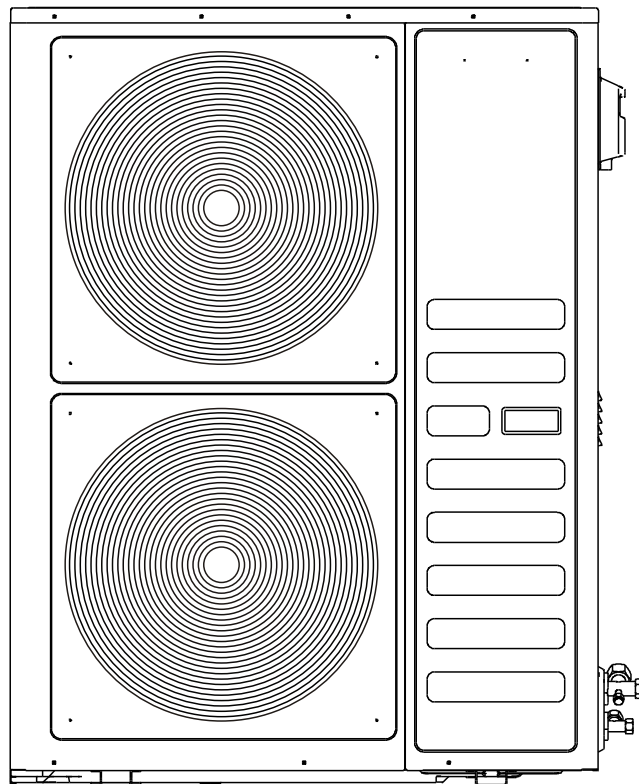




VRF DC INVERTER TYPE AIR CONDITIONER

Installation and User's Manual



This instruction manual contains important information and recommendations that we would ask you to comply with to obtain best results from air conditioner.

Thank you once again.

Remarks:

1. The 《Installation and User's Manual》 applies to outdoor units of DC Inverter Mini VRF system .
2. When you are ready to use it, you must read the chapter " Caution " first to prevent you from damaging the air-conditioner or suffering other accidents due to your wrong operations.
3. Please select and use relevant parameters and directions as per the type of outdoor unit you purchase.
4. Please refer to the 《Installation Manual for the Indoor Units》 when installing the indoor units.

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Directions for Use

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Directions for Installation

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1. Precautions

- Be sure not to use this comfortable air-conditioner for special places such as computer room, precise instruments, food, plants, animals or works of art.
- Please read the 《Installation and User's Manual》 carefully before using this machine, operate it strictly as per the directions for use in the Manual. Otherwise, your operations may damage this machine or imperil others' personal and property safety.

● Sign Description

| Sign | Meaning of Sign | Sign | Meaning of Sign |
|---|---|---|--|
|  Warning | Wrong operations (or use) may cause death or serious injury. |  | The graphic symbol means " prohibited ". Specific prohibited content is expressed in the graphic symbol or in graphs or words nearby the graphic symbol. |
|  Caution | Wrong operations (or use) may cause personal injury or property loss. |  | The mark means forced (execution) Specific forced content is expressed in the graphic symbol or in graphs or words nearby the graphic symbol. |

1. The personal injury means being injured, burned or electric shock and it is unnecessary to be hospitalized or receive long-term treatment.
2. The property loss means the loss of articles or materials.

1-1. Check before Use

- 1) Check whether or not the earth wire is under reliable connection or broken off.
- 2) It is necessary to power on for over 12 hours when starting it for the first time or restarting it after stopping it for a long time. In addition, when it is necessary to stop the air-conditioner within the time of about one day and night, please do not power the air-conditioner down (with the aim to heat the crankcase and prevent the compressor from being started with liquid).
- 3) Confirm that the air inlet and outlet of outdoor units are not blocked.
- 4) Please do not expose the air-conditioning set directly to any environment with water or damp where it easily suffers corrosion.
- 5) Please do not stamp on the air-conditioning set or place any article on the air-conditioning set.

1-2. Safety Rules

Caution

- Air-conditioner installation should conform to the provisions of relevant national standards and National Electrical Code as well as meet the requirements of the 《Installation and User's Manual》 .
- The air-conditioner should be installed by professional technical personnel and the user is not allowed to install it voluntarily. Otherwise, you or others may be hurt or the air-conditioner may be damaged.
- Please use this machine as per the " Service Conditions of Air-conditioner " in the Manual in order to normally use it. Failing to do so may cause internal protection of the air-conditioner or water dropping or reduce the cooling or heating effect.
- The room temperature should be set appropriately, especially when there are old men or women, children or patients in the room.
- Lightning, near automobiles or mobile telephones may lead to the air-conditioner malfunction. In case of such circumstances, please manually cut off the power supply and then restart the air-conditioner.
- It is necessary to power the air-conditioner off only after running it for 5 minutes at least if it is started. Otherwise, the service life of the air-conditioner may be affected.

Warnings

- The master power switch of the air-conditioner should be placed out of children's reach to prevent the children from being in danger due to touching the master power switch. The master power switch of the air-conditioner should be not covered with inflammable such as curtain.
- In case of a thunderstorm, please switch off the master power switch. Otherwise, lightning may damage the air-conditioner.
- When the air-conditioner is not used for a long time, please switch off the master power switch. Otherwise, accidents may occur.
- Before cleaning the air-conditioner or doing maintenance for it, please switch off the master power switch. Otherwise, accidents may occur.
- Be sure not to use any liquid, liquefied or corrosive detergent to wipe this machine or sprinkle water or any other liquid on the machine body. Otherwise, plastic parts of the machine body may be damaged and electric shock may happen if the situation is serious.



Warnings

- Do not insert objects like your hand or stick into the air outlet of the outdoor unit. Otherwise, the fan running at high speed may hurt you.
- It is necessary to regularly change the air when using the air-conditioner together with any combustor. Failing to do so may cause oxygen deficiency.
- Be sure not to dismantle the fan housing of the outdoor unit. Otherwise, the fan running at high speed may hurt you.
- Be sure not to let a child play with the air-conditioner. Otherwise, the child may be in danger.
- Do not place any combustor at the position of direct air supply of the air-conditioner. Failing to do so may cause incomplete combustion of such combustor.
- Be sure not to use combustible gases or liquids such as natural gas, hair spray, paint and gasoline nearby the air-conditioner. Otherwise, a fire accident may happen.
- Do not make the air outlet of this machine directly face any animal or plant. Otherwise, this machine will have an adverse impact on such animal or plant.
- In case of any abnormal circumstance like abnormal noise, smell, smoke, temperature rise or leakage of electricity, please immediately switch off the power supply, being sure not to repair the air-conditioner voluntarily.
- Do not place any combustible sprayer nearby the air-conditioner or directly spray the air-conditioner with any combustible sprayer because a fire accident may happen.
- Do not place any container with water on the air-conditioner because water may enter the air-conditioner, weaken the insulating property of the machine and thus cause electric shock.
- After using the air-conditioner for a long time, it is necessary to confirm whether or not the support suffers abrasion. If the air-conditioner is placed when its support suffers abrasion, the machine may fall and thus cause casualties.
- Do not operate any switch with any wet hand because electric shock may happen.
- Be sure to stop the air-conditioner from running and cut off the power supply at the time of repair or maintenance. Otherwise, the wind wheel running at high speed may hurt you.
- Do not use the fuse whose capacity is other than the one stipulated in the Manual, and it is necessary to use iron wires, copper wires will cause consequences such as fire and troubles. With regard to the power supply, it is a must to use a special circuit with rated voltage for the air-conditioner.

1-3. Requirements for Electrical Safety

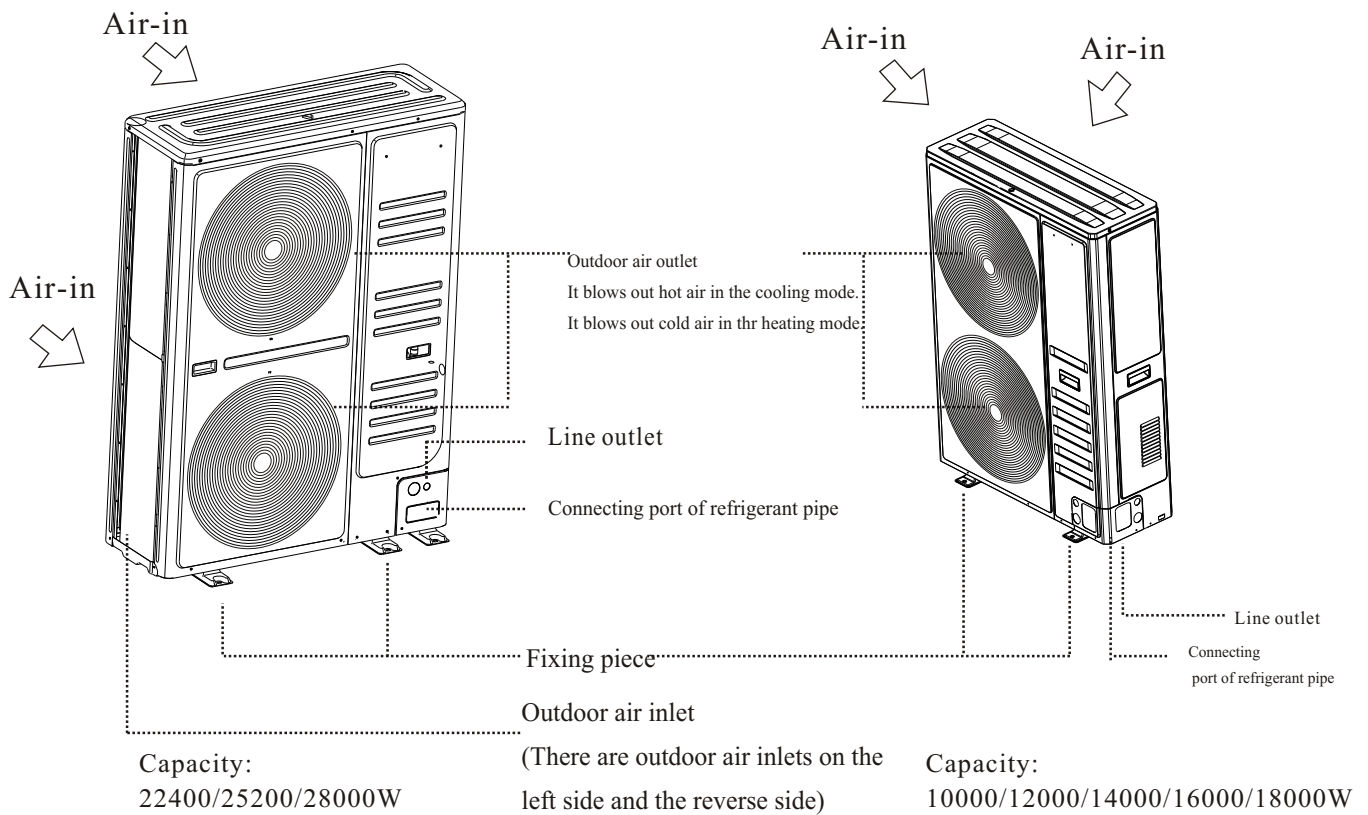
- 1) The wiring work must be done by a qualified electrician.
- 2) All the wiring work must conform to the electrical safety specification.
- 3) It is a must to ensure that the air-conditioner is in good ground connection and the master switch of air-conditioner has a reliable earth wire.
- 4) It is a must to equip the air-conditioner with independent power supply conforming to the rated parameter values.
- 5) The fixed wiring for connecting the air-conditioner must be installed with a device which can disconnect the power supply as per the wiring rules.
- 6) If a power line is damaged, it is a must to ask professional personnel of manufacturer, Maintenance Department or similar department to replace it in order to avoid danger.



Caution

- It is not allowed to disconnect the earth wire of master power switch in any case.
- It is not allowed to use any damaged power line, and it is necessary to immediately replace any damaged power line after finding it.
- It is not allowed to supply the power to the air-conditioner through external switch devices in order to prevent danger caused by error reset of thermal circuit breaker. For example, the air-conditioner is connected to a timer or a circuit under connection and disconnection realized as per the timing of a general component.

2. Parts and functions



All the diagrams in this Manual are used only for explanation, the appearance and functions may be inconsistent with those of the air-conditioner you buy. The appearance and functions of your air-conditioner should be subject to the actual air-conditioner model.

3. Operation and Performance of Air-conditioner

3-1. Service Conditions of Air-conditioner

Please run the air-conditioner in the following temperature conditions in order to keep its good performance.

Table 3.1

| | | |
|-------------------|-------------------------|---|
| Cooling Operation | Outdoor Air Temperature | -5°C ~ 54°C |
| | Room Temperature | 16°C ~ 32°C |
| | Relative Room Humidity | Below 80% If the air-conditioner runs for a long time in the status of relative humidity exceeding 80%, the air-conditioner will condense to dew on the surfaces of the indoor units or blow out fog-like cold air from the air outlets. |
| Heating Operation | Outdoor Air Temperature | -20°C ~ 24°C |
| | Room Temperature | 15°C ~ 31°C |

● If you use the air-conditioner in the conditions other than the above service conditions, the safety protection function of the air-conditioner may go into effect and the functions of air-conditioner may be abnormal.

3-2. Three-minute Protection

- A compressor executes self-protection if it does not run within three minutes after immediately re-running or re-switching on the manual switch after the air-conditioner is stopped from running.

3-3. Cooling/Heating Operation

- The indoor units of a DC mini VRF system air-conditioning set can be controlled independently, but the indoor units of the same system cannot be run in the cooling and heating modes. When the modes conflict, it is necessary to run the indoor units as per the preset mode having the priority. See the dial setting in the SW1 mode in Table 5.4 on Page 31 for specific setting.
- Determining the running mode of complete machine as per the following rules:
 - 1) If the master indoor unit is not set, there are three priority modes of cooling, heating and starting first and the running modes of outdoor units should be determined as per the aforementioned three modes. When the running modes of indoor units conflict with those of complete machine, the indoor units fail to run and display mode conflict.
 - 2) If the master indoor unit is set, the running modes of outdoor units should depend on the running modes of the master indoor unit. When the running modes of the other indoor units conflict with those of complete machine, these indoor units fail to run and display mode conflict.

After the outdoor units determine the running modes of complete machine as per the running modes of the master indoor unit, or cooling, heating or starting first priority, the conflict relationship between the running modes of the other indoor units and the running modes of complete machine is as follow:

| Running Mode of Indoor Unit \ Running Mode of Complete Machine | Cooling | Dehumidifying | Heating | Air Supply |
|--|---------|---------------|---------|------------|
| Cooling | No | No | Yes | No |
| Heating | Yes | Yes | No | No |

3-4. Characteristic of Heating Operation

- When the air-conditioner starts to run, it will not immediately blow out hot air until the indoor heat exchanger becomes hot after 3~5 minutes (more or less as per the indoor and outdoor temperatures).

3-5. Defrosting during the Heating Operation

- In the heating mode, if the outdoor units frost, the air-conditioner will automatically execute defrosting (for about 2~10 minutes) to improve the heating effect. At this moment, the outdoor units drain away water.
- During the defrosting operation, the air supply motors of indoor units stop running.

3-6. Timer Interval of Quick Power-on

- When debugging the outdoor units of DC mini VRF syseem air-conditioning set, it is not allowed to quickly power such machines on again when they do not discharge electricity completely. Such operation easily burns the electrical main PCB control panel out. The time interval between power-on should not be short and exceed two minutes. It is not allowed to power the machines on again until they discharge electricity completely.

3-7. Protective Device (High Pressure Switch)

This is " a device which automatically stops the air-conditioner from running when the air-conditioner is in the forced-running mode " The complete machine stops from running and its indoor units show corresponding trouble codes when the protective device functions.

■ The protective device may start when the following circumstances occur.

In the cooling mode:

- The air inlets or outlets of the outdoor units are blocked up.
- Strong air continuously blows towards the air outlets of the outdoor units.

In the heating mode:

- The dust filters of the indoor units are covered with excessive dust and garbage.
- The air outlets of the indoor units are blocked up.

When the protective device motions, please switch off the manual power switch and restart the air-conditioner after finding out and dealing with the cause

3-8. Power Failure




- It is necessary to stop all operations if power failure occurs when the air-conditioner is running.
- When re-starting up the air-conditioner for running, please re-press the " ON/OFF " key (remote controller or wire controller).
- In case of malfunction during the operation
In case of malfunction caused by thunder, lightning and automobile radio when the air-conditioner is running, please switch off the manual power switch and re-press the " ON/OFF " key (remote controller or wire controller) after re-switching on the manual power switch.

3-9. Heating Capacity

- The heating mode of the air-conditioner is the pump-heating mode in which the air-conditioner absorbs heat outdoor and releases heat indoor, so the heating capacity will reduce if the outdoor temperature drops.
- When the outdoor air temperature is low, it is suggested using the air-conditioner together with other heating installation.
- In the areas at particularly low outdoor air temperature such as extremely cold areas, the heating effect will be better if the indoor units equipped with auxiliary heating devices are used.

