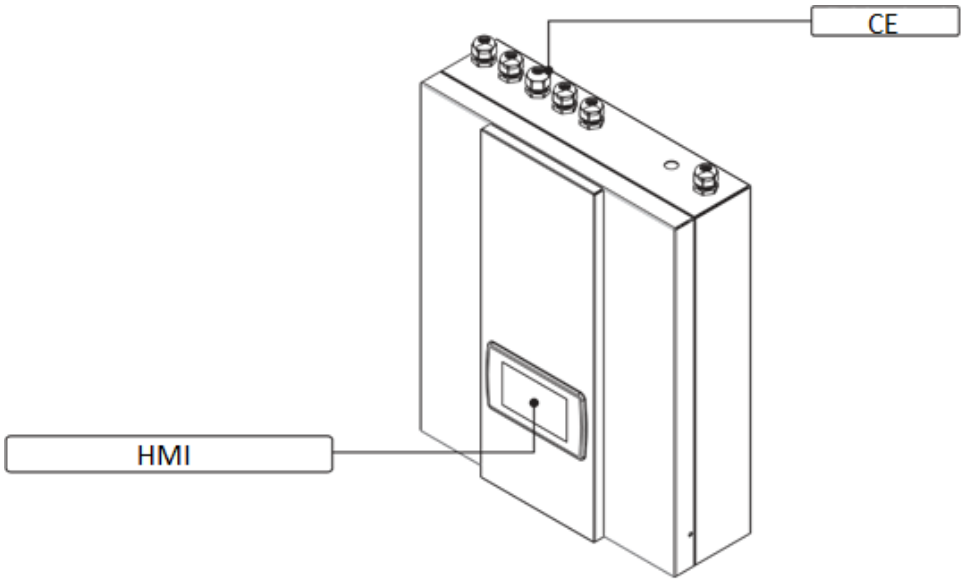
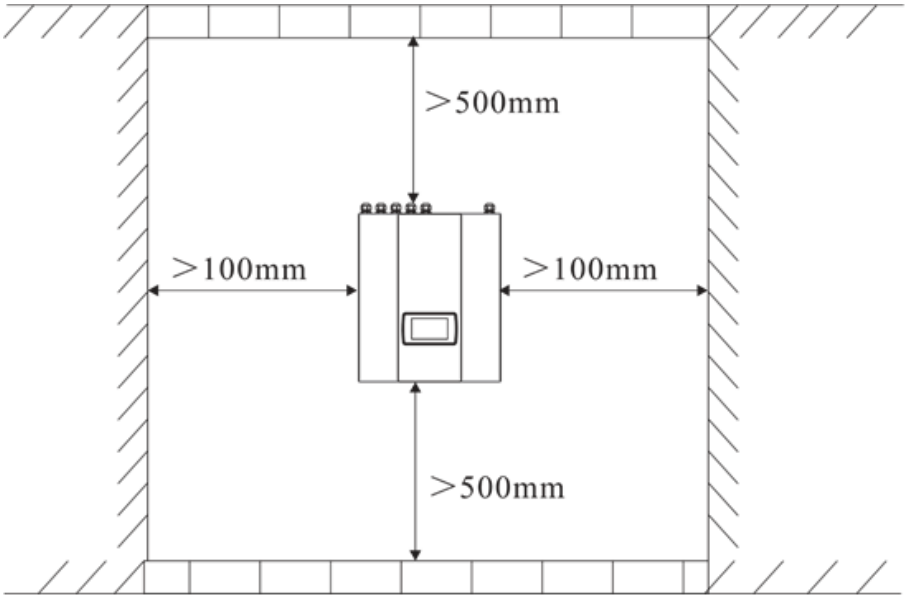
⩾150mm
⩾400mm
⩾500mm
⩾650mm
⩾1500mm
⩾500mm

