



PROCIDA AWM
X6 - X8 - X10 - X12 - X14 - X16
(single-phase)
T10 - T 12 - T14 - T16
(three-phase)

INSTALLATION MANUAL

MONOBLOC AIR/ WATER HEAT PUMP



EN

Translation of the
original instructions
(in Italian)

Thank you for choosing a heat pump by Fondital. Carefully read this Manual before using the unit and keep it for future reference.

For users

Thank you for choosing a product by Fondital. In order to use the product correctly, please carefully read this instruction manual before installation and use. To achieve the intended operation of the air conditioner, please follow the recommendations below for the proper installation and use of the product:

1. Installation, use and maintenance of this appliance must be carried out by specially trained technical personnel. During operation, the safety instructions on labels, in the User manual and other documents must be strictly complied with. This appliance is not intended for use by persons (including children) with physical, sensory and cognitive impairments, or lacking appropriate experience and knowledge, unless they are supervised or instructed for its use by persons responsible for their safety. Children should be supervised to ensure that they do not play with the appliance.
2. This product underwent a strict inspection and operating tests before leaving the factory. In order to avoid damage due to improper disassembly and inspection, which could affect the normal operation of the unit, do not disassemble it yourself. If necessary, contact our company's authorised service centre.
3. Our company shall not be liable for personal injury, loss or damage to property caused by improper use, including improper installation and testing procedures, unnecessary maintenance, violation of applicable national laws, regulations and industry standards, and failure to follow this instruction manual.
4. If the product is faulty and can not be used, please contact our service centre as soon as possible and provide the following details.
 - » Contents of the product identification plate (model number, cooling/heating capacity, product code, date of leaving the factory).
 - » Malfunction condition (specify the situations before and after the error occurs).
5. All drawings and data in this instruction manual are provided for reference only. The product is subject to continuous improvements and innovations aimed at optimising its quality. We reserve the right to make any necessary changes to the product at any time for commercial or production reasons, as well as to revise the contents of the manual without prior notice.
6. The right of final interpretation of this instruction manual lies with Fondital Spa.

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Safety warnings (to be strictly adhered to)



WARNING: failure to follow these instructions could result in serious damage to the unit or injury to persons.



NOTE: failure to follow these instructions could result in minor or moderate damage to the unit or injury to persons.



This sign indicates that operation must be prohibited. Incorrect operation may cause serious damage or be life-threatening.



This sign indicates that components must be inspected. Incorrect operation can cause damage to people or property.

NOTE

Upon receipt of the unit, check its appearance, verify the model and parts supplied, and ensure that everything is as ordered. The design and installation of the unit must be carried out by authorised personnel, in accordance with current laws and regulations and with these instructions.

After installation, the unit may only be put into operation if there are no problems to check.

After normal use, carry out the specified periodic cleaning and maintenance procedures to ensure trouble-free operation and long life of the unit.

If the power cable is damaged, it must be replaced by the manufacturer, its service agent or similarly qualified persons in order to avoid danger.

The unit must be installed in accordance with national wiring regulations.

This product is a general-purpose air conditioner and must not be installed in the presence of corrosive, explosive, flammable or polluting substances because use under such conditions would cause malfunctions, a shorter service life, fire hazard and risk of serious injury to persons. Special air conditioners must be used under the above-mentioned conditions.



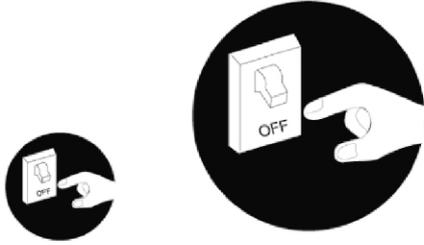
This marking means that the product must not be disposed of as household waste in EU countries. Recycle the product with a sense of responsibility to promote sustainable reuse of resources and avoid any damage to the environment or human health resulting from uncontrolled disposal of waste. To return the used appliance, rely on sorted waste systems or contact the dealer where appliance was purchased. The dealer could take the product and recycle it in an environment-friendly manner.

R32:675

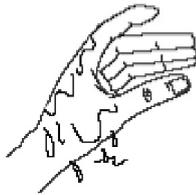




WARNING



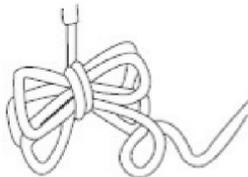
In the event of anomalies, such as a smell of smoke, immediately switch off the unit and contact a service centre.
If the anomaly persists, the unit may be damaged and an electric shock or fire may occur.



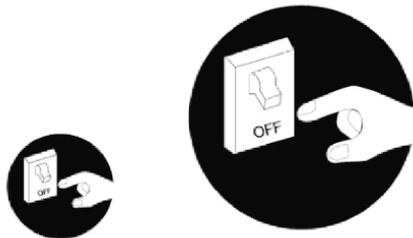
Do not operate the unit with wet hands.
Non-compliance could result in an electric shock hazard.



Before installation, check that the mains voltage corresponds to the values indicated on the unit's rating plate and that the capacity of the electrical system, power cable or electrical outlet is compatible with the unit's power requirements.



A special power supply circuit must be used to avoid fire hazards.
Do not use multiple sockets or extension cords for connecting the cables.



When the unit is left unused for a long period, unplug it and empty the indoor unit and the water storage tank.

Non-compliance may result in the dust building up causing a risk of overheating, fire or (in winter) freezing of the storage tank or coaxial heat exchanger.



Do not damage the electrical cable or use a cable that does not comply with the specifications.

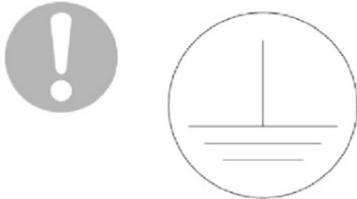
Non-compliance may result in overheating or fire.



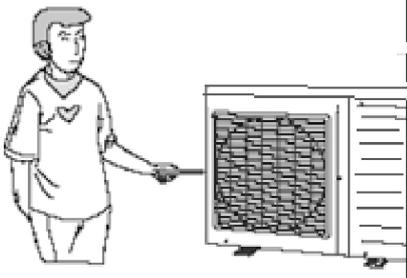
Before cleaning the unit, disconnect it from the mains.
Non-compliance could result in risk of an electric shock or damage to property.

The power supply must adopt a special circuit with a residual current circuit breaker and must have sufficient capacity.

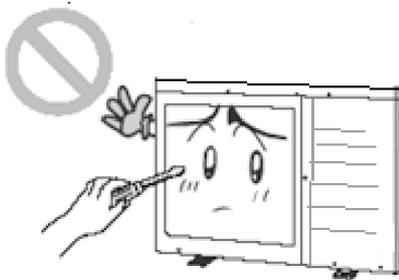
The user may not replace the power cable socket without the manufacturer's prior consent. Electrical connections must be carried out by a professional. Ensure that the unit is properly connected to ground and do not change the way it is connected to ground.



Ground: the unit must have a reliable ground connection! The ground cable must be connected to a building protection device.
In the absence of such a device, ask a qualified technician to install one. It is also recommended not to connect the ground cable to gas pipes, water pipes, drain pipes or other improper items not approved by a professional technician.



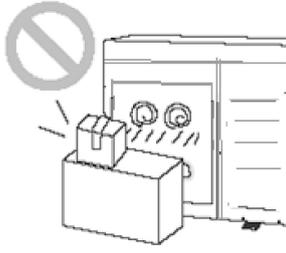
Do not insert foreign objects into the outdoor unit to avoid risk of damage. Do not insert your hands into the air outlet of the outdoor unit.



Do not attempt to repair the unit yourself.
Improper repair may cause fire or electric shock. For this reason, it is recommended to contact a service centre for repairs.



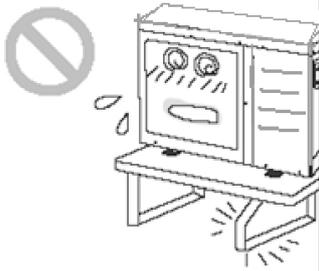
Do not climb on the unit or place objects on it.
This could create a falling hazard for people and objects.



Do not obstruct the air inlet and outlet areas of the unit.
Obstructions could reduce efficiency or cause the unit to shut down or create a fire hazard.



Keep pressurised sprays, gas cylinders and other similar objects at least 1 m away from the unit.
Fire or explosion hazards may result.



Check that the installation support is sufficiently stable.
If it is damaged, there is a risk of the unit falling and injuring persons.

The unit should be installed in a well-ventilated place to reduce energy consumption.

When the storage tank is empty, the unit must not be operated.



WARNING

Do not use any means other than those recommended by the manufacturer to speed up the defrosting process or for cleaning. If a repair is necessary, contact the nearest authorised service centre. Repairs carried out by unqualified personnel could be dangerous. The appliance must not be placed in a room containing continuously operating ignition sources (e.g. open flames, gas appliances or electric heaters). Do not pierce or burn.

The appliance must be installed, used and stored in a room having an area of at least Xm (for the measure of space X , refer to table "a" in the section "Safety precautions for the use of flammable refrigerants").

The appliance contains the flammable gas R32. For repairs, strictly follow the manufacturer's instructions. Note that refrigerants are odourless. Read the manual for the specific product.

If the fixed appliance is not equipped with a mains lead with a plug, or other means of disconnection from the mains supply which ensures a separation between the contacts in each pole and is capable of completely disconnecting the power supply under category III overvoltage conditions, the instructions state that such a means of disconnection must be incorporated into the fixed wiring in accordance with the regulations in force on electrical connections.

The appliance is suitable for use by children aged 8 years and over and by persons with physical, sensory and cognitive impairments, or lacking appropriate experience and knowledge exclusively when they are adequately supervised or have been instructed in the safe use of the appliance and understand the associated dangers. Children should be supervised to ensure that they do not play with the appliance. Cleaning and maintenance must not be carried out by children without proper supervision.

The appliance must be located in a well-ventilated room whose dimensions correspond to those specified for operation.

The appliance must not be stored in a room containing open flames (e.g. gas appliances) and ignition sources (e.g. electric stoves) that are continuously in operation.

The appliance must be stored in such a way as to prevent any mechanical damage.



NOTE



The appliance contains the flammable gas R32.



It is recommended to read the user manual before using the appliance.

A special refrigerant circulates in the system to obtain the function of air conditioner. The refrigerant used is R32 fluoride, which undergoes a special cleaning treatment. The refrigerant is flammable and odourless. Moreover, it can lead to explosion hazards under certain conditions. However, the flammability of the refrigerant is very low. Ignition is only possible with fire.

Compared to commonly used refrigerants, R32 is non-polluting and does not damage the ozone layer. This means that it also has a lower greenhouse effect. R32 has excellent thermodynamic characteristics that result in very high energy efficiency. As a result, the units require a lower filling level.

Before installation, check that the electrical power ratings at the designated location correspond to the specifications on the unit rating plate and check the reliability and safety of the electrical connection.

The unit must be connected to the mains by means of an omnipolar circuit breaker suitable for category III overvoltages.

Before use, check that the electrical cables and water pipes are correctly connected to avoid water leaks, risk of electrocution and the like.

Do not operate the unit with wet hands. Children must not be allowed to use it.

In the instructions, the on/off switching descriptions refer to the use of the unit on/off button. The power supply is cut by disconnecting the unit from the mains.

Do not expose the unit directly to the corrosive conditions of environments containing water and humidity. Do not operate the unit with empty water storage tank. The air outlet/inlet openings of the unit must not be obstructed by any objects.

When the unit is not in use, the water in the unit and in the pipes must be drained to prevent the storage tank, pipes and water pump from cracking due to frost.

Never use sharp objects to press the button. Doing so could damage the manual control unit. Do not use other wires instead of the special communication line of the unit. Doing so could damage the control elements. Never clean the manual control unit with benzene, thinners or other chemicals to avoid discolouration of the surfaces and damage to the elements. Clean the unit using a cloth soaked in mild detergent. Gently clean the display screen and connecting parts to avoid discolouration.

The power cable must be separated from the communication line.

Work on the refrigerant circuit must only be carried out by persons with valid certification from an accredited body stating that they can handle refrigerants safely, in accordance with the specifications in force.

Maintenance work on the appliance must be carried out strictly in accordance with the manufacturer's instructions. Maintenance and repair work requiring the assistance of other qualified personnel must be carried out under the supervision of the person competent to handle flammable refrigerants.

Maximum and minimum water temperatures		
Function	Minimum water temperature	Maximum water temperature
Cooling	7°C	25°C
Central heating	20°C	60°C
Water heating	40°C	80°C
Maximum and minimum water pressure values		
Function	Minimum water pressure	Maximum water pressure
Cooling	0.05 MPa	0.25 MPa
Central heating		
Water heating		
Maximum and minimum water pressure values at inlet.		
Function	Minimum water pressure at inlet	Maximum water pressure at inlet
Cooling	0.05 MPa	0.25 MPa
Central heating		
Water heating		

The external static pressures with which the appliance has been tested are stated (only additional heat pumps and appliances with additional heaters). If the power cable is damaged, it must be replaced by the manufacturer, its service agent or an equally qualified person in order to avoid danger.

The appliance is intended to be connected to the water mains permanently and not by means of connecting pipes.

If you have any questions, please contact your local dealer, an authorised service centre, a branch office or our company directly.



NOTE

If hot work is to be carried out on cooling equipment or any associated components, a suitable fire extinguisher must be kept at hand. Have a dry powder or CO₂ fire extinguisher near the loading area.

Any electrical components installed as replacement must be suitable for the purpose and to the appropriate specifications. The manufacturer's maintenance and service instructions must be followed under all circumstances. If in doubt, consult the manufacturer's technical department.

The following checks must be carried out on installations using flammable refrigerants:

- the filling volume must be suitable for the cubic capacity of the room in which the components containing the refrigerant are installed;
- ventilation devices and openings must open properly and be free of obstructions;
- if an indirect cooling circuit is used, check for the presence of refrigerant in the secondary circuit;
- the unit markings must always be visible and legible. Markings and signs that become illegible must be rectified;
- cooling pipes or components must be installed in a location with a low probability of exposure to substances that can corrode refrigerant-containing components, unless the components are manufactured from materials that are inherently corrosion-resistant or adequately protected against corrosion.

Repair and maintenance procedures for electrical components must include initial safety checks and component inspection procedures. If a defect is found that may create a safety hazard, the power supply to the circuit must be interrupted until the problem is satisfactorily resolved. If the fault can not be rectified immediately but the equipment must continue to be used, a suitable temporary solution must be adopted. This situation must be reported to the owner of the equipment so that all parties are aware of it.

Initial safety checks: check that capacitors are discharged. This procedure must be carried out in a safe manner to avoid the possibility of sparks. Make sure that there are no live components or wires exposed when filling, restoring or bleeding the system. Make sure that there are no interruptions in the grounding.

When repairing sealed components, it is necessary to disconnect all electrical devices from the equipment before removing sealed covers, etc. If it is absolutely necessary to have a power supply during the intervention, a permanently operating leak detection device must be set up at the most critical point to signal potentially dangerous situations.

Particular attention must be paid to the following to ensure that, during work on electrical components, the housing does not undergo any alterations that compromise the level of protection. These may include damage to cables, an excessive number of connections, the use of terminals that do not conform to the original specifications, damage to seals and gaskets, incorrect gland assembly, etc.

Ensure that the equipment is securely mounted.

Ensure that the gaskets or sealing materials have not deteriorated to such an extent that they can no longer prevent the ingress of flammable atmospheres. Spare parts must comply with the manufacturer's specifications.

NOTE: the use of silicone sealants may reduce the effectiveness of some types of leak detection equipment.

Intrinsically safe components do not need to be isolated before work is carried out.

Before applying permanent inductance or capacity loads to the circuit, make sure that this operation does not cause the allowed voltage and current values for the device in use to be exceeded.

Intrinsically safe components are the only ones which can be serviced when live in the presence of a flammable atmosphere. The test equipment must have the correct nominal characteristics.

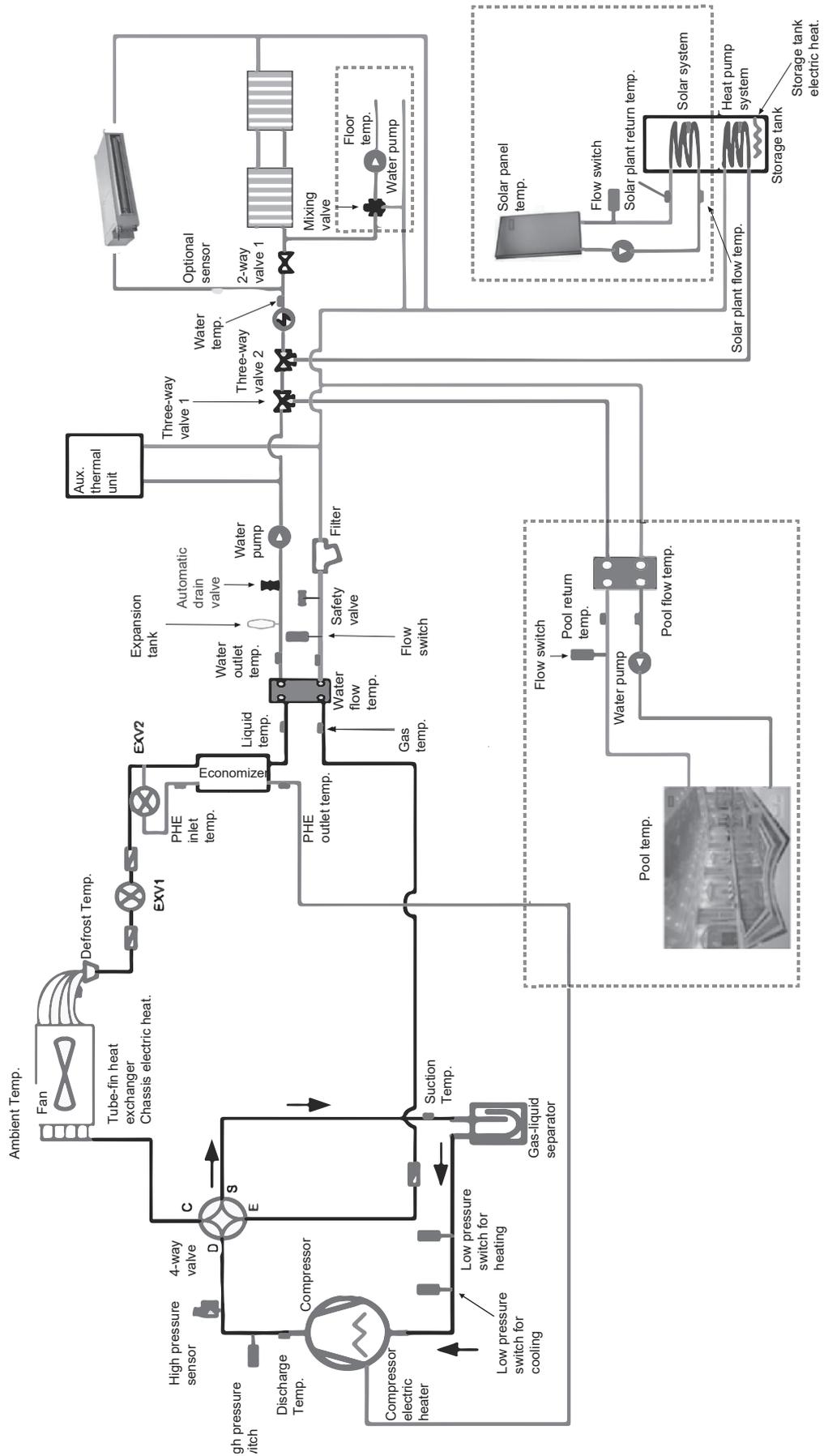
When replacing components, use only those parts specified by the manufacturer. Non-approved components could cause ignition of the refrigerant released into the atmosphere.

Check that the wiring is not exposed to wear, corrosion, excessive pressure, vibration, sharp edges or other adverse environmental factors. The inspection should also take into account the effects of ageing or continuous vibration from compressors, fans or other similar sources.

The use of potential ignition sources to search for or detect refrigerant leaks is forbidden under any circumstances. The use of halogen lights (or other open flame detection systems) is not permitted.

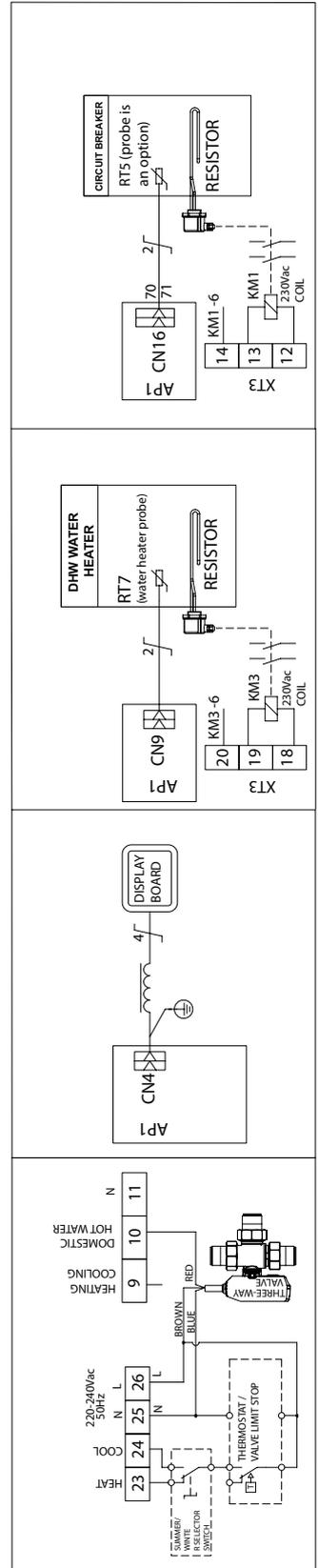
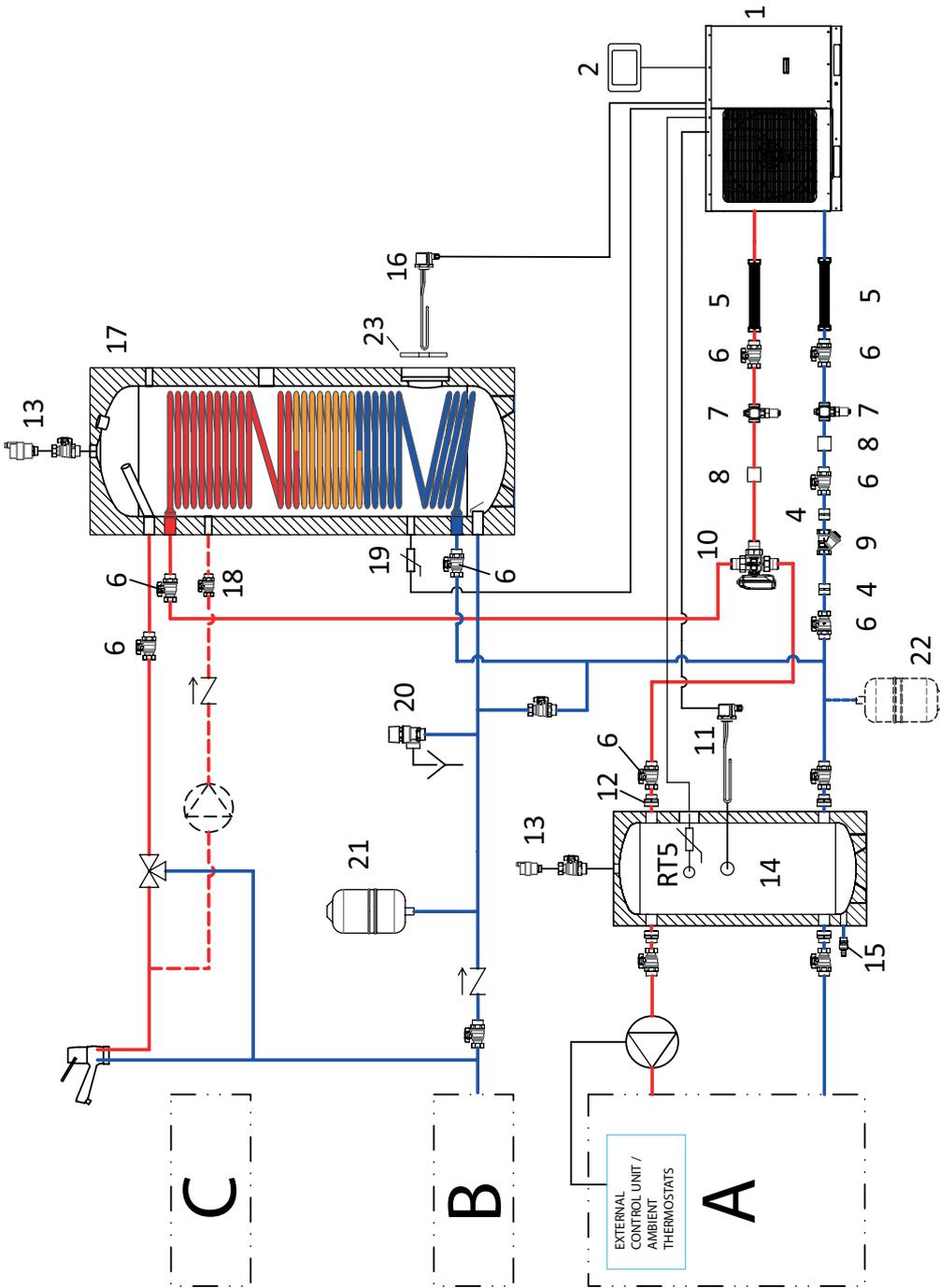
The equipment must be labelled to indicate that it has been decommissioned and refrigerant drained. The labels must be dated and signed. Ensure that there are labels on the appliance stating that it contains flammable refrigerant gas.

1. Diagram of the operating principle



Note: the pool, the solar kit and the water mixing accessory are components not included in the delivery.