4. Abnormal Circumstances

In case of the following circumstances, please refer to the following table before applying for maintenance service.

| | Phenomenon/Phenomena | | Reason |
|-------------|---|--|---|
| Not faults | Outdoor Units | <ul style="list-style-type: none"> ● White cold air like fog or water appears. | <ul style="list-style-type: none"> ● The air supply motors of outdoor units automatically stop for defrosting. ● The air-conditioner emits such sound due to the role of solenoid valves when the defrosting operation starts and ends. ● The air-conditioner emits a water-flowing-like sound when it is running or just stops and such sound becomes noisier when it starts to run for 2~3 minutes because this is water draining sound from refrigerant flow or dehumidification. ● The air-conditioner may emit slight " pu " sound which the heat exchanger emits due to slight expansion and contraction caused by temperature changes. ● Dust particles from walls, carpets, furniture, clothes, cigarette, cosmetics and other articles attach to the air-conditioner. ● The indicator light twinkles when switching on the manual power switch after power failure and re-power-on. ● When the cooling running cannot be executed due to the influence of heating running of other indoor units. ● When the set mode conflicts with the fixed cooling and heating modes. ● Stop air supply to avoid blowing out cold air. |
| | | <ul style="list-style-type: none"> ● The air-conditioner sounds " pu " from time to time. | |
| | Indoor Units  | <ul style="list-style-type: none"> ● The blown-out air is of peculiar smell. | |
| | | <ul style="list-style-type: none"> ● The running indicator light twinkles. | |
| Check again | Automatic operation or stop | | <ul style="list-style-type: none"> ● The timer may suffer incorrect operations. |
| |  | <ul style="list-style-type: none"> ● The air-conditioner does not run. | <ul style="list-style-type: none"> ● Power failure may occur. ● The manual power switch may be not switched on. ● The fuse may be burned out. ● The protective devices may be started. (The running indicator light goes on.) ● The time set by the timer may be up. (The running indicator light goes on.) |
| |  | <ul style="list-style-type: none"> ● The cooling/heating effect is not obvious. | <ul style="list-style-type: none"> ● The air inlets and outlets of the outdoor units may be blocked up. ● The doors and windows may be opened. ● The dust filter may be covered with dust and garbage. ● The position of the outlet air deflector may be inappropriate. ● The " FAN " mode may be switched to " low " or the " mode " may be switched to " FAN ONLY " . ● The set temperature is improper. ● The cooling and heating modes may be selected simultaneously. |

In case of the following circumstances, please immediately stop the air-conditioner from running and then contact the local Customer Service Center .

- The movements of the switch are not correct.
- The fuse or earth leakage protective device is burned out for many times.
- Foreign matters or water enters the air-conditioner by mistake.

5. Models and Main Parameters

Table 5.1-1

| Model(capacity of outdoor unit) | | 10000W | 12000W(C) | |
|---------------------------------|--|---|----------------------------|----------|
| Power Supply | | 220V 50Hz | 220V 50Hz/60Hz | |
| Refrigerating Capacity | W | 10000 | 12000 | |
| Heating Capacity | W | 12000 | 14000 | |
| Refrigeration power | W | 2760 | 3000 | |
| Heating power | W | 2650 | 3300 | |
| Dimensions (W*H*D) | mm | 940×340×910 | 950×340×1330 | |
| Compressor | Type | Rotary Compressor | | |
| | Gas Displacement | cm ³ /rev | 22 | 30.7 |
| | Working Frequency Range of Inverter Compressor | | 20~100Hz | 20~240Hz |
| Fan | Type | Axial Fan | | |
| | Air Volume | m ³ /h | 4800 | 5400 |
| | Drive | | Axial Fan | |
| Weight | kg | 75 | 91 | |
| Safety Devices | | High Pressure Switch, Temperature Sensor, High Pressure transducer, Low Pressure transducer | | |
| Capacity Control | | 10~100% | | |
| Refrigerant | Type | R410A | | |
| | Filling Amount | kg | 3.0 | 4.0 |
| | Control Method | | Electronic Expansion Valve | |
| | Level of Noise | dB(A) | 56 | 52 |

Remarks:

1. The cooling and heating capacities of air-conditioner is measured in the conditions stipulated in GB/T18837-2002 and the actual cooling and heating capacities will vary with changes of ambient temperature and relative humidity;
2. The level of air-conditioner noise is measured in a semi-anechoic laboratory which is in the conditions stipulated in GB/T18837-2002, and the actual level of noise will vary with the changes of indoor and outdoor ambient temperatures;
3. The external static pressure of air-conditioner at the time of test is 0Pa;
4. The product specification should be subject to the parameters on the nameplate of this product if such specification changes due to improvement.

Table 5.1-2

| Model(capacity of outdoor unit) | | 14000W(C) | 16000W(C) | 18000W(C) | |
|---------------------------------|--|---|----------------------------|-----------|------|
| Power Supply | | 220V 50Hz/60Hz | | | |
| Refrigerating Capacity | W | 14000 | 16000 | 18000 | |
| Heating Capacity | W | 16000 | 18000 | 20000 | |
| Refrigeration power | W | 3600 | 4350 | 5250 | |
| Heating power | W | 4000 | 4650 | 5200 | |
| Dimensions (W*H*D) | | 950×340×1330 | | | |
| Compressor | Type | | Rotary Compressor | | |
| | Gas Displacement | cm ³ /rev | 30.7 | 41.8 | 41.8 |
| | Working Frequency Range of Inverter Compressor | | 20~240Hz | | |
| Fan | Type | | Axial Fan | | |
| | Air Volume | m ³ /h | 5900 | 6500 | 7000 |
| | Drive | | Direct Drive | | |
| Weight | | kg | 91 | 94 | 99 |
| Safety Devices | | High Pressure Switch, Temperature Sensor, High Pressure transducer, Low Pressure transducer | | | |
| Capacity Control | | 10~100% | | | |
| Refrigerant | Type | | R410A | | |
| | Filling Amount | kg | 4.0 | 4.3 | 5.6 |
| | Control Method | | Electronic Expansion Valve | | |
| Level of Noise | | dB(A) | 53 | 54 | 55 |

Remarks:

1. The cooling and heating capacities of air-conditioner is measured in the conditions stipulated in GB/T18837-2002 and the actual cooling and heating capacities will vary with changes of ambient temperature and relative humidity;
2. The level of air-conditioner noise is measured in a semi-anechoic laboratory which is in the conditions stipulated in GB/T18837-2002, and the actual level of noise will vary with the changes of indoor and outdoor ambient temperatures;
3. The external static pressure of air-conditioner at the time of test is 0Pa;
4. The product specification should be subject to the parameters on the nameplate of this product if such specification changes due to improvement.

Table 5.1-3

| | | | | | |
|---------------------------------|--|---|----------------------------|-----------|-------|
| Model(capacity of outdoor unit) | | 22400W(C) | 25200W(C) | 28000W(C) | |
| Power Supply | | 380V 3N~ 50Hz/60Hz | | | |
| Refrigerating Capacity | W | 22400 | 25200 | 28000 | |
| Heating Capacity | W | 24500 | 27000 | 30800 | |
| Refrigeration power | W | 7200 | 8250 | 9100 | |
| Heating power | W | 7100 | 8000 | 8500 | |
| Dimensions (W*H*D) | | 1120×400×1560 | | | |
| Compressor | Type | | Rotary Compressor | | |
| | Gas Displacement | cm ³ /rev | 54.8 | 54.8 | 54.8 |
| | Working Frequency Range of Inverter Compressor | | 60~300Hz | | |
| Fan | Type | | Axial Fan | | |
| | Air Volume | m ³ /h | 10500 | 10500 | 10500 |
| | Drive | | Direct Drive | | |
| Weight | | kg | 130 | 140 | 140 |
| Safety Devices | | High Pressure Switch, Temperature Sensor, High Pressure transducer, Low Pressure transducer | | | |
| Capacity Control | | 10~100% | | | |
| Refrigerant | Type | | R410A | | |
| | Filling Amount | kg | 6.5 | 6.5 | 8.5 |
| | Control Method | | Electronic Expansion Valve | | |
| Level of Noise | | dB(A) | 58 | 59 | 61 |





Remarks:



1. The cooling and heating capacities of air-conditioner is measured in the conditions stipulated in GB/T18837-2002 and the actual cooling and heating capacities will vary with changes of ambient temperature and relative humidity;
2. The level of air-conditioner noise is measured in a semi-anechoic laboratory which is in the conditions stipulated in GB/T18837-2002, and the actual level of noise will vary with the changes of indoor and outdoor ambient temperatures;
3. The external static pressure of air-conditioner at the time of test is 0Pa;
4. The product specification should be subject to the parameters on the nameplate of this product if such specification changes due to improvement.




1. Safety Precautions

- Be sure not to use this comfortable air-conditioner for special places such as computer room, precise instruments, food, plants, animals or works of art.
- Please read the 《Installation and User's Manual》 carefully before using this machine, strictly operate it strictly as per the directions for use in the Manual. Otherwise, your operations may damage this machine or imperil others personal and property safety.




Warnings





| | | |
|-----------------------|---|---|
| Installation Warnings |  Entrust professionals for installation | Please entrust professionals for installation. If the air-conditioner is installed by other personnel, incomplete installation may occur and thus cause water leakage, electric shock or fire. |
| |  Confirm the earth wire | Confirm whether or not the air-conditioner is in correct ground connection. Incomplete ground connection may cause electric shock. |
| |  Measures for not exceeding the limit concentration | When the air-conditioner is installed in a small room, it is necessary to take certain measures for preventing personnel from suffocation once the refrigerant leakage exceeds the limit concentration. Consult with the corresponding dealer for specific measures. |
| |  Warning | Confirm that the air-conditioner is powered on only after all the installation work is finished. |

| | | |
|--------------|---|---|
| Use Warnings |  Prohibited | It is prohibited to insert your fingers, sticks or other objects into the air inlet or outlet because the internal fan running at high speed may cause personal injury and the air-conditioner may be damaged. |
| |  Switch off the manual power switch | In case of any abnormal circumstance (empyreumatic smell), it is necessary to immediately switch off the manual power switch, stop the air-conditioner from running and contact the local Customer Service Center or appointed technical service center . If abnormal operation continues, electric shock or fire may occur. |

| | | |
|----------------------------|---|---|
| Moving and Repair Warnings |  Entrust | Please entrust the corresponding dealer or professionals to move or re-install the air-conditioner if it is necessary to do so. Incomplete installation may cause accidents such as electric shock, fire, personal injury and water leakage. |
| |  Prohibited | It is absolutely prohibited to voluntarily refit or repair the air-conditioner. Otherwise, electric shock or fire may occur easily. |
| |  Entrust | Please entrust the corresponding dealer or professionals to repair the air-conditioner if it is necessary to do so. Improper repair may cause accidents such as fire, electric shock, personal injury and water leakage. |

Cautions

| | | |
|-----------------------|---|---|
| Installation Warnings |  Confirm the installation site | It is prohibited to install the air-conditioner in a place where combustible gases easily leak. In case of leakage, the combustible gases stay surrounding the outdoor units and may cause fire. |
| |  Confirm the fixing method | Confirm whether or not the installation base is strong. If the installation base is not strong, the outdoor units may fall and cause accidents. |
| |  Confirm the residual current circuit-breaker | Confirm whether or not the residual current circuit-breaker is installed. Electric shock or fire may occur if the residual current circuit-breaker is not installed. |
| | Confirm vacuumizing | Before the vacuumizing is finished, it is not allowed to open the high pressure valve, low pressure valve and oil balance valve. These valves cannot be opened until vacuumizing is finished. |

| | | |
|-----------------------|---|---|
| Installation Warnings |  Check the installation platform | At the time of long-term use, it is necessary to check whether or not the installation platform is fixed firmly and in perfect condition. If the installation platform is damaged or not fixed firmly, the outdoor units may fall and cause personal injury. |
| |  Switch off the manual power switch | When cleaning the air-conditioner, it is a must to stop it from running and switch off the manual power switch. If the air-conditioner is not stopped from running, the internal fan running at high speed may cause personal injury. |
| |  Prohibited | It is necessary to use corresponding fuse. It is absolutely prohibited to substitute copper or iron wire. Otherwise, faults or fire may occur. |
| |  Prohibited | It is prohibited to directly spray combustible spray towards the outdoor units. Otherwise, fire may occur. |

2. Key Inspection Points of Construction

2-1. Arrival of Goods and Box-opening Check

- 1) After receiving machines, it is necessary to check whether or not such machines suffer transport damage. When finding any surface or interior damage, it is necessary to report immediately to the corresponding transport company in written form.
- 2) After receiving machines, it is necessary to check whether or not the models, specifications and quantities of equipment conform to the corresponding contract.
- 3) When opening the external packing, please keep the operating manual properly and check the accessories.

2-2. Refrigerant Pipes

- 1) It is necessary to use the special refrigerant distributor (to be purchased separately) to install the supporting refrigerant pipes.
- 2) It is a must to use the refrigerant pipes with designated pipe diameters and thickness.
- 3) When welding copper pipes, it is a must to do nitrogen filled protection by filling nitrogen of 0.2kgf/cm² before welding. After finishing welding, it is necessary to keep filling nitrogen till the copper pipes cool completely.
- 4) The refrigerant pipes must be under insulation treatment.

2-3. Air Tightness Test

After installing the supporting refrigerant pipes, it is a must to fill nitrogen of 40kgf/cm² (4.0MPa) simultaneously on the gas, liquid and oil balance sides in order to do 24-hour air tightness test.

2-4. Vacuumizing

After doing the air tightness test, it is a must to do vacuumizing treatment simultaneously on the gas, liquid and oil balance sides (wherein the vacuum degree should be -0.1MPa).

2-5. Refrigerant Addition

- 1) It is necessary to calculate the refrigerant addition as per the pipe diameters and lengths (actual lengths) of liquid-side supporting pipes of the indoor and outdoor units. (Refrigerant addition method for specific models can be found on pages 25,4-10 and pages 26,4-11、4-12、4-13)
- 2) It is necessary to write down the amount of refrigerant addition, liquid-side pipe diameter, length (actual length) and height difference between the indoor and outdoor units in the log sheet (on the cover of electrical control box) of outdoor unit for future use.

2-6. Electrical Wires

- 1) Please select the power capacity and the diameters of electric wires as per the design manual. The diameter of power lines for the air-conditioner should be bigger than that for ordinary motors.
- 2) Be sure not to crisscross or twine the power lines (380V, 3N) with the (low-voltage) wires connecting the indoor and outdoor units to prevent the air-conditioner from incorrect operations.
- 3) Please power on the indoor units after doing the air tightness test and vacuumizing.
- 4) Please set an outdoor unit as the master or slave via the Dial Switch SW1 on the main PCB, and set the static pressure of an outdoor unit and the number of outdoor unit modules via the Dial Switch SW2. Please refer to the wiring label or the setting of dial switches in Table 5.4 on Page 31 of this Manual for specific setting methods.

2-7. Trial Operation

The trial operation cannot be done until the outdoor unit is powered on and preheated for over 12 hours. Failing to do so may cause system damage.

3. Installation of Outdoor Units

3-1. Combinations of Outdoor Units

| Capacity of Outdoor Units (kW) | Maximum Number of Indoor Units | Capacity of Indoor Units(kW) |
|--------------------------------|--------------------------------|------------------------------|
| 10 | 6 | 5.0~13.0 |
| 12 | 7 | 6.0~15.6 |
| 14 | 8 | 7.0~18.2 |
| 16 | 9 | 8.0~20.8 |
| 18 | 9 | 9.0~23.4 |
| 22.4 | 10 | 11.2~29.1 |
| 25.2 | 11 | 12.6~32.8 |
| 28 | 13 | 14.0~36.4 |

Notes:

- If all the indoor units in one system run relatively frequently at the same time, the total capacity of indoor units in such system should be less than or equal to the combined capacity of outdoor units. Otherwise, overload operation may appear in bad working conditions or narrow running space.
- The total capacity of indoor units should be less than the combined capacity of outdoor units if the system is used in a cold region (with the ambient temperature of below -10°C) or any environment with a high heating load.
- With regard to a system in which not all the indoor units run at the same time, the admissible maximum capacity of all the indoor units is 130% of the combined capacity of outdoor units.

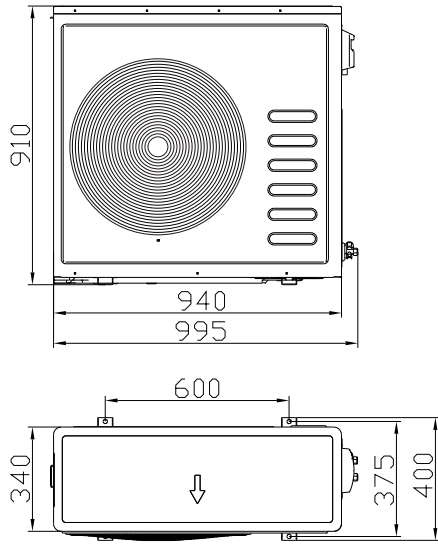
3-2. Selection of Installation Site

Warnings

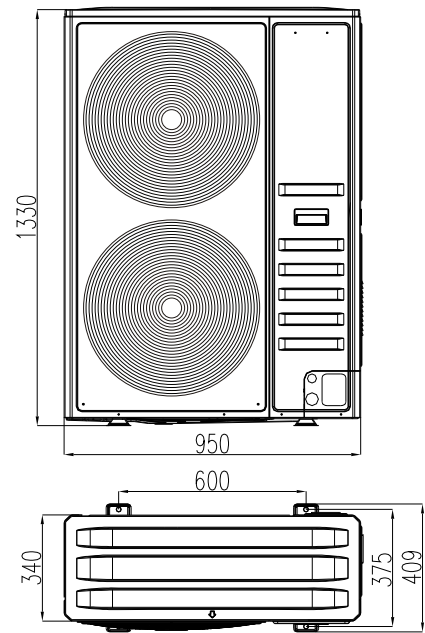
- ◆ It is necessary to install the air-conditioner at a position whose strength is sufficient to support the weight of air-conditioner.
- ◆ If the strength is insufficient, the machine may fall and cause personal injury.
- ◆ It is necessary to do specific installation work in order to resist strong wind or earthquake.
- ◆ Incomplete installation may cause an accident due to falling of machine.