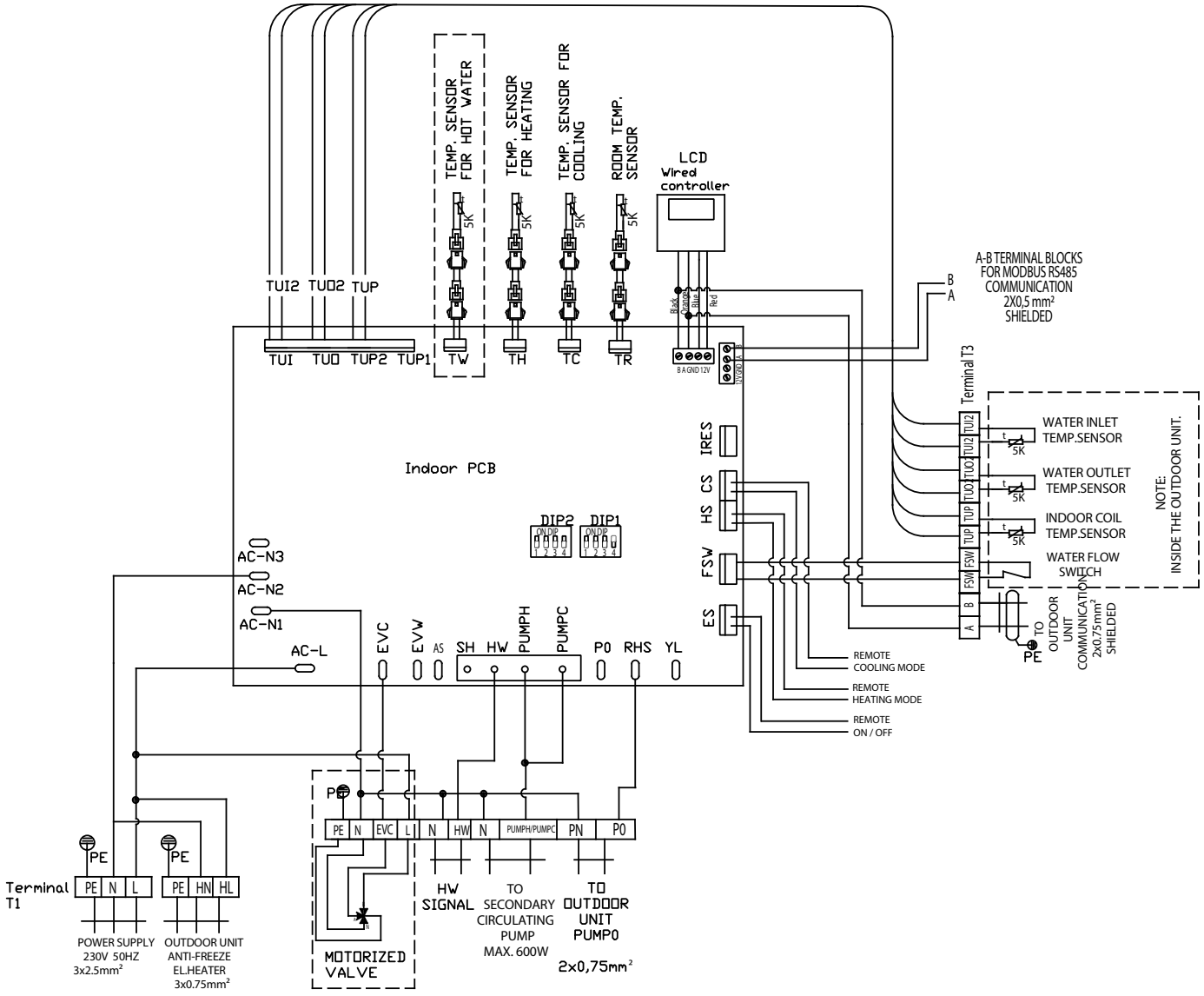
C.2


CE
HMI

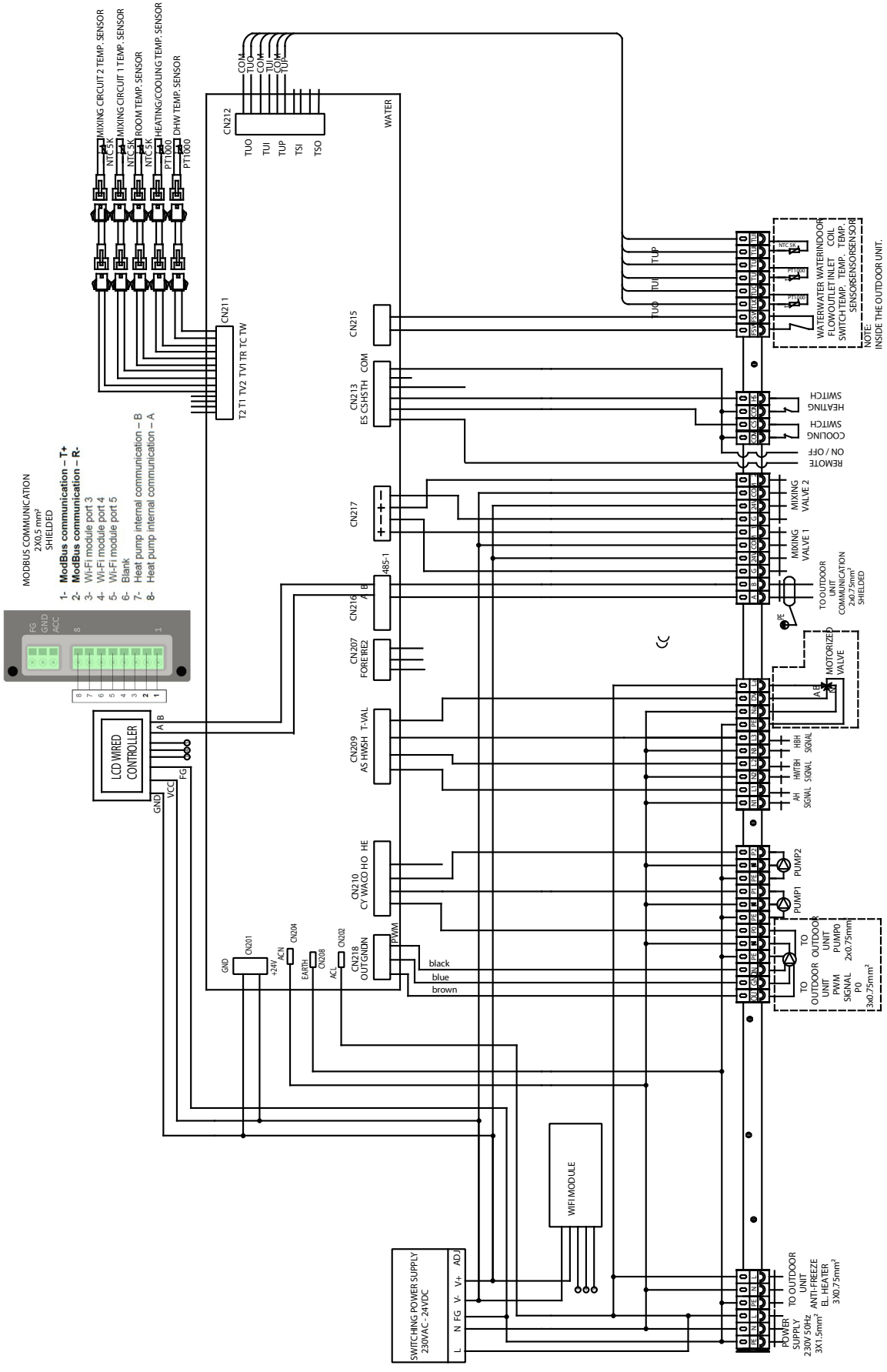
C.3


>500mm
>100mm
>100mm
>500mm

C.4



IU V5+



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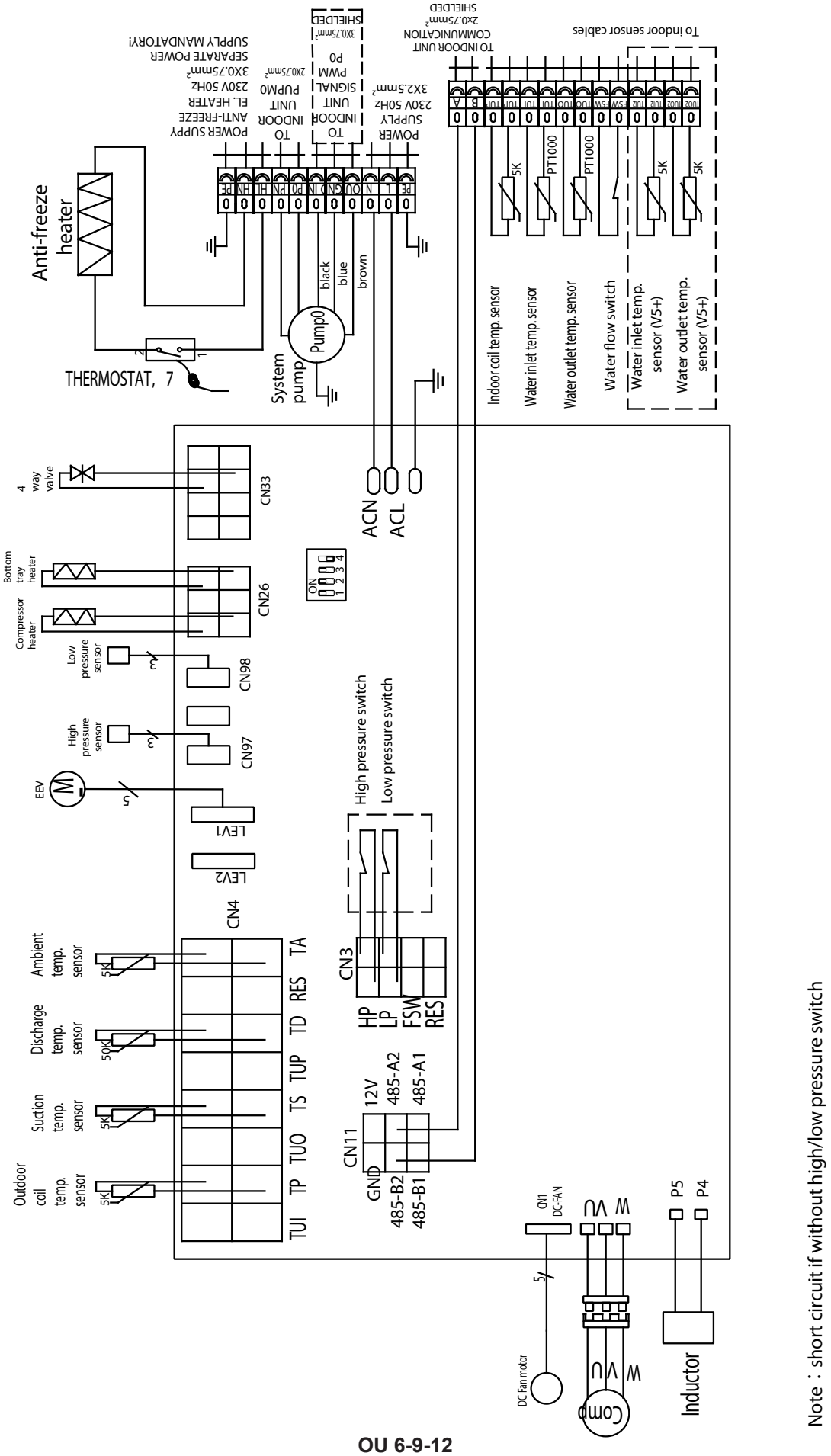

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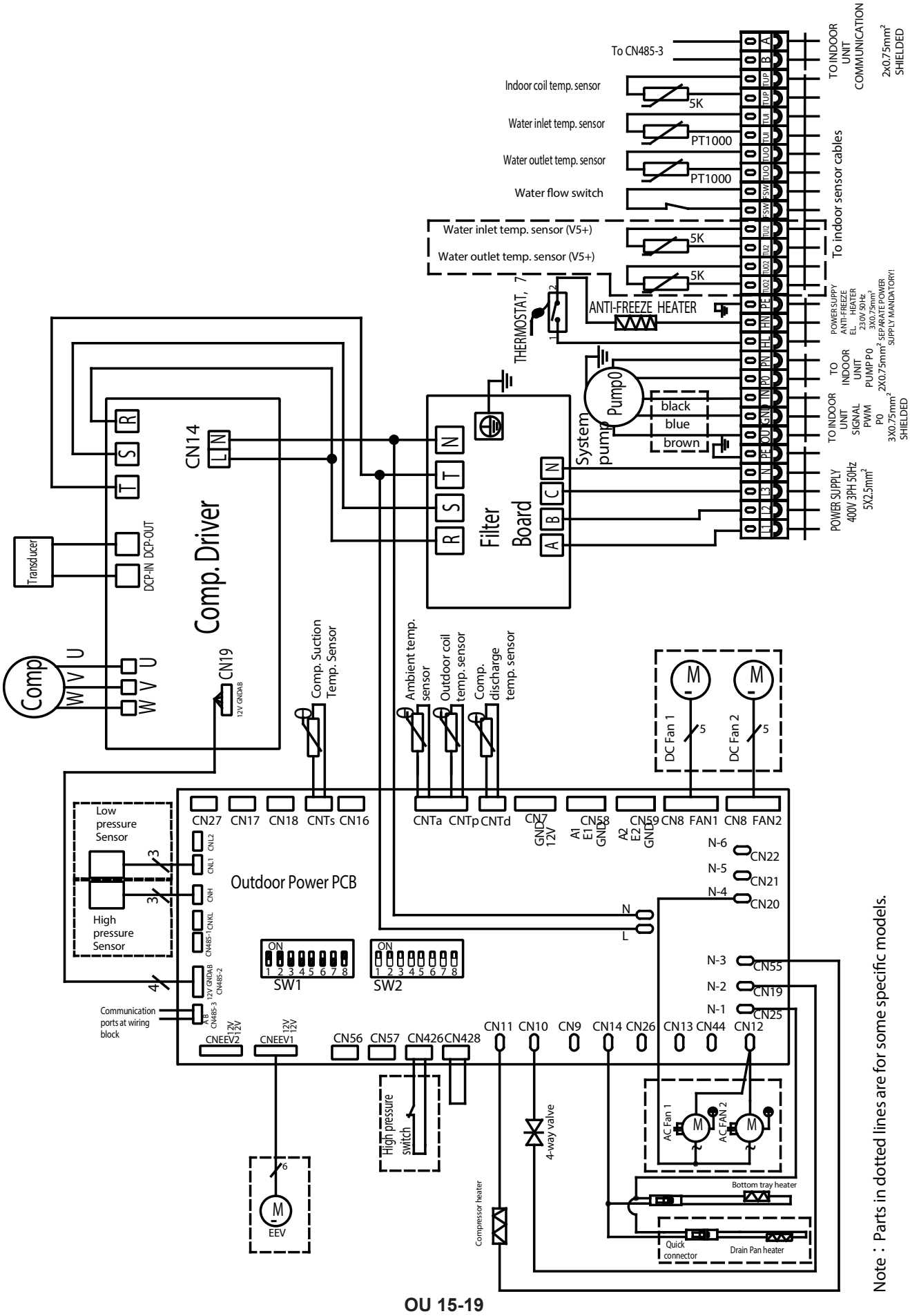
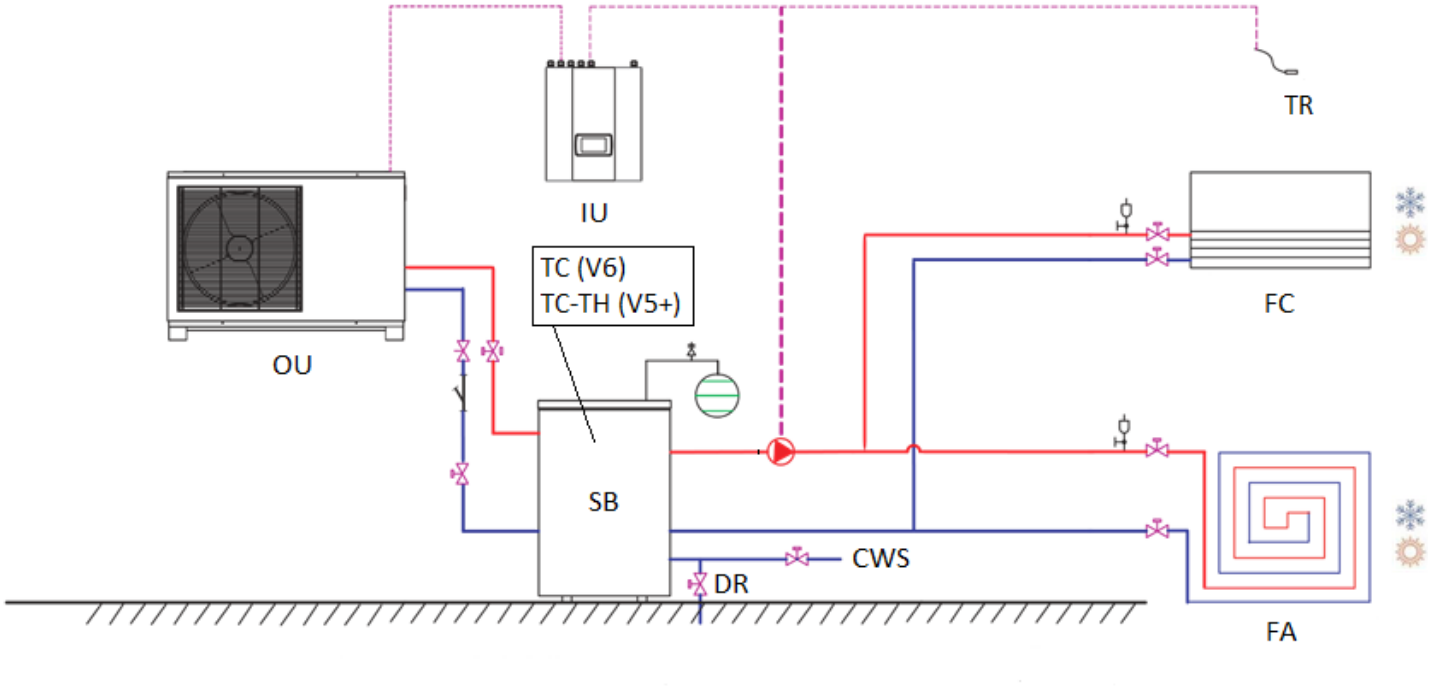


