Installation& Maintenance MANUAL

keram®
www.keramheating.com

KAW-N3 V2.0

Air/Water Heat Pump System

- Please read the manual carefully before installation.
- KERAM reserves the right to make changes in design without prior notice.

CONTENTS

GENERAL

SAFETY PRECAUTIONS

Warning

- *The heat pump must not be installed by the user. You should ask a certified installer or an authorized technician to install the unit. If the heat pump is installed improperly, electric shock, water leakage, or fire may be caused.*
- *The heat pump must be installed according to the instructions in order to minimized the risk of damage by natural disasters such as earthquakes, typhoons, or strong winds. Improperly installed unit may fall down and cause damages or injuries.*
- *The heat pump must be securely installed on a structure that can sustain its weight. If the heat pump is mounted on an unstable structure, it may fall down and cause damage or injuries.*
- *If the heat pump is installed in an enclosed area, measures must be taken to prevent the refrigerant concentration in the room in the event of refrigerant leakage. Consult an installer regarding the appropriate measures.*
- *Ventilate the room if refrigerant leaks during operation. If refrigerant comes into contact with a flame, poisonous gases will be released.*
- *When installing or moving the heat pump, make sure to use the specified refrigerant(Please check it on the Technical Specification) to charge the refrigerant lines. Do not either mix it with any other refrigerant or allow air to remain within the pipes. Air enclosed in the pipes can cause pressure peaks resulting in a rupture and other hazards.*
- *Make sure to use accessories authorized by Keram and you should ask an qualified installer or an authorized technician to install them. If accessories are improperly installed, it may cause electric shock, water leakage, or fire.*
- *The user should never attempt to repair the unit or transfer it to another location. If the unit is installed improperly, it may cause electric shock, water leakage, or fire. If the heat pump needs to be repaired or moved, ask an qualified installer or an authorized technician.*
- *After installation has been completed, make sure that refrigerant does not leak. If refrigerant leaks into the room and comes into contact with the flame of a heater or portable cooking range, poisonous gases will be released.*
- *Use clean enough water which meets water quality standards. The deterioration of water quality may result in the system breakdown or the water leakage.*

BEFORE INSTALLATION

Caution

- *Do not use the unit in an unusual environment. If the heat pump is installed exposed to steam, volatile oil, or sulfuric gas, or exposed to briny air, or covered with snow, the performance can be significantly reduced and the internal parts can be damaged.*
- *Do not install the unit where combustible gases may leak ,be produced, flow, or accumulate. If combustible gas accumulates around the unit, it may cause fire or explosion.*
- *The outdoor unit produces condensate during the heating operation. Make sure to provide drainage around the outdoor unit if such condensate is likely to cause damage.*
- *Be fully careful when moving the units. The unit must be carried by at least 2 people. Do not hold the packaging bands. Wear protective gloves to unpack and to move it, in order to avoid your hands be injured by fins or other parts.*
- *Be sure to safely dispose of the packaging materials. Packaging materials, such as nails and other metal or wooden parts may cause injuries.*

BEFORE ELECTRIC WORK

Caution

- *All electric work must be performed by a qualified technician according to local regulations and the instructions given in this manual.*
- *Be sure to install a circuit breaker. If it is not installed, there may be a risk to get an electric shock.*
- *For the power lines, use standard cables of sufficient capacity. Otherwise, it may cause a short circuit, overheating , or fire.*
- *When installing the power lines, do not apply tension to the cables. The cables may be cut or overheated resulting in a fire.*
- *Make sure to ground the unit. Do not connect the ground wire to gas or water pipes, lightening rods, or telephone grounding lines. If the heat pump is not properly grounded, there may be a risk to get an electric shock.*
- *Make sure to use circuit breakers(ground fault interrupter, isolating switch , fuse), and molded case circuit breaker) with the specified capacity. If the circuit breaker capacity is larger than the specified capacity, break down or fire may result.*
- *Terminal block cover panel of the outdoor unit must be firmly fixed. If the cover panel is mounted improperly, dust and moisture may enter the unit, and it may cause electric shock or fire.*

BEFORE STARTING THE TEST RUN

Caution

- *Turn on the main power switch more than 12 hours before starting operation. Starting operation immediately after turning on the power switch can severely damage the internal parts. Keep the main power switch turned on during the operating period.*
- *Before starting operation, check that all panels, guards and other protective parts are correctly installed. Make sure not to get injured by touching rotating, hot, or high voltage parts.*
- *Do not touch any switch with wet hands. There may be a risk to get an electric shock.*
- *Do not touch the refrigerant pipes with bare hands while unit is running. The refrigerant pipes can be hot or cold depending on the condition of working mode. There may be a risk of getting burned or frostbite.*

Warning

Contains Refrigerant!
System contains oil and refrigerant under high pressure. Recover refrigerant to relieve pressure before opening the system. See unit nameplate for refrigerant type. Do not use non-approved refrigerants, refrigerant substitutes, or refrigerant additives.

IMPORTANT INFORMATION

Note

It is important as the user that you read through the manual.
Under no circumstances may the user make settings that are designed for the installer.
This can cause serious malfunction of the heat pump.

Danger to life

This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety.
Children should be supervised to ensure that they do not play with the appliance.

The heat pump must be installed and commissioned by a competent person in accordance with the current legislation and standards and the installation & maintenance manual.

Opening of the device only by a competent person. Before opening the device, all electric circuits must be switched off.

Work on the refrigeration system must be carried out only by competent person.

Emptying Water

If the heat pump will be shut down during the winter months, the heating system should be emptied of water to avoid any damage due to freezing.

Warning

Main power not cutting off!

In winter, if the heat pump will left not working for long time, please don't cut off the main power, because the heat pump is still working for the purpose of anti-freeze protection.

Do not use heating or cooling water that is produced by the heat pump directly for drinking or cooking. There is risk to damage your health. There is also a risk that installing the water heat exchanger may corrode if the necessary water quality for the air to water heat pump system cannot be maintained. If you wish to use the heating or cooling water from the heat pump for these purpose, take measure such as to the second heat exchanger within the water piping system.

Energy-saving use of the heat pump heating system

Avoid unnecessarily high temperature of flow. The lower the temperature of the heating medium is, the more efficiently the heat pump works.

Do not dispose of electrical appliances as unsorted municipal waste, use separate collection facilities. Contact your local government for information regarding the collection systems available. If electrical appliances are disposed of in landfills or dumps, hazardous substances can leak into the groundwater and get into the food chain, damaging your health and well-being.

When replacing old appliances with new ones, the retailer is legally obligated to back your old appliance for disposals at least free of charge.

ABOUT THE AIR/WATER HEAT PUMP

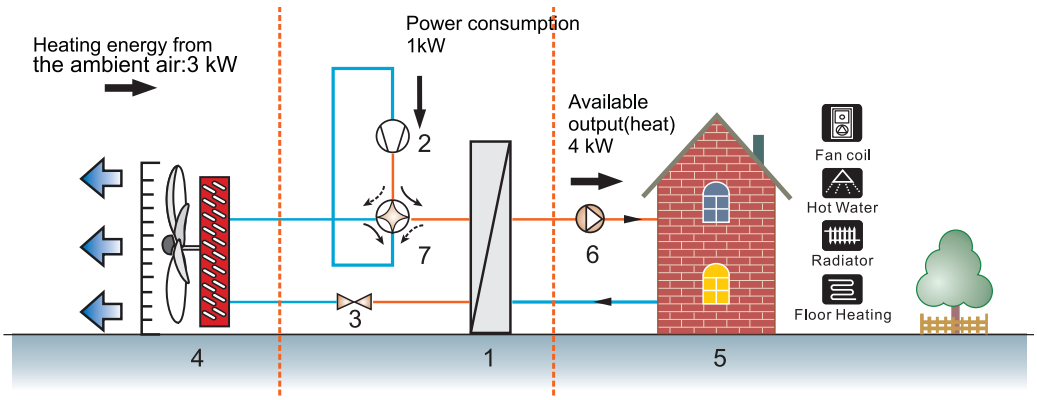
An air source heat pump system is another way of utilization of solar energy. A large portion of solar energy existed in the air, the heat is absorbed from the air by an outdoor unit called evaporator, refrigerant in the evaporator is in gaseous state, then the compressor increase the temperature and pressure of the refrigerant, after that, the refrigerant transfers its heat to the heating medium in condenser, the heating medium will bring the heat to your house heating system or for hot water. The refrigerant was reverted into liquid now, it will move to the evaporator again and start to collect the new energy for the air. The circling will keep running all the time.

WORKING PRINCIPLE

The heat pump has three separate circuits

- ***Outdoor ambient air*** **–––** is the heat source in the winter or heat sink in the summer.
- ***Refrigerant circuit*** **–––** is the circuit that contains an environmentally friendly refrigerant that inside the heat pump, transfers the energy retrieved from the outdoor ambient air through evaporation, compression and condensation, and supplied it to the heating/cooling transfer fluid circuit.
- ***Heating/cooling medium circuit*** **–––**is the circuit that contains the water that transports the heat/cool to the heating/cooling system and the water heater.

Heating And Hot Water



$$\text{Coefficient Of Performance(COP)} = \frac{\text{heating output}}{\text{Power consumption}} = \frac{4\text{kW}}{1\text{ kW}} = 4$$

Coefficient Of Performance(COP)= manufacturer's specification, lab.value to EN14511

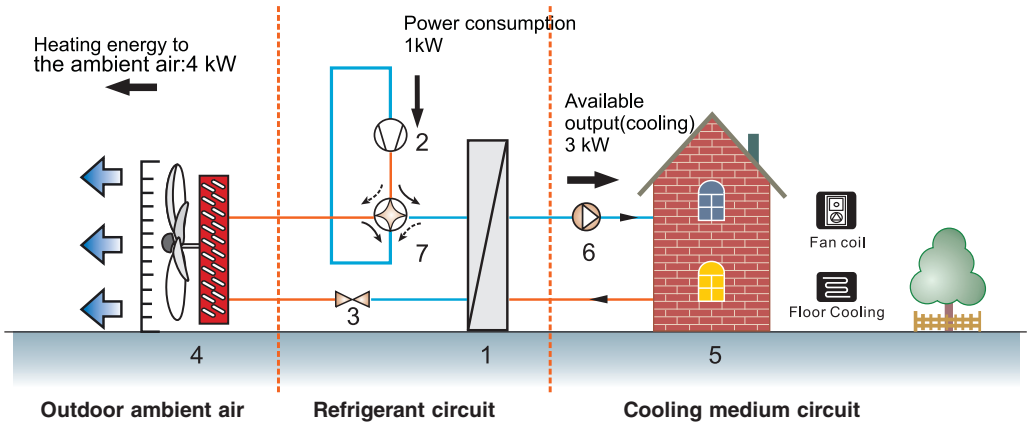
Figure 1: Function principles in heating and hot water

1.Plate heat exchanger 2.Scroll compressor 3.Expansion valve 4.Finned tube heat exchanger
5.House 6.Heating medium pump 7.Four-way reversing valve

Working process

1. The heat is absorbed from the outdoor air by an outdoor unit called evaporator, refrigerant in the evaporator boils into gas.
2. The refrigerant now contains a large quantity of energy in the form of heat is transferred to the compressor, which both increases its temperature and pressure.
3. The refrigerant then continues to the condenser. When condensing, the refrigerant supplies its heat energy to the heat transfer fluid circuit. The refrigerant's temperature decreases and returns to a liquid state.
4. The heating medium (hot water) transports the heat energy out to the water heater, radiator or the under floor heating system.
5. The refrigerant is then transported through the expansion valve where the pressure drops and the refrigerant starts to boil and then the process starts again.

Cooling



$$\text{Coefficient Of Performance(COP)} = \frac{\text{cooling output}}{\text{Power consumption}} = \frac{3\text{kW}}{1\text{ kW}} = 3$$

Coefficient Of Performance(COP)= manufacturer's specification, lab.value to EN14511

Figure 2: Function principles in cooling

1.Plate heat exchanger 2.Scroll compressor 3.Expansion valve 4.Finned tube heat exchanger
5.House 6.Cooling medium pump 7.Four-way reversing valve

Working process

1. The refrigerant boils into gas in the plate heat exchanger , and it absorbs energy from cooling medium from the house, so the temperature of cooling medium(water) decrease, the cooling medium is pumped to house to absorb heat .
2. The refrigerant now contains a large quantity of energy in the form of heat is transferred to the compressor, which both increases its temperature and pressure.
3. The refrigerant then continues to the outdoor heat exchanger to condense. When condensing, refrigerant supplies its heat energy to the ambient air. The refrigerant's temperature decreases and returns to a liquid state.
4. The refrigerant is then transported through the expansion valve where the pressure drops and the refrigerant starts to boil and then the process starts again.

KAW AIR/WATER HEAT PUMP

KAW heat pump can supply heating in winter, cooling in summer and hot water. The heat pump has indoor unit and outdoor unit. KAW heat pump consists of three basic system: refrigerant system, domestic hot water system and control system.With the helps of new technology and design the KAW heat pump get more higher COP and bring less energy consumptions.

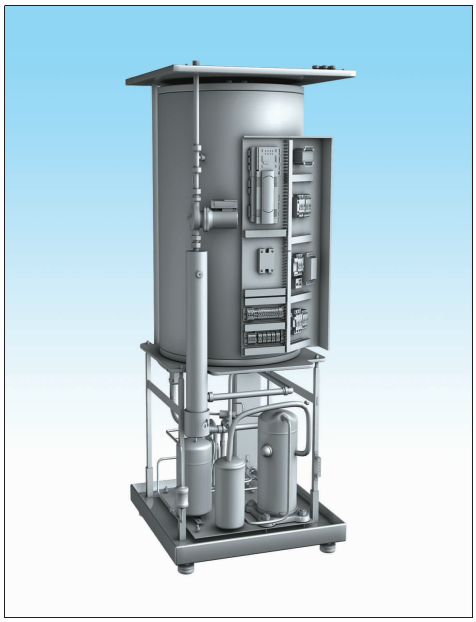


Figure 3: Indoor unit

Figure 4: Outdoor unit

Refrigerant System

- ***Compressor with EVI technology***
  The KAW heat pump use scroll compressor. The refrigerant sytem gets greater efficiency and unmatched reliablility with scroll compressor. Some heat pimps use EVI technology sroll compressor. It can get more high heating capacity and efficiency even in very low temperature condition. The heat pump can work normally and supply enough heating capacity at below -20℃ outdoor temperature.
- ***Stainless steel plate heat exchanger***
  Latest generation plate heat exchanger is used in KAW heat pump. It can get 10% higher heat exchange efficiency than old design heat exchanger.
- ***Expansion valve and eletric expansion valve***
  Electric expansion valve (EEV) and the EVD evolution driver are the advanced and versatile solution for achieving significant energy saving in KAW heat pump.
- ***Fin tube heat exchanger***
  The fin tube heat exchanger of KAW can supply high efficient heat exchange. Special shape aluminum fin and big spacing help the heat pump frosting slowly and defrosting quickly in winter.

Domestic Hot Water System

- ***Internal water tank***
  The KAW heat pump has a stainless steel internal water tank. The inner heat exchanger is stainless steel pipe. The water tank has good insulation performance because of the polyurethane foam process.
- ***Circulation water pump***
  Low energy consumption water pump is used for KAW heat pump.

Control System

- ***Main controller***
  The KAW heat pump use programming controller. It has high reliability and stability. A big graphic LCD terminal is convenient for user to operate and display many working information.New soft can be uploaded easily if neccessary.
- ***Auxillary electric heater***
  The auxillary heater has three steps 3, 6, 9KW. It can work automatically if neccessary.
- ***Soft starter***
  The soft starter can reduce starting current. It is helpful for the heat pump and electricity supply.
- ***Axial fan***
  The KAW heat pump uses exterior rotor axial motor and metal fan. This fan supply big air flow with has very low noise level.

TEMPERATURE CONTROL

The heating curve is a central part of the heat pump's control system. The heating curve determines the temperature demand for your room at different outdoor temperatures.It is important that the heating curve is correctly selected, so that you can achieve the best function and work economically.
Different heating system requires different heating supply temperature.The difference is determined by radiator surface area, the number of radiators and how well insulated the house is.
The heating curve for your property is set by two values in heat pump control menu.This is set in the menu 2.1.
To achieve at the correct heating curve will take some time. The best way to achieve this is to select operation without room sensor in the initial period. The system then operates according outdoor temperatures only.
During the adjustment period it is important that:

--All radiator thermostat valves are fully open.

--Outdoor temperature is not higher than +5° C. (If the outdoor temperature is higher when the system is installed, use the factory set curve until the outdoor temperature falls to this level.)

--The radiator system functions well and is correctly adjusted for the different circuits.

Heating Curve

The curve defines the heating medium flow temperature to the radiators at an outdoor temperature.

Example:

38℃ is the calculated temperature according the outside temperature 0℃ When curve 6 is selected, it is always changing with the change of outdoor temperature. (Figure 5)

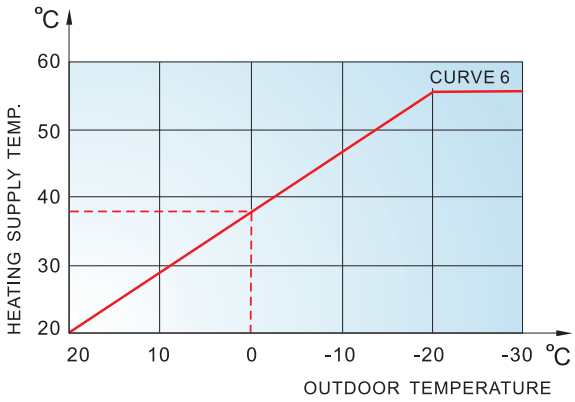


Figure 5

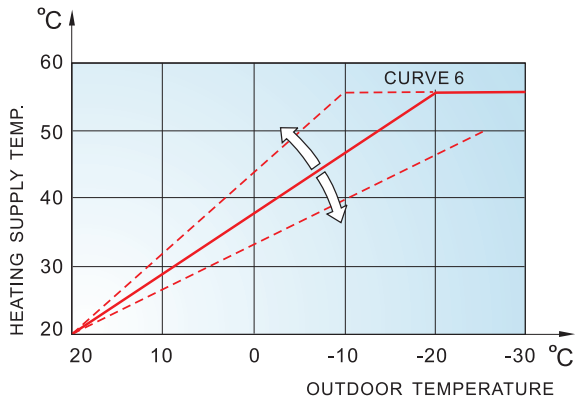


Figure 6

A lower value is set where a radiator system has larger radiator areas (a low temperature system). Floor heating systems require much lower temperatures. An even lower value should therefore be selected.
The value must be increased for high temperature systems to achieve high enough indoor temperatures.(Figure 6)

Curve Offset

The curve offset defines how much the temperature of the heat medium flow supplied to the radiators should be increased or decreased by outdoor temperatures.
Curve offset is set to give you more slightly temperature adjusting when certain curve has been selected. It will bring you a more comfortable and accurate feeling temperature for your house. (Figure 7)

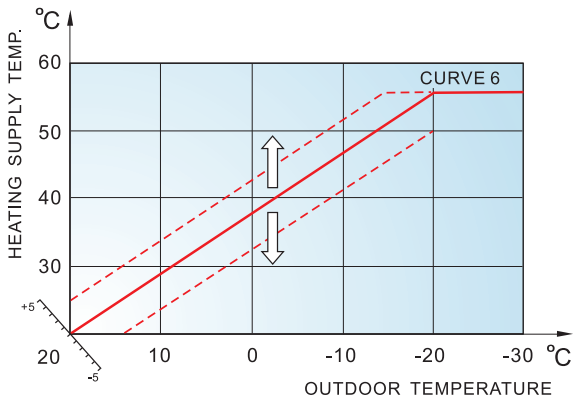


Figure 7

You can set the curve offset in menu 2.1.

CONTROLS & OPERATION

CONTROL PANEL

Layout

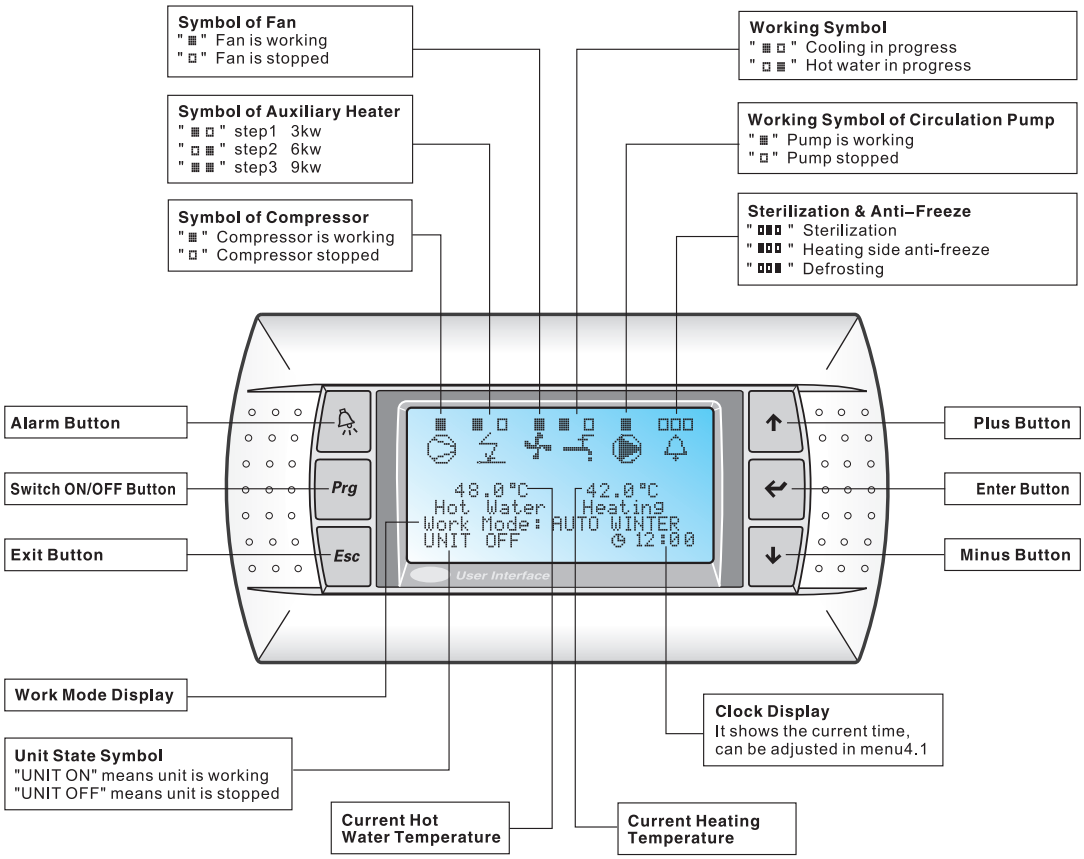


Figure 8

Explanation

Alarm Button

When the unit has fault, the alarm light shows red and the screen of the main menu glitters "-ALARM-". If you want to read and reset fault, press the button to enter into the alarm record menu. See the alarm record.