- 1) The installation of air-conditioning set must conform to local or national safety standards.
- 2) The installation site can provide sufficient installation and maintenance space and should be far away from places with low noise requirement such as bedrooms.
- 3) The air inlet and outlet should be unblocked and free from strong wind.
- 4) It is necessary to install the air-conditioner in a dry and ventilated place.
- 5) The supporting surface of the installation site should be horizontal and enough to bear the weight of outdoor unit horizontally as well as will not add noise and vibration.
- 6) It is necessary to install the air-conditioner in a place where the running noise and discharged air do not affect any neighbor.
- 7) It is necessary to install the air-conditioner in a place which is free from leakage of any combustible gas.
- 8) It is necessary to install the air-conditioner in a place which is convenient for installation and connection of pipes as well as electrical connection.
- 9) It is necessary to avoid installing the air-conditioner in a place where there is much salinity or any corrosive gas.
- 10) The indoor and outdoor units should be as close as possible to each other in order to reduce the length of refrigeration pipe and number of bends as much as possible.

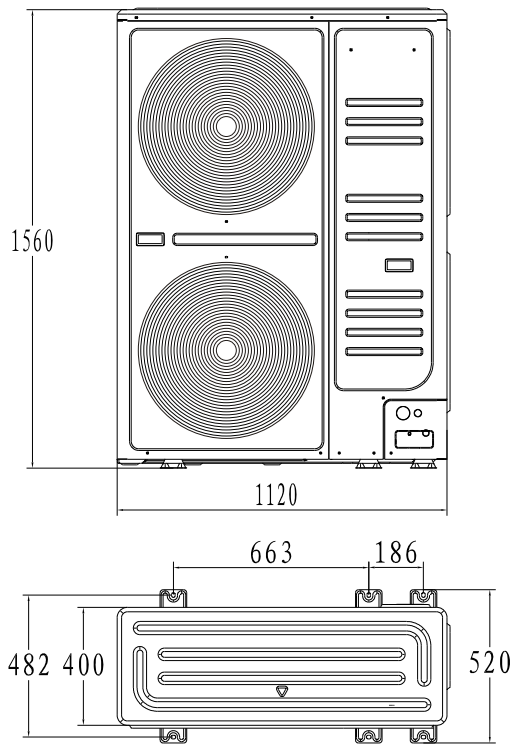
3-3. Dimension Diagram of an Outdoor Unit (Unit: mm)



Capacity:10000W



Capacity:12000/14000/16000/18000W



Capacity:22400/25200/28000W

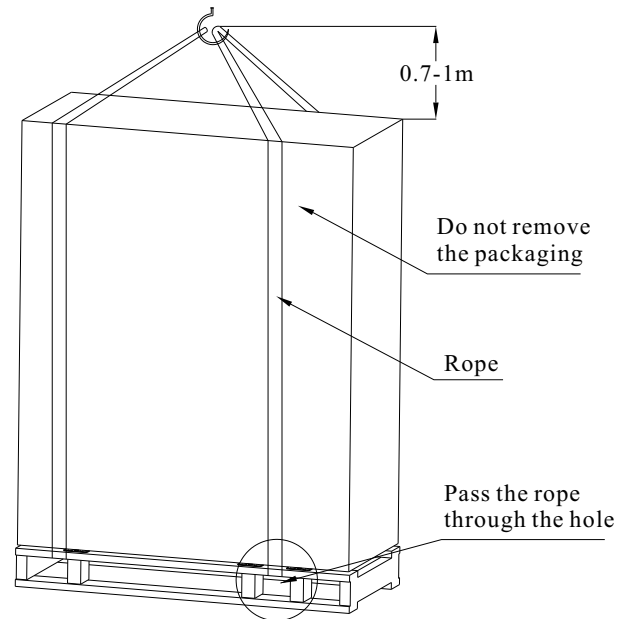
3-4. Moving-in of An Outdoor Unit

1. Use steel wires to lift an outdoor unit

▲ When lifting an outdoor unit, it is not allowed to take any package apart, and it is necessary to use two ropes with the single length of over 8 meters to lift such packaged outdoor unit safely and stably while keeping balance of the machine. When the outdoor unit is not packaged or its package is damaged, it is necessary to use protective plates or packages for protection.

▲ When moving and lifting an outdoor unit, it is necessary to make the outdoor unit keep vertical with the inclination of not more than 30°C and pay attention to safety in the course of moving and lifting.

2. Use a forklift to horizontally move an outdoor unit



3-5. Base of an Outdoor Unit

1) Providing a firm and right base has the following effects:

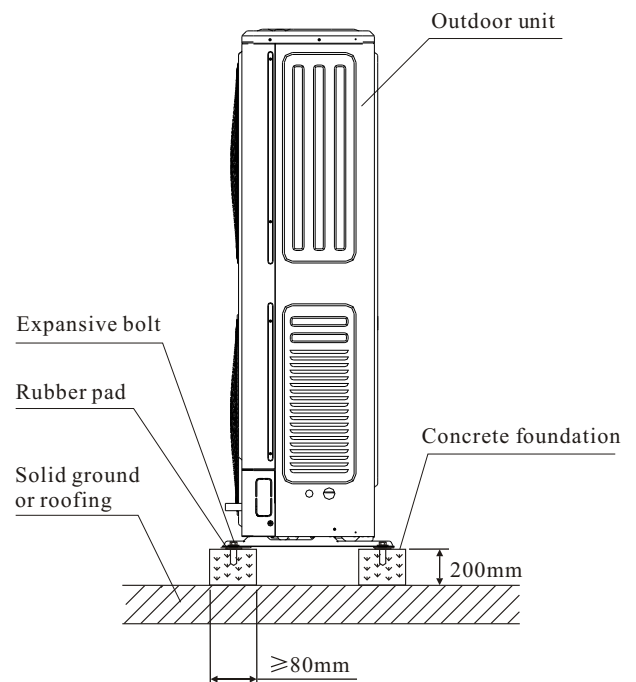
- ①The outdoor unit will not subside.
- ②The outdoor unit will not produce abnormal noise caused by the base.

2) Type of Bases

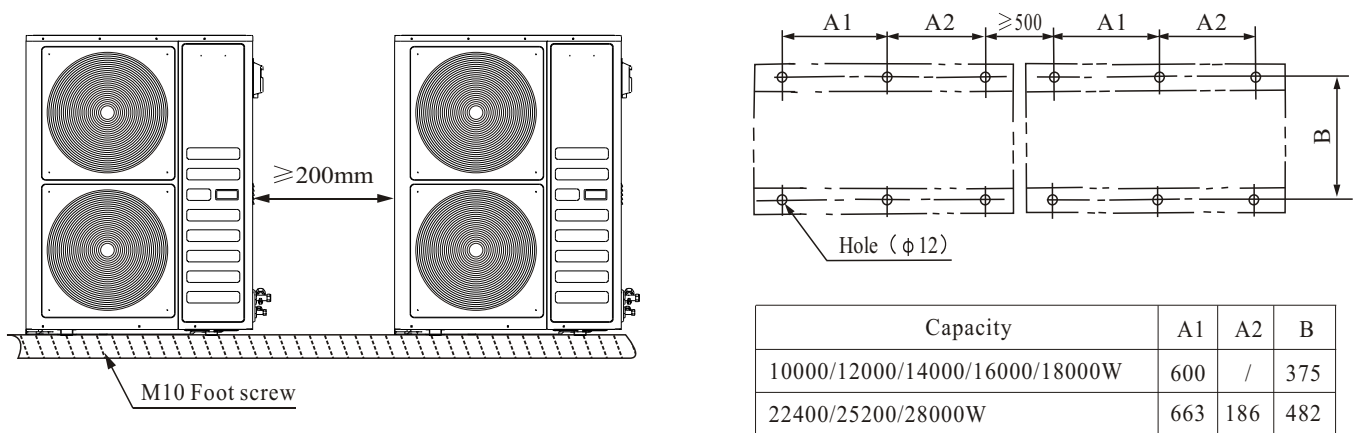
- ①Steel-structured base
- ②Concrete base (with common making method as shown in the following picture)

Key Points of Base Making:

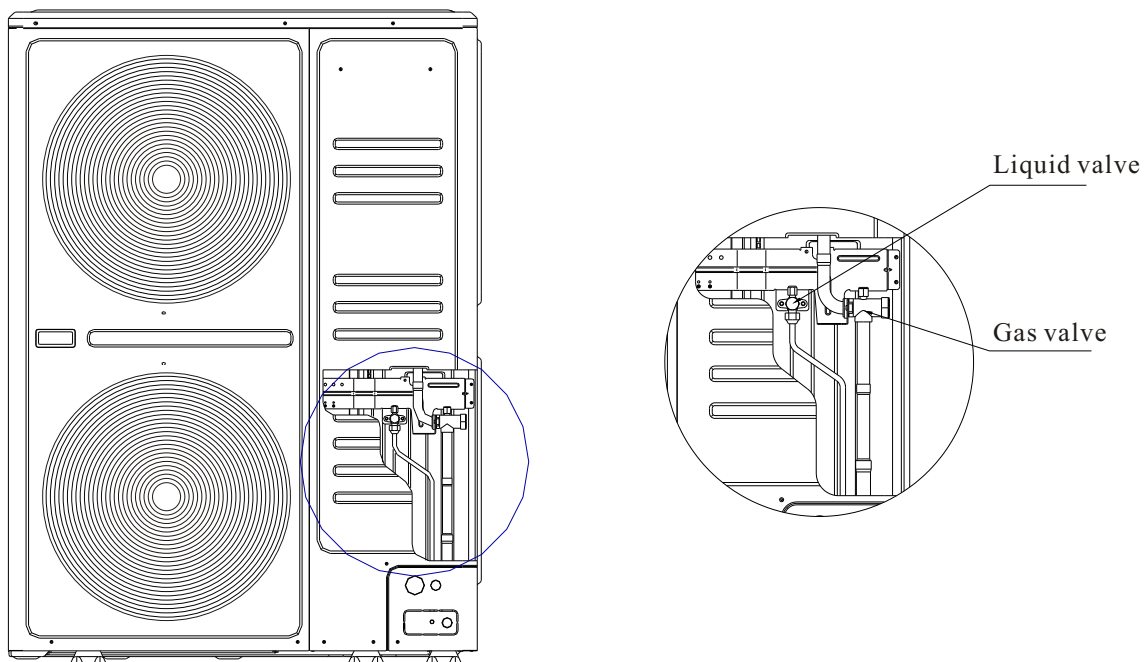
- ① With regard to the base of master, it is necessary to make a concrete base on the firm cement ground. The common method of making a concrete base is shown in the right picture or it is allowed to make the concrete base after field measurement on the site.
- ② The base should be horizontal completely to ensure that every point is under even contact.
- ③ When making an installing base of a machine, please ensure that the base directly supports the folded vertical edges of front and back base-plates of chassis because the folded vertical edges of front and back base-plates are the actual weight-bearing positions of such machine.
- ④ When the base is made on a roof, the gravel layer is unnecessary but the concrete surface must be knocked to be rough. The standard concrete proportion is 1 (cement): 2 (sand): 4 (cobble stones). It is necessary to add $\Phi 10$ reinforced steel bars, level the surface of cement mortar and chamfer the upper edges of base.
- ⑤ It is necessary to set drainage ditches surrounding the base in order to discharge the accumulated water surrounding the equipment.
- ⑥ Please check the weight-bearing capacity of roof to ensure the load capacity.
- ⑦ When deciding to pipe a machine from its bottom, it is necessary to ensure that the height of base exceeds 200mm.



3-6. Diagrams of Installation Position of Foundation Bolts



3-7. Outdoor unit Connecting Pipes



3-8. Key Installation Points of an Outdoor Unit

- 1) It is necessary to install a vibration isolator or pad between the set and the base as per the design requirements.
- 2) The contact between the outdoor unit and the base should be close. Otherwise, much vibration and noise will appear.
- 3) The outdoor unit must be in reliable ground connection.
- 4) Before debugging the outdoor unit, it is prohibited to open the valves of gas-side, liquid-side and oil balance pipes of such outdoor unit.
- 5) It is necessary to ensure that the installation site has sufficient maintenance space.

Installation Space Map (company:mm)

