



**INSTALLATION & OPERATION INSTRUCTION MANUAL**  
**FOR**  
**FLOOR CEILING AIR CONDITIONING**

■ MODEL

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FCA-60  
FCA-48  
FCA-36  
FCA-24

GZ05Eng

Thank you for choosing our company products!

Air conditioning facilities are valuable products. In order to protect your legitimate rights and interests, please make sure that the installations are done by professional technicians. This manual is a general-purpose version for the conditioning systems manufactured by our CO., the one that you have chosen might be a little different in appearance from the ones described in the manual . But these differences will not have any impacts upon your operation and use of the system.

Please read the manual carefully before you operate the system and check to see if the model is identical to the one you have purchased, keep the manual properly in case you might refer to it in the future.

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# NOTICES TO USERS

## 1. 1 Safety Notices

" Important Safety Information " affords very important points about how to operate the unit safely. To prevent injury to the user or other people and property damage, the following instructions must be followed. Incorrect operation due to ignoring of instructions may cause harm or damage.

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The safety precautions listed here are divided into two categories. In either case, important safety information is listed which must be read carefully.

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### WARNING



Failure to observe a warning may result in serious injury, grave accidents even death.



### CAUTION

Failure to observe a caution may lead to injury or damage to the equipment.

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Please read the mark of the unit carefully .If you detect any abnormality, such as abnormal noise, smell, fog, temperature rise, creepage, fire and so on; Please turn off the power supply immediately and call your dealer or local service center for instructions. Do not repair the unit by yourself. If necessary, call the local fire department or Emergency department for help.

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### WARNING

1. Never install the unit by yourself and call the professionals from distributor or maintenance center for installation, or it may lead to accidents and affect the performance of usage .
2. Be sure to install leakage protection switch.  
If not installation leakage protection switch, may cause the accident of getting an electric shock etc .
- 3.The outdoor unit should be installed on the firm level reliably.
4. Must keep the noncongestion that drain off water, otherwise the condensate will be damaged your furniture, electric devices,etc.
5. Make sure that the air conditioner is grounded unfailingly, or it may cause an electric shock .
6. Forbid installing it in the places where there might be leakage of combustible gases , full of oil or saliniferous places such as seaside.

7. If the unit will be idle for a long time, disconnect the power to avoid of accidents .
8. The unit shall be equipped with special power supply switch and power line to avoid of sharing the same power line with other devices. Besides, it adopts the stated- cross-section wire to supple the power, matching with the corresponding breaker(with creepage protect function) .
9. The unit is connected with the stated-cross-section earth wire, which is grounded safely and is not allowed to be connected with the gas pipe, water pipe, lightning conductor or the telephone earth wire in order to avoid of electric shocks.
10. Never stop the operation of the unit by pulling out the power supply line in order to avoid of electric shocks or fire hazards .



### **CAUTION**

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1. Do not put your hands or sticks into the air vents . As the fan running with high speed will hurt you.
2. Keep the electric control system from damp to avoid of circuit-short or damage of unit .
3. After cleaning the filter screen, install the air filter screen quickly .It is not allowed to operate the unit without the air filter screen which may get the poor performances.
4. When there are old men, children and patient in the room, please adjust the room temperature properly.
5. If the unit is interrupted by the lightning or other electromagnetic radiation, cut off the power, restart the unit after eliminating that factors.
6. Do not clog the air inlet and outlet of the unit.
7. Never use the fuse with incorrect capacity or iron or copper wires for fuse .
8. Keep the unit off the places where might happen fire hazards .Pull out the power plug immediately and put down the fire with fire extinguisher result from circuit-short.
9. Cut off the power supply before servicing.
10. Do not touch the pipe on the exhaust side, because the temperature may be above than 100°C, so it may result in scald.
11. Do not touch the fin and sharp edge which will hurt you.
12. Do not move the unit randomly without professional guidance, otherwise it may cause the damage of the unit .

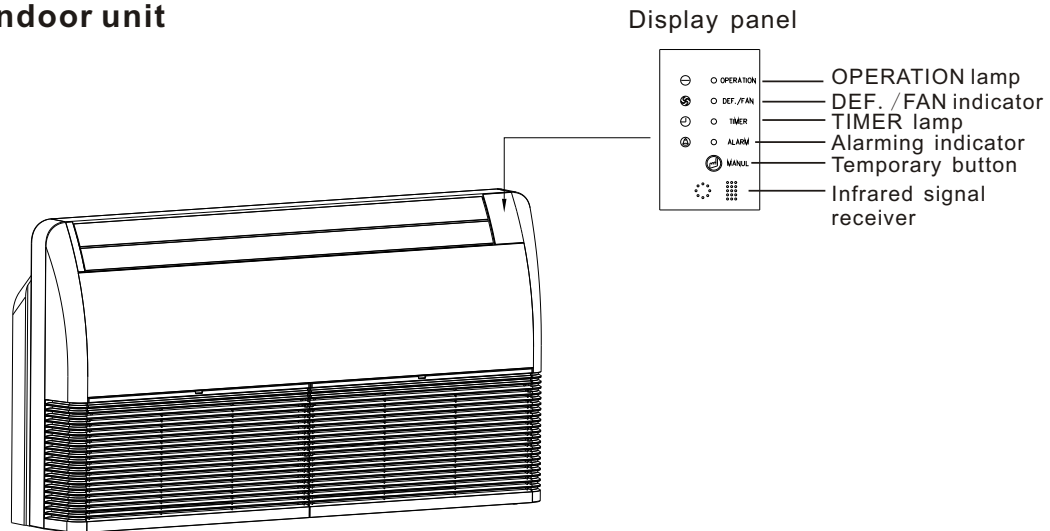
13. Do not touch the rotary air vents with your hands or other objects to avoid of accidents or damage.
14. It is forbidden placing goods above the machine set, so as not to result in the danger of the fall off when they are running.

## **1. 2 Use notices**

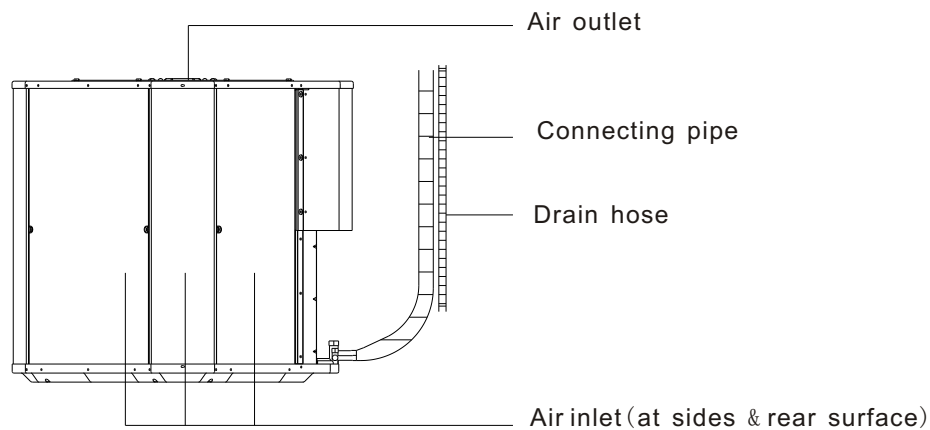
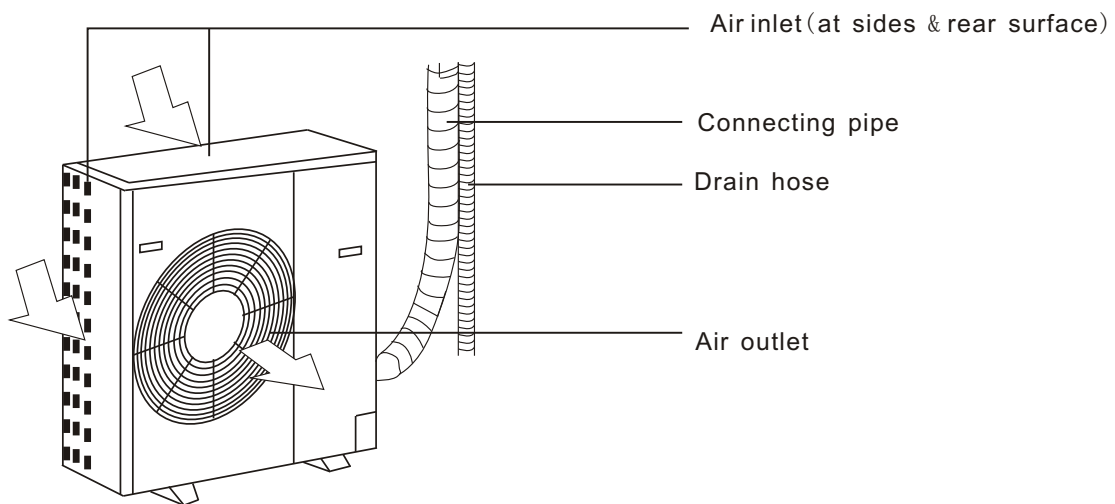
1. The unit must be installed in outdoor field where there is sunlitproof and rainproof establishments , or else our company is not responsible for the problems caused because of wrong installation.
2. All the operation parameters of the unit set , the set values of the protective device have been set before the delivery , the consumers are not allowed to change the set values at random , and also are not allowed to make the line of the protective devices of the machine set , short-circuit or the unit may be damaged as result of improper protection.
3. When the unit is running, the unprofessional personnel do not touch any electrical element and buttons, or it will result in serious accident.
4. If the unit goes wrong , don' t repair it by yourself , please consult the service center of the company ( the consultation telephone number can refer to the back over ). If the machine set is repaired by unprofessional personnel , it may result in the machine breakdown or the casualty of personnel.
5. During cleaning the unit, never clean the operational panel with benzene, diluent agent , or chemical cloth and so on , or it will result into fade or the fault function of the buttons ; It is not allowed to directly sprinkle the unit with water or cleaning agent, when it is necessary, please clean them with a cloth that is stained with water or neutral cleaning agent.
6. In order to prolong the service time of the air- condition, please do not start the compressor frequently. (It should not be more than five times in an hour).
7. The refrigerant used in the machine set is noncombustible and innocuous , as for the specific gravity of which is greater than air , so when it leaks, it will diffuse on the ground. As a consequence, if the unit is installed in a room, it must make sure that the ventilation condition is good , or it way result in serious asphyxia when the refrigerant leaks.
8. If the refrigerant leaks, stop the unit as soon as possible, and get in touch with the maintenance and repairmen in time, the flame on the field is forbidden, because if the refrigerant contacts with the flame, it will decompose into harmful gas
9. Please service the machine set termly according to the requirements of the specification , in order to make sure that the operation condition of the machine set is good.

# PARTS NAME AND FUNCTION

## ■ Indoor unit



## ■ Outdoor unit



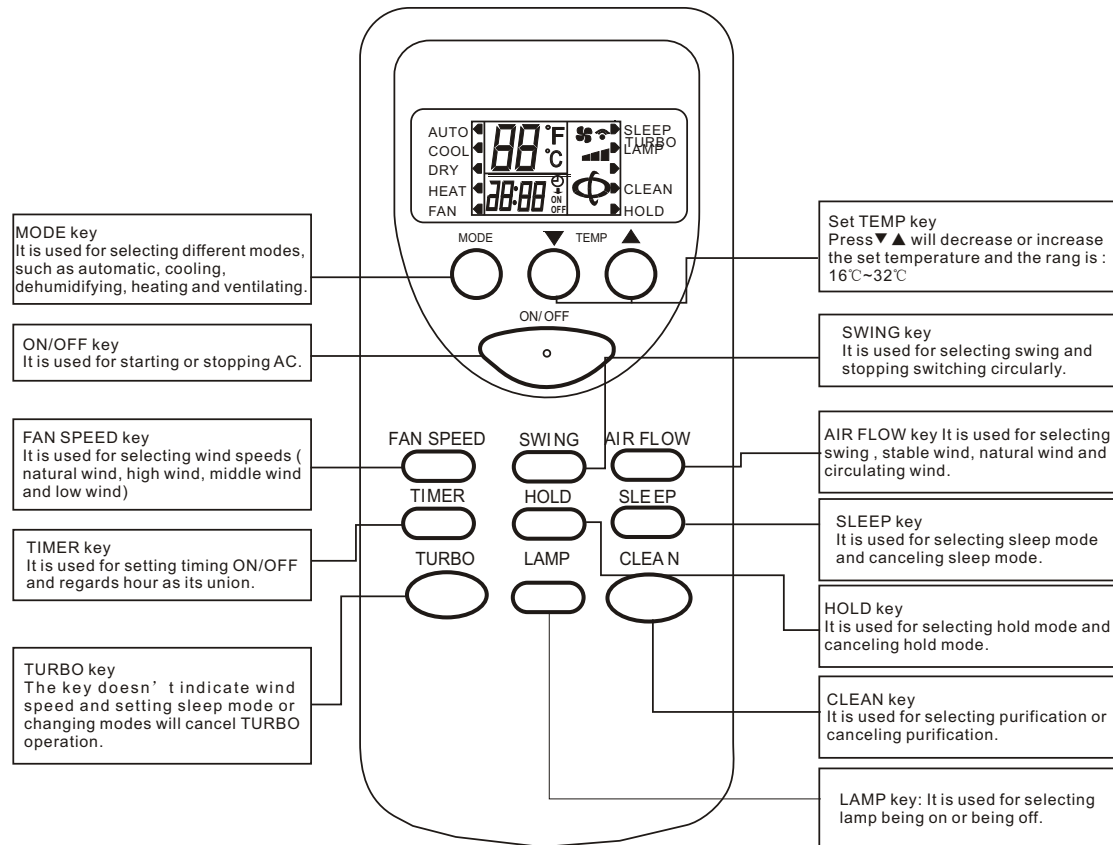
NOTE: The drawings above based on one model of our product is for reference only, which may be different from the unit you purchased.

# INTRODUCTION OF REMOTE CONTROLLER

## 3.1 Instruction for Remote controller

The model of the following remote controller is Lingtong common remote controller.

TURBO key, LAMP key, AIR FLOW key and CLEAN key are applicable for special latest developed new models instead of normal ones.



## 3.2 Introduction of Functional Key

- **ON/OFF key:** Press the key and the remote control will switch circularly in the order : ON→OFF→ON.

When it is powered on at first from off state to on state, the default setting of work condition is that the set temperature is 25°C and the mode, wind speed, swing and air door are all automatic and there is no LAMP, no TURBO, no CLEAN, no SLEEP, no TIMER and no HOLD function). When it is not powered on firstly from OFF state, the work condition is as the same as the state before stopping. It will cancel LAMP, CLEAN, SLEEP, TURBO and TIME mode.

- **MODE key:** Press the key to switch modes in the order :  
AUTO→COOL→DRY→HEAT→FAN→AUTO
- **▼ key:** In DRY mode or AUTO mode, pressing ▼ key cannot change the temperature. In other mode, press the key once and the temperature will decrease 1°C in the order : 32°C →31°C →...→17°C →16°C .
- **▲ key:** In DRY mode and AUTO mode, pressing ▲ key cannot change the temperature. In other mode, press the key once and the temperature will increase 1°C in the order: 16°C →17°C →...→31°C →32°C .

- **FAN SPEED key:** The default wind speed is in the automatic wind mode when starting firstly. The remote control won't react by pressing the key because the wind speed can't be adjusted and in low speed in dehumidifying mode. In other mode, press the key to switch modes in the order : automatic wind→ high speed →middle speed→ low speed →automatic wind.
- **SWING key :** In dehumidifying mode, the swing mode is in the stable wind mode without change. In other mode, press the key to switch modes in the order: swing →stable wind→natural wind →swing.
- **AIR FLOW key :** The default air flow is in the swing mode when starting firstly and press the key to switch modes in the order: SWING →STOP →SWING.
- **TIMER key :** The default mode is in no timing state, press the key to set timing time . The switch order is: 1H→2H→ … →24H→cancel→1H… . Press the key to set timing starting in the OFF state and set timing stopping in the ON state. After setting timing function, the time keeps decreasing per hour until the time decreasing to the timing on or timing off and the timing display will be cancelled at the same time . Pressing MODE key can't cancel timing in timing mode which will set out timing time by pressing other key.
- **HOLD key:** The default state is in no HOLD key state, press the key to select modes in order: HOLD key →cancel HOLD key→ HOLD key ; In HOLD key mode, all keys except HOLD key of the remote control can't work .  
( **NOTE:** In HOLD key mode, the remote and operation panel of the unit both will be locked automatically by pressing the key and press the key again , they will be unlocked. As for the split unit , it only hold the control other than EMERGENCY key and the panel will make a reaction.)
- **SLEEP key :** Press the key to switch modes in the order: SLEEP→ cancel SLEEP→ SLEEP. The sleeping function won't be cancelled for changing modes. Press the key to set sleep mode and the wind speed will automatically be switched to low speed and it can adjust the wind speed by pressing the FAN SPEED key (except dehumidifying mode).
- **TURBO key:** The default state for the control is no turbo and the key don't work in the AUTOMATIC mode, DRY mode and FAN mode ( It will not display any contents and not send out any codes). The control, however, will switch between on and off by pressing the key in other mode. The wind speed isn't indicated in turbo mode and it will be cancelled for changing modes and setting sleep mode.
- **LAMP key :** The default state is in no LAMP key state, press the key to select modes in order : LAMP key →cancel LAMP key→ LAMP key; In LAMP key mode, pressing MODE key can't cancel the show of LAMP key.
- **CLEAN key :** The default state is in no purification state, press the key to select modes in order : CLEAN →cancel CLEAN→ CLEAN; In CLEAN mode, pressing CLEAN key can't cancel CLEAN function. Press the key when the remote control is closed, the control will switch modes in the order : CLEAN →cancel CLEAN→ CLEAN; When you stop the unit and turn on the purification switch, except the wind, the stable swing and air door swing speed aren't adjusted.



### 3. 3 Notices for operating the remote control

- ① Don't place the control near high heat source such as Electric blanket, warm furnace and so on.
- ② Don't expose the control in sun.
- ③ Take care for it and prevent it from damage for falling down.
- ④ Don't place any rolling obstacle between the signal acceptor of AC and the control, otherwise it may affect sending or incepting signals.
- ⑤ Don't spray water or other liquid on the control.
- ⑥ Don't place any clog on the control.

**NOTE:** When the remote control is out of work, please replace the battery and operated it once ; If the failure hasn't be cancelled, please take urgent operation methods to restart the AC.

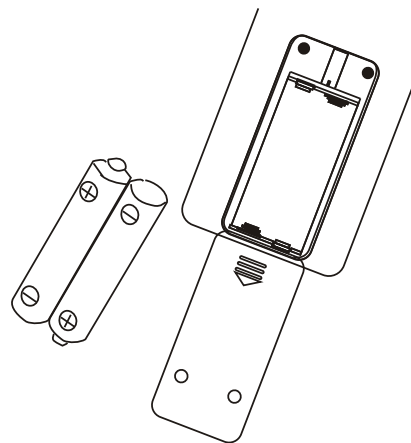
### 3. 4 Replace batteries of the remote control

If the following condition appears, which mean that the batteries have been used up, please take out of the old batteries and change for new ones.

- ① After sending the signal, the air conditioner can not send receiving sound.
- ② The display screen is not clear

The operating steps are as follows:

- Remove the back cover, take out of the old batteries.
- Replace batteries, please notice the poles “+” and “-” on the batteries.
- Close the back cover and set the current time.
- Make sure whether it indicates a.m. 0:00 or not.



Pay attention to poles of “+” and “-”



#### **NOTE**

1. New and old batteries can not be used together.
2. If the remote controller will not be idle for long time, please take out of the batteries.
3. The service life of the dry batteries, accorded with the requirements of the standard of JIS or IEC, is 6 to 12 months under common condition ; Overrunning the service time or using dry batteries , which are not accorded with the above mentioned specifications, the liquid seeping phenomenon may be occur on the battery and the remote control won't work.
4. There is “Advised Service Time” marked on the battery, the practical service time may be shorter than the advised one.

# PREPARATIONS FOR INSTALLATION



## CAUTION

The installation of the unit has to be carried out by the professional installation operator. Improper installation of the unit may cause water leakage, an electric shock or fires .

### 4. 1 Selection of the installation site

#### 4. 1. 1 Installation sites for the outdoor unit

- 1) Installed the unit at the places where not be exposed to rain or not direct sunshine ,and the places with good ventilation.
- 2) Noises made by unit will not affect the neighboring places.
- 3) Easy to connect the units and the power.
- 4) Not install the unit on the non-special metal bracket;
- 5) Not to installed at the places where may leak inflammable gases;
- 6) In heating, pay attention to the drainage of the condensed water from the base plate so that it does not affect the neighbor or passer-by;
- 7) Not locate the exhaust ports pointing the windward direction ;
- 8) Make sure that the children can not touch it ;
- 9) Leave enough space for installation or maintenance, refer to Fig 1;
- 10) The air conditioner is not applicable for the following fields:
  - a. On the vehicle or ship;
  - b. The place with heavy oil or strong wind;
  - c. The moist place, such as bathroom, cellar and so on;
  - d. The place with high-frequency equipment, such as wire-less equipment, electric welder, medical instrument and so on;
  - e. Other special fields.

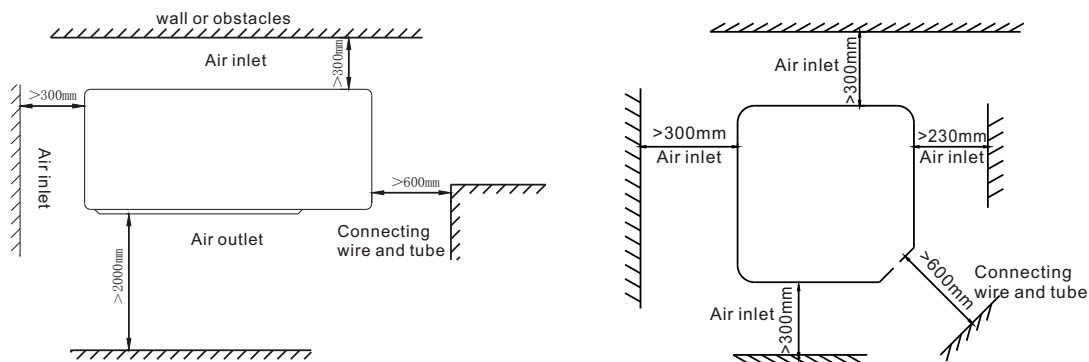


Fig 1

#### 4. 1. 2 Installation sites for the indoor unit

- 1) Keep the unit level and without any vibration and keep supply air to all places in room quickly;
- 2) The air inlet or outlet of the indoor unit can not be blocked so that the supple air or return air is free and not affected by heat or moisture nearby;
- 3) Not install it in the place with too much oil smoke or steam.

- 4) Avoid the place where inflammable gases may generate, inflow, linger or leak .
- 5) Avoid high-frequency facilities (such as high frequency arc welders, etc.).
- 6) Not install the exhaust ports near a fire alarm;
- 7) To avoid the places where acid solutions are frequently used.
- 8) Keep the indoor unit near the power plug or special wires.

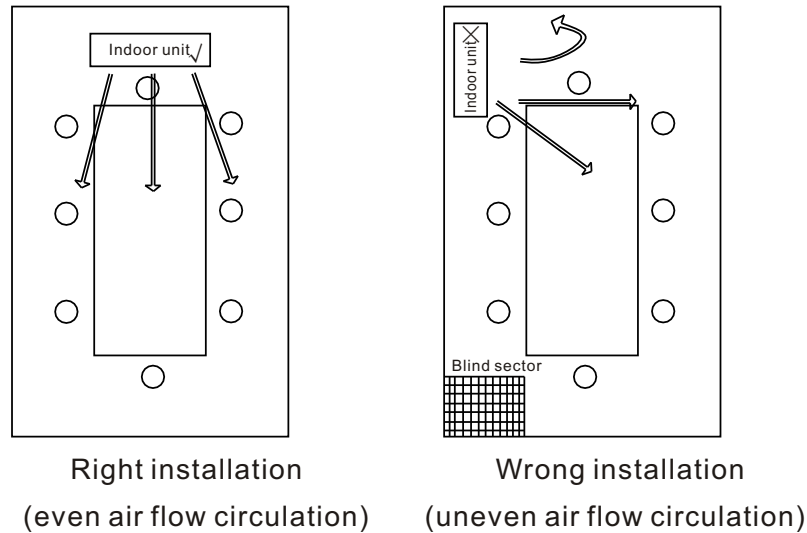


Fig 2

## 4. 2 Preparation before installation

According to the position and installed dimension to made the base.(Fig 3)

### 4. 2. 1 Outdoor unit

4. 2. 1. 1 Install the unit on the ground:

#### ■ Concrete foundation

This foundation is cast with the design mark concrete, which has great anti-vibration effect, the following factors shall be emphasized:

- 1) The surface of concrete foundation is massy, firm and flat. The bearing of the support surface is more than 2 times of the unit weight.
- 2) When the cement foundation platform is made , the following measures are adopted: put the whorl reinforcing steel bar ( Dia > 9.5 mm )into the concrete foundation, the whorl reinforcing steel bar must be enlaced as top and bottom layers, and the space between bars is 10cm.
- 3) When making the cement foundation on the concrete floor board, please keep the surface coarse, and then clean and wet it, after all of these works, make the concrete foundation seat.
- 4) The mix ratio of the concrete is 1:2:4, if necessary, embed some proper anchor bolts. Finally, keep the surface of the basic platform smooth.
- 5) The surface of the concrete foundation platform should have the waterproof disposal and around of it we should have a drip through and the gradient is more than 30 °C, pointing to outfall.
- 6) Until the concrete foundation is fully dry, you can install the unit.

- 7) In order to run the unit quietly and avoid the noise and vibration interference to the surroundings, there should keep a separate layer for vibration-proof between the base of the unit and foundation. And then keep the unit level when installing.
- 8) To avoid units distortion and even rupture, which is caused in displacement of the unit run for a long time, you should take some measures to fix the unit at the restrict position. (Fig3)

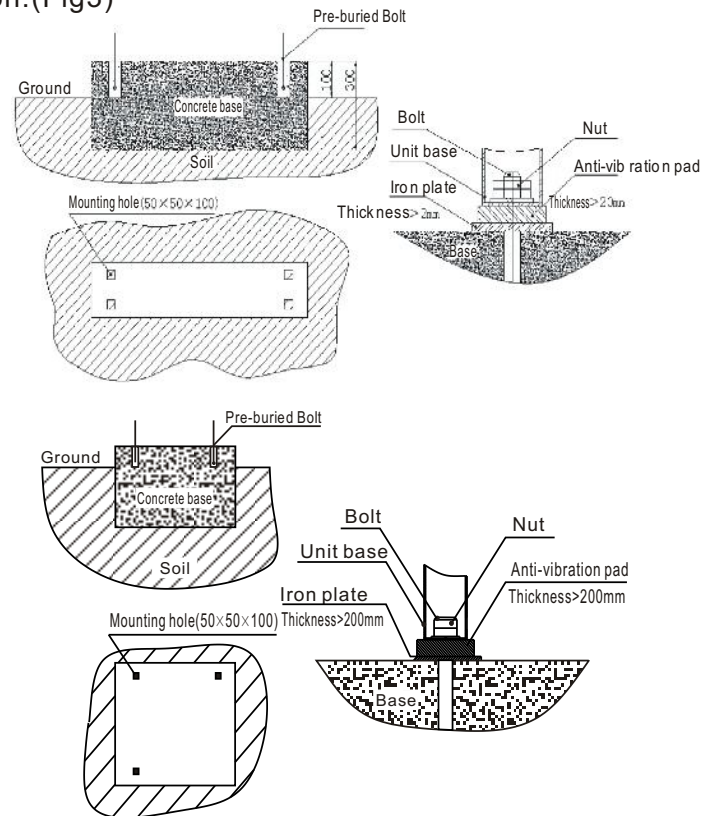


Fig 3



### NOTE

- The distance between the concrete foundation and the ground is more than 100 mm;
- The height of the concrete foundation is more than 300 mm;
- The concrete foundation should keep level with the level gradient less than 0.1 %

■ Welded with Channel Steel, I-Steel and Angle Iron, the support should be riveted on the ground with bolts.



### NOTE

The support surface must be strong enough to bear unit' s load, and it do not increase vibration and noise, which may cause the disturbance.

4. 2. 1. 2 Install the unit on the wall:

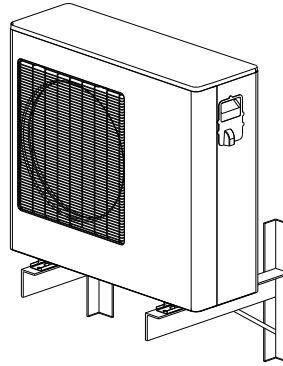
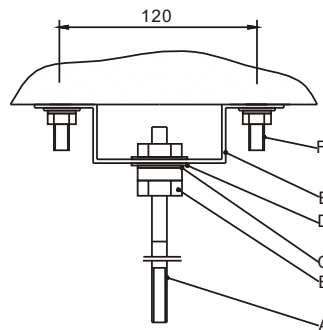


Fig 4

4. 2. 2 Indoor unit

4. 2. 2. 1 Install the unit on the ceiling:



- A:Hanger bolt
- B:Nut
- C:Spring washer
- D:Flat washer
- E:Installation rack
- F:Expansion bolt

Fig 5

4. 3 Unpacking inspection

Inspect the equipment before installation. Do as follows:

- Check for any damage or damp at outer surface after opening.
- Check for name, specification, type of the unit meeting requirement and make sure the user' s manual , qualification card are complete and the accessories are compliant to the packing list.
- Checking the unit , refer to Table 1

Table 1

Check item	Content	Check item	Content
Unit	1) Check if the surface is broken or humid when the packing is open . 2) Check the pipe is ok. 3) Check the accessory is ok. 4) Check if the gas pressure of unit is OK.	Fan	Check if the fan works well.
PCB	1) check if the PCB is ok. 2) check if the insert accessory is tight. 3) check if the connect of earth wire is tight.	Fan motor	1) Check if insulation is ok. 2) Check if the connect of earth wire is tight. 3) Check if the wire connect of fan motor is tight.

■ Keep check record as Table2

Table 2

Unit name			
Unit inspection	1.Packing		
	2.Unit treatment		
	3.PCB check		
	4.Fan and motor check		
	5.Others		
Inspection on technical documents	1.Packing list	copy	pcs
	2.Qualified card	copy	pcs
	3.User' s manual	copy	pcs
	4.Others	copy	pcs
Problem and treatment			
Inspector	Year	Month	Date

#### 4. 4 Check the power of the unit

- Before installing the unit, must check the specifications of power capacity, power cord and switch, to ensure the unit accord with secure request.
- The power of the unit should be connected with the special power switch with leakage protection function.



**NOTE**

**If the request above is not met, the installer must refuse to install the unit.**

# INSTALLATION OF THE UNIT

## 5. 1 Install indoor units and outdoor units

### 5. 1. 1 Install outdoor units

- 1) Fix the unit on foundation and adjust it to level with the gradient.
- 2) Fix the unit on the base with nuts and then tighten them.
- 3) Fix the unit firmly enough to withstand vibration or strong wind.
- 4) When mounting the unit on the wall with the bracket, please refer to the installation of Household Air conditioner.
- 5) Adopting the concrete foundation, please refer to Fig 6:

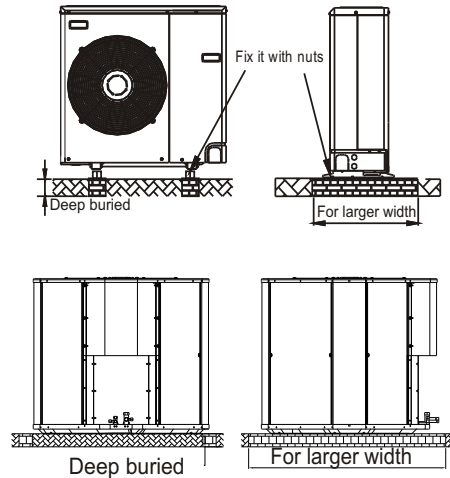


Fig 6



### NOTE

- Transit the unit with the package to the installation field.
- The gradient is not over 20° when transiting the unit.

### 5. 1. 2 Install indoor units

#### 5. 1. 2. 1 Install M10 hanging screw bolts. (4bolts) :

- Please refer to the following figure for the distance measurement between the screw bolts.
  - Please install with M10 hanging screw bolts.
  - The handling to the ceiling varies from the constructions, consult the construction personnel for the specific procedures.
- 1) The size of the ceiling to be handled. . . do keep the ceiling flat. Consolidate the roof beam for possible vibration.
  - 2) Cut off the roof beam.
  - 3) Strengthen the place cut off and consolidate the roof beam.
- Carry out the pipeline operation in the ceiling after finishing the installation of the main body. While choosing where to start the operation, determine the direction of the pipes to be drawn out. Especially in case of there is a ceiling, position the refrigerant pipes, drain pipes, indoor & outdoor lines to the connection places before hanging up the machine.
  - The installation of hanging screw bolts

■ **Wooden construction**

Put the square timber cross the roof beam, then install the hanging screw bolts (Refer to Fig 7)

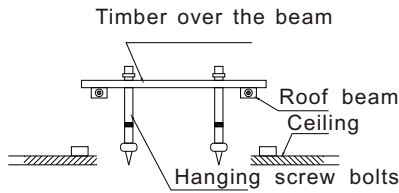


Fig 7

■ **New concrete bricks**

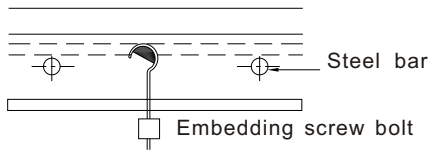
Inlaying or embedding the screw bolts (Refer to Fig 8)



Fig 8

■ **For Original concrete bricks**

Use embedding screw bold, crock and stick harness (Refer to Fig 9)



(Pipe hanging and embedding screw bolt)

Fig 9

■ **Steel roof beam structure**

Install and use directly the supporting angle steel (Refer to Fig 10)

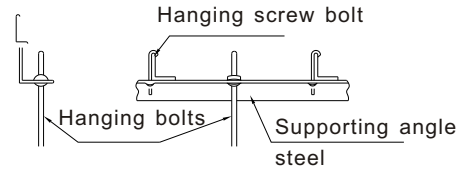


Fig 10

**5. 1. 2. 2 Wall Mounting Installation**

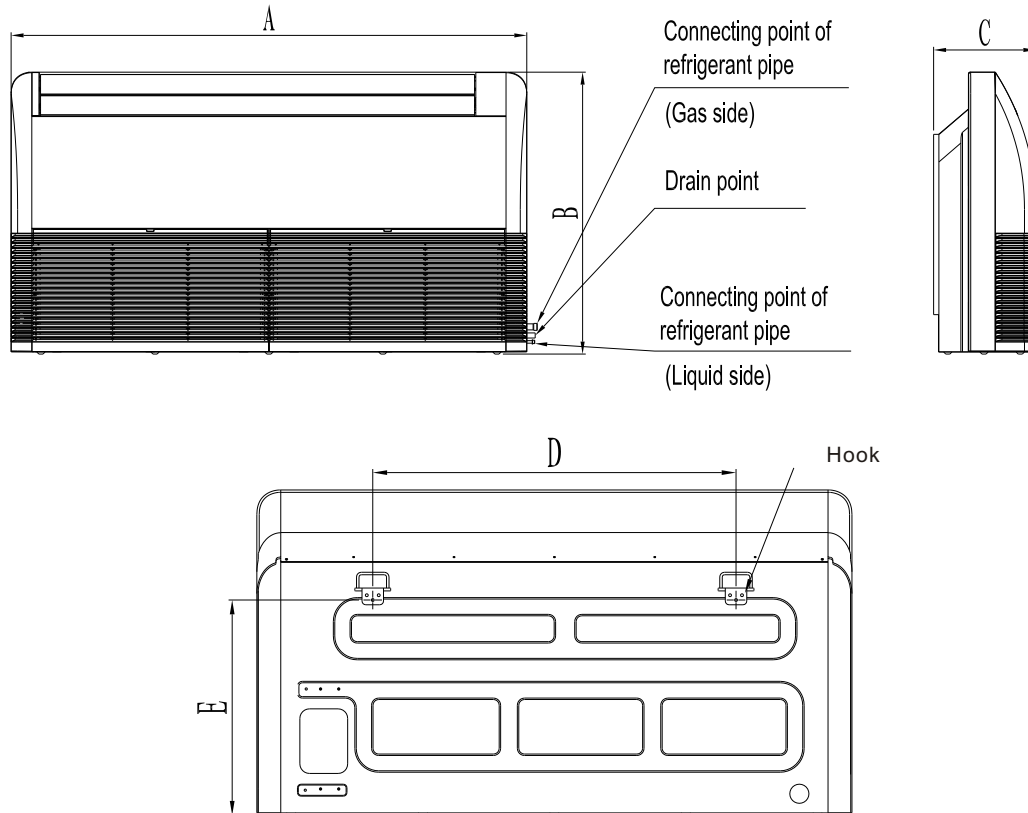


Fig 11



- Fix the hook with tapping screw onto the wall (Refer to Fig 12 )
- Hang the indoor unit on the hook

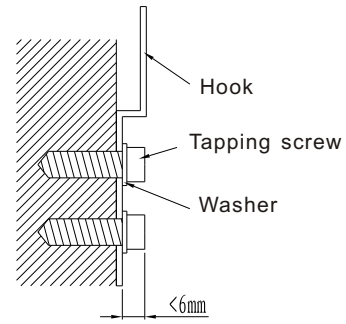


Fig 12

### 5. 1. 2. 3 Ceiling Installation

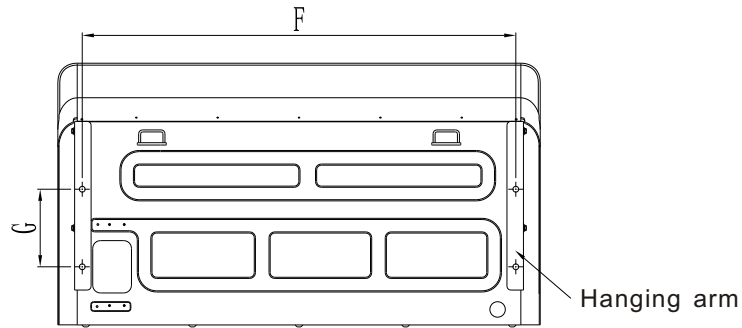


Fig 13

- Remove the side board. (Refer to Fig14)

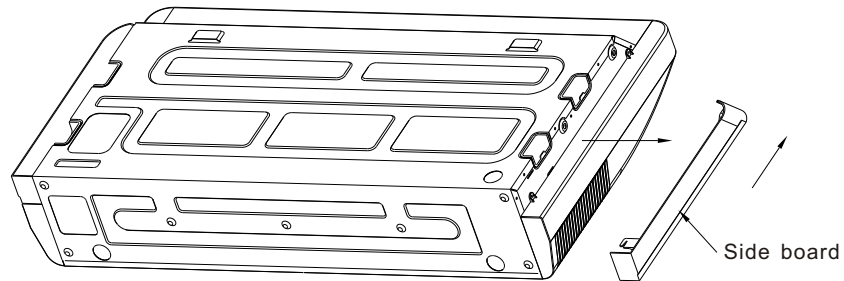


Fig14

- Locate the hanging arm on the hanging screw bolt (Refer to Fig15)
- Prepare the mounting bolts on the unit. (Refer to Fig16)

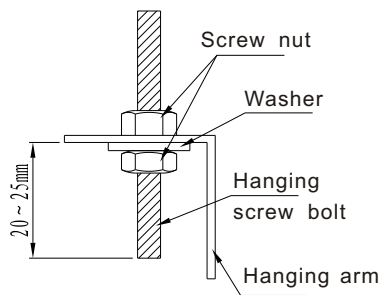


Fig15

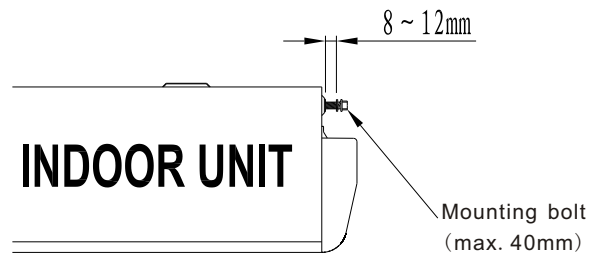


Fig16

■ Hang the unit on the hanging arm by sliding backward. Securely tighten the mounting bolts on both sides (Refer to Fig 17 )

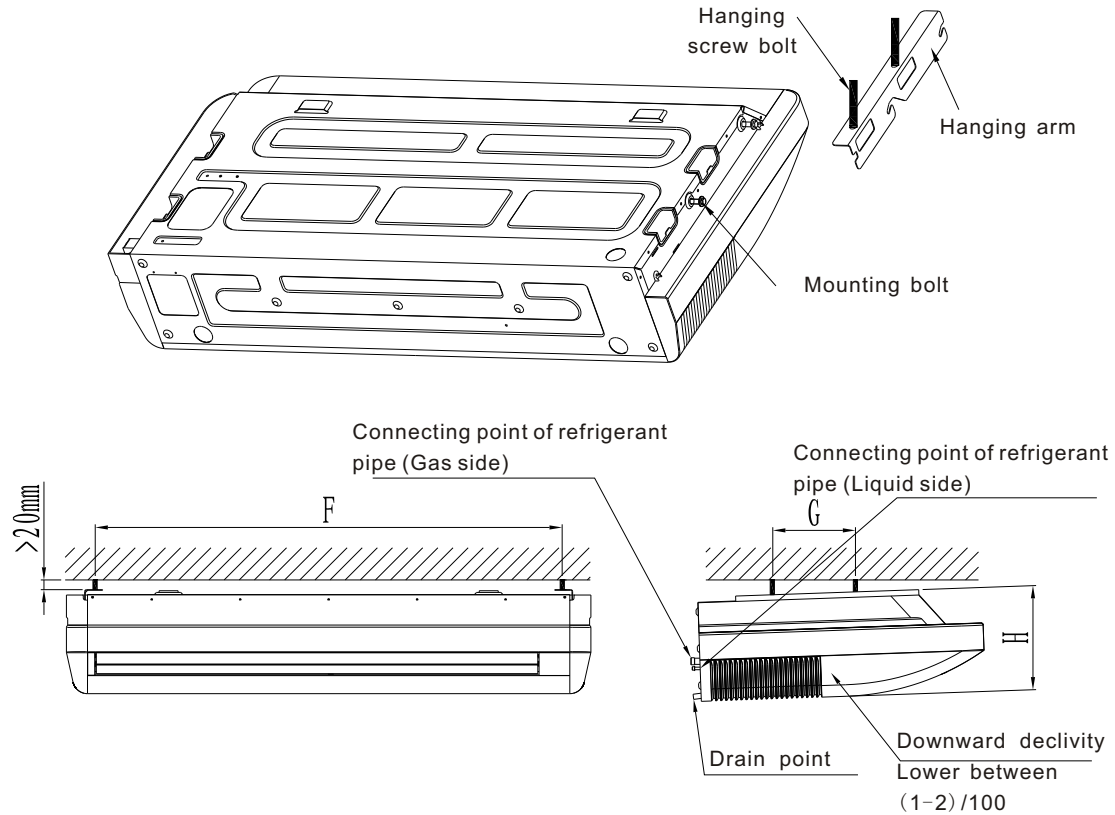


Fig 17

5. 1. 2. 4 The dimension of the unit

Table 3

Model (kBtu/h)	A	B	C	D	E	F	G	H
24~36	1245	680	244	760	450	1119	200	240
48~60	1670	680	244	1070	450	1542	200	240

**NOTE:** The dimension of 24 kBtu/h and 36 kBtu/h are the same  
The dimension of 48 kBtu/h and 60 kBtu/h are the same

## 5. 2 Install and connect refrigerant pipes

After installing the indoor and outdoor unit, you can connect the pipes.

### 5. 2. 1 Inspection of pipes

Before connecting pipes, inspect pipes so that the following requirement is met;

- The inside of the pipe is clean, no dust, air or water gathers in the pipe;
- Flares and nuts at both ends of the pipe are in good condition.

Bend the refrigerant pipe following the scheduled routine. During bending pipes, avoid the pipe broken or out of shape and keep the bent radius of the copper pipe as big as possible (400mm at least) and the bent number no more than 3 times.

### 5. 2. 2 Connection of pipes

As connecting the refrigerant pipes for indoor units, the operation must be rapid to make sure that the time for connecting two pipes is not too long at site.

5. 2. 2. 1 When connecting the flared connector, keep two pipes aligned with the same center and then put on the screw nut and revolved them in. Finally, tighten the screws with wrenches, refer to the figure below:

Please fix the copper with wrenches in proper torque force according to Table 4 Torque Force Table.

Table 4

Diameter of copper pipe $\phi$ (mm)	Tightening torque(kgf · m)
6.35	1.4~1.7
9.52	1.4~1.7
12.7	4.8~6.2
15.88	4.8~6.2
19.05	6.9~9.9

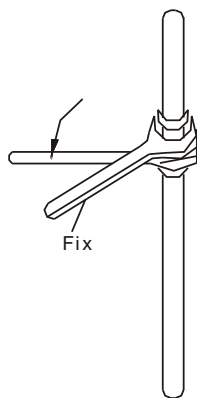


Fig 18

**NOTE:** Please use two wrenches, normal wrench and torque wrench.

### 5. 2. 2. 2 Drill through the wall:

The pipe and wire should be protected with the sleeve when it drills through the wall.(Fig 19)

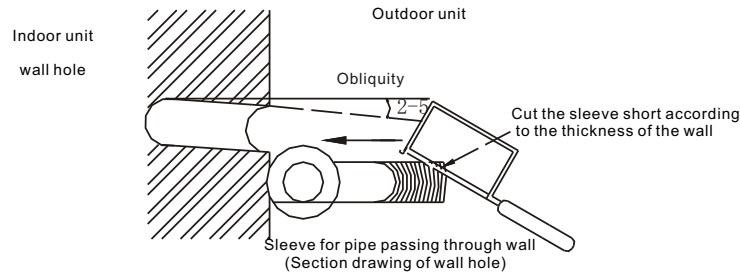


Fig 19

### 5. 2. 2. 3 Exhaust the air in connecting pipeline:

- If the connection pipe is no more than 5 meters, use refrigerant in outdoor unit to exhaust the air(50-100 g refrigerant is charged for emptying the pipe before the outdoor unit is delivered, refer to Fig 20).
  - ① Screw down the nuts at A, B, C, D joint completely.
  - ② Turn on the nut of the Valve B with the hexagon wrench and then turn the valve core 45° anti-clockwisely for 10 seconds with the inner-hexagon wrench, then tighten the union A.
  - ③ Have the leak test at A, B, C, D joint and then press the core of Valve A to exhaust the air for 20 seconds and then screw down the service valve.
  - ④ Open Check valve B and A completely with the inner-hexagon wrench, then tighten nuts of them.

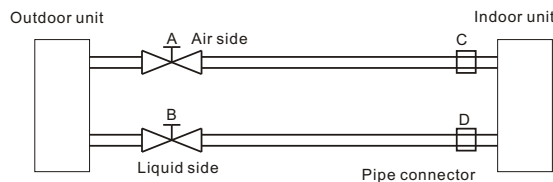


Fig 20

- When connect pipe length over 5 meters(single distance),use vacuum pump to exhaust the air ; As for the unit utilizing R410A, it must use vacuum pump to exhaust the air no matter how long the pipe is . (Refer to Fig 21)
  - ① Open Nut A, connect Charging hose 1 of the manifold to valve A (Valve A and B must be turned off). Then connect Charging hose 2 to the vacuum pump.
  - ② Open Low pressure handle of the manifold Lo complete.
  - ③ Start the vacuum pump to exhaust the air. Open valve B a little to check whether the air come in or not.(The noise from vacuum pump changes and the reading of gauge alters from negative to zero),and then tighten the valve nut.
  - ④ After exhausting the air, close Low pressure handle of the manifold ( Lo) completely.

**NOTE:** Exhaust the air over 15 minutes and ensure the multimeter show “-1.0x105Pa”(-76cmHg).

- ⑤ Take down Charging hose at A joint, then tighten the nut.
- ⑥ Unscrew the nuts of valve A and B and turn on Valve A and Valve B, then tighten their nuts.

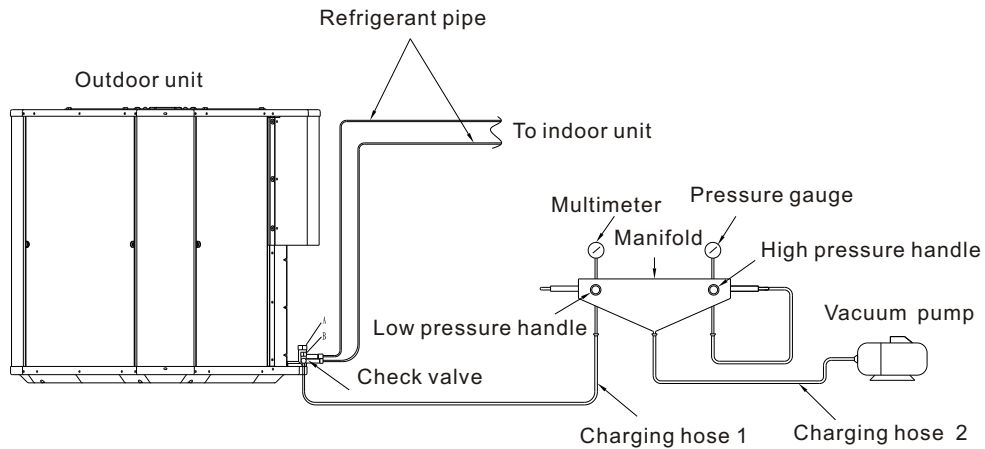


Fig 21

5. 2. 2. 4 Air leakage test: Water soap suds to connectors and joints of valves to check whether there is any leakage at the joints.

5. 2. 2. 5 Heat preservation: After leakage test and pressure test, wrap the pipe with the insulating material .Request of the insulation layer.

- Insulation layer of pipeline should be 8 mm at least and wrapped up tightly.
- Process the surface of the insulation lay for waterproof and moisture-proof (usually wrap the pipe with the bend).
- It is not allowed for the surface with dew when the unit is in cooling mode.

5. 2. 2. 6 New tools for R410A

Table 5

New tools for R410A	Changes
Gauge manifold	If the working pressure is quite high, it is impossible to measure the pressure with the conventional gauge. In order to prevent any other refrigerant from being charged, the diameter of the port should be changed.
Charge hose	In order to improve the pressure resisting performance, the hose material and the size of the hose should be changed (1/2 UNF thread, 20 threads per inch). When purchasing the charge hose, please confirm the size.
Multi-meter	When the working pressure is quite high and the gasification speed is fast, it's difficult to read the indicated value for using the charging cylinder.
Torque wrench (Nominal Diameter: 1/4, 3/8 )	The size of the opposing flare nut is increased. Besides, the common wrench is applicable for the case: The nominal diameter of the port is 1/4 or 3/8.
Flare tool( clutch type)	Increasing the size of hole in the clamp bar can increase the force of the drift punch of the flare tool.
Cut pipe	Used when making the flare with the conventional flare tool.
Vacuum pump adapter	Connected to the conventional vacuum pump, the adapter can prevent the oil of the vacuum pump flowing back to the charge hose. The charge hose has two ports: one for the conventional refrigerant (7/16 UNF thread, 20 threads per inch) and the other for R410A. If the oil of the vacuum pump is mixed with some R410A, the sludge will be produced, which will do damage to the equipment.
Gas leakage detector	Exclusive for the refrigerant HFC



## NOTE

- The refrigerant cylinder comes with the refrigerant designation (R410A) and the specified color of the protector coating is rose in the ARI (ARI color code: PMS 507).
- The charge port of the refrigerant cylinder is 1/2 UNF thread, that is 20 threads per inch, subjected to the diameter of the charge hose.

### 5.3 Tubing for pipeline

Because of the installation position and the pipeline length of the is differ, please select proper pipe and the installation position where can keep the pipe as short as possible. During collocating the pipe, please pay attention to the following items:

- Maximal distance of pipeline

Table 6

Cooling capacity(kBtu/h)	24~42	48~60
Max length(m)	12	15
Max height(m)	8	8
Max elbow(pcs)	10	10

**NOTE:** The above parameters fully consider the loss of refrigeration output and oil return while ensuring 80% refrigeration output.

- The use of oil loops

When the height difference between indoor and outdoor units is relatively large, oil loops should be used to facilitate for oil return. Please refer to the following typical mounting methods in Fig 22

- 1) Height difference of indoor and outdoor unit is over 5 meters:

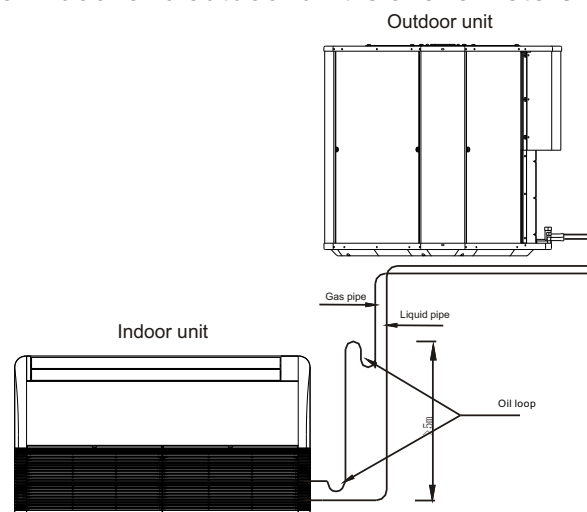


Fig 22

**NOTE:** Cooling only unit does not adopt oil loops.

2) When height difference of indoor and outdoor unit is less than 5 meters, it will take normal way to install them.

■ Adding refrigerant

Add refrigerant when the connecting pipes are longer than 8 meters, as Table 7:

Table 7

Diameter of liquid pipes(mm)	Adding amount per meter(g)
Φ6.3	30
Φ9.5	65
Φ12.7	120

**NOTE:** when adding refrigerant, the running air return pressure must be 4.5-5.5kgf/cm<sup>2</sup>.

### 5. 4 Install condensate pipes

As for Floor ceiling unit, there are two ways in installing the drain pipe :

**5. 4. 1** When installation place is near the drain off, it will adopt the installing method of House-hold air conditioner;

**5. 4. 2** When installation place far from the drain off:

■ You can select U-PVC as the pipeline material;

■ Request of installation

a. Set water seal in outdoor water spout and then fix it up.

b. The gradient of drain pipe is no less than 1° and there is no bent for this section .

c. Indoor part of condensate pipe should be wrapped with heat-preservation material to avoid of generating dew, so do the joint of the indoor unit;

d. If the drain pipe is quite long, please set supports to protect the pipe from bending.

e. After installing the condensate pipe, it will do leakage test through pouring some water to check whether there is a leakage at joints and drain is smooth.

As for the new room, do the leakage test before laying the ceiling, please refer to Fig 23.

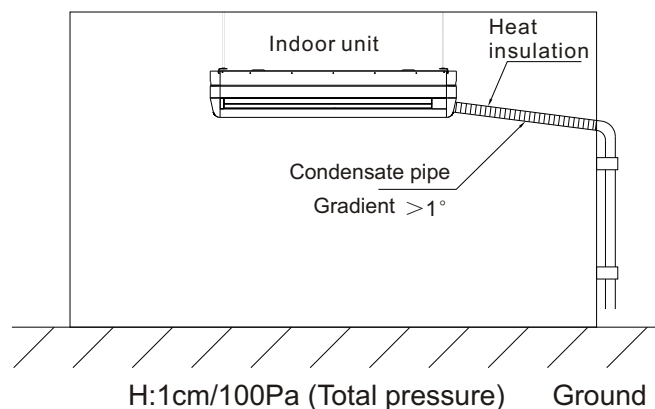


Fig 23

# SYSTEM CHECK AND TEST RUN

## 6. 1 Check the air conditioner

Before test running, please check the units according to the following items.

- Check whether the indoor and outdoor units have been installed right .
- Check whether the tubing and wiring has been right .
- Check all the joints of the refrigerant pipeline with gas leak detector.
- Check whether the drain is smooth.
- Check whether the heat preservation layer is in good condition.
- Check whether the machine is properly grounded .
- Check the voltage of power supply (Make sure the voltage is within rate limit) .
- Check whether there is any obstacle in the inlet and outlet vents of indoor and outdoor units .
- Open the liquid side and air side check valve .

If all cases above are OK, you can begin to carry on the test run.

## 6. 2 Test run and debugging

Turn on the unit in cooling mode by remote controller and then check following items.

### 6. 2. 1 Indoor unit

- Check if ON/OFF key or functional keys on the remote controller work well .
- Check if the air guide board is running normally.
- Check if all lamps are all right.
- Check if the drain is smooth .
- Check if there is any abnormal noise or vibration during operating.
- Check if the units runs normally in heating mode for heat pump type unit.

### 6. 2. 2 Outdoor unit

- Check if there is any abnormal noise or vibration during operation .
- Check if the noise, wind and drain water from the units disturb the neighbors.
- Check if there is leakage of refrigerant .

## 6. 3 Check and accept

If the debugging and test run are OK, tide up the information and deliver to users.

- The preparation of information includes(refer to Table 6 and Table 7):
  - 1) The checking records of unpacking the equipment, the certificate of qualification of all equipments;
  - 2) Debugging records ;
- Fill the guarantee card



Test run and debugging records

Table 8

Project name	
Debugging date	
Debugging content	
Debugging results	
Opinions	
Personnel	

The record of checking and accepting the completion

Table 9

Project name		Project site	
Completion date		Delivery date	
Content			
Checking information			
Checking opinions			
Note			
	Year	Month	Date
	Representation for users		Year
	Month	Date	

**NOTE:** The tables above are just for a reference other than a standard of checking and accepting for the completion.

# MAINTENANCE AND UPKEEP

## 7.1 Before maintenance

- Turn off the air conditioner and pull out the plug .
- Do not clean the air conditioner with water .

It might cause electric shocks , please use a soft and dry cloth to clean the air conditioner .

- Do not use the following substances :

- 1) Hot water(over40°C): The hot water will deform the air conditioner or make it fade in color .
- 2) Gasoline, paint diluent ,benzene and polishing agents, etc. These substances will deform the air conditioner .



### CAUTION

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If the air strainer is blocked by dust or dirt ,the performance of cooling and heating will be affected, with the operation noise and power consumption increased. Therefore, please clean the air strainer regularly .

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## 7.2 Maintenance after a long stop period

(eg. at the beginning of the season)

- Check if there are any obstacle in the intake and outlet vents of the indoor and outdoor units .
- Check if the installation base is corroded or rusty .
- Check if the machine is properly grounded .
- Check if the air filter is clean .
- Turn on the power source .
- Put batteries in the remote controller .

## 7.3 Maintenance during operation season

Clean the air strainer(Normal intervals is once every two weeks).

- Take down the air strainer;
- Clean the air strainer .

If the strainer is very dirty, please clean it with lukewarm water (about 30°C) and then air it.



### CAUTION

- 
- Do not use boiling water to clean the screen .
  - Do not bake the screen dry over a fire .
  - Do not draw it forcibly .

- Install the air strainer .

To operate the air conditioner without the air strainer, which will accumulate some dirt in the interior of the machine so that it will get the poor performance even damage the units .

- Clean the air conditioner

- 1 ) Use a soft and dry cloth to rub the air conditioner ,or use a vacuum cleaner to clean it .

- 2 ) If the air conditioner is very dirty ,use a piece of cloth and soak it with neutral home-use detergent to clean it .

## **7. 4 Maintenance before a long stop period**

(eg. at the end of the season)

- Set the temperature at 30°C and make it run in cooling mode for about half a day .(To dry theinterior of the units)

- Stop the machine and cut off the power. Usually, the air conditioner will consume about 5W electric energy even through the machines is turned off. For saving energy and safety, please pull out the plug if you do not use the air conditioner.

- Clean and install the air strainer.

- Clean the indoor and outdoor units.

- Take out the batteries from the remote controller .

# TROUBLESHOOTING

## 8. 1 Malfunction analysis

If the following cases happen, do not worry, for them being not faults:

Phenomena	Phenomena analysis
The air conditioner can not be restarted just after shutting down	The unit delays running for 3 minutes after stopping for protection. The three-minute protection timer built-in micro-computer works automatically, but it is not for the case when the unit is powered first time.
The air conditioner does not supply air at the beginning of heating.	The air conditioner does not supply air to avoid of blowing cold air until the indoor heat exchanger is warm(2-5minutes).
The air conditioner does not supply air after it has running for 5-10 minutes in heating mode.	The air conditioner enters defrost mode automatically when the outdoor temp. Is quite low or the humidity is too high, so please wait for a moment. Besides, during defrosting, some moisture or steam will come out from the outdoor unit
The air conditioner does not supply air in dehumidifying mode.	Sometimes, the fan of indoor unit will stop running to prevent the condensate from evaporating and save energy.
The air conditioner blows out the moisture in cooling mode.	This is caused by too high temperature and humidity of the room. It will eliminate when the temperature and humidity reduces.
The air blown out is smelly.	The air blown out is smelly during operating, it may come from the tobacco or other cosmetics stucked to the inner of the air conditioner.
Squeak is heard from the unit	This is caused by the circulating refrigerant inside the unit.
Crack is heard from the unit	This is caused by heat expansion or contraction of plastics
When the power restores, the air conditioner can not run	This is because the memory circuit of the microcomputer is cleared. Please start the air conditioner through the remote controller.
The air conditioner can not receive the signal from the remote controller.	It may happen when the signal receiver of the air conditioner is exposed to sunlight or strong light directly or the batteries are used up. In that case, eliminate those factors or change the batteries.
There is some drop on the air outlet and the grille.	The air outlet and the grillemoisture will condense when the air conditioner is operated in humid environment for a long time, please adjust the grille and the vane to the position which is in parallel with the wind supply direction and select "High speed" mode to improve the condensing phenomena.

Pull out power plug immediately and inform to your distributor in the following situations:

1. Fuse or breaker often breaks off .
2. Power wires are excessively hot .
3. Covering of power wires is broken .
4. Switch works well.
5. Abnormal noise is heard during operation .

## 8. 2 Fault display:

### ■ Indoor fault display

Faults	LED display	Fault code	Fault instruction
Room temperature probe fault	TIMER indicator lamp flashes at 5 Hz	E2	The system will get right automatically once faults eliminated.
Evaporator probe fault	RUN indicator lamp flashes at 5 Hz	E3	
Condenser probe fault	Defrost indicator lamp flashes at 5 Hz	E5	
Float switch protection	Alarming indicator lamp flashes at 5 Hz	F5	
Outdoor protection	Defrosting and alarming indicator lamps flash at 5 Hz	F2	
EEPROM communication fault	RUN and TIMER indicator lamps flash at 5 Hz	P6	The system will get right after blackout.

■ Outdoor fault display

Low pressure protection	Flashes four times per six seconds
High pressure protection	Flashes three times per five seconds
Phase sequence protection	Flashes nine times per eleven seconds
Over current protection	Flashes seven times per nine seconds
Outdoor coil temperature sensor fault	Flashes five times per seven seconds
Outdoor coil overheating protection	Flashes twice per four seconds
Defrosting protection	Flashes once per three seconds
Power down memory protection	Flashes eight times per ten seconds

# ELECTRIC WIRING

## 9. 1 Electric wiring construction

### 9. 1. 1 Electric wiring precaution

- The unit must adopt the special power, matching with a breaker with the electric leakage protection function;
- Make out the voltage and the spec. of wires before wiring;
- Take care of the clew on the terminal board to avoid wrong wiring;
- Never connect the signal ports of indoor unit and outdoor unit with the power, otherwise, it may cause badly accidents;
- Pay attention to the polarity of the terminal board and the terminal codes;
- Have electricians wiring power wires according to local regulations of the power department and the device standard;
- If the power cable is broken, please contact with our service department for special soft wires;

### 9. 1. 2 Connect the wires of indoor unit

- Take down the cover of indoor electric box and the clamping board of the trunkings;
- Connect power wires and signal wires to the corresponding ports according the electric wiring diagram;
- Open the clamp and then fix power wires and signal wires on the clamping board;
- Put on the clamping board and then fit on the cover of the electric box.

### 9. 1. 3 Connect the control lines of indoor unit and outdoor unit

- Connect wires of indoor unit and outdoor unit;
- During wiring, please consider the environment conditions, such as environment temperature, the temperature for direct sunlit and direct sunlit;
- The diameter of wires is the minimum of the metal core wires. But considering the loss of the voltage, adopt the power wire that is larger than ones with the smallest diameter;
- Connect the grounding wires to the unit.

## 9. 2 Power Wires Spec. Table

### ■ Down-flow outdoor unit:

Model (kBtu/h)	Main power wires	Indoor power wires	Signal wires of indoor and outdoor unit	Power supply types
<sup>24</sup> (Cooling only)	3×2.5mm <sup>2</sup>	3×1.0mm <sup>2</sup>	2×0.5mm <sup>2</sup>	Indoor unit and outdoor unit supply separately
<sup>24</sup> (Cooling & heating)	3×2.5mm <sup>2</sup>	3×1.0mm <sup>2</sup>	4×0.5mm <sup>2</sup>	Indoor unit and outdoor unit supply separately
<sup>36</sup> (Cooling only)	3×4.0mm <sup>2</sup>	3×1.0mm <sup>2</sup>	2×0.75mm <sup>2</sup>	Indoor unit and outdoor unit supply separately
<sup>36</sup> (Cooling & heating)	3×4.0mm <sup>2</sup>	3×1.0mm <sup>2</sup>	4×0.75mm <sup>2</sup>	Indoor unit and outdoor unit supply separately
<sup>42</sup> (Cooling only)	5×1.5mm <sup>2</sup>	3×1.0mm <sup>2</sup>	2×0.5mm <sup>2</sup>	Indoor unit and outdoor unit supply separately
<sup>42</sup> (Cooling & heating)	5×1.5mm <sup>2</sup>	3×1.0mm <sup>2</sup>	4×0.5mm <sup>2</sup>	Indoor unit and outdoor unit supply separately

Model (kBtu/h)	Main power wires	Indoor power wires	Signal wires of indoor and outdoor unit	Power supply types
48 (Cooling only)	3×4.0mm <sup>2</sup>	3×1.0mm <sup>2</sup>	2×0.75mm <sup>2</sup>	Indoor unit and outdoor unit supply separately
48 (Cooling & heating)	3×4.0mm <sup>2</sup>	3×1.0mm <sup>2</sup>	4×0.75mm <sup>2</sup>	Indoor unit and outdoor unit supply separately
60 (Cooling only)	3×4.0mm <sup>2</sup> or 3×6.0mm <sup>2</sup>	3×1.0mm <sup>2</sup>	2×0.75mm <sup>2</sup>	Indoor unit and outdoor unit supply separately

■ **Side-flow outdoor unit, with the frequency 50Hz:**

Model (kBtu/h)	Main power wires	Indoor power wires	Signal wires of indoor and outdoor unit	Power supply types
24	3×2.5mm <sup>2</sup>	3×1.0mm <sup>2</sup>	26AWG(Special)	Indoor unit and outdoor unit supply separately
36	5×1.5mm <sup>2</sup>	3×1.0mm <sup>2</sup>	26AWG(Special)	Indoor unit and outdoor unit supply separately
42	5×1.5mm <sup>2</sup>	3×1.0mm <sup>2</sup>	26AWG(Special)	Indoor unit and outdoor unit supply separately
48	5×2.5mm <sup>2</sup>	3×1.0mm <sup>2</sup>	26AWG(Special)	Indoor unit and outdoor unit supply separately
60	5×2.5mm <sup>2</sup>	3×1.0mm <sup>2</sup>	26AWG(Special)	Indoor unit and outdoor unit supply separately

■ **Side-flow outdoor unit, with the frequency 60Hz:**

Model (kBtu/h)	Main power wires	Indoor power wires	Signal wires of indoor and outdoor unit	Power supply types
24 (Cooling only)	3×2.5mm <sup>2</sup>	3×1.0mm <sup>2</sup>	2×0.75mm <sup>2</sup>	Indoor unit and outdoor unit supply separately
24 (Cooling & heating)	3×2.5mm <sup>2</sup>	3×1.0mm <sup>2</sup>	4×0.75mm <sup>2</sup>	Indoor unit and outdoor unit supply separately



**CAUTION**

The units listed in the table are Commercial air conditioners, which are not collocated with power wires and wires for connecting indoor unit and outdoor unit.

If the unit is located outdoor, please adopt the power wires which are not less than Chloroprene rubber armored cord( Number 57 wire of IEC 60245). There is no further notify for modifying the spec.

Above, please refer to the parameters on the fitting box.