Switch ON/OFF Button

It is used to start and stop the running of the unit. The button shows yellow when power on, the light will turn off after the displaying contents are initialized.

Exit Button

It is used to quit the current menu and return to the last menu.

Plus Button

It is used to move forward to the next menu on the current menu level and to increase the value when you need to enter the password or modify the set values.

Enter Button

It is used as the confirmation when a menu is selected or the set value and password have been selected or modified.

Minus Button

It is used to move back to the previous menu on the current menu level and to decrease the value when you need to enter the password or modify the set values.

CONTROL MENU TREE

Main Menu		
	Main menu 1	Initial display
	Main menu 2	Operation parameters info
	Main menu 3	Operation mode
	Main menu 4	Heating curve

Menu 1 Hot water setting		
	menu 1.1	Hot water temperature
	menu 1.2	Extra hot water
	menu 1.3	Hot water timer setting
	menu 1.4	High_Temp mode

Menu 2 Heating setting		
	menu 2.1	Heating curve
	menu 2.2	Heating supply temperature
	menu 2.3	Timer setting

Menu 3 Cooling setting		
	menu 3.1	Cooling supply temperature
	menu 3.2	Hot water temperature
	menu 3.3	Cooling curve
	menu 3.4	Cooling timer setting

Menu 4 Heat pump setting		
	menu 4.1	Language
	menu 4.2	Clock & date
	menu 4.3	Force defrost
	menu 4.4	Auxiliary heater
	menu 4.5	Holiday setting
	menu 4.6	Degree minute setting
	menu 4.7	Anti-freeze setting

Menu 5 Heat pump info		
	menu 5.1	Operation parameters info
	menu 5.2	Compressor info
	menu 5.3	Alarm info
	menu 5.4	Software info

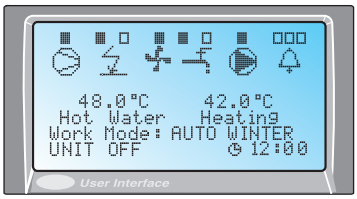
Menu 6 Service		
	menu 6.1	Circulation pump mode
	menu 6.2	Manual operation
	menu 6.3	Probe adjustment
	menu 6.4	Delay time
	menu 6.5	Remote switch
	menu 6.6	Auto restart
	menu 6.7	Heat/Cool stop
	menu 6.8	Emergency mode
	menu 6.9	Defrost parameters setting
	menu 6.10	Setting new password

Menu 7 Manufacturer setting	

MAIN MENU

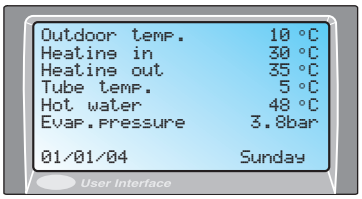
Main menu 1	**Initial display**
Main menu 2	**Operation parameters info**
Main menu 3	**Operation mode**
Main menu 4	**Heating curve**

- ***Main Menu–1*** **Initial display**



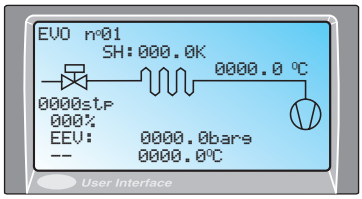
The interface always displays on the screen after initializing. Please find the description on control panel.

- ***Main Menu–2*** **Operation parameters info**



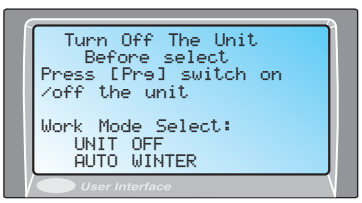
Show the current temperature of outdoor,room,heating supply, heating return, tube*, hot water temperature, evaporating pressure the week and date.

* The outdoor sensor which is welded on the outdoor heat exchanger.



It shows the current superheat and suction pressure of electronic expansion valve.

- ***Main Menu–3*** **Operation mode**



Before selection of work mode

The work mode can be selected on main menu-3. The factory default setting is "AUTO WINTER" mode. You can change the work mode when the unit stops.

【AUTO WINTER】

This is the default setting of manufacturer.

The heat pump supplies domestic hot water and the heating medium to heating system simultaneously. The hot water is always given priority over heating. When the temperature of hot water reaches the set point, the heating medium will turn to heating system automatically. Heating is produced by the heating curve.

【HOLIDAY】

The heat pump can reduce energy consumption in holiday mode. You can set the hot water temperature and heating supply temperature in menu4.5.

【AUX HEATER】
The heat pump only works with auxiliary heater. This mode is normally used when a new installation is being put into service or the heat pump is under maintenance. In this mode it only supplies hot water.

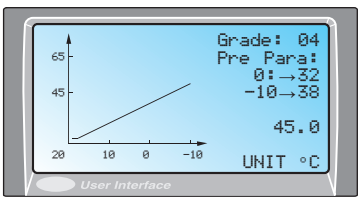
【COOLING】
The heat pump only supplies the cooling medium to cooling system and stop suppling hot water.

【AUTO SUMMER】
The heat pump supplies the cooling medium to cooling system and hot water in meantime. The hot water is always given priority over cooling.

【HOT WATER】
The heat pump only supplies hot water in this mode.

【HEATING】
The heat pump only supplies the heating medium to heating system and stops supplying hot water.

- ***Main Menu–4*** **Heating Curve**

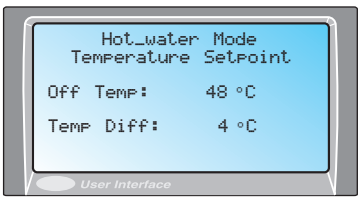


The menu shows the heating curve. The heating supply temperature is variable on the curve with the increasing or decreasing of outdoor temperature. Please read more on menu 2.1 to know how to select the heating curve.

Menu 1 HOT WATER SETTING

1.1 **Hot water temperature**
1.2 **Extra hot water**
1.3 **Hot water timer setting**
1.4 **High_Temp mode**

- ***Menu 1.1*** **Hot water temperature**

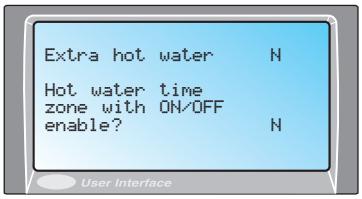


Hot water temperature: 48℃ (default)
Setting range: 35~60℃

Temp diff: 4℃ (default)
Setting range: 3~10℃

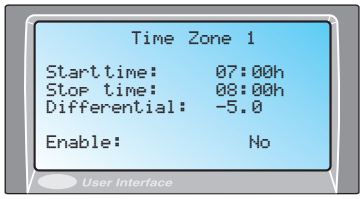
The default setting temperature of hot water is 48℃. Please select the suitable temperature. Too high temperature will cause high energy consumption. When the auxiliary heater assists to heat hot water it will cause higher power consumption.
The default setting of temperature difference is 4℃, the setting range is from 3℃ to 10℃.It means that heat pump starts when the water temperature is lower than the setting temperature and stops until the water temperature reaches the setting temperature. Smaller the temperature difference is, More frequently heat pump starts. It is necessary to set the difference in a proper value to regulate your power consumption.

- ***Menu 1.2*** **Extra hot water**



The extra hot water is for the sudden high demand for hot water. It prevents hot water shortage caused by water temperature falls too quickly.
When you change the extra hot water from "N" to "Y" the heat pump will work in extra hot water mode.

- ***Menu 1.3*** **Hot water timer setting**



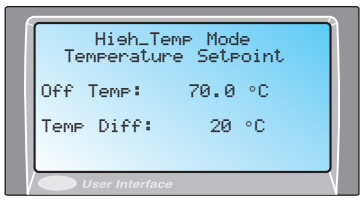
When you select the hot water time zone to "Y", you can turn to the time zone setting submenu. Totally, six time zones per day can be set here.

Each time zone has start time, end time and differential. The setting range of differential is from -15℃ to 15℃. The differential means the hot water temperature difference with the original setting. When you set "No" to "Yes" this time zone will be effective.

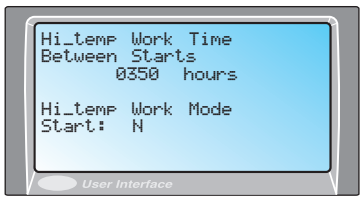
Note

Each time zone is not allowed to set overlapped.
Proper setting of the demanding hot water temperature in the high electricity cost periods will help to reduce power consumption.

- ***Menu 1.4*** **High_Temp Mode**



Temperature: 70℃ (default)
Setting range: 20~70℃



To prevent legionella growth in the hot water cylinder, the hot water can increase the hot water at regular interval.
Once a week the domestic hot water cylinder is increased to a temperature of 70℃. The different temperature and period can be set by local rules.

When you set "No" to "Yes", this high temp mode will be effective.

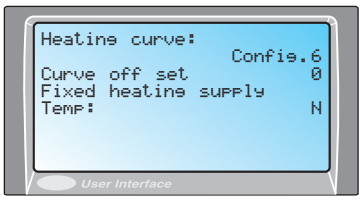
Menu 2 HEATING SETTING

2.1 **Heating curve**
2.2 **Heating supply temperature**
2.3 **Heating timer setting**

Before Heating Setting

Before heating setting and adjustment, please confirm the temperature limit of heating system. There are two heating systems: floor system and radiator system. For floor system, the supply temperature should be from 35℃ to 45℃. For radiator system, the supply temperature should be not below 50℃. Please select heating supply temperature carefully.
Heating supply temperature depends on many factors, such as water pump, pipeline design, heating equipment sort and house heat insulation etc.

- ***Menu 2.1*** **Heating curve**



Heating curve: 6 (default)
Setting range: 1~10
The menu shows the heating curve. You can increase or decrease the heating curve by changing "Grade No." The No. is available from 1 to 10.
The supply temperature is adjusted by changing the heating curve. The heat pump calculates what the supply temperature should be for water that is sent out in the heating system. Lower the outdoor temperature, the higher the supply temperature required.

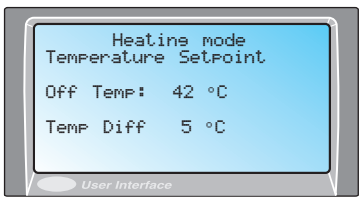
Curve offset: 0 (default)
Setting range: –5~+5
When heating curve has been selected, if you wish to increase or reduce the supply temperature, change the curve offset parallelly.

Note

·Wait 24 hour before making a new setting, so that the room temperature has time to stable.
·If it is cold outdoors and the room temperature is too low, increase the curve slope by one step.
·If it is cold outdoors and the room temperature is too high, lower the curve slope by one step.
·If it is warm outdoors and the room temperature is too low, increase the curve offset by one step.
·If it is cold outdoors and the room temperature is too high, lower the curve offset by one step.

Fixed heating supply temperature
Sometimes (e.g. heating a buffer tank to a constant temperature) you need the stable supply temperature then you can set to fixed heating supply.
You can change the "N" to "Y' then the heat pump will work with fixed supply temperature. And you can adjust the supply temperature in menu 2.2.

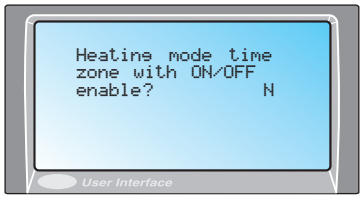
- ***Menu 2.2*** **Heating supply temperature**

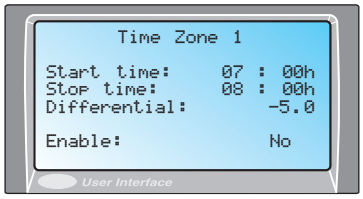


Fixed supply temp setting: 42℃ (default)
Setting range: 20~60℃

Set fixed supply temperature value. The default setting is 42℃, the setting range is from 20℃ to 60℃. In this mode, heat supply temperature wil not be affected by heating curve or outdoor temperature.

- ***Menu 2.3*** **Heating timer setting**





When you select the heating mode time zone to "Y", you can turn to the time zone setting submenu. You can set toal 6 time zones one day.

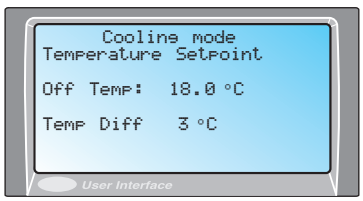
Each time zone has start time, end time and differential. The setting range of differential is from -15℃ to 15℃. The differential means the supply temperature difference with the original setting. When you set "No" to "Yes" this time zone will be effective.

Note

Each time zone is not allowed to set overlapped.
Proper setting of the demanding supply temperature in the high electricity cost periods will help to reduce power consumption.

Menu 3 COOLING SETTING

- ***Menu–3.1*** **Cooling supply temperature**



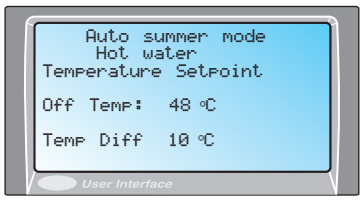
Supply temp setting: 18℃ (default)
Setting range: 5~30℃

Temp diff setting: 3℃ (default)

Setting range: 2~9℃

Set supply temperature value. The default setting is 18℃, the setting range is from 5℃ to 30℃. In this mode, cool supply temperature wil not be affected by cooling curve or outdoor temperature.

- ***Menu–3.2*** **Hot water temperature**



Temp setting: 48℃ (default)
Setting range: 37~60℃

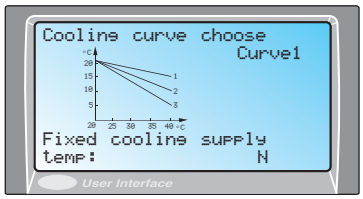
Temp diff: 6℃ (default)
Setting range: 5~10℃

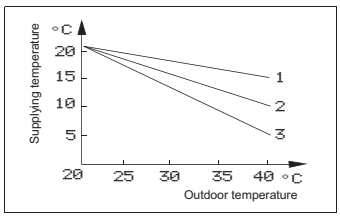
Note

The hot water temperature must be set here in auto summer mode.

If the temperature difference is too low, the heat pump will start more frequently. It is necessary to set the difference in a proper value to save your power consumption.

- ***Menu–3.3*** **Cooling curve**





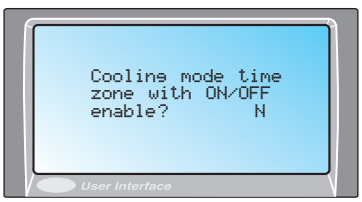
Cooling curve: 1 (defaut)
Setting range: 1~3
The menu shows the cooling curve. You can increase or decrease the cooling curve by changing "Grade No." The No. is available from 1 to 3.
The indoor temperature is adjusted by changing the cooling curve. The heat pump calculates what the supply temperature should be for water that is sent out in the cooling system. Higher the outdoor temperature, the lower supply temperature required.

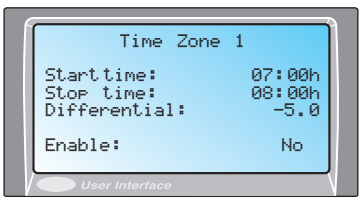
Note

·If the room temperature is too high, lincrease the curve slope by one step.
·If the room temperature is too low, decrease the curve slope by one step.

Fixed cooling supply temperature
Sometimes (e.g. cooling a buffer tank to a constant temperature) you need the stable supply temperature then you can set to fixed cooling supply.
You can change the "N" to "Y' then the heat pump will work with fixed supply temperature. And you can adjust the supply temperature in menu 3.1.

- ***Menu 3.4*** **Cooling timer setting**





When you select the cooling mode time zone to "Y", you can turn to the time zone setting submenu. You can set toal 6 time zones per day.

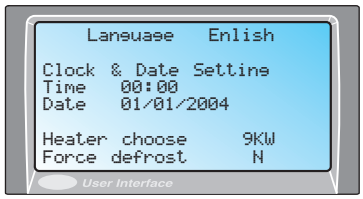
Each time zone has start time, end time and differential. The setting range of differential is from -15℃ to 15℃. The differential means the supply temperature difference with the original setting. When you set "No" to "Yes" this time zone will be effective.

Note

Each time zone is not allowed to set overlapped.
Proper setting of the demanding supply temperature in the high electricity cost periods will help to reduce power consumption.

Menu 4 HEAT PUMP SETTING

- ***Menu 4.1*** **Language**



Select language in this menu.

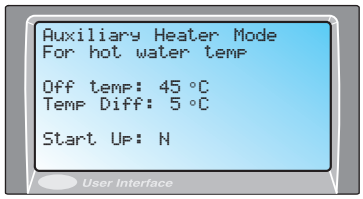
- ***Menu 4.2*** **Clock & date**

Set clock & date in this menu.

- ***Menu 4.3*** **Force defrost**

You can defrost manually when the heat pump can not defrost completely.

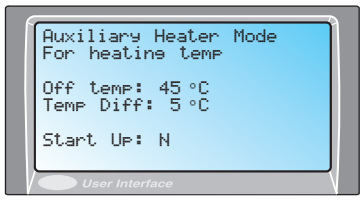
- ***Menu 4.4*** **Temperature setting under AUX HEATER mode**



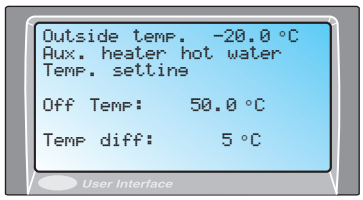
Aux heater output: 9kw
Setting range: 3,6,9kw

Set max. aux. heater capacity of heat pump. The factory setting is 9kW. 3, 6, 9kw is available.

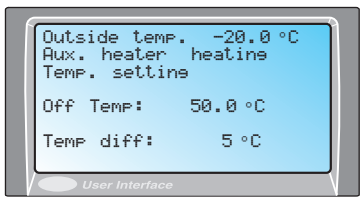
You can set the the setpoint of hot water in auxiliary heater mode.



You can set the the setpoint of heating in auxiliary heater mode.



When the outdoor temperature is lower than -20℃， the compresoor can not work again. The auxiliary heater will help to make hot water and heating hereafter.

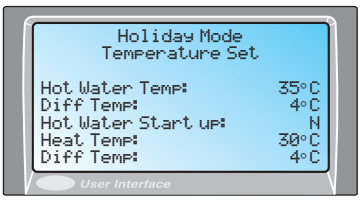


You can set the the temp. of hot water and heating here.

Note

Don't set the temperature too high because the auxiliary heat will cause more energy consumption.

- ***Menu 4.5*** **Holiday setting**

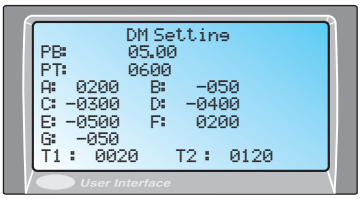


Hot water temp: 35℃
Setting range: 25~50℃

Heating supply temp: 30℃
Setting range: 20~50℃

If holiday mode is set,heat pump runs in holiday mode automatically. In the meantime you can set hot water start up to "Y" then the heat pump will supply hot water.You can set the lower heating supply temperature and stop hot water to reduce the power consumption.

- ***Menu 4.6*** **Degree minute setting**



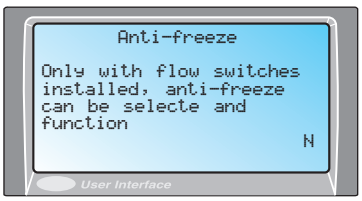
A Compressor Off value: 200 (heating)
B Compressor On value: –50 (heating)
C Aux_heater1 On value: –300
D Aux_heater2 On value: –400
E Aux_heater3 On value: –50
F Compressor Off : 200 (cooling)
G Compressor On : –50 (cooling)

The heat pump calculates heating demand by DM parameter. If heating is short or surplus, compressor and auxiliary heater will start or stop automatically.
Bigger the Compressor ON DM parameter is, compressor will starts frequently. Contrariwise, compressor will not starts frequently. But it increases change of supply temperature. Please adjust DM parameter by actual demand.
Bigger Aux_heater DM parameter is, More early auxiliary heater start. Contrariwise, auxiliary heater will start later.