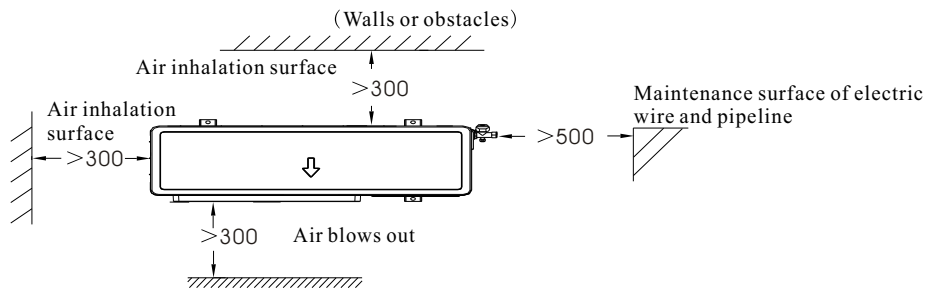


chart1

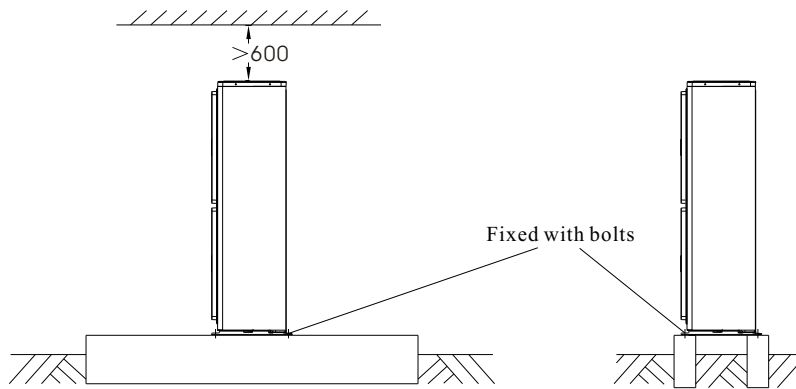


Chart2

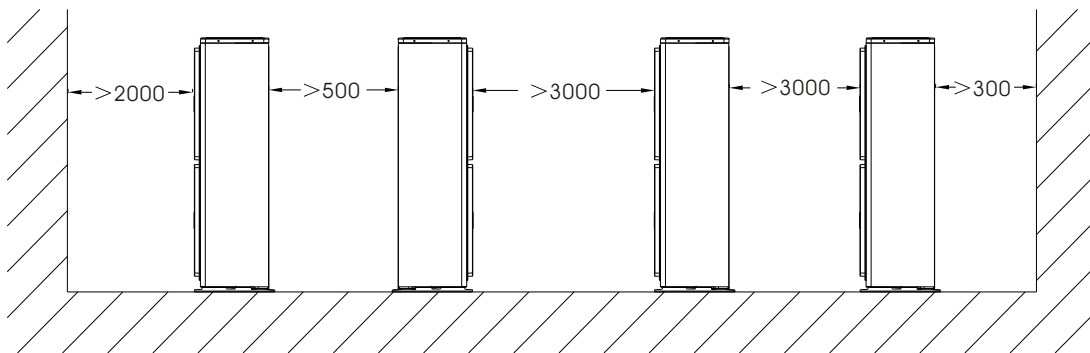


Chart3

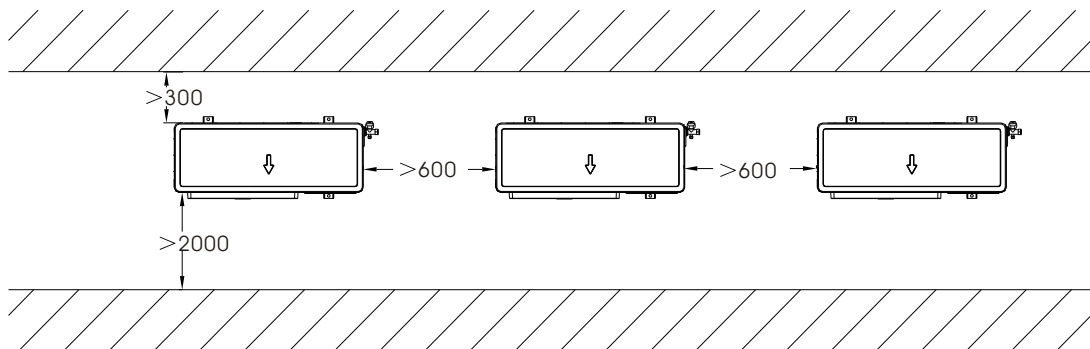


Chart4

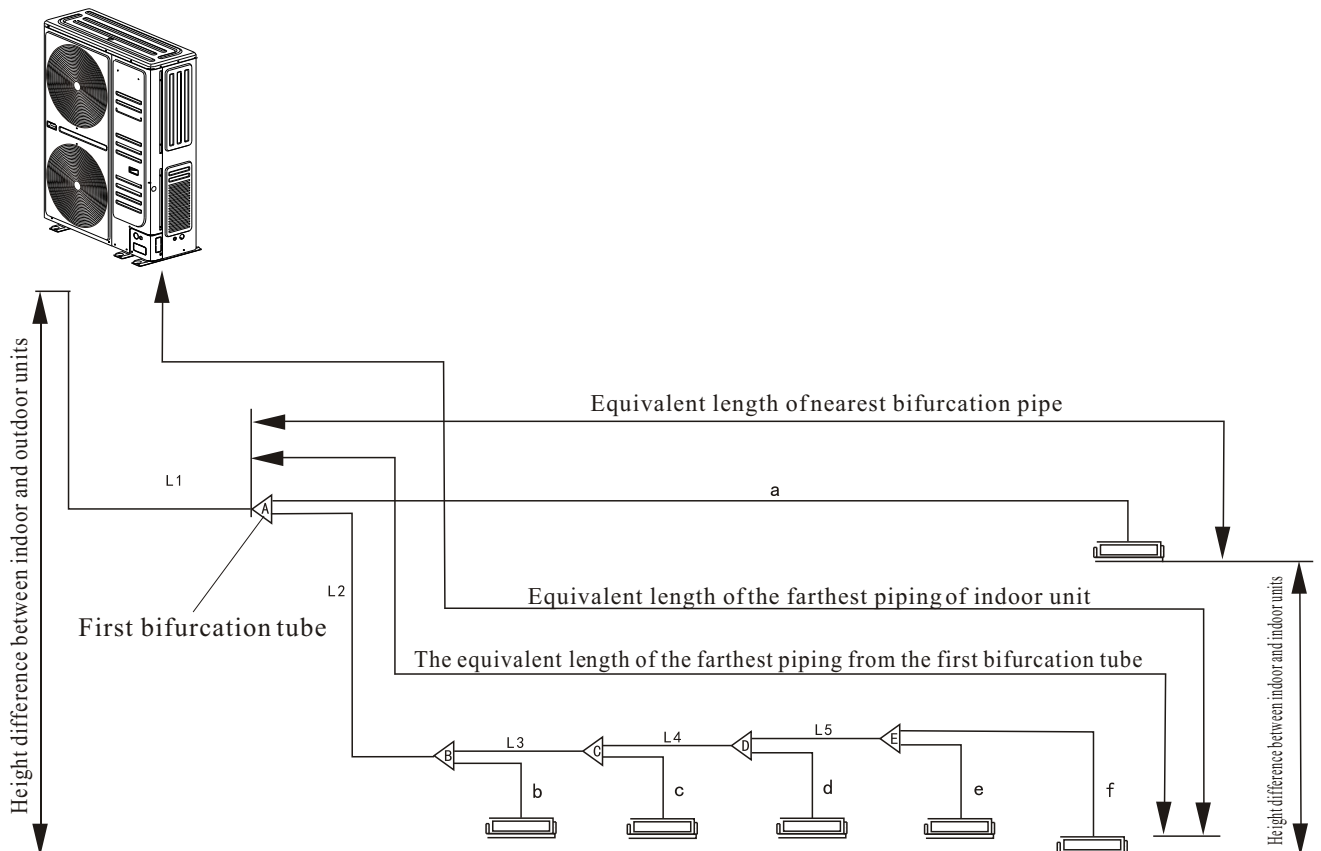
4. Refrigerant Pipes connection

4-1. Admissible Length and Height Difference of Supporting Refrigerant Pipes

Table 4.1

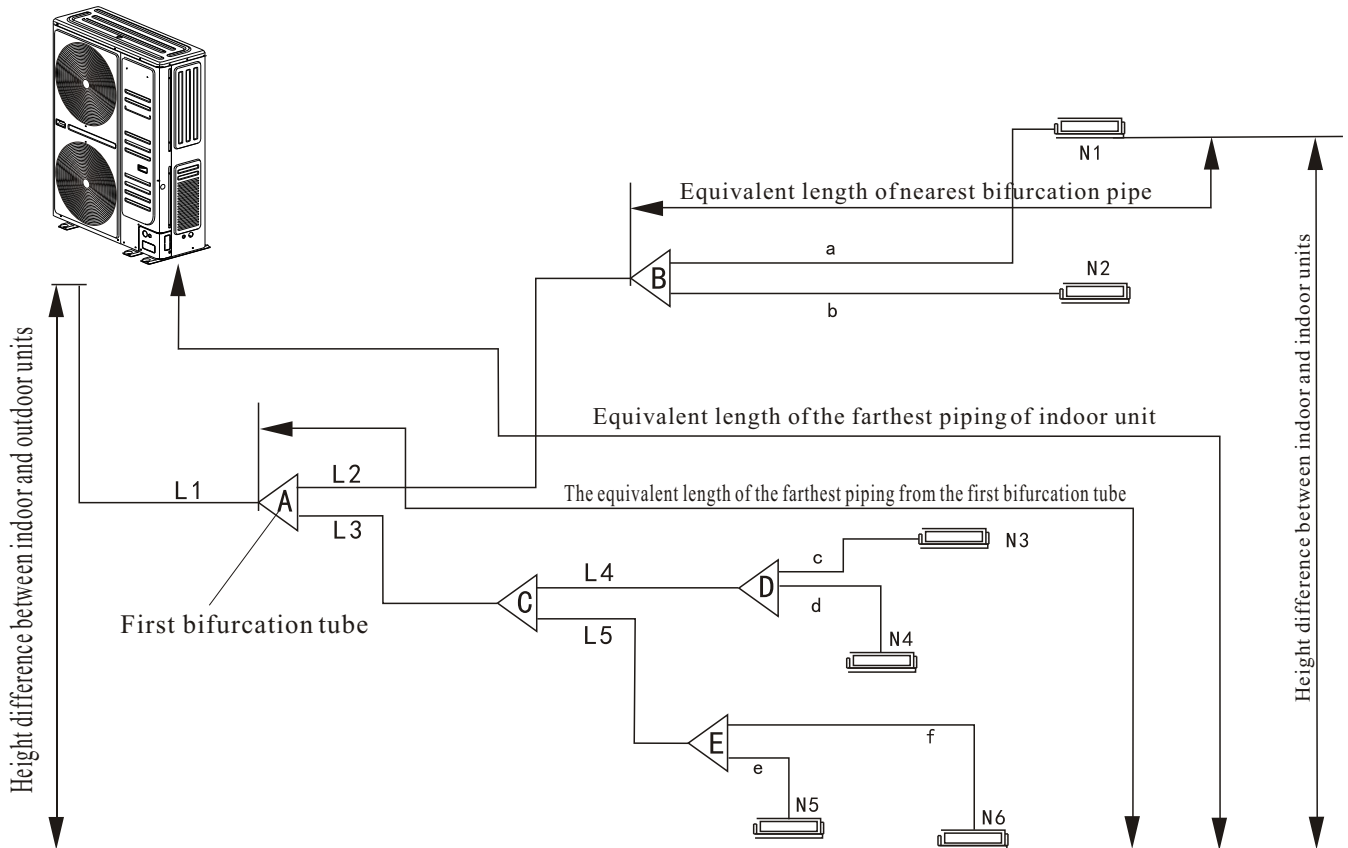
| | | Admissible Value | Pipes |
|---------------------------|---|-------------------------------------|---|
| Length of Supporting Pipe | Total Length of Refrigerant Pipes (Total extended length) | $\leq 120\text{m}$ | $L1+L2+L3+L4+L5+a+b+c+d+e+f$ |
| | Length of the farthest supporting pipe (L) | True length | $\leq 60\text{m}$ |
| | | Equivalent length | $\leq 70\text{m}$ |
| | Length of the supporting pipe furthest from the first branch pipe (L) | $\leq 20\text{m}$ | $L2+L3+L4+L5+f(\text{connection method1})$ or $L3+L5+f(\text{connection method2})$ or $L3(\text{connection method3})$ |
| Height Difference | Height difference (H) between an indoor unit and an outdoor unit | When the outdoor unit is on top | $\leq 30\text{m}$ |
| | | When the outdoor unit is underneath | $\leq 20\text{m}$ |
| | Height difference (H) between the indoor units | $\leq 8\text{m}$ | |

Connection Method 1



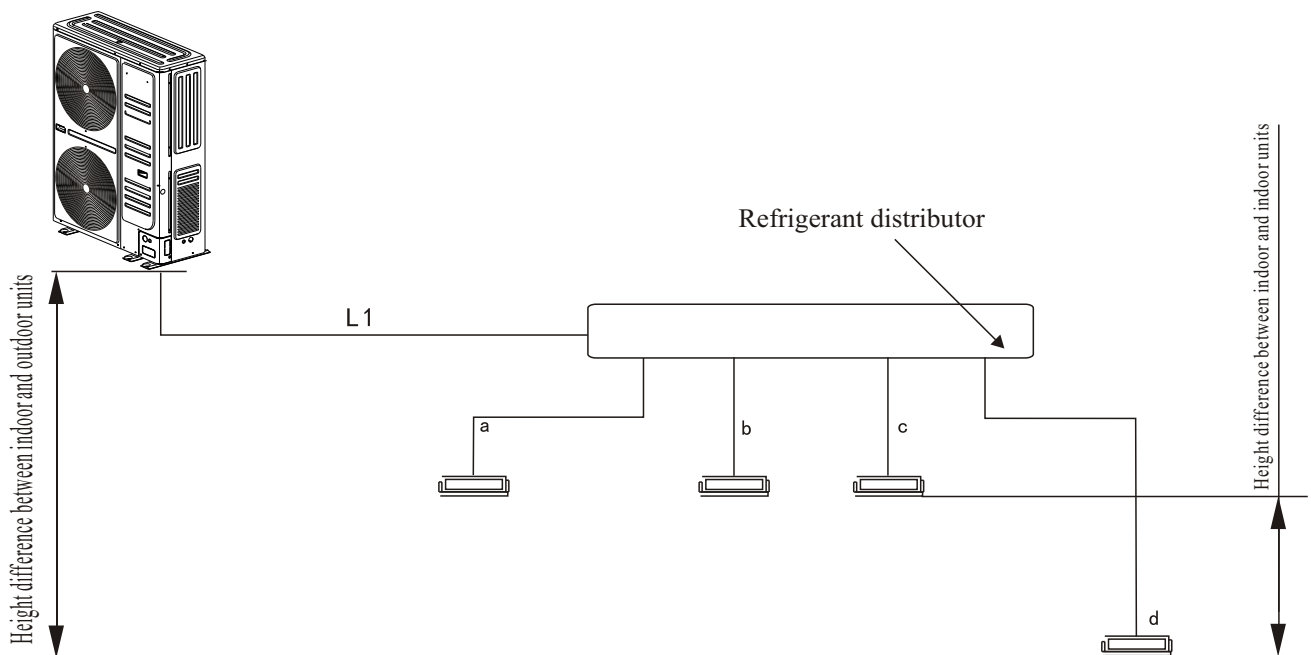
(Figure4-1.1)

Connection Method 2



(Figure4-1.2)

Connection Method 3

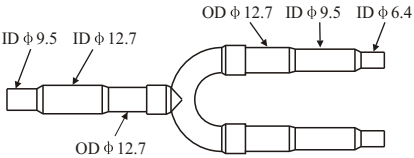
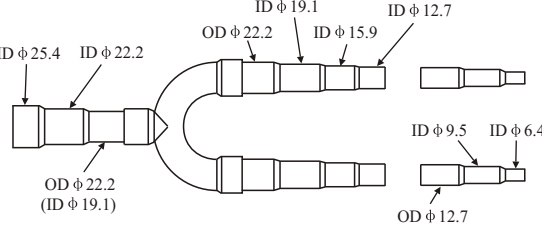
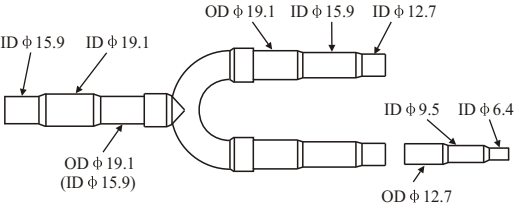
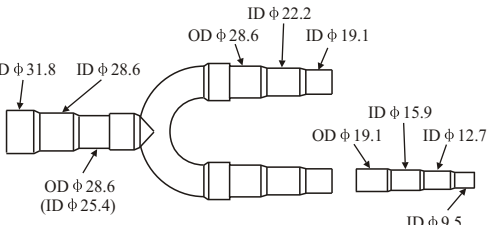
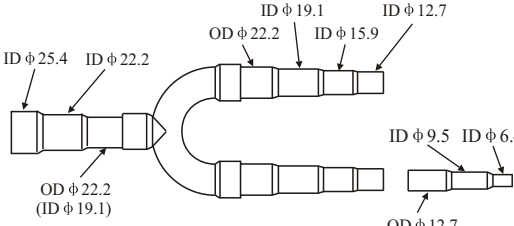
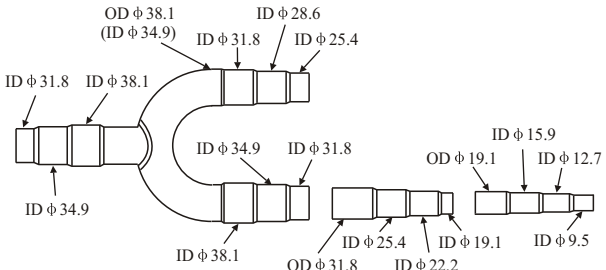
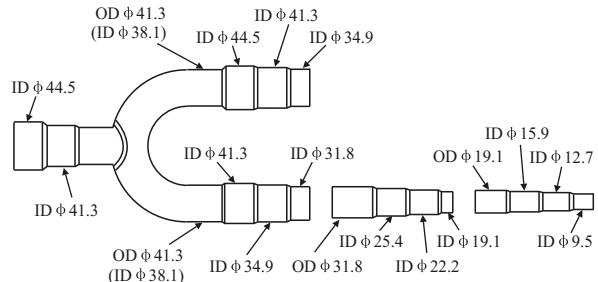


Explanation: The refrigerant distributor can be connected with 1-6 indoor machines. If a divergent pipe is not used, it can be welded tightly. The refrigerant distributor should be placed horizontally, and can be installed in the room, corridor or toilet.

(Figure4-1.3)

4-2. Specifications of Branch Pipe Connectors

Table 4.2

| Liquid-side Branch Pipes | Gas-side Branch Pipes |
|---|--|
| <p>L01: (φ 9.5- φ 12.7)——2×(φ 12.7- φ 6.4)</p>  | <p>G01: (φ 25.4- φ 19.1)——2×(φ 22.2- φ 6.4)</p>  |
| <p>L02: (φ 15.9- φ 19.1)—— (φ 19.1- φ 12.7)+(φ 19.1- φ 6.4)</p>  | <p>G02: (φ 31.8- φ 25.4)—— (φ 28.6- φ 19.1)+(φ 28.6- φ 9.5)</p>  |
| <p>L03: (φ 19.1- φ 25.4)—— (φ 22.2- φ 12.7)+(φ 22.2- φ 6.4)</p>  | <p>G03: (φ 31.8- φ 38.1)—— (φ 34.9- φ 25.4)+(φ 38.1- φ 9.5)</p>  |
| | <p>G04: (φ 41.3- φ 44.5)—— (φ 44.5- φ 34.9)+(φ 41.3- φ 9.5)</p>  |

| Assembly | Included Parts | Assembly | Included Parts |
|---------------------------|----------------|---------------------------|----------------|
| Branch Pipe Assembly By01 | G01, L01 | Branch Pipe Assembly By02 | G02, L01 |
| Branch Pipe Assembly By03 | G02, L02 | Branch Pipe Assembly By04 | G03, L02 |
| Branch Pipe Assembly By05 | G04, L03 | Branch Pipe Assembly By06 | G01, L01 |
| Branch Pipe Assembly By07 | L01, L02 | | |

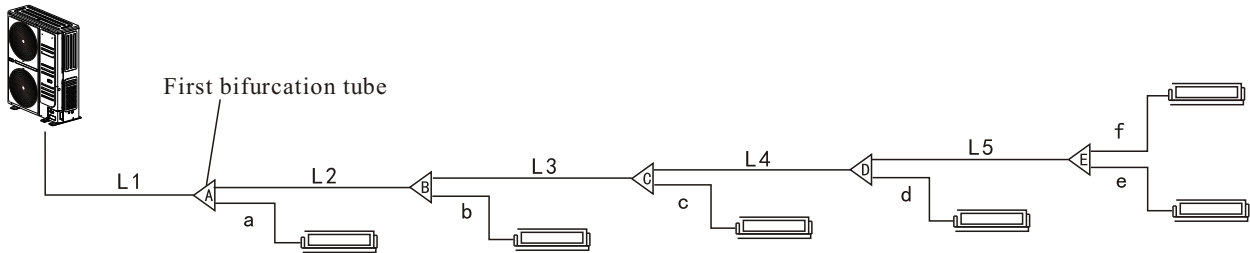
Remark: Some liquid-side and gas-side branch pipe assemblies in the above table consist of Y-shaped branch pipes and one to two variable-diameter pipes. Please decide whether or not to weld the pipes as per the actual situation at the time of construction.