OU 15-19

Note：Parts in dotted lines are for some specific models.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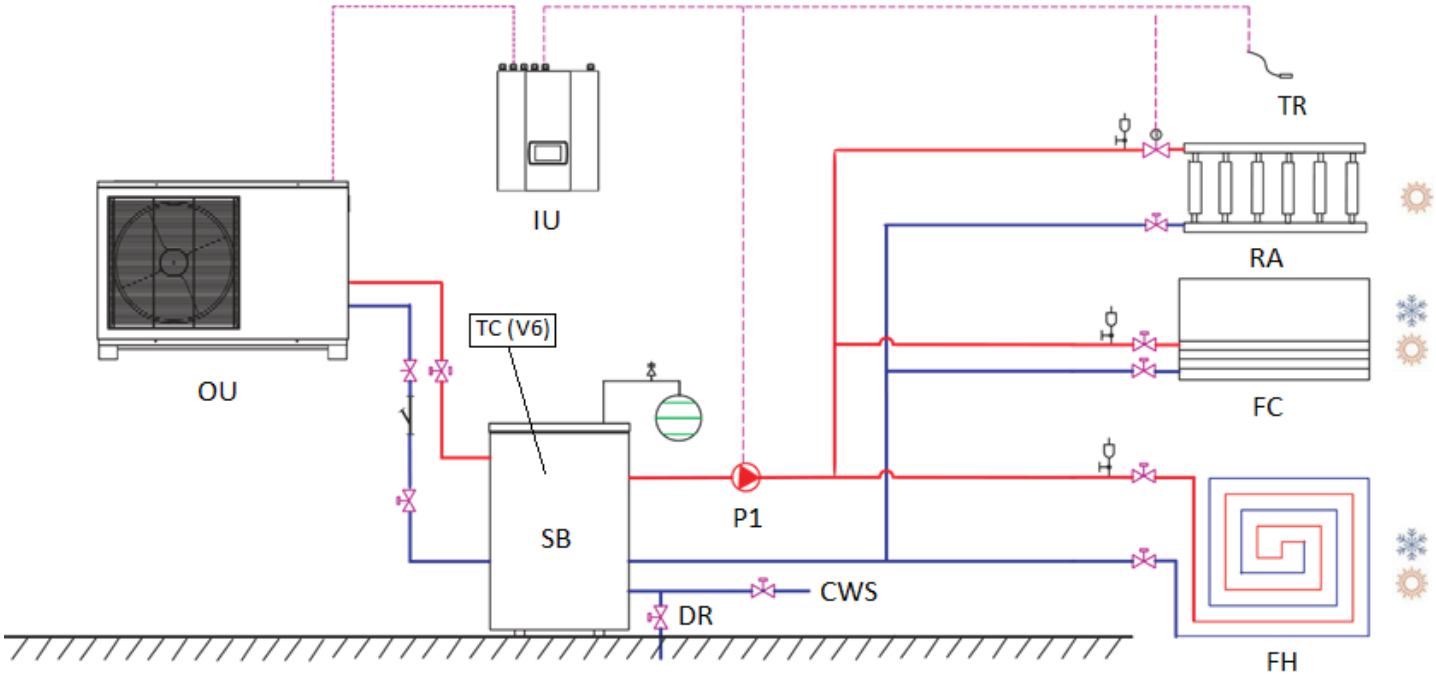
TC (V6)
TC-TH (V5+)
FC
OU
SB
CWS
DR
FA

E.1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TC (V6)
FC
OU
P1
SB
CWS
DR
FH

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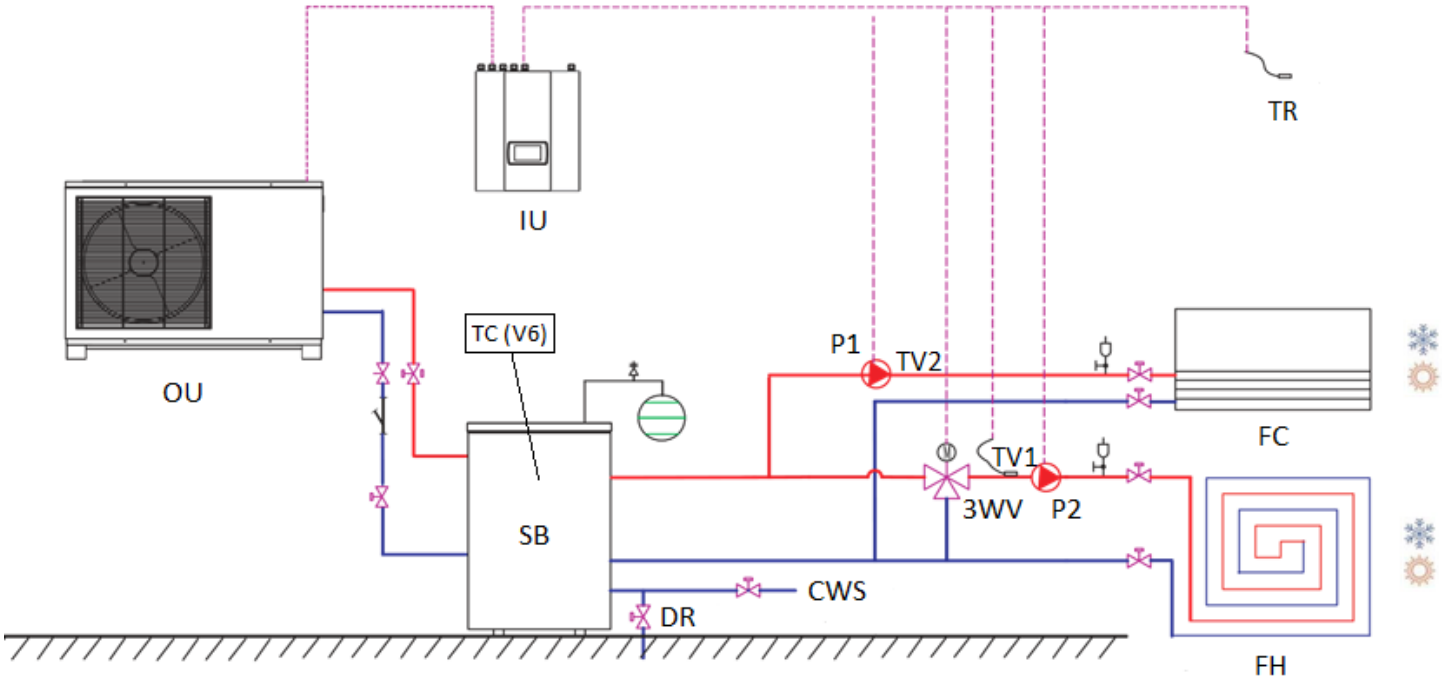
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OU
TC (V6)
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TV2
FC
TV1
3WV
P2
SB
CWS
DR
FH