Note

In the menu A~E are the DM value for compressor and auxililary heater. Don't set the other parameters (PB, PT, T1, T2).

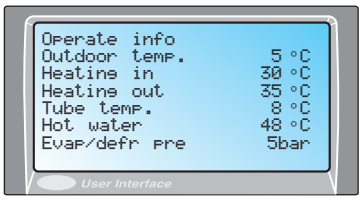
- ***Menu 4.7*** **Anti–freeze setting**



When flow switches are installed in circulation pipe system the anti-freeze function can be set.

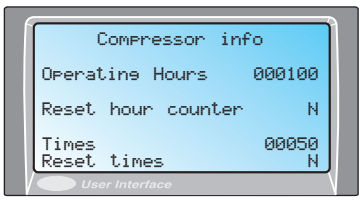
Menu 5 HEAT PUMP INFO

- ***Menu 5.1*** **Operation parameters info**



Show the current temperature of outdoor, heating in, heating out, tube, hot water temperature.

- ***Menu 5.2*** **Compressor info**



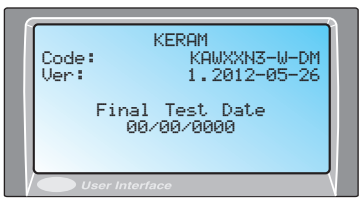
Show the total running hours and the starting times of the compressor. You can reset the hour counter to zero.

- ***Menu 5.3*** **Alarm info**

The menu shows no faults happened. The menu means no alarm. Only when there is no fault or reset after fault, does this interface displays.

The menu means there is something wrong. The problems are displayed under the event description by the time.
The first line shows date/month/year, the serial number of event and hour/minute. The second one shows the event description.
After fault reset, press the alarm button twice to exit from the fault, the heat pump can be restarted again.

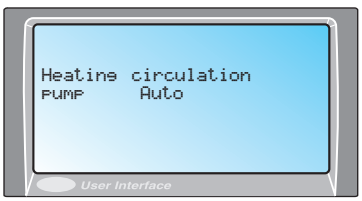
- ***Menu 5.4*** **Software info**



The menu shows the software information of the unit, the software number and the version number.
Software can be upgraded when necessary. The installer will contact to you directly and upload the updated software into your controller.

Menu 6 SERVICE

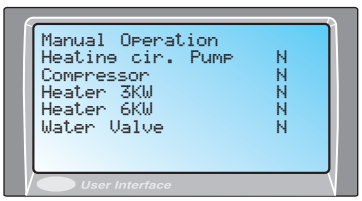
• *Menu 6.1* Circulation pump

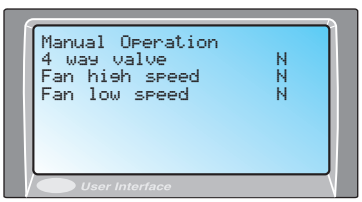


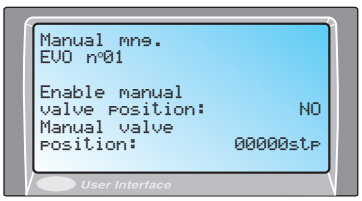
Operation mode: Auto (default)
Setting range: Auto / Continue

The heating circulation pump will operate automatically. When compressor stops the pump will stop later. The delay time can be set in menu 6.4.
You can change the running mode from "Auto" to "Continue". Then the circulation pump will work continuously whatever the compressor is running or stopping.

• *Menu 6.2* Manual operation







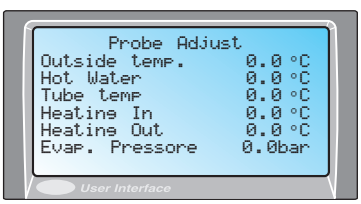
The spare parts of heat pump can be manually operated, which is convenient to check during installation and maintenance.

Note

The manual operation has to resume to "N" after checking. Don't manual operate the compressor, heater alone. It may cause damage.

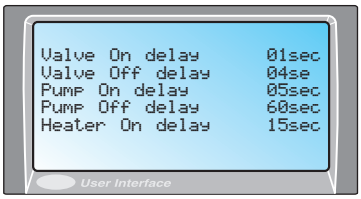
Shows open/close level of EEV when it is operated manually. Operation only by professionals.

• *Menu 6.3* Probe adjustment



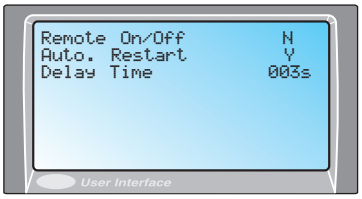
The heat pump is equipped with sevaral temperature sensors. The reading of sensors may show a small differences with the actual temperature. You can adjust the tolerance parameter in this menu.

- ***Menu 6.4*** **Delay time**



The delay time means the part starts or stops before or after the compressor.

- ***Menu 6.5*** **Remote switch**

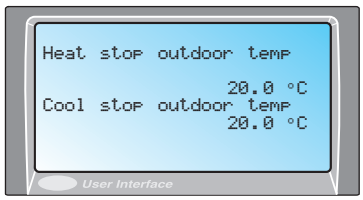


If remote switch function is actived, the compressor will turn on or turn off directly according to the on/off singal of the remote switch. The remote switch can be the manual switch, temperature switch, etc.
If a room thermostat is installed and connected to the remote switch terminal, the function can be actived.
Room thermostat is used to stop heating when room temperature reaches the setting temperature. It is convenient for you to control your room temperature to a comfortable level and sending the command of start/stop to the heat pump promptly. It's also the complementary of heating curve, saving the electricity consumption.
Remote manual switch is also can be used to start/stop heat pump. It's convenient and efficient to control heat pump by remote manual switch.

- ***Menu 6.6*** **Auto restart**

If power failure happens, the controller will remember the previous operation mode and setting parameters. When power is on again, heat pump will resume to the previous state automatically.

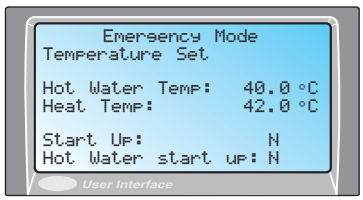
- ***Menu 6.7*** **Heat/Cool stop**



Heat stop temp: 20℃ (default)
Setting range: 10~40℃
The default setting is 20℃. It means that heat pump stops heating when outdoor temperature is high than the setting temperature.

Cool stop temp: 20℃ (default)
Setting range: 10~35℃
The default setting is 20℃.It means that heat pump stops cooling when outdoor temperature is low than the setting temperature.

- ***Menu 6.8*** **Emergency mode**

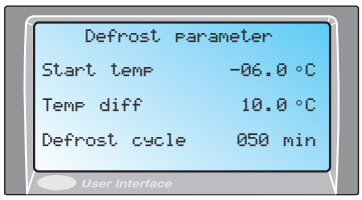


Hot water range: 35~50℃
Heating Range: 30~45℃

If heat pump is installed in cold area, the accidental malfunction can cause heat pump stop running, and heat pump or peripheral equipment are damaged by low temperature. It will bring much trouble by room temperature fall.
In this case, the compressor stop working and heat pump runs in emergency mode automatically, auxiliary heater is working now.
If need, please set this function in emergency mode. The hot water temperature in emergency mode is also set here.

Note *Too high hot water temperature will cause higher power consumption.*

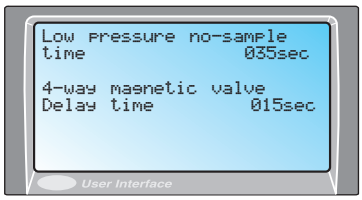
- ***Menu 6.9*** **Defrost parameters setting**



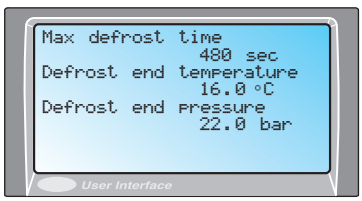
Defrost parameters can be set to achieve a better defrosting effect according to the climate conditions of where the heat pump is installed. To avoid damages of not proper running to the heat pump, every settings here have to be set by professionals.

If the defrosting effect is not good, or the unit is frequently defrosting when the evaporator is not freezing any more, please adjust the parameters show on the left interface, and observe the defrosting situation after adjustment.

The above three parameters are the three essential conditions for the unit to enter into the defrosting mode. Starting temperature refers to the coil temperature of the outdoor evaporator, temperature difference refers to the difference between the ambient temperature and evaporator coil temperature, defrosting cycle refers to the interval between each defrosting.



Low pressure no sampling time means the time controller will not detect the low pressure of the system when the unit resumes starting heating after the ending of defrosting.



The left above three parameters are the conditions of ending the defrosting mode, if only one of these three parameters is reached, the defrosting will be stopped.
Max defrost time refers to the maximum time setting of defrosting, the defrosting will be stopped when time reaches to the setting parameter.
Defrost end temperature means the defrosting will be stopped when the coil temperature of evaporator reaches to the set temperature.
Defrost end pressure means the defrosting will be stopped when the system pressure reaches to the set pressure.

- ***Menu 6.10*** **Setting new password**

You can reset the password for service manual here.

I/O CHART DEFINITION

Digital Input

Number	Name Of Switching Value Input
ID1	High pressure switch
ID2	Low pressure switch
ID3	Heating flow switch
ID4	
ID5	Fan thermal protection
ID6	Remote switch
ID7	Power phase sequence protection
ID8	Auxi electric heater overheat protection

Digital Output

Number	Name Of Switching Value Input
NO1	Heating medium circulation pump
NO2	Fan
NO3	Fan
NO4	Compressor
NO5	4-way valve
NO6	1# Electric heater
NO7	2# Electric heater
NO8	Motorized three-way valve

Analogue Input

Number	Analogue Input Name
B1	Outdoor temperature
B2	Evaporating pressure
B3	Temperature of heating water in
B4	Temperature of heating water out
B5	Temperature of tube
B6	Temperature of hot water in hot water tank

TABLE OF ALARM EVENT DESCRIPTION

Event Description	Meaning
1. Clock Board Not Installed or Broken	Clock board is not installed or loosen, broken
2. Arrears Time Alarm	Arrears time reached
3. Hot Water Temp.Probe Broken or Not Connected	Temperature probe on water heater may be disconnected or broken
4.Inlet H. Water Temp.Probe Broken or Not Connected	Temperature probe on heating medium return line may be disconnected or broken
5. Outlet H. Water Temp. Probe Broken or Not Connected	Temperature probe on heating medium feed line may be disconnected or broken
6. Outside Temp. Probe Broken or Not Connected	Temperature probe of outdoor temp. sensor may be disconnected or broken
7. Ain.2 Probe Broken or Not Connected	Room temperature probe may be disconnected or broken
8. Comp Overload High Pressure	Compressor high pressure protection
9. Heating Flow Switch	No flow running in heating system
10.Heater 1, Heater 2 Overload	Auxiliary electric heater overheat protection
11. Power Failure Alarm	Wrong phase power protection
12.Compressor Low Pressure Cutout	Compressor low pressure protection
13.H. Water Out High Temper (B)	Hot water high temperature protection, the temperature of hot water produced by auxiliary electric heater is higher than 65℃
14.H. Water Out High Temper (A)	Hot water high temperature protection, the temperature of hot water produced by compressor is higher than 55℃
15. Fan Overload	Thermal protection or the overload running of the fan
16.Evap.Pressure Probe Broken or Disconnected	The pressure sensor on the evaporator is broken or not properly connected
17.Outlet Temperature Freeze Alarm	Heating medium side temperature drops to the freezing piont
18.Tube Temp.Probe Broken or Not Connected	Defrosting temperature sensor is broken or not properly connected
19. Driver Off-Line (EVD)	Communication alarm
20. EEV Motor Error (EVD)	Electronic expansion valve motor alarm
21. Alarm EEPROM (EVD)	Electrionic expansion valve controller CPU alarm
22.Probe S1 Error (EVD)	Pressure probe S1 may be disconnected or broken
23.Probe S2 Error (EVD)	Temperature probe S1 may be disconnected or broken

INSTALLATION

GENERAL INFORMATION

Important Information/safety Regulations

Before start to install your heat pump, read the following information and regulations.

The heat pump must be installed by authorized installation engineers and the installation must follow the applicable local rules and regulations.

The heat pump should be placed in an area with a floor drain.

The heat pump should be located on a stable base.
The base must be able to support the gross weight of the heat pump.

It is important that the heating system is completely vented after installation.

Venting valves must be installed where necessary.

The hot water tank must be equipped with an approved safety valve.

Radiator systems with a closed expansion tank must also be equipped with an approved pressure gauge and safety valve, for a maximum 2.5 bar opening pressure, or according to country specific requirements.

Cold and hot water pipes and overflow pipes from safety valves must be made of heat resistant and corrosion-resistant material, e.g. copper.

The safety valve overflow pipes must have an open connection to the drain and visibly flow into this in a frost free environment.

The connecting pipe between the expansion tank and the safety valve must slope continuously upwards. A continuous upwards slope means that the pipe must not slope downwards from the horizontal at any point.

In addition to applicable local rules and regulations the installation should be carried out in a manner that prevents vibrations from the heat pump being transmitted into the house causing noise.

Don't wash the heat pump,you may receive an electric shock.

Refrigerant

Work on the refrigerant pipe must only be carried out by a certified engineer!

Although the heat pump refrigerant pipeline is filled with a chlorine-free and environmentally-approved refrigerant that will not affect the ozone layer, work on this system may only be carried out by authorized persons.

Fire risk

The refrigerant is not combustible or explosive in normal conditions.

Toxicity

In normal use and normal conditions the refrigerant has low toxicity. However, although the toxicity of the refrigerant is low, it can cause injury (or be highly dangerous) in abnormal circumstances or where deliberately abused. Refrigerant vapor is heavier than air and, in enclosed spaces below the level of a door for example, and in the event of leakage, concentrations can arise with a resultant risk of suffocation due to a lack of oxygen. Spaces in which heavy vapor can collect below the level of the air must therefore be well ventilated.
Refrigerant exposed to a naked flame creates a poisonous irritating gas. This gas can be detected by its odor even at concentrations below its permitted levels. Evacuate the area until it has been sufficiently ventilated.
Anyone with symptoms of poisoning from the vapor must immediately move or be moved into the fresh air.

Work on the refrigerant pipeline

when repairing the refrigerant pipeline, the refrigerant must not be released from the heat pump,it must be destroyed at a special plant. Draining and refilling must only be carried out using new refrigerant through the service valves.

Transport And Storage

Be careful when picking up and moving the indoor and outdoor units. Get a partner to help, and bend your knees when lifting to reduce strain on your back. Sharp edges or thin aluminum fins on the heat pump can cut your fingers.

KAW heat pump must be kept in upright position and dry while transportation or storage.

Consider the weight of the heat pump!
(See technical data)

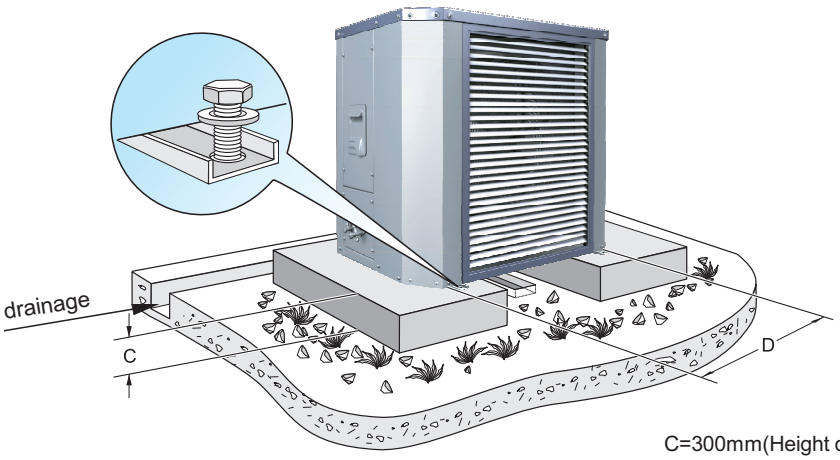
Location & Space

Choosing the outdoor unit installation location

- Avoid locations where the unit is exposed to direct sunlight or other sources of heat.
- Select a location where noise emitted by the unit does not disturb neighbors.
- Select a location where easy wiring and pipe access to the power source is available.
- Avoid locations where combustible gases may leak, be produced, flow, or accumulate.
- Note that condensate water may be produced during operation.Make sure to provide drainage around the outdoor unit if such condensate is likely to cause damage.
- Select a level location that can bear the weight and vibration of the heat pump.
- Avoid locations where the outside unit can be covered with snow. In areas where heavy snow fall is anticipated, special precautions must be taken to prevent the snow from blocking the air intake such as to install the unit at higher position or installing a hood on the air intake. This can reduce the airflow and the unit may not operate properly.
- Avoid location where the unit is exposed to oil, steam, or sulfuric gas.

In moist or uneven locations

- Use a raised concrete pad or concrete blocks to provide a solid, level foundation for the outdoor unit. This prevents water damage and abnormal vibration.
- The drainage is suggested to be built behind the outdoor unit as shown in the following figure.



C=300mm(Height of the concrete)
D=930mm(Distance between the two legs)

Figure 9

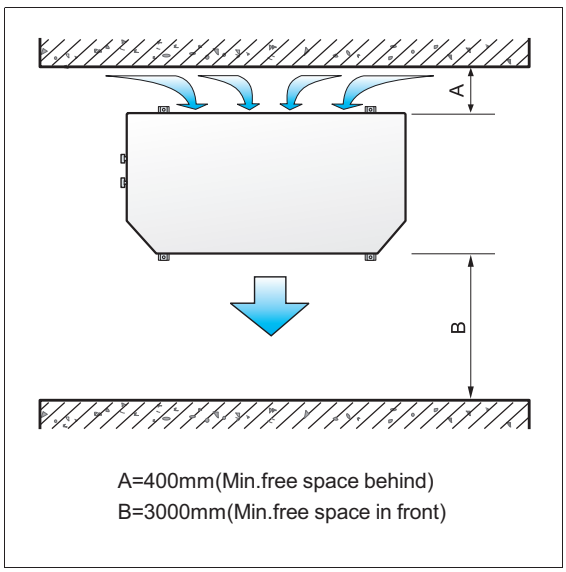
Space requirements

1. Outdoor unit

To facilitate the installation and subsequent testing and maintenance, it is recommended that there is sufficient free space around the heat pump in accordance with the following dimensions. (Figure 10)

2. Indoor unit

Figure 11 shows the best installation distance leaves to the back, forth, roof and right side, if it is installed in a wall corner.



A=400mm(Min.free space behind)
B=3000mm(Min.free space in front)

Figure 10

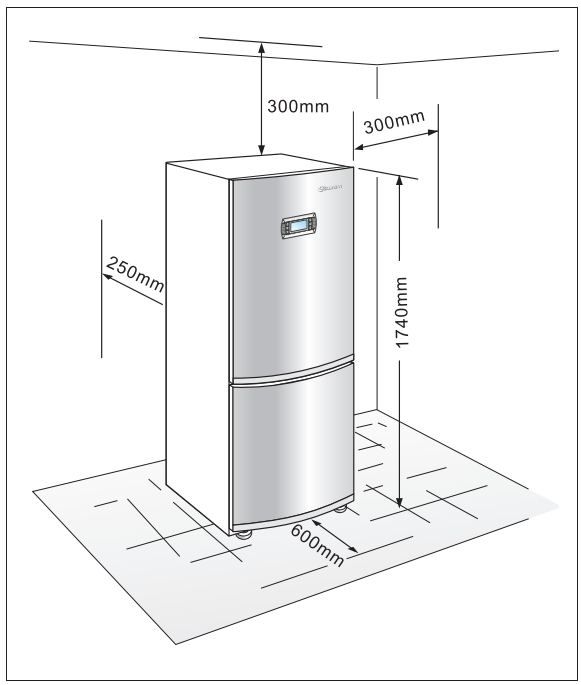


Figure 11

--- 300 mm on left or right
--- 300 mm on above
--- 600 mm in front
--- 250 mm behind

How to open the indoor unit & adjust the horizontal balance

Caution

When move the front door from frame,be careful of the communication wire between the pco[1] mainboard and control panel,the wire should be disconnected before take the front door away.