4-3. Classification of Supporting Pipes

Table 4.3

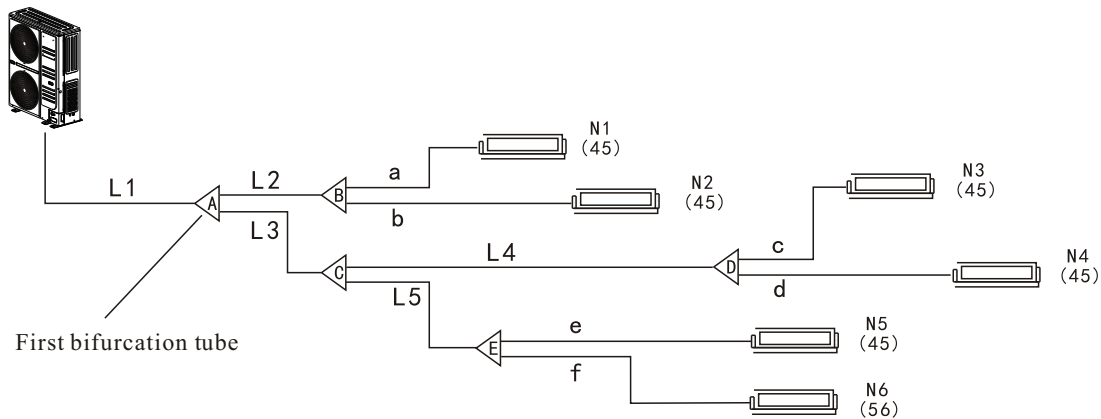
| Name of Supporting Pipe | Connection Position of Supporting Pipe | Code (as per Figure 4-3.1) |
|---|---|----------------------------|
| Master Pipe | The Supporting pipe between the outdoor unit and the indoor first branch pipe | L1 |
| Master Supporting Pipes of Indoor Units | The supporting pipes behind the indoor first branch pipe and not directly connected to the indoor units | L2, L3, L4,L5 |
| Slave Supporting Pipes of Indoor Units | The supporting pipes behind the branch pipes and directly connected to the indoor units | a, b, c, d, e,f |
| Branch Pipe Assemblies of Indoor Units | The supporting pipe assemblies connecting the master pipe, master supporting pipes and slave supporting pipes | A,B,C,D,E |

Connection Method 1



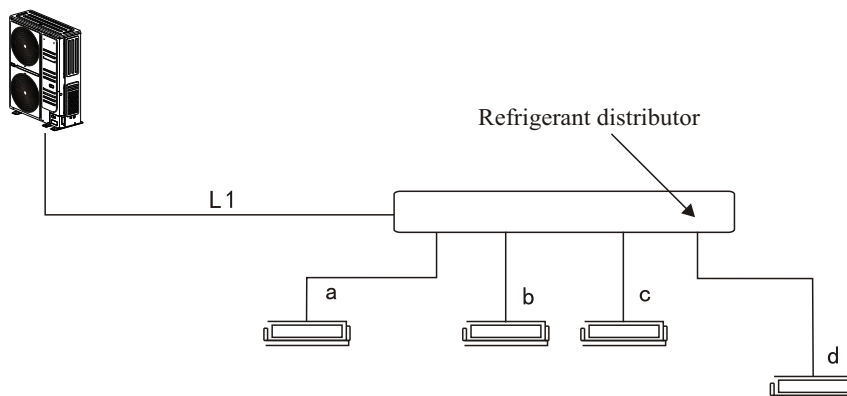
(Figure 4-3.1)

Connection Method 2



(Figure 4-3.2)

Connection Method 3



(Figure 4-3.3)

4-4. Determining the Pipe Diameters of Supporting Pipes Connecting Indoor Units

Pipe Diameters of Slave Supporting Pipes Connecting Indoor Units (Graphical Number: a, b, c, d, ... m)

Table 4.4

| Indoor unit Model | Gas-side | Liquid-side | Applicable Branch Pipe (Gas/Liquid-side) |
|------------------------|----------|-------------|--|
| Capacity: 6300~14000W | φ 15.88 | φ 9.52 | Assembly BY07(L01/L02) |
| Capacity: 14000~23000W | φ 19.05 | | Assembly BY07(L01/L02) |
| Capacity: 23000~33000W | φ 22.2 | | Assembly BY01(G01/L01) |

4-5. Determining the Pipe Diameters of Supporting Pipes Connecting Outdoor Units

Table 4.5

| Capacity of Outdoor units | Dimensions of Masterpipe, when the equivalent length of all supporting pipe is less than 90 meters | | Dimensions of Masterpipe, when the equivalent length of all supporting pipe is 90 meters at least | |
|---------------------------|--|----------------------------------|---|----------------------------------|
| | Gas/Liquid side | Indoor Branch Pipe1 (Gas/Liquid) | Gas/Liquid side | Indoor Branch Pipe1 (Gas/Liquid) |
| $A \leq 180$ | φ 19.05/ φ 9.52 | Assembly BY07(L01/L02) | φ 22.2/ φ 9.52 | Assembly BY07(L01/L02) |
| $180 < A \leq 280$ | φ 22.2/ φ 9.52 | Assembly BY07(L01/L02) | φ 25.4/ φ 9.52 | Assembly BY07(L01/L02) |

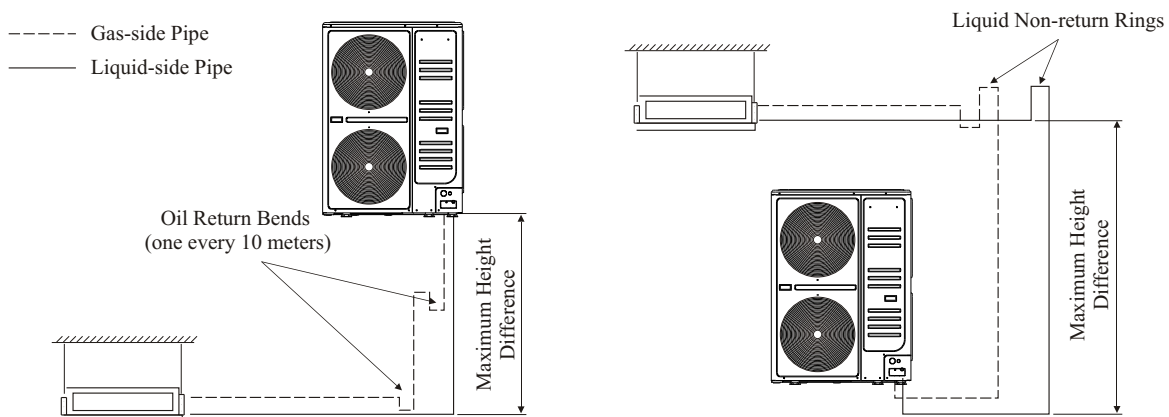
When the indoor and outdoor units drop more than 10m, in order to ensure that the compressor can return oil normally, it should be ensure that the indoor and outdoor units connecting pipes are set to a return bend every 10m.

Caution

● When connecting the supporting pipes, it is necessary to often check whether or not the supporting refrigerant pipes are connected to one refrigerant circulating system in order to avoid much rework. When finishing the connection, it is necessary to confirm the situation again.

4-6. Connection between indoor and outdoor units

- ◆ When the height difference between indoor and outdoor units exceeds 10 meters, it is necessary to set one oil return bend every 10 meters of height difference of pipes connecting the indoor and outdoor units in order to ensure normal oil return of compressors. The height of one oil return bend is 10cm or 3~5 times as much as external diameter of a copper pipe. When the indoor unit is above the outdoor unit, it is also necessary to set liquid non-return rings if there is a very large height difference between the indoor and outdoor units.



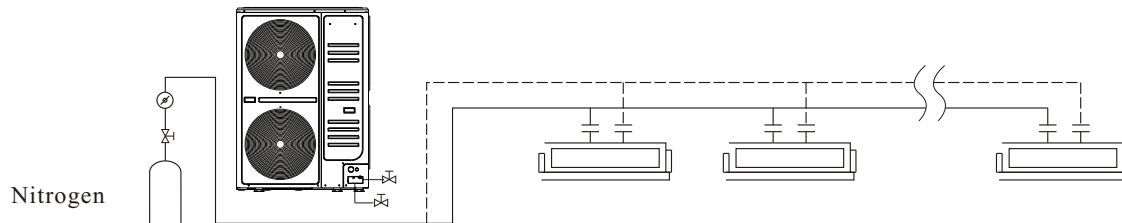
(Figure 4-6)

Caution

● When connecting the supporting pipes, it is necessary to often check whether or not the supporting refrigerant pipes are connected to one refrigerant circulating system in order to avoid much rework. When finishing the connection, it is necessary to confirm the situation again.

4-7. Removing Refuse and Water in Supporting Pipes

After welding the supporting pipes, it is necessary to use dry nitrogen to remove the refuse and water in the gas and liquid-side pipes respectively before connecting the supporting pipes to the indoor and outdoor units. As shown in the following picture, please do not open the sealing plug on the pipe of an indoor unit. Otherwise, dirt will be blown in. when the pipe is relatively long, it is necessary to preliminarily blow it by sections.



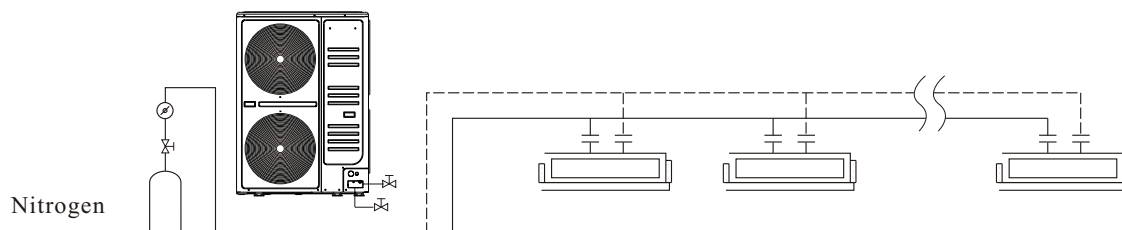
(Figure 4-7)

- 1) Use blind plugs to plug up all the pipe orifices, opening one pipe orifice to blow.
- 2) Open the valve of nitrogen cylinder and place the pressure regulating valve at the position of 5kg/cm², and then check whether or not nitrogen passes through the open pipe orifice.
- 3) Use the insulating material in your hand to prop up the open pipe orifice. When the pressure is so high that you fail to prop up the open pipe orifice, you should quickly release the insulating material and then repeat this step to blow the pipe for the second time.
- 4) Place a piece of light-color cloth or white paper at the open pipe orifice to check till no damp or impurity appears again. If you do not intend to connect the pipe immediately, you should do the sealing work well.
- 5) Blow other pipes as per the same steps.

4-8. Gas Tightness Test

4-8-1. Testing Stages

- 1) Stage I: The supporting pipes have been connected to the indoor units but not connected to the outdoor unit. It is necessary to check the air tightness of the indoor supporting pipes.



(Figure 4-8)

- 2) Stage II: Connect the indoor supporting pipes to the outdoor units after confirming that the air tightness at Stage I is qualified upon check, and then fill about 0.4MPa mixture of refrigerant and nitrogen (wherein the pressure of mixture should be not higher than the pressure of refrigerant in the outdoor units), and finally use a halogen leak detector to detect the leakage at the mouth of pipe connecting the outdoor units.

4-8-2. Operating Steps

- 1) Slowly fill dry nitrogen in the piping system. When the pressure reaches 1.5MPa, keep such pressure for 3 minutes. Enter Step 2 if the pressure gauge shows that the pressure does not decrease obviously; otherwise, it is necessary to check the leakage point(s);
- 2) Continue filling the dry nitrogen. When the pressure reaches 3.0MPa, keep such pressure for 3 minutes. Enter Step 3 if the pressure gauge shows that the pressure does not decrease obviously; otherwise, it is necessary to check the leakage point(s);
- 3) Continue filling the dry nitrogen. When the pressure reaches 4.0MPa, keep such pressure for 10 minutes. Start to time 3 if the pressure gauge shows that the pressure does not decrease obviously; otherwise, it is necessary to check the leakage point(s); when starting to time, it is necessary to record the current temperature and pressure value. 24 hours later, record the temperature and pressure value again. The air tightness is deemed to be qualified when the pressure does not decrease for about more or less 24 hours, excluding the pressure change caused by temperature change. Otherwise, it is necessary to check the leakage point(s) and re-do the air tightness test till the air tightness is qualified.

4-8-3. Operating Instructions

- 1) Doing the air tightness test by stages can reduce the complexity of checking the leakage point(s).
- 2) It is necessary to note whether or not the range and precision of pressure gauge meet the relevant requirements when using it. The precision of a pressure gauge should be Grade 1.5 at least and the maximum pressure of a pressure gauge qualified upon check must be greater than the test pressure and the recommended maximum pressure of a pressure gauge is 1.5~2.0 times as much as the test pressure.
- 3) When combining the modules, it is also necessary to do the air tightness test and pressure maintaining treatment for the oil balance pipes among the outdoor units. If the air tightness is good, it is also necessary to do the vacuumizing operation in Item 4-9 on the next page for the pipes on the side of oil balance. Otherwise, the refrigerating system will run abnormally if any other gas enters it.
- 4) After doing the air tightness test, it is a must to reduce the pressure in order to prevent the high pressure from damaging the equipment if it is necessary to place the tested equipment for a period of time; meanwhile, the pressure must be greater than the atmosphere pressure in order to prevent air from entering the system. It is suggested that the pressure should be reduced to about 0.4MPa.
- 5) After installation, it is a must to tighten the nuts of stop valves for playing a sealing role and relieving the component ageing.

 Warnings

- It is a must to slowly fill the nitrogen and pressurize the gas and liquid-side pipes simultaneously in order to avoid damaging the valves.
- It is not allowed to screw off the valve rod of stop valves.

 Caution




- The pressure of nitrogen varies with the change of ambient temperature. It is not allowed to mix water or any other gas with the nitrogen. It is necessary to record the temperatures at the time of pressure test and confirmation in order to make adjustment by comparing the temperature change.
- It is necessary to do the vacuumizing operation before checking the air tightness in order to eliminate the influence of air and moisture on the pressure change of nitrogen and judge whether or not the outdoor units suffer refrigerant leakage.
- When connecting the system pipeline to the outdoor units, it is necessary to note that the stop valves cannot be damaged. Otherwise, leakage will occur easily.

4-9. Vacuumizing




- 1) Use a vacuum pump with the relative vacuum degree of -0.1MPa and air displacement of 4L/s.
- 2) The outdoor units do not need to be vacuumized. Be sure not to open the stop valves on the sides of gas, liquid and oil balance of the outdoor units.
- 3) The sides of gas, liquid and oil balance of the outdoor units need to be vacuumized.
- 4) Setting the system vacuumizing mode:

The vacuumizing operation can be done after the power and communication lines of outdoor units are connected. When using the vacuumizing mode, it is allowed to do the vacuumizing operation on the liquid or gas side. However, it is recommended that the vacuumizing operation be done on the liquid and gas sides in order to quickly realize the vacuumizing effect. Specific methods are as follows: (See the relevant content on Page 29 of this Manual for introduction to keys and display content.)

a. When you momentarily press the functional key " KEY1 " (Menu) on the master control panel, the letters on the Nixie tube DS1 twinkle and the system enters the state of waiting for function selection. At this moment, you can select the corresponding functions via the upward selection key (Up) on " KEY3 " and the downward selection key (Down) on " KEY4 " and stop when the Nixie tube DS1 displays " A9 " ;

| DS1  | | DS2  | | DS3  | |
|---|--------------|---|--------------|---|--------------|
| Function Code | Display Mode | Current State | Display Mode | Current State | Display Mode |
| A9 | Twinkling | 00 | Twinkling | 00 | Twinkling |

b. When you momentarily press the functional key " KEY5 " (Enter) for confirmation, " A9 " displays Normally Going On, confirming that you enter the function setting of the vacuumizing mode;

| DS1  | | DS2  | | DS3  | |
|---|-------------------|---|--------------|---|--------------|
| Function Code | Display Mode | Current State | Display Mode | Current State | Display Mode |
| A9 | Normally Going On | 00 | Twinkling | 0C | Twinkling |

c. When all the Nixie tubes display the content as shown in the above picture, you enter the " state of waiting for conforming the system vacuumizing mode ". When you momentarily press the functional key " KEYS " (Enter) for confirmation, the final display content is as follow:

| | | | | | |
|---------------|-------------------|---------------|--------------|---------------|--------------|
| DS1 88 | | DS2 88 | | DS3 88 | |
| Function Code | Display Mode | Current State | Display Mode | Current State | Display Mode |
| A9 | Normally Going On | 00 | Twinkling | 0C | Twinkling |

At this moment, the oil balance valves of all the modules are opened, the master electronic expansion valve of the outdoor units is adjusted to 480PLS, the sub-cooler electronic expansion valves are adjusted to 480PLS, the electronic expansion valves of all the indoor units are adjusted to 480PLS and the complete machine fails to start for running.

At this moment, the complete machine exits from the vacuumizing state after you momentarily press the exit key " KEY2 " on the master control panel or keep the vacuumizing state for 24 hours.

- 5) Confirm whether or not the relative vacuum degree reaches below -0.1MPa after the vacuum pump works for more than 2 hours. It means that there is moisture or leakage in the system if the relative vacuum degree fails to be below -0.1MPa when the vacuum pump works for more than 3 hours.
- 6) After finishing the vacuumizing and drying operations, keep the vacuumizing state for one hour and use a vacuum gauge to monitor whether or not the pressure goes up.

! Caution

- Do not use the tools and measuring instruments used for different refrigerants and in direct contact with refrigerants.
- Be sure not to use refrigerant for removing air.
- Please consider whether or not there is leakage when the relative vacuum degree fails to be below -0.1MPa. Please run the vacuum pump for more one to two hours if there is no leakage.