2. HEATING AND COOLING AND DHW WITH CIRCUIT BREAKER



Ref	Description	Notes
A	Heating / cooling system	-
B	Hydraulic network	-
C	Recirculation	-
1	Heat pump	-
2	Control panel - user interface	-
4	1" M-M fittings	(**)
5	1" F-F flexible hoses	(**)
6	1" M-F taps	(**)
7	Freeze protection valve	(****)
8	1" F-F sleeves	(**)
9	1" F-F Y-shaped filter	(**)
10	Three-way deviating valve	(**)
11	Heating element	(**)
12	1" ¼ - 1" M-M fitting	(**)
13	Bleed valve	(***)
14	WHPF PU buffer tank	(**)
15	System discharge cock.	(**)
16	Heating element	(**)
17	WHDHP SS storage tank	(**)
18	½ " tap	(***)
19	Probe	(**)
20	Safety valve.	(***)
21	DHW expansion vessel	(***)
22	Extra CH expansion tank	(***)
23	Flange with resistor fitting	(**)
RT5	Probe	(**)

(**) Extra accessory

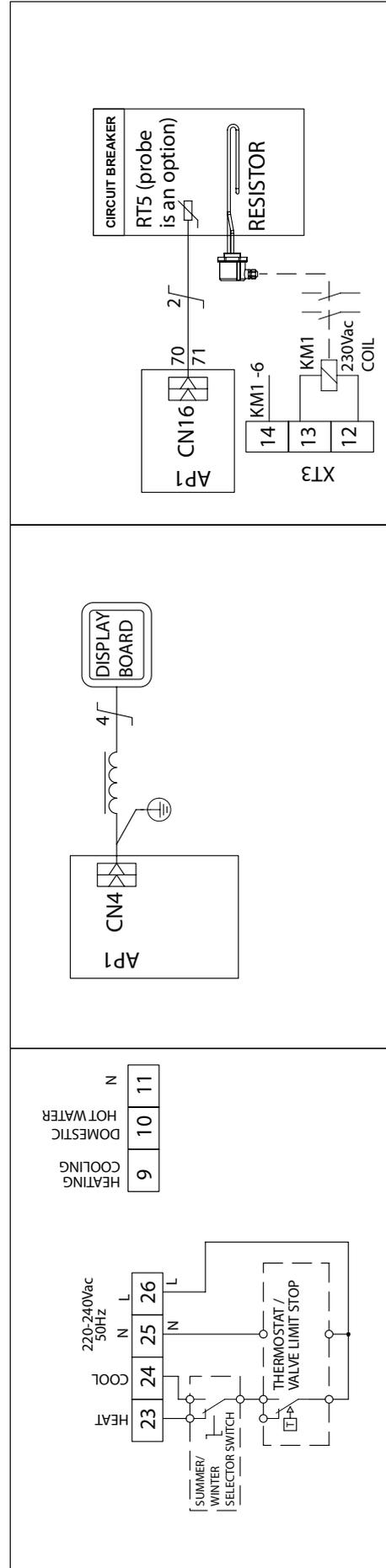
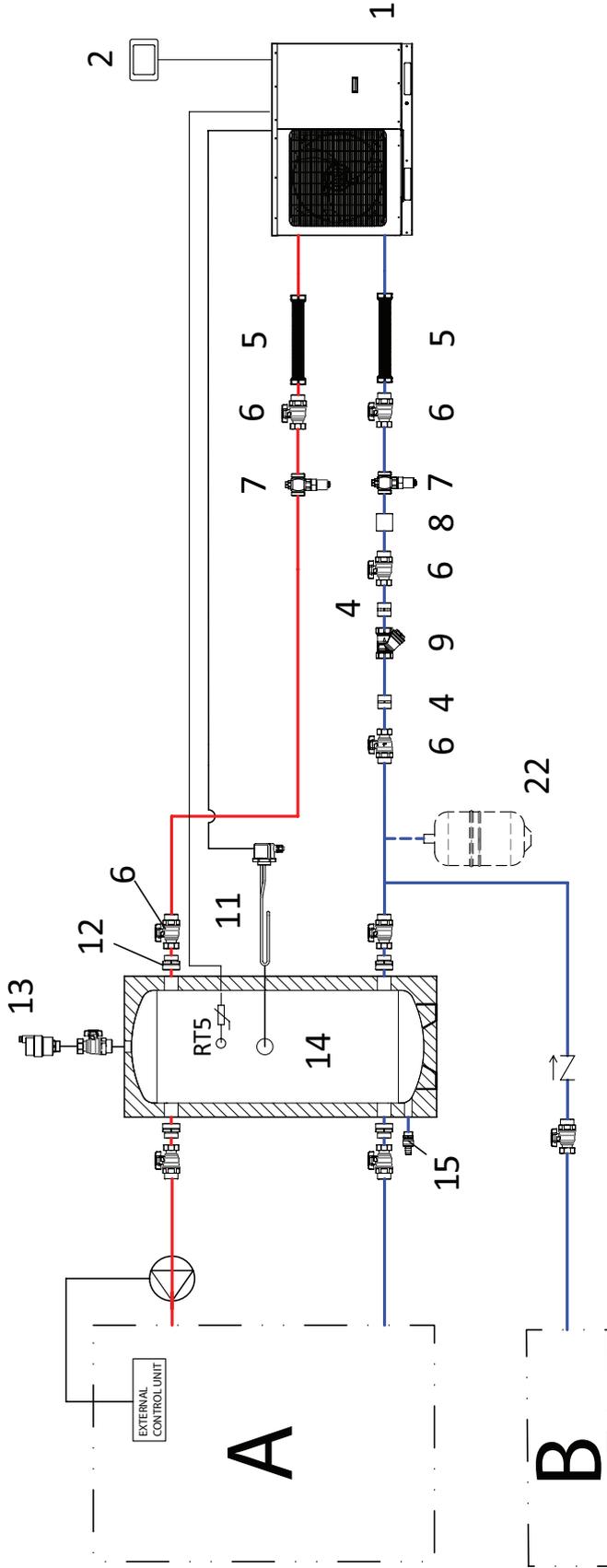
(***) Not included in extra Fondital accessories

(****) To be used if no glycol solution is added to the system water. Does not protect the heat pump in case of power failure.

The diagram is purely indicative and for descriptive purposes.

The system must be designed and validated by a qualified thermal-engineering firm.

3. HEATING AND COOLING



Ref	Description	Notes
A	Heating / cooling system	-
B	Hydraulic network	-
1	Heat pump	-
2	Control panel - user interface	-
4	1" M-M fittings	(**)
5	1" F-F flexible hoses	(**)
6	1" M-F taps	(**)
7	Freeze protection valve	(****)
8	1" F-F sleeves	(**)
9	1" F-F Y-shaped filter	(**)
11	Heating element	(**)
12	1" ¼ - 1" M-M fitting	(**)
13	Bleed valve	(***)
14	WHPF PU buffer tank	(**)
15	System discharge cock.	(**)
22	Extra CH expansion tank	(***)
RT5	Probe	(**)

(**) Extra accessory

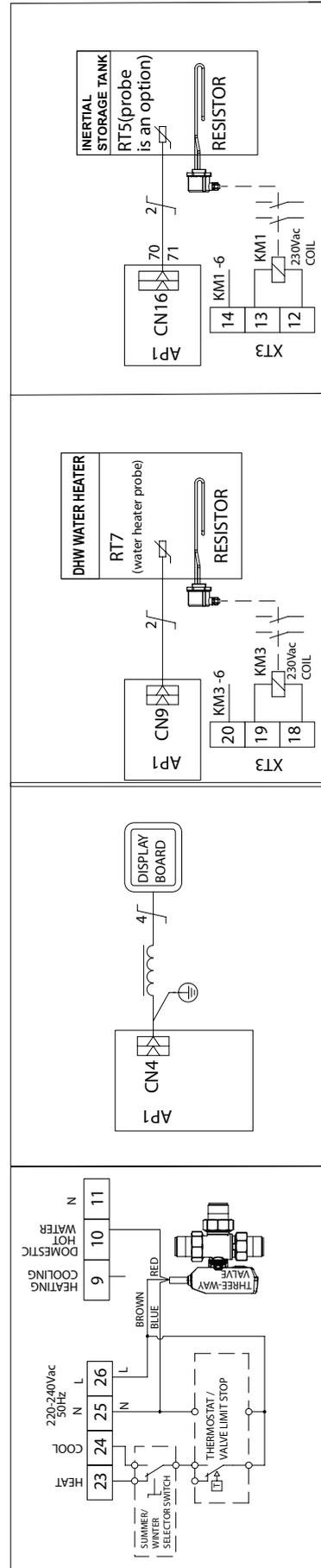
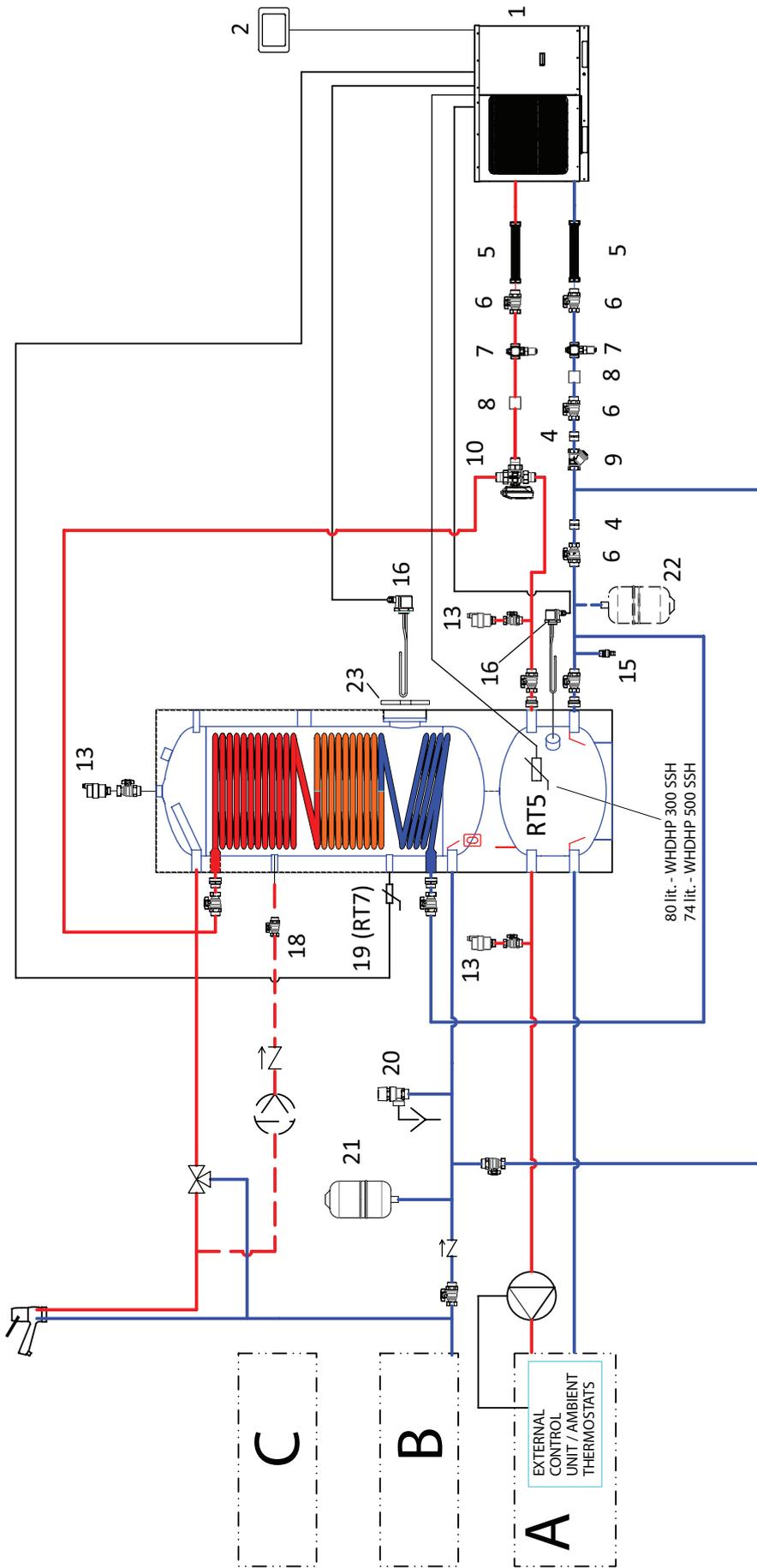
(***) Not included in extra Fondital accessories

(****) To be used if no glycol solution is added to the system water. Does not protect the heat pump in case of power failure.

The diagram is purely indicative and for descriptive purposes.

The system must be designed and validated by a qualified thermal-engineering firm.

4. HEATING AND COOLING AND DHW WITH COMPACT WATER HEATER



Ref	Description	Notes
A	Heating / cooling system	-
B	Hydraulic network	-
C	Recirculation	-
1	Heat pump	-
2	Control panel - user interface	-
4	1" M-M fittings	(**)
5	1" F-F flexible hoses	(**)
6	1" M-F taps	(**)
7	Freeze protection valve	(****)
8	1" F-F sleeves	(**)
9	1" F-F Y-shaped filter	(**)
10	Three-way deviating valve	(**)
13	Bleed valve	(***)
15	System discharge cock.	(**)
16	Heating element	(**)
18	½ " tap	(***)
19	Water heater probe (RT7)	(**)
20	Safety valve.	(***)
21	DHW expansion vessel	(***)
22	Extra CH expansion tank	(***)
23	Flange with resistor fitting	(**)
RT5	Probe	(**)

(**) Extra accessory

(***) Not included in extra Fondital accessories

(****) To be used if no glycol solution is added to the system water. Does not protect the heat pump in case of power failure.

The diagram is purely indicative and for descriptive purposes.

The system must be designed and validated by a qualified thermal-engineering firm.

5. Unit operating principle

The air/water heat pump with DC inverter consists of an outdoor unit, an indoor unit and a storage tank with internal fan coil. Functions:

Cool;

- (1) Heat;
- (2) Hot Water;
- (3) Cool + Hot Water;
- (4) Heat + Hot Water;
- (5) Emergen. mode;
- (6) Fast Hot Water;
- (7) Holiday mode;
- (8) Force mode;
- (9) Quiet mode;
- (10) Disinfection;
- (11) Weather depend;
- (12) Floor preparation;
- (13) Air removal;
- (14) Other thermal

Cool: in cooling mode, the refrigerant condensates inside the outdoor unit and evaporates in the indoor unit. Thanks to heat exchange with indoor unit water, water releases heat and its temperature decreases, while refrigerant absorbs heat and evaporates. Outlet temperature can be set based on user's needs, by means of a wired control. System low-temperature water is connected to internal fan coil and underground tube through a valve control, so as to ensure heat exchange with indoor air and decrease ambient temperature to the required value.

Heat: in heating mode, the refrigerant evaporates inside the outdoor unit and condensates in the indoor unit. Thanks to heat exchange with indoor unit water, water absorbs heat and its temperature increases, while refrigerant releases heat and condensates. Outlet temperature can be set based on user's needs, by means of a wired control. System high-temperature water is connected to internal fan coil and underground tube through a valve control, so as to ensure heat exchange with indoor air and increase ambient temperature to the required value.

Hot Water: in water heating mode, the refrigerant evaporates inside the outdoor unit and condensates in the indoor unit. Thanks to heat exchange with indoor unit water, water absorbs heat and its temperature increases, while refrigerant releases heat and condensates. Outlet temperature can be set based on user's needs, by means of a wired control. System high-temperature water is connected to internal storage tank coil through a valve control, so as to ensure heat exchange with storage tank water and increase its temperature to the required value.

Cool + Hot Water: when the cooling mode is combined to the water heating mode, user can set priority of either mode as required. In the preset configuration, the heat pump has top priority. In this configuration, if the cooling mode is used together with the water heating mode, the heat pump will give priority to cooling. In this case, water can only be heated up using the storage tank electric heater. In the opposite configuration, the heat pump will give priority to water heating and switch to cooling only as soon as water has been heated up.

Heat + Hot Water: when the heating mode is combined to the water heating mode, user can set priority of either mode as required. In the preset configuration, the heat pump has top priority. In this configuration, if the heating mode is used together with the water heating mode, the heat pump will give priority to heating. In this case, water can only be heated up using the storage tank electric heater. In the opposite configuration, the heat pump will give priority to water heating and switch to heating only as soon as water has been heated up.

Emergen. mode: this mode is only available for room heating and water heating. When the outdoor unit stops due to a malfunction, the corresponding emergency mode is activated. For heating mode, after the emergency mode is activated, heating can only be obtained through the electric heater of the indoor unit. When the set outlet or indoor temperature is reached, the electric heater of the indoor unit stops working. For water heating mode, the electric heater of the indoor unit stops while the electric heater of the storage tank is working. Once the set air or storage tank temperature is reached, the electric heater stops.

Fast Hot Water: in fast water heating mode, the unit operates on the basis of the water heating command from the heat pump and the electric heater of the storage tank also starts up simultaneously.

Force mode: this mode is only used for refrigerant recovery and troubleshooting of the unit.

Holiday mode: this mode is only available for the heating function. It can be used to maintain the indoor ambient temperature or water temperature in a certain range to prevent the unit hydraulic system from freezing or to protect certain objects from possible frost damage. When the outdoor unit stops due to a malfunction, the two electric heaters of the unit are activated.

Disinfection: in this mode, the water heating system can be disinfected. When you activate the disinfection function and set the corresponding time, the function is started. When the set temperature is reached, the function is turned off.

Weather depend: this mode is only available for the room heating or cooling function. In the climate-dependent mode, the set value (ambient air temperature or water temperature in the storage tank) is automatically measured and controlled when the outside air temperature changes.

Quiet mode: silent mode is available for cooling, heating and water heating functions. In Quiet mode, the outdoor unit reduces the operating noise through automatic control.

Floor preparation: this function is intended to periodically preheat the floor for initial use.

Air removal: this function aims to remove air from the hydraulic system and fill it with water to allow the unit to operate with stable water pressure.

Solar heater: if the conditions for starting up the solar water heater are met, it starts to heat the circulating water. The heated water then reaches the storage tank, where heat exchange with the water contained in the tank takes place. Under all conditions, the solar water heater always has start-up priority to promote energy preservation.

Other thermal: when the outside temperature is lower than the set value for starting the auxiliary thermal unit and, at the same time, the appliance is in an error condition and the compressor has been stopped for three minutes, the auxiliary thermal unit starts to deliver heat or hot water.

6. Name

PROCIDA	A	W	M	X	16
1	2	3	4	5	6

N.	Description	Options
1	Product name	PROCIDA
2	Type of external source	A = air
3	CH system fluid type	W = water
4	Heat pump type	M = monobloc
5	Power type	X = single-phase; T = three-phase
6	Rated heating output	6.0 = 6,0 kW; 8.0 = 8,0 kW; 10 = 10 kW; 12 = 12 kW; 14 = 14 kW; 16 = 16 kW

Model range

Model name	Power		Electric power supply
	Heating ¹ , kW	Cooling ² , kW	
PROCIDA AWM X6	6	5,8	220-240 VAC single-phase/50 Hz
PROCIDA AWM X8	7,5	6,8	
PROCIDA AWM X10	10	8,8	230 VAC, single-phase, 50 Hz
PROCIDA AWM X12	12	11	
PROCIDA AWM X14	14	12,5	
PROCIDA AWM X16	15,5	14,5	
PROCIDA AWM T10	10	8,8	400 VAC, three-phase, 50 Hz
PROCIDA AWM T12	12	11	
PROCIDA AWM T14	14	12,5	
PROCIDA AWM T16	15,5	14,5	

Notes

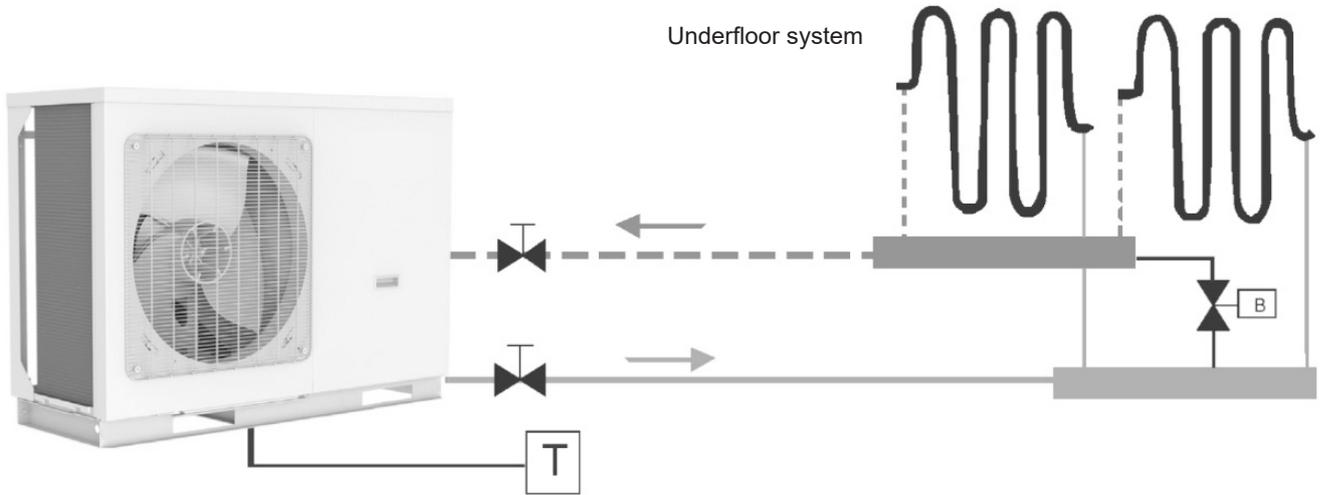
- (a) ¹Power values and input power refer to the following conditions:
Internal water temperature 30 °C/35 °C, External air temperature 7 °C DB/6 °C WB;
DB = dry bulb / WB = wet bulb.
- (b) ²Power values and input power refer to the following conditions:
Internal water temperature 23 °C/18 °C, External air temperature 35 °C DB/24 °C WB;
DB = dry bulb / WB = wet bulb.

Operating scenario

Mode	Temperature on heating side (°C)	Temperature on user side (°C)
Central heating	- 25~35	20~60
Cooling	-15~48	7~25
Water heating	- 25~45	40~80

7. Installation example

SCENARIO 1: Connection of an underfloor system for heating and cooling

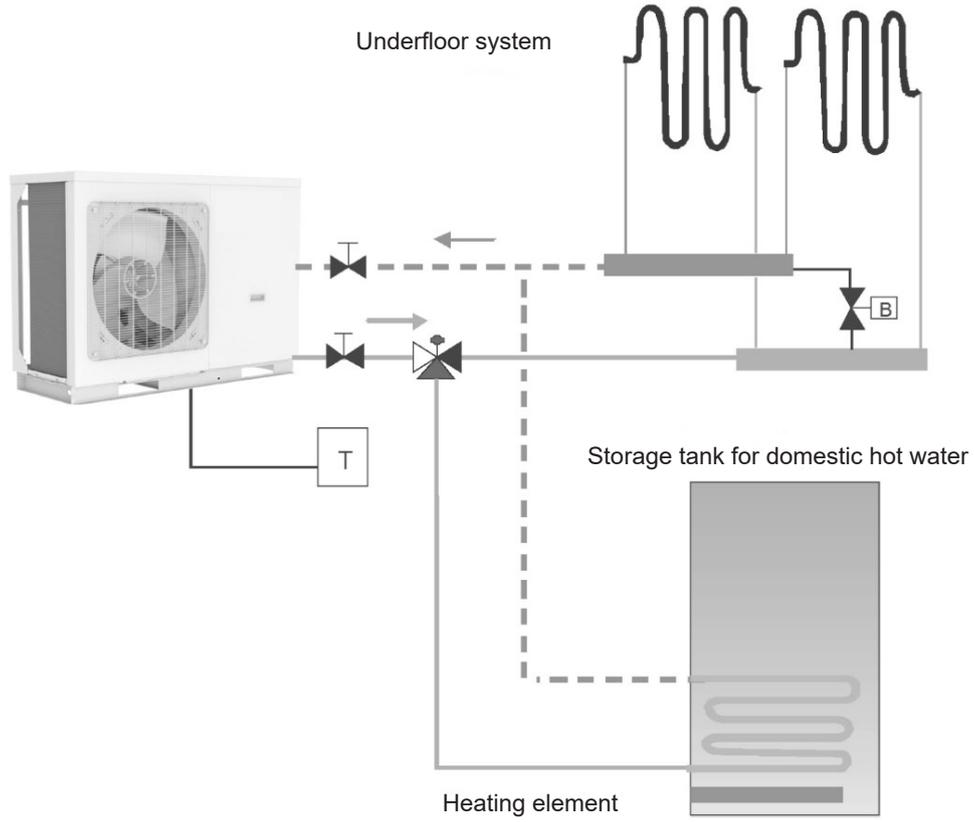


Symbol	Description
	Shut-off valve
	Remote ambient thermostat (provided on site)
	By-pass valve (provided on site)
	High-temperature line
	Low-temperature line

Notes

- (a) Thermostat type and installation specifications must comply with the provisions of this manual;
- (b) The by-pass valve must be installed on manifold to ensure a sufficient water flow rate.

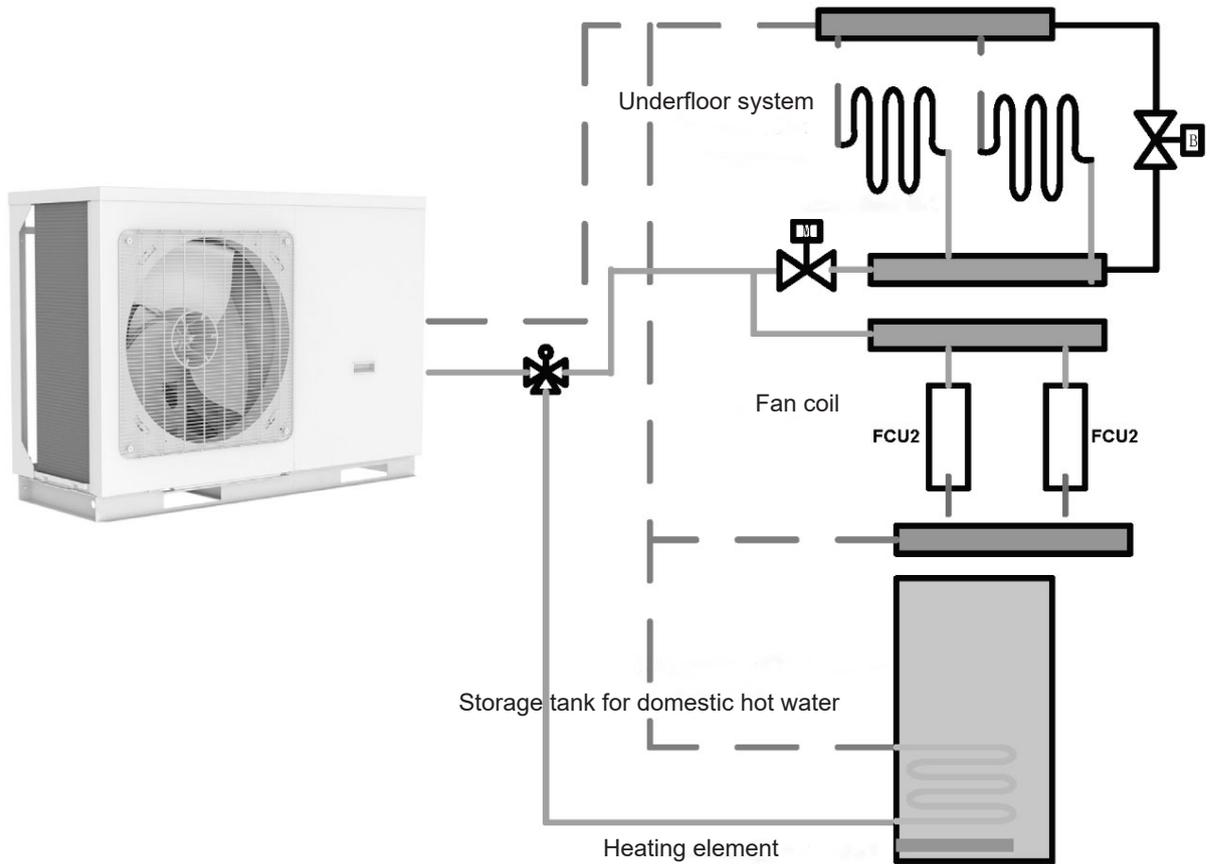
SCENARIO 2: Connection of a storage tank for domestic hot water, with an underfloor system



Symbol	Description
	Shut-off valve
	Remote ambient thermostat (provided on site)
	By-pass valve (provided on site)
	Three-way valve (provided on site)
	High-temperature line
	Low-temperature line

- Notes**
- (a) In this case, a three-way valve must be installed according to the instructions in this manual;
 - (b) The storage tank for domestic hot water should be equipped with an internal electric heater to ensure a sufficient heating power in very cold conditions.

SCENARIO 3: Connection of a storage tank for domestic hot water, of an underfloor system and a fan coil



Symbol	Description
	Shut-off valve
	Remote ambient thermostat (provided on site)
	By-pass valve (provided on site)
	Three-way valve (provided on site)
	Three-way valve (provided on site)
	High-temperature line
	Low-temperature line

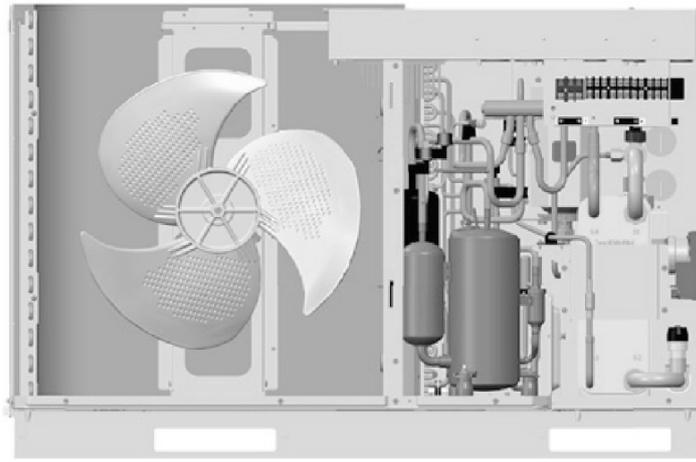
Note

The two-way valve is key to avoid condensation on the floor and on radiator in cooling mode.