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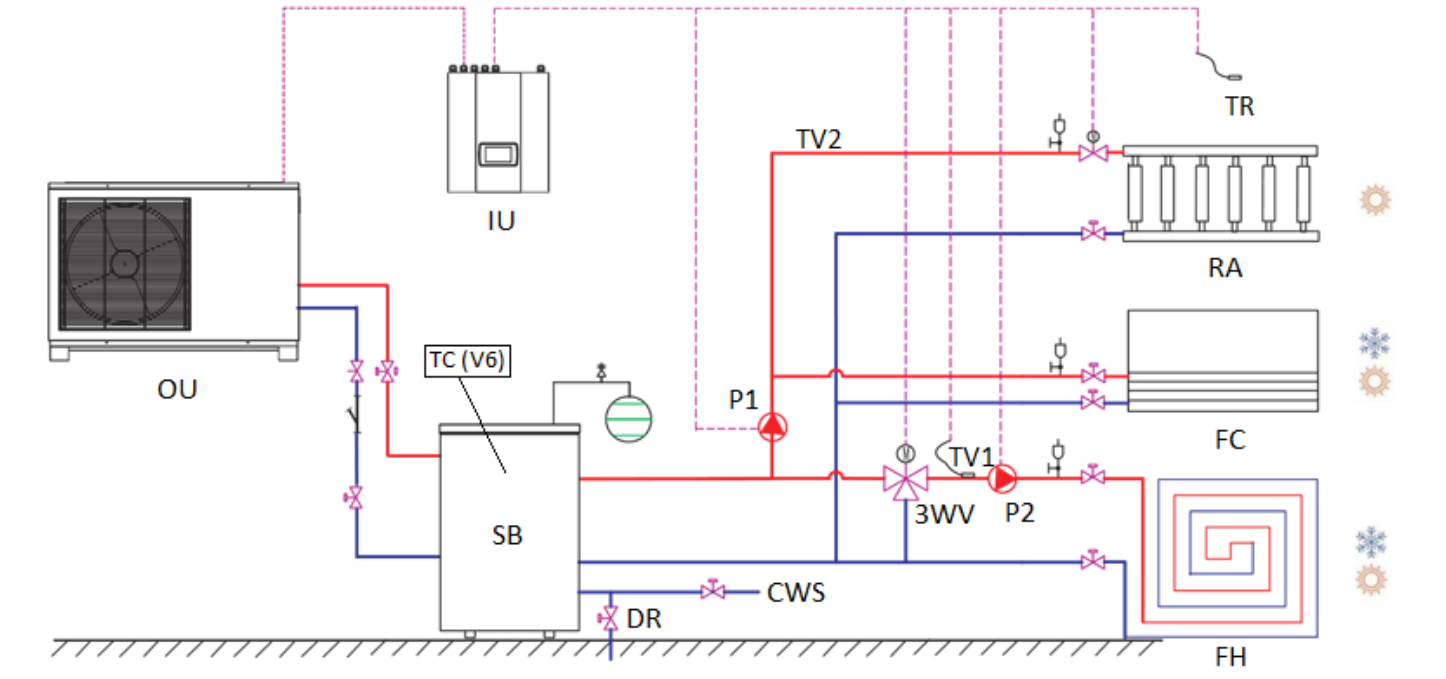
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TV2
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RA
OU
TC (V6)
P1
FC
TV1
3WV
P2
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CWS
DR
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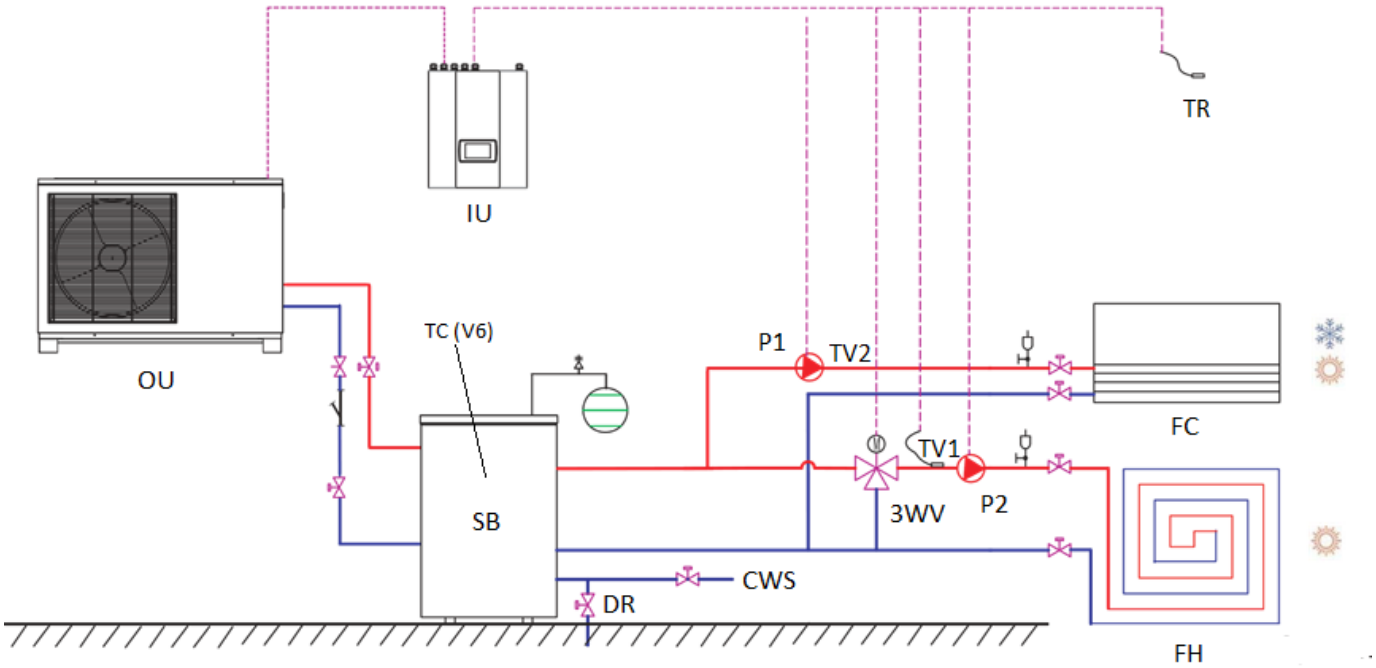

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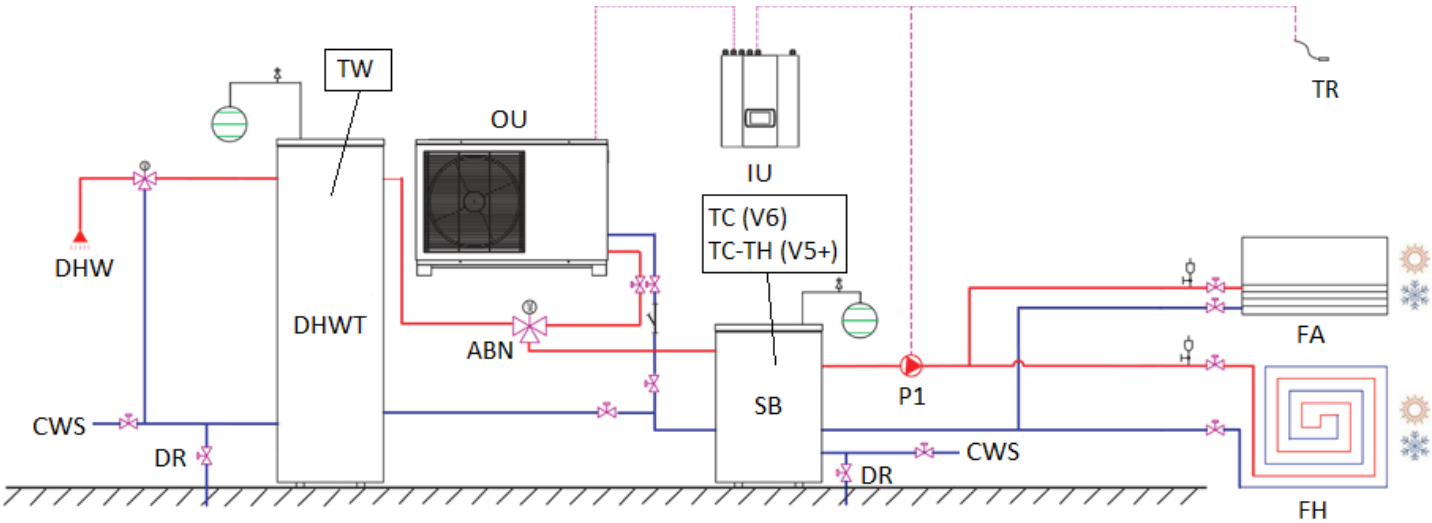