4-10. Refrigerant Addition

It is allowed to add the refrigerant manually or automatically (See the content of engineering commissioning on Page 33)

Calculate the refrigerant adding amount as per the diameter and length of liquid-side pipes connecting the indoor and outdoor units wherein the added refrigerant is R410A.

| Diameter of Liquid-side Pipe | Refrigerant Addition Amount Equivalent to One-meter-length Pipe (Unit: kg) | Diameter of Liquid-side Pipe | Refrigerant Addition Amount Equivalent to One-meter-length Pipe (Unit: kg) | Diameter of Liquid-side Pipe | Refrigerant Addition Amount Equivalent to One-meter-length Pipe (Unit: kg) | Diameter of Liquid-side Pipe | Refrigerant Addition Amount Equivalent to One-meter-length Pipe (Unit: kg) |
|------------------------------|--|------------------------------|--|------------------------------|--|------------------------------|--|
| φ 6.35 | 0.022 | φ 12.7 | 0.110 | φ 19.05 | 0.250 | φ 25.4 | 0.550 |
| φ 9.52 | 0.054 | φ 15.88 | 0.170 | φ 22.2 | 0.350 | φ 28.6 | 0.680 |

Notice: On the premise of strictly following the refrigerant adding method in the above table, it is necessary to make sure that the total refrigerant adding amount of system does not exceed the maximum refrigerant adding & filling amount in the following table. If the refrigerant adding & filling amount exceeds the range in the following table upon calculation, it is necessary to shorten the total length in the piping construction scheme and re-calculate the refrigerant adding & filling amount in order to meet the requirements in the following table.

<Maximum Refrigerant Adding & Filling Amount>

| Capacity of Outdoor Units(W) | 10000 | 12000~18000 | 22400~28000 |
|--|-------|-------------|-------------|
| Maximum Refrigerant Adding & Filling Amount (kg) | 3 | 4 | 7 |

Notice: Refrigerant R410A must be filled quantitatively in liquid state via an electronic scale.

4-11. Refrigerant Addition

It is allowed to add the refrigerant manually or automatically (See the content of engineering commissioning on Page 33)

Calculate the refrigerant adding amount as per the diameter and length of liquid-side pipes connecting the indoor and outdoor units wherein the added refrigerant is R410A.

| Diameter of Liquid-side Pipe | Refrigerant Addition Amount Equivalent to One-meter-length Pipe (Unit: kg) | Diameter of Liquid-side Pipe | Refrigerant Addition Amount Equivalent to One-meter-length Pipe (Unit: kg) | Diameter of Liquid-side Pipe | Refrigerant Addition Amount Equivalent to One-meter-length Pipe (Unit: kg) | Diameter of Liquid-side Pipe | Refrigerant Addition Amount Equivalent to One-meter-length Pipe (Unit: kg) |
|------------------------------|--|------------------------------|--|------------------------------|--|------------------------------|--|
| φ 6.35 | 0.022 | φ 12.7 | 0.110 | φ 19.05 | 0.250 | φ 25.4 | 0.550 |
| φ 9.52 | 0.054 | φ 15.88 | 0.170 | φ 22.2 | 0.350 | φ 28.6 | 0.680 |

4-12.Explanation of calculation method for additional refrigerant

Calculating method of additional refrigerant quality(Baseline on liquid pipe)

Additional refrigerant quality=Sum of length of liquid pipe * Refrigerant Addition Amount Equivalent to One-meter-length Pipe(Refer to refrigerant additional scale 4-11 on 26 pages)

Notes:When the total length of the liquid pipe is less than or equal to 20 meters without refrigeratant and the liquid pipe is more than 20 meters to ensure that the system does not leak, the R410A refrigerant is added to the unit from the injection port of the outdoor hydraulic pipe valve when the compressor is not working.when it is found that the refrigerant can not be filled quickly due to the pressure rise in the tube, the refrigerant can be charged from the low-pressure detection valve of the external machine by placing the unit in the refrigeration start-up state.

5. Electrical Wiring

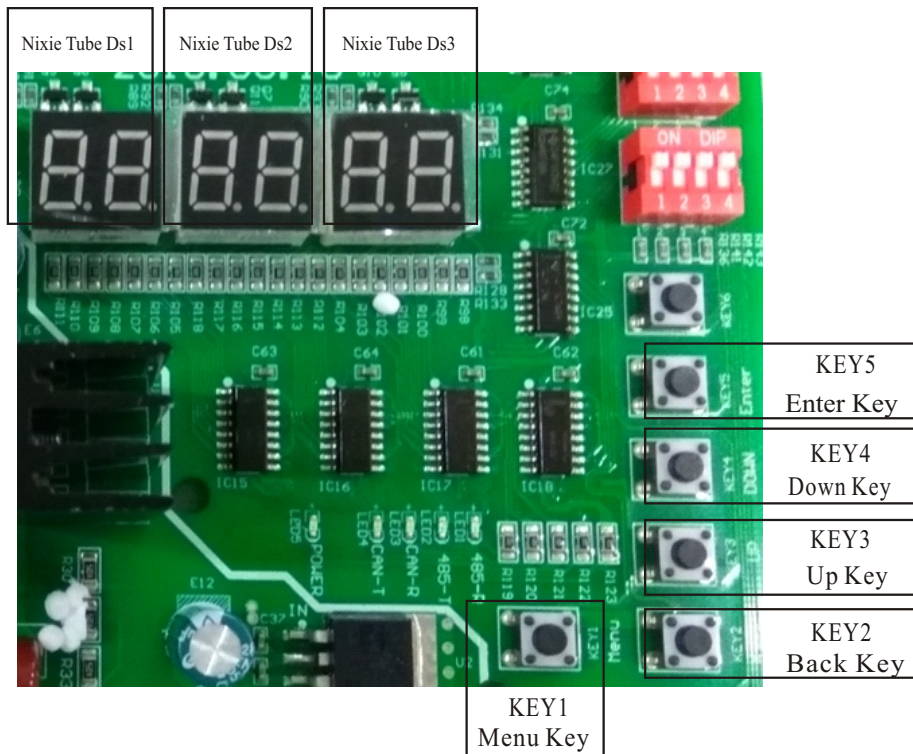
5-1. Description of Point Inspections of the Outdoor Units

1) Table of Troubles, Protection and States

Table 5.1

| Display Content | Definition of Code | Display Content | Definition of Code | Display Content | Definition of Code |
|-------------------|---|--|---|-----------------|---|
| | Troubles of Outdoor Units | U8 | Compressor preheat is insufficient. | FA | Variable-frequency Fan motor phase missing |
| L1 | Exhaust Temperature Sensor TP1 goes wrong. | U9 | Valves/pipes of outdoor units are abnormal. | FH | Fan drive charging circuit fault |
| L2 | Exhaust Temperature Sensor TP2 goes wrong. | UA | Valves/pipes of indoor units are abnormal. | FC | Variable-frequency Fan motor Startup failure |
| L3 | Exhaust Temperature Sensor TP3 goes wrong. | UC | Oil return capillary anomaly | FL | Fault of fan driven temperature sensor |
| L4 | Exhaust Temperature Sensor TP4 goes wrong. | UE | Module combination error | System State | |
| L5 | Exhaust Temperature Sensor TP5 goes wrong. | UH | Four-way valves are under commutation failure protection. | A0 | System is not debugged. |
| L6 | Exhaust Temperature Sensor TP6 goes wrong. | UL | Wrong dialing of outdoor unit model | A1 | System is defrosted. |
| L7 | Exhaust Temperature Sensor TP7 goes wrong. | Detailed Troubles about Compressor Drive | | A2 | System suffers oil return. |
| L8 | Outdoor Ambient Temperature Sensor goes wrong. | J0 | Variable-frequency compressors suffer total running malfunction. | A3 | System Query |
| L9 | Defrosting Sensor T3A goes wrong. | J1 | IPM over-current | A4 | Rated Capacity Test |
| LA | Sensor T3B goes wrong. | J2 | Compressor drive fails. | A5 | IPLV1 Test |
| LH | Vapor Incoming Pipe Temperature Sensor goes wrong. | J3 | Compressors are under over-current. | A6 | IPLV2 Test |
| LC | Vapor Outgoing Pipe Temperature Sensor goes wrong. | J4 | Input voltage suffers a default phase. | A7 | Refrigerant recovery of indoor units |
| LL | Sub-cooler Gas Outgoing Sensor goes wrong. | J5 | IPM current sampling goes wrong. | A8 | Refrigerant recovery of modules |
| LE | Sub-cooler Liquid Outgoing Sensor goes wrong. | J6 | Radiators stop due to overheat. | A9 | Vacuumizing Mode |
| Ld | Sub-cooler Gas Incoming Sensor goes wrong. | J7 | Precharge fails. | AA | System is set. |
| LF | High-pressure Sensor goes wrong. | J8 | DC bus is of over-voltage. | AH | Heating Mode |
| LJ | Low Pressure Sensor goes wrong. | J9 | DC bus is of under-voltage. | AC | Cooling Mode |
| LP | MAC Address of outdoor units is abnormal. | JA | Abnormal AC input voltage protection | AL | Automatic Filling |
| LU | Outdoor EEPROM goes wrong. | JH | DC input is of over-current. | AE | Manual Filling |
| System Protection | | JC | Input voltage sampling goes wrong. | AF | Air Supply Mode |
| H0 | Outdoor units go wrong/are protected. | JL | PFC hardware overcurrent fault | AJ | Main-board Hardware Self-checking |
| H1 | High-pressure Protection | JE | Temperature sensors go wrong. | AP | Online testing |
| H2 | Low-pressure Protection | JF | Drive chip failure | AU | Self cleaning mode |
| H3 | System is under exhaust high-temperature protection. | JJ | Compressor phase missing | System State | |
| H4 | Pressure ratio is under excessively high protection. | Communication Troubles | | n0 | Historical set fault querying |
| H5 | Pressure ratio is under excessively low protection. | C0 | CAN communication cables suffer total communication malfunction. | n1 | Set system parameter querying |
| H6 | System is under refrigerant deficiency protection | C1 | Multiple master control troubles | n2 | Set set-state querying |
| H7 | Degree of system exhaust superheat is under excessively low protection. | C2 | Number of outdoor unit modules is abnormal (less/more) | n3 | Engineering number querying |
| H8 | Fixed-frequency Compressor 1 is under over-current protection. | C3 | Communication between master controller and variable-frequency compressor drives goes wrong | n4 | Cooling/heating function setting |
| H9 | Fixed-frequency Compressor 2 is under over-current protection. | C4 | Communication between master controller and variable-frequency fan drives goes wrong | n5 | Silent mode setting |
| HA | Fixed-frequency Compressor 3 is under over-current protection. | C5 | Communication between indoor units and wire controllers goes wrong | n6 | System energy-saving operation setting |
| HH | Fixed-frequency Compressor 4 is under over-current protection. | C6 | Missing indoor unit | n7 | Defrosting cycle (K1) setting |
| HC | Fixed-frequency Compressor 5 is under over-current protection. | Fan drive fault | | n8 | Forced defrosting |
| HL | High-voltage Switches of Modules are protected. | F0 | Fan 1 suffers running troubles. | n9 | Upper limit setting of capacity configuration rates of indoor and outdoor units |
| HE | Power supply is under phase sequence protection. | F1 | Fan 2 suffers running troubles. | nA | Cooling/Heating Type |
| Others | | F2 | Variable-frequency Fan motor is under over-current protection. | nH | Single-heating Type |
| U1 | Module emergency dialing error | F3 | Fan drive IPM module protection | nC | Single-cooling Type |
| U2 | Modules are in emergency state. | F4 | Fault of fan driven temperature sensor | nL | Capacity limit setting of maximum capacity input |
| U3 | Variable-frequency compressors are in emergency state. | F5 | Fan driven IPM over temperature protection | nE | Wind and Snow Control |
| U4 | Fixed-frequency compressors are in emergency state. | F6 | Fault of memory chip driven by fan | nF | Type of Air Supply |
| U5 | Variable-frequency fans are in emergency state. | F7 | Fan driven DC bus is of over-voltage. | nJ | Fast Cooling and Fast Heating |
| U6 | Rated capacity configuration rate is excessively low. | F8 | Fault of fan driving current detection circuit | nP | Forced Dust Removal |
| U7 | Rated capacity configuration rate is excessively high. | F9 | Fan driven DC bus is of under-voltage. | | |

2) Point-inspection Keys and Display



3) Historical Fault Querying of Outdoor Units

1. When you momentarily press the functional key " KEY1 " (Menu) on the master control panel, the display content is as follows:

| DS1 88 | | DS2 88 | | DS3 88 | |
|--|--------------|--|--------------|--|--------------|
| Function Code | Display Mode | Current State | Display Mode | Current State | Display Mode |
| A3 | Twinkling | 00 | Twinkling | 00 | Twinkling |

2. When you momentarily press the functional key " KEY5 " (Enter) on the master control panel, the display content is as follows:

| DS1 88 | | DS2 88 | | DS3 88 | |
|--|-------------------|--|--------------|--|--------------|
| Function Code | Display Mode | Current State | Display Mode | Current State | Display Mode |
| A3 | Normally Going On | n0 | Twinkling | 00 | Twinkling |

3. When you momentarily press the functional key " KEY5 " (Enter) on the master control panel, the display content is as follows:

| DS1 88 | | DS2 88 | | DS3 88 | |
|--|--------------|--|--------------|--|--------------|
| Function Code | Display Mode | Current State | Display Mode | Current State | Display Mode |
| n0 | Twinkling | 00 | Twinkling | 00 | Twinkling |

4. When you momentarily press the upward selection key (Up) on " KEY3 " or the downward selection key (Down) on " KEY4 " on the master control panel to query various groups of trouble codes, DS3 will display the historical trouble codes of such module in recording chronological order where in the default display serial number is " 00 ". Five latest historical troubles at most can be queried.

4) Scavenge engineering number (clear indoor D8 address conflict fault)

1. Long press KEY4 key of outdoor main control board for 5 seconds, the indicator light flashes twice and then turns to normal flashing state. The unit has entered the function of one key clearing engineering number and one key clearing all on-line engineering number.
2. After entering the one-button clearance project number function, it is necessary to reset the power-off (the internal machine needs all power-off and power-on again). The external machine re-electrifies the internal machine without redistributing the project number, and the internal machine re-electrifies and redistributes the project number.

5) Point Inspection Methods and Parameter Description for Outdoor Units

1. When you momentarily press the functional key " KEY1 " (Menu) on the master control panel, the display content is as follows:

| DS1 88 | | DS2 88 | | DS3 88 | |
|--|--------------|--|--------------|--|--------------|
| Function Code | Display Mode | Current State | Display Mode | Current State | Display Mode |
| A3 | Twinkling | 00 | Twinkling | 00 | Twinkling |

2. When you momentarily press the functional key " KEY5 " (Enter) on the master control panel, the display content is as follows:

| DS1 88 | | DS2 88 | | DS3 88 | |
|--|-------------------|--|--------------|--|--------------|
| Function Code | Display Mode | Current State | Display Mode | Current State | Display Mode |
| A3 | Normally Going On | n0 | Twinkling | 00 | Twinkling |

3. When you momentarily press the upward selection key (Up) on " KEY3 " or the downward selection key (Down) on " KEY4 " on the master control panel, the display content is as shown in the following table. Please choose the parameters to query " n1 "

| DS1 88 | | DS2 88 | | DS3 88 | |
|--|-------------------|--|--------------|--|--------------|
| Function Code | Display Mode | Current State | Display Mode | Current State | Display Mode |
| A3 | Normally Going On | n0 | Twinkling | 00 | Twinkling |
| A3 | Normally Going On | n1 | Twinkling | 00 | Twinkling |
| A3 | Normally Going On | n2 | Twinkling | 00 | Twinkling |
| A3 | Normally Going On | n3 | Twinkling | 00 | Twinkling |

4. When you momentarily press the functional key " KEY5 " (Enter) on the master control panel to enter parameter query: the default display serial number is " 00 " and corresponding parameter value.

When you momentarily press the upward selection key (Up) on " KEY3 " or the downward selection key (Down) on " KEY4 " on the master control panel, you can take turns to query various groups of parameters.