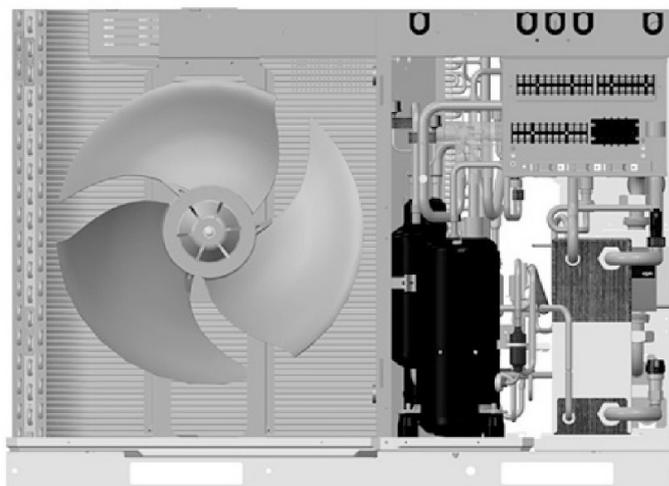
8. Key components

(1) PROCIDA AWM X6, PROCIDA AWM X8





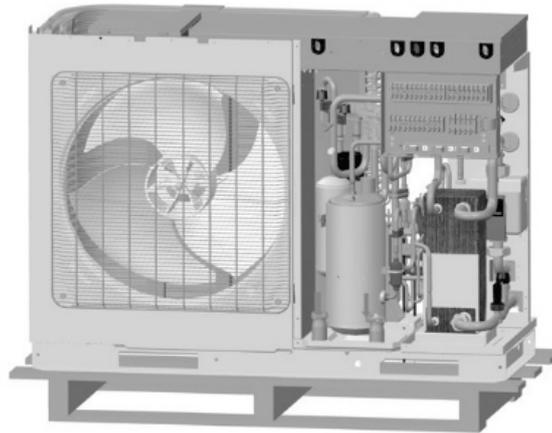
- (2) PROCIDA AWM X10, PROCIDA AWM X12, PROCIDA AWM X14, PROCIDA AWM X16, PROCIDA AWM T10, PROCIDA AWM T12, PROCIDA AWM T14, PROCIDA AWM T16



9. Guidelines for monobloc unit installation

9.1 Instructions for the installation

1. Unit must be installed according to applicable national and local safety regulations.
2. Installation quality directly affects the normal operation of the air conditioner. Do not install it on your own. Contact the dealer for after-sales service. Installation and tests must be carried out by professional installers, in compliance with the installation manual.
3. Do not connect the power supply unless installation is completed.
4. The brackets on compressor feet reduce vibrations during transport. They must be removed before commissioning or they will cause malfunction. After removing the brackets from the feet, tighten the retaining screws to prevent the compressor from detaching during operation. This condition does not apply to models PROCIDA AWM X6 and PROCIDA AWM X8



Phase 0



Phase 1



Phase 2



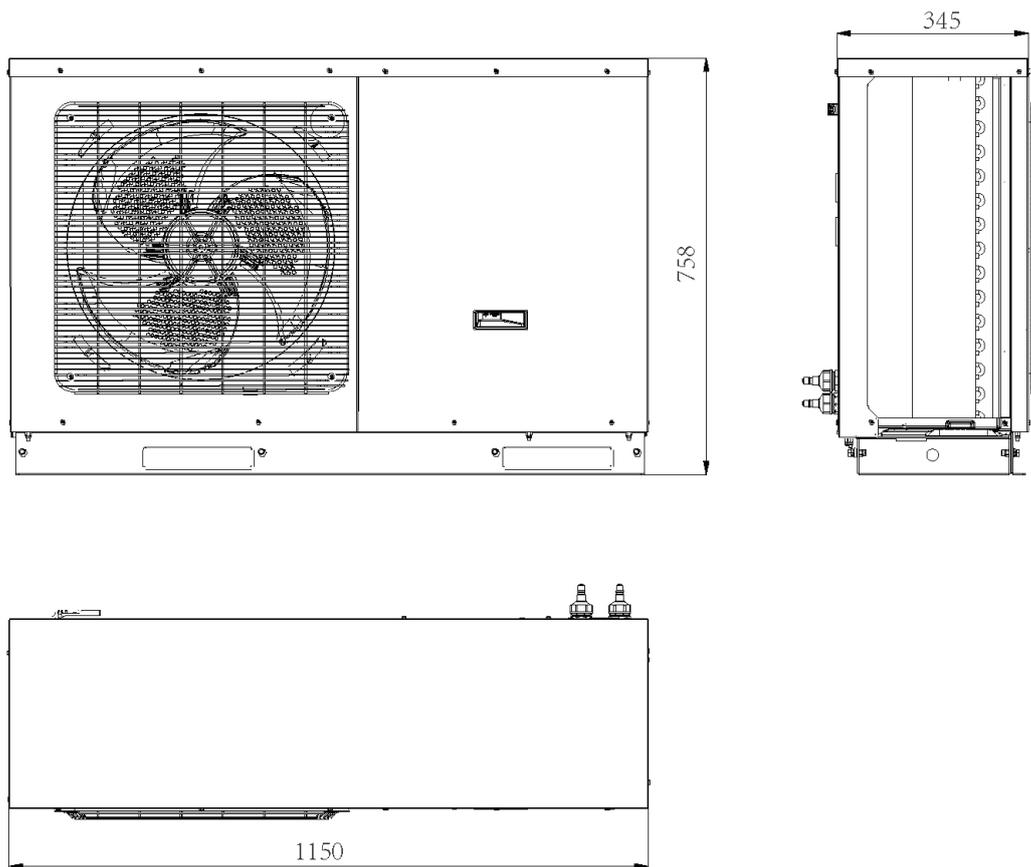
9.2 Monobloc unit installation

9.2.1 Choosing where to install the monobloc unit

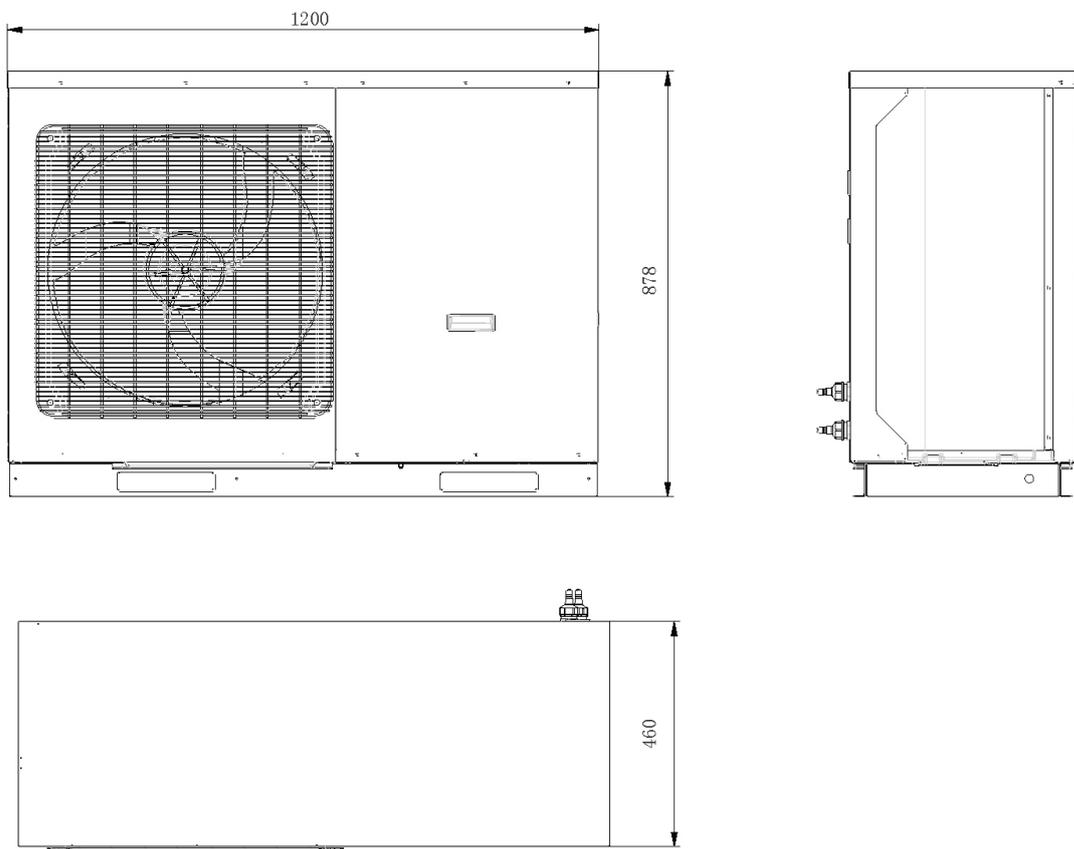
1. The monobloc unit must be installed on a firm and solid support.
2. Do not set the monobloc unit under a window or between two buildings to prevent that the normal noise emission in operation may be heard in the room.
3. Do not obstruct the air inlet and outlet areas.
4. Install the unit in a well-ventilated place, so that the machine may absorb and release a sufficient quantity of air.
5. Do not install the unit in places containing flammable or explosive materials or in places exposed to dust, salt spray and polluted air.

9.2.2 Monobloc unit external dimensions

(1) PROCIDA AWM X6, PROCIDA AWM X8



(2) PROCIDA AWM X10, PROCIDA AWM X12, PROCIDA AWM X14, PROCIDA AWM X16, PROCIDA AWM T10, PROCIDA AWM T12, PROCIDA AWM T14, PROCIDA AWM T16

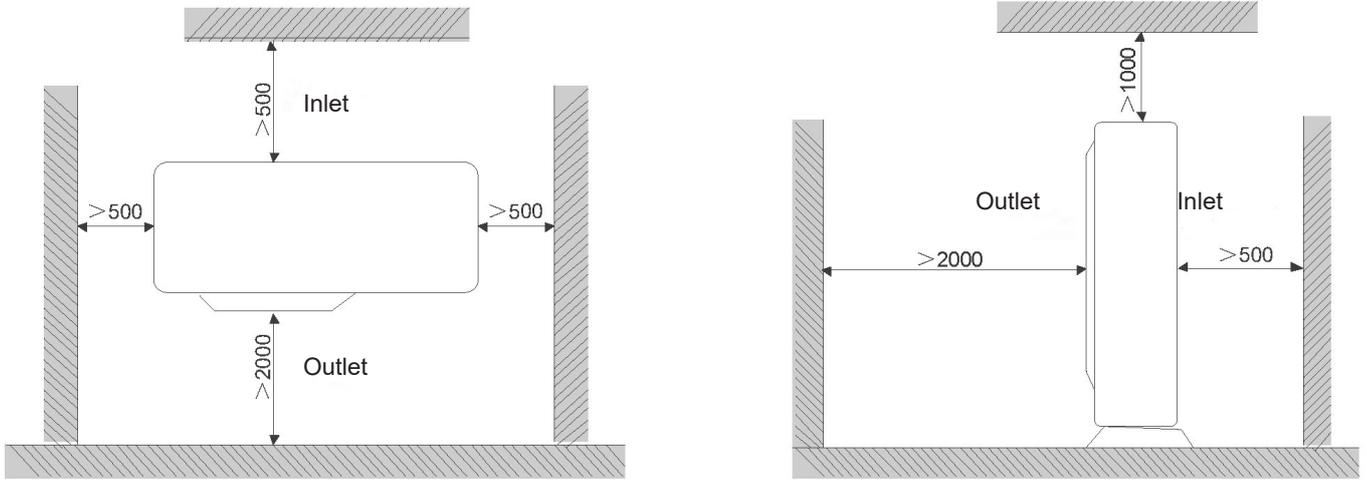


Description

Unit: millimetres

N.	Name	Notes
1	Handle	Used to cover or uncover the front housing
2	Air outlet grille	/

9.2.3 Space required for installation

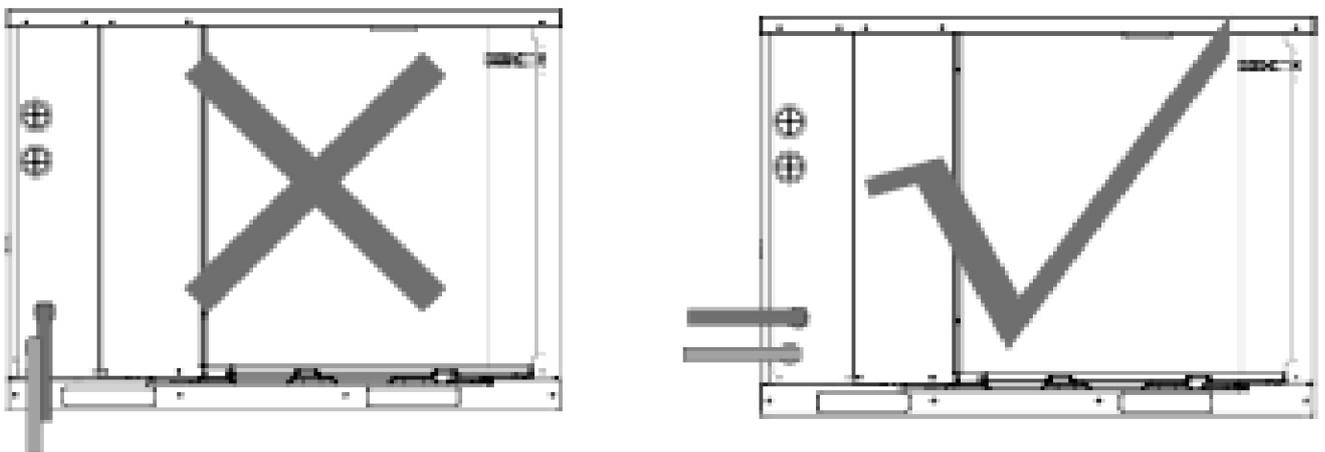


Note: for the figure on the left, if we exclude the outlet side, the distance between the unit and the closest barrier on the other three sides must not be lower than 300 mm. For the figure on the right, the distance between the inlet side and the closest barrier must not be lower than 300 mm.

9.2.4 Precautions for monobloc unit installation

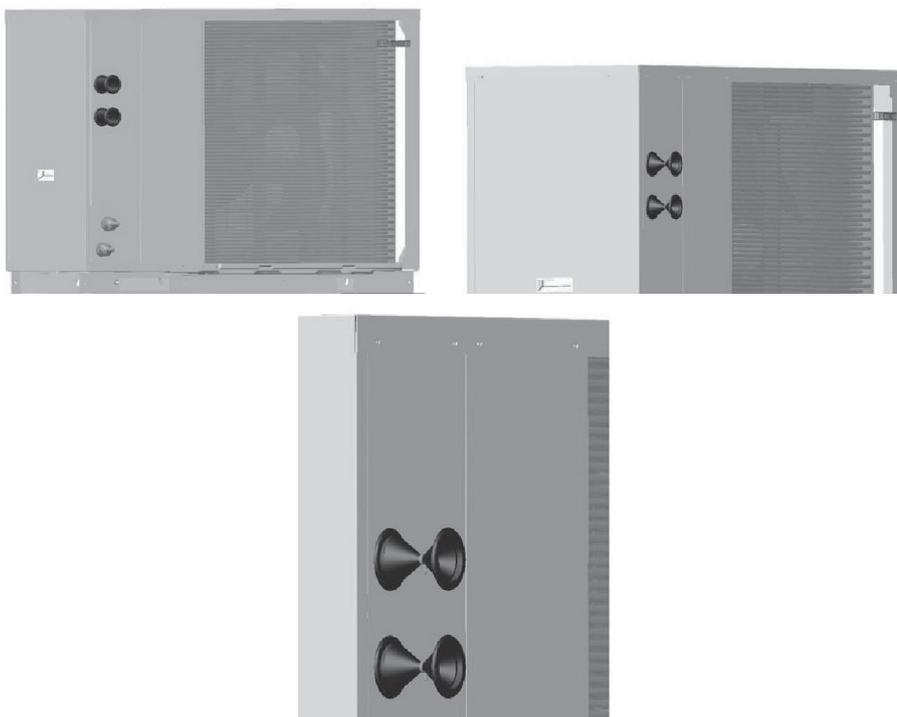
1. To handle the outdoor unit, it is necessary to use two ropes long enough to support the unit in all 4 directions. The angle between the ropes when unit is being lifted and handled must be below 40° so as to avoid shifting the centre of gravity of the unit.
2. Use M12 bolts to fasten the feet and the frame base during installation.
3. The monobloc unit should be installed onto a 10 cm high cement base.
4. The dimensions of the space required for installation of unit parts are shown in the figure below.
5. Lift the monobloc unit using the suitable hole. Duly protect the unit while lifting it. To avoid rust, make sure to avoid damaging the metal parts.

9.2.5 Connecting the water pipes of the monobloc unit



It is recommended to connect water pipes horizontally. Do not connect water pipes vertically.

9.2.6 Use of rubber rings

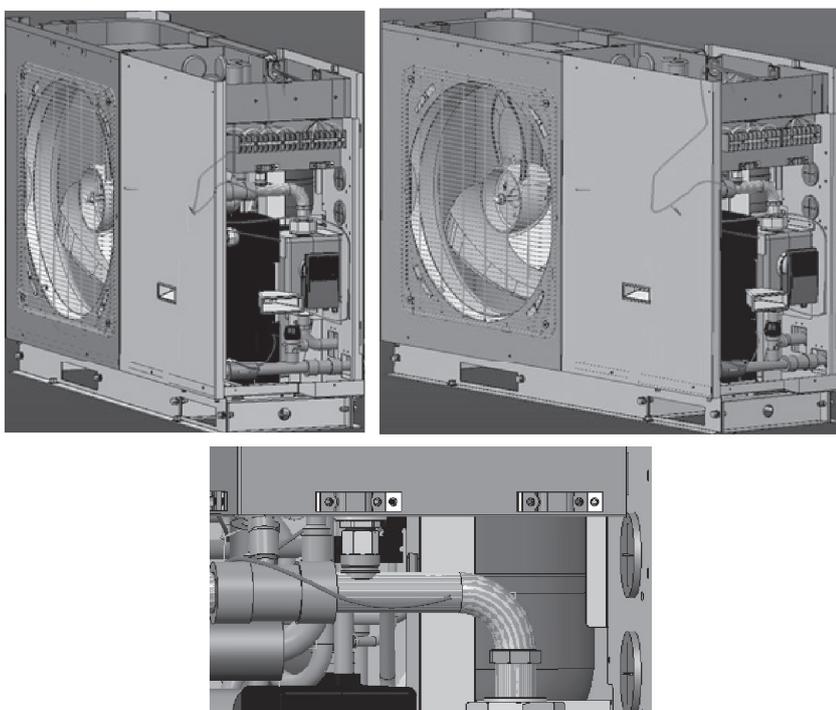


1. Remove the original rubber rings and replace them with the long rubber rings provided as accessories;
2. Connection items to be installed on site must be routed through the rubber rings (2-way valve, 3-way valve, power cable, etc.). Make sure to separate electric cables from lighting cables.
3. Once connections are completed, tighten the rubber rings.

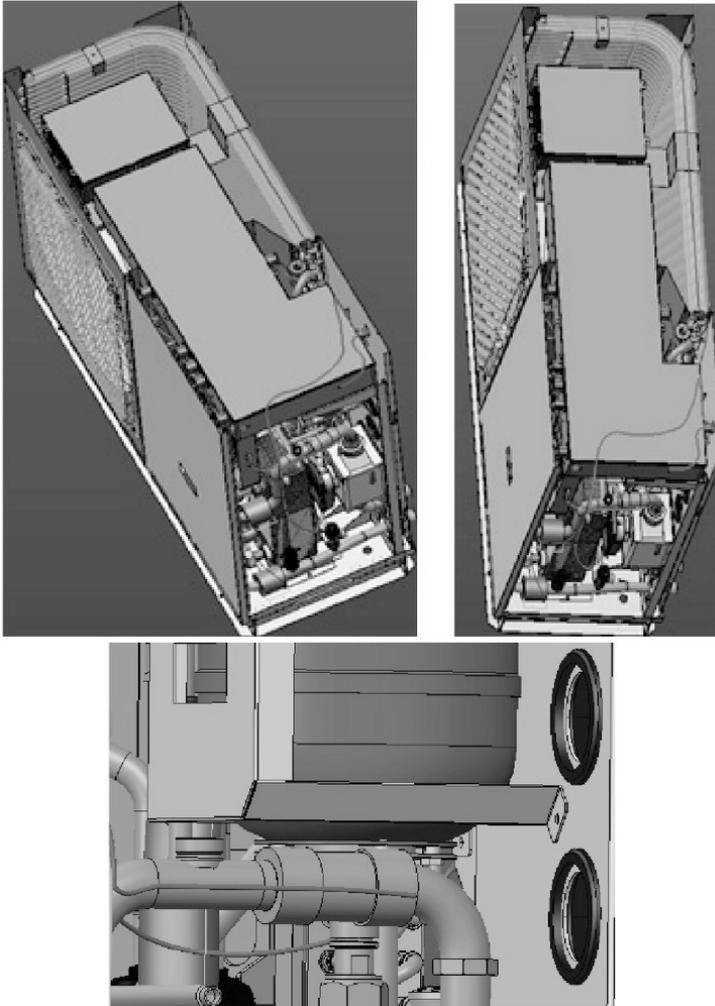
9.2.7 Using the communication cable exclusively dedicated to FONDITAL SERVICE CENTRES.

The dedicated communication cable (72) can be used for commissioning and troubleshooting purposes to connect the display and be able to view unit parameters and status details.

6/8 kW units



Communication cable (72)

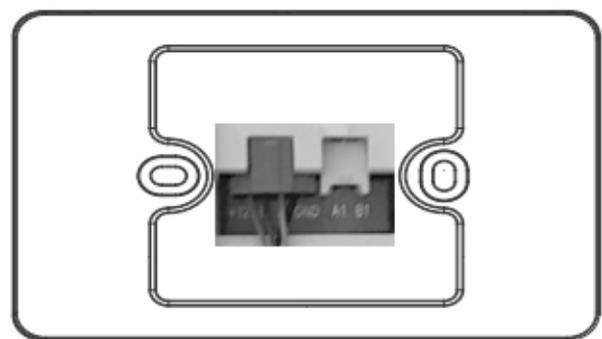


Communication cable (72)

9.2.8 Connection of communication cable (72) with wired control (Control Panel)



Front view



Rear view

9.2.9 Safety precautions when using flammable refrigerants

Notes for maintenance

Ensure that the maintenance area or room area meet the required values.

- » The unit can only be used in rooms meeting the required specifications. Make sure that the maintenance area is properly ventilated.
- » Ventilation must be always active during system operation.

Check the maintenance area for any sources of fire.

- » The use of open flames is prohibited in the maintenance area; it is also recommended to post the "no smoking" sign.

Check that the warning sign attached to the unit is in good condition.

- » Replace any faded or damaged warning signs.

Welding

If it is necessary to cut or weld refrigerant system pipes during maintenance operations, proceed as follows:

- Switch off the unit and disconnect it from the power supply
- Remove the refrigerant
- Create vacuum
- Clean the system using gas N₂
- Carry out the cutting or welding operation
- Bring the unit back to service area for welding

Recycle all refrigerant using the suitable storage tank.

Ensure that there are no open flames close to vacuum pump outlet and the area is well ventilated.

Filling with refrigerant

Use the specific filling equipment for R32 refrigerant. Avoid cross-contamination between different types of refrigerant.

The refrigerant tank must be held in vertical position during filling.

After refilling (or topping up), apply the corresponding sticker on the system.

Do not overfill the system.

After refilling, check for leaks before testing. The leak test should be carried out even in case of removal.

Safety instructions for transport and storage

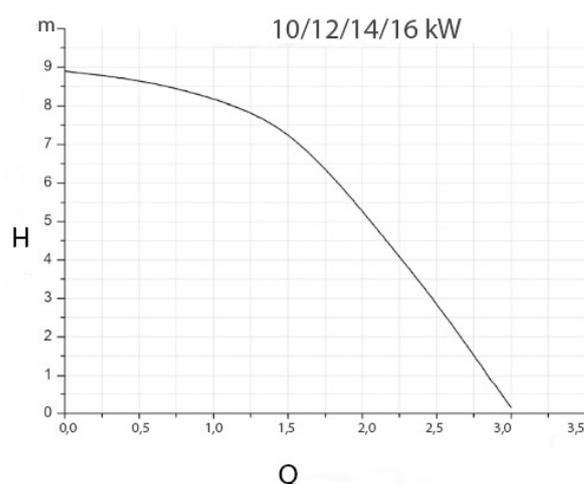
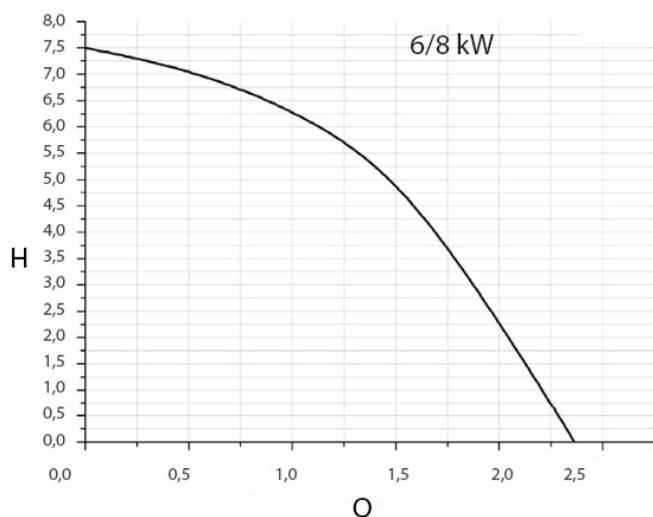
Use a flammable gas detector before draining and opening the tank.

Avoid sources of ignition and smoking.

Comply with local laws and regulations.

10. Hydraulic unit installation

10.1 Useful head at outdoor unit outlet



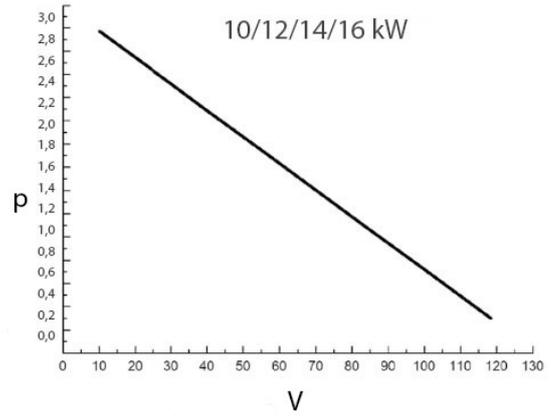
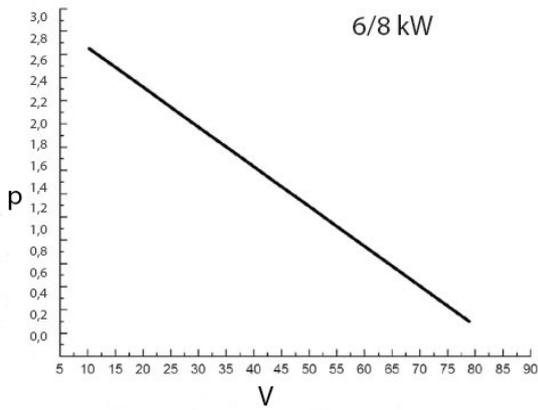
H = Useful head (m.c.a.)

Q = Water flow rate (m³/h)

Note

The above curve shows the maximum useful head. The water pump has a variable frequency. During operation, the water pump controls outlet according to actual load.

10.2 Water volume and pressure in the expansion tank



P = Pressure in the expansion tank (bar)

V = Total maximum water volume (litres)

Notes

- The expansion tank has a capacity of 2 litres and is pre-pressurised to 1.5 bar for 6/8 kW units, while it has a capacity of 3 litres and is pre-pressurised to 1.5 bar for 10/12/14/16 kW units;
- Total water volume is usually 44 litres for 6/8 kW units and 66 litres for 10/12/14/16 kW units; if the total water volume is modified because of installation conditions, the preset pressure must be adjusted accordingly, in order to ensure proper operation. If the unit is installed in the top position, adjustment is not necessary;
- Total minimum water volume is 20 litres;
- To adjust preset pressure, use nitrogen gas provided by a certified installer.

10.3 How to calculate expansion tank filling pressure

Below is the method to use in order to calculate the expansion tank filling pressure.

During installation, if the hydraulic system volume has changed, check whether expansion tank preset pressure should be adjusted according to this formula:

$P_g = (H/10+0.3)$ Bar where H = difference between indoor unit installation point and hydraulic system highest point.

Make sure that the hydraulic system volume is lower than the maximum volume required shown in the figure above. If the value exceeds the specified range, the expansion tank does not meet installation requirements.

For 4/6/8 units

Difference between installation heights ¹	Water volume	
	<44 L	>44 L
<12 m	No adjustment required	1. Preset pressure should be adjusted according to the above formula. 2. Check that the water volume is below the maximum allowed volume (refer to the above figure)
>12 m	1. Preset pressure should be adjusted according to the above formula. 2. Check that the water volume is below the maximum allowed volume (refer to the above figure)	The expansion tank is too small and the required adjustment is not possible.

For 10/12/14/16 units

Difference between installation heights ¹	Water volume	
	<66 L	>66 L
<12 m	No adjustment required	1. Preset pressure should be adjusted according to the above formula. 2. Check that the water volume is below the maximum allowed volume (refer to the above figure)
>12 m	1. Preset pressure should be adjusted according to the above formula. 2. Check that the water volume is below the maximum allowed volume (refer to the above figure)	The expansion tank is too small and the required adjustment is not possible.