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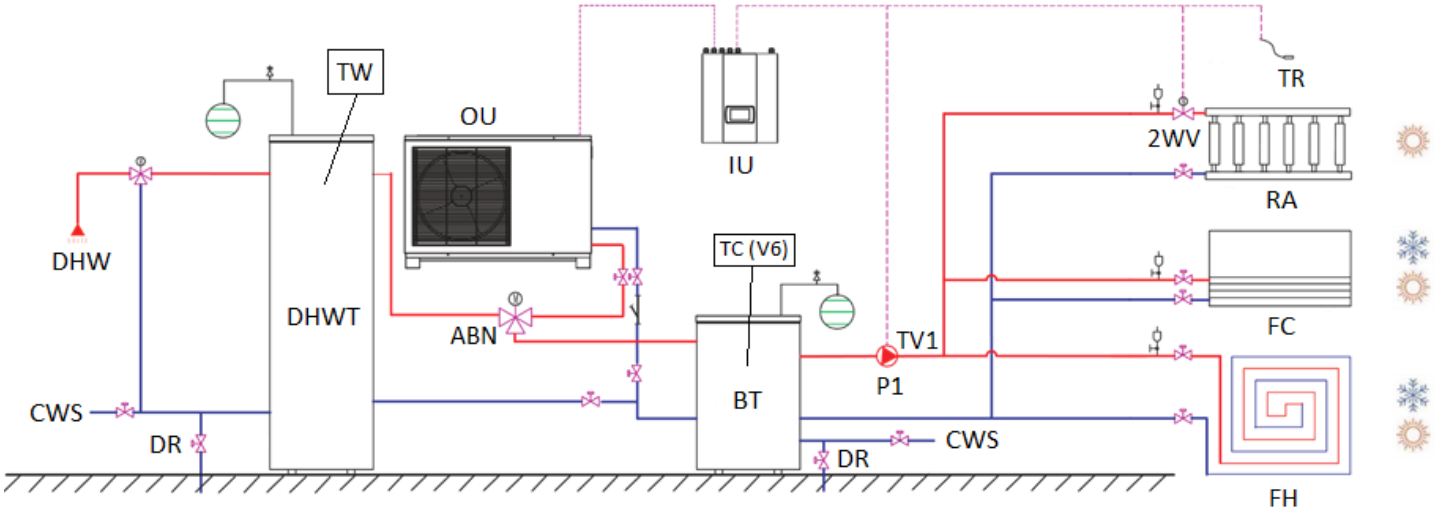
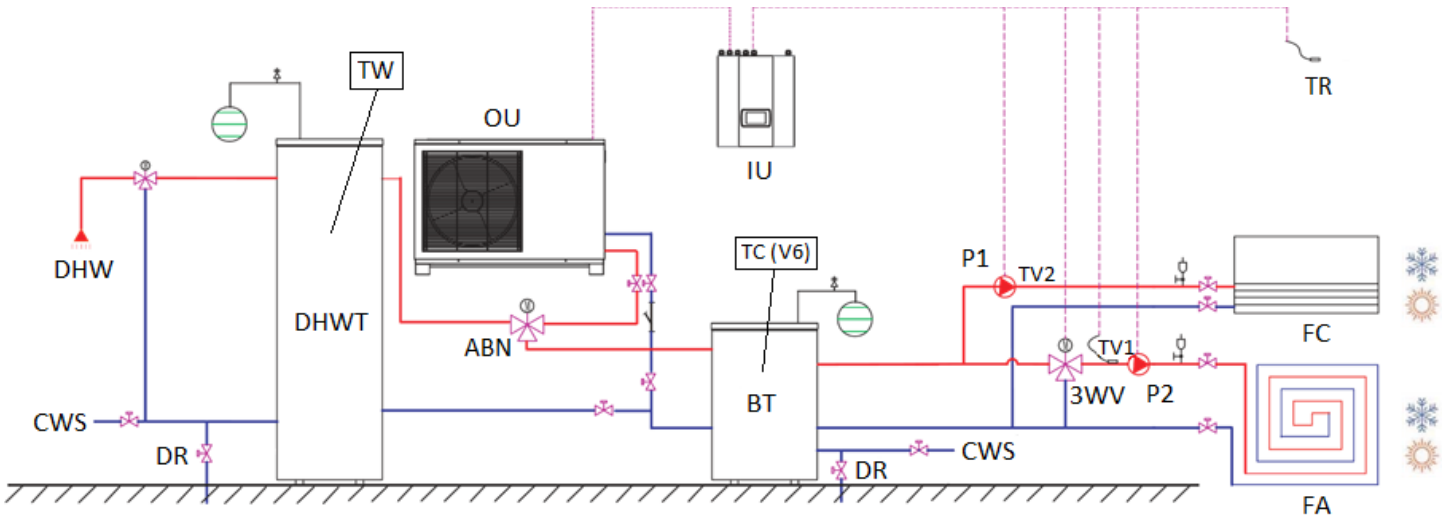
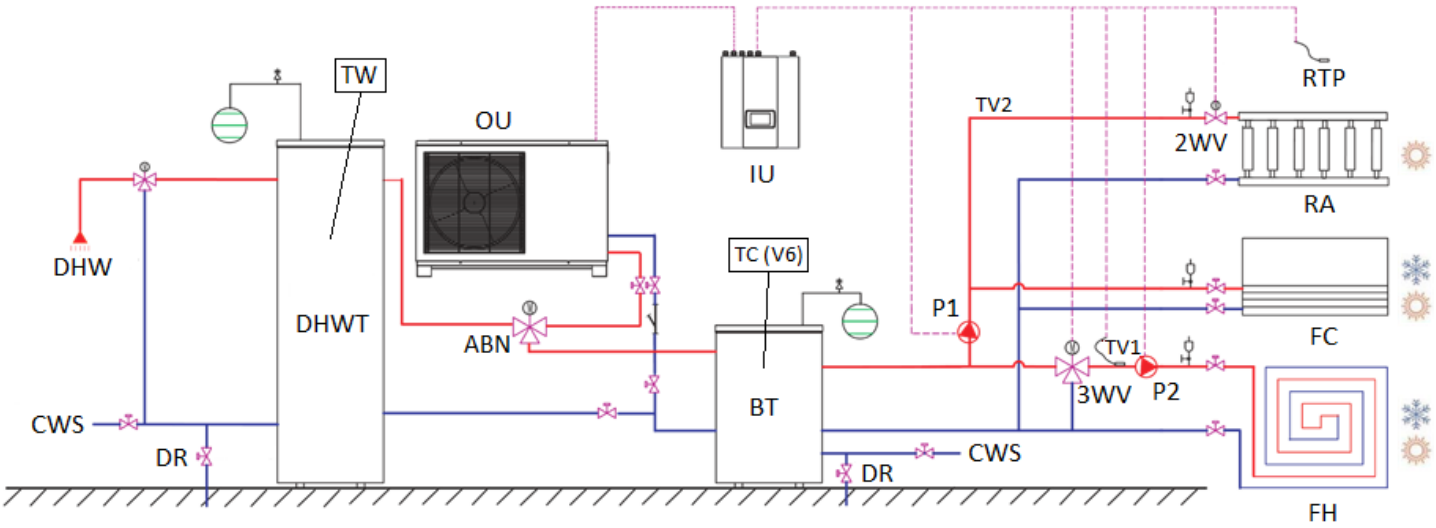