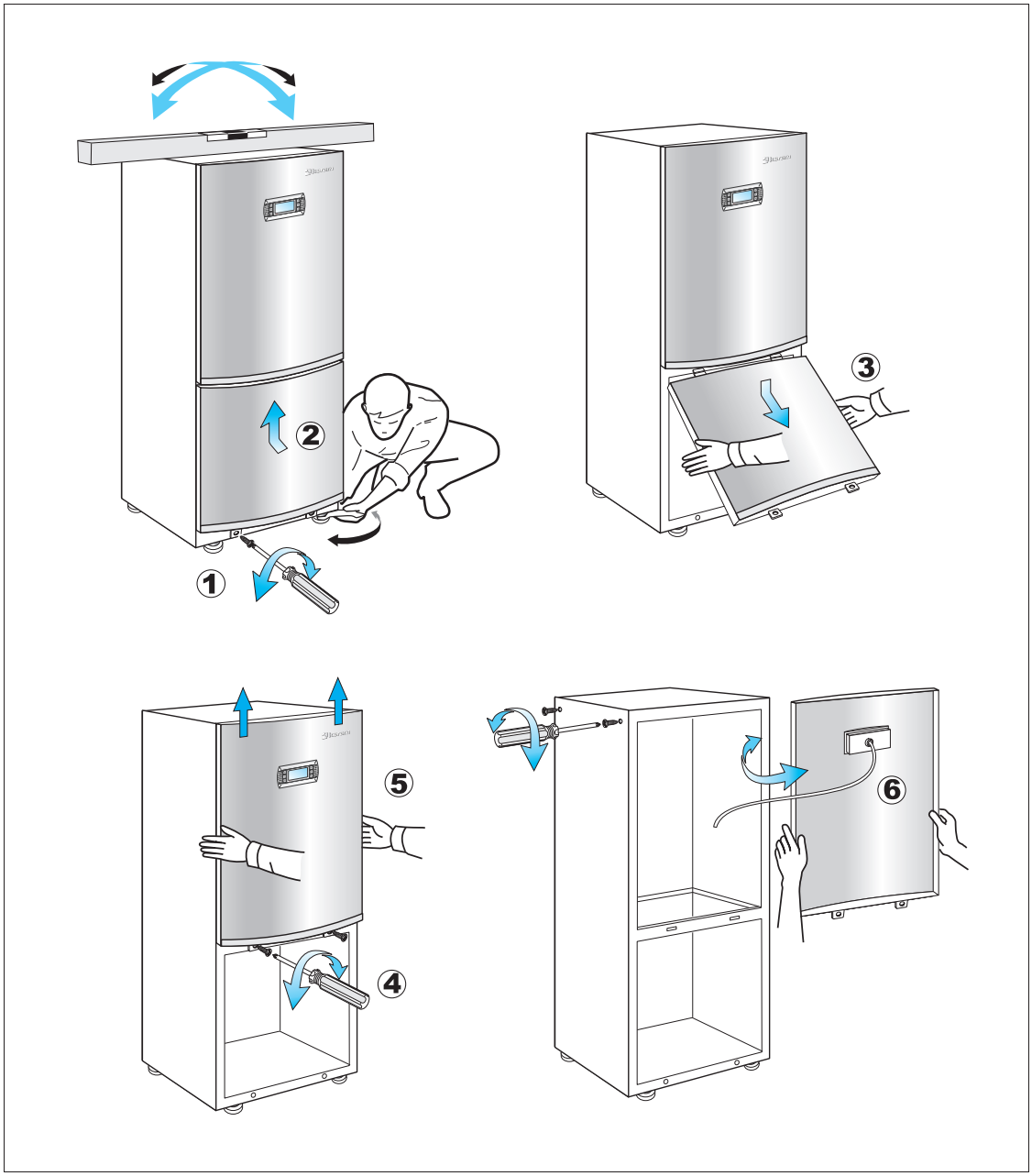


Figure 12

PIPE CONNECTION

Connection Of The Indoor /Outdoor Units

Refrigerant pipe connection between indoor/outdoor unit

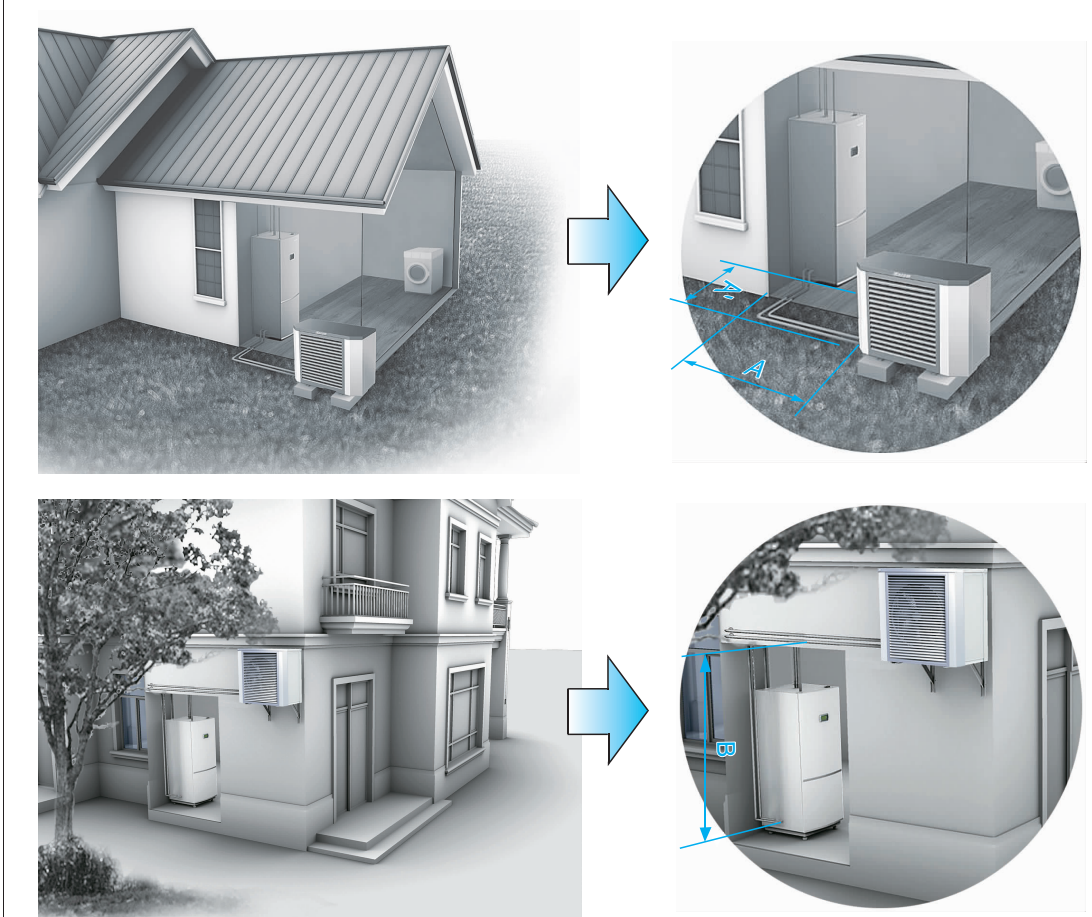


Figure 13

Connection copper tube specifications

Model	Diameter(mm)		Diameter(inches)	
	Gas tube	Liquid tube	Gas tube	Liquid tube
KAW 08	15.88	9.52	5/8``	3/8``
KAW 10	15.88	9.52	5/8``	3/8``
KAW 12	19.05	12.7	3/4``	1/2``
KAW 16	22.22	12.7	7/8``	1/2``

Maximum connection length and height difference

Maxi. Length(A+A`) m	Maxi. Height (B) m	Additional Refrigerant Adding In The Connection Pipe
15	7	If the connection pipe length or height over the Maxi.range, the adding quantity should be 20 (g/m).

- **Shut–off valve for refrigerant connection**

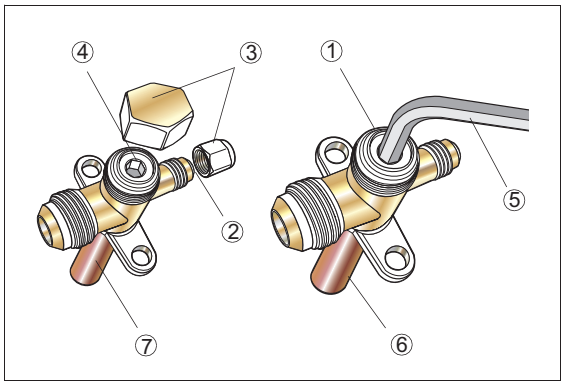


Figure 14

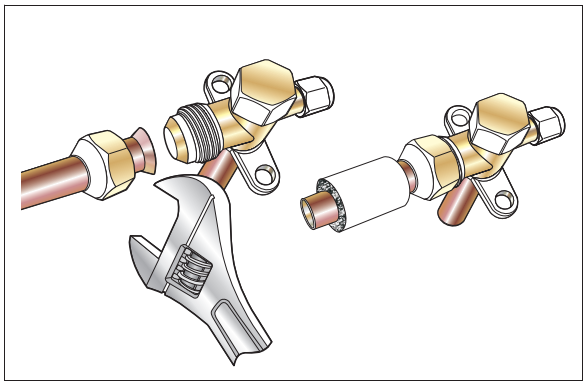


Figure 15

① Gas shut-off valve ② Schraeder valve ③ Cap
④ Liquid shut-off valve ⑤ Hexagen socket screw key ⑥ Gas line (bigger dia.)
⑦ Liquid line (small dia.)

When connecting refrigerant tubing

1. Use the flare method for connecting tubing
2. Apply refrigerant lubricant to the matching surfaces of the flare and union tubes before connecting them, then tighten the nut with a torque wrench for a leak-free connection.

- **Ball valve for refrigerant connection**

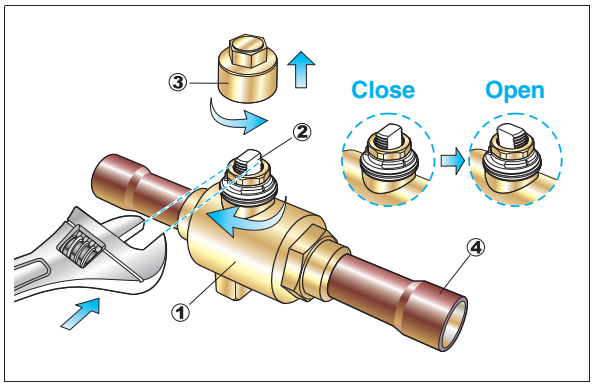


Figure 16

① Valve body ② Valve core
③ Protection cap ④ Copper tube

When connecting refrigerant tubing

1. Use brazing method for connecting tubing
2. When brazing,use wet rags or other heat protection.
3. To avoid oxidation it is advised to purge the system with nitrogen gas while brazing.

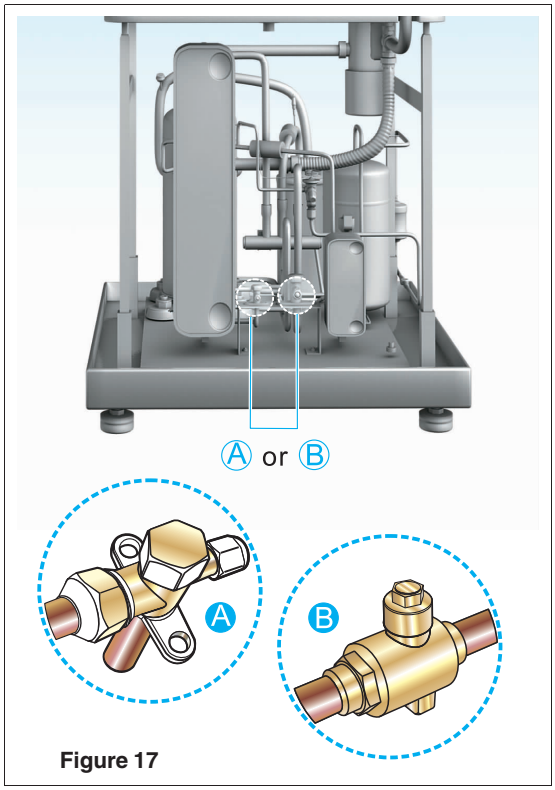


Figure 17

- **Pressure and Leakage test**

  After completetion of installation,the pressure and leakage test must be carried out.The test pressure is 30bar.

- **Purge air**

  1.Connect vacuum to the refrigeration system: using quick connect adaptor to the Schraeder , the Schraeder valve is similar to that used in cycle or car tyres.

  2. Use vacuum to purge the air in the copper line.

  3.To be sure not to use refrigerant in the outdoor unit to purge the air in the connection copper tube.

  4. Take off the cap of vapor and liquid shut-off valve.

  5.Using vacuum to evacuate the connection tube: showed in above diagram, keep the shut off valves on the outdoor unit closed, keep the shut off valves on the indoor unit opened.

  6.When the pressure get to required vacuum approved by local regulatio, open the liquid shut-off valve, keep opened 3 seconds, and close it, test the probable leakage.

  7. After inspection, open the liquid and vapor shut-off valve entirely.

  8. Fit on the cap, test the probable leakage.

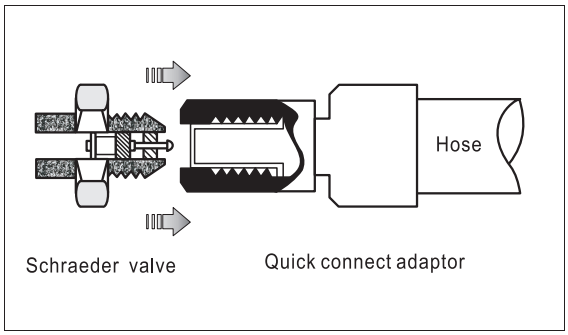


Figure 18

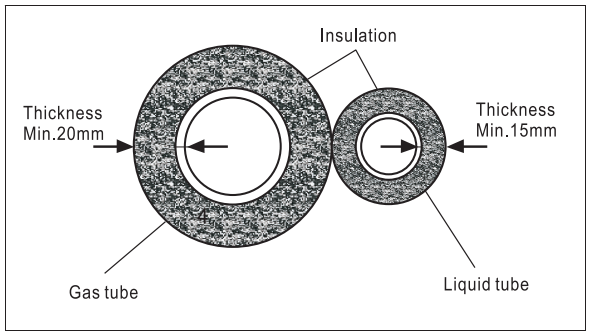


Figure 19

- **Insulation of refrigerant tubing**

  To prevent heat loss and wet floors due to dripping of condensation, both tubes must be well insulated with a proper insulation material. The thickness of the insulation of gas tube should be a min.20mm, and liquid tube 15mm.

Caution

Ventilate any enclosed areas when installing or testing the refrigeration system. Escaped refrigerant gas, on contact with fire or heat, can provide dangerously toxic gas.

Confirm upon completing installation that no refrigerant gas is leaking. If escaped gas comes in contact with a stove, gas water heater, electric room heater or other heat source, it can produce dangerously toxic gas.

Connection Of Heating

Connecting the heat pump to the heating system

It is important that ensure the pipe system has been well flushed before it is connected to the heat pump. Flushing protects the heat pump from contamination.

The heating system must be diffusion-proof. Oxygen must not enter the system. when oxygen enters the system this causes corrosion in the heat pump and clogging of the filter on the heat transfer side.

The pipes connected to the heating side (floor heating, radiator) are set on the top of the heat pump. There are two pipes, one is feed line and the other is return line. Before connecting with these two pipes, make sure there is no air in your heating pipe system. An air venting valve is suggested to be installed on the feed line.

Note

Dust filter should be installed on the inlet pipe, to make sure the dust can not enter plate heat exchanger.

Please do not use untreated water, to avoid the heat pump damage. Or, Keram will not be responsible for the damage due to the water quality.

After the pipework installation finished, flush the pipework.

Cold water pipe must be insulated to avoid condensate. May the pipe be exposed to environment below 0 ℃, electric heater should be installed on the pipe.

Anti-freeze!

In the winter, to avoid plate heat exchanger damaged due to freezing, please be sure not cut off the power, when the temperature drops to some temperature points,the heat pump will start automatically to protect freezing; you can also let the heat pump produce heating water to avoid freezing ,to protect plate heat exchanger.

If the heat pump is not used for a long time,drain the water in plate heat exchanger and pipe,to avoid heat pump damage due to freezing.

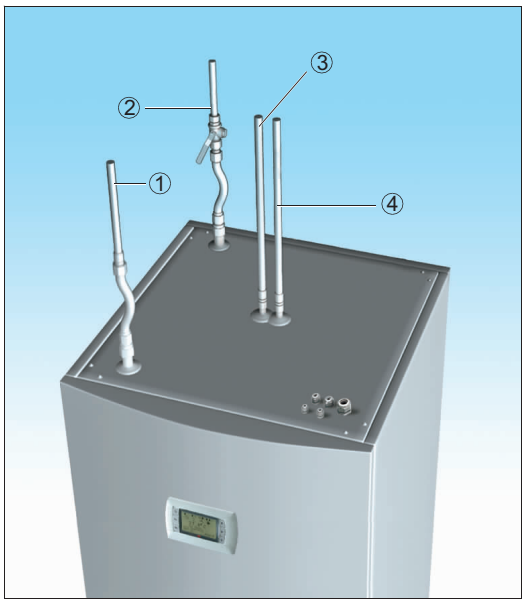


Figure 20

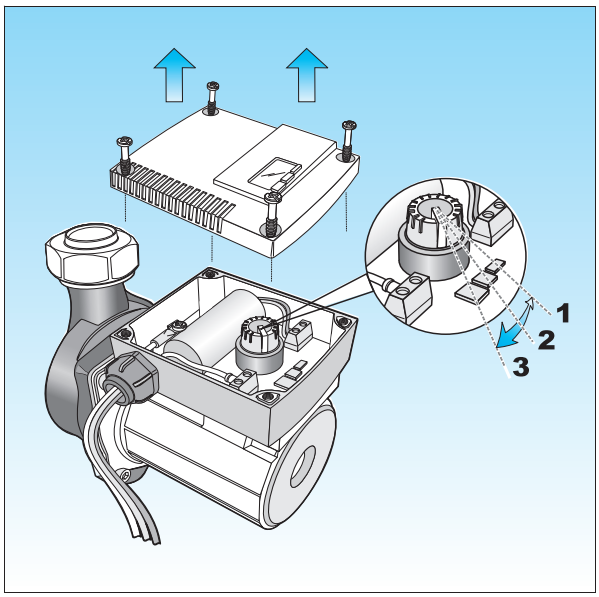


Figure 21

① Heating medium feed line
② Heating medium return line
③ Hot water line
④ Cold water line

How to select the speed switch to control the water flow in heating circulation

(See the structure of water pump on figure 21)

Adjust the flow by selecting the speed switch 1,2 or 3. Factory setting is on 3.

Our experience to share with the customers is, normally, to maintain the flow temperature difference between the heating medium out and heating medium in at 4-10 ℃.The temperature over 10℃ or less than 4 ℃means the flows are slower or faster,adjust the speed switch to the normal level.If the difference is too large,the heat pump will occur high pressure protection.In this case,the compressor will stop working,you need to reset the control panel for restarting the compressor.

Selection of heating circulation pump

The heating circulation pump is supplied by manufacturer as a standard outfit for the unit.
The circulation pump performance curve as below,

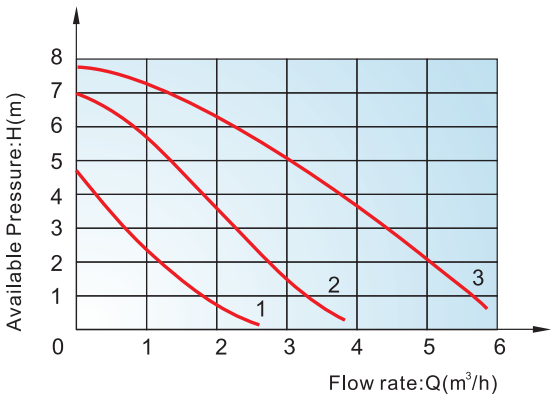


Figure 22: KAW8/10/12

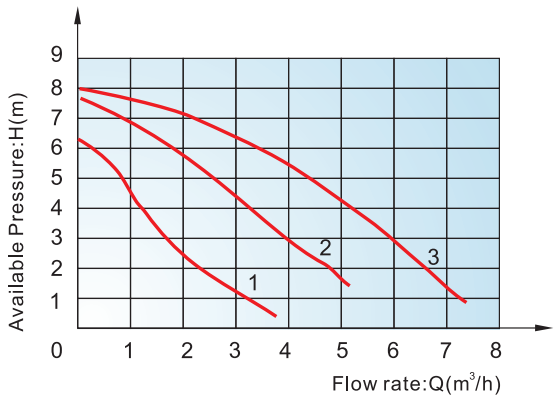


Figure 23: KAW16

Flow switch protection of heating system

A flow switch is suggested to be installed(by installer) on the pipe of heating medium feed line to make sure the heating system can work properly. When the heating circulation pump starts to work, if there is no flow in heating system, the control panel will send alarm signal and heat pump will stop working.(Electrical wiring connection see page 40)

Domestic hot water tank

The domestic hot water tank has a stainless steel internal water tank.
The inner heat exchanger is stainless steel bellows pipe.