Note

- Difference between installation heights: difference between indoor unit installation position and the highest point of the hydraulic system. If the indoor unit is at the highest point of installation, the height difference is considered to be 0 m.
- **Example 1:** the 16 kW unit is installed 5 m below the highest point of the hydraulic system and the total water volume is 60 litres.
 - » With reference to the above figure, it is not necessary to adjust expansion tank pressure.
- **Example 2:** unit is installed at the highest point of the hydraulic system and the total water volume is 100 litres.
 - » Considering that hydraulic system volume is above 66 litres, expansion tank pressure must be adjusted to a lower value.
 - » Formula for calculating pressure
 - » $P_g = (H/10 + 0.3) = (0/10 + 0.3) = 0.3$ bar
 - » The maximum volume of the hydraulic system is approx. 118 litres. Considering that hydraulic system volume is 100 litres, the expansion tank meets the installation requirements.
 - » Adjust expansion tank preset pressure from 1.5 bar to 0.3 bar.

10.4 Selecting the expansion tank

Formula

$$V = \frac{C \cdot e}{1 - \frac{1 + p_1}{1 + p_2}}$$

- V--- Expansion tank volume
- C--- Total water volume
- P₁-- Preset pressure of the expansion tank
- P₂-- Highest pressure reached during system operation (corresponding to the safety valve trigger pressure).
- e--- Water expansion coefficient (difference between expansion coefficient of water original temperature and the one of maximum water temperature).

Water expansion coefficient at different temperatures	
Temperature (°C)	Expansion coefficient e
0	0,00013
4	0
10	0,00027
20	0,00177
30	0,00435
40	0,00782
45	0,0099
50	0,0121
55	0,0145
60	0,0171
65	0,0198
70	0,0227
75	0,0258
80	0,029
85	0,0324
90	0,0359
95	0,0396
100	0,0434

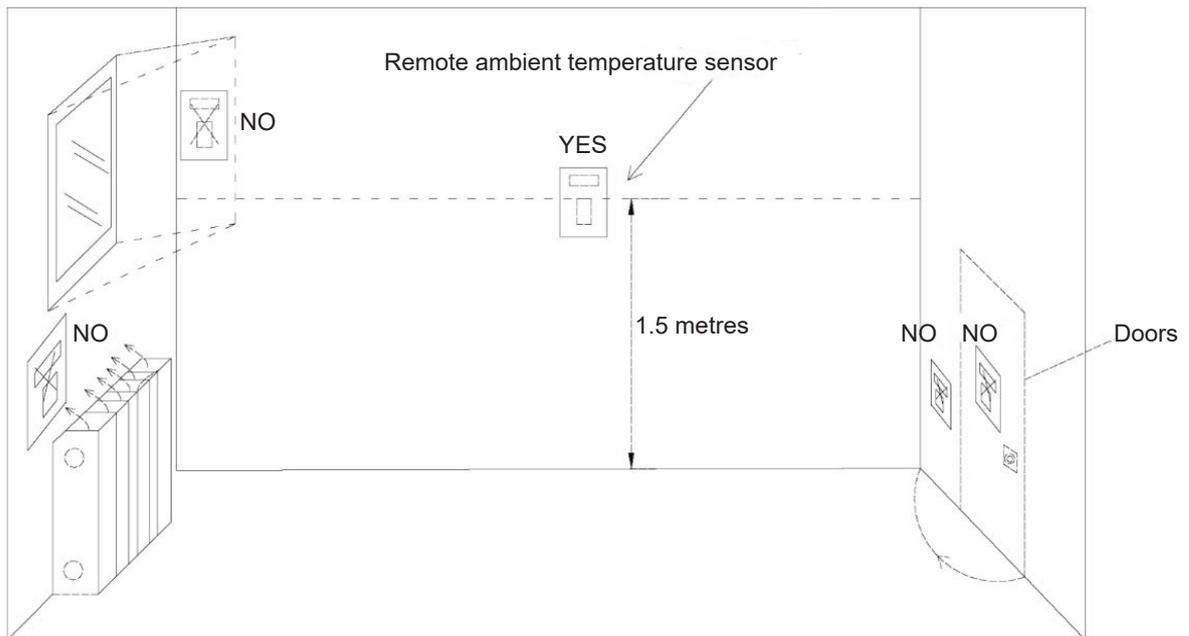
11. Remote ambient temperature sensor

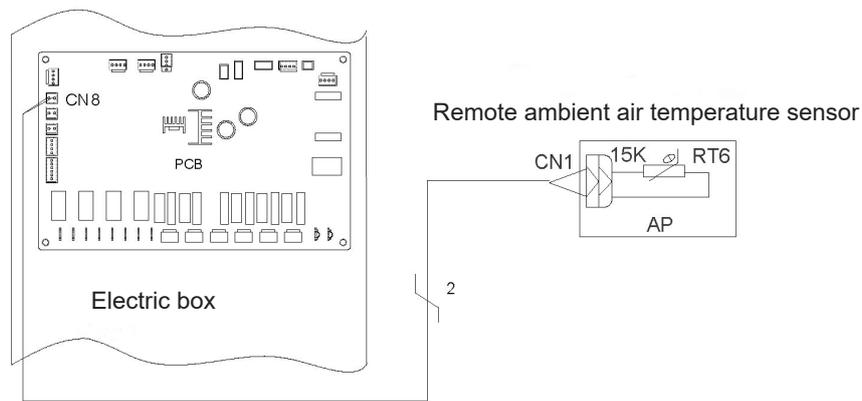


Front side



Rear side



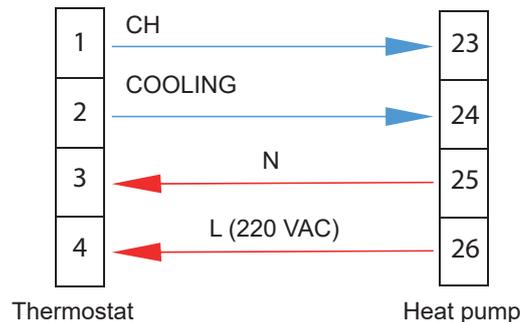


Notes

- The distance between the indoor unit and the remote air temperature sensor must be lower than 15 m, because of the length of the remote sensor connection cable;
- Height above floor is approximately 1.5 m;
- The remote ambient temperature sensor must not be installed in a position where it would be hidden when door is open;
- The remote ambient temperature sensor must not be installed in a position where it would be affected by external heat;
- The remote air temperature sensor must be installed in a position where ambient heating is normally installed;
- After installing the remote air temperature sensor, it is recommended to set the corresponding option to “With” using the wired control so as to adjust ambient temperature at the control point.

12. Thermostat with voltage output

Thermostat installation procedure is similar to the one for the remote ambient temperature sensor.



Thermostat connection

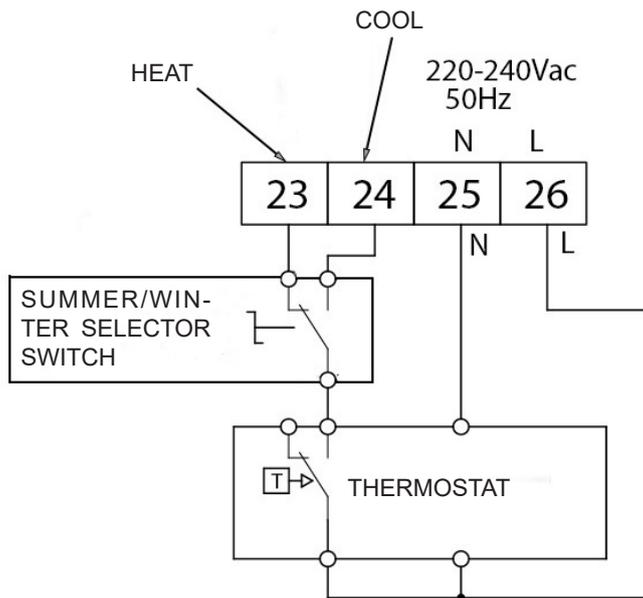
1. Remove the indoor unit front cover and open the electric box;
2. Identify thermostat power specifications: if it is 230 V, identify terminal board XT5 as NO.22~24 and terminal board XT6 as NO.33~34; while if it is 24 V, identify terminal board XT5 as NO.17~21;
3. If it is a heating/cooling thermostat, connect the wires as shown in the above figure.



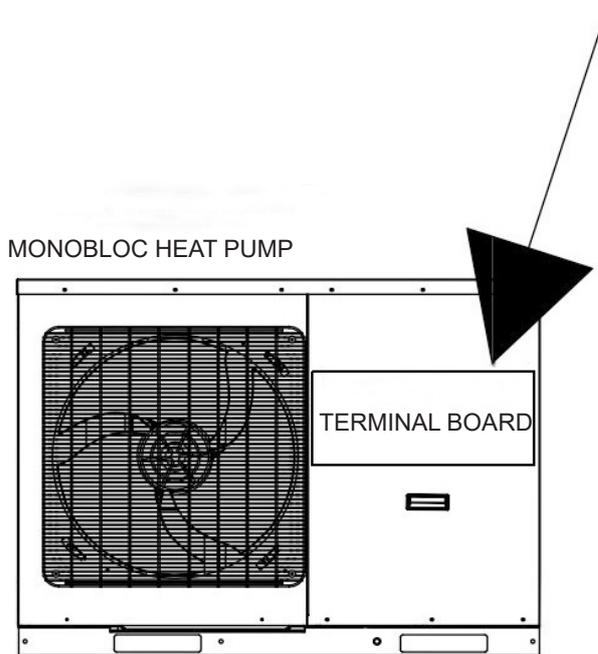
NOTE

- Thermostat 220 V power supply can be provided by the heat pump.
- The temperature set using the thermostat (heating or cooling) must fall in the range specified for the product;
- For other constraints, refer to the previous pages on remote ambient temperature sensor;
- Do not connect any external electrical loads. The 220 VAC cable must only be used for the electrical thermostat;
- Do not connect any external electrical loads such as valves, fan coils, etc. Connecting these parts could seriously damage the main board of the unit;
- Thermostat installation procedure is similar to the one for the remote ambient temperature sensor.

Thermostat ON/OFF



TERMINAL BOARD :
23 : winter operation
24 : summer operation
25 : neutral
26 : phase



Note

To activate the thermostat, you must first enable it via the controller upon starting.
 Path in the controller: COMMISSION - FUNCTION (Select "Air" or "Air + Hot Water")

If you have the split heat pump version instead of the monobloc one, the number of terminals on the terminal board could change but connection remains the same

13. Wired control (CONTROL PANEL)

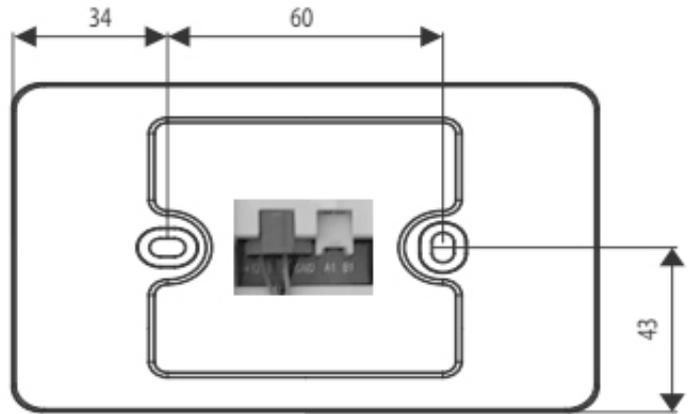
The wired control can be installed inside the house using a **flush module 502E**.

In the accessories box, you will find a cable about 8 metres long, which will be used to connect the wired control to the electronic board named AP1 (see photo below). Connect the BLUE connector of the cable with the CN4 BLUE connector of the AP1 board and the corresponding ground cable to a ground terminal.

N.B.: It is possible to connect the cable across the wired control and the AP1 board up to 15 metres.



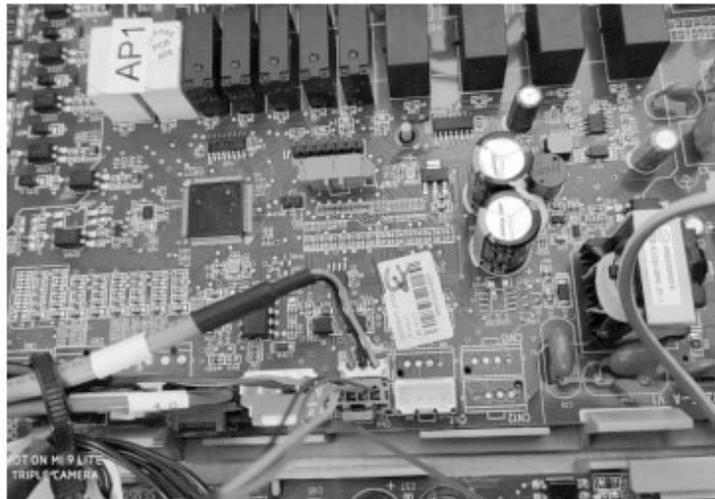
Wired control (front view)



Wired control (rear view)



Board-Wired control connection cable



AP1 board

CN4

14. 2-way valve

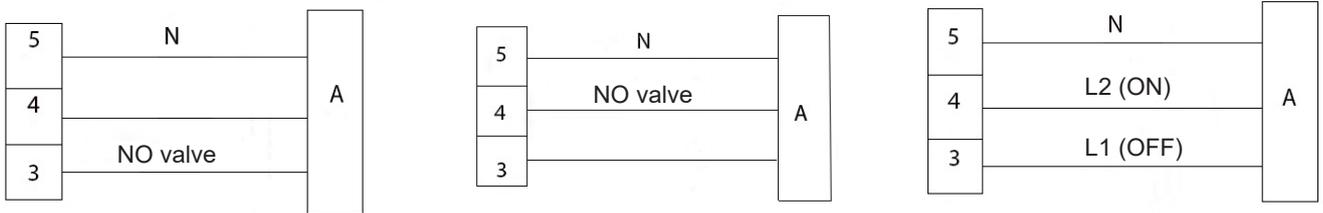
The two-way valve 1 controls water flow rate in the underfloor circuit. If the "Floor Config" parameter is set to "With" for the cooling or heating function, the valve is kept open. If the "Floor Config" parameter is set to "Without", the valve is kept closed. General

Type	Power	Operating mode	Supported
NO 2 wires	230 V 50 Hz ~AC	Close water flow	yes
		Open water flow	yes
NC 2 wires	230 V 50 Hz ~AC	Close water flow	yes
		Open water flow	yes

1. NO type (normally open). The valve is open when NO current is applied. (The valve closes when current is applied).
2. NC type (normally closed). The valve is closed when NO current is applied. (The valve opens when current is applied).
3. Connecting a two-way valve:

Electrically connect the two-way valve as follows.

- Phase 1. Remove the unit front cover and open the electric box.
- Phase 2. Identify the terminal board and connect the wires as shown below.



A : 2-way valve 1



WARNING

- The NO valve (normally open) must be connected to wire (OFF) and to wire (N) to obtain that it closes in cooling mode.
- The NC valve (normally closed) must be connected to wire (ON) and to wire (N) to obtain that it closes in cooling mode.
- (ON): Line signal (for NO type) from PCB to 2-way valve
- (OFF): Line signal (for NC type) from PCB to 2-way valve
- (N): Neutral signal from PCB to 2-way valve

15. Three-way valve

The three-way valve 2 is required for domestic hot water storage tank. It switches between the underfloor heating circuit and the storage tank heating circuit.

General

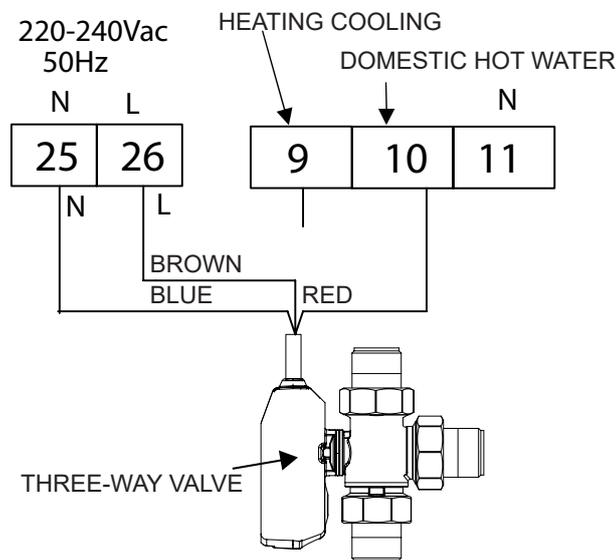
Type	Power	Operating mode	Supported
Actuator, 2 wires	230 V 50 Hz ~AC	Selecting "Flow A" between "Flow A" and "Flow B"	yes
		Selecting "Flow B" between "Flow B" and "Flow A"	yes

- 2-wire actuator control = see diagram below.
- Flow A is the "water flow from the indoor unit to the underfloor water circuit" (valve at rest).
- Flow B is the "water flow from the indoor unit to the storage tank for domestic hot water" (phase on red wire).

Electrically connect the three-way valve as follows.

Follow Phase 1, Phase 2 and Phase 3 of the procedure below.

- Phase 1. Connect the blue wire (neutral) to terminal 25.
- Phase 2. Connect the brown wire (phase) to terminal 26.
- Phase 3. Connect the red wire to switch water flow for domestic hot water.



WARNING

- The 3-way valve selects the storage tank circuit when wire (ON) and wire (N) are powered.
- The 3-way valve selects the underfloor circuit when wire (OFF) and wire (N) are powered.
- (ON): Phase signal (storage tank circuit) from main board to three-way valve
- (OFF): Phase signal (heating system) from main board to three-way valve
- (N): Neutral signal from main board to three-way valve

DHW storage tank temperature sensor

Connection to Electronic board AP1, connector **CN9-CN10**



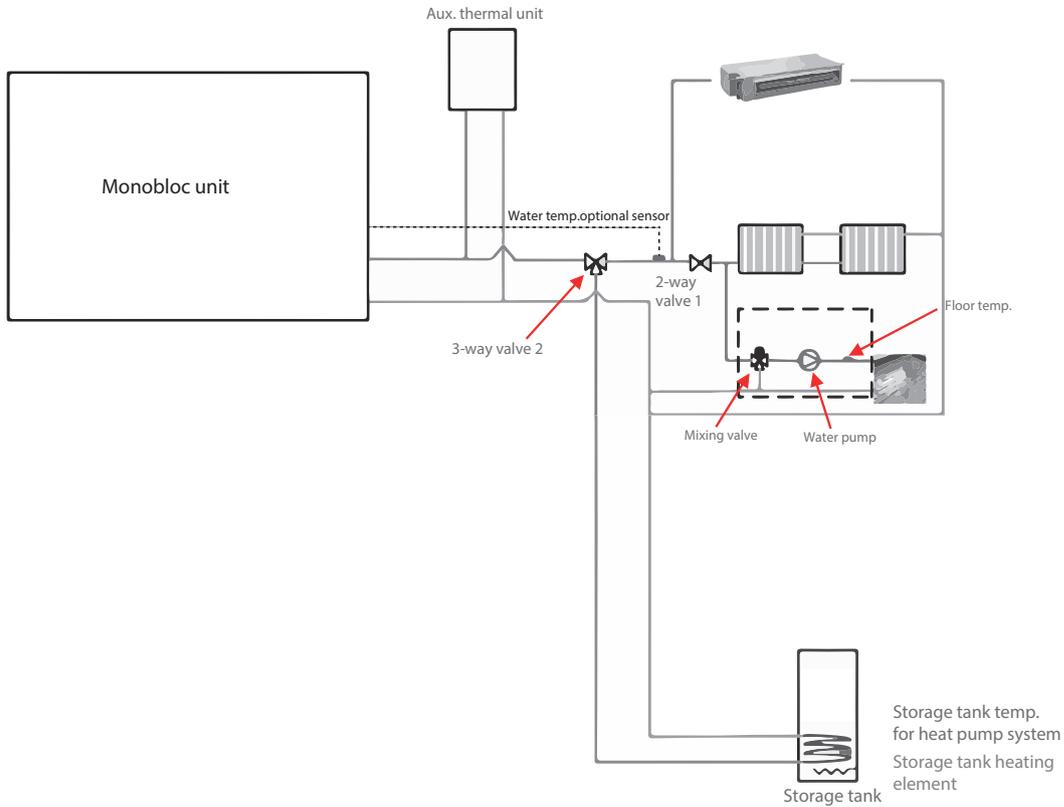
16. Aux. thermal unit

The appliance allows the connection of an auxiliary thermal unit, which can be controlled so that the main board delivers 230 V when the outside temperature is lower than the set value for activating the auxiliary heat source.

Note: It is NOT possible to install an auxiliary thermal unit together with an optional electric heater.

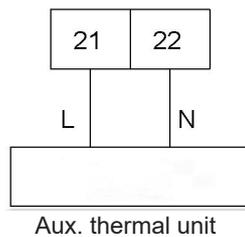
Phase 1. Installation of an auxiliary thermal unit

The auxiliary thermal unit must be installed in parallel to the monobloc unit. Moreover, an optional sensor must be installed for water temperature (5 metre long), available as an accessory.

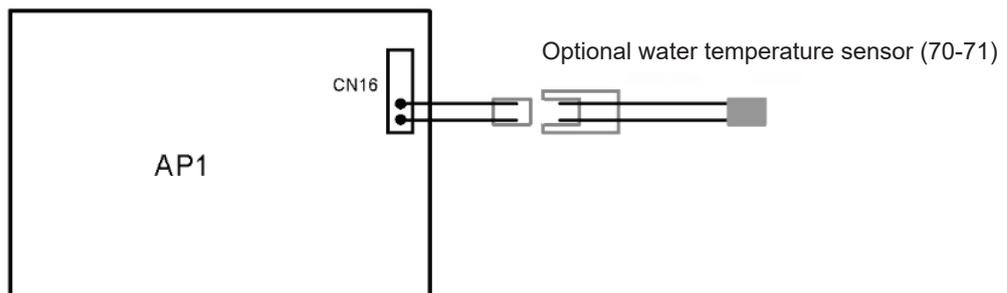


Phase 2. Electrical connection

Connect L and N wires of the auxiliary thermal unit to XT3~21,22.

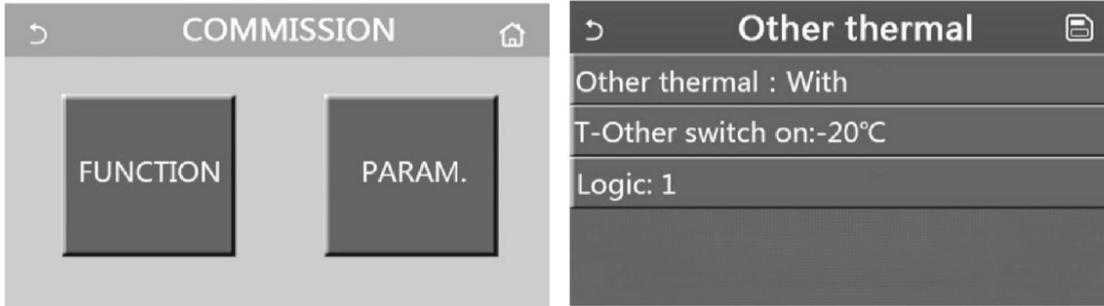


Connect the optional water temperature sensor to AP1 CN16.



Phase 3. Setting the wired control

If necessary, select "With" for "Other thermal" parameter within COMMISSION → FUNCTION, then set (outdoor) temperature switch and control logic (1/2/3).

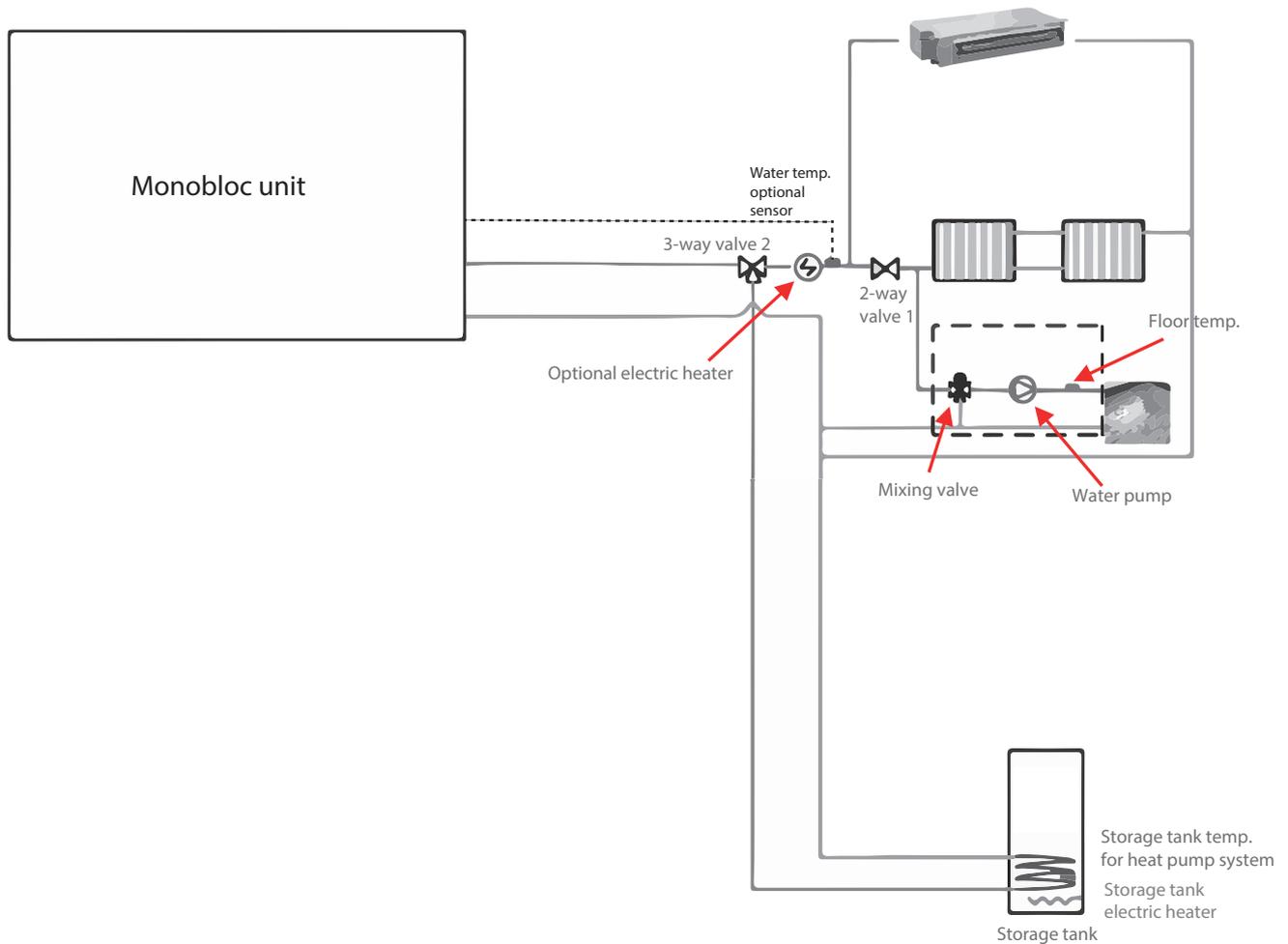


17. Optional electric heater

The appliance allows connecting an optional electric heater, which can be controlled so as to activate when the outdoor temperature is lower than the set ON value.

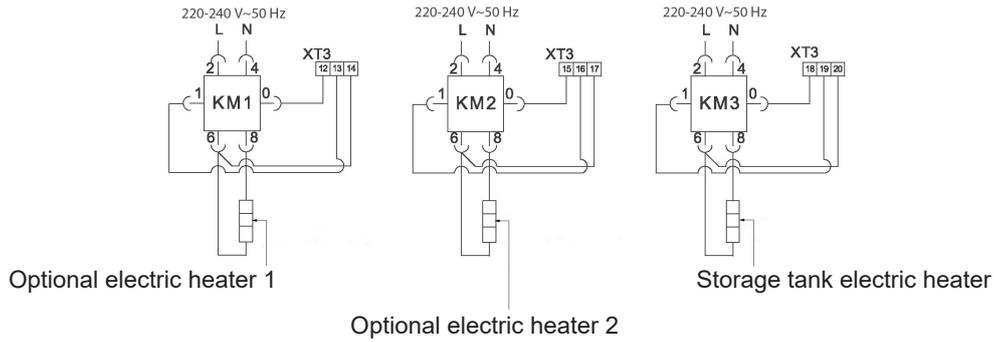
Phase 1. Installing the optional electric heater

The optional electric heater must be installed in series to the monobloc unit. Moreover, an optional sensor must be installed for water temperature (5 metre long), available as an accessory. The optional electric heater can belong to group 1 or 2 and can work for room heating only.