TW
OU
IU
TR
2WV
RA
DHW
DHWT
TC (V6)
ABN
FC
TV1
P1
BT
CWS
DR
CWS
DR
FH

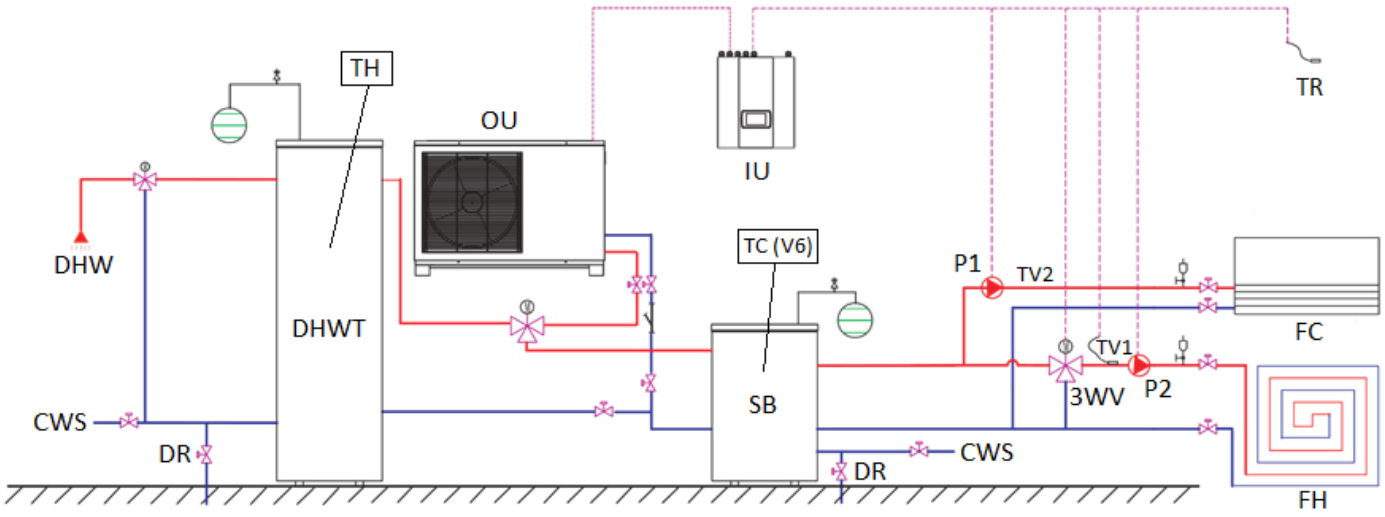
E.7


TW
OU
IU
TR
DHW
DHWT
TC (V6)
P1
TV2
FC
ABN
TV1
3WV
P2
BT
CWS
DR
CWS
DR
FA

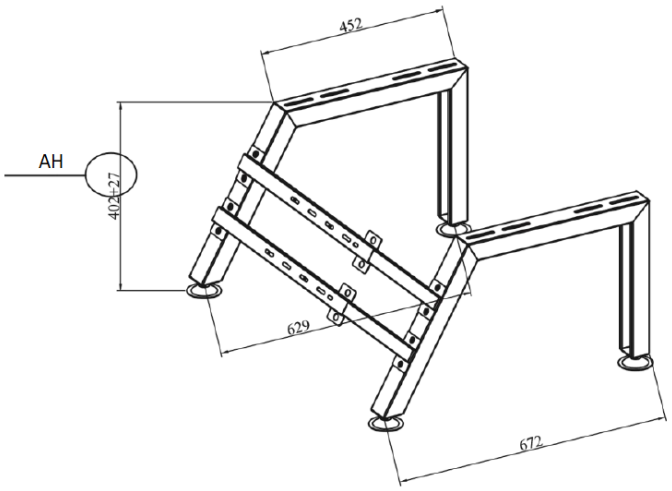
E.8


TW
OU
IU
RTP
TV2
2WV
RA
DHW
DHWT
TC (V6)
P1
ABN
FC
TV1
3WV
P2
CWS
BT
CWS
DR
DR
FH

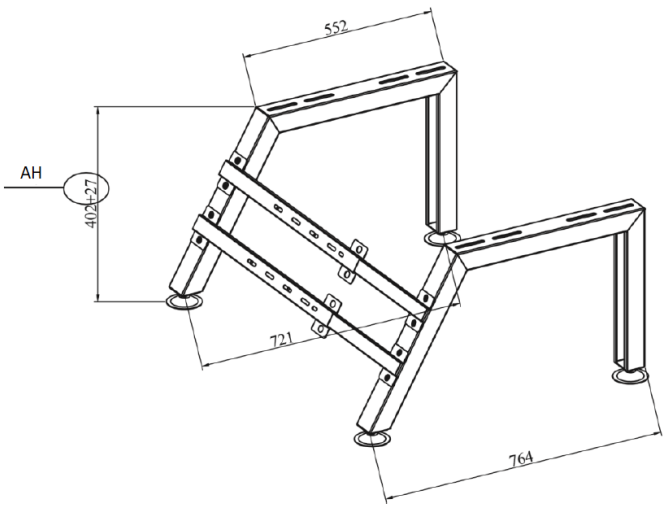
E.9


TH
OU
IU
TR
DHW
DHWT
TC (V6)
P1
TV2
FC
TV1
3WV
P2
SB
CWS
DR
CWS
DR
FH

E.10

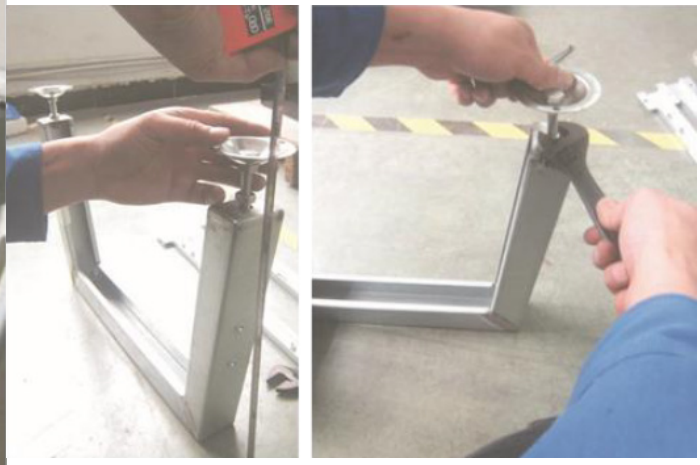


F.1



F.2

F.3

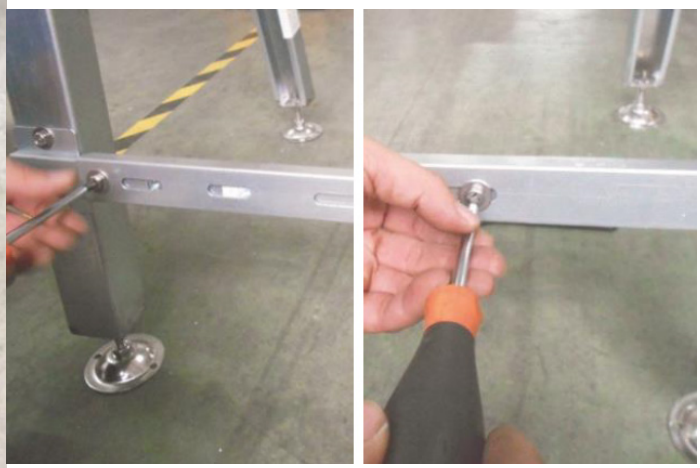


F.4

F.5

F.6

F.7



F.8

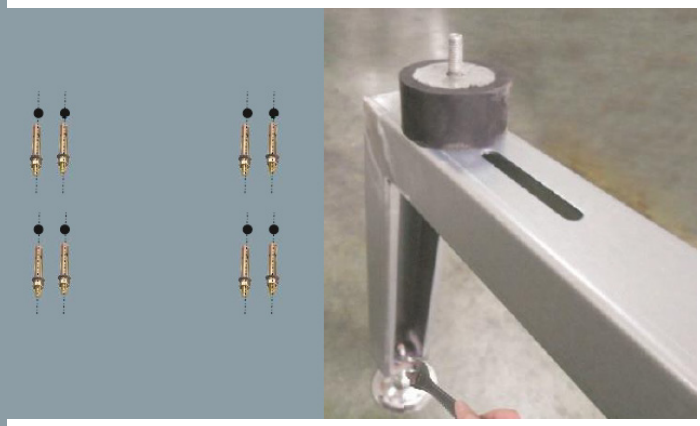
F.9

F.10

F.11

F.12

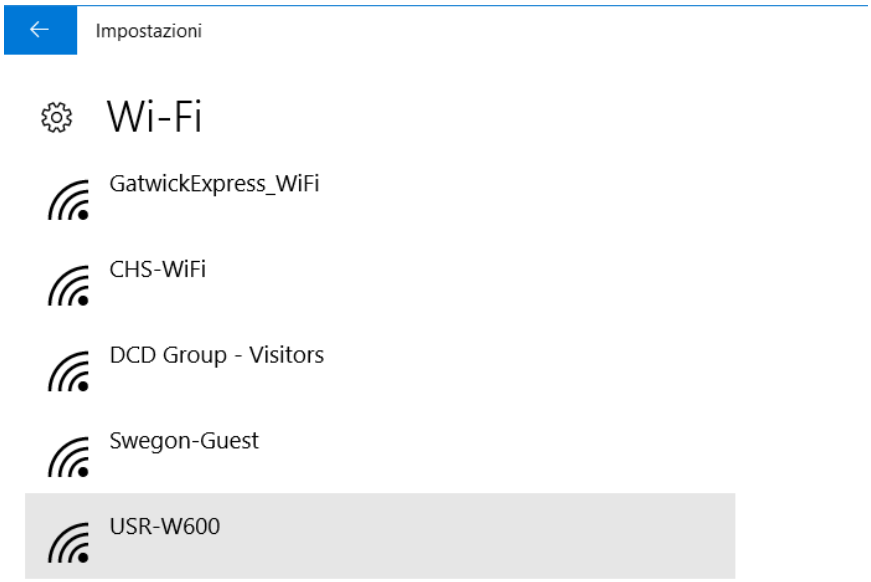
F.13



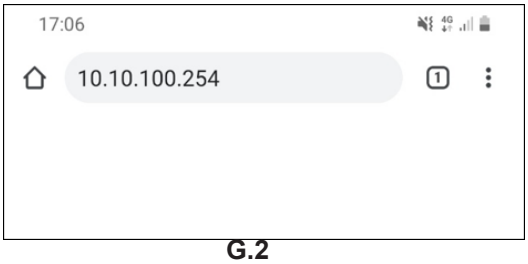
F.14

F.15

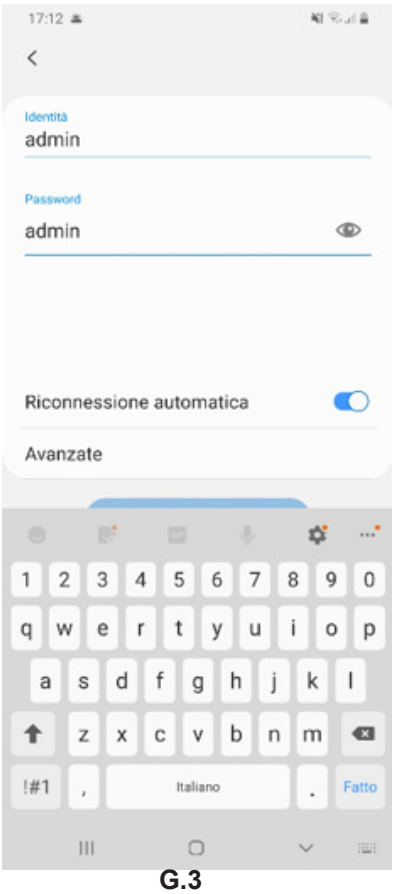
F.16


Impostazioni
Wi-Fi
GatwickExpress_WiFi
CHS-WiFi
DCD Group - Visitors
Swegon-Guest
USR-W600

G.1


17:06
10.10.100.254

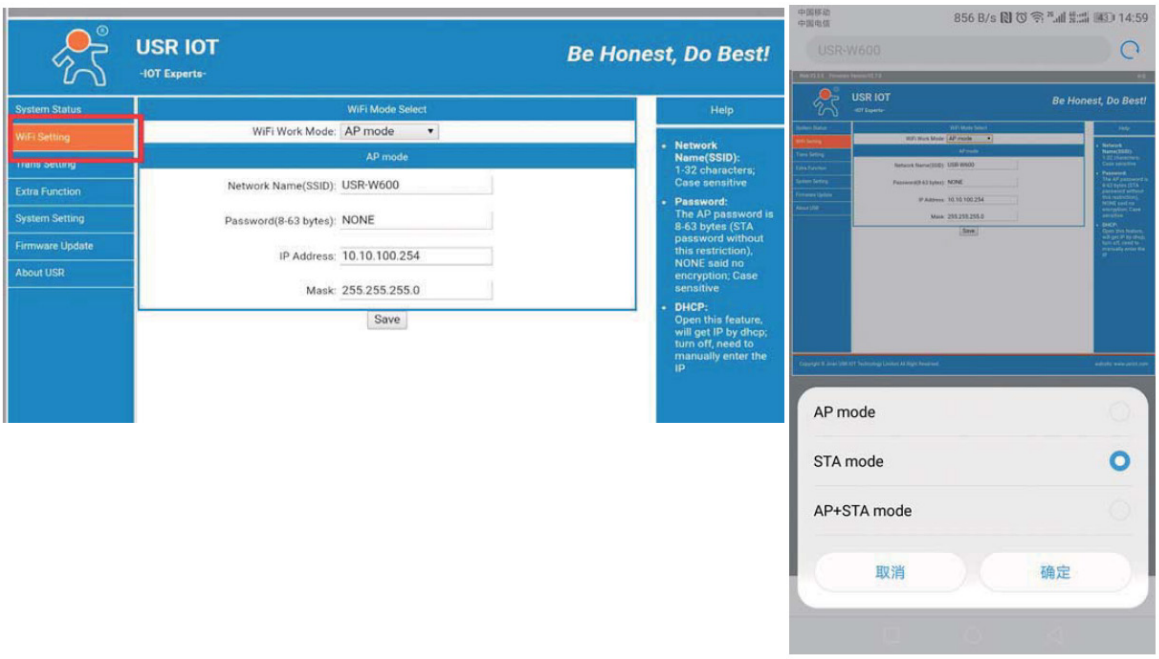
G.2


17:12
Identità
admin
Password
admin
Riconnessione automatica
Avanzate
Italiano
Fatto