① Cold water line
② Hot water line
③ Anti-corrosion magnesium rod
④ Internal stainless hot water tank
⑤ Polyure thane foam insulation
⑥ Outer steel cabinet
⑦ Inner heat exchanger

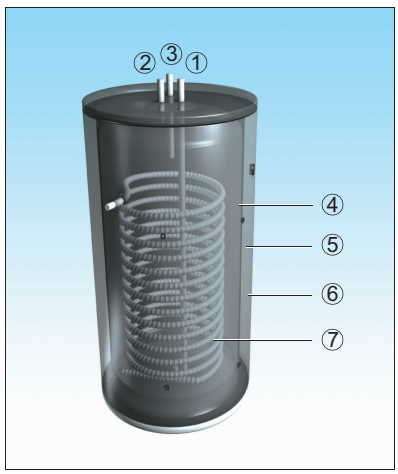


Figure 24

Hydraulic intergation

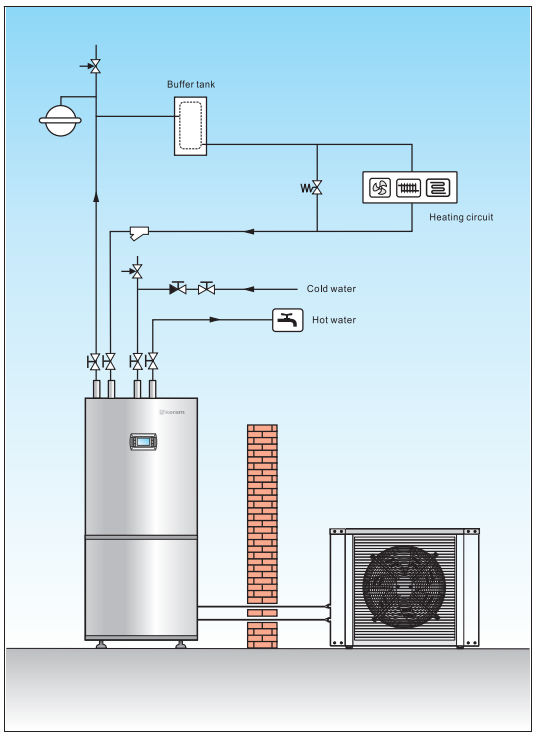


Figure 25 Standard Installation

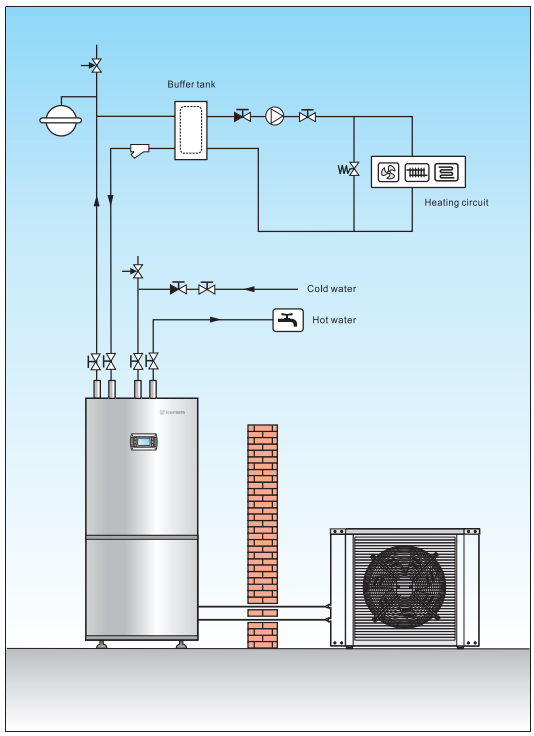


Figure 26 Standard Installation+Secondary Water Pump

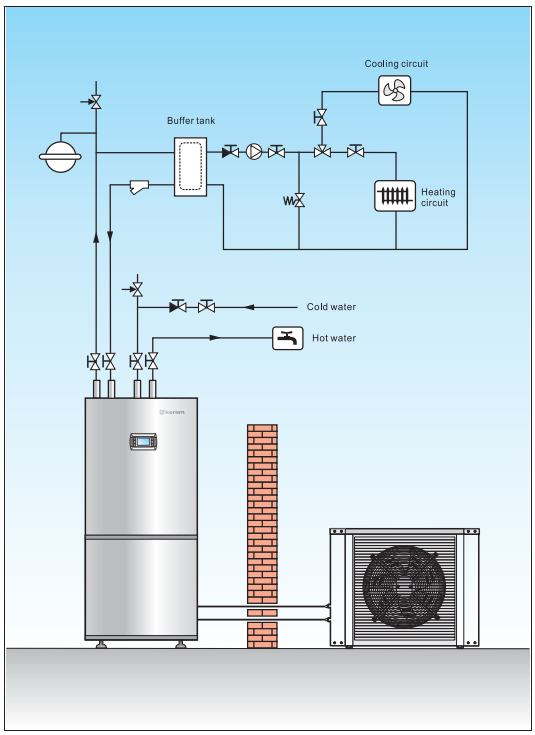


Figure 27 Standard Installation+Cooling

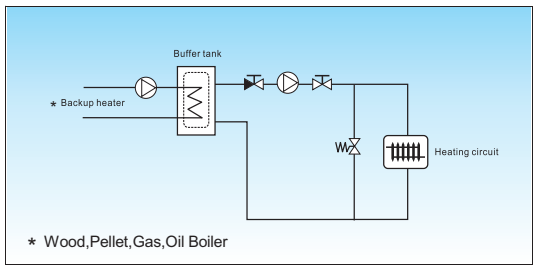


Figure 28

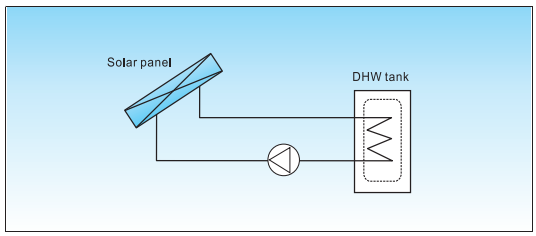


Figure 29 Solar Panel Installation

Safety valve
Shut-off valve
Expansion vessel
Overflow vessel
Shut-off/Check valve
Circulation pump
Filter
Fan coil
Radiator
Floor heating

Safety valve

The safety valve of the water heater protects the closed heater against positive pressure. It is quite normal that the safety valve lets out small amounts of water when the water heater is being charged, especially if a lot of water was used previously.

Note

When heated, water tends to expand which causes some water to be let out through the overflow pipe. This water may be hot! The overflow pipe should therefore discharge into a floor drain placed so that nobody can be hurt.

Expansion vessel

The expansion vessel can be used to compensate the expansion of the heating water. The dimension of the expansion vessel is calculated by the volume of heating system and the maximum working temperature.

Overflow valve

The overflow valve is used to maintain the flow through the heat pump. If the room thermostats are used, it can cause the volume flows in the heating circuit to fluctuate. The fluctuation can be compensated by the overflow valve. It is important to ensure the minimum heating flow for the heat pump.

Note

The overflow valve can not be closed too tightly. Otherwise the minimum heating flow through the heat pump can not be guaranteed.

Buffer tank

The buffer tank must be installed for air source heat pump.

Sometime the heating circuits are opened individually because most of the thermostat valves are closed. This will cause the supply line temperature rises quickly and the heat pump stops prematurely. The heat pump perhaps starts to work frequently. It will cause the extra energy consumption. If the heating system is installed with buffer tank will effectively prevent this happening。

Secondly, the use of the buffer tank heat pump units in defrost during the heating system will not produce very big effect to defrost and have certain help.

ELECTRICAL CONNECTION

Important Information/Safety Regulations

Note

Electrical installation and service must be carried out by an authorized electrician and must follow applicable local and national regulations.

Danger to life

Be care of electrical current

The terminal blocks are live and can be highly dangerous due to the risk of electric shock. The power supply must be isolated before electrical installation is started. The electrical installation must be carried out using permanently routed cables in accordance with the local wire rules.

It must be applied to isolate the power supply using an all-pole circuit breaker that provide full disconnection under over-voltage category III.

Power supply

A voltage variation of ± 10% of nameplate utilization voltage is acceptable.

Three-phase system imbalance shall not exceed 2%.

Safety switch

All heat pumps must be fitted with a safety switch.

Earthing well

The heat pump should be earthed well, to prevent components damage and electric shock!

The inlet and outlet of sanitary hot water pipe must be permanently and reliably connected to protective earthing.

Earth–fault breaker

If the building is equipped with an earth-fault breaker, then a separate earth-fault breaker for the heat pump is recommended. Comply with local applicable regulations.

Fuse ：230V/50Hz, 10A

Power cable: Power supply cable specification used for heat pump：3N~400V 5 wires,each wire is 6mm²

Location Of Components On The Electrical Panel

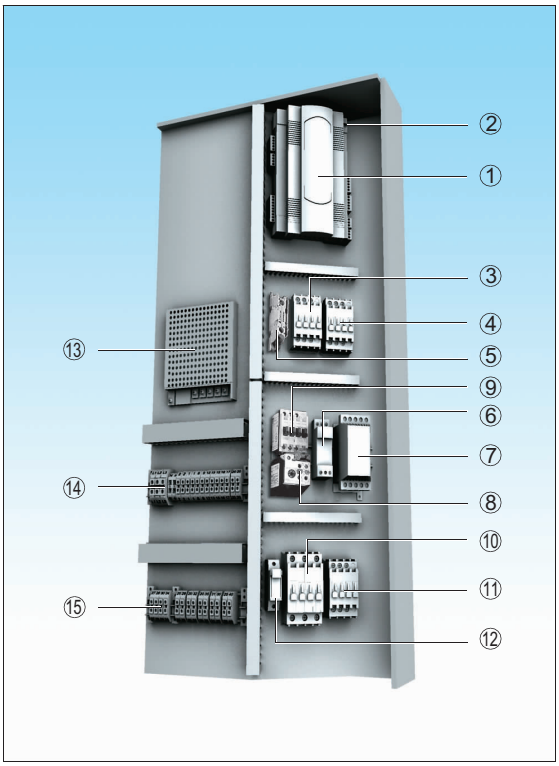


Figure 30: 3N~400V Power/Fan(Standard model)

1. Main board of control
2. Socket of communication wire to control panel
3. Contactor 1 of fan
4. Contactor 2 of fan
5. Assistant interface of contactor
6. Wrong phase protector(Power phase sequence protection)
7. Soft starter
8. Thermal relay
9. Contactor 3 of fan
10. Contactor (6kW Auxiliary electric heater)
11. Contactor (3kW Auxiliary electric heater)
12. Fuse
13. 24V DC power
14. Power connection terminal block
15. Connection terminal block

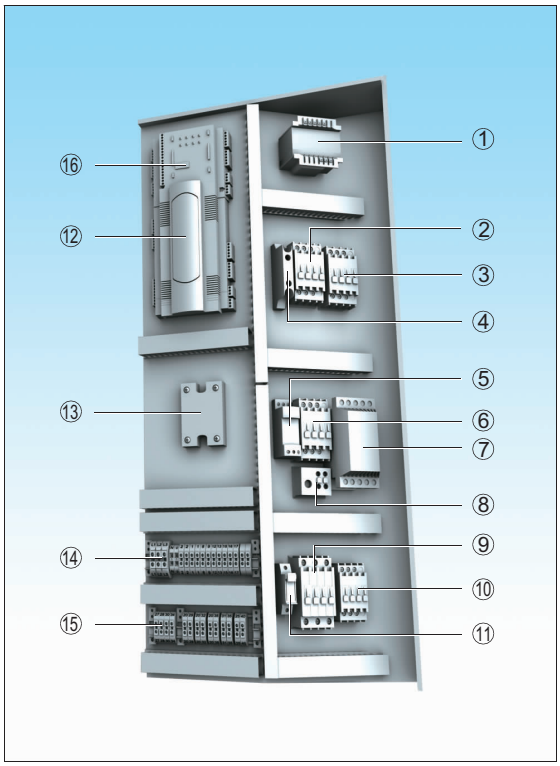


Figure 31: 3N~400V Power/Fan(Electronic expansion valve)

1. 24v AC power
2. Contactor 1 of fan
3. Contactor 2 of fan
4. Assistant interface of contactor
5. Wrong phase protector
6. Contactor 3 of fan
7. Soft starter
8. Thermal relay
9. Contactor (6kW Auxiliary heater)
10. Contactor (3kW Auxiliary heater)
11. Fuse
12. Main board of control
13. Relay
14. Power connection terminal
15. Connection terminal board
16. EVD

KAW N3 Wiring Diagram

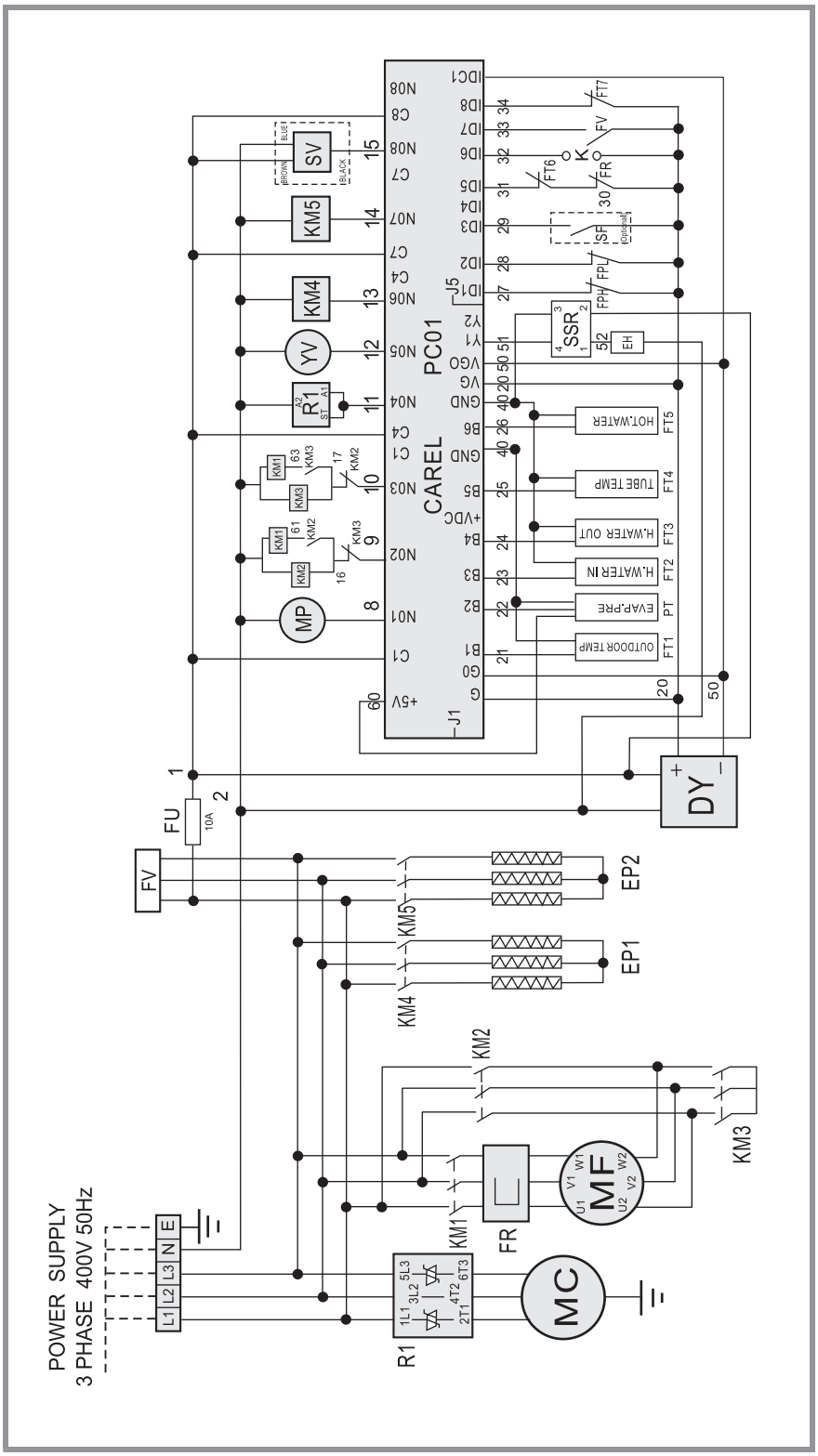


Figure 32: KAW N3 WIRING DIAGRAM

MC	Compressor	EP	Electric heater	FPL	Low pressure switch
MP	Circulation Pump	FU	Fuse	SF	Flow switch
MF	Fan motor	PT	Pressure sensor	K	Remote control switch
EH	Compressor crankcase heater	FT1-FT5	NTC temperature sensor	DY	DC power
R1	Soft starter	FT6	Fan thermal switch	YV	4-way valve
KM	Contactor	FT7	Heater overheat switch	FV	Power protection
SV	Electric 3-way valve	FPH	High pressure switch	FR	Thermal protector

KAW EVD Wiring Diagram

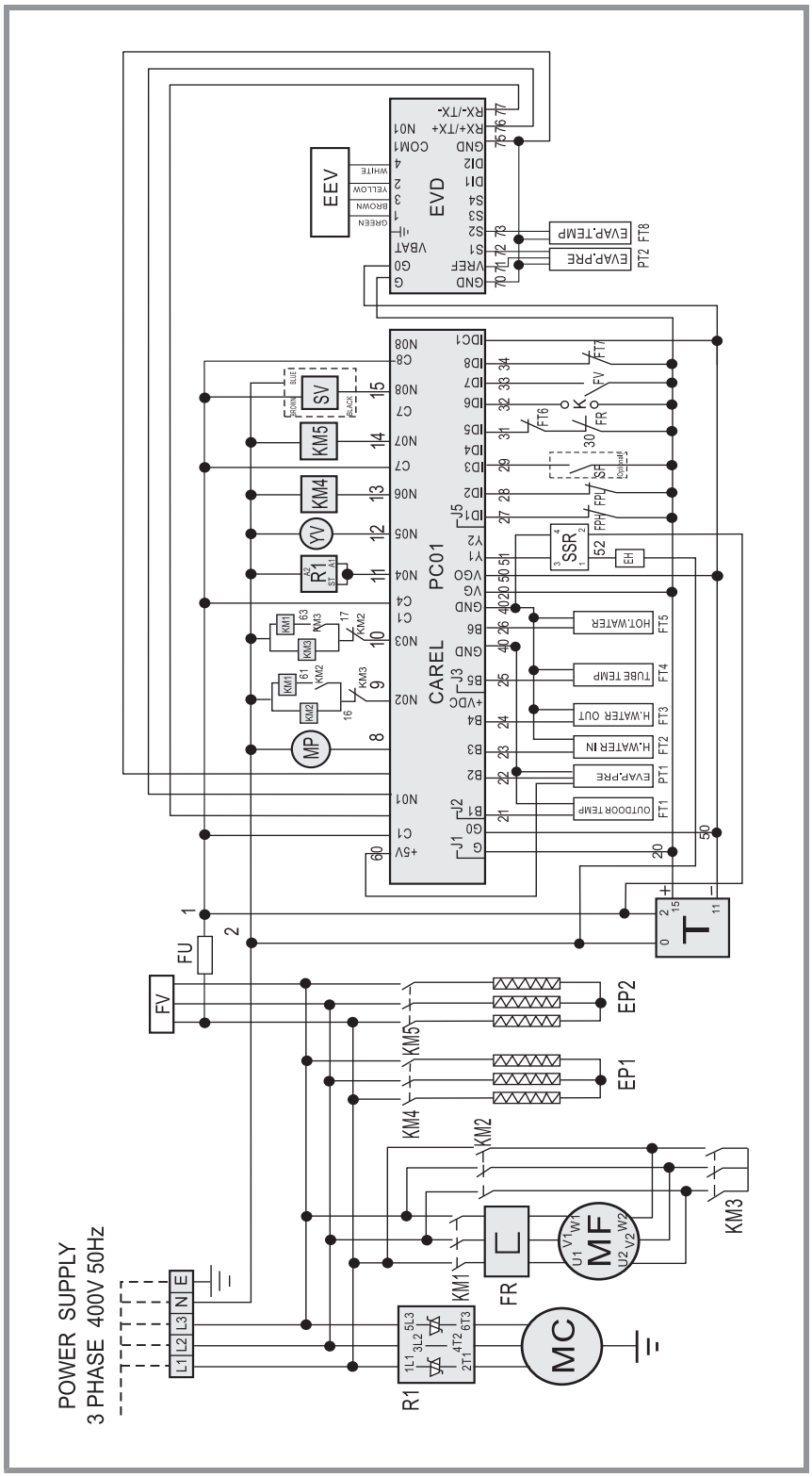
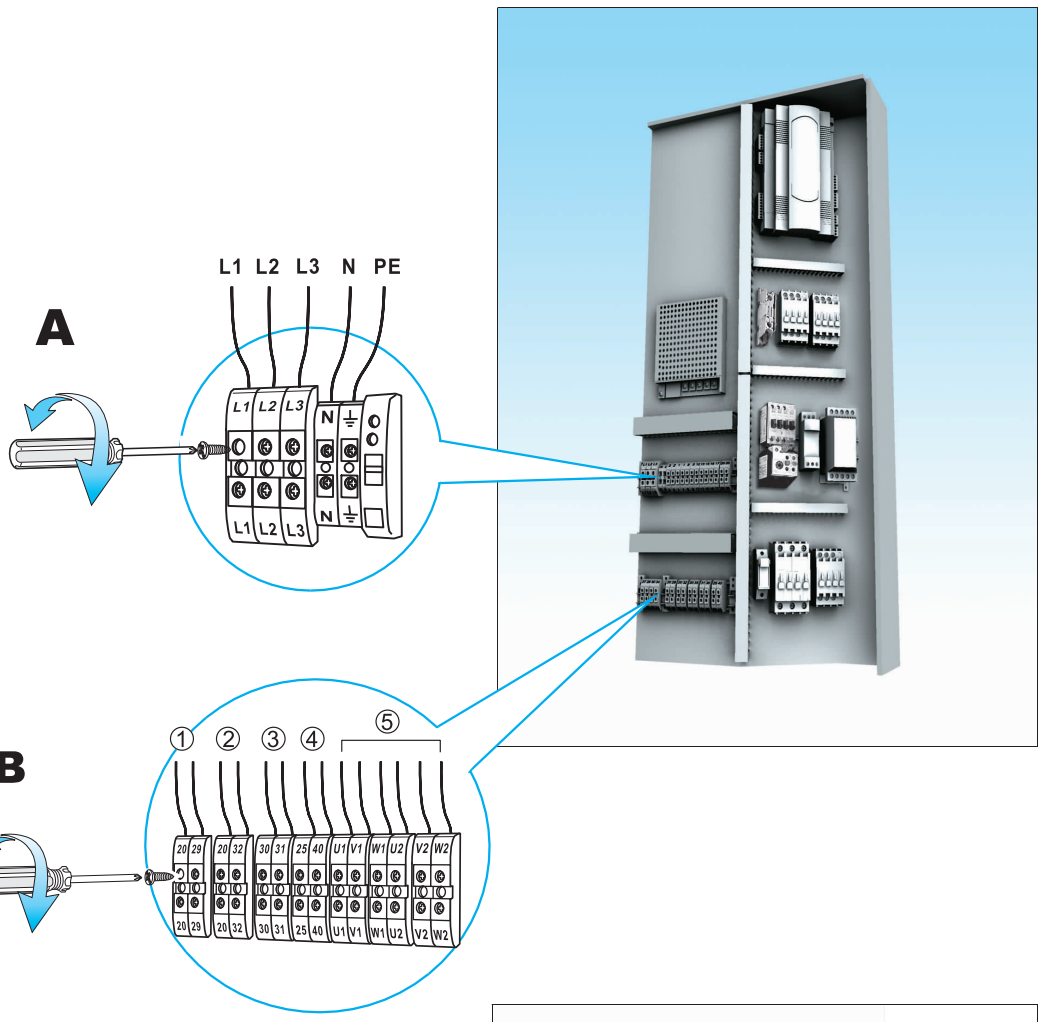