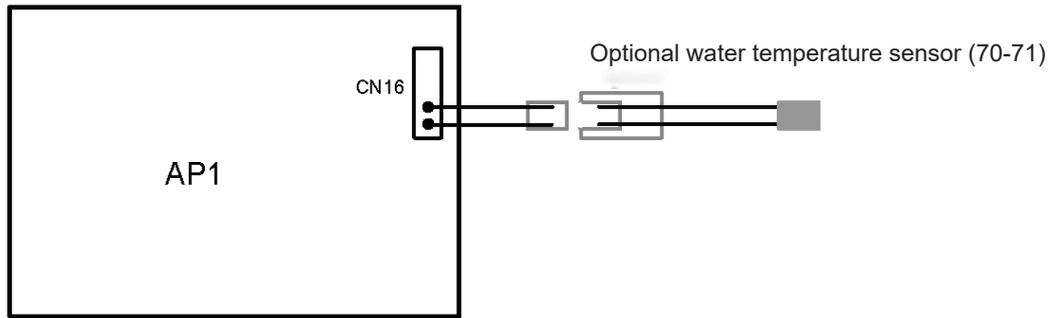


Phase 2. Electrical connection

The AC contactor (Relay) must be installed in XT3 KM1 (group 1 electric heater) or KM1 and KM2 (group 2 electric heater).

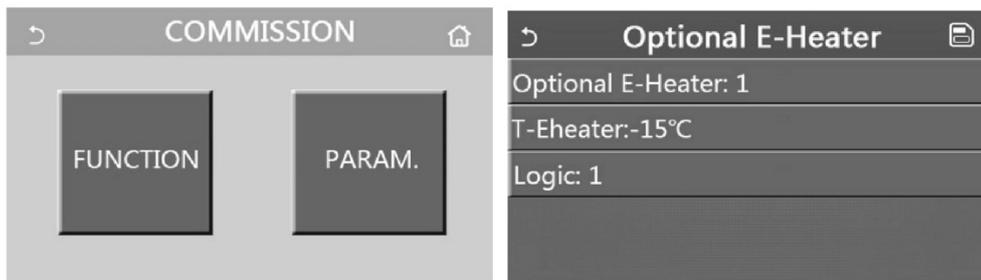


Connect the optional water temperature sensor to AP1 CN16.



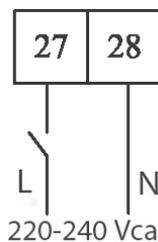
Phase 3. Setting the wired control

If necessary, select group "1/2" for "Optional E-Heater" parameter within COMMISSION → FUNCTION, then set (outdoor) temperature switch and control logic (1/2).



18. Door control unit

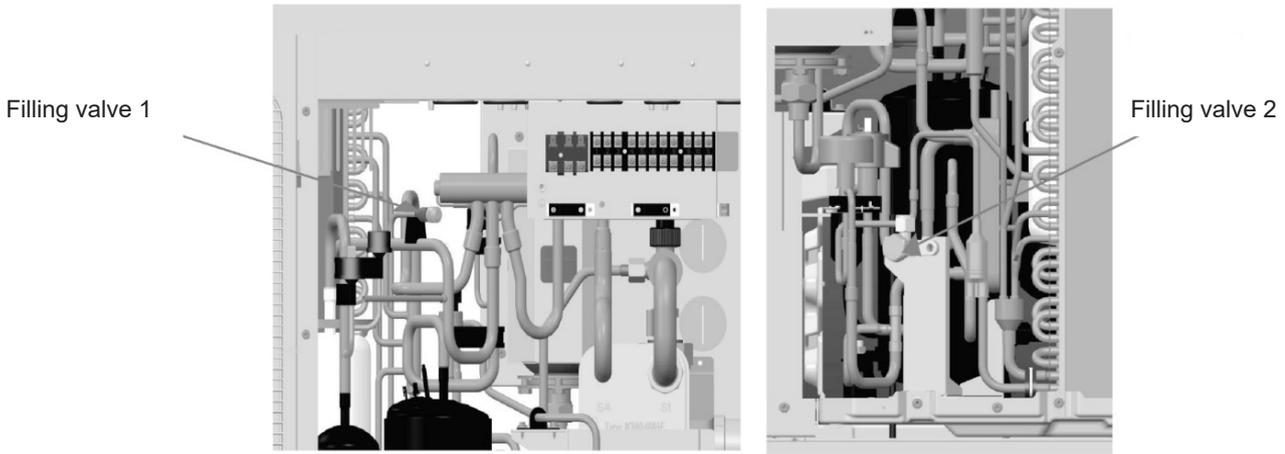
If a door control function is available, install as follows:



19. Refrigerant filling and draining

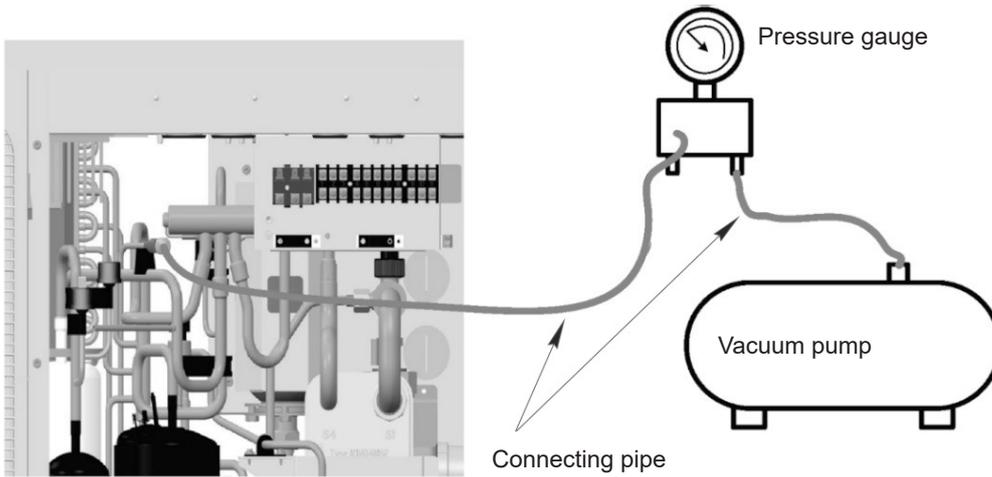
The unit is filled with refrigerant before delivery. Overfilling or underfilling will cause compressor malfunction or damage. When refrigerant shall be filled or drained for installation, maintenance or other purposes, proceed as described below and use the nominal filling volume specified on the appliance rating plate.

Drain: remove the metal plates of the external housing, connect a tube to the filling valve, then drain the refrigerant.



Notes

- Drain can be performed only if the unit has been stopped. (Switch off the unit and switch it back on after 1 minute)
- When draining, it is recommended to take protective measures to avoid any burns from frost.
- Should it not be possible to immediately create vacuum when draining is completed, remove the tube to avoid that air or foreign objects could get into the unit.
- Vacuum: after draining the unit, use suitable hoses to connect the filling valve, the pressure gauge and the vacuum pump to create vacuum inside the unit.



Note

After creating vacuum, the pressure inside the unit should be kept below 80 Pa for at least 30 minutes to ensure that there are no leaks. Load valve 1 or load valve 2 can be used to create vacuum.

Fill: After creating vacuum and checking for leaks, you can proceed with the filling operation.

Methods for detecting leaks:

1. The following leak detection methods are considered acceptable for systems containing flammable refrigerants.
2. For the detection of flammable refrigerants, electronic leak detectors must be used, but their sensitivity may not be adequate or may require recalibration (detectors must be calibrated in a room free of refrigerant).
3. Ensure that the detector is not a potential source of ignition and is suitable for the refrigerant.
4. Leak detection equipment must be configured to a percentage of the lower flammable limit (LFL) of the refrigerant and be calibrated for the refrigerant used including a check of the appropriate gas percentage (max. 25%).
5. Leak detection liquids are suitable for use with most refrigerants; however, the use of detergents containing chlorine should be avoided as the latter may react with the refrigerant and corrode copper piping.
6. If a leak is suspected, remove/extinguish all open flames. If there is a refrigerant leak that requires welding, all refrigerant must be removed from the system or isolated (using shut-off valves) in a part of the system away from the leak. Oxygen-free nitrogen (OFN) must be removed from the system both before and during the welding process.

Note

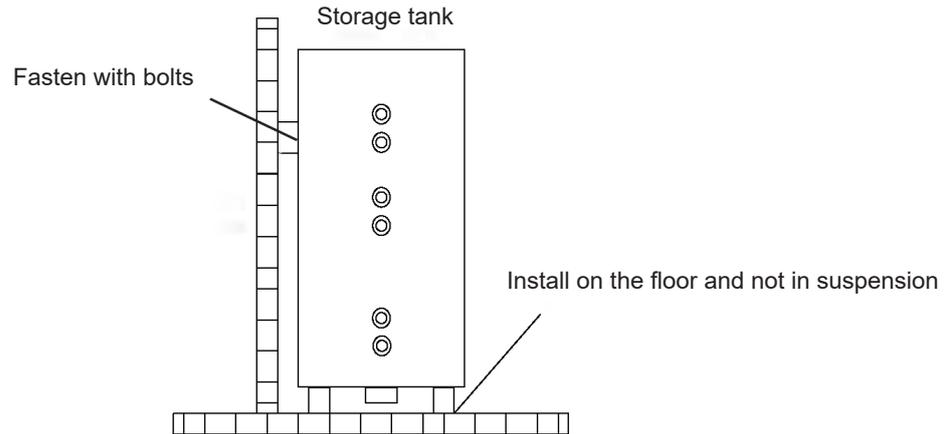
Before and during operation, use a suitable refrigerant leak detector to monitor the operating area and ensure that technicians are aware of any potential or actual flammable gas leaks. Ensure that the leak detector is suitable for flammable refrigerants. For instance, it must not create sparks and must be fully sealed and safe.

20. Installing a sealed storage tank

20.1 Installation sizes

The sealed water storage tank must be installed and held horizontally within 5 m and vertically within 3 m from the indoor unit. It can be installed in the room.

The storage tank must be installed vertically, with the support base resting on the floor and never suspended. The installation base must be sturdy enough and the storage tank must be bolted to the wall to avoid vibration, as shown in the figure below. During installation, also consider storage tank capacity.

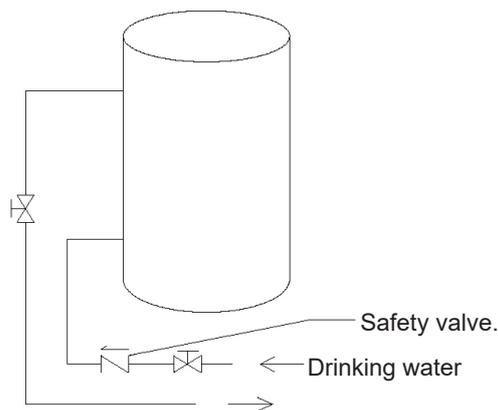


The minimum distance between the water storage tank and the combustible surface must be 500 mm.

Water pipe, hot water fitting and a floor drain must be close to the storage tank in order to make it easier to fill water, deliver hot water and drain the storage tank.

Connecting the inlet/outlet ducts: connect unit safety valve (with the arrow facing the storage tank) at storage tank inlet using the PPR pipe, as shown in the figure below, and seal using non-sintered tape. The other end of the safety valve must be connected to drinking water fitting. Connect hot water pipe and storage tank outlet using the PPR pipe.

Install a device for protecting the system against maximum pressure.



Note

- For water safe use, it is recommended to connect the storage tank outlet and/or inlet using a certain PPR pipe length, $L \geq 70 \times R^2$ (in cm, where R is pipe inside radius). Moreover, to preserve heat, metal pipes should be avoided. Upon first use, fill the storage tank before switching the unit on.
- Some water could leak out of the drain pipe of the pressure relief device and that pipe must be open to the environment.
- The pressure relief device must be regularly activated to remove scale build-up and make sure it is not obstructed.

- The drain pipe connected to the pressure relief device must always be installed aiming down and in a frost-free environment.
- The appliance is intended to be connected to the hydraulic mains permanently and not by means of a connecting pipe.
- The pressure relief device is type A3J and must be installed with a threaded fitting.
- The pressure of the water entering the storage tank must be greater than 0.2 MPa and less than 0.7 MPa.
- The instructions on the storage tank label must be strictly adhered to when draining the water.

As the pressure in the water heater gradually increases during the heating phase, a pressure relief valve must be installed. If this is not installed or is installed incorrectly, the water heater could become deformed or damaged and harm or cause damage to people, animals and/or property.

20.2 Connection of the hydraulic system

- If the connection between the water storage tank and the indoor unit must pass through a wall, drill a $\phi 70$ hole for the circulating water pipe. If a hole is not required, this step is not necessary.
- Piping preparation: the circulating water inlet/outlet pipes must be suitable for hot water.
- Installation of inlet/outlet pipes for circulating water: connect the water inlet of the unit with the outlet of the storage tank for circulating water, and connect the water outlet of the unit with the inlet of the storage tank for circulating water.
- Installation of the storage tank inlet/outlet pipes: a safety valve, filter and shut-off valve must be installed for the water inlet pipe in accordance with the installation diagram of the unit. At least one shut-off valve is required for the water outlet pipe.
- Installation of drain pipes at the base of the storage tank: connect a length of PPR pipe with drain outlet to the floor drain opening. A shut-off valve must be installed in the middle of the drain pipe, at a point where it can be easily operated by users.
- After connecting the water lines, first carry out a leak test to ensure that there are no leaks. Next, join the water pipes, water temperature sensor and electrical wires using the cable ties supplied with the unit.

Notes

- Water lines may only be installed after the water heating unit has been secured in place. Avoid ingress of dust and other foreign particles into the pipe system when installing the connecting pipes.
- After connecting the water lines, first carry out a leak test to ensure that there are no leaks. Next, proceed with the thermal insulation of the hydraulic system, paying particular attention to the valves and fittings. The insulation tape must be sufficiently thick. If necessary, install a pipe heating device to prevent possible frost damage.
- The hot water delivered from the insulated storage tank depends on the pressure of the water tap, so there must be a running water supply.
- During use, the cooling water inlet shut-off valve of the storage tank must remain normally open.

20.3 Water quality requirements

Parameter	Value	Unit
pH (25°C)	6,8~8,0	
Impurities	< 1	NTU
Chlorides	< 50	mg/L
Fluorides	< 1	mg/L
Iron	< 0,3	mg/L
Sulphates	< 50	mg/L
SiO ₂	< 30	mg/L
Hardness (amount of CaCO ₃)	< 70	mg/L
Nitrates (amount of N)	< 10	mg/L
Conductance (@25 °C)	< 300	µs/cm
Ammonia (amount of N)	< 0,5	mg/L
Alkalinity (amount of CaCO ₃)	< 50	mg/L
Sulphides	Not detectable	mg/L
Oxygen consumption	< 3	mg/L
Sodium	< 150	mg/L

20.4 Electrical connection

20.4.1 Connecting principle

General principles

- The wires, equipment and connectors provided for use on site must comply with regulations and design technical requirements.
- On site electrical connections can only be performed by qualified electricians.
- Disconnect the system from the mains before starting any connection.
- The installer will be liable for any loss or damage resulting from incorrect connection of the external circuit.
- Warning — MANDATORY use of copper wires.
- Connecting the power cable to the unit electrical panel
- Power cables must be laid in chases, tubes or cableways.
- The power cables to be connected to the electric cabinet must be protected with rubber or plastic parts to prevent any scratching from metal sheet edges.
- The power cables close to the unit electric cabinet must be securely fastened to prevent the cabinet power terminal from undergoing any strains.
- The power cable must be reliably connected to ground.

20.4.2 Power cable and residual current circuit breaker specifications

The table below gives all recommended specifications for power cables and residual current circuit breakers.

Model	Power supply	Air break switch	Min.cross-section of ground cable	Min.cross-section of power cable
	V, Phases, Hz	A	mm ²	mm ²
PROCIDA AWM X6	220-240 VAC single-phase/50 Hz	16	1,5	2*1,5
PROCIDA AWM X8		16	1,5	2*1,5
PROCIDA AWM X10		32	4,0	2*4,0
PROCIDA AWM X12		32	4,0	2*4,0
PROCIDA AWM X14		40	4,0	2*4,0
PROCIDA AWM X16		40	4,0	2*4,0
PROCIDA AWM T10	380-415 VAC three-phase, 50 Hz	16	1,5	4*1,5
PROCIDA AWM T12		16	1,5	4*1,5
PROCIDA AWM T14		16	1,5	4*1,5
PROCIDA AWM T16		16	1,5	4*1,5

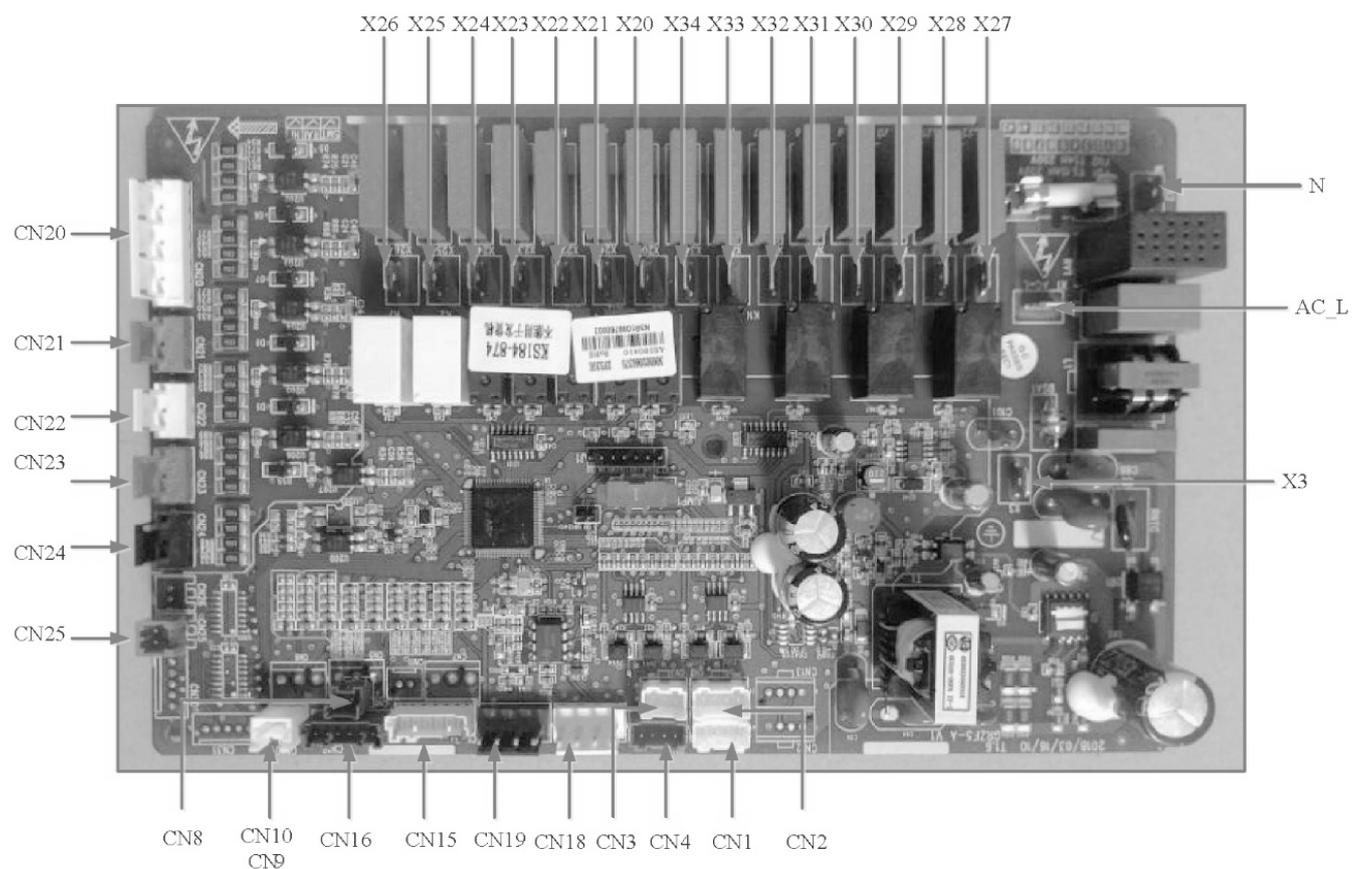
Notes

- The residual current circuit breaker is required for additional installations. When using circuit breakers with leakage current protection, the response time must be less than 0.1 seconds and the protection circuit must be 30 mA.
- The above diameters for the power cables have been determined on the assumption that the distance between the distribution cabinet and the unit is less than 75 m. If the cables are between 75 and 150 m apart, the diameter of the power cable must be increased by one degree.
- The power supply must have the same rated voltage as the unit and use a special power line for the air conditioner.
- All electrical installations must be carried out by professional technicians, in compliance with local regulations and laws.
- Ensure that the grounding is reliable; the ground wire must be connected to the protection devices of the building and must be installed by professional technicians.
- The circuit breaker and power cable specifications in the table above are determined according to the maximum power (maximum amperes) of the unit.
- The power cable specifications in the above table refer to a multi-wire copper cable protected by a cableway (insulated copper cable type YJV) used at 40 °C and resistant up to 90 °C (see IEC 60364-5-52). If the conditions of use change, the wiring must be modified according to the applicable national regulations.
- The specifications for the residual current circuit breaker in the above table refer to an operating temperature of 40 °C. If the operating conditions change, the wiring must be modified according to the applicable national regulations.

21. Wiring diagram

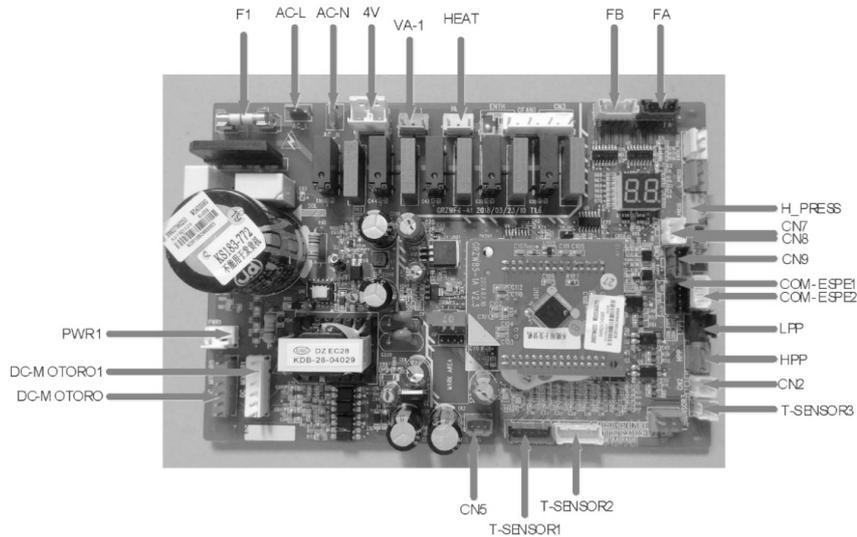
21.1 Control board

(1) PROCIDA AWM X6, PROCIDA AWM X8



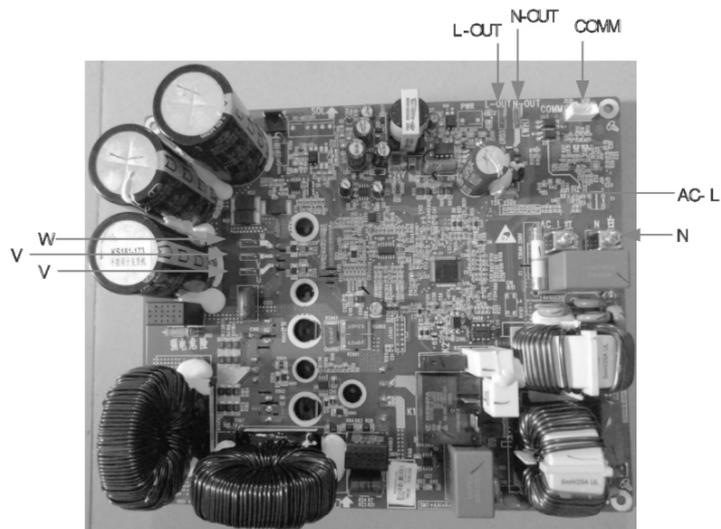
AP1 board

Marked ID	Description
AC-L	Phase wire of power cable
N	Neutral wire of power cable
X3	Ground
X20	Storage tank electric heater
X21	Electric heater 1
X22	Electric heater 2
X23	220 VAC auxiliary heater
X24	Reserved
X25	Electric heater for plate heat exchanger
X26	Reserved
X27	The two-way electromagnetic valve 1 is normally open
X28	The two-way electromagnetic valve 1 is normally closed
X29	Load control at high power
X30	Load control at high power
X31	The three-way electromagnetic valve 1 is normally open (reserved)
X32	The three-way electromagnetic valve 1 is normally closed (reserved)
X33	The three-way electromagnetic valve 2 is normally open (storage tank)
X34	The three-way electromagnetic valve 2 is normally closed (storage tank)
CN30	Signals 1, 2, 3, 4, power 5
CN31	Signals 1, 2, 3, 4, power 5
CN18	Interface for variable frequency water pump
CN19	Interface for variable frequency water pump
CN15	Temperature sensor 20 K (inlet water)
CN15	Temperature sensor 20 K (outlet water)
CN15	Temperature sensor 20 K (refrigerant liquid line)
CN16	Temperature sensor 20 K (refrigerant vapour line)
CN16	Temperature sensor 10 K (outlet water for auxiliary electric heater)
CN16	Temperature sensor 20 K (reserved)
CN8	Temperature sensor 15 K (ambient) (CN5)
CN9	Temperature sensor 10 K (ambient) (CN6)
CN7	Temperature sensor
CN6	Temperature sensor (CN9)
CN5	Temperature sensor (CN8)
CN20	Thermostat
CN21	Detection of welding protection for auxiliary electric heater 1
CN22	Detection of welding protection for auxiliary electric heater 2
CN23	Detection of welding protection for storage tank electric heater
CN24	Door safety detection
CN25	Flow switch
CN26	Reserved
CN1	485-112 V 4 pins
CN2	Communication 485-1 without 12 V - 4 pins
CN3	Communication 485-2 without 12 V - 3 pins
CN4	Communication 485-2 with 12 V 4 pins (wired control - control panel)



AP2 board

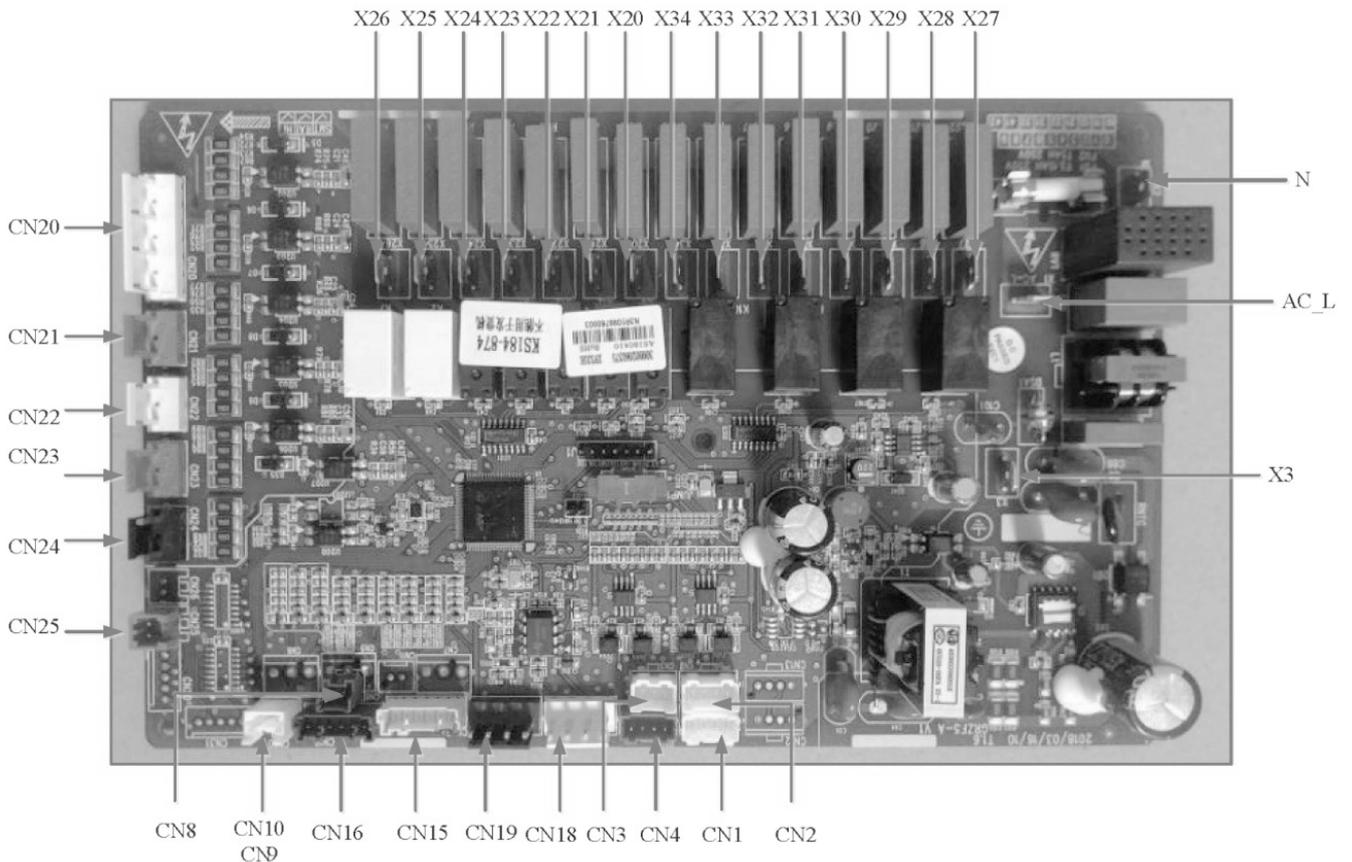
Marked ID	Description
AC-L	Phase wire of power input
N	Neutral wire of power input
PWR1	310 V power supply - 310 V DC power upon start-up
F1	Fuse
4V	4-way valve
VA-1	Chassis electric heater
HEAT	Electric heating tape
DC-MOTORO	Pin 1: Fan power supply; Pin 3: Fan GND; Pin 4: +15 V; Pin 5: Control signal; Pin 6: Feedback signal; Pin 1 DC fan: high-voltage power supply; Pin 3: Fan GND; Pin 4: +15 V; Pin 5: Control signal; Pin 6: Feedback signal
DC-MOTORO1	Pin 1: Fan power supply; Pin 3: Fan GND; Pin 4: +15 V; Pin 5: Control signal; Pin 6: Feedback signal; Pin 1 DC fan: high-voltage power supply; Pin 3: Fan GND; Pin 4: +15 V; Pin 5: Control signal; Pin 6: Feedback signal
FA	1, 2, 3, 4: Signals; 5: Power supply to EXV1, pipe electric expansion valve; Pin 1-4: Drive pulse output; Pin 5: +12 V
FB	1, 2, 3, 4: Signals; 5: Power supply to EXV2, pipe electric expansion valve; Pin 1-4: Drive pulse output; Pin 5: +12 V
T_SENSOR2	1, 2: Ambient; 3, 4: Discharge; 5, 6: Suction; Holes 1, 2: Tube temperature; Holes 3, 4: Ambient; Holes 5, 6: Discharge
T_SENSOR1	1, 2: Economizer inlet; 3, 4: Economizer outlet; 5, 6: Defrost
H_PRESS	Pin 1: Ground; Pin 2: Signal; Pin 3: input of pressure sensor +5V signal; Pin 1: GND; Pin 2: Signal input; Pin 3: +5 V
HPP	Pin 1: +12 V, Pin 3: Signal
LPP	Pin 1: +12 V, Pin 3: Signal
CN2	Pin 1: +12 V, Pin 2: Signal
CN7	Pin 1: Ground, Pin 2: B; Pin 3: Communication A between AP1 and AP2; Pin 2 communication cable: B; Pin 3: A
CN8	Pin 1: 12 V, Pin 2: B; Pin 3: A, Pin 4: Ground; To wired control, communication cable: Pin 1: Ground, Pin 2: B, Pin 3: A, Pin 4: +12 V power supply;
CN9	Pin 1: +12 V, Pin 2: B; Pin 3: A, Pin 4: ground
COM_ESPE1	Pin 1: +3.3 V, Pin 2: TXD, Pin 3: RXD, Pin 4: Ground
COM_ESPE2	Pin 1: +3.3 V, Pin 2: TXD, Pin 3: RXD, Pin 4: Ground
CN5	Pin 1: Ground, Pin 2: +18 V; Pin 3: +15 V



AP3 board

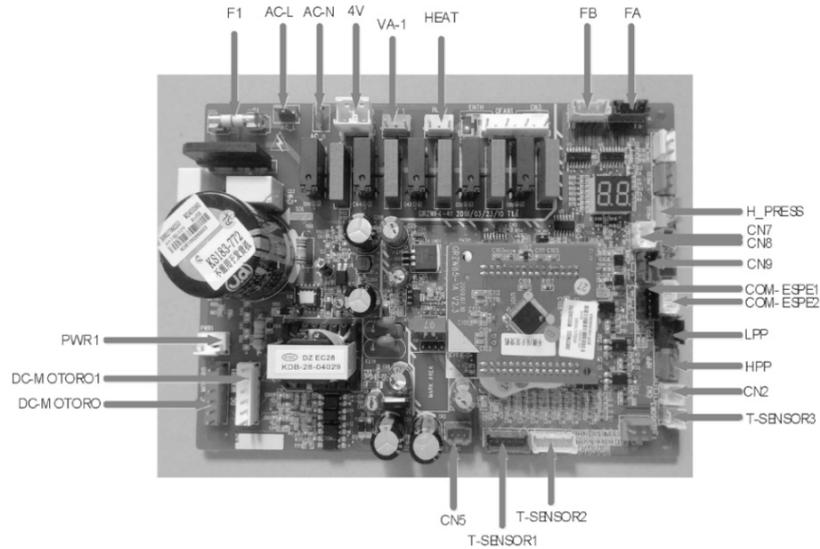
Marked ID	Description
AC-L	Phase line input
N	Neutral line input
L-OUT	Phase line output
N-OUT	Neutral line output
COMM	Communication
U	To compressor phase U
V	To compressor phase V
W	To compressor phase W

(2) PROCIDA AWM X10, PROCIDA AWM X12, PROCIDA AWM X14, PROCIDA AWM X16



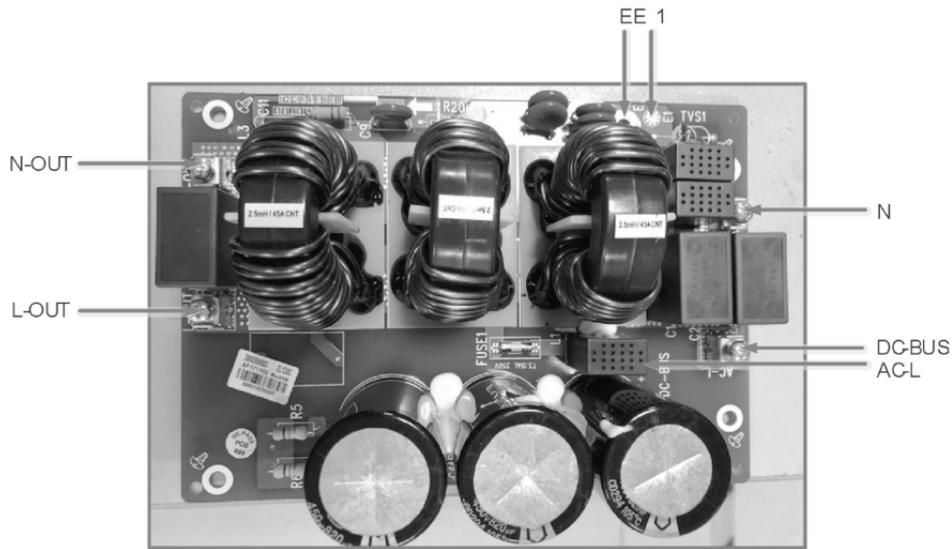
AP1 board

Marked ID	Description
AC-L	Phase wire of power cable
N	Neutral wire of power cable
X3	Ground
X20	Storage tank electric heater
X21	Electric heater 1
X22	Electric heater 2
X23	220 VAC auxiliary heater
X24	Reserved
X25	Electric heater for plate heat exchanger
X26	Reserved
X27	The two-way electromagnetic valve 1 is normally open
X28	The two-way electromagnetic valve 1 is normally closed
X29	Load control at high power
X30	Load control at high power
X31	The three-way electromagnetic valve 1 is normally open (reserved)
X32	The three-way electromagnetic valve 1 is normally closed (reserved)
X33	The three-way electromagnetic valve 2 is normally open (storage tank)
X34	The three-way electromagnetic valve 2 is normally closed (storage tank)
CN30	Signals 1, 2, 3, 4, power 5
CN31	Signals 1, 2, 3, 4, power 5
CN18	Interface for variable frequency water pump
CN19	Interface for variable frequency water pump
CN15	Temperature sensor 20 K (inlet water)
CN15	Temperature sensor 20 K (outlet water)
CN15	Temperature sensor 20 K (refrigerant liquid line)
CN16	Temperature sensor 20 K (refrigerant vapour line)
CN16	Temperature sensor 10 K (outlet water for auxiliary electric heater)
CN16	Temperature sensor 20 K (reserved)
CN8	Temperature sensor 15 K (ambient) (CN5)
CN9-10	Temperature sensor 10 K (DHW storage tank)
CN7	Temperature sensor
CN6	Temperature sensor (CN9)
CN5	Temperature sensor (CN8)
CN20	Thermostat
CN21	Detection of welding protection for auxiliary electric heater 1
CN22	Detection of welding protection for auxiliary electric heater 2
CN23	Detection of welding protection for storage tank electric heater
CN24	Door safety detection
CN25	Flow switch
CN26	Reserved
CN1	485-112 V 4 pins
CN2	Communication 485-1 without 12 V - 4 pins
CN3	Communication 485-2 without 12 V - 3 pins
CN4	Communication 485-2 with 12 V 4 pins (wired control - control panel)



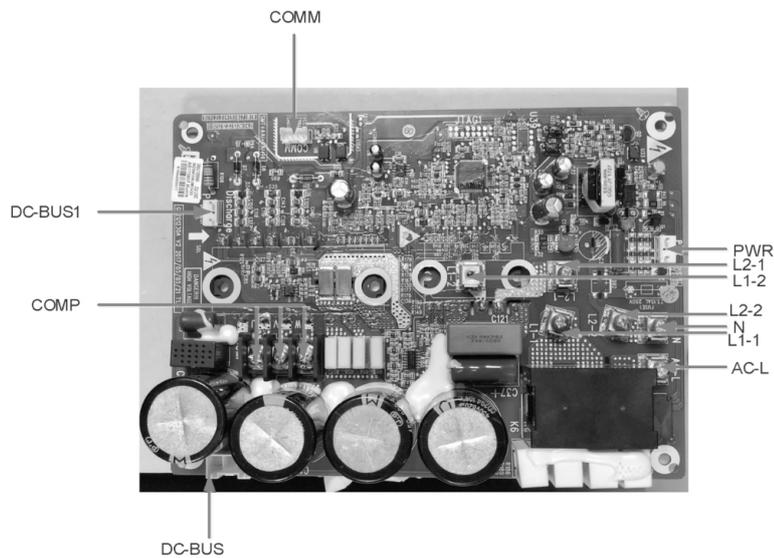
AP2 board

Marked ID	Description
AC-L	Phase wire of power input
N	Neutral wire of power input
PWR1	310 V power supply - 310 V DC power upon start-up
F1	Fuse
4V	4-way valve
VA-1	Chassis electric heater
HEAT	Electric heating tape
DC-MOTORO	Pin 1: Fan power supply; Pin 3: Fan GND; Pin 4: +15 V; Pin 5: Control signal; Pin 6: Feedback signal; Pin 1 DC fan: high-voltage power supply; Pin 3: Fan GND; Pin 4: +15 V; Pin 5: Control signal; Pin 6: Feedback signal
DC-MOTORO1	Pin 1: Fan power supply; Pin 3: Fan GND; Pin 4: +15 V; Pin 5: Control signal; Pin 6: Feedback signal; Pin 1 DC fan: high-voltage power supply; Pin 3: Fan GND; Pin 4: +15 V; Pin 5: Control signal; Pin 6: Feedback signal
FA	1, 2, 3, 4: Signals; 5: Power supply to EXV1, pipe electric expansion valve; Pin 1-4: Drive pulse output; Pin 5: +12 V
FB	1, 2, 3, 4: Signals; 5: Power supply to EXV2, pipe electric expansion valve; Pin 1-4: Drive pulse output; Pin 5: +12 V
T_SENSOR2	1, 2: Ambient; 3, 4: Discharge; 5, 6: Suction; Holes 1, 2: Tube temperature; Holes 3, 4: Ambient; Holes 5, 6: Discharge
T_SENSOR1	1, 2: Economizer inlet; 3, 4: Economizer outlet; 5, 6: Defrost
H_PRESS	Pin 1: Ground; Pin 2: Signal; Pin 3: input of pressure sensor +5V signal; Pin 1: GND; Pin 2: Signal input; Pin 3: +5 V
HPP	Pin 1: +12 V, Pin 3: Signal
LPP	Pin 1: +12 V, Pin 3: Signal
CN2	Pin 1: +12 V, Pin 2: Signal
CN7	Pin 1: Ground, Pin 2: B; Pin 3: Communication A between AP1 and AP2; Pin 2 communication cable: B; Pin 3: A
CN8	Pin 1: 12 V, Pin 2: B; Pin 3: A, Pin 4: Ground; To wired control, communication cable: Pin 1: Ground, Pin 2: B, Pin 3: A, Pin 4: +12 V power supply;
CN9	Pin 1: +12 V, Pin 2: B, Pin 3: A, Pin 4: ground
COM_ESPE1	Pin 1: +3.3 V, Pin 2: TXD, Pin 3: RXD, Pin 4: Ground
COM_ESPE2	Pin 1: +3.3 V, Pin 2: TXD, Pin 3: RXD, Pin 4: Ground
CN5	Pin 1: Ground, Pin 2: +18 V; Pin 3: +15 V



AP3 board

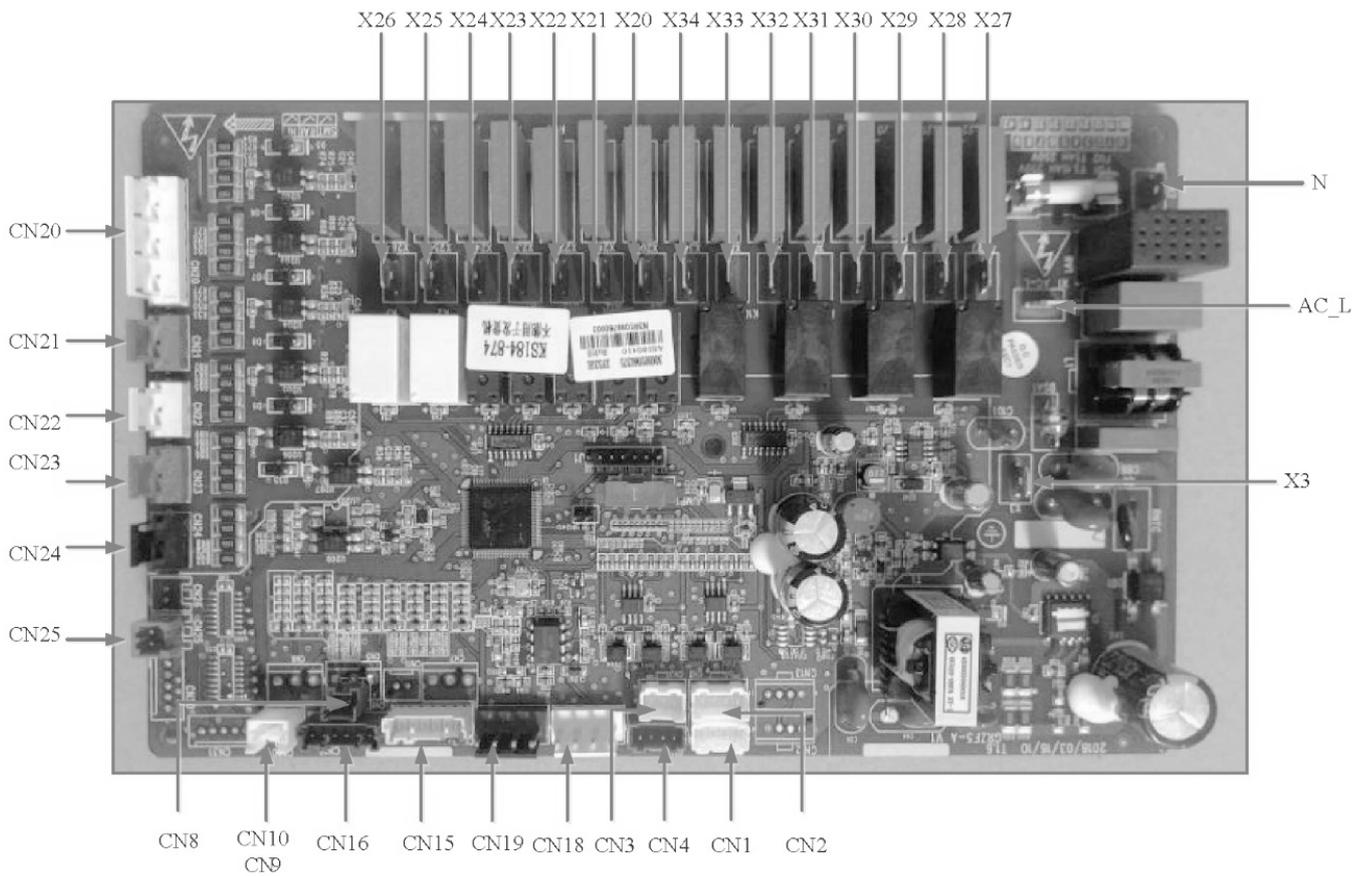
Marked ID	Description
AC-L	Main board phase line input
N	Power supply neutral line for main board
L-OUT	Filter board phase line output (to driver and main boards)
N-OUT	Filter board neutral line output (to driver board)
N-OUT1	Neutral line output
L-OUT1	Phase line output
DC-BUS	DC-BUS, other side of drive board
E	Threaded hole for grounding
E1	Ground line, reserved



AP2 board

NO	Marked ID	Description
1	AC-L	L-OUT Filter board phase line input
2	N	N-OUT Filter board neutral line input
3	L1-1	To brown line of PFC inductor
4	L1-2	To white line of PFC inductor
5	L2-1	To yellow line of PFC inductor
6	L2-2	To blue line of PFC inductor
7	COMP	Wiring board (pin 3) (DT-66BO1W-03) (variable frequency)
8	COMM	Communication interface [1-3.3 V, 2-TX, 3-RX, 4-GND]
9	DC-BUS	DC-BUS pin for electric discharge of the high-voltage bar during test
10	PWR	Drive board power supply input [1-GND, 2-18V, 3-15V]
11	DC-BUS1	Pin for electric discharge of the high-voltage bar during test

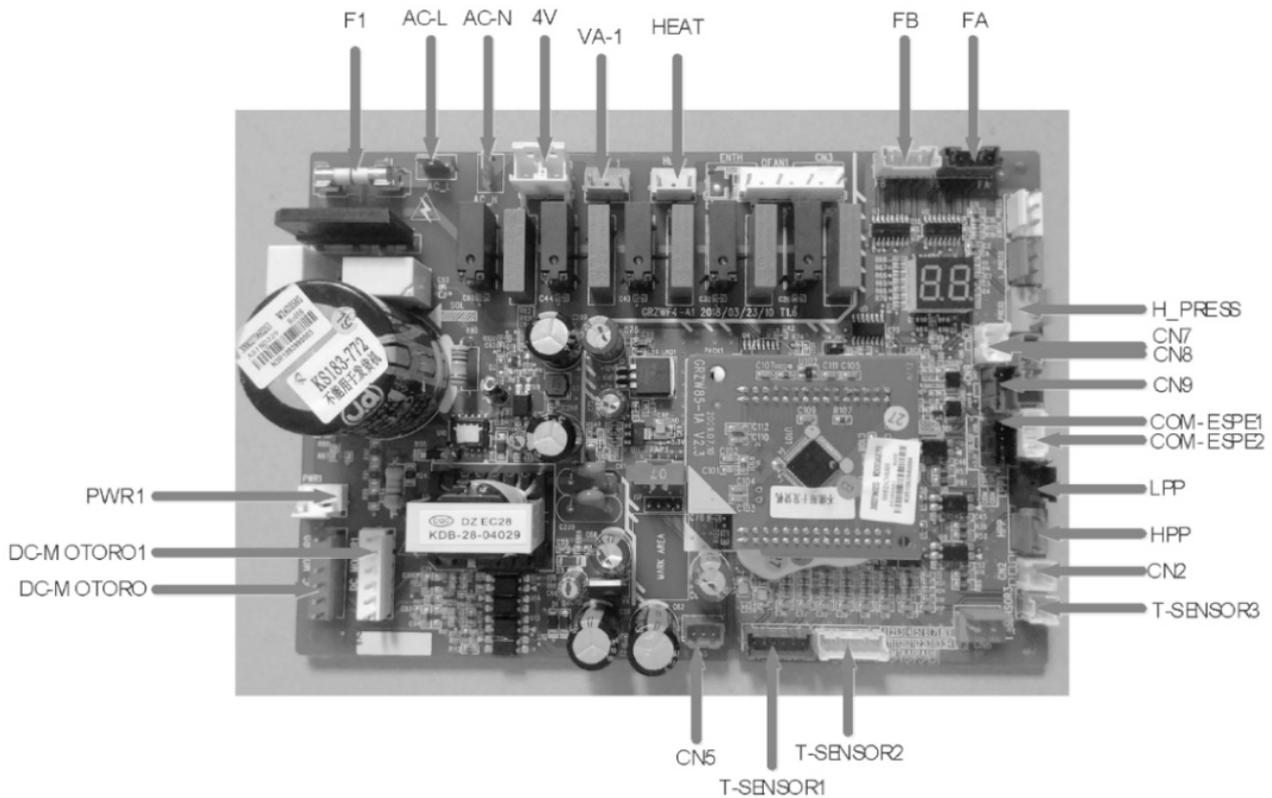
(3) PROCIDA AWM T10, PROCIDA AWM T12, PROCIDA AWM T14, PROCIDA AWM T16



AP1 board

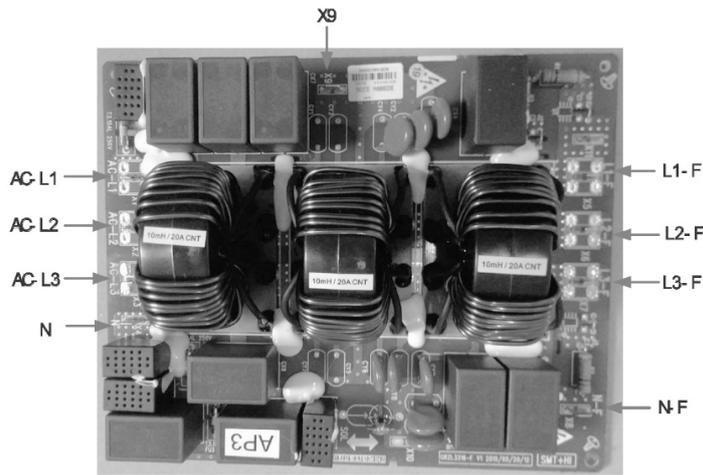
Marked ID	Description
AC-L	Phase wire of power cable
N	Neutral wire of power cable
X3	Ground
X20	Storage tank electric heater
X21	Electric heater 1
X22	Electric heater 2
X23	220 VAC auxiliary heater
X24	Reserved
X25	Electric heater for plate heat exchanger
X26	Reserved
X27	The two-way electromagnetic valve 1 is normally open
X28	The two-way electromagnetic valve 1 is normally closed
X29	Load control at high power
X30	Load control at high power
X31	The three-way electromagnetic valve 1 is normally open (reserved)

Marked ID	Description
X32	The three-way electromagnetic valve 1 is normally closed (reserved)
X33	The three-way electromagnetic valve 2 is normally open (storage tank)
X34	The three-way electromagnetic valve 2 is normally closed (storage tank)
CN30	Signals 1, 2, 3, 4, power 5
CN31	Signals 1, 2, 3, 4, power 5
CN18	Interface for variable frequency water pump
CN19	Interface for variable frequency water pump
CN15	Temperature sensor 20 K (inlet water)
CN15	Temperature sensor 20 K (outlet water)
CN15	Temperature sensor 20 K (refrigerant liquid line)
CN16	Temperature sensor 20 K (refrigerant vapour line)
CN16	Temperature sensor 10 K (outlet water for auxiliary electric heater)
CN16	Temperature sensor 20 K (reserved)
CN8	Temperature sensor 15 K (ambient) (CN5)
CN9-10	Temperature sensor 10 K (DHW storage tank)
CN7	Temperature sensor
CN6	Temperature sensor (CN9)
CN5	Temperature sensor (CN8)
CN20	Thermostat
CN21	Detection of welding protection for auxiliary electric heater 1
CN22	Detection of welding protection for auxiliary electric heater 2
CN23	Detection of welding protection for storage tank electric heater
CN24	Door safety detection
CN25	Flow switch
CN26	Reserved
CN1	485-112 V 4 pins
CN2	Communication 485-1 without 12 V - 4 pins
CN3	Communication 485-2 without 12 V - 3 pins
CN4	Communication 485-2 with 12 V 4 pins (wired control - control panel)



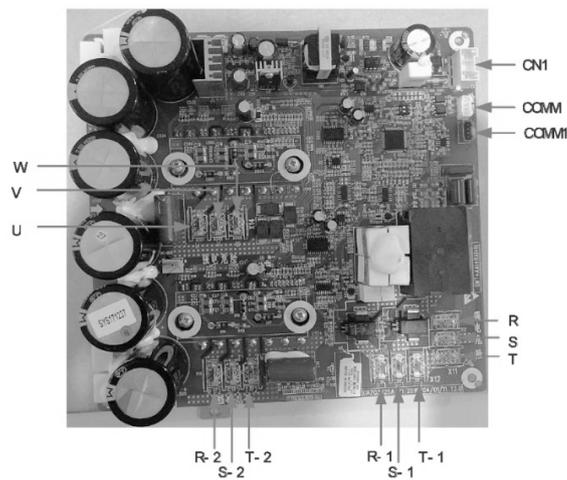
AP2 board

Marked ID	Description
AC-L	Phase wire of power input
N	Neutral wire of power input
PWR1	310 V power supply - 310 V DC power upon start-up
F1	Fuse
4V	4-way valve
VA-1	Chassis electric heater
HEAT	Electric heating tape
DC-MOTORO	Pin 1: Fan power supply; Pin 3: Fan GND; Pin 4: +15 V; Pin 5: Control signal; Pin 6: Feedback signal; Pin 1 DC fan: high-voltage power supply; Pin 3: Fan GND; Pin 4: +15 V; Pin 5: Control signal; Pin 6: Feedback signal
DC-MOTORO1	Pin 1: Fan power supply; Pin 3: Fan GND; Pin 4: +15 V; Pin 5: Control signal; Pin 6: Feedback signal; Pin 1 DC fan: high-voltage power supply; Pin 3: Fan GND; Pin 4: +15 V; Pin 5: Control signal; Pin 6: Feedback signal
FA	1, 2, 3, 4: Signals; 5: Power supply to EXV1, pipe electric expansion valve; Pin 1-4: Drive pulse output; Pin 5: +12 V
FB	1, 2, 3, 4: Signals; 5: Power supply to EXV2, pipe electric expansion valve; Pin 1-4: Drive pulse output; Pin 5: +12 V
T_SENSOR2	1, 2: Ambient; 3, 4: Discharge; 5, 6: Suction; Holes 1, 2: Tube temperature; Holes 3, 4: Ambient; Holes 5, 6: Discharge
T_SENSOR1	1, 2: Economizer inlet; 3, 4: Economizer outlet; 5, 6: Defrost
H_PRESS	Pin 1: Ground; Pin 2: Signal; Pin 3: input of pressure sensor +5V signal; Pin 1: GND; Pin 2: Signal input; Pin 3: +5 V
HPP	Pin 1: +12 V, Pin 3: Signal
LPP	Pin 1: +12 V, Pin 3: Signal
CN2	Pin 1: +12 V, Pin 2: Signal
CN7	Pin 1: Ground, Pin 2: B; Pin 3: Communication A between AP1 and AP2; Pin 2 communication cable: B; Pin 3: A
CN8	Pin 1: 12 V, Pin 2: B; Pin 3: A, Pin 4: Ground; To wired control, communication cable: Pin 1: Ground, Pin 2: B, Pin 3: A, Pin 4: +12 V power supply
CN9	Pin 1: +12 V, Pin 2: B, Pin 3: A, Pin 4: ground
COM_ESPE1	Pin 1: +3.3 V, Pin 2: TXD, Pin 3: RXD, Pin 4: Ground
COM_ESPE2	Pin 1: +3.3 V, Pin 2: TXD, Pin 3: RXD, Pin 4: Ground
CN5	Pin 1: Ground, Pin 2: +18 V; Pin 3: +15 V



AP3 board

Marked ID	Description
AC-L1	Power supply input L1
AC-L2	Power supply input L2
AC-L3	Power supply input L3
N	Power supply neutral line input
N-F	Power supply neutral line output
L1-F	Power supply line output L1-F (drive board L3-F)
L2-F	Power supply line output L2-F (drive board L3-F)
L3-F	Power supply line output L3-F (drive board L3-F)
X9	To ground line



AP4 board

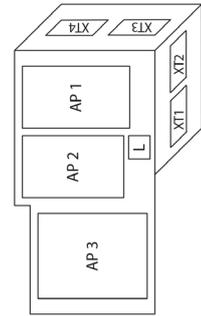
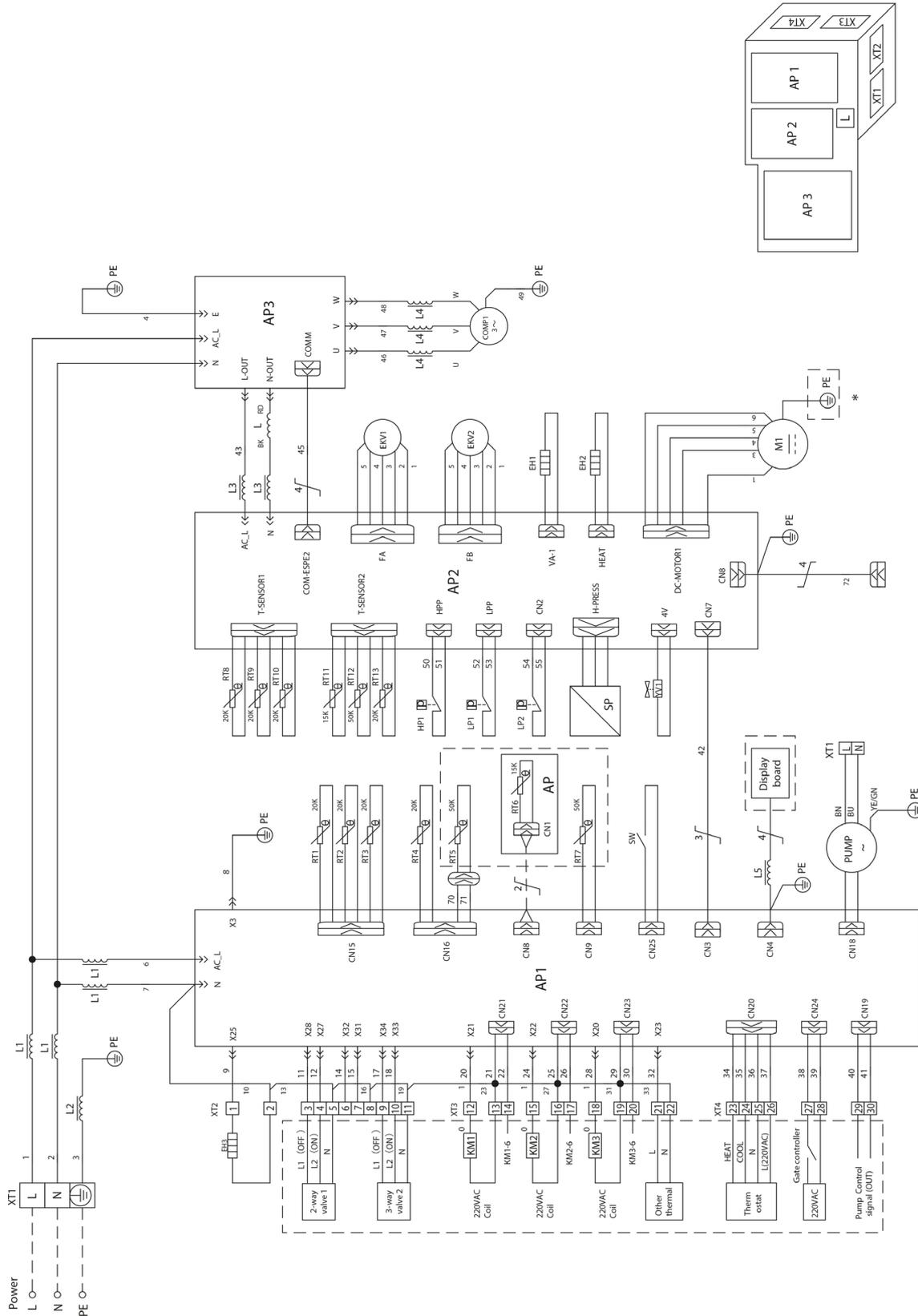
Marked ID	Description
W	Connection to compressor phase W
U	Connection to compressor phase U
V	Connection to compressor phase V
R-2	Connection to reactor (input)
S-2	
T-2	
R-1	Connection to reactor (input)
S-1	
T-1	
R	Connection to filter L1-F
S	Connection to filter L2-F
T	Connection to filter L3-F
COMM1	Reserved
COMM	Communication
CN1	Power supply switching input

21.2 Electrical connections

21.2.1 Electrical connections (refer to Wiring Diagram under the electric box cover)

PROCIDA AWM X6, PROCIDA AWM X8

Layout of electrical components

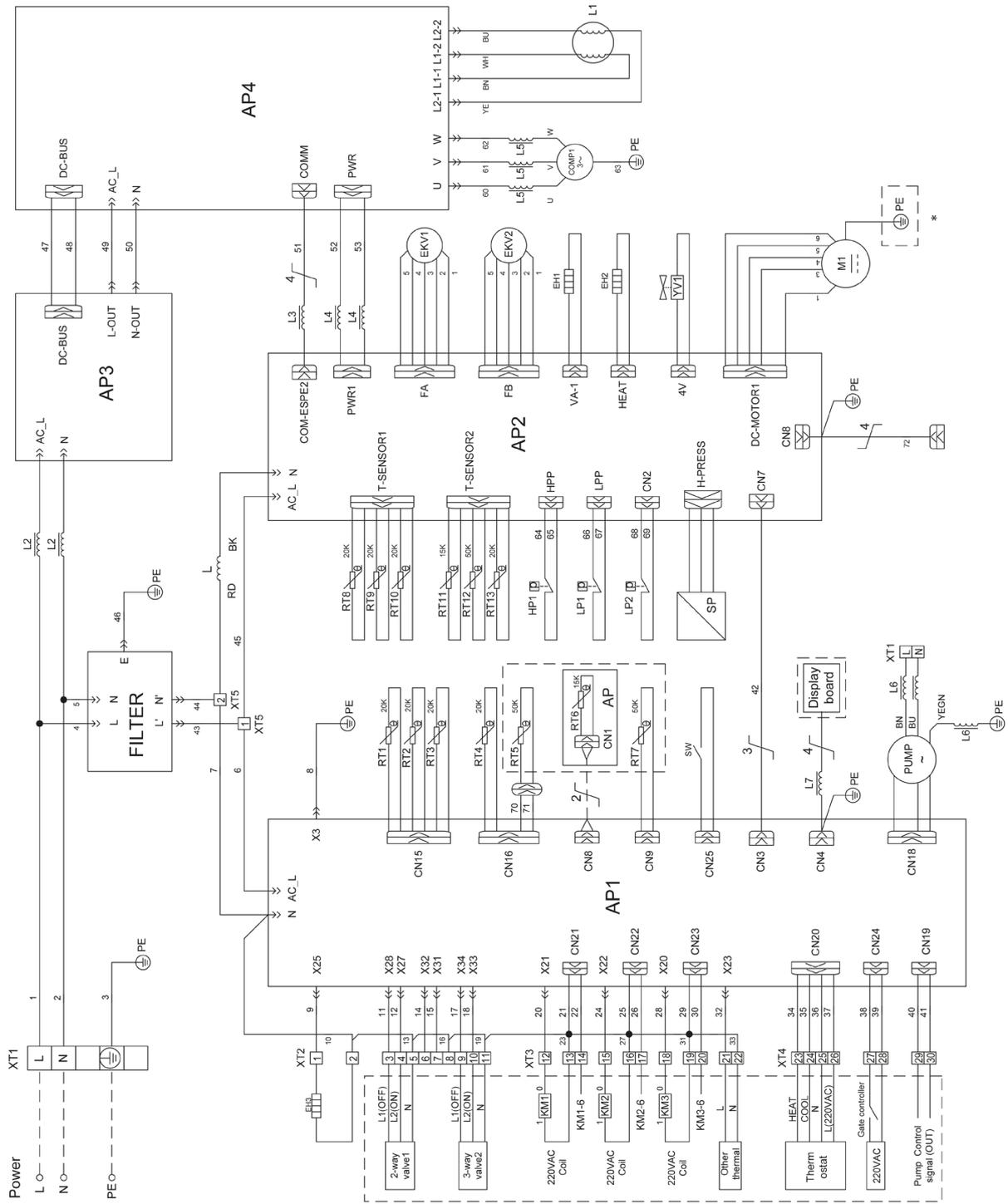


* The ground wire is available for motor having an iron housing, while it is not available for motor having a plastic housing

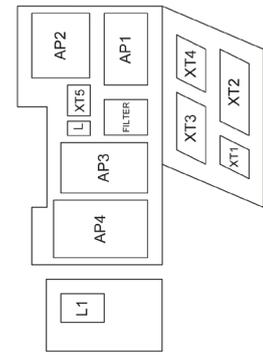
CODE	DESCRIPTION
AP	Main board - only for RT6
AP1	Indoor unit main board
AP2	Outdoor unit main board
AP3	Drive board
COMP1	Compressor
EH1	Bottom band heater
EH2	Compressor band heater
EH3	Antifreeze for plate heat exchanger
EKV1	Electronic expansion valve - coil 1
EKV2	Electronic expansion valve - coil 2
HP1	High pressure switch
KM1	AC contactor 1 Optional electric heater
KM2	AC contactor 2 Optional electric heater
KM3	Storage tank electric heater AC contactor
L	Electrical inductance
L1 - L5	Magnetic ring
LP1	Low pressure switch for heating
LP2	Low pressure switch for cooling
M1	Motor
PUMP	Indoor unit pump
RT1	Unit water inlet T sensor
RT2	Unit water outlet T sensor
RT3	Liquid tube T sensor
RT4	Gas pipe T sensor
RT5	Water T sensor - option
RT6	Remote ambient probe T sensor
RT7	Water heater temperature sensor
RT8	Economizer inlet T sensor
RT9	Economizer outlet T sensor
RT10	Defrost T sensor
RT11	External T sensor
RT12	Discharge T sensor
RT13	Suction T sensor
SP	High pressure sensor
SW	Flow rate switch
XT1	Power supply terminal board
XT2	Terminal board 1-11
XT3	Terminal board 12-22
XT4	Terminal board 23-30
YV1	4-way valve coil

Specifications

1. Terminal board wires must be connected on site.
2. KM1, KM2 is the AC contactor of auxiliary electric heater for the coil. If an auxiliary electric heater is required, connect terminal board (XT3) 12, 13, 14, 15, 16, 17.
3. KM3 is the AC contactor of auxiliary electric heater for the storage tank. If an auxiliary electric heater is required for the storage tank, connect terminal board (XT3) 18, 19, 20.



Layout of electrical components

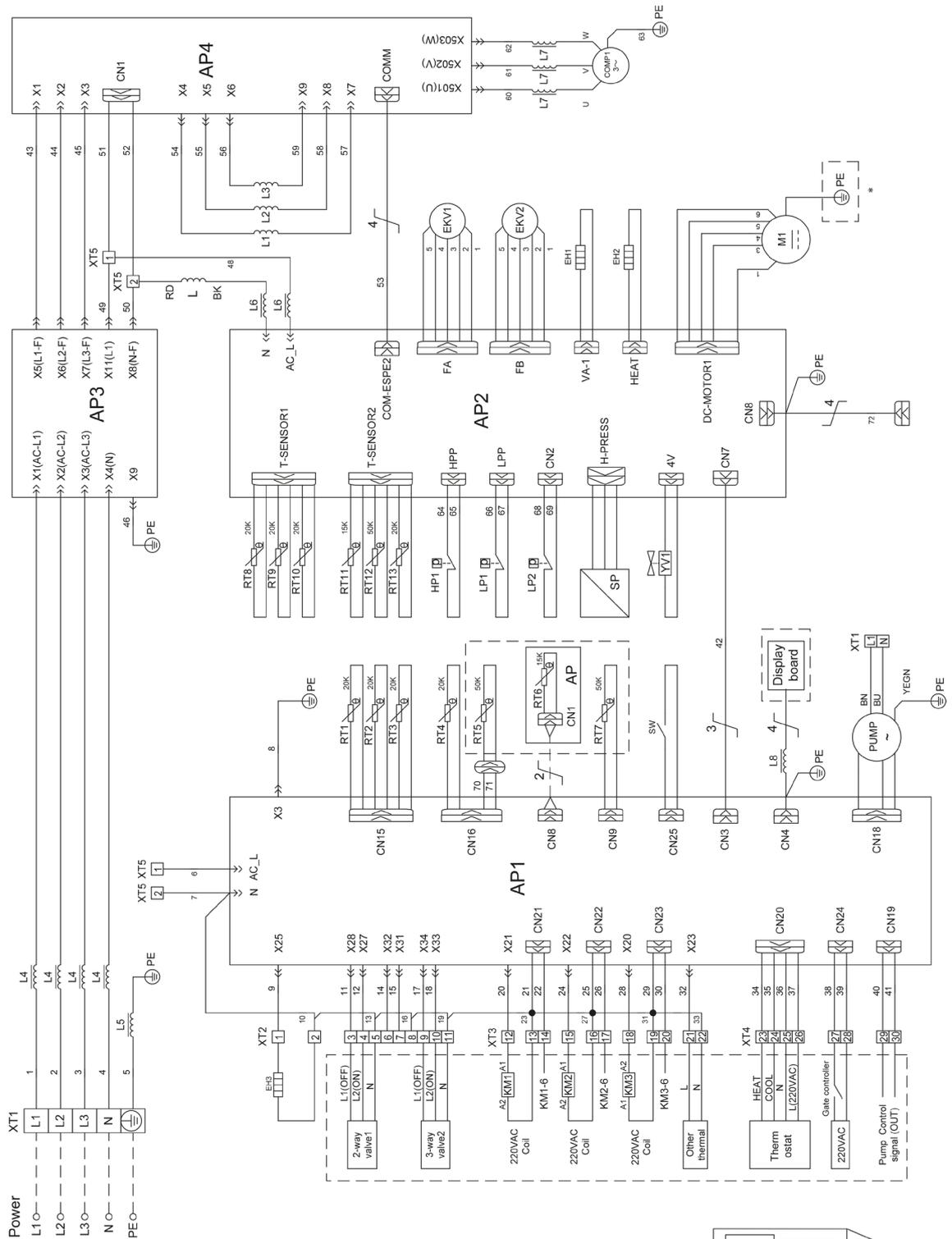


* The ground wire is available for motor having an iron housing, while it is not available for motor having a plastic housing

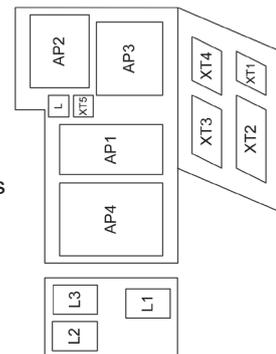
CODE	DESCRIPTION
AP	Main board - only for RT6
AP1	Indoor unit main board
AP2	Outdoor unit main board
AP3	Filter board
AP4	Drive board
COMP1	Compressor
EH1	Bottom band heater
EH2	Compressor band heater
EH3	Antifreeze for plate heat exchanger
EKV1	Electronic expansion valve - coil 1
EKV2	Electronic expansion valve - coil 2
FILTER	Filter
HP1	High pressure switch
KM1	AC contactor 1 Optional electric heater
KM2	AC contactor 2 Optional electric heater
KM3	Storage tank electric heater AC contactor
L	Electrical inductance
L1	Electrical inductance PFC
L2 - L7	Magnetic ring
LP1	Low pressure switch for heating
LP2	Low pressure switch for cooling
M1	Motor
PUMP	Indoor unit pump
RT1	Unit water inlet T sensor
RT2	Unit water outlet T sensor
RT3	Liquid tube T sensor
RT4	Gas pipe T sensor
RT5	Water T sensor - option
RT6	Remote ambient probe T sensor
RT7	Water heater temperature sensor
RT8	Economizer inlet T sensor
RT9	Economizer outlet T sensor
RT10	Defrost T sensor
RT11	External T sensor
RT12	Discharge T sensor
RT13	Suction T sensor
SP	High pressure sensor
SW	Flow rate switch
XT1	Power supply terminal board
XT2	Terminal board 1-11
XT3	Terminal board 12-22
XT4	Terminal board 23-30
XT5	Terminal board 1-2
YV1	4-way valve coil

Specifications

1. Terminal board wires must be connected on site.
2. KM1, KM2 is the AC contactor of auxiliary electric heater for the coil. If an auxiliary electric heater is required, connect terminal board (XT3) 12, 13, 14, 15, 16, 17.
3. KM3 is the AC contactor of auxiliary electric heater for the storage tank. If an auxiliary electric heater is required for the storage tank, connect terminal board (XT3) 18, 19, 20.



Layout of electrical components



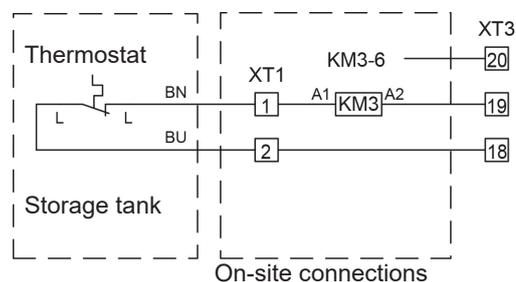
* The ground wire is available for motor having an iron housing, while it is not available for motor having a plastic housing

CODE	DESCRIPTION
AP	Main board - only for RT6
AP1	Indoor unit main board
AP2	Outdoor unit main board
AP3	Filter board
AP4	Drive board
COMP1	Compressor
EH1	Bottom band heater
EH2	Compressor band heater
EH3	Antifreeze for plate heat exchanger
EKV1	Electronic expansion valve - coil 1
EKV2	Electronic expansion valve - coil 2
HP1	High pressure switch
KM1	AC contactor 1 Optional electric heater
KM2	AC contactor 2 Optional electric heater
KM3	Storage tank electric heater AC contactor
L	Electrical inductance
L1 - L3	Electrical reactor
L4 - L8	Magnetic ring
LP1	Low pressure switch for heating
LP2	Low pressure switch for cooling
M1	Motor
PUMP	Indoor unit pump
RT1	Unit water inlet T sensor
RT2	Unit water outlet T sensor
RT3	Liquid tube T sensor
RT4	Gas pipe T sensor
RT5	Water T sensor - option
RT6	Remote ambient probe T sensor
RT7	Storage tank temperature sensor
RT8	Economizer inlet T sensor
RT9	Economizer outlet T sensor
RT10	Defrost T sensor
RT11	External T sensor
RT12	Discharge T sensor
RT13	Suction T sensor
SP	High pressure sensor
SW	Flow rate switch
XT1	Power supply terminal board
XT2	Terminal board 1-11
XT3	Terminal board 12-22
XT4	Terminal board 23-30
XT5	Terminal board 1-2
YV1	4-way valve coil

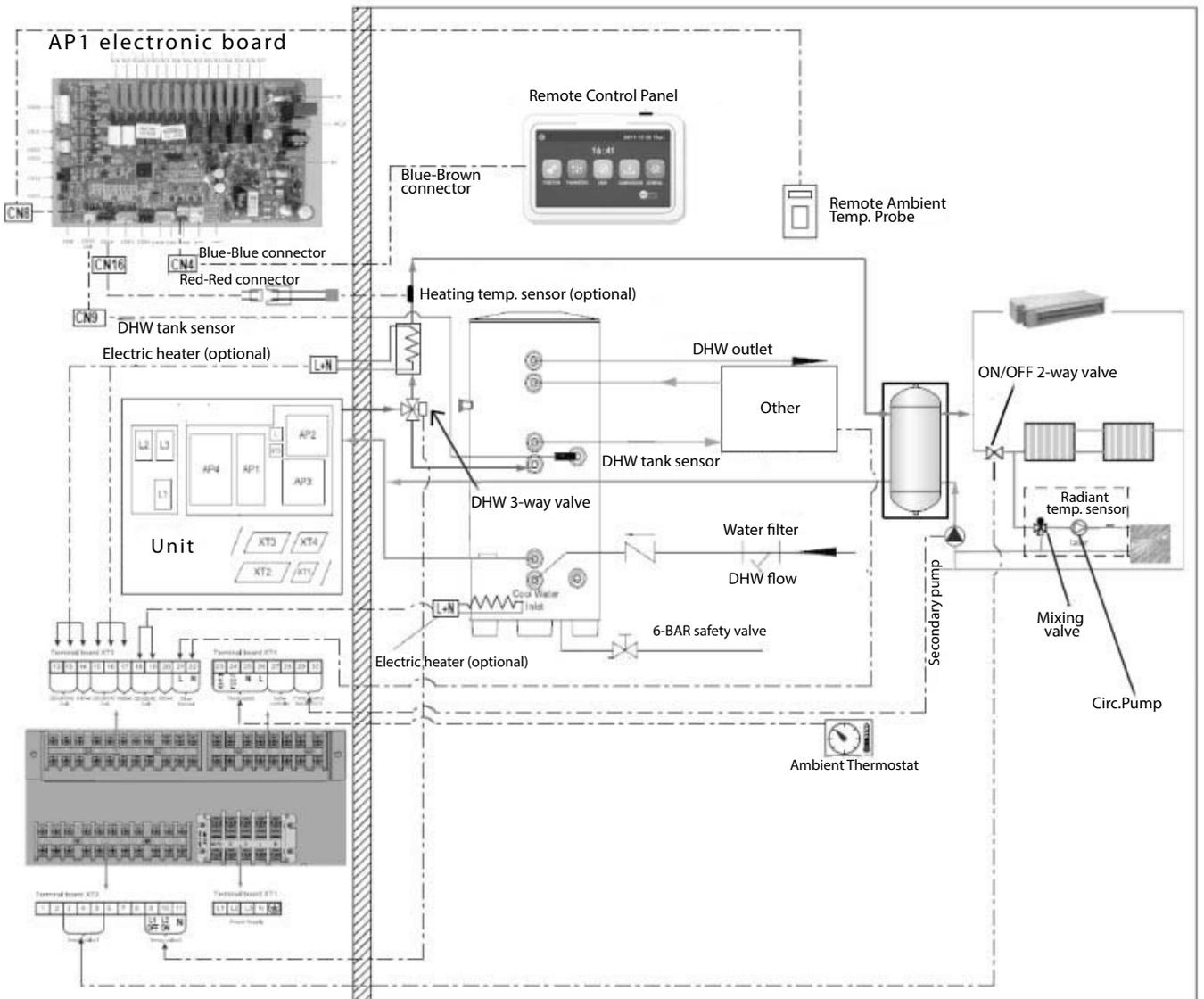
Specifications

- Terminal board wires must be connected on site.
- KM1, KM2 is the AC contactor of auxiliary electric heater for the coil. If an auxiliary electric heater is required, connect terminal board (XT3) 12, 13, 14, 15, 16, 17.
- KM3 is the AC contactor of auxiliary electric heater for the storage tank. If an auxiliary electric heater is required for the storage tank, connect terminal board (XT3) 18, 19, 20.

If storage tank thermostat is not connected, it must be connected in series to the storage tank contactor circuit as shown in the figure below:

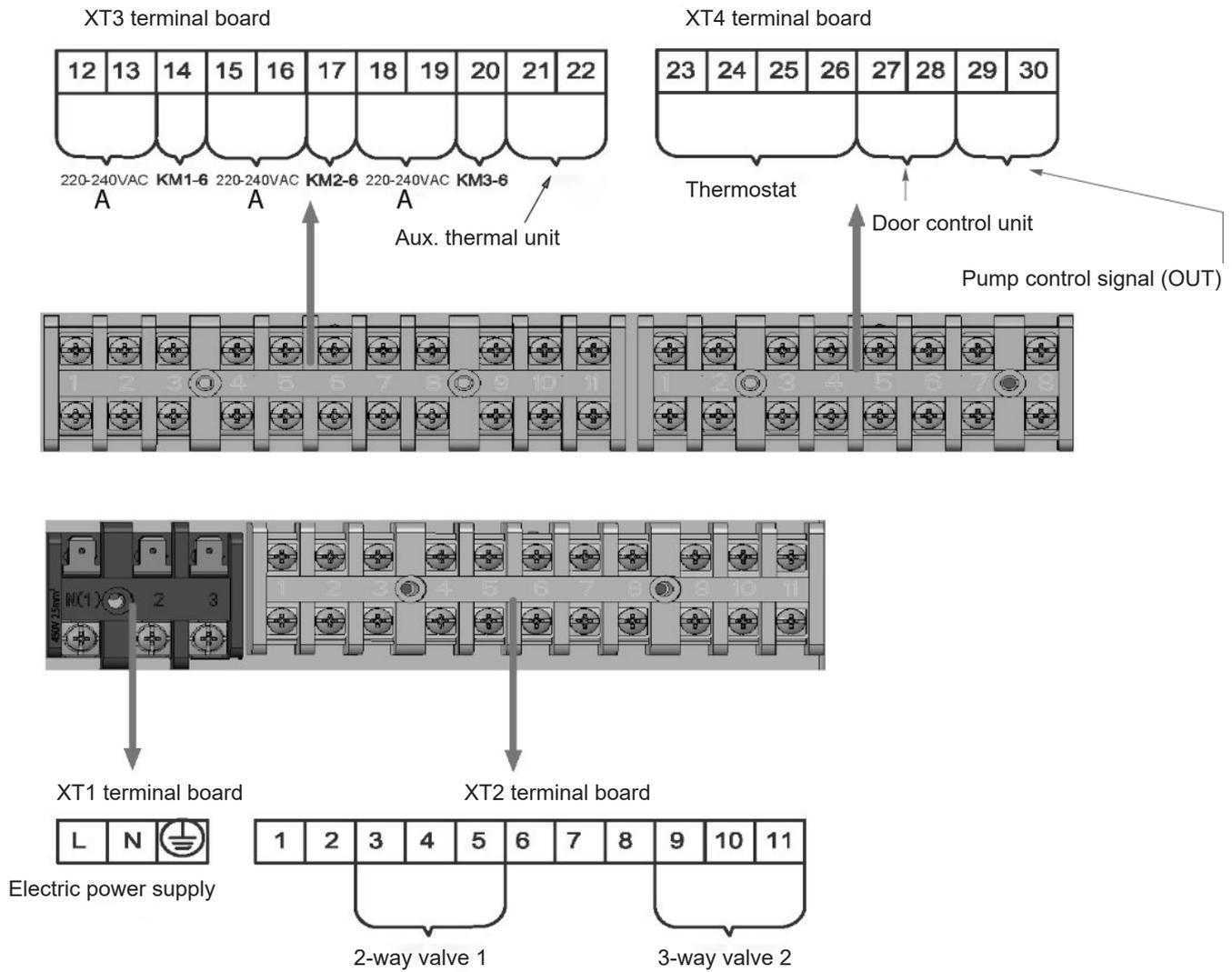


Electrical cable kit supplied with the Monobloc unit and their connections

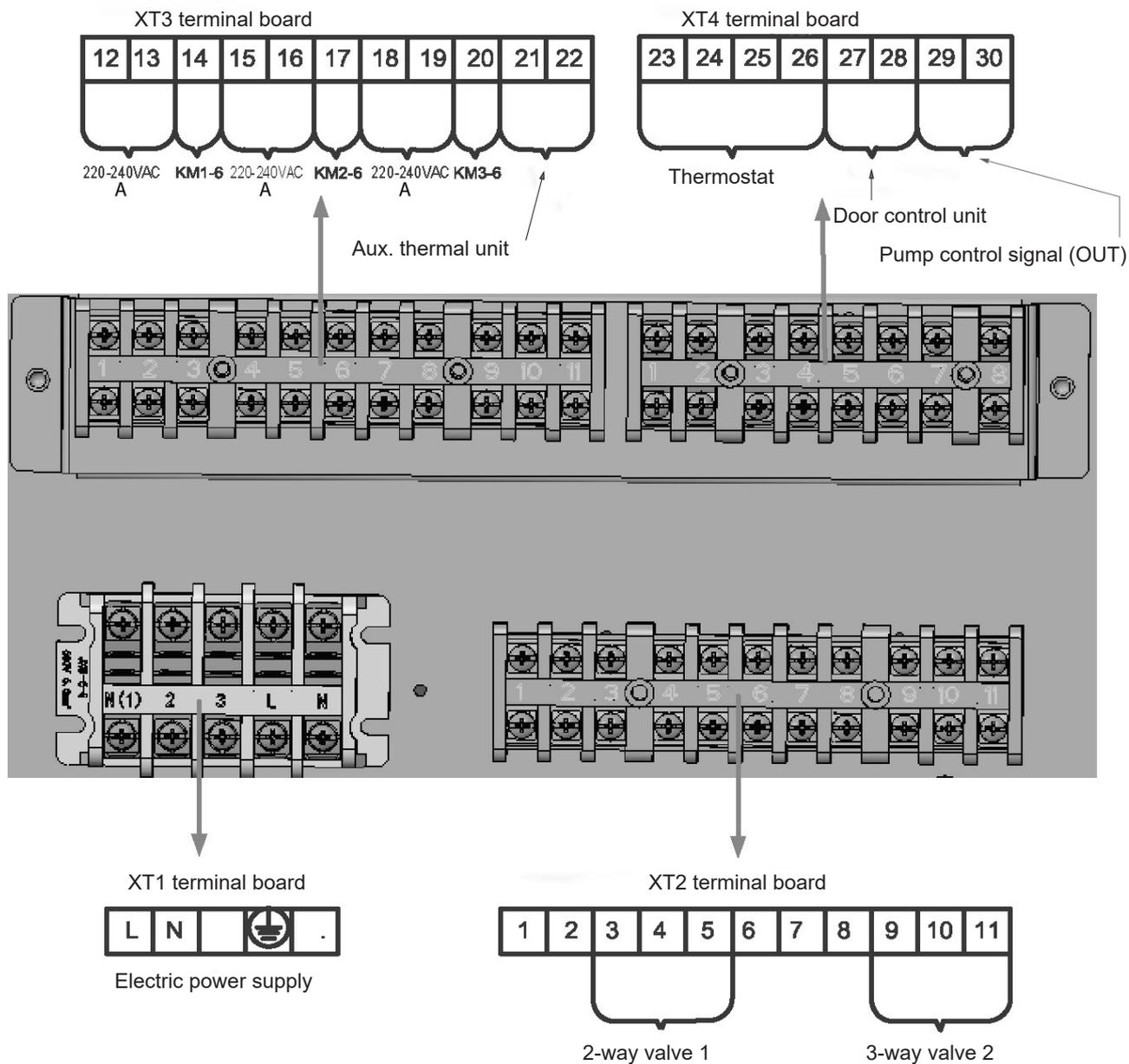


21.2.2 Terminal board

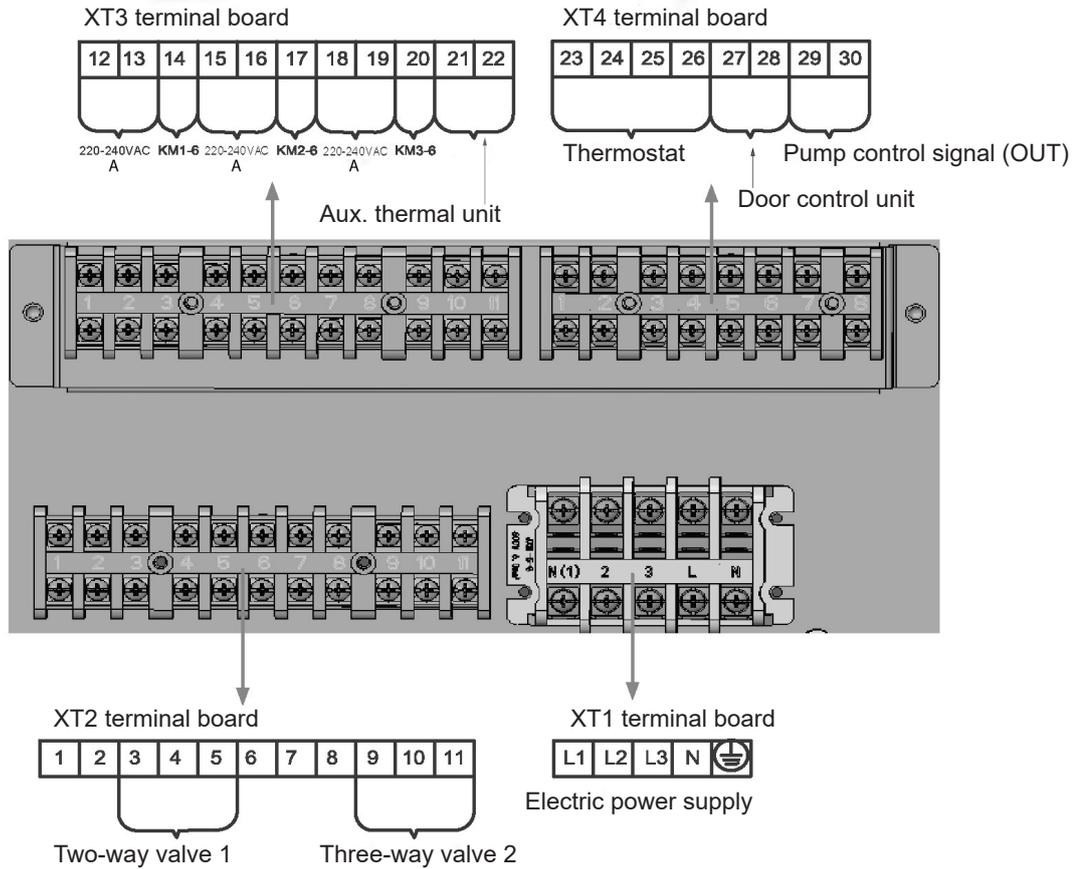
PROCIDA AWM X6, PROCIDA AWM X8



A = Coil



A = Coil



A = Coil

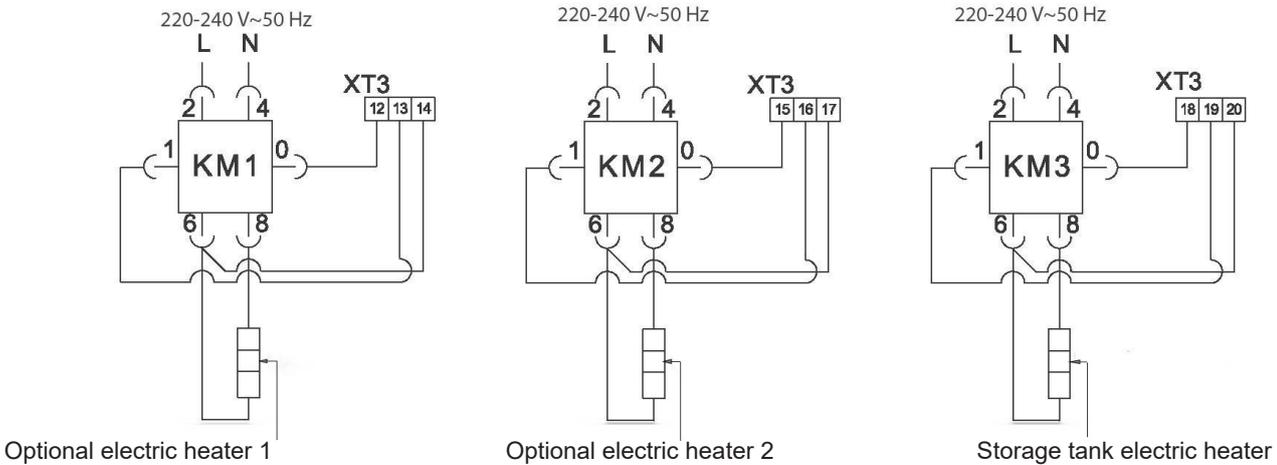
SELECTING THE AC CONTACTOR

The AC contactors are not installed to the unit before delivery. This means that AC contactors for auxiliary electric heater 1, auxiliary electric heater 2 and storage tank heater must be installed on site. Please refer to the table below for technical specifications.

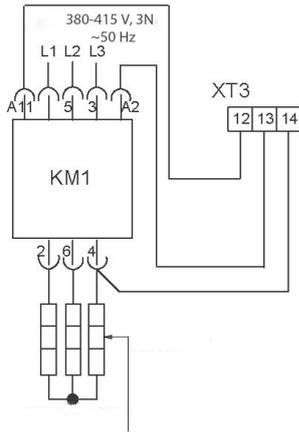
Name	Rated Frequency	Coil rated voltage	Rated service voltage of the main circuit	Rated service current of the main circuit
AC contactor	50 Hz	220 V	220 V	25 A

For further details on electrical connections, refer to the figures below:

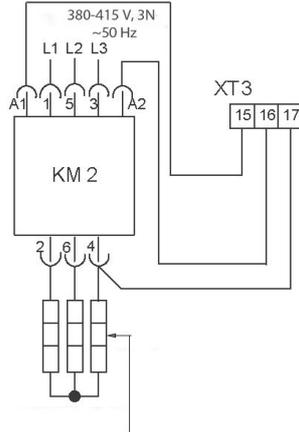
PROCIDA AWM X6, PROCIDA AWM X8, PROCIDA AWM X10, PROCIDA AWM X12, PROCIDA AWM X14, PROCIDA AWM X16



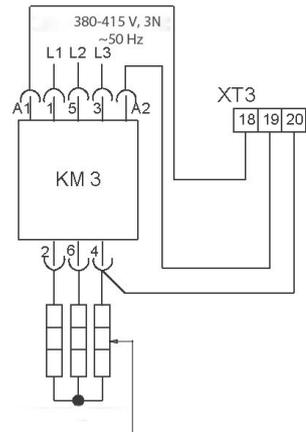
Scenario 1



Optional electric heater 1

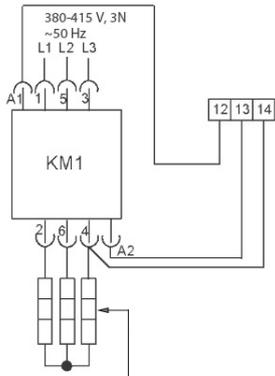


Optional electric heater 2

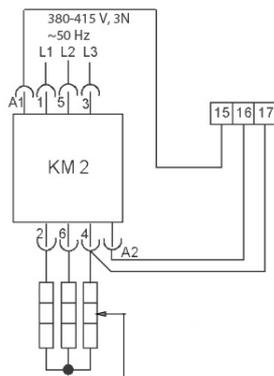


Storage tank electric heater

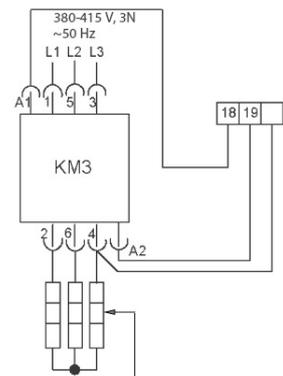
Scenario 2



Optional electric heater 1

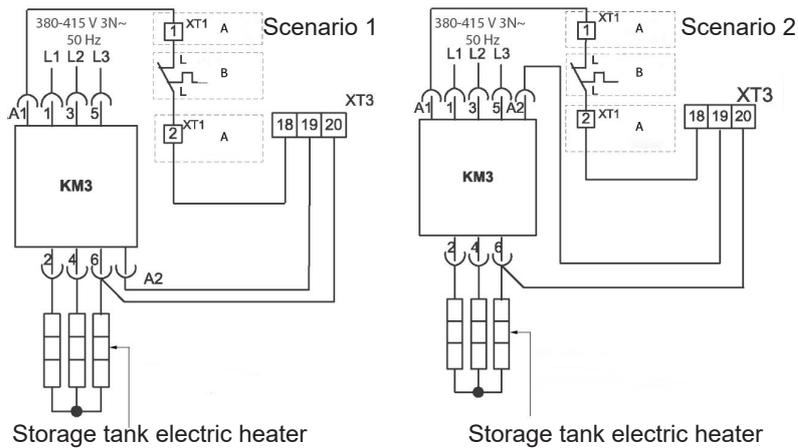


Optional electric heater 2



Storage tank electric heater

If storage tank thermostat is of a special type (i.e., is not a thermostat with omnipolar circuit breaker), it must be connected in series to the storage tank contactor circuit as shown in the figure below:



Storage tank electric heater

Storage tank electric heater

- A = Provided on site
- B = Storage tank thermostat

22. Commissioning

22.1 Checks before start-up

To ensure safety for users and the unit, the system must undergo a functional inspection before testing. The required procedures are described here below:

The following inspections must be carried out by qualified service technicians.		
Together with the sales technician, dealer, installer and customer, check whether the operations below have already been performed or still have to be performed.		
N.	Installation confirmation	√
1	Check whether the content of the request to install this unit, as submitted by the installer, is true. If it is not so, testing will be rejected.	<input type="checkbox"/>
2	Is there a written report indicating that the elements to be modified are related to a non-professional installation?	<input type="checkbox"/>
3	Have request to install and testing checklist been submitted simultaneously?	<input type="checkbox"/>
N.	Preliminary check	√
1	Is the appearance of the unit and internal piping fine during handling, transport or installation?	<input type="checkbox"/>
2	Check any accessories provided with the unit, their quantity, packaging, etc.	<input type="checkbox"/>
3	Check that the necessary diagrams are available: wiring diagram, control diagram, piping design, etc.	<input type="checkbox"/>
4	Ensure that the unit installation is sufficiently stable and that there is enough room for operating and repairing it.	<input type="checkbox"/>
5	Check refrigerant pressure in every unit and check for leaks.	<input type="checkbox"/>
6	Is the water storage tank securely installed? Are supports stable when storage tank is full?	<input type="checkbox"/>
7	Are storage tank insulation, water inlet/outlet pipes and filling pipe appropriate?	<input type="checkbox"/>
8	Are any storage tank level sensor, water temperature indicator, control unit, pressure gauge, pressure relief valve, automatic drain valve, etc. installed and properly operating?	<input type="checkbox"/>
9	Do power supply values correspond to the ones on the rating plate? Are power cables complying with the applicable regulations?	<input type="checkbox"/>
10	Are power and control cables properly connected according to the wiring diagram? Is grounding connection safe? Are all terminals securely connected?	<input type="checkbox"/>
11	Are connecting pipes, water pump, pressure gauge, thermometer, valves, etc. properly installed?	<input type="checkbox"/>
12	Do system valves open and close according to their specifications?	<input type="checkbox"/>
13	Make sure that customer's staff and Party A inspectors are on site.	<input type="checkbox"/>
14	Has the installation inspection table been completed and signed by the installer?	<input type="checkbox"/>
Warning: Report to supplier if there are any items marked with x. The above items are given just for reference.		
Confirmed items after preliminary check		
Overall assessment: Test <input type="checkbox"/> Change <input type="checkbox"/>		
Assess the elements below (if indications are lacking, qualification specifications will apply),		
a: Power supply and electrical control system b: Load calculation c: Unit heating problems d: Noise problems e: Pipe problems f: Other		
Normal testing operations can only be carried out if all installation components are qualified. In case of problems, it is necessary to solve them before doing anything. If a problem is not promptly rectified, the installer shall be liable for any costs resulting from delayed and repeated testing.		
Sending change reports to the installer.		
Was the written change report to be signed after disclosure transmitted to the installer?		
Yes () No ()		

22.2 Operation test

The operation test is preliminarily performed to make sure that the unit can operate normally. If the unit can not operate normally, identify and rectify the problems so as to obtain a satisfying test result. Before starting the operation test, ensure that all test items gave the required results. The operation test must be carried out as described in the table below:

The following procedure must be carried out by qualified and experienced service technicians.	
N.	Starting the preliminary procedure
Note: before the test, make sure that all power connections are disconnected, including any remote switches; if that is not so, dangerous conditions could occur.	
1	Preheat unit compressor for 8 hours.
	Warning: warm up lubricating oil at least 8 hours in advance to avoid that it may mix with refrigerant, and potentially damage the compressor when starting the unit.
2	Make sure that the compressor oil temperature is higher than the external ambient temperature.
	Warning: if compressor oil temperature is not higher than external ambient temperature, it means that compressor electric heating tape is damaged. In this case, the compressor could easily get damaged. It is recommended to repair the electric heating tape before starting the unit.
3	Check that the main power phase sequence is correct. If it is not so, rectify the sequence before proceeding.
	Before starting the unit, check again the phase sequence to avoid compressor from turning in the reverse direction, which could damage the system.
4	Use a universal multimeter to measure the insulation resistance across each phase and the ground, and across phases.
	Warning: unsuitable grounding could lead to risk of electrocution.
N.	Preparing for start-up
1	Disconnect all temporary power lines, take all protection measures and check electrical conditions for the last time.
	Check control circuit power supply and its voltage; _____ V must fall within the range of rated values with a $\pm 10\%$ tolerance.
N.	Unit start-up
1	Check all conditions required for starting up the unit: oil temperature, mode, load required, etc.
2	Start the unit and check operation of the various components: compressor, electrical expansion valve, fan motor, water pump, etc.
	Note: faulty operation could damage the unit. Do not start the unit if pressure or current is high.
Other:	
Items for acceptance after testing	Assessment or proposal concerning the overall condition of operation: good, to be changed
	Identify the potential problem (if no more details are specified, installation and testing shall be considered to be in line with the requirements).
	a. Problem with the power supply and electrical control system: b. Problem with load calculation: c. Problem with the external refrigerant system: d. Noise problem: e. Problem with the indoor unit and the piping system: h. Other problems:
	During operation, all maintenance interventions due to quality problems, such as resulting from incorrect installation and maintenance, must be charged to the user.
	Acceptance
Did the user receive the required training? Sign. Yes () No ()	

23. Operation and routine maintenance

- All protection devices are installed before delivery to avoid damaging the unit. It is recommended not to modify or remove them.
- For unit first start-up or in case of start-up after a long period of inactivity (more than 1 day) with power line disconnection, it is recommended to connect the unit to the mains in advance and preheat it for at least 8 hours.
- Do not set any objects on the unit and on accessories. Keep the area around the unit dry, clean and ventilated.
- Periodically remove the dust building up on condenser fins to keep unit efficient and avoid stops controlled by the protection devices.
- To avoid unit stop or damage because of hydraulic system clogging, periodically clean the filter of the hydraulic system and frequently check the water filling device.
- To ensure proper frost protection, do not disconnect unit power lines if ambient temperature drops below zero in winter.
- To avoid damage due to frost, it is recommended to drain water from the unit and piping if you plan not to use it for a long period. Also open storage tank plug to allow draining.
- If the storage tank is installed but the corresponding parameter is set to "Without", the storage tank features will not activate and the temperature displayed for the storage tank will always be "-30". In this case, the storage tank will be exposed to frost and other damage in case of low external temperature. This is why, after installing the storage tank, it is recommended to set it to "With". In case of failure to comply, Fondital shall not be liable for any malfunction.
- Do not switch the unit on and off too frequently and close the manual valve of the hydraulic system when the unit is used by the users.
- Frequently check the operation of every part to check for oil stains at pipe joints. If necessary, change the valves to avoid refrigerant leakage.
- Promptly contact an authorised service centre in case of unit malfunction that could not be fixed by users.

Notes

The pressure gauge for water pressure is installed on the return line to the unit. Adjust hydraulic system pressure as follows:

- If pressure is below 0.5 bar, immediately refill with water.
- While refilling, system pressure should not exceed 2.5 bar.

Malfunctions	Causes	Possible solutions
The compressor does not start	Power supply issue.	The phase sequence is reversed.
	The connection cable is disconnected.	Check and rectify.
	Main board malfunction.	Identify the causes and perform any necessary repair.
	Compressor malfunction.	Replace compressor.
Fan is very noisy	Fan retaining bolt is loose.	Tighten fan retaining bolt.
	Fan blades touch the grille or housing.	Identify the causes and perform any necessary adjustment.
	The fan operation is not reliable.	Replace the fan.
Compressor is very noisy	Liquid refrigerant returns to compressor ("slugging").	Check that expansion valve is not damaged and that temperature sensor is not disconnected.
	Compressor internal parts damage.	If necessary, perform any required repair. Replace compressor.
The water pump is not working or has a malfunction	Power supply or terminal malfunction.	Identify the causes and perform any necessary repair.
	Relay malfunction.	Replace relay.
	Air inside the water piping.	Bleed.
The compressor frequently starts or stops	Insufficient or excessive quantity of refrigerant. Faulty flow in the hydraulic system. Insufficient level.	Drain or top up refrigerant. The hydraulic system is either clogged or contains some air. Check water pump, valves and piping. Clean the water filter or bleed the system. Adjust the level or add storage tanks.
The unit is not heating despite compressor is operating	Refrigerant leakage.	Repair the leakage and top up refrigerant.
	Compressor malfunction.	Replace compressor.
Poor water heating efficiency	Faulty insulation in the hydraulic system.	Improve system insulation efficiency.
	Insufficient heat exchange in evaporator.	Check that air at unit inlet and outlet is normal and clean the evaporator.
	Insufficient refrigerant level in the unit.	Ensure that there are no refrigerant leaks from the unit.
	Obstruction of heat exchanger on water side.	Clean or replace the heat exchanger.

23.1 Recovery

When draining refrigerant from a system for maintenance or disposal purposes, it is recommended to remove the refrigerant in safety conditions.

If refrigerant is transferred to cylinders, only use cylinders suitable for recovering refrigerant. Make sure to have a suitable number of cylinders to store all system refrigerant. All cylinders used must be designed for the recovered refrigerant and duly labelled (i.e., special cylinders for refrigerant recovery). Cylinders must be equipped with efficient safety valve and shut off valves. Empty recovery cylinders must be disposed of and, if possible, cooled down before recovery.

Recovery equipment must be in good operating conditions together with all necessary instructions and suitable for recovering flammable refrigerants.

Moreover, it is necessary to prepare a set of properly operating calibrated scales.

Flexible hoses must be equipped with sealing joints in good conditions. Before using the recovery device, ensure it is in good operating condition, has undergone proper maintenance and all associated electrical components are sealed to avoid ignition in case of refrigerant spillage. In case of doubt, contact the manufacturer.

The recovered refrigerant must be handed back to the supplier in proper recovery cylinders, together with the relevant form for waste identification. Do not mix different types of refrigerant inside recovery units, especially in cylinders.

Should it be necessary to decommission compressors or dispose of compressor oil, drain them to an acceptable level to prevent that flammable refrigerant remains in the lubricant. The drain and recovery procedure must be carried out before returning the compressor to suppliers. To speed it up, only apply electric heating to the compressor body. Drain oil from a system only if the safety conditions are complied with.

23.2 Decommissioning

Before performing this procedure, it is crucial that the technician is fully familiar with the equipment and all its details. It is good practice to safely recover all refrigerants. Before proceeding, take a sample of oil and refrigerant. Before reusing the recovered refrigerant, analyse it if necessary. Check that the power supply is available.

- Become familiar with the equipment and its operation.
- Electrically insulate the system.
- Before proceeding, make sure that: if necessary, mechanical equipment for handling refrigerant cylinder is available; all personal protection devices are available and are properly used; the recovery procedure is carried out under constant supervision by a competent person; recovery equipment and cylinders comply with the prevailing regulations.
- Reduce system pressure, if possible.
- Should it not be possible to create vacuum, prepare a manifold so as to remove the refrigerant from various parts of the system.
- Make sure that the cylinder is on the scale before starting recovery.
- Start the recovery device and use it according to manufacturer's instructions.
- Do not excessively fill the cylinders (not over 80% of the liquid filling volume).
- Do not exceed maximum operating pressure of cylinders, not even temporarily.
- Once cylinders have been properly filled and the procedure is completed, promptly transfer cylinders and equipment out of the site and close all shut-off valves of the equipment.
- Before filling the recovered refrigerant into another cooling system, it must be cleaned and inspected.

23.3 Precautions before seasonal use

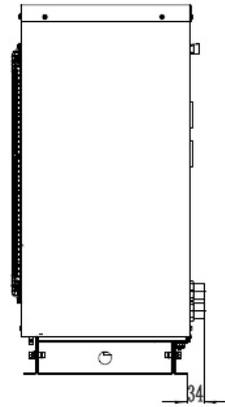
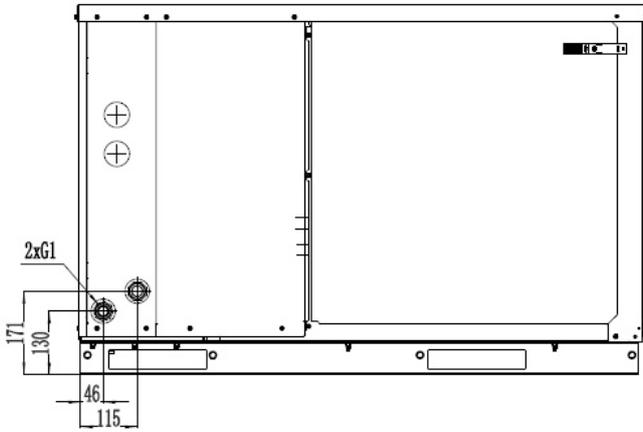
- Ensure that air inlets and outlets of indoor and outdoor units are not clogged.
- Ensure that grounding connection is safe.
- In case of restarting after a long period of inactivity, switch on the unit 8 hours before operation should start so as to allow preheating of the external compressor.
- Precautions to prevent freezing in winter. If temperature drops below zero in winter, it is necessary to add an antifreeze fluid to the hydraulic circuit and duly insulate water piping on the outside. It is recommended to use a glycol-based solution as antifreeze fluid.

Concentration [%]	Freezing temp. [°C]
4,6	- 2
8,4	- 4
12,2	- 5
16	- 7
19,8	- 10
23,6	- 13
27,4	- 15
31,2	- 17
35	- 21
38,8	- 26
42,6	- 29
46,4	- 33

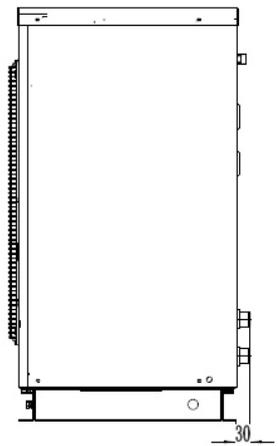
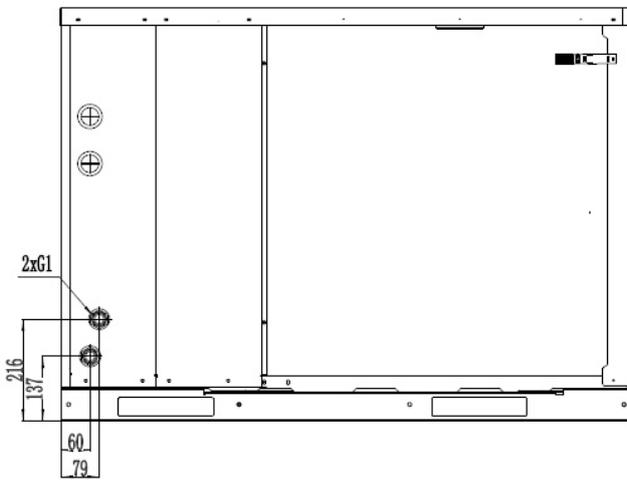
Note: "concentration" values indicated in the table refer to mass concentration.

24. Water piping layout

PROCIDA AWM X6, PROCIDA AWM X8



PROCIDA AWM X10, PROCIDA AWM X12, PROCIDA AWM X14, PROCIDA AWM X16
PROCIDA AWM T10, PROCIDA AWM T12, PROCIDA AWM T14, PROCIDA AWM T16



REGULATION (EU) No. 517/2014 - F-GAS

The unit contains R32, a fluorinated greenhouse gas having a global warming potential (GWP) = 675. Do not release R32 into the environment.

Model	
PROCIDA AWM X6	0.87 kg = 0.590 tons of CO2 equivalent
PROCIDA AWM X8	0.87 kg = 0.590 tons of CO2 equivalent
PROCIDA AWM X10	2.2 kg = 1.490 tons of CO2 equivalent
PROCIDA AWM X12	2.2 kg = 1.490 tons of CO2 equivalent
PROCIDA AWM X14	2.2 kg = 1.490 tons of CO2 equivalent
PROCIDA AWM X16	2.2 kg = 1.490 tons of CO2 equivalent
PROCIDA AWM T10	2.2 kg = 1.490 tons of CO2 equivalent
PROCIDA AWM T12	2.2 kg = 1.490 tons of CO2 equivalent
PROCIDA AWM T14	2.2 kg = 1.490 tons of CO2 equivalent
PROCIDA AWM T16	2.2 kg = 1.490 tons of CO2 equivalent

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The manufacturer reserves the right to modify his/her products as deemed necessary, without altering the basic characteristics of the products themselves.

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