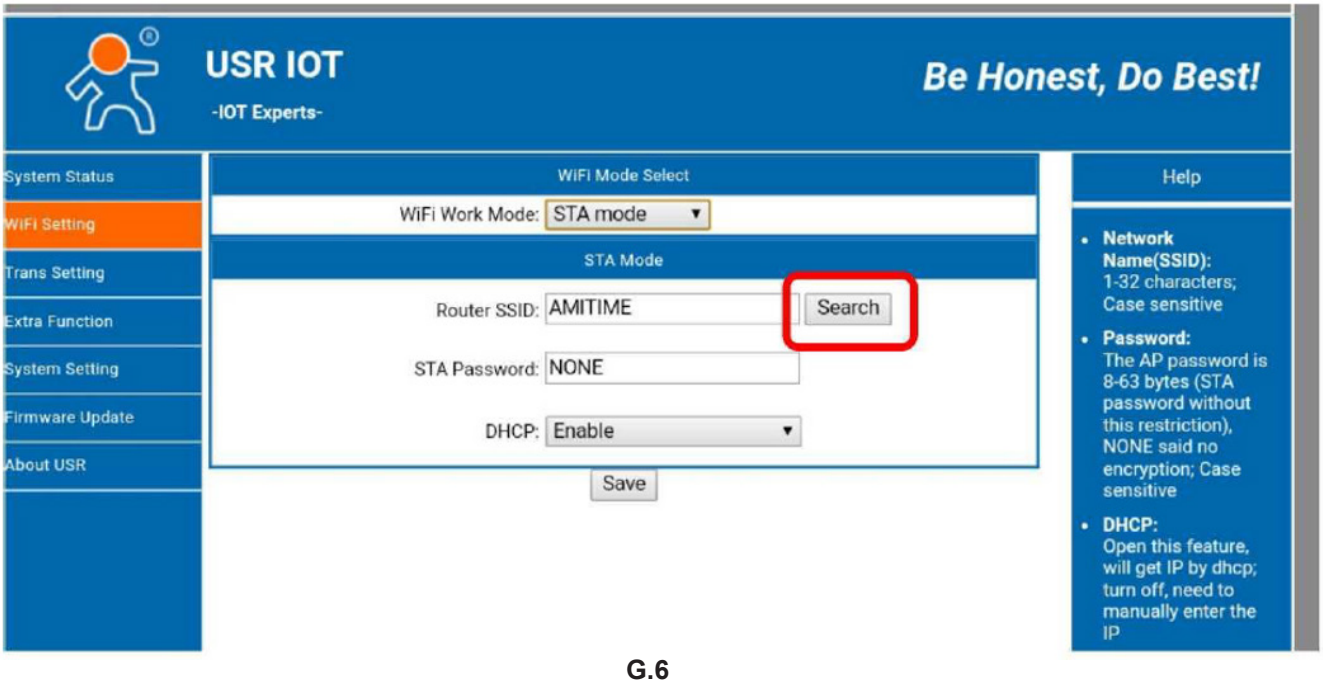
G.3


Web:V2.3.5
English
USR IOT
-IOT Experts-
Be Honest, Do Best!

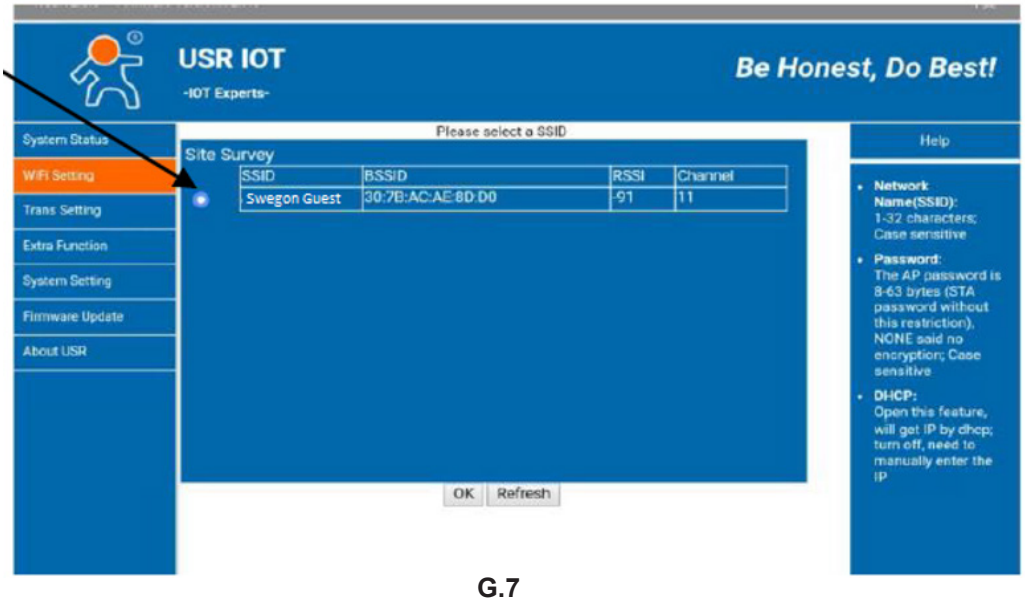
G.4


USR IOT
-IOT Experts-
Be Honest, Do Best!
System Status
WiFi Setting
Extra Function
System Setting
Firmware Update
About USR
WiFi Mode Select
WiFi Work Mode: AP mode
AP mode
Network Name(SSID): USR-W600
Password(8-63 bytes): NONE
IP Address: 10.10.100.254
Mask: 255.255.255.0
Save
Help
Network Name(SSID): 1-32 characters; Case sensitive
Password: The AP password is 8-63 bytes (STA password without this restriction), NONE said no encryption; Case sensitive
DHCP: Open this feature, will get IP by dhcp; turn off, need to manually enter the IP
USR-W600
AP mode
STA mode
AP+STA mode
取消
确定

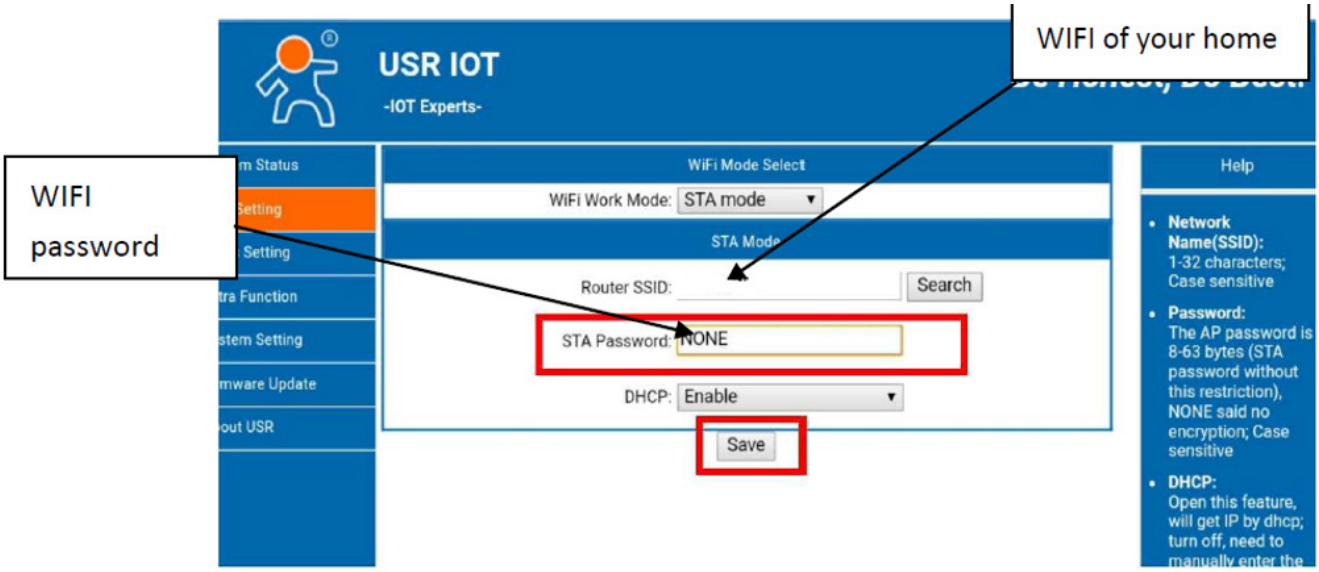
G.5


USR IOT
-IOT Experts-
Be Honest, Do Best!
System Status
WiFi Setting
Trans Setting
Extra Function
System Setting
Firmware Update
About USR
WiFi Mode Select
WiFi Work Mode: STA mode
STA Mode
Router SSID: AMITIME
Search
STA Password: NONE
DHCP: Enable
Save
Help
Network Name(SSID): 1-32 characters; Case sensitive
Password: The AP password is 8-63 bytes (STA password without this restriction), NONE said no encryption; Case sensitive
DHCP: Open this feature, will get IP by dhcp; turn off, need to manually enter the IP

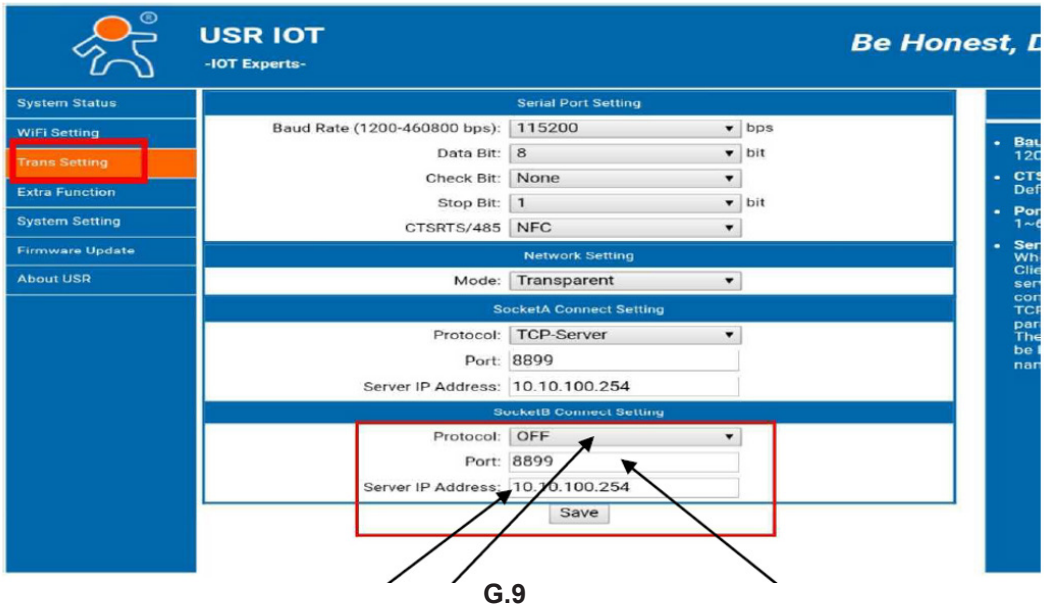
G.6



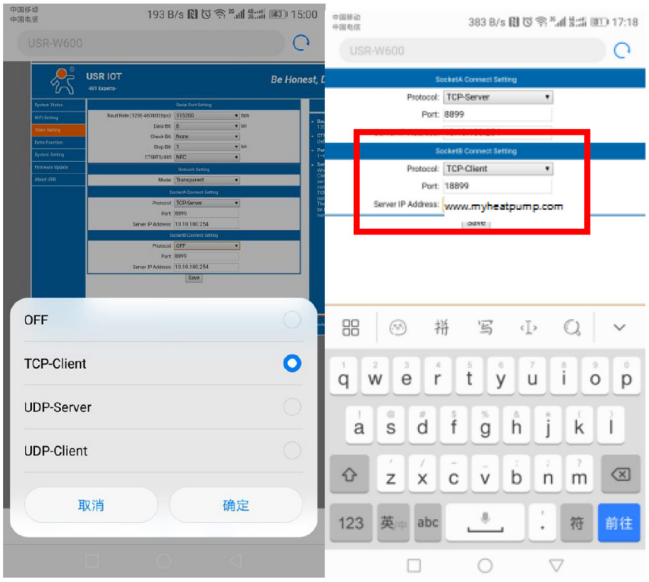
G.7



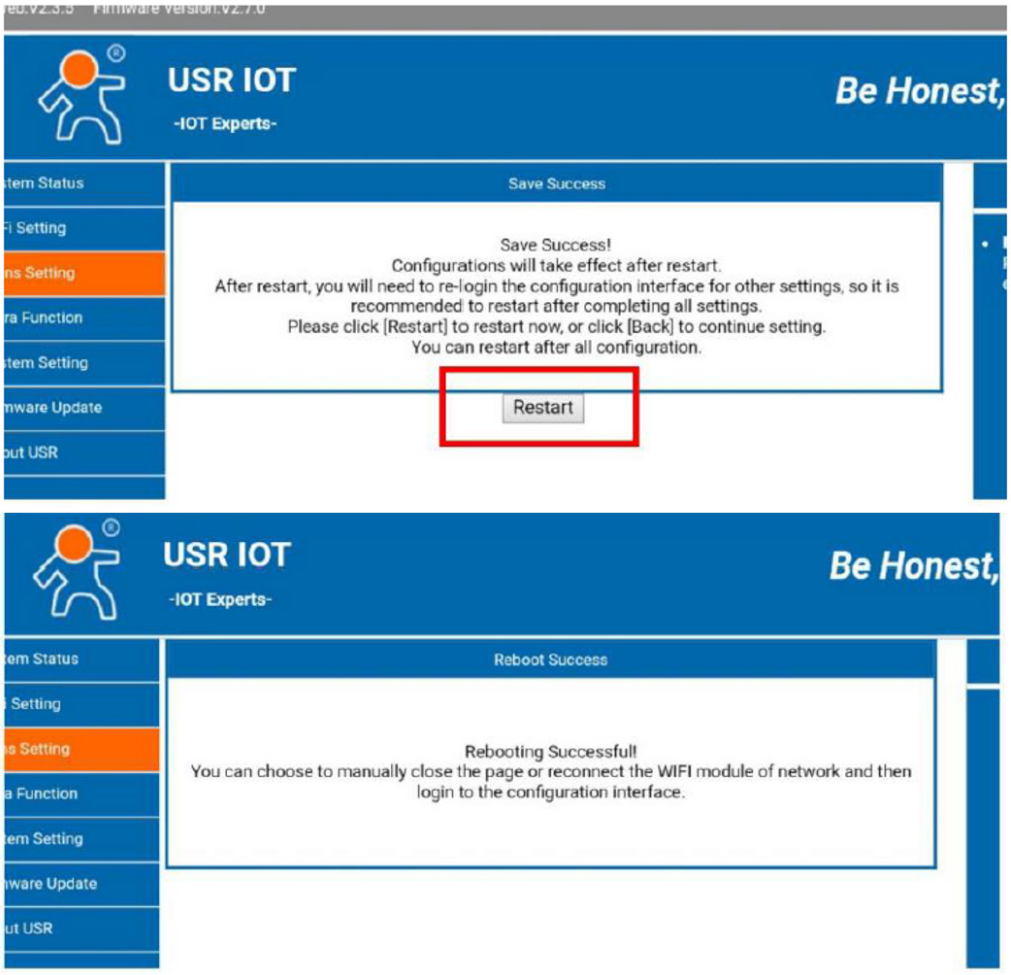
G.8



G.9

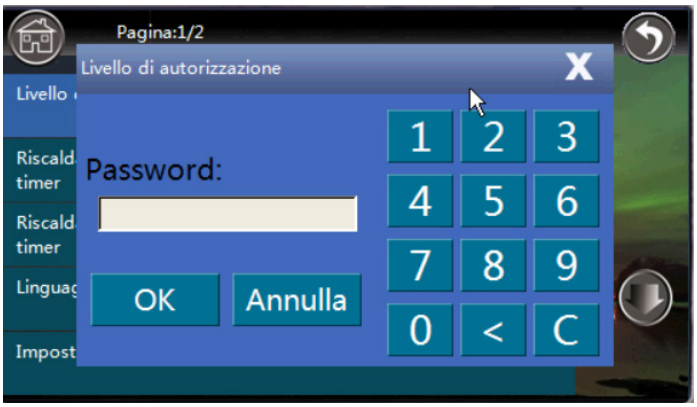

USR-W600
USR IOT
Be Honest,
OFF
TCP-Client
UDP-Server
UDP-Client
取消
确定
USR-W600
SocketA Connect Setting
Protocol: TCP-Server
Port: 8899
SocketB Connect Setting
Protocol: TCP-Client
Port: 18899
Server IP Address: www.myheatpump.com

G.10

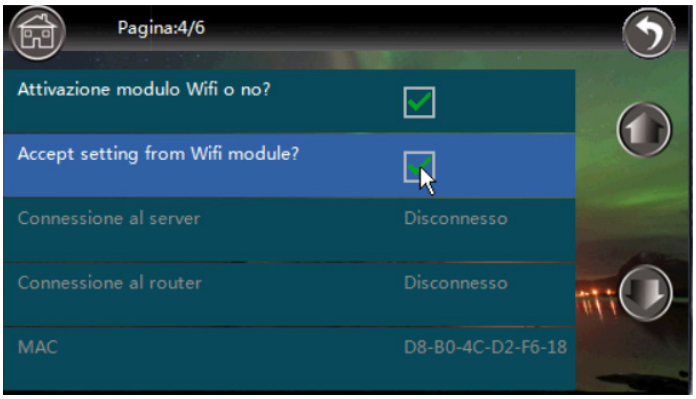

USR IOT
-IOT Experts-
Be Honest,
Save Success
Save Success!
Configurations will take effect after restart.
After restart, you will need to re-login the configuration interface for other settings, so it is recommended to restart after completing all settings.
Please click [Restart] to restart now, or click [Back] to continue setting.
You can restart after all configuration.
Restart
USR IOT
-IOT Experts-
Be Honest,
Reboot Success
Rebooting Successful!
You can choose to manually close the page or reconnect the WIFI module of network and then login to the configuration interface.

G.11

G.12


Pagina:1/2
Livello di autorizzazione
Password:
OK
Annulla
1
2
3
4
5
6
7
8
9
0
<
C

G.13


Pagina:4/6
Attivazione modulo Wifi o no?
Accept setting from Wifi module?
Connessione al server
Disconnesso
Connessione al router
Disconnesso
MAC
D8-B0-4C-D2-F6-18

G.14

UM-0000-Tau Sky Hi HP-EN-29-08-2022-rev04

WESTERN™ AIRCONDITIONING WARMTEPOMPEN

BlueBox by Swegon