Figure 33: KAW N3 (EVD) WIRING DIAGRAM

MC	Compressor	PT	Pressure sensor	YV	4-way valve
MP	Circulation Pump	FT1-FT5	NTC temperature sensor	FV	Power protection
MF	Fan motor	FT6	Fan thermal switch	FR	Thermal protector
EH	Compressor crankcase heater	FT7	Heater overheat switch	EEV	Electric expansion valve
R1	Soft starter	FPH	High pressure switch	EVD	Electric expansion valve controller
KM	Contactor	FPL	Low pressure switch	PT2	Pressure sensor for EEV
SV	Electric 3-way valve	SF	Flow Switch	FT8	Temperature sensor for EEV
EP	Electric heater	K	Remote control		
FU	Fuse	T	Transformer		

Power Connection (3N~400V Power)



① Flow switch
② Remote control
③ Fan thermal protection
④ Defrosting temp. sensor
⑤ Fan

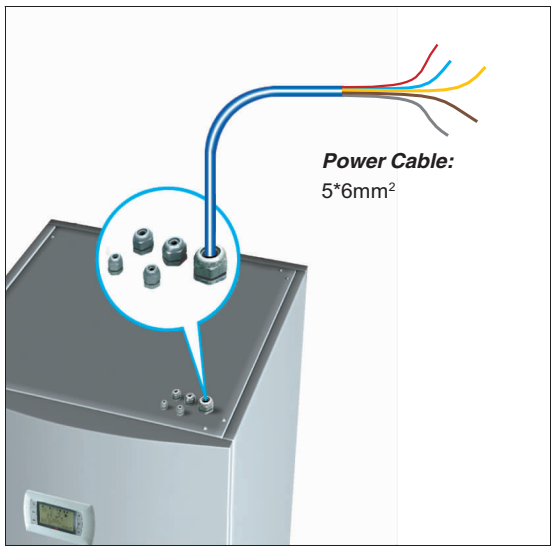
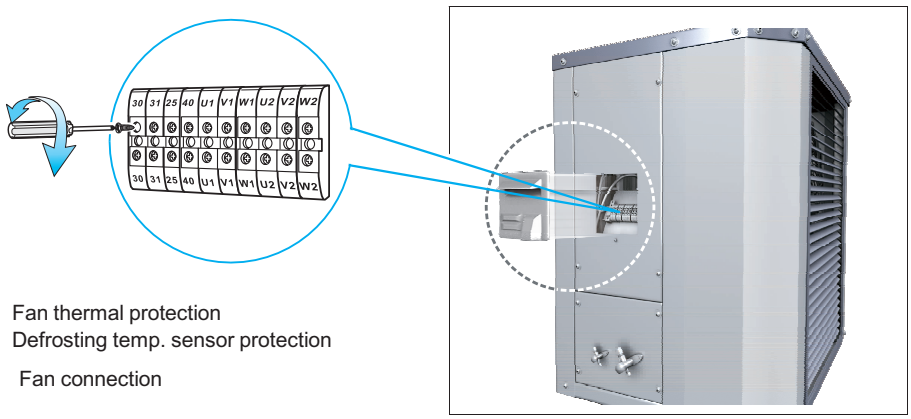


Figure 34

Electrical Connection Between Indoor/Outdoor Units(3N~400V Power/Fan)



30,31	Fan thermal protection
25,40	Defrosting temp. sensor protection
U1,V1,W1 U2,V2,W2	Fan connection

Figure 35: Connection terminal on outside unit

Install only need to connect 30 to outdoor 30, indoor 31 to outdoor 31, and so on.
The wire connecting indoor u1,v1,w1,u2,v2,w2 to outdoor u1, v1,w1,u2,v2,w2 must be at least 1.5mm^2.

Auxiliary Electric Heater

3/6/or 9KW electric heating element
Three-step capacity control:
Step 1 =3Kw
Step 2 =6Kw
Step 3 =3Kw+6Kw=9Kw

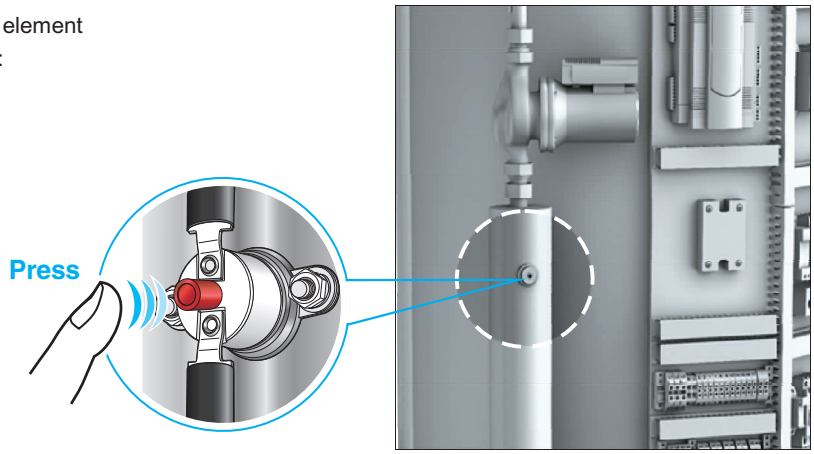


Figure 36

- **Overheat protector**

  As illustrated in the above figure, our auxiliary electric heater has an overheat protector with it. The overheat protector will protect the unit from being damaged with dry running overheat, if dry running happens, the overheat protector will cut out the electrical circuit.

  The control panel will show alarm as"Heater Overload" .

- **Reset the overheat protector**

  It can be manually reset by pressing in the button on the overheat protector. After overheat protection, If you turn on the auxiliary heater again, the heater does not work. It doesn't mean the heater is damaged.

  Call the qualified service technician, to check the overheat protector, press the reset button on the overheat protector. The auxiliary electric heater will switch on again.

Connecting The Outdoor Temperature Sensor

Installation instruction for the outdoor temperature sensor

- To avoid the direct sunshine, put the outside sensor on the north or northwest side of the house.
- To measure the outside temperature as accurately as possible, the sensor must be positioned 2/3 of the way up the facade on houses, certain protection of wind should be considered.
- The sensor must be positioned at least 1m from openings in the walls that emit hot gas.
- If the sensor cable is connected through a pipe, the pipe must be sealed so that the sensor is not affected by outgoing air.
- If the outside sensor cable runs close to power cables, shielded cable must be used.
- If a conduit is used it must be sealed to prevent condensation in the sensor capsule.

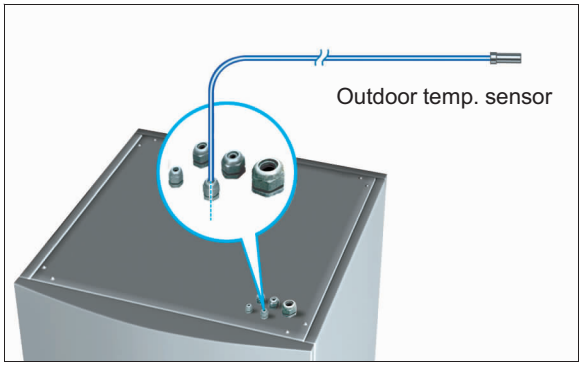


Figure 37

Note

The outdoor temperature sensor is connected with extra low protection voltage.

Remote Control Connection

The remote control connection is left for the users who put the heat pump in basement or other places far from your living area. It is used to switch on/off the heating of heat pump.

To set this function, see the controls menu 6.5

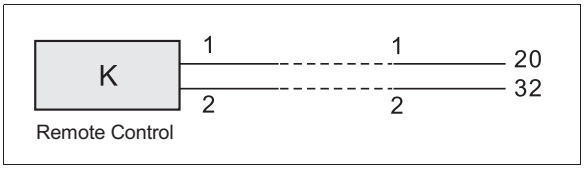


Figure 38

Flow Switch Connection

The figure shows how to make the wire connection of flow switch.

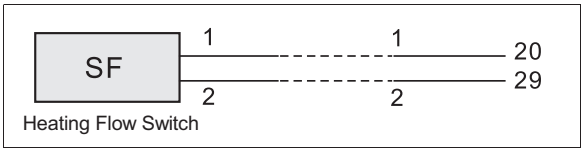


Figure 39

Defrosting Temp. Sensor Connection

The connection wire of defrosting temp.sensor is supplied as a standard kit.

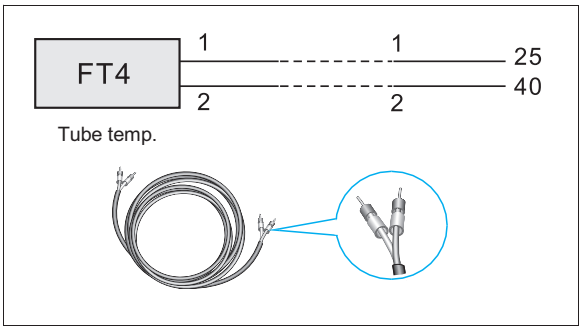


Figure 40

Fan Thermal Protection Connection

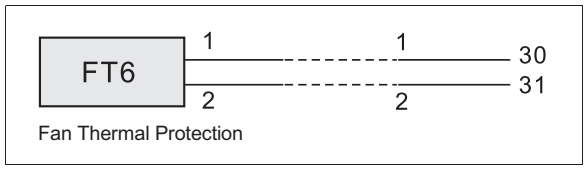


Figure 41

Fan Connection

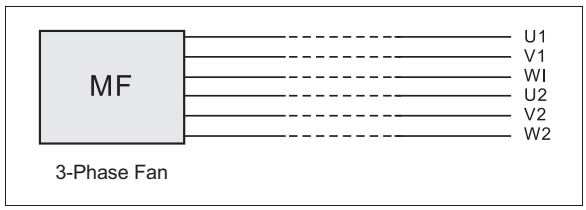


Figure 42

COMMISSIONING AND ADJUSTING

Before start up

1) Check the pipe connection.
2) Check the electrical connection.
3) Filling the domestic hot water system.
4) Filling the heating and cooling system.
5) Venting the heating and cooling system.

Note

- *If the heating circulation pump should be start during venting, it can be start in menu 6.2*
- *All the air in the pipe should be removed. It need some time to vent.*
- *The water pressure should be correct.*

Start up

1) Turn on the power.
2) Set the heat pump parameters.
3) Select the work mode.
4) Start the heat pump.

Note

- *Check the running of the indoor and outdoor unit. It is important to check the unit when it has been installed and is ready to be commissioned to ensure that everything is in order.*
- *Check temperature differece between supply and back tempertaure. It should be normal as we have discribed before. Low or high temp. difference will make the heat pump not working properly and energy saving.*
- *Don't set the heting supply temperature too high to avoid to damage to the floor.*
- *Fill the installation record table after adjusting.*

TECHNICAL SPECIFICATIONS

COMPONENTS ASSEMBLY

Indoor Unit

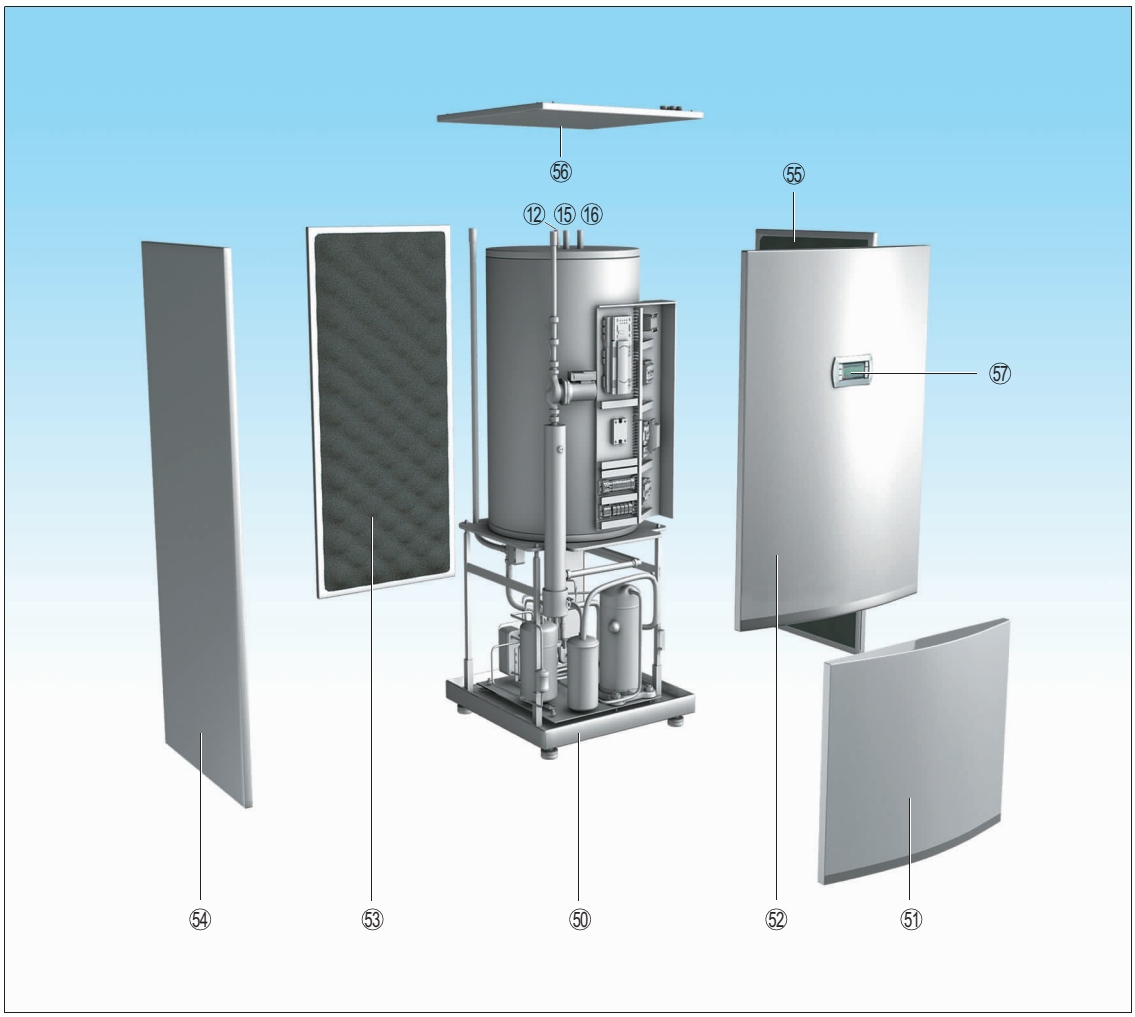
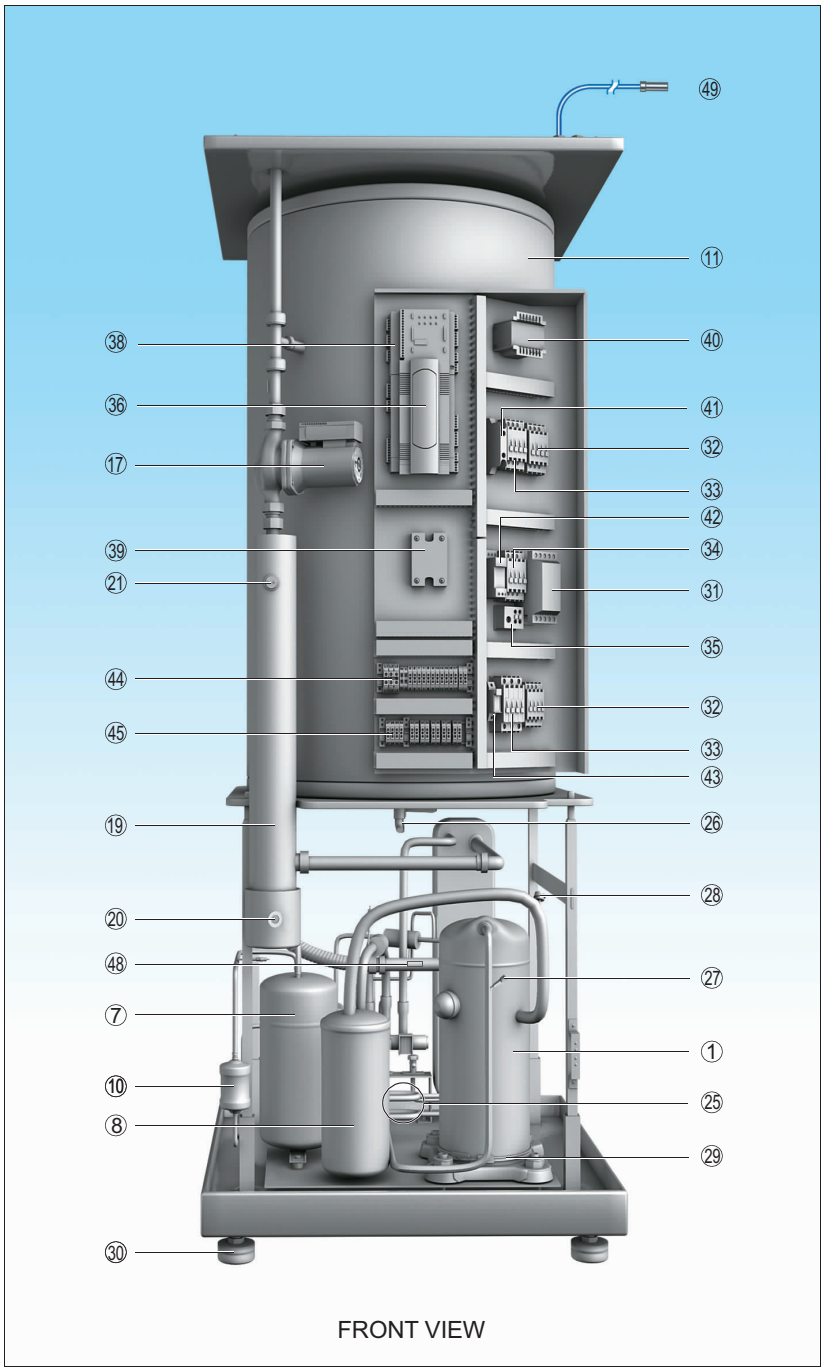


