



**INSTALLATION&OPERATION INSTRUCTION MANUAL
FOR
DUCT TYPE AIR CONDITIONING**

GP08Eng

■ MODEL

FUA-60
FUA-48
FUA-36
FUA-24

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

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.

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

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.

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.



WARNING

- This product is extensively applied in offices, restaurants, hotels, residence and so on.
- Be sure only trained and qualified service personnel to install, repair or service the equipment. Improper installation, repair, and maintenance may result in electric shocks, short-circuit, leaks, fire or other damage to the equipment.
- Install at a strong and firm location which is able to withstand the set' s weight. If the strength is not enough or installation is not properly done, the set will drop to cause injury.
- While following the instructions in this installation manual, install drain piping in order to ensure proper drainage and insulate piping in order to prevent condensation. Improper drain piping may result in water leakage and property damage.

- Never use or stockpile some flammable objects such as hair spray, alcohol or paint near the unit. It may cause a fire.
- Cut off the power of the air conditioner in case of accidents, such as smelling something burning.
- Keep the air-conditioning room with good ventilation to avoid of oxygen deficiency.
- Do not insert fingers, rods or other objects into the air inlet or outlet.
When the fan is rotating at high speed, it will cause injury.
- Never try to plug in or pull out the power plug for starting or shutting the air conditioner.
- Pay attention to the mounting support in case of damage for a long usage
- Ask your dealer or qualified service personnel for improvement, repair, and maintenance. Incomplete improvement, repair, and maintenance may result in a water leakage, electric shock, and fire.

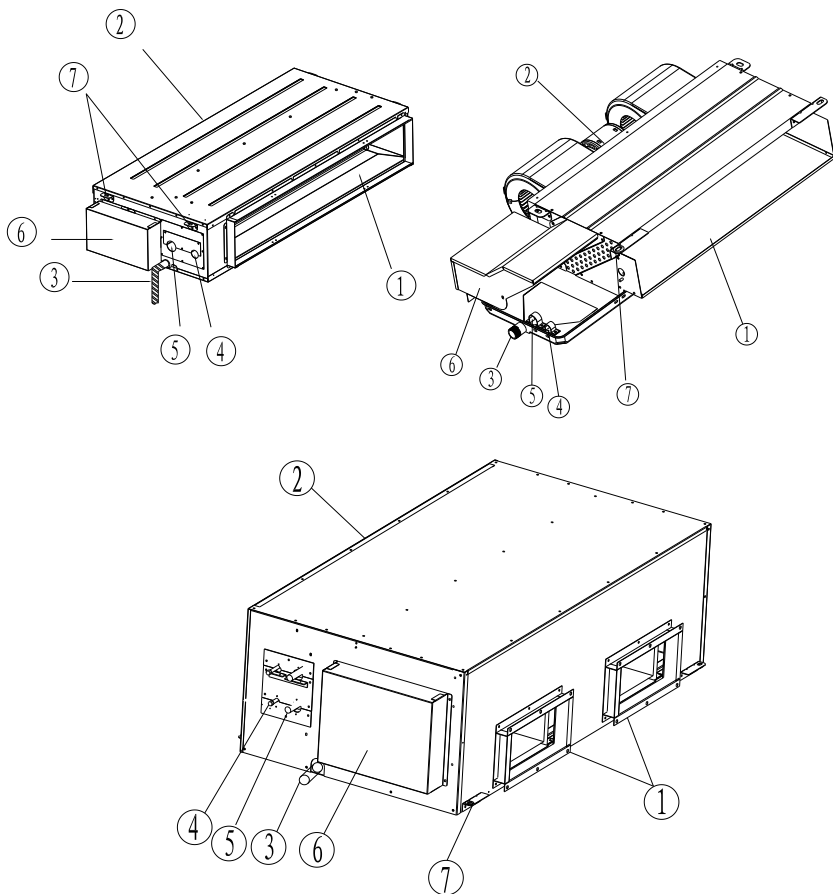


CAUTION

- Before installing, check whether the power is safe and keep it accordance with its nameplate;
- Before operating, make sure that all connections of cables, drain pipes and other pipes are in good condition in case of water leakage, refrigerant leakage, electric shocks, fires.
- Be sure the air conditioner is grounded. In order to avoid electric shock, make sure that the unit is grounded and that the earth wire is not connected to gas or water pipe, lightning conductor or telephone earth wire.
- Keep the air conditioner running for 5 minutes at least before shutdown, otherwise, it will do bad to the oil return of the compressor.
- The child is not allowable to operate the air conditioner.
- Do not operate the air conditioner with a wet hand.
An electric shock may happen.
- Cut off the power of the air conditioner prior to cleaning the unit or replacing the air strainer;
- Cut off the power of the air conditioner before the unit being idle for a long time.
- Do not step on the outdoor unit or avoid placing any object on it.
Falling or tumbling may result in injury.
- Please electrify the unit and then carry out electric leakage test after the installation of electric devices;

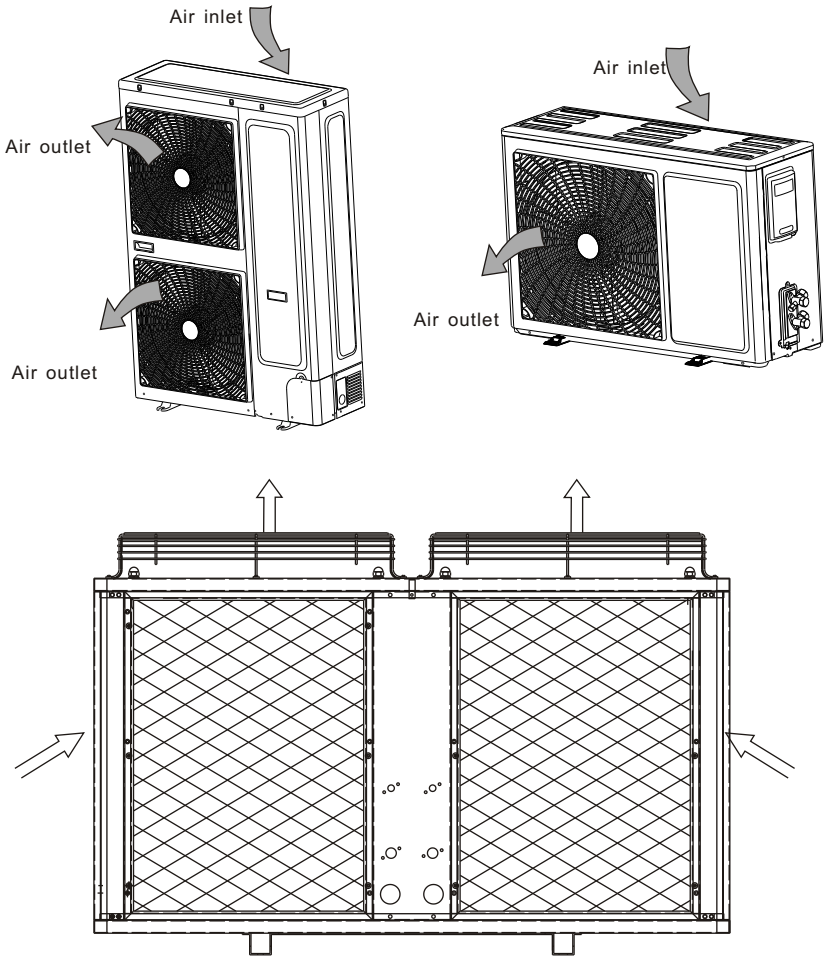
PARTS NAME AND FUNCTION

■ Indoor unit



- ① Air outlet ② Air inlet ③ Drain pipe ④ Liquid pipe
⑤ Gas pipe ⑥ Electric control cabinet ⑦ Hook

■ Outdoor unit



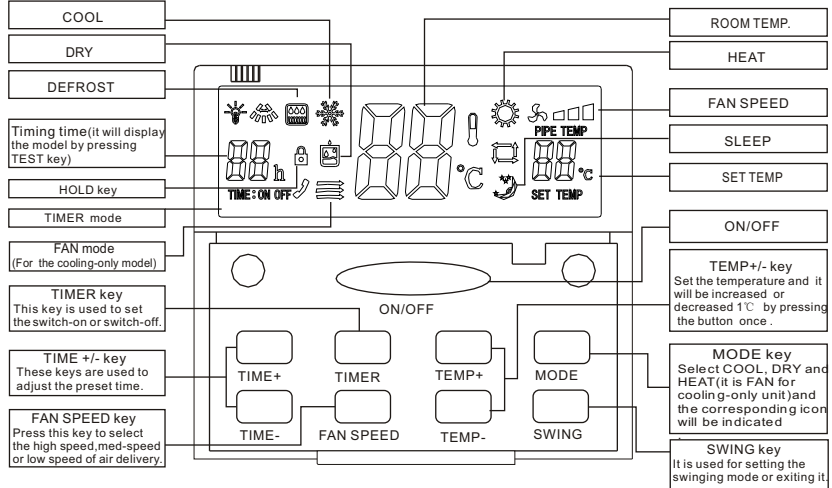
CAUTION

- All the pictures in this manual are for explanation purpose only. They may be slightly different from the air conditioner you purchased(depend on model). The actual shape shall prevail.
- This air conditioner just consists of indoor unit and outdoor unit, other than connecting pipes and ducts.