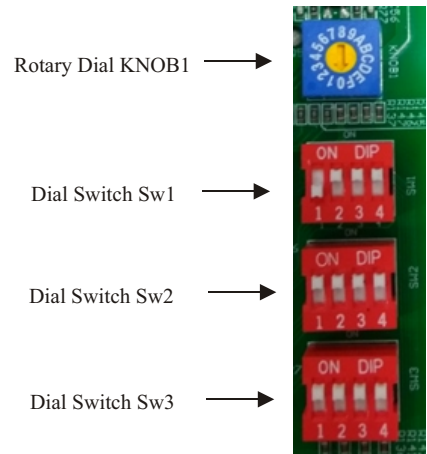
Table 5.2

| DS1 88 | DS2 88 | DS3 88 | DS1 88 | DS2 88 | DS3 88 |
|--|--|--|--|--|--|
| Parameter Code (Twinkling) | (Parameter Name) | | Parameter Code (Twinkling) | (Parameter Name) | |
| 00 | Frequency of Variable-frequency Compressor 1 | | 16 | Gas Outlet Temperature of Sub-cooler | |
| 01 | Master Electronic Expansion Valve of Outdoor Unit | | 17 | Liquid Outlet Temperature of Sub-cooler | |
| 02 | Frequency of Variable-frequency Compressor 1 | | 18 | Exhaust Temperature of Variable-frequency Compressor 1 | |
| 03 | Electronic Expansion Valve of Sub-cooler | | 19 | Exhaust Temperature of Variable-frequency Compressor 2 | |
| 04 | Frequency of Fan 1 | | 20 | Exhaust Temperature of Fixed-frequency Compressor 1 | |
| 05 | High Pressure of Module | | 21 | Exhaust Temperature of Fixed-frequency Compressor 2 | |
| 06 | Low Pressure of Module | | 22 | Exhaust Temperature of Fixed-frequency Compressor 3 | |
| 07 | Tc | | 23 | Electric Current of Variable-frequency Compressor 1 | |
| 08 | Te | | 24 | Electric Current of Variable-frequency Compressor 2 | |
| 09 | Demand for Total Capacity of All Indoor Units | | 25 | IPM Temperature of Variable-frequency Compressor 1 | |
| 10 | Demand for Revised Total Actual Operation Capacity | | 26 | IPM Temperature of Variable-frequency Compressor 2 | |
| 11 | Total Capacity of All Outdoor Units | | 27 | Reserved | |
| 12 | Outdoor Ambient Temperature (T4) | | 28 | Reserved | |
| 13 | Condenser Outlet Pipe Temperature (T3A) | | 29 | Reserved | |
| 14 | Vapor Incoming Pipe Temperature (TQ1) | | 30 | Reserved | |
| 15 | Vapor Outgoing Pipe Temperature (TQ2) | | | | |

5-2. Settings of Dial Switches

1) Description of Dial Switches

1. The Rotary Dial KNOB1 has been dialed to the corresponding position as per the model when leaving the factory, so the user is required to not change. Wrong setting will cause wrong operation of machine.
2. " ■ " represents the contact position of a dial switch; the Dial Switches SW1-SW3 default to the " ON " state when leaving the factory wherein the Dial Switch Sw2 and Sw3 are reserved.
3. Please set the dial switches as per the following rules in accordance with the use situation of set on the premise that the set is electrically neutral. The setting of changing the dial is invalid when the set is electriferous. The changed dial cannot go into effect until the set is re-powered on.



2) Settings of Dial Switches

1. Capacity Dial KNOB1

Table 5.3

| Dial Position | Model | Dial Position | Model | Dial Position | Model |
|---------------|-----------------------|---------------|-----------------------|---------------|-----------------------|
| | Outdoor unit (10000W) | | Outdoor unit (12000W) | | Outdoor unit (14000W) |
| | Outdoor unit (16000W) | | Outdoor unit (18000W) | | |
| | Outdoor unit (22400W) | | Outdoor unit (25200W) | | Outdoor unit (28000W) |

2. Dial Switches Sw1 (Sw3 is reserved)

Table 5.4

Table 5.5

| Description of Dial Switch SW1 (Model Dial) | | | | | Description of Dial Switch Sw2 (Model Dial) | |
|---|---------------|---|---------------|-----------------------------------|---|---------------|
| Function | Dial Position | Position Definition | Dial Position | Position Definition | Model | Dial Position |
| Fan type selection | | AC fan | | DC fan | NV6-224F3/R1-ODU NV6-280F3/R1-ODU | |
| Machine shutdown is effective in main mode | | Shutdown efficiency | | Invalid shutdown | | |
| Selection of Mode Priority | | Starting the indoor unit first has thd priority | | The cooling mode has the priority | | |
| | | The heating mode has the priority | | The heating mode has the priority | | |

5-3. Electrical System and Installation

5-3-1. Electrical Wiring Matters Needing Attention

- 1) Please design the special power supply respectively for indoor and outdoor units.
- 2) It is necessary to use branch return circuits for the power supply as well as install electrical leakage protectors and manual switches.
- 3) The power supply, electrical leakage protectors and manual switches of indoor units connected to the same outdoor unit are required to be universal. (Please use the same return circuit for the power supply of indoor units in the same system; it is a must to power on and off at the same time. Otherwise, the service life of such system will be affected and unforeseen circumstances may appear.)
- 4) Please classify the indoor and outdoor unit connecting pipe system and the refrigerant pipe system as the same system.
- 5) With regard to the signal lines for the indoor and outdoor units, 3-core shielded lines are recommended in order to reduce the interference. Please do not use unshielded multi-core lines.
- 6) At the time of installation, it is not allowed to intertwine the communication lines with the power lines. It is a must to arrange the lines separately. The minimum distance should exceed 20cm. Failing to do so may cause abnormal set communication.
- 7) It is necessary to follow relevant national electrical standards.
- 8) It is a must to entrust professional electricians to install the power lines.

5-3-2. Power Lines of Outdoor Units

- 1) A single outdoor machine independent power supply

Table 5.5

| Model | Power Supply | Diameter of the Thinnest Line (mm ²) (lines for metal tubes and synthetic resin tubes) | | | Manual Switch (A) | Electric Leakage Protector |
|--------|------------------------|---|---------------------|-------------------|-------------------|------------------------------|
| | | Below 20m | Below 50m | Earth Wire | | |
| 10000W | 220V~50Hz | 2×10mm ² | 2×16mm ² | 10mm ² | 32 | Less than 100mA 0.1sec |
| 12000W | 220V~50Hz 220V~60Hz | | | | | |
| 14000W | | | | | | |
| 16000W | | | | | | |
| 18000W | | | | | | |
| 22400W | 380V~3N 50Hz | 4×6mm ² | 4×10mm ² | 10mm ² | 40 | |
| 25200W | 380V~3N 60Hz | | | | | |
| 28000W | | | | | | |

⚠ Caution

The wire diameters and continuous lengths in this table express the situation in which the voltage reduces by less than 2%. When the continuous wire length exceeds the values in this table, it is necessary to select the electrical wire diameters as per relevant regulations.

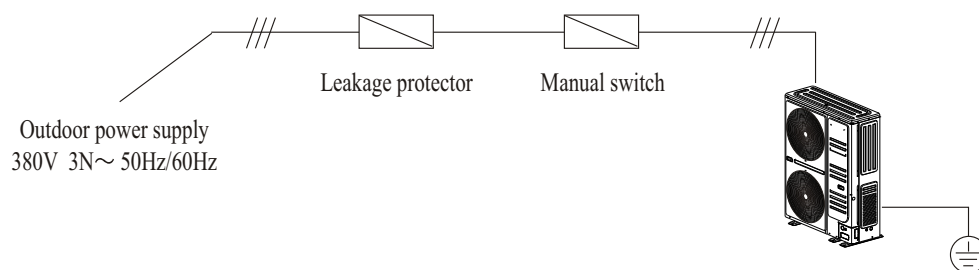


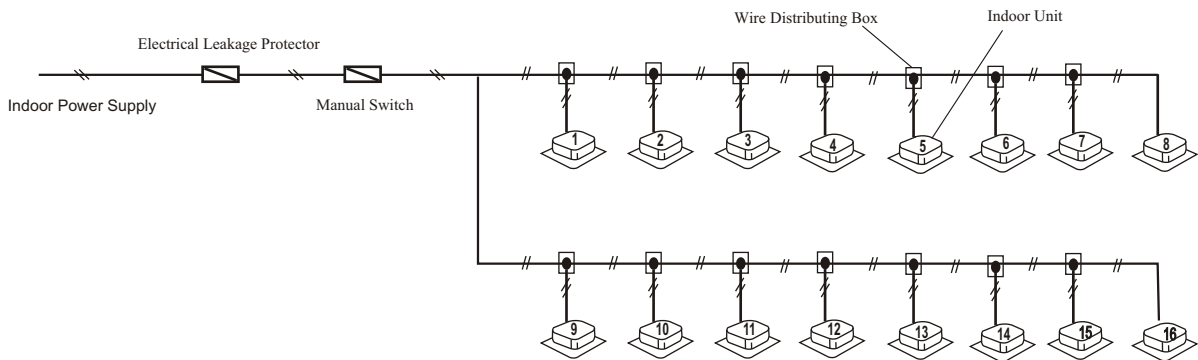
Figure 5-3-2 Schematic diagram of outdoor machine wiring

5-3-3. Power Lines of Indoor Units

Table 5.6

| Type | | Item | Power Supply | Diameter of the Thinnest Line (mm ²) | | | Manual Switch (A) | | Electrical Leakage Protector |
|---------------------------|-----------------------------------|------|-------------------|--|-------------------------------|------------|-------------------|------|------------------------------|
| | | | | Dimension (continuous length) | Dimension (continuous length) | Earth Wire | Capacity | Fuse | |
| All types of indoor units | electrical auxiliary heating type | | 380V 3N~50Hz/60Hz | 2.5 (30m) | 4.0 (50m) | φ 1.6mm | 30 | 15 | 20A, 30mA Below 0.1sec |
| | Other indoor units | | 220V~50Hz/60Hz | | | | | | |

Note: The wire diameters and continuous lengths in this table represent the situation in which the voltage reduces by less than 2%. When the continuous wire length exceeds the values in this table, it is necessary to select the electrical wire diameters as per relevant regulations.



Caution

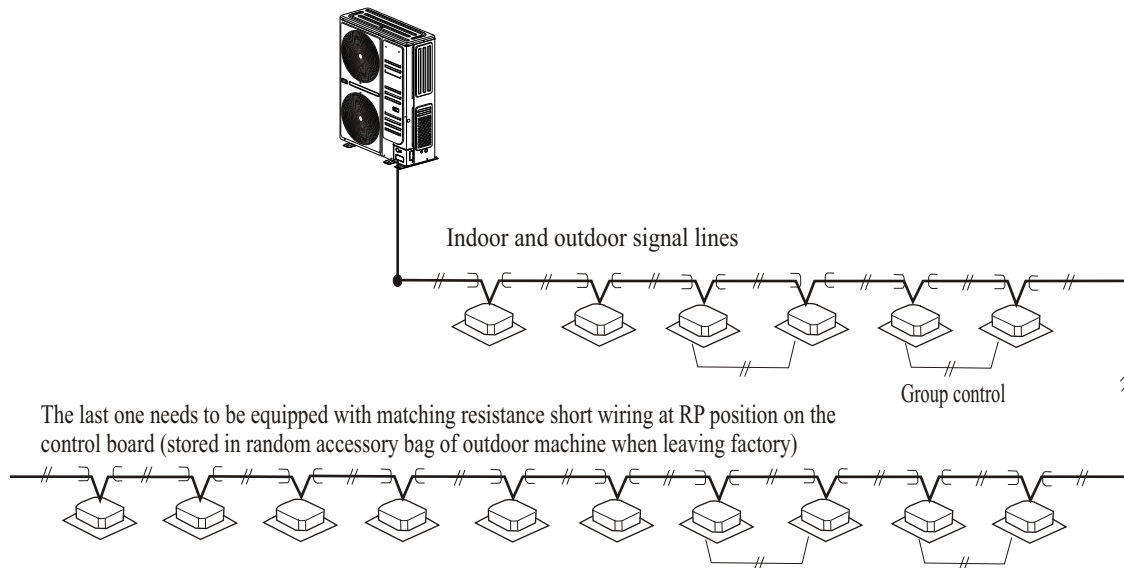
- Please take the refrigerant piping system, the signal lines between the indoor units and the signal lines between the indoor and outdoor units as the same system.
- All the indoor units in the same system must be under unified power supply.
- When the power lines and the signal lines are parallel, it is necessary to place the lines in respective line pipes and reserve an appropriate distance between the lines. (Distance between power lines: 300 mm for current less than 10 A and 500 mm for current less than 50 A)
- When two or more outdoor units are under parallel connection, it is a must to set their addresses. (Refer to the settings of dial switches)

5-4. Control System and Installation

- 1) It is a must to use shielded signal lines. Using other guide lines may produce signal interference and thus cause malfunction.
- 2) The shielding nets at two ends of any shielded line must be in ground connection or the shielding nets of all the shielded lines must be connected to each other and finally in ground connection at one connected metal plate.
- 3) It is prohibited to bind the signal lines, refrigerant pipes and power lines together. When the power lines and the signal lines are laid in parallel, it is necessary to keep the distance of over 300mm between the lines in order to avoid signal interference.
- 4) The signal lines are required to not form a closed loop circuit.
- 5) It is not necessary to distinguish the signal lines when connecting them because they do not have polarity.

5-5. Signal Lines for Indoor and Outdoor Units

It is necessary to use shielded polarity-free two-core signal lines (equal to or more than 0.75mm²) for indoor and outdoor units and lead such signal lines out from the top of the furthest outdoor unit for connection.



6. Operator Guide and Unit Commissioning

6-1. Check and Confirmation Work before Unit Commissioning

- 1) Check and confirm that the refrigeration pipes and communication lines connecting the indoor and outdoor units have been connected to the same refrigerating system. Otherwise, operation troubles may appear.
- 2) Power supply voltage is within the scope of plus or minus 10% of rated voltage.
- 3) Check and confirm that the power lines and the control lines are connected correctly.
- 4) Confirm that no line is in short circuit before powering the units on.
- 5) Check and confirm whether or not all the units have passed the test on 24-hour nitrogen protection (40kgf/cm²).
- 6) Confirm whether or not the system to be debugged has been vacuumized and dried as well as filled with refrigerant as per the corresponding requirements.

6-2. Preparations before Unit Commissioning

- 1) Calculate the refrigerant adding amount of every unit as per the length of liquid-side pipe on the site.
- 2) Prepare the needed refrigerant.
- 3) Prepare the system plan, system piping diagram and control wiring diagram.
- 4) Recorded the preset address codes on the system plan.
- 5) Switch on the outdoor units in advance and ensure that the outdoor units are powered on for over 12 hours so that the heaters can heat the engine oil of compressors.
- 6) Completely open the gas-side, liquid-side and oil balance stop valves of an outdoor unit. Otherwise, the machine will be damaged.
- 7) Check whether or not the power supply phase sequence of an outdoor unit is correct.
- 8) Check whether or not all the dial switches of the indoor and outdoor units have been set as per the product technical requirements.

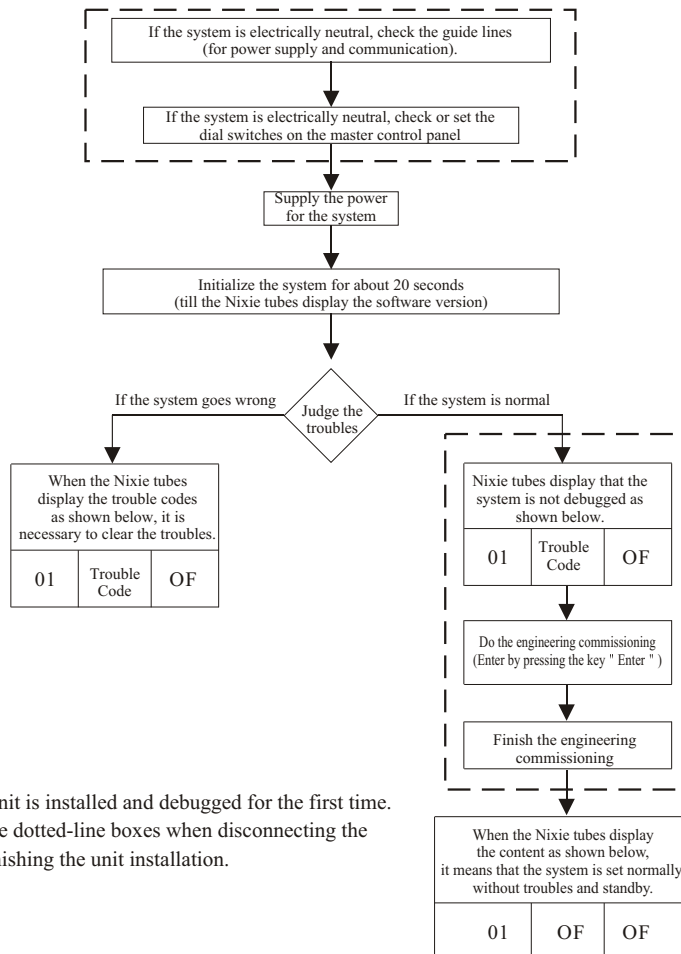
6-3. Unit Commissioning

6-3-1. Warnings

- 1) It is strictly prohibited to do any maintenance operation for the power-supply board and the driver board when the power light goes on!
- 2) It is a must to discharge the electricity of capacitance first before replacing the capacitance!
- 3) It is strictly prohibited to plug in and pull out the amphenol connectors of fan motor wires when they are electrified!
- 4) It is strictly prohibited to do any operation for the power-supply board when the fans are running!

6-3. Unit Commissioning

6-3-2. Electrical Commissioning Process



Remarks:

1. It is necessary to execute all the steps if a unit is installed and debugged for the first time.
2. It is not necessary to execute the steps in the dotted-line boxes when disconnecting the power supply and restarting such unit after finishing the unit installation.

6-3-3. Dial Setting

See the content Section 5-2 " Setting of Dial Switchs " on Page 27 of this Manual.