Figure 43


49
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FRONT VIEW

Figure 44

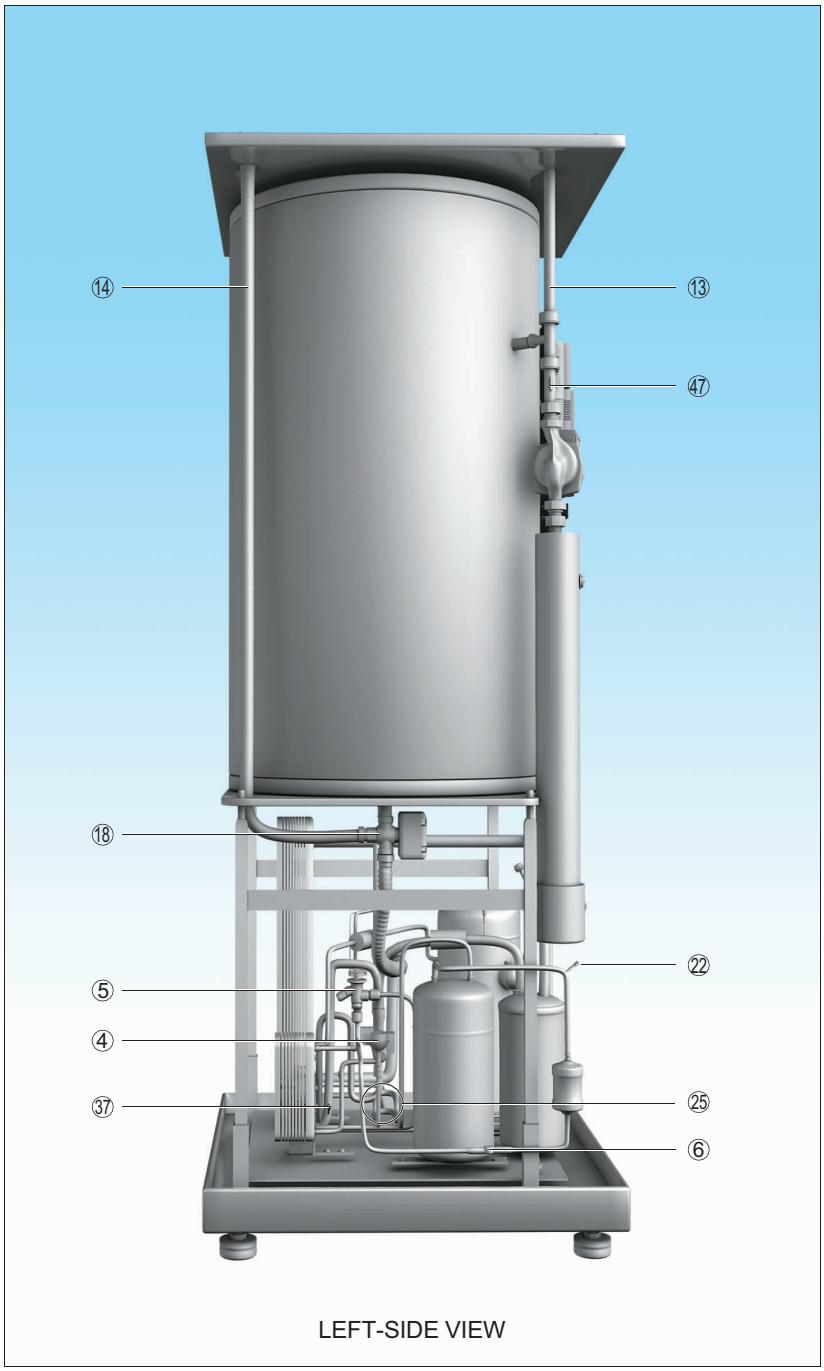


Figure 45

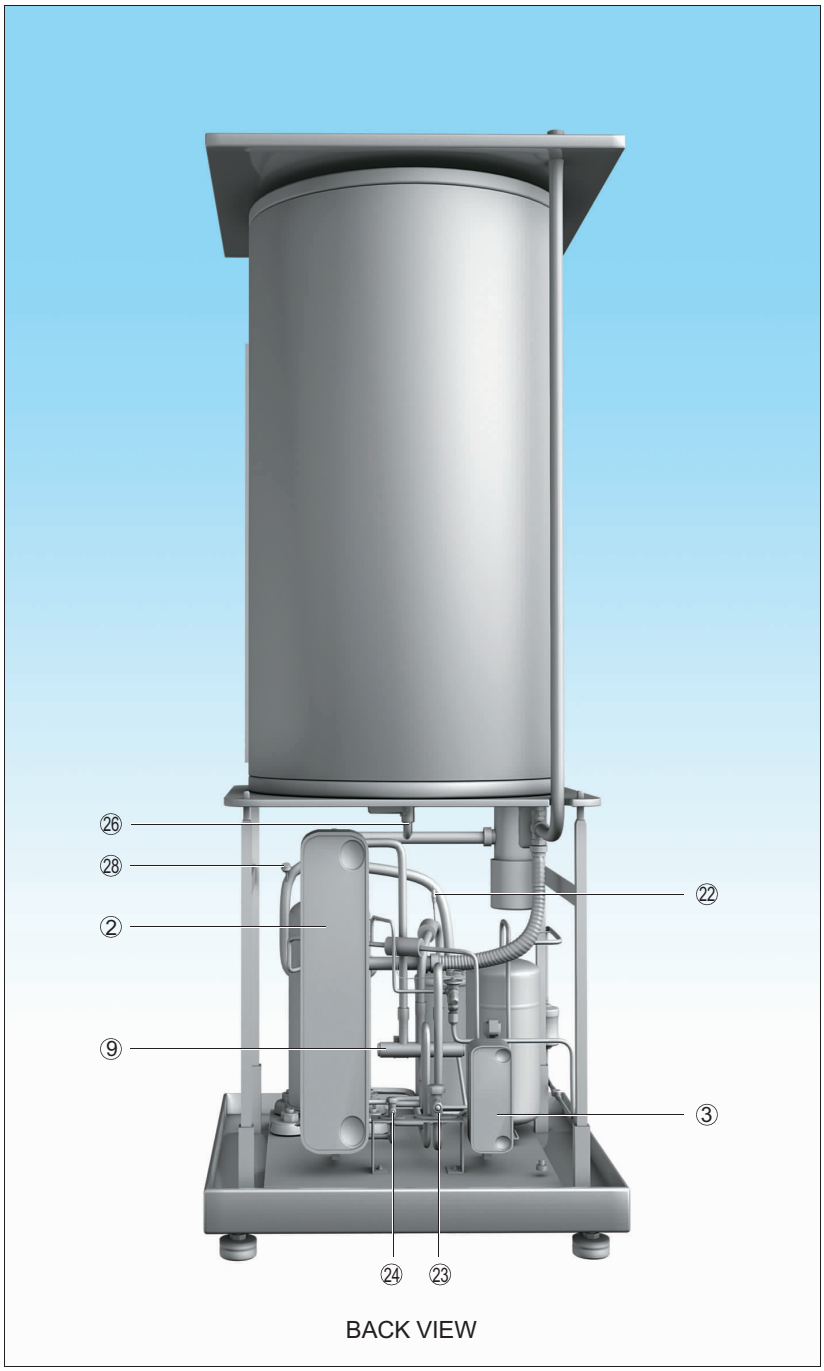


Figure 46

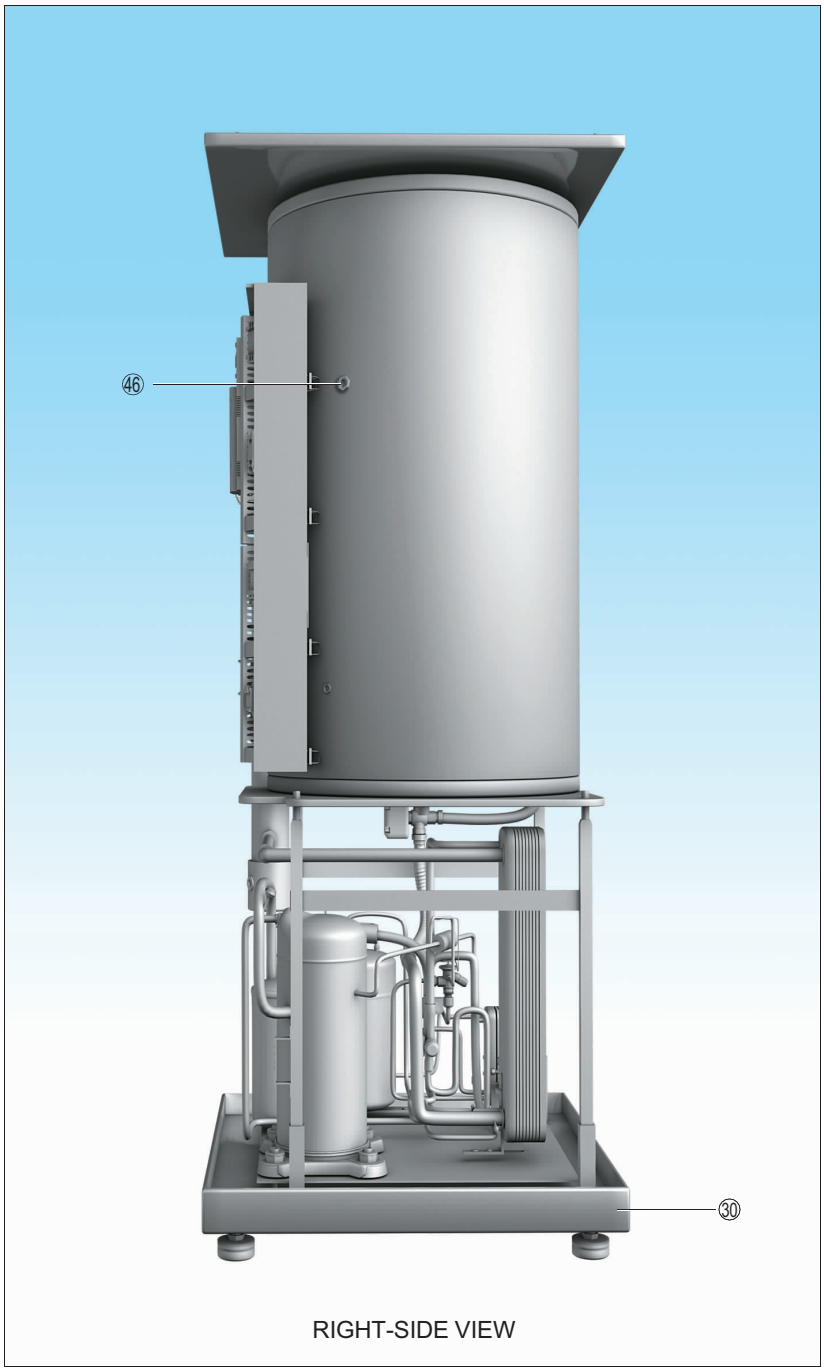


Figure 47

List Of Components

NO.	Item	Number
1	Compressor	1
2	Plate heat exchanger	1
3	Plate heat exchanger	1
4	Electrical expansion valve (EEV)	1
5	Expansion valve	1
6	Sight glass	1
7	Receiver	1
8	Separator	1
9	Reversing valve	1
10	Dry filter	1
11	Domestic water tank	1
12	Anti-corrosion rod	1
13	Pipe connection of heating feed line	1
14	Pipe connection of heating return line	1
15	Pipe connection of domestic hot water	1
16	Pipe connection of cold water	1
17	Circulation pump	1
18	Electric 3-way valve	1
19	Auxiliary electric heater	1
20	Electric box for auxiliary electric heater	1
21	Thermal protector for auxiliary electric heater	1
22	Service valve	1
23	Gas valve	1
24	Liquid valve	1
25	Check valve set	1
26	Drain valve	1
27	High pressuer switch(HP)	1
28	Low pressuer switch(LP)	1
29	Electric heater for compressor crankcase	1
30	Adjusting screws	4
31	Soft starter	1
32	Contactor	1
33	Contactor	2
34	Contactor	2
35	Overload relay	1
36	Main controller	1
37	Pressure sensor	1
38	Controller for EEV(EVD)	1
39	Solid state relay	1
40	Transformer/DC power	1
41	Contactor relay	1
42	Power phase protector	1
43	Fuse	1
44	Terminal block for power supply	1
45	Terminal block for outdoor unit	1
46	Temperature sensor/water tank	1
47	Temperature sensor/feed line	1
48	Temperature sensor/return line	1
49	Temperature sensor/outdoor	1
50	Base	1
51	Front panel botton	1
52	Front panel top	1
53	Rear panel	1
54	Left panel	1
55	Right panel	1
56	Top panel	1
57	Control panel	1

Outdoor Unit

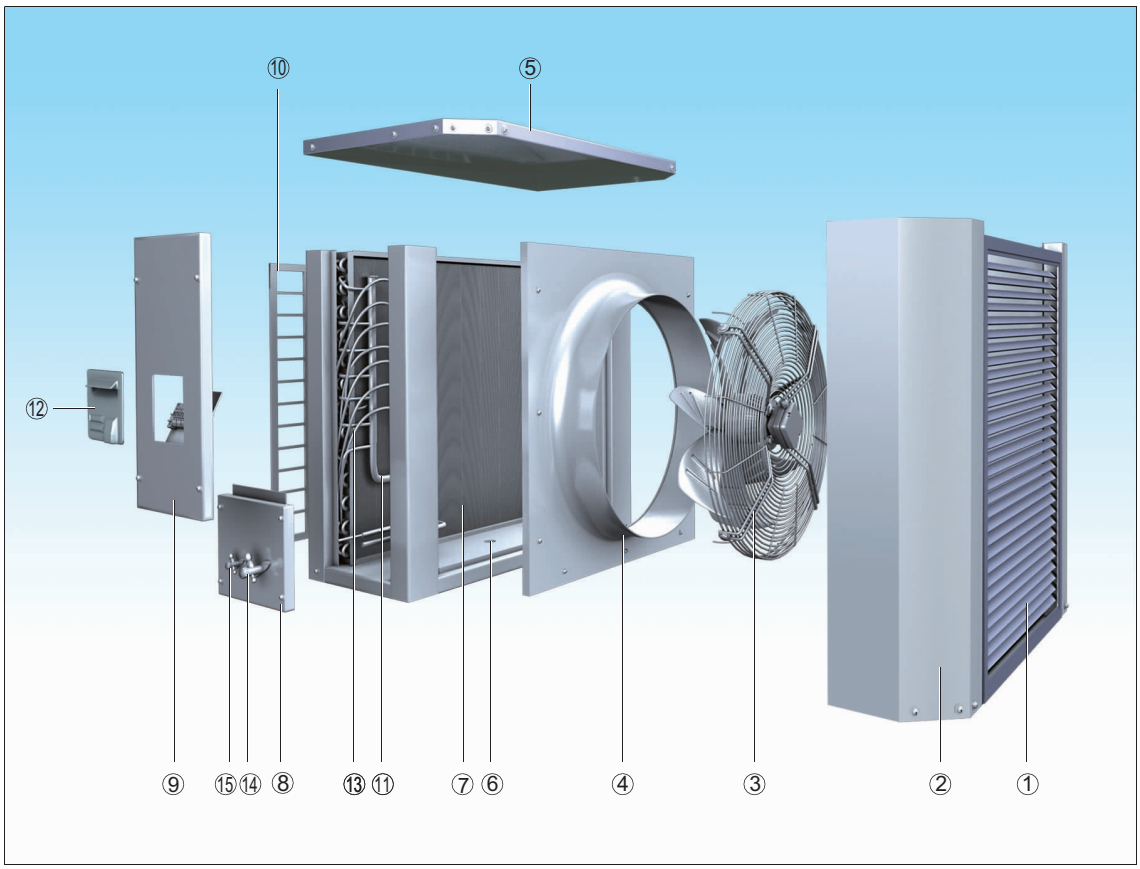
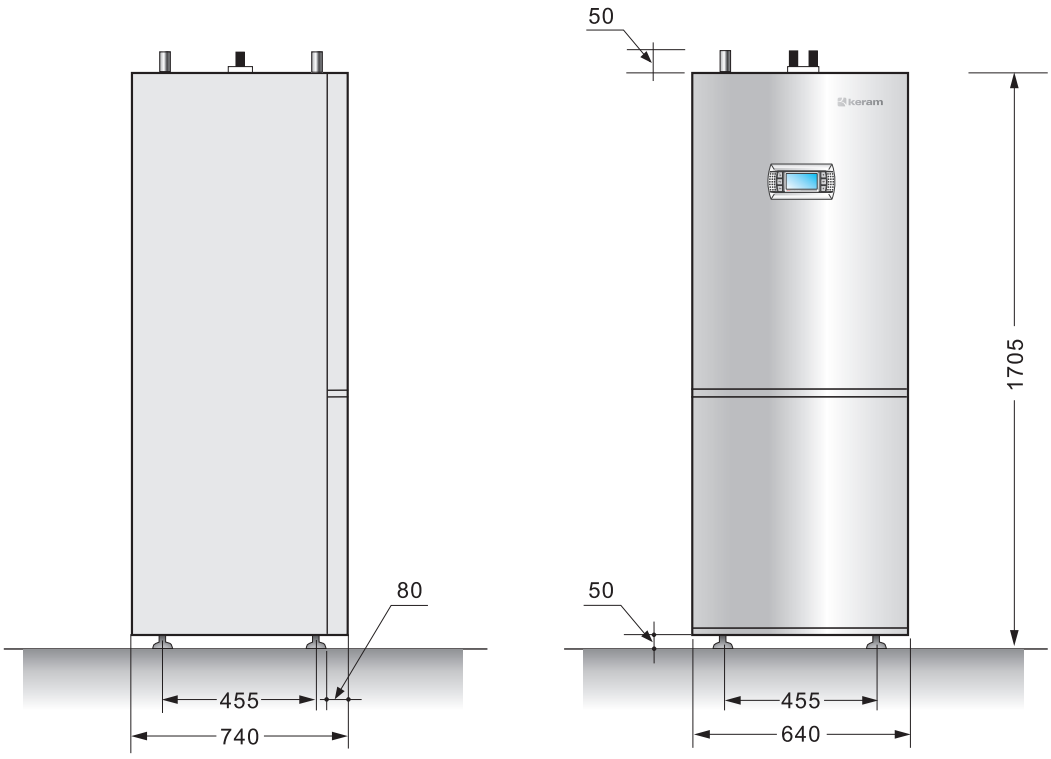


Figure 48

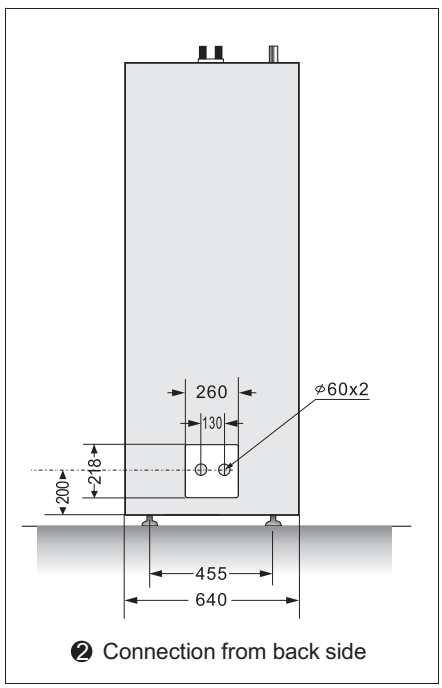
1. Air out-let
2. Font panel
3. Fan motor/Fan blade
4. Fan cover (bell mouth)
5. Top cover
6. Base plate
7. Heat-exchanger
8. Side panel of connection valve
9. Side panel of terminal board
10. Back grille
11. Piping assembling
12. Cover of terminal board
13. Temperature sensor for defrosting
14. Gas valve
15. Liquid valve

DIMENSION

Indoor Unit



❶ Connection from left side



❷ Connection from back side

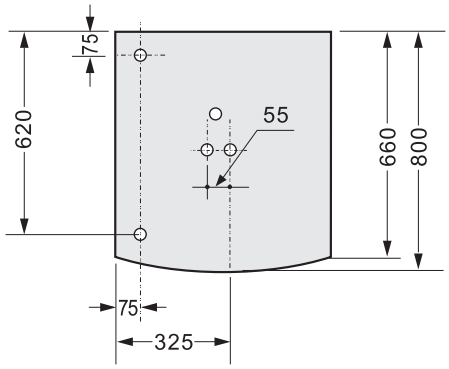


Figure 49

Outdoor Unit

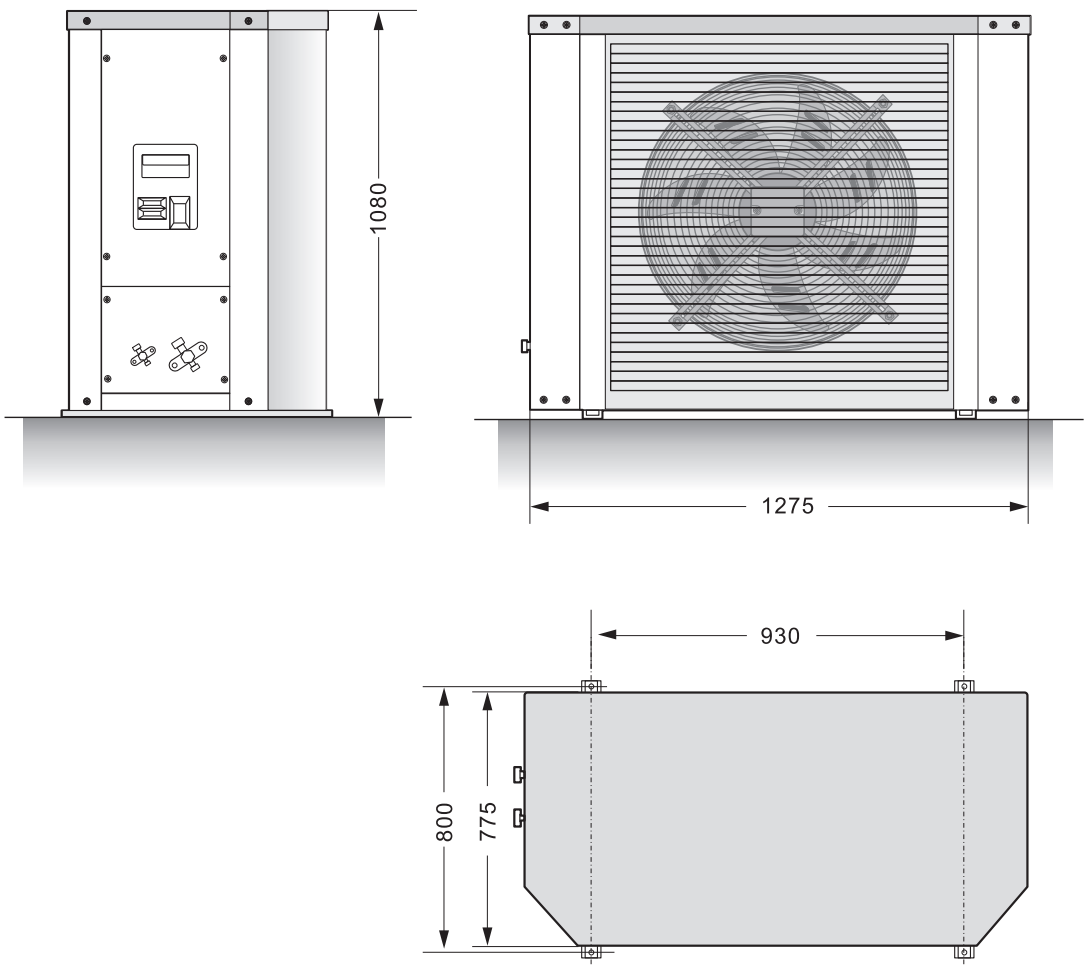


Figure 50

TECHNICAL DATA

Noise Levels

The following noise levels are based on standard testing conditions, it will be affected by walls, bricks, ground level, etc.