INTRODUCTION OF CONTROLLER

3. 1 Instruction of Wire Controller

- The control panel of Wire controller is in charge of receiving infrared remote control signal, controlling the system operation through buttons on it, displaying operating conditions of the whole system via LCD and communicating with system control panel.
- The control panel of Wire controller consists of LCD, 9 buttons, infrared receiver module, communication link, etc.
- The system control panel supply the power for the wire control panel.



NOTE:

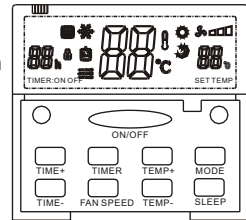
1. Do not handle the button with nail or other sharp things , so as avoid the damages of operation panel .
2. Thanks to technical renovation, the operation panel or remote controller may be changed without further notice.

3. 1. 1 Instruction Wire Controller (ZKX-FE-02/D , ZKX-FEM-02/D)

Operation modes:

Operation modes include COOL, DRY, HEAT or FAN mode, its detailed operation methods is as follows:

- Press ON/OFF button to start the unit;
- Press MODE button to select desired mode, and then select FAN mode , with the compressor standby.
- Press TEMP+ / - button to set the desired room temperature in the range from 18°C to 29°C .
- Press FAN button to select the desired high speed, mid speed or low speed of Fan. Fan works only at low speed during DRY mode.



- Press ON/OFF key again to stop the unit.

To protect the air conditioner from starting immediately after stopping, the delayed start function will keep the air conditioner idle for 3 minutes before automatically starting it.



CAUTION

- When the ambient temperature is lower than 21°C or higher than 43°C, please don't start the cooling operation.
 - When the ambient temperature is lower than -7°C or higher than 24°C, please don't start the heating operation.
 - When the room temperature is lower than 18°C, please don't switch the operation to DRY mode.
-

Timing operation

■ Timing OFF operation :

Set the shutdown time and the air conditioner will automatically stop when the setting time is over.

- 1) Press the TIMER button during running, the air conditioner enters timing OFF state and "TIMING OFF" will be indicated on the display screen.
- 2) Press TIME+ / - button to set the desired timing OFF time in the range from 1 to 12 hours.

The number indicated on the display area shows the timing OFF time, that is, the time left for shutdown and it will decrease by 1 every hour.

- 3) To cancel the setting, press the TIMING button again. Under operating state, only TIMING OFF function can be set.

■ Timing ON operation :

Set the starting time and the air conditioner will automatically start when the setting time is over.

- 1) Press the TIMER button at standby state, the air conditioner enters timing ON state and "TIMING ON" will be indicated on the display screen.
- 2) Press TIME+ / - button to set the desired timing ON time in the range from 1 to 12 hours.

The number indicated on the display area shows the timing ON time, that is, the time left for starting and it will decrease by 1 every hour.

- 3) To cancel the setting, press TIMING button again. Under standby state, only TIMING ON function can be set.

SLEEP function operation

- In running of air conditioner, press SLEEP key on the wire controller or aim the remote controller at the signal receiving window of the panel and then press SLEEP key, the unit will run at low speed.
- After setting SLEEP mode, if the air conditioner is in COOL, DRY or FAN mode, the temperature set will automatically increase by 1°C after 2 hours

and 2°C after 8 hours. If the air conditioner is in HEAT mode while setting SLEEP mode, the temperature will decrease by 2°C after 1 hour and another 2°C after 2 hours, and totally decrease by 4°C after 8 hours.

- If SLEEP OFF function and TIMING OFF function are set simultaneously, the system will carry out the function of which the time comes early;
- During sleeping operation, you can change the operating mode and the sleeping function will be cancelled automatically when switching to other mode.

Heating operation features

Theory and Capacity

- Air conditioner absorbs heat from outdoor air and transmits it indoor to heat the Indoor air.

For this heat pump heating theory, its heating capacity depends on the outdoor air temperature.

- This heat cycling system raises the room temperature fast.
- When the outdoor temperature is quite low, it can combine other heating facilities for heating operation.

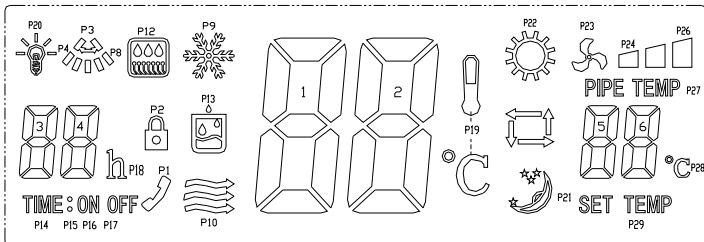
Defrost operation

When the outdoor temperature is quite low and humidity is high, the outdoor heat exchanger will frost, which will affect heating efficiency. In order to avoid of this frosting problem, the system will start automatic DEFROST function and carry on defrosting operation for about 5-10 minutes, the heating operation, however, will be idle during this period.

- During defrosting operation, all fans of indoor and outdoor unit will shut down, and the HEAT lamp (green) will flash slowly.
- During defrosting operation, the outdoor unit may give off some vapor, that is not air-conditioning trouble.
- After defrosting operation, the unit will continue to heating operation.

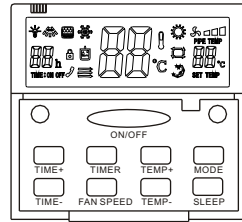
3. 1. 2 Instruction of Wire Controller (ZKX-PFE-02)

3. 1. 2. 1 LCD sketch diagram of Wire Controller



3. 1. 2. 2 Instruction for function operations of Wire Controller

In the first 5s after powering on, the electric control main panel will detect whether the wire controller is available. If the wire controller works and the communication fault lasts one minute, the control panel will display the fault and its fault code as well as the unit will shut down.



■ ON/OFF key:

When the control panel is powered on for the first time, the work condition is in default mode, that is, the set temperature is 25°C (room temperature) and the swinging mode works and the high speed air is supplied.

If ON/OFF key is hold when the wire controller is powered on, the LCD can work in a full screen at the first two seconds and then it will display the room temperature and the buzzer will ring three times.

■ MODE key:

When pressing this key, the operating modes are switched in the order :

Cooling & Heating type: COOL→DRY→HEAT→FAN→COOL

Cooling only type: COOL→DRY→FAN→COOL

■ "TEMP+" key and "TEMP-" key:

5 icon and 6 sections indicate the set temperature.

If the set temperature rises by 1°C by pressing "TEPM+" once and the temperature won't change any more when it rises to 32°C;

If the set temperature reduces by 1°C by pressing "TEPM-" once and the temperature won't change any more when it reduces to 16°C;

Holding "TEPM+" key and "TEMP-" key for one second can lock all keys and the locking icon P2 is indicated on the LCD and all keys are disabled. However, do the same key operation again, the keys will be unlocked.

■ TIMER key:

This key is used for setting TIMING ON or TIMING OFF function. The timing ranges of the remote control and the wire control are all from one hour to 24 hours.

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This key is used for setting TIMING ON or TIMING OFF function. The timing ranges of the remote control and the wire control are all from one hour to 24 hours.

■ "TIME+ "key and "TIME- "key

P3 and P4 icons indicate the hours and the two keys are used for adjusting the timing time. After setting timing function, the timing time displayed will increase by one hour and the time won't change any more when it gets to 24 hours; It is the same with "TEMP-" key, that is, the timing time displayed will reduce by one hour and the time won't change any more when it gets to one hour.

■ FANSPEED key

This key can adjust the wind speed and press the key to switch modes in the order :

Auto wind→ Hi speed →Mid speed→ Low speed →Auto wind.

■ SWING key

Pressing this key, the LCD screen will display swing icon which is composed of P3, P4, P5, P6, P7 and P8. When the swinging function works, the icon will swing from P4 to P8;

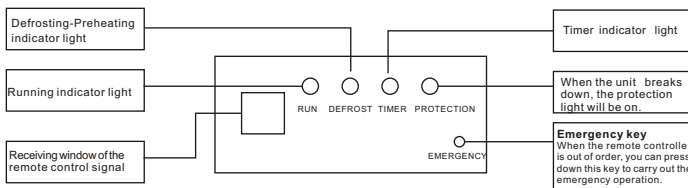
If the key is pressed, the UP/DOWN and LEFT/RIGHT air guiding slips are swinging in the specified rang and those air guiding slips will stop swinging when the key is pressed again.

■ PIPE TEMP inquiry function

Hold "TIME+" key and "TIME-"key for one second to enter the pipe temperature inquiry interface. On this interface, PIPE TEMP icon P27 is displayed and 5 and 6 sections of the digital code tube indicates the temperature value. However, the set temperature cannot be changed by pressing down the "TEMP+"key or "TEMP-" key. Do the operation again, you can choose the inside pipe temperature or outside pipe temperature, and 3 and 4 sections indicates the code of pipe temp (D1: inside pipe temp. ;D2: outside pipe temp. ;D3: Obligated) . Repeat the pressing key once more to exit from the inquire interface and SET TEMP icon P28 is displayed and 5 and 6 sections will indicate the set temperature.

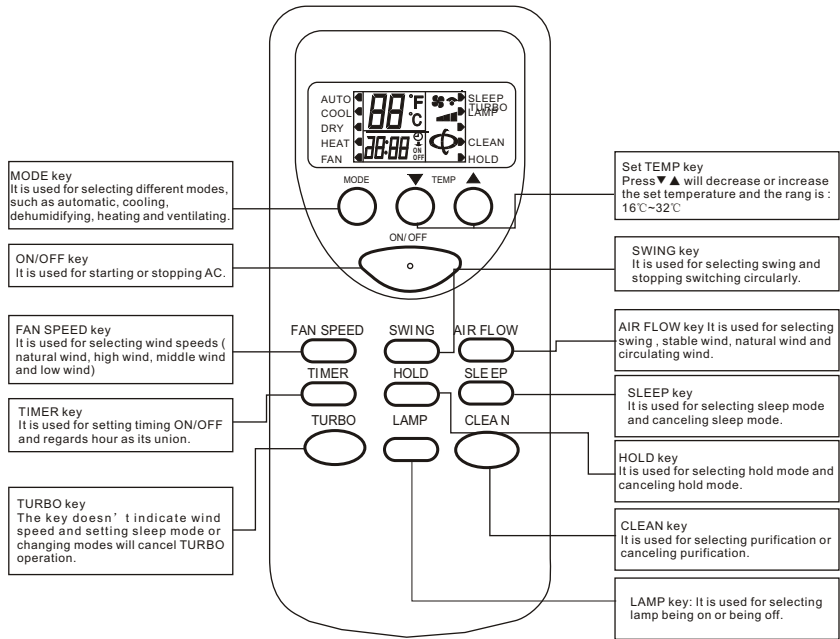
3.2 Instruction for Remote controller and Indicator Light Board(optional)

Indicator Light Board (It should be used with the remote controller)



The model of the following remote controller is Jingling common remote controller (It can work with the wire controller or the indicator light board).

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



3. 2. 1 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 (The set temperature is 25°C and the mode , wind speed, swing and air dore 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. 2. 2 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.

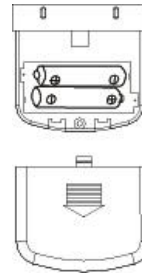
3. 2. 3 Replace batteries of the remote control

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.

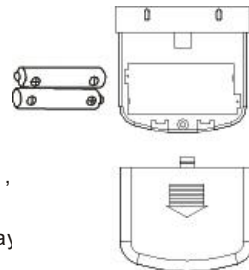


Take down the back cover



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.



Pay attention to poles of “+” and “-”

INSTALLATION OF THE UNIT

4. 1 Install Indoor unit

4. 1. 1 Outline view and dimensions of Indoor unit

■ Outline view and dimension of Indoor units (applicable for Low-static pressure type (TA) series)

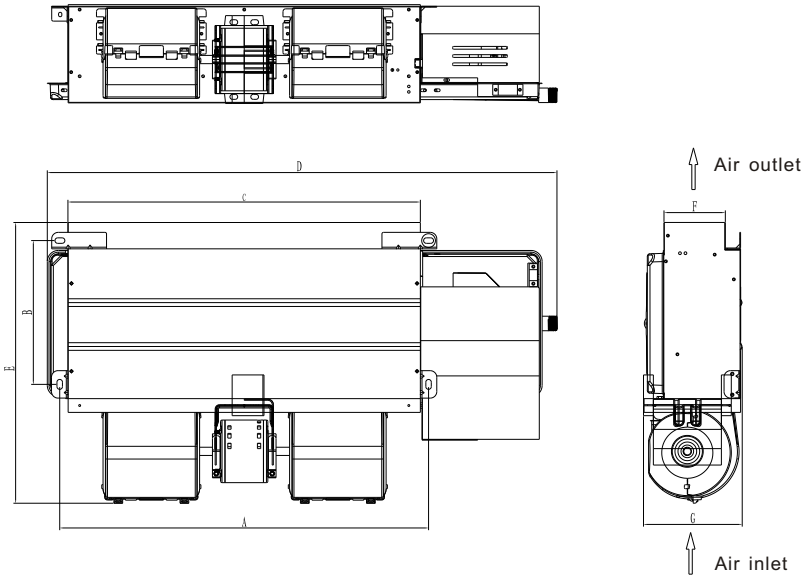


Fig 1

Table 1: unit : mm

Model(kBtu/h)	Items	A	B	C	D	E	F	G
09、12		672	261	642	926	510	112	181
18		951	261	921	1204	510	112	181
24		1274	261	1244	1532	510	112	181

■ Outline view and dimension of Indoor units (applicable for Mid-static pressure type (TB) series)

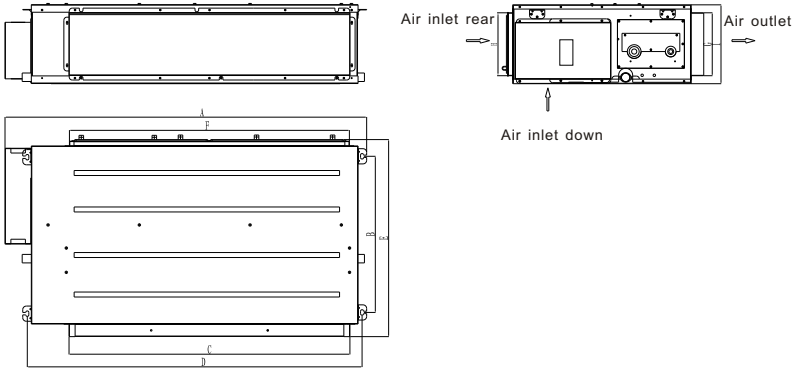


Fig 2

Table 2: unit : mm

Model (kBtu/h) \ Items	A	B	C	D	E	F	G	H	I
24	1190	515	920	1100	643	920	207	207	260
36, 48, 60	1425	515	1155	1337	643	1155	207	207	260

■ Outline view and dimension of Indoor units (applicable for High-static pressure type (TH) 48-60 series)

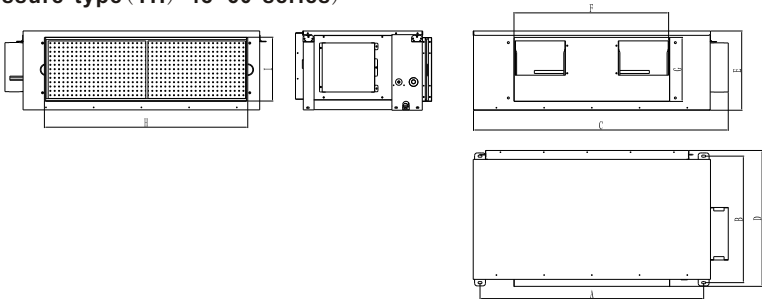


Fig 3

Table 3: unit : mm

Model (kBtu/h) \ Items	A	B	C	D	E	F	G	H	I
48, 60	1031	583	1175	625	370	713	295	938	294

■ Outline view and dimension of Indoor units (applicable for High-static pressure type (TH) 96 series)

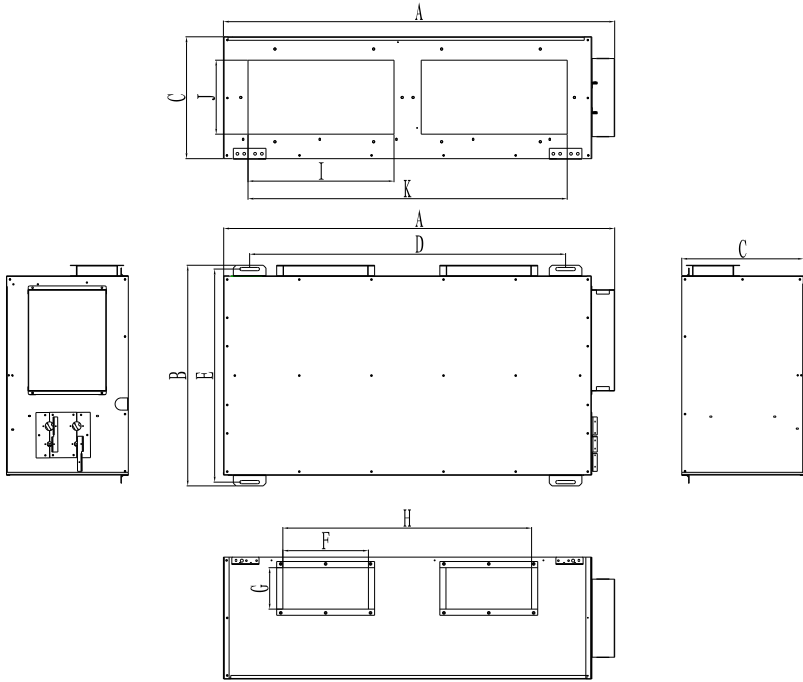


Fig 4

Table 4: unit : mm

Items	A	B	C	D	E	F	G	H	I	G	K
Model (kBtu/h)											
96	1440	811	448	1162	784	300	150	900	537	272	1174

4. 1. 2 Installation dimensions of Indoor unit

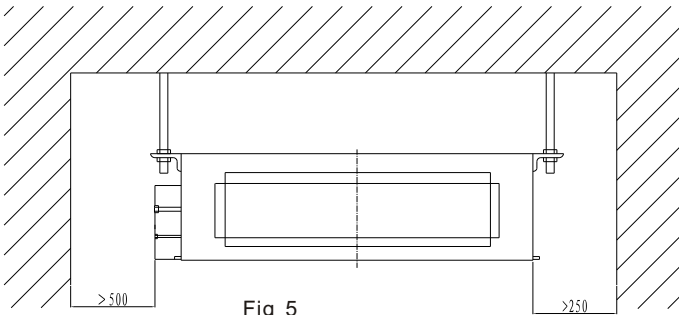


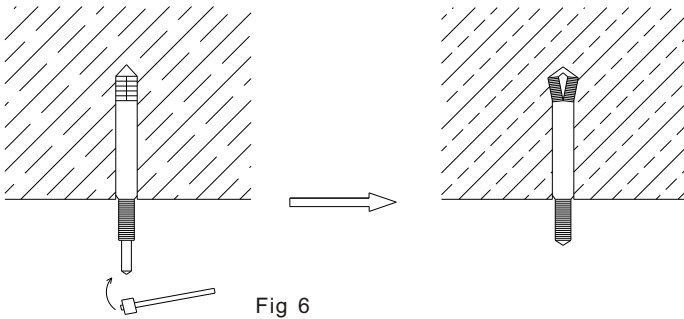
Fig 5

4. 1. 3 Selection of the installation site

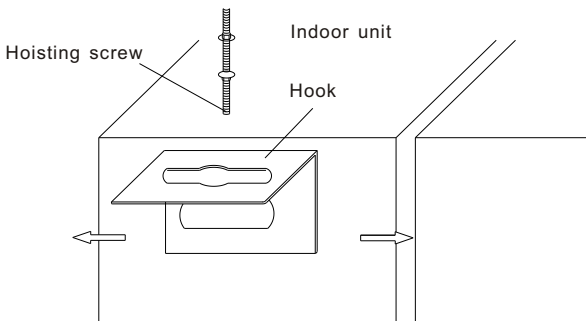
- Make sure top hangers can bear the weight of the unit;
- Make sure that the drain pipe can drain the water conveniently;
- Make sure that the air inlet and the outlet of the indoor unit should not be blocked, with a good ventilation.
- There is enough space for maintenance and installation as listed in Fig 4;
- Keep the unit off heat source, inflammable gas or smog.
- The unit is ceiling type or concealed in-the-ceiling type;
- Make sure that indoor unit, outdoor unit, power wires and connecting wires are 1 meter at least away from TV or radio in case of noise or image interference. Depending on the radio waves, a distance of 1 meter may not be sufficient enough to eliminate the noise.

4. 1. 4 Install the indoor unit

- Insert M10 Expansion bolts into mounting holes and then drive iron nails into bolts, see Fig 6. As for the hole intervals, please refer to Fig 4.



- Fix hooks in the indoor unit (refer to Fig 7)



- Install the indoor unit on the ceiling (refer to Fig 8)

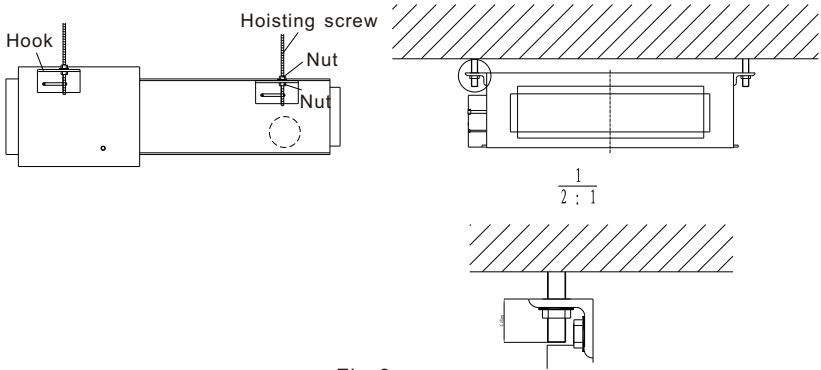


Fig 8



CAUTION

- Before installation, please finish the installation of all ducts (refrigerant duct, drainage duct)and the connection of the all power lines(the power lines of the outdoor unit), once the installation has finished, the ducts and the power lines can be connected with the indoor units immediately.
- In order to keep the ceiling level and from vibrating, please reinforce the ceiling before digging an opening in the ceiling .
- If the ceiling is not strong enough, please install a angle iron bracket and lay the unit on the bracket;

4. 2 Install Outdoor unit

4. 2. 1 Outline view and dimensions of Outdoor unit

- Outline view and dimension of Outdoor units (Applicable for 09-24 series)

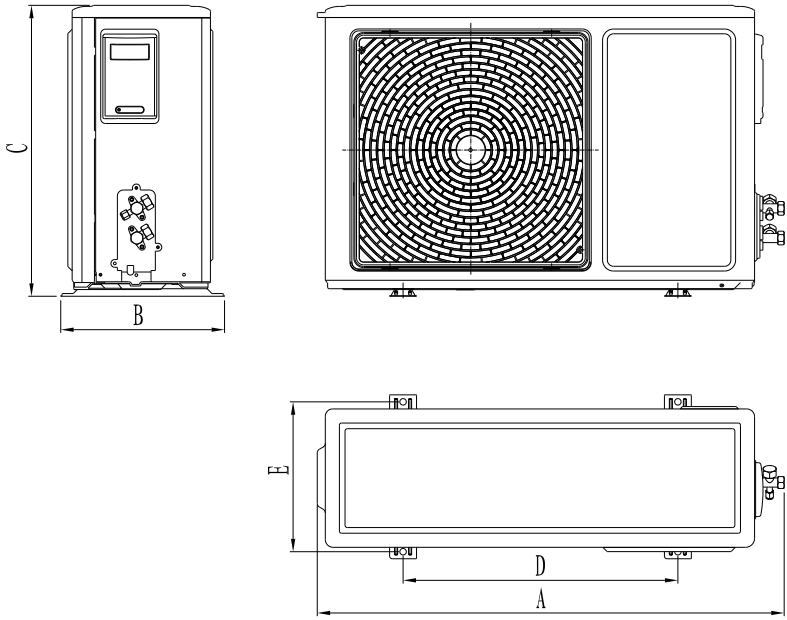


Fig 9

Table 5: unit : mm

Model (kBtu/h) \ Items	A	B	C	D	E
09	735	286	505	510	260
12, 18	880	305	540	510	280
24	925	366	700	590	340

■ Outline view and dimension of Outdoor units (Applicable for 36-48 series)

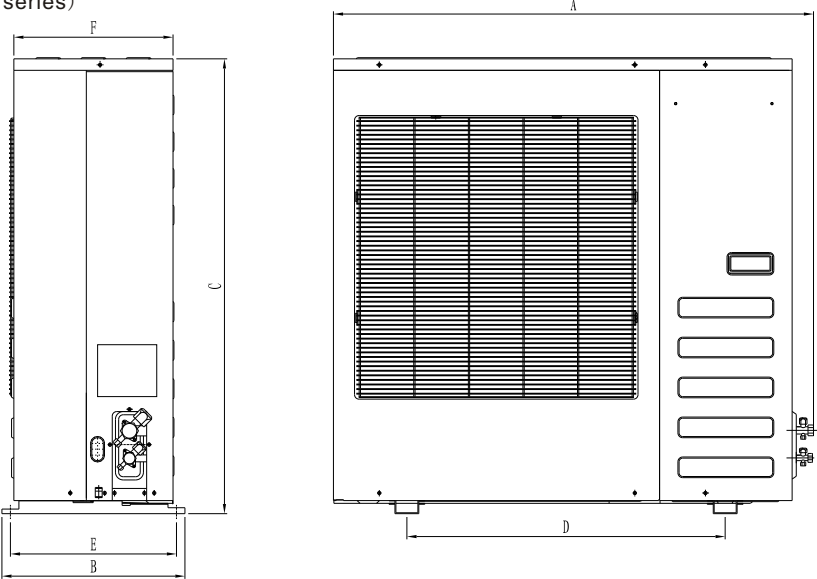


Fig 10

Table 6: unit : mm

Model (kBtu/h)	Items	A	B	C	D	E	F
36, 48		1050	400	995	700	380	347

■ Outline view and dimension of Outdoor units (Applicable for 48-60 series)

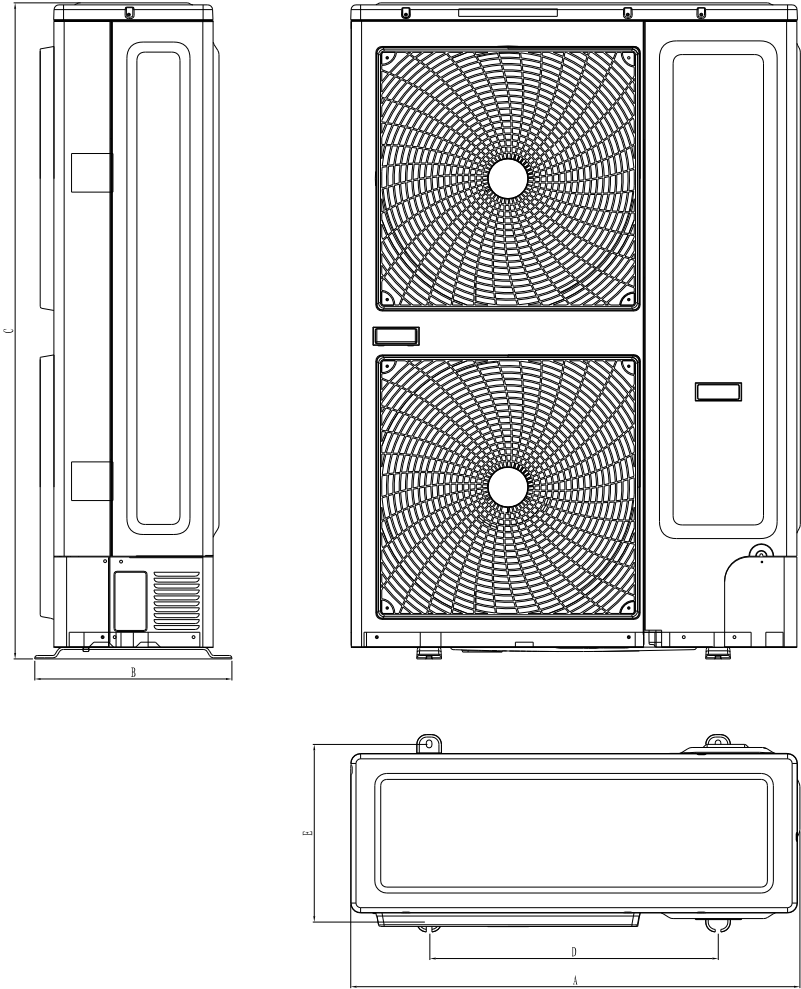


Fig 11

Table 7: unit : mm

Model (kBtu/h) \ Items	A	B	C	D	E
48, 60	911	400	1330	585	360

■ Outline view and dimension of Outdoor units (Applicable for 96 series)

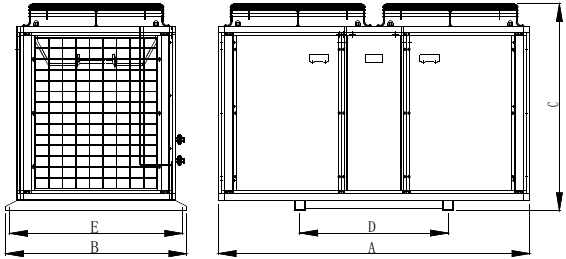


Fig 12

Table 8: unit : mm

Model (kBtu/h)	Items	A	B	C	D	E
96		1470	854	975	1170	807

4. 2. 2 Installation dimensions of Outdoor unit

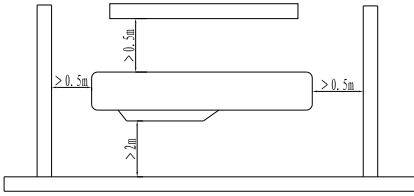


Fig 13

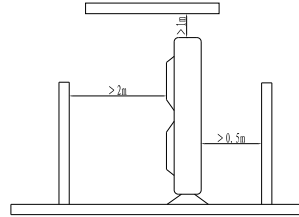


Fig 14

The outdoor unit should be installed in the location that meets the following requirements:

- There is enough room for installation and maintenance and make sure the exhaust does not flow back;
- The place where there is a good ventilation so that the unit can suck or drain out sufficient airflow. Besides, make sure that air outlet and air inlet are not impeded, otherwise, please remove the obstacles
- The support is flat and horizontal and can stand the weight of the outdoor unit. and the installation site has sound proofing and damping function so that the neighborhood will not feel uncomfortable with the noise or expelled air.
- In case of exposure to direct sunlight, you'd better install an awning.
- Make sure that the installation site can drain out the rain and condensate water;
- Select the position where it will not be subject to snow drifts, rubbish or oil smog. If unavoidable, please cover it with a shelter.
- Locate the outdoor unit in the place not facing the strong wind directly.

4. 3 Hoisting and fixing of the equipment

Each set of air - conditioning unit has been strictly inspected and tested before delivery at the factory so as to guarantee the quality and performances of the unit . Therefore , much care shall be taken during the installation of the unit to avoid of damage to the control system and the pipeline.

The installation of the indoor units or the outdoor units must be taken care the different of the left side and the right side . In the event that indoor units or outdoor units are too big to be moved due to its large dimensions or the limitation of small space , hoisting installation may be considered.

- General requirements for hoisting are as follows:
 1. The gradient of the outdoor unit shall not exceed 20° ;
 2. The damage to the units shall be avoided by putting soft materials, such as

Cloth, between the rope and the unit during hoisting;

3. Take care when handling and hoisting, the force in each point of hoisting must be uniform.

■ The following methods in hoisting are for your reference:

1. Hoisting by hand, hoisting by forklift;
2. Putting round logs (or pipes) under the unit for movement by worker with hands.

■ Fixing up the unit

The following work must be done after hoisting is completed:

1. After hoisting the unit on the base, please adjust the unit as level as possible with the gradient error no more than 0.1%.
2. Fixing up the unit with the force on each fixing point uniform when the unit is in a proper level.

4. 4 Connect and install refrigerant pipes

4. 4. 1 Inspection of pipes:

The inspection of pipes must be carried out accordance with the following requirements before connection of the pipes.

- Keep the pipes inside clean;
- The flares in both ends and the nuts must be complete.

4. 4. 2 Connection of pipes

Connect refrigerant pipes of indoor units as quickly as possible. For field installation, the time for connecting two pipes shall not exceed 5 minutes.

- When connecting flared connectors, the two pipes must be aligned with the same center. Then put on the nut and revolve it in and then tighten it with two spanners, see Fig 15.

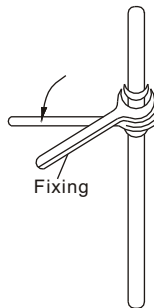


Fig 15

Note:

Two spanners must be used: One is normal spanner, the other is torque spanner.

When connecting the copper pipes, please adjust the torque spanner according to the following torque parameters in Table 9 before operation.

Table 9

Pipe Diameter ϕ (mm)	Tiorque force (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

■ Getting through the wall:

When getting pipes of the outdoor and indoor units through the wall, the sleeve must be used in order to protect the pipe and cables shown as Fig 16:

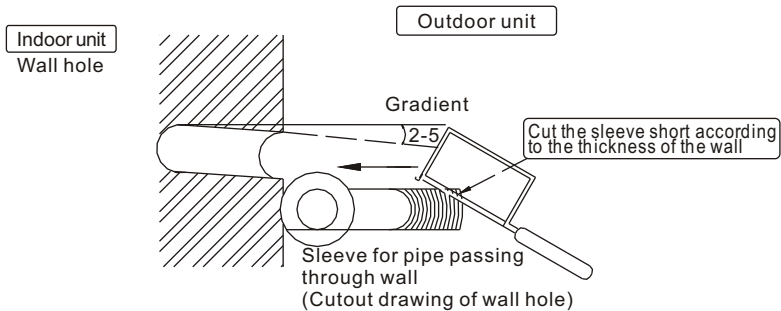


Fig 16

■ Pressure test, vacuumize and leakage check for connection pipes and indoor pipeline:

After installing the units and connection ducts, keep filling the connection duct and the pipeline of the indoor units with nitrogen gas until the pressure in the duct reach 2. 4-3.0MPa (absolute pressure); Maintain this pressure for about 24 hours with the value change no less than 0.03Mpa. Meanwhile, the leak test should be carried out to each joint and weld points by using soap bubble, if there is no leak point, please discharge the nitrogen gas until the pressure reduces to 130Pa (absolute pressure), and maintain this pressure value for about 24 hours with the value change no less than 20pa. At last, open the valve of the main machine to start the commission. If the refrigerant pipe is longer than the stated one, please charge more refrigerant R22 according to the following experienced formula:

$$R = L1 \times 0.030 \text{kg/m} + L2 \times 0.065 \text{kg/m} + L3 \times 0.115 \text{kg/m} + L4 \times 0.190 \text{kg/m} + L5 \times 0.290 \text{kg/m} + L6 \times 0.380 \text{kg/m} + L7 \times 0.580 \text{kg/m} + L8 \times 0.760 \text{kg/m}$$

Remarks:

R--Total charging amount of refrigerant;

L1--Total length of $\phi 6.4$ Liquid pipe

L2--Total length of $\phi 9.5$ Liquid pipe

L3--Total length of $\phi 12.7$ Liquid pipe

L4--Total length of $\phi 16.9$ Liquid pipe

L5--Total length of $\phi 19.1$ Liquid pipe

L6--Total length of $\phi 22.2$ Liquid pipe

L7--Total length of $\phi 25.4$ Liquid pipe

L8--Total length of $\phi 28.6$ Liquid pipe



CAUTION

Please vacuumize its pipeline with a vacuum pump prior to installation, for the refrigerant in the pipeline of the outdoor unit is not emptied before delivery.

■ Heat Insulation:

When everything is normal after leakage inspection and pressure testing, carry out heat insulation operation accordance with the requirements as below:

- ① The insulated material must be wrapped tightly without any cracks ;
- ② The thickness of the insulated material is no less 8 mm .
- ③ After wrapping with insulated material, please carry on rainproof and dampproof treatment for the surface, such as wrap it with some bands.
- ④ Condensation on the surface of the copper pipes is not allowed during cooling operation.

4. 5 Dispose tubing

Because of the different installation positions of the air-conditioners, the accessory pipe for the piping is varied in length. The longer the pipe is, the more the refrigerant is needed, therefore, please select the proper pipe as short as possible according to Table 10

4. 5. 1 The most working distance of the piping :

Table 10

Rated refrigeration (Kbtu/h)	<24	24-60	≥96
Value			
Max. length (m)	15	20	50
Max. Height (m)	8	10	20
Max. number of bends(piece)	10	10	10



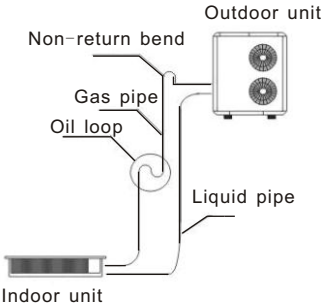
CAUTION

Under the conditions to guarantee 80% cooling capacity , the parameters above mentioned are obtained considering the loss of refrigeration and oil return.

4. 5. 2 Allocate oil loops and non-return bends

When the difference of heights between outdoor unit and indoor unit is great , allocate some loops in the pipeline for easy oil return. For actual operation , the typical installation methods may be used as shown in Fig 17 :

The case of the outdoor located higher than the indoor unit



The case of the indoor located higher than the outdoor unit

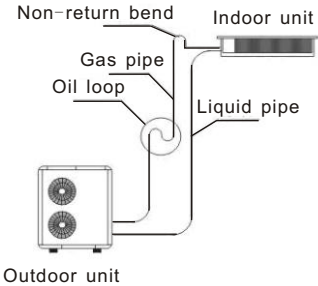


Fig 17



CAUTION

- The radius of oil loops shall be as small as possible and one is allocated every 5 meters as shown in the above figures.
- When the height difference is more than 5 meters between the indoor unit and the outdoor unit , some oil loops or non-return bends need to be installed in the pipeline system.
- The figures above are just for the multi-connecting unit with one indoor unit, it is the same with ones with several indoor units.

4. 6 Install condensate pipes

As for the condensate pipe of indoor unit of central air-conditioning, the following points shall be considered :

- ① The large drainage amount of the condensate ;
- ② The loss of refrigeration capacity;
- ③ For built-in types, it is not convenient to maintain the unit and the leakage might occur at this place.

4. 6. 1 Select the material of condensate pipes

The materials of condensation water pipe may be U-PVC pipe and Zinc-plated pipe. Considering the problems of sanitary and rusting, the U-PVC pipe is recommended.

4. 6. 2 Requirement of installation:

- The water outlet outside the house must have water seal which shall be fixed.
- The gradient of the drainage pipe is no less than 1% .
- The indoor part of the condensate pipe shall be sleeved with insulating pipe or wrapped with thermal insulating asbestos.
- After the installation of condensate pipes, leakage test must be carried out by pouring some water to confirm no leakage in any connecting point and the drainage is smooth . For the installation, please see Fig 18 :

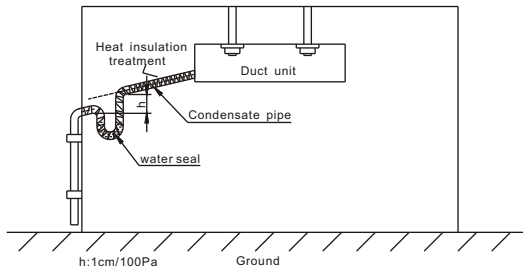


Fig 18

4. 7 Installation and heat insulation of air pipes

4. 7. 1 Install fresh air pipes

The inlet of new air pipe shall be located at the clean place. The air inlet of outdoor units shall be installed with shutter and filter against rain.

It is recommended to install a flow adjuster valve at the section of fresh air pipes and keep the fresh air volume is 10~15% of total air volume, see Fig 19

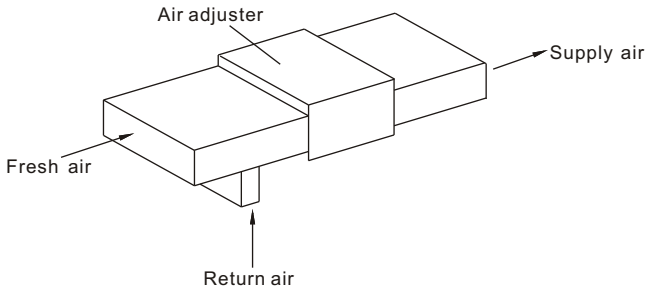


Fig 19

4.7.2 Install blast tubes

The rectangular blast tubes can be connected directly with the outlet of indoor unit and lead to the air diffuser with the total length less than 6 m.

The flow speed at each outlet of the air diffuser shall be basically uniform to meet the requirement of air-conditioning in the room as shown in Fig 20:

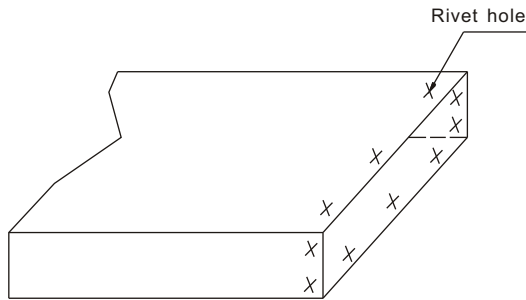
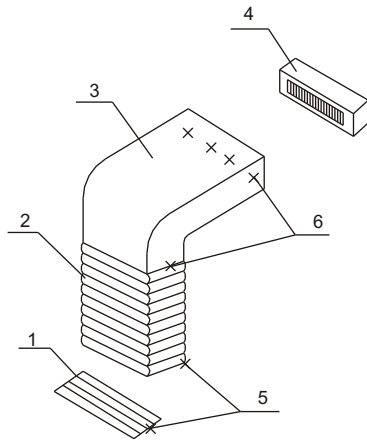


Fig 20

4.7.3 Install return air tubes

Connecting one end of return air tubes with rivets to air inlet of indoor unit, the other end is connected to indoor air inlet. A short hose of fireproofing canvas is fold up as the coupling tube penetrated through with 8# Iron wire so that the length of the coupling tube can be adjusted freely according to the height of the ceiling, as shown in Fig 21:



- 1--shutter for return air
- 2--air pipe made of fireproofing canvas
- 3--pipe for return air flow
- 4--indoor unit
- 5--wood screw
- 6--rivet

Fig 21

4. 7. 4 Heat-insulation for air pipes

Both blast tubes and return air tubes should be wrapped with PE or Glass wool insulated materials .In case that glass wool is used, clean the surface of air tubes at first, and then stick PE with matched glue onto tubes. In case that glass wool is used ,affix the glass wool onto tubes with rubber nails and then wrap with a layer of tinfoil and fix them with rubber nails. At last, seal the connecting joints tightly with tinfoil adhesive tapes as shown in Fig 22:

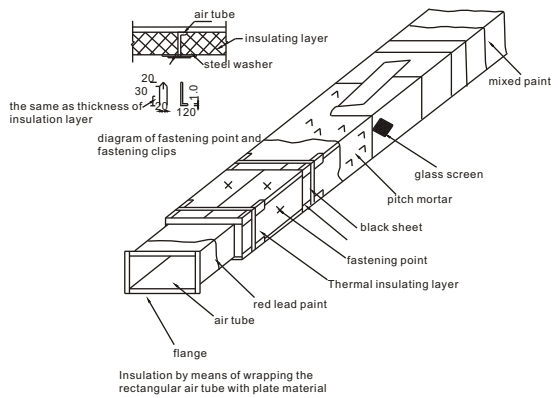


Fig 22



CAUTION

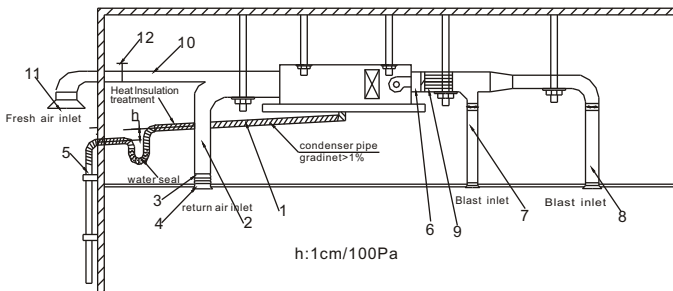
- Paste density of rubber nails are as Table 11:
- Tips for wrapping insulation material: The surface of insulation material is not dewing during cooling operation.

Table 11

On the side of air pipe or under it	On the top side of air pipe
12 pcs/ m ²	5 pcs/ m ²

4. 7. 5 Others

It is recommended that the distance between the wall and the edge of return air tube is more than 150 mm. The following figure is the diagram of hoisting of air duct unit :



- | | | |
|----------------------|-----------------------|---------------------------|
| 1—hook | 2—return air tube | 3—air pipe made of canvas |
| 4—return air shutter | 5—drainage pipe | 6—coupling tube |
| 7—blast tube | 8—air diffuser | 9—muffler |
| 10—fresh air tube | 11—rain-proof shutter | 12—air adjuster |

Fig 23



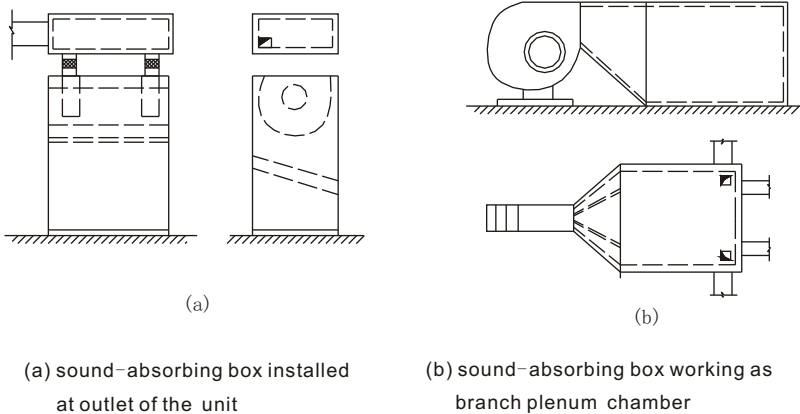
CAUTION

Return air tube must be installed in order to garatee the operation efficiency of the unit.

4. 8 Plenum chamber

4. 8. 1 Location and function of Plenum chamber

In the air outlet of the unit, the plenum chamber should be allocated and affixed with sound absorbing material, which not only make the air flow stable but also effectively reduce the fan noise result from abrupt change of plenum chamber sectional area and sound-absorbing function of the inner surface.



(a)

(b)

(a) sound-absorbing box installed at outlet of the unit

(b) sound-absorbing box working as branch plenum chamber

Fig 24 Plenum chamber application

4. 8. 2 Install Plenum chamber

■ Regulations of Plenum chamber

- If the air outlet static pressure is higher than 30Pa, a plenum chamber must be allocated in the air tube;
- The plenum chamber shall be located on the section with smooth air flow in the piping system. When the flow speed in the air pipe is slower than 8m/s , the plenum chamber shall be placed near outlet of the main air pipe of the fan; When it is faster than 8m/s , plenum chamber shall be installed separately on the branch pipes.
- The plenum chambers are not suitable to be installed in the air-conditioning rooms , nor out of the rooms because the noise from outdoors may get through the pipes at the rear of muffler. And in this case , the insulation capacity of sound of the static pressure box shall be validated .
- The speed of air flow through the plenum chamber shall not exceed the following data:

Resistance plenum chamber: 5-10m/s (4-6m/s for high requirement case)

Resonant plenum chamber: 5m/s Sound-absorbing elbow: 6-8 m/s

e. The plenum chamber is mainly used for reducing the aerodynamic noise. As for the noise generated by the ventilator, some measures for shock proof shall be executed.

■ Installation requirement of the plenum chamber

- a. The plenum chamber should be installed in the proper place against moisture or damage;
- b. Keep the punching plate clean without corrosion and holes not blocked;
- c. The supports for plenum chamber and sound-absorbing elbow shall be located separately.
- d. The fixing screws for plenum chambers are distributed equably and the joints are even and firm.
- e. Make sure glass fiber cloth on the outside surface of sound-absorbing baffle is even and no scratch and rusting.

4.9 Sound-through preventing

When the air flow from one pipe is sent to more than one rooms, the sound in one room may spread to the other rooms. In order to avoid this problem, the schemes from (a) to (e) in Fig 25 may be carried out:

- a. Increase the distance between the air outlets of the two rooms;
- b. Affix the sound absorption materials;
- c. Adding elbow to branch air outlet in room B;
- d. Air supply is sent by two pipe systems;

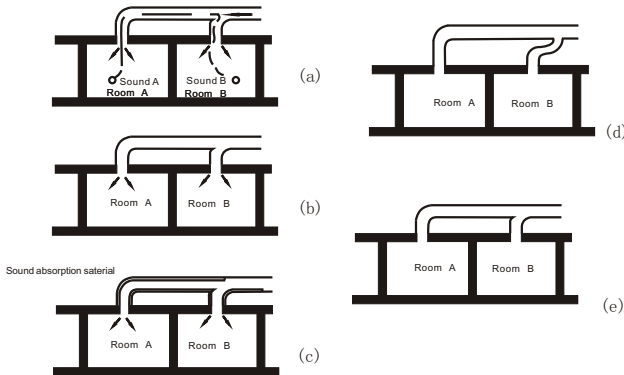


Fig 25



CAUTION

After installation of the unit, make sure to call the after-sale personnel of our company for debugging, or the aftereffect will be charged with the user or installation people.

ELECTRIC WIRING

5. 1 Connect wires to amphenol connectors



CAUTION

- Make sure that the power specification is of accordance with one listed on the nameplate;
- Make sure that the capacity of power supply is proper and the section-cross-area of room wires is more than 2.5mm²;
- Wiring construction must be carried out by professional;
- As for fixed lines, the leakage protective switch and air switch should be allocated and make sure that the distance between electrode tips is more than 3 mm;
- Solid cable wiring:
 - a. Strip off the insulating material with wire stripper about 25 mm at the end of the solid cable;
 - b. Take down screws of the air-conditioner terminal;
 - c. Make the end of solid cable into a ring with size as large as screws with the clamp;
 - d. Get screws through the ring and then fix it on the terminal;
- Stranded wire wiring:
 - a. Strip off the insulating material with wire stripper about 10 mm at the end of the stranded wire;
 - b. Then put the corresponding number tubes on the stripped wires (Pay attention to the terminal number of indoor unit and outdoor unit)
 - c. Insert the stranded wire into connector with size as large as screws with the clamp;
 - d. Take down screws of the air-conditioner terminal;
 - e. Get screws through the connector of the stranded wire and then fix it on the terminal;

NOTE: Please connect power wires and connecting wires to corresponding connectors.



WARNING

If supply cords and signal wires are broken, please replace them with special cords.

- Prior to wiring, affirm voltages of all parts listed on the nameplate and then carry out the wiring construction according to Electric wiring diagram;
- The air-conditioner should apply special power supply, leakage protective switch and air switch in case of overload trouble.
- In case of electric shock, get the air conditioner grounded unfailingly;
- All wires should apply with clamping connectors or solid cable. If stranded wires is connected to terminal, it may lead to fires.

- In case of air conditioner breakdown or damage, the wiring construction will be firmly conformed to the electric wiring diagram;
- Never get the cables in touch with refrigerant pipe, compressor, fan or other operating parts;

Not remove wires of the air conditioner, or it may lead to damage or breakdown and the manufacturer will not take responsibility for the aftermath.

5.2 Power wires connection

5.2.1 Connect power wires to outdoor units

- Take down the front end board or the large handle;
- Connect power wires to L connector and N connector(or L1, L2, L3 and N connector) and grounding screws;
- Fix power wires with cable clip.

5.2.2 Connect power wires to indoor units

- Take down the electric control box of indoor units;
- Connect power wires to L connector and N connector(or L1, L2, L3 and N connector) and grounding screws;
- Fix power wires with cable clip.

5.3 Signal wires connection of wire controller

- Take down the electric control box of indoor units;
- Get the signal wires through the rubber ring;
- Insert the signal wires into five-needlebar on the electric control panel of indoor units.



CAUTION

In case of Electromagnetic interference (EMI), pay attention to the following wiring operation;

- Separate signal wires from power wires and connecting wires of indoor units and outdoor units;
- When the air conditioner is installed in the place where there is EMI, take shielded wires and twisted pair as signal wires.

5.4 Power wiring diagram

There are many kinds of power wiring diagram for different user powers and models, make sure the section-cross area of wire that users purchased is not less than those specifications list in the following figures:

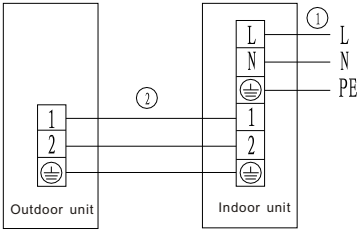


Fig 1

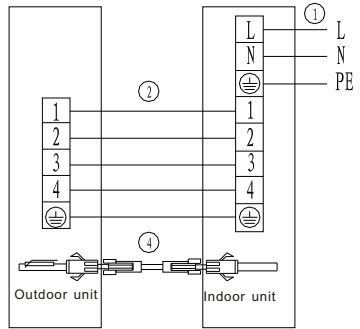


Fig 2

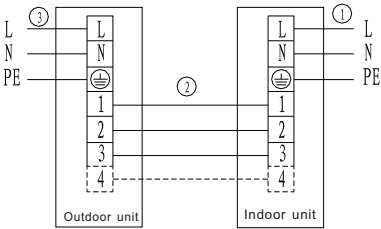


Fig 3

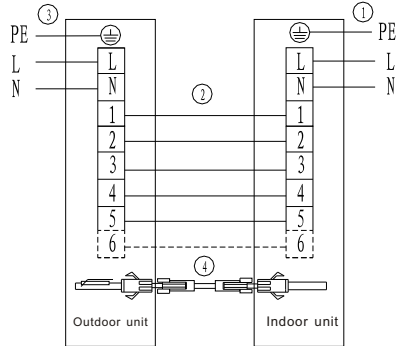


Fig 4

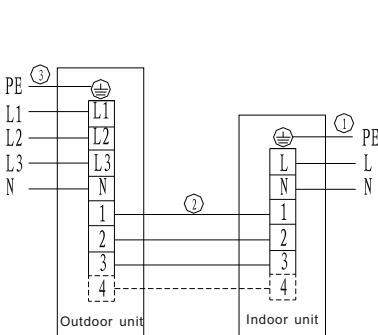


Fig 5

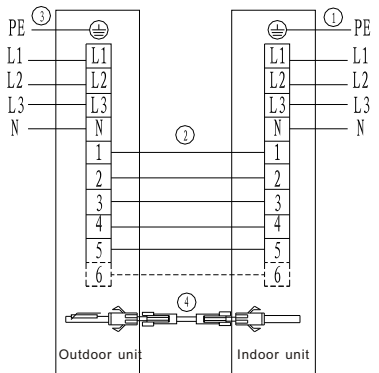


Fig 6

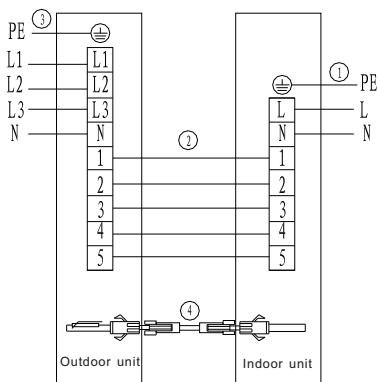


Fig 7

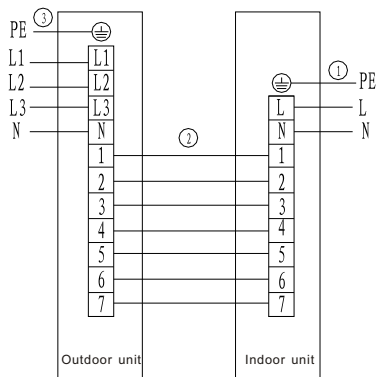


Fig 8

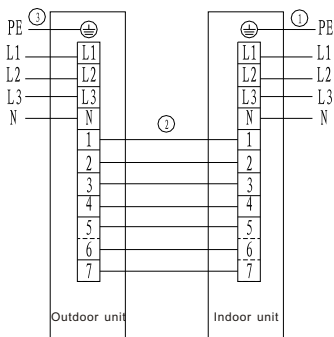


Fig 9

NOTE:

1. The signal terminal block includes five types: 3 terminals, 4 terminals, 5, 6 and 7 terminals. Therefore, please connect the units according to the actual ones so that indoor unit is connected to the outdoor unit with the same terminals. As for the terminals of indoor unit is less than 3, just connect the unit with the outdoor unit with 4 terminals.
2. If there is no 4 Line for the outdoor electric control panel (connecting line of outdoor coil temperature sensors), please carry out electric wiring according to the actual electric wiring nameplate, otherwise, the system will display faults.

5.4 Electric wiring

NOTE: The cross-section areas of wires or lines should not be less than the corresponding ones listed in the table below; Besides, if the power wires is quite long from the unit, please choose the windings with larger cross-section area to guarantee the normal power supply.

Model (Cooling capacity)	Type	Indoor power wires	Connecting wires	Outdoor power wires	Power supply types
No more than 18KBTu/h	Cooling only	3×1.5mm ²	3×1.5 mm ²		Indoor power supply
	Cooling & Heating	3×1.5 mm ²	5×1.5 mm ²		Indoor power supply
	Cooling & Heating with Auxiliary heater	3×2.5 mm ²			
18~24 KBTu/h	Cooling only	3×1.0 mm ²	3×0.75 mm ² or 4×0.75 mm ²	3×2.5 mm ²	Outdoor single-phase power supply
	Cooling only	3×1.0 mm ²	3×0.75 mm ² or 4×0.75 mm ²	5×1.0 mm ²	Outdoor three-phase power supply
	Cooling & Heating	3×1.0 mm ²	5×0.75 mm ² or 6×0.75 mm ²	3×2.5 mm ²	Outdoor single-phase power supply
	Cooling & Heating with Auxiliary heater	3×1.5 mm ²			
	Cooling & Heating	3×1.0 mm ²	5×0.75 mm ² or 6×0.75 mm ²	5×1.0 mm ²	Outdoor single-phase power supply
	Cooling & Heating with Auxiliary heater	3×1.5 mm ²			
36~42 KBTu/h	Cooling only	3×1.0 mm ²	3×0.75 mm ² or 4×0.75 mm ²	3×4.0 mm ²	Outdoor single-phase power supply
	Cooling only	3×1.0 mm ²	3×0.75 mm ² or 4×0.75 mm ²	5×1.5 mm ²	Outdoor three-phase power supply
	Cooling & Heating	3×1.0 mm ²	5×0.75 mm ² or 6×0.75 mm ²	3×4.0 mm ²	Outdoor single-phase power supply
	Cooling & Heating with Auxiliary heater	5×1.0 mm ²			
	Cooling & Heating	3×1.0 mm ²	5×0.75 mm ² or 6