6-3-4. Engineering Commissioning

1) Engineering Commissioning Commands

Table 6.1

| Engineering Commissioning Command | Operating Method |
|---------------------------------------|---|
| Start the engineering commissioning | Momently press the confirmation key " key5 " automatic debugging and then execute the control as per the engineering commissioning requirements. |
| Return the engineering commissioning | Momently press the return key " KEY2 " on the master control panel to make the system keep the state of finishing the engineering commissioning before the current engineering commissioning stage. For example, the system will return to Engineering Commissioning Step 5 named " 5. Stage of Judging the Refrigerant before Starting " for finishing the waiting stage if the system receives the signal " suspend the engineering commissioning " when executing Step 6 named " 6. Stage of Judging the States of Outdoor Unit Valves before Starting " . |
| Confirm the engineering commissioning | Momently press the confirmation key " key5 " of engineering commissioning to be confirmed and continue executing the engineering commissioning when the system is in the current state. |

2) Engineering Commissioning Steps

Table 6.2

| Step | Operation | Digital display status | Step description | Operational guidance | | | | | | | | | | | | | | | | | | |
|-------|--|--|------------------|----------------------|-----|----|----|-------|---|---|-----|----|----|------------|--|---|-----|----|----|-----------|---|---|
| 00 | To be debugged | <table border="1"> <tr><td>DS1</td><td>DS2</td><td>DS3</td></tr> <tr><td>01</td><td>A0</td><td>0C</td></tr> </table> | DS1 | DS2 | DS3 | 01 | A0 | 0C | The unit is installed after powerup, the default is to be debugged. | Short press KEY5 confirm key to debug. | | | | | | | | | | | | |
| DS1 | DS2 | DS3 | | | | | | | | | | | | | | | | | | | | |
| 01 | A0 | 0C | | | | | | | | | | | | | | | | | | | | |
| 01 | Confirm the number of outdoor units | <table border="1"> <tr><td>DS1</td><td>DS2</td><td>DS3</td></tr> <tr><td>db</td><td>01</td><td>01-04</td></tr> </table> | DS1 | DS2 | DS3 | db | 01 | 01-04 | After entering the debug stage, the number of digital modules displayed in all modules is detected. | The number of online projects is the same as the actual number of projects. Press KEY5 to enter the next step. Otherwise, it is necessary to check the external communication connection lines and reconfirm after eliminating abnormalities. | | | | | | | | | | | | |
| DS1 | DS2 | DS3 | | | | | | | | | | | | | | | | | | | | |
| db | 01 | 01-04 | | | | | | | | | | | | | | | | | | | | |
| 02 | Confirm the number of indoor units. | <table border="1"> <tr><td>DS1</td><td>DS2</td><td>DS3</td></tr> <tr><td>db</td><td>02</td><td>01-80</td></tr> </table> | DS1 | DS2 | DS3 | db | 02 | 01-80 | All module digital display shows the number of online indoor machines. | The number of on-line indoor computers is the same as the actual number of projects. Press KEY5 to enter the next step. Otherwise, we need to check the communication connection of indoor computers and reconfirm after eliminating abnormalities. | | | | | | | | | | | | |
| DS1 | DS2 | DS3 | | | | | | | | | | | | | | | | | | | | |
| db | 02 | 01-80 | | | | | | | | | | | | | | | | | | | | |
| 03 | Confirm internal fault of outdoor unit | <table border="1"> <tr><td>DS1</td><td>DS2</td><td>DS3</td></tr> <tr><td>db</td><td>03</td><td>0C</td></tr> </table> <p>Or</p> <table border="1"> <tr><td>DS1</td><td>DS2</td><td>DS3</td></tr> <tr><td>db</td><td>03</td><td>Fault code</td></tr> </table> | DS1 | DS2 | DS3 | db | 03 | 0C | DS1 | DS2 | DS3 | db | 03 | Fault code | OC indicates that there is no fault in the module, and all modules are automatically accessible to the next step. If the module has an abnormal fault, the module digital tube displays the corresponding fault code. | No failure of the system, no need to operate. Troubleshooting is required for troubleshooting. See the technical service manual for troubleshooting. | | | | | | |
| DS1 | DS2 | DS3 | | | | | | | | | | | | | | | | | | | | |
| db | 03 | 0C | | | | | | | | | | | | | | | | | | | | |
| DS1 | DS2 | DS3 | | | | | | | | | | | | | | | | | | | | |
| db | 03 | Fault code | | | | | | | | | | | | | | | | | | | | |
| 04 | Judging compressor preheating | <table border="1"> <tr><td>DS1</td><td>DS2</td><td>DS3</td></tr> <tr><td>db</td><td>04</td><td>0C</td></tr> </table> <p>Or</p> <table border="1"> <tr><td>DS1</td><td>DS2</td><td>DS3</td></tr> <tr><td>db</td><td>04</td><td>U8</td></tr> </table> | DS1 | DS2 | DS3 | db | 04 | 0C | DS1 | DS2 | DS3 | db | 04 | U8 | OC indicates that the unit's preheating time meets the requirements and automatically enters the next step. U8 indicates that the compressor is not heated enough and is not allowed to start. | OC no need to operate. U8 can continue to wait or press KEY5 for 5 seconds. Caution: there is a risk of compressor damage due to insufficient preheating. | | | | | | |
| DS1 | DS2 | DS3 | | | | | | | | | | | | | | | | | | | | |
| db | 04 | 0C | | | | | | | | | | | | | | | | | | | | |
| DS1 | DS2 | DS3 | | | | | | | | | | | | | | | | | | | | |
| db | 04 | U8 | | | | | | | | | | | | | | | | | | | | |
| 05 | Refrigerant judgement before startup | <table border="1"> <tr><td>DS1</td><td>DS2</td><td>DS3</td></tr> <tr><td>db</td><td>05</td><td>0C</td></tr> </table> <p>Or</p> <table border="1"> <tr><td>DS1</td><td>DS2</td><td>DS3</td></tr> <tr><td>db</td><td>05</td><td>H2</td></tr> </table> | DS1 | DS2 | DS3 | db | 05 | 0C | DS1 | DS2 | DS3 | db | 05 | H2 | OC indicates that the refrigerant meets the requirements and automatically enters the next step. H2 indicates that the refrigerant consumption of the system is insufficient, and the refrigerant needs to be checked. | OC no need to operate. H2 needs to check leakage or add refrigerant until abnormal elimination, and automatically enter next step. | | | | | | |
| DS1 | DS2 | DS3 | | | | | | | | | | | | | | | | | | | | |
| db | 05 | 0C | | | | | | | | | | | | | | | | | | | | |
| DS1 | DS2 | DS3 | | | | | | | | | | | | | | | | | | | | |
| db | 05 | H2 | | | | | | | | | | | | | | | | | | | | |
| 06 | Condition judgement of external valve | <p>Start operation</p> <table border="1"> <tr><td>DS1</td><td>DS2</td><td>DS3</td></tr> <tr><td>db</td><td>06</td><td>0N</td></tr> </table> <p>Valve result</p> <table border="1"> <tr><td>DS1</td><td>DS2</td><td>DS3</td></tr> <tr><td>db</td><td>06</td><td>0C</td></tr> </table> <p>Or</p> <table border="1"> <tr><td>DS1</td><td>DS2</td><td>DS3</td></tr> <tr><td>db</td><td>06</td><td>U9</td></tr> </table> | DS1 | DS2 | DS3 | db | 06 | 0N | DS1 | DS2 | DS3 | db | 06 | 0C | DS1 | DS2 | DS3 | db | 06 | U9 | At this stage, the system starts commissioning to judge the valve. 0N indicates that the unit is running. At the end of the operation, the result of judgement is displayed. OC indicates that the valve opens normally and automatically enters the next step. U9 indicates that the valve is abnormal and needs to open the connecting valve. | OC no need to operate. U9 after opening all connection valves, press KEY2 short to return the key and re judge the valve. If you confirm that the valve is open, press the KEY5 for 5 seconds to enter the next step. |
| DS1 | DS2 | DS3 | | | | | | | | | | | | | | | | | | | | |
| db | 06 | 0N | | | | | | | | | | | | | | | | | | | | |
| DS1 | DS2 | DS3 | | | | | | | | | | | | | | | | | | | | |
| db | 06 | 0C | | | | | | | | | | | | | | | | | | | | |
| DS1 | DS2 | DS3 | | | | | | | | | | | | | | | | | | | | |
| db | 06 | U9 | | | | | | | | | | | | | | | | | | | | |
| 07 | Selection of artificial perfusion refrigerants | <table border="1"> <tr><td>DS1</td><td>DS2</td><td>DS3</td></tr> <tr><td>db</td><td>07</td><td>AL</td></tr> </table> <p>Or</p> <table border="1"> <tr><td>DS1</td><td>DS2</td><td>DS3</td></tr> <tr><td>db</td><td>07</td><td>AE</td></tr> </table> | DS1 | DS2 | DS3 | db | 07 | AL | DS1 | DS2 | DS3 | db | 07 | AE | At this stage, the AE perfusion mode should be chosen for the perfusion mode, and the system will go to the next step. The outdoor environment temperature $\geq 20^{\circ}\text{C}$, and the system runs into the artificial perfusion refrigeration mode. The outdoor environment temperature $< 20^{\circ}\text{C}$, and the system goes into the artificial perfusion heating mode. | Through KEY3 (UP) and KEY4 (DOWN), choose to enter the artificial perfusion "AE", press KEY5 confirmation key to enter the next step. | | | | | | |
| DS1 | DS2 | DS3 | | | | | | | | | | | | | | | | | | | | |
| db | 07 | AL | | | | | | | | | | | | | | | | | | | | |
| DS1 | DS2 | DS3 | | | | | | | | | | | | | | | | | | | | |
| db | 07 | AE | | | | | | | | | | | | | | | | | | | | |
| 08/09 | Reserve | | | | | | | | | | | | | | | | | | | | | |
| 10 | Artificial instillation Cooling operation | <p>Cooling operation</p> <table border="1"> <tr><td>DS1</td><td>DS2</td><td>DS3</td></tr> <tr><td>db</td><td>10</td><td>AE</td></tr> </table> <p>Running result</p> <table border="1"> <tr><td>DS1</td><td>DS2</td><td>DS3</td></tr> <tr><td>db</td><td>10</td><td>Fault code</td></tr> </table> <p>Or</p> <table border="1"> <tr><td>DS1</td><td>DS2</td><td>DS3</td></tr> <tr><td>db</td><td>10</td><td>AE(flash)</td></tr> </table> | DS1 | DS2 | DS3 | db | 10 | AE | DS1 | DS2 | DS3 | db | 10 | Fault code | DS1 | DS2 | DS3 | db | 10 | AE(flash) | db、10、AE indicate the operation of artificial perfusion cooling. If the system fails, the corresponding fault code will be displayed and the whole machine will stop running. The AE flash indicates that the artificial perfusion cooling testrun is completed and automatically enters the next step. | If the refrigerant in the system is sufficient and the operation parameters are normal, press KEY5 for 5 seconds to enter the next step automatically. |
| DS1 | DS2 | DS3 | | | | | | | | | | | | | | | | | | | | |
| db | 10 | AE | | | | | | | | | | | | | | | | | | | | |
| DS1 | DS2 | DS3 | | | | | | | | | | | | | | | | | | | | |
| db | 10 | Fault code | | | | | | | | | | | | | | | | | | | | |
| DS1 | DS2 | DS3 | | | | | | | | | | | | | | | | | | | | |
| db | 10 | AE(flash) | | | | | | | | | | | | | | | | | | | | |
| 11 | Artificial instillation Heating operation | <p>Heating operation</p> <table border="1"> <tr><td>DS1</td><td>DS2</td><td>DS3</td></tr> <tr><td>db</td><td>11</td><td>AE</td></tr> </table> <p>Running result</p> <table border="1"> <tr><td>DS1</td><td>DS2</td><td>DS3</td></tr> <tr><td>db</td><td>11</td><td>Fault code</td></tr> </table> <p>Or</p> <table border="1"> <tr><td>DS1</td><td>DS2</td><td>DS3</td></tr> <tr><td>db</td><td>11</td><td>AE(flash)</td></tr> </table> | DS1 | DS2 | DS3 | db | 11 | AE | DS1 | DS2 | DS3 | db | 11 | Fault code | DS1 | DS2 | DS3 | db | 11 | AE(flash) | db、11、AE indicate the operation of artificial perfusion heating. If the system fails, the corresponding fault code will be displayed and the whole machine will stop running. The AE flicker indicates that the artificial perfusion heating testrun is completed and automatically enters the next step. | If the refrigerant in the system is sufficient and the operation parameters are normal, press KEY5 for 5 seconds to enter the next step automatically. |
| DS1 | DS2 | DS3 | | | | | | | | | | | | | | | | | | | | |
| db | 11 | AE | | | | | | | | | | | | | | | | | | | | |
| DS1 | DS2 | DS3 | | | | | | | | | | | | | | | | | | | | |
| db | 11 | Fault code | | | | | | | | | | | | | | | | | | | | |
| DS1 | DS2 | DS3 | | | | | | | | | | | | | | | | | | | | |
| db | 11 | AE(flash) | | | | | | | | | | | | | | | | | | | | |
| 12 | Completion | <table border="1"> <tr><td>DS1</td><td>DS2</td><td>DS3</td></tr> <tr><td>db</td><td>12</td><td>0C</td></tr> </table> | DS1 | DS2 | DS3 | db | 12 | 0C | OC means debugging is complete. Confirm the completion of commissioning or recommissioning. | Confirm that the debugging is completed, press the KEY5 short, the project is debugged, and the whole machine is in standby mode. If you need to re debug, press KEY2 short and start debugging again from the first step. | | | | | | | | | | | | |
| DS1 | DS2 | DS3 | | | | | | | | | | | | | | | | | | | | |
| db | 12 | 0C | | | | | | | | | | | | | | | | | | | | |

7. Test Run

7-1. Name Filling of Connecting Systems

When setting two or more indoor units, name and record every system connecting the indoor and outdoor units and then fill as per the following table.

| | |
|--|--|
| | |
| Type of Indoor Unit | |
| Room Name: Example: The indoor unit (A) of the first system on the second floor is recorded as ---2F---1A | |

7-2. Refrigerant Leakage Matters Needing Attention

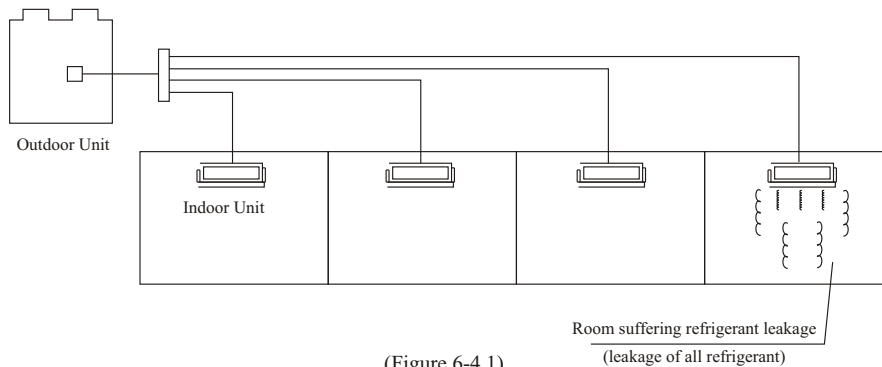
- 1) The refrigerant used for this air-conditioner is harmless and noncombustible.
- 2) The room used to place the air-conditioner should be of appropriate size and not exceed the limit concentration even if refrigerant leakage occurs. In addition, necessary measures can be taken.
- 3) Concentration of gas limit causing no harm to human body is 0.42[kg/m³].
- 4) Confirm the limit concentration as per the following sequence and take corresponding necessary measures.

a. Calculate the total refrigerant filling volume (A[kg])

Total refrigerant volume = refrigerant filling volume at the time of shipment (see the nameplate of the outdoor unit) + refrigerant adding volume corresponding to the piping length

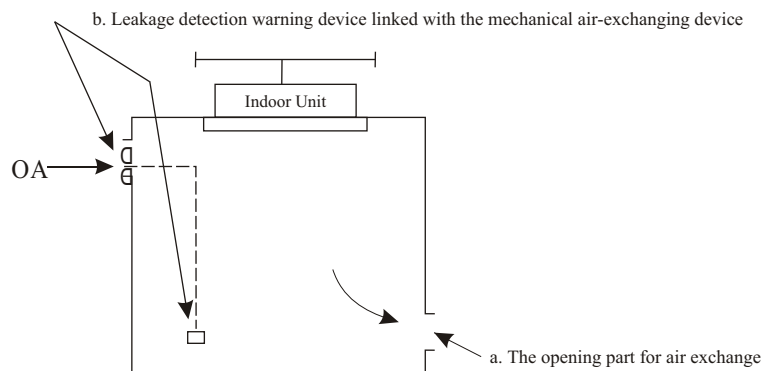
b. Calculate the indoor volume (B[m³]) (as per the minimum volume)

c. Calculate the refrigerant concentration (A[kg]/B[m³] ≤ limit concentration: 0.3[kg/m³])



5) Countermeasures to prevent the refrigerant concentration from exceeding the limit concentration

- a. Please install a mechanical air-exchanging device in order to reduce the refrigerant concentration to be less than the limit concentration (frequent air exchange)
- b. Please install a leakage detection warning device linked with the mechanical air-exchanging device if it is impossible to achieve frequent air exchange.

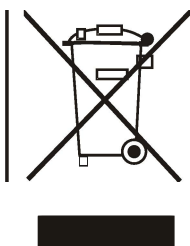


(The leakage detection warning device should be installed at the position where the refrigerant easily suffers retention.)

(Figure 6-4.2)

7-3. Handover to the Client

- Be sure to hand the 《Installation and User's Manual》 for indoor units, the 《Installation and User's Manual》 for outdoor units to the client.
- Give the client detailed description of the content of directions for use in the 《Installation and User's Manual》.



**IMPORTANT INFORMATION FOR CORRECT DISPOSAL OF THE PRODUCT
IN ACCORDANCE WITH EC DIRECTIVE 2002/96/EC.**

At the end of its working life, the product must not be disposed of as urban waste. It must be taken to a special local authority differentiated waste collection centre or to a dealer providing this service.

Disposing of a household appliance separately avoids possible negative consequences for the environment and health deriving from inappropriate disposal and enables the constituent materials to be recovered to obtain significant savings in energy and resources. As a reminder of the need to dispose of household appliances separately, the product is marked with a crossed-out wheeled dustbin.