KAW heat pump has equipped with two kinds of fans. One is the standand fan with high noise level, the other is the super quiet fan with low noise level.
The fan always has two speeds (3 phase power supply), also we use more than 2 speeds fan (1 phase power supply).
Fan speeds are controled by gas pressure and outdoor ambient temperature.

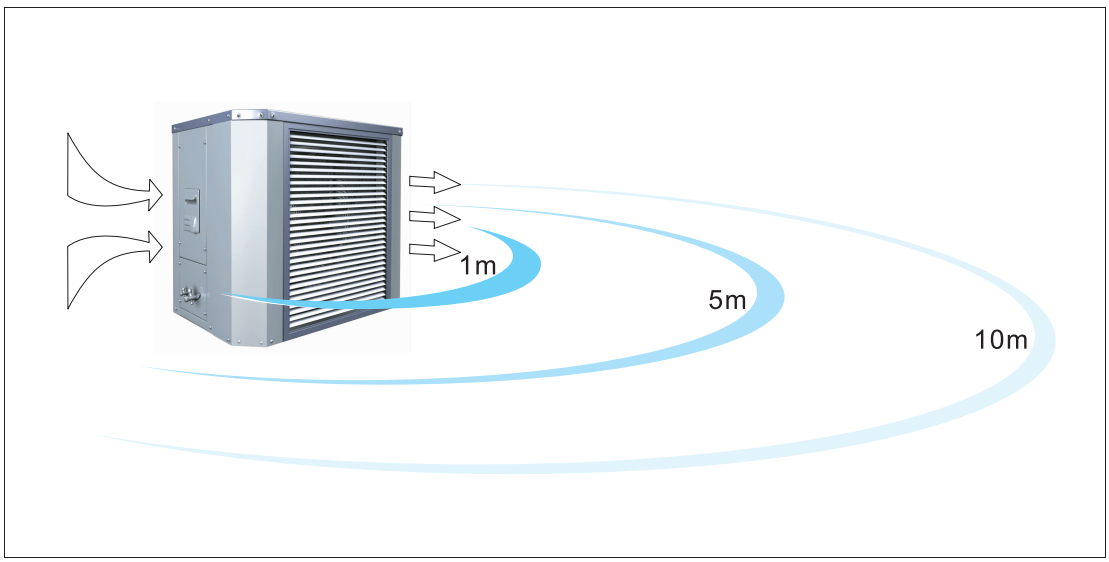


Figure 51

Model		KAW08	KAW10	KAW12	KAW16
Noise level at 1m. Fan low/high	dB(A)	38/46	40/48	40/48	45/54
Noise level at 5m. Fan low/high	dB(A)	34/40	36/42	36/42	40/48
Noise level at 10m. Fan low/high	dB(A)	30/36	32/38	32/38	35/42

Specifications

Model			KAW08N3	KAW10N3	KAW12N3	KAW16N3
Delivered/supplied power at A2/W35		KW	7.50/2.34	8.68/2.71	10.15/3.20	13.20/4.15
Delivered/supplied power at A2/W50		KW	7.10/2.84	8.16/3.28	9.45/3.85	12.35/4.95
Delivered/supplied power at A7/W35		KW	9.12/2.53	10.44/2.85	12.06/3.35	15.84/4.45
Delivered/supplied power at A7/W50		KW	8.71/3.12	9.95/3.56	11.48/4.12	15.08/5.40
Delivered/supplied power at A10/W35		KW	9.60/2.52	11.05/2.92	12.78/3.45	16.76/4.45
Delivered/supplied power at A-7/W35		KW	5.63/2.07	6.55/2.45	7.51/2.78	9.90/3.75
Auxiliary heater		KW	3/6/9			
Starting current		A	24	28	30	32
Max operating current, compressor		A	7.2	8.0	9.5	12.5
Power supply			3N~400V50Hz			
Refrigerant/Quantity			R407C/5.5kg	R407C/6.5kg	R407C/7kg	R407C/8.5kg
Defrosting system			Hot gas defrosting			
Max discharge pressure		MPa	2.7	2.7	2.7	2.7
Mini suction pressure		MPa	0.15	0.15	0.15	0.15
Compressor			Scroll compressor			
Heating						
Heating medium flow(nominal)		l/s	0.28	0.35	0.41	0.55
Rated pump input		KW	0.15	0.15	0.15	0.17
Available external pressure		KPa	50	48	46	44
Heat exchanger			Stainless steel brazed plate heat exchanger			
Max pressure heating side		MPa	0.3	0.3	0.3	0.3
Connection of heating medium		Cu	28	28	28	28
Max heating medium temperature		℃	55	55	55	55
Hot Water						
Connection of hot water			3/4"(Stainless steel)			
Max hot water temperature		℃	50	50	50	50
Volume of hot water tank		L	180	180	180	180
Max pressure water tank		MPa	0.9	0.9	0.9	0.9
Lowest operation point		℃	-15/45	-15/45	-15/45	-15/45
Highest operation point		℃	35/55	35/55	35/55	35/55
Noise(Indoor unit)		dB(A)	40~45	40~45	42~47	42~47
Enclosure class			IPX1			
Dimension outdoor unit	Length	mm	1270	1270	1270	1270
	Width	mm	750	750	750	750
	Height	mm	1100	1100	1100	1100
Weight outdoor unit		Kg	120	120	130	130
Dimension indoor unit	Length	mm	640	640	640	640
	Width	mm	740	740	740	740
	Height	mm	1705	1705	1705	1705
Weight indoor unit		Kg	210	220	250	250

·In accordance with EN14511.

·Max water temperature can reach 70℃ by auxiliary heater.

Model (EVI)			**KAW09N3W**	**KAW12N3W**	**KAW15N3W**
Delivered/supplied power at A2/W35		KW	7.51/2.11	12.5/3.3	13.6/3.50
Delivered/supplied power at A2/W50		KW	7.50/2.77	12.2/4.1	13.5/4.55
Delivered/supplied power at A7/W35		KW	8.65/2.17	14.2/3.25	15.5/3.55
Delivered/supplied power at A7/W50		KW	8.78/2.82	14.4/4.4	15.8/4.85
Delivered/supplied power at A10/W35		KW	9.52/2.21	15.6/3.31	17.1/3.63
Delivered/supplied power at A-7/W35		KW	5.33/2.05	8.81/3.2	9.60/3.50
Auxiliary heater		KW	3/6/9		
Starting current		A	26	30	32
Max operating current, compressor		A	7.8	10.5	11.2
Power supply			3N~400V50Hz		
Refrigerant/Quantity			R407C/6.5kg	R407C/8.5kg	R407C/9.0kg
Defrosting system			Hot gas defrosting		
Max discharge pressure		MPa	3.0	3.0	3.0
Mini suction pressure		MPa	0.15	0.15	0.15
Compressor			EVI Scroll compressor		
Heating					
Heating medium flow(nominal)		l/s	0.45	0.6	0.7
Rated pump input		KW	0.15	0.18	0.18
Available external pressure		KPa	40	50	50
Heat exchanger			Stainless steel brazed plate heat exchanger		
Max pressure heating side		MPa	0.3	0.3	0.3
Connection of heating medium		Cu	28	28	28
Max heating medium temperature		℃	55~60	55~60	55~60
Hot Water					
Connection of hot water			3/4"(Stainless steel)		
Max hot water temperature		℃	50	50	50
Volume of hot water tank		L	180	180	180
Max pressure water tank		MPa	0.9	0.9	0.9
Lowest operation point		℃	-25/50	-25/50	-25/50
Highest operation point		℃	35/55	35/55	35/55
Noise(Indoor unit)		dB(A)	40~45	40~45	42~47
Enclosure class			IPX1		
Dimension outdoor unit	Length	mm	1270	1270	1270
	Width	mm	750	750	750
	Height	mm	1100	1100	1100
Weight outdoor unit		Kg	120	130	130
Dimension indoor unit	Length	mm	640	640	640
	Width	mm	740	740	740
	Height	mm	1705	1705	1705
Weight indoor unit		Kg	220	250	250

·In accordance with EN14511.

·Max water temperature can reach 70℃ by auxiliary heater.

Heating Capacity

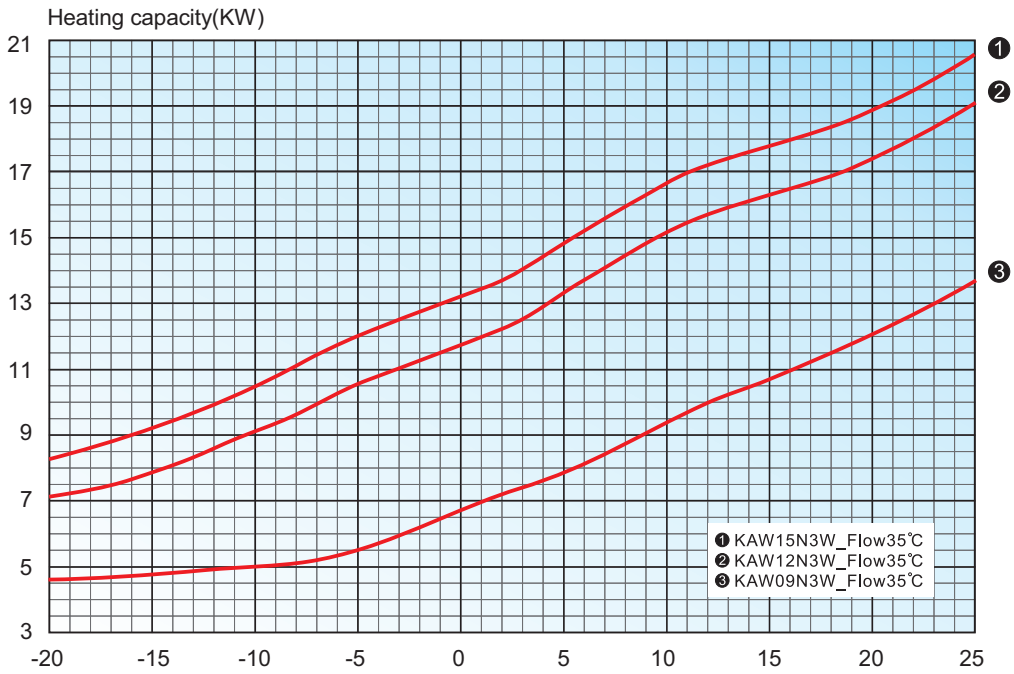


Figure 52 Outdoor temperature(℃)

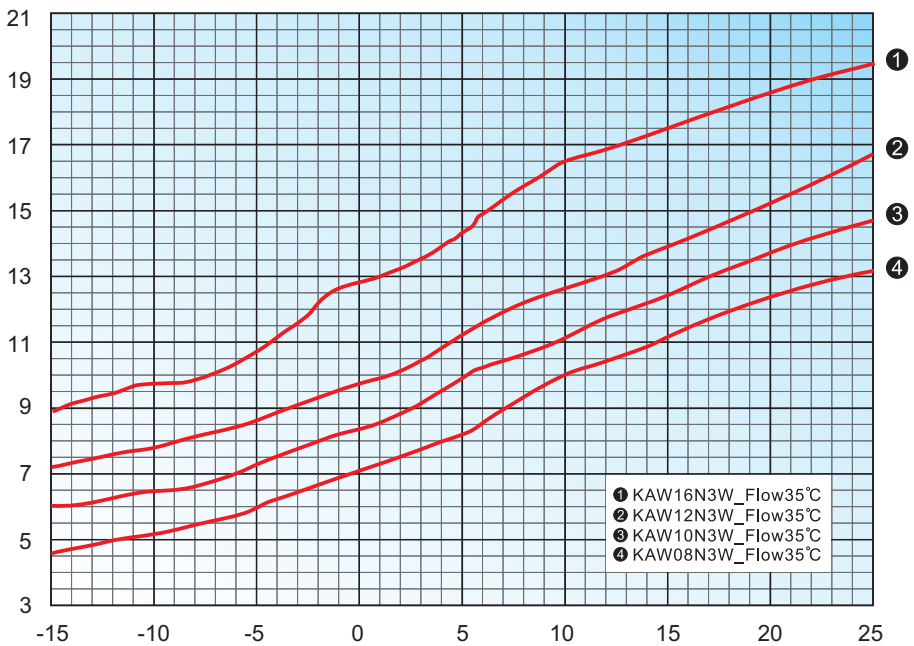


Figure 53 Outdoor temperature(℃)

MAINTENANCE & TROUBLESHOOTING

MAINTENANCE

Note

Never carry out any work on a heat pump unit that requires special permission on electrical or refrigeration parts.

In principle, your heat pump is maintenance free and therefore requires minimal care after commissioning. However, the following items need you checked regularly to keep your heat pump working optimally.

- **Safety valves**

Check the safety valve regularly to prevent blockage. If turn the safety valve's knob anti-clockwise, there has no flow over through, replace the safety valve.

- **Expansion tanks**

The expansion tanks are cinnected to the heating and hot water system to protect the system from over pressure..

- **Dust filter (strainer)**

The dust filter need to be checked and cleaned regularly to prevent the dirt obstruction.

- **Energy–saving tips**

The heat pump produces heat and hot water according to your needs.

Many factors affect the energy consumption are, for example, the indoor temperature, hot water consumption and insulation level of the house, and the level of comfort that you require. Thermostat valves in the radiators and floor heating system can negatively affect the energy consumption. They slow the flow rater in the heating system, so the heat pump must increase heating medium temperature to compensate heating medium flow decrease. It then works harder and consumes more electricity. Make sure fully open these valves.

- **Outdoor unit basecheck**

The base of the out door unit must be periodically checked to ensure not being loose, cracked or damaged. If such defects are left untreated, the heat pump may fail down and cause damage or injuries.

IN CASE REFRIGERANT IS LEAKING

Caution

Never attempt to charge additional refrigerant when refrigerant has been leaking from the unit. Follow the procedure described below to locate points of leaks and carry out repairs, then recharge the refrigerant.

(1) Detecting Leaks

Use the detector to locate refrigerant leak points.

(2) Recovering refrigerant

- Never release the gas to the atmosphere; recover residual refrigerant using the refrigerant recovery unit , instead.
- Don not reuse the recovered refrigerant because its composition will have been altered.

(3) Welding leaking points

- Confirm again that no residual refrigerant exists in the unit before starting welding.
- Weld securely using flux and wax.
- Prevent oxide film from forming inside the tubes utilizing substitution with nitrogen(N2) in the refrigerant circuit of the unit. Leave ends of tubes open during welding.

(4) Checking for sealing

Hazard of Explosion!

- Use only dry nitrogen with a pressure regulator for pressurizing unit. Do not use acetylene, oxygen or compressed air or mixture containing them for pressure testing. Do not use mixtures of a hydrogen containing refrigerant and air above atmo-

spheric pressure for pressure testing as they may become flammable and could result in an explosion. Refrigerant, when used as a trace gas should only be mixed with dry nitrogen for pressurizing units.
Failure to follow these recommendations could result in death or serious injury or equipment or property-only damage.

(5) Evacuation

- Use a solenoid valve-installed vacuum pump so that even if power is cut off in the middle of evacuation of air due to a power interruption, the valve will prevent the pump oil from flowing back.
- The equipment may be damaged if moisture remains in the tubing, thus carry out the evacuation thoroughly.
- For field evacuation, use a rotary-type vacuum pump capable of pulling a vacuum of 500 microns or less. Follow the pump manufacturer's instructions for proper use of the pump. The line used to connect the pump to the system should be copper and be the largest diameter that can be practically used. A larger line size with minimum flow resistance can significantly reduce evacuation time.

(6) Recharging

- Be sure to charge the specified amount of refrigerant in liquid state using the service port of the wide tube service valve. The proper amount is listed on the unit's nameplate. When the entire amount cannot be charged all at once, charge gradually while operating the unit in cooling operation.

TROUBLESHOOTING

If there is any problem of system, please call the qualified technician. The following table can act as a reference for them to resolve the problems

Faults	Causes	Action
1.Compressor can not be started.	1. Power supply fault 2. The set point of temperature controller is too high or too low 3. Connection is loose 4. Relay or fuse fault 5. Compressor fault	1. Find out the causes 2. Reset 3. Check and repair 4. Check and repair 5. Change the compressor
2. Compressor is started and stopped frequently.	1. Too much or too less refrigerant 2. Bad water recycle 3. The difference set point of temperature controller is too low	1. Check leakage and charge or discharge some refrigerant 2.Water system is clogged or has gas in it,check the pump and valve piping, clean the water filter or exhaust the gas. 3. Reset
3. Compressor noise is big	1. Liquid refrigerant has gone to the compressor. 2. Parts insides the compressor damaged.	1. Check the expansion valve. 2. Check the compressor.
4. Low cooling capacity.	1. Lack of refrigerant. 2. Bad heat-preservation of water system 3. Lack of water flow. 4. Cooling system is clogged.	1. Check the leak and charge refrigerant 2. Preserve the heating of the piping. 3. Clean the water filter. 4. Check or change the dry filter.
5. Water pump does not run or screams	1. Power supply fault 2. Relay fault 3. Pump motor is damaged 4. There is gas in water system	1. Check the power supply and Repair it 2. Change the relay 3. Change the pump motor 4. Exhaust the gas

Faults	Causes	Action
6. HP(High pressure)	1. Blocked condenser 2. Shut-off main tap on heating system 3.Large pressure drop in the heating system (poor pipes) 4. Cable break/loose cable to pressure switch 5. Incorrectly facing non-return valve or too "strong" valve=incorrect type of valve 6.Air in the heating system Blocked filter in heating system 7. Operating pressure switch incorrect break value Closed radiator thermostats 8. Heating medium circulation pump defective / jammed 9. High pressure switch incorrect break value 10. Overfilled refrigerant circuit 11. Air in the refrigerant circuit	Check the flow of the heating system: 1. Are valves open fully(condenser)? 2. Check the filter 3. Is the circulation pump running? 4. Flush air 5. Wiring- check pressure switch 6. Check refrigerant circuit
7.LP(Low Pressure)	1. There is dust on the outside evaporator 2. The outside fan speed too low 3. Not enough refrigerant in refrigeration system	1.Clean the evaporator 2. check the fan 3. Check refrigerant/check leakage in refrigeration system, repair and charge refrigerant
8. Water pump is stopped	1. Check the power supply of the water pump 2. Starting capacitor fault 3. Water pump fault 4. Pump motor overheat protection	1. Find out the causes 2. Change the capacitor 3. Change the water pump 4.Wait for the protection switch re-switch on (wait for the motor cooled down)
9. Compressor is running but the unit does not cool.	1. Refrigerant leaks all 2. Plate heat exchanger is frozen 3. Compressor fault	1.Find the leak,repair and charge refrigerant. 2.Find out the cause and change the plate heat exchanger
10.Heat pump in almost continuous operation	1. Incorrectly dimensioned 2. Lack of refrigerant 3. Higher hot water consumption 4. Incorrect flow in heating circuit 5. Air in the system	1. Check cooling 2.Check refrigeration system leakage, repair and charge refrigerant 3. change conditions 4. check heating circuit 5. flush air
11. Heat pump has short operating intervals	1. Room set point too high 2. Closed radiator valves 3. Insufficient water volume in the heating system 4. Element too small 5. Poor pipe dimensions	1. Reset room set point 2. Check radiator valves 3. check heating system 4. check heating element 5. check pipe system
12. Outside fan overheat	1. fan capacitor wrong 2. fan bearing clogged	1. Replace fan capacitor 2. Inspect and repair

Note: Above mentioned is not he overall analysis to heat pump refrigeration system, its aim is only to provide operational fundamental technological know-how for the user, so as to let them know when to notice technician come to do servicing.

INSTALLATION RECORD

The following installation record table has to be filled out by the installation engineer when the heat pump is installed.

Serial number of the machine. (find in the bottom of back side)

_____

Model **KAW_____N(H)_____**

Installation date

Installed by (Company & Name of Engineer)

Installation place of outdoor unit

_____

Pipe connection between indoor and outdoor unit

- Refrigerant connection_____
- Air purging ☐ Complete ☐ Incomplete
- Gas leakage test ☐ Yes ☐ No

Wire connection between indoor and outdoor unit

- Fan ☐ Connected ☐ Disconnected
- Fan thermal protection ☐ Connected ☐ Disconnected
- Defrosting temp. wire ☐ Connected ☐ Disconnected

Sensor position

Outdoor sensor _____ (Place of installation)

Hot water sensor _____ (Place of installation)

Settings

Item	Menu No.	Description	Default Setting	User Set
Hot water	Menu 1.1	Temperature	48 °C	
	Menu 1.3	Time zone	No	
Heating	Menu 2.1	Heating curve	No.6	
		Curve offset	0	
	Menu 2.2	Heating supply temp.	42 °C	
	Menu 2.3	Time zone	No	
Cooling	Menu 3.3	Cooling curve	No.1	
	Menu 3.1	Cooling supply Temp.	18 °C	
	Menu 3.4	Time zone	No	

Date_____ **Signature**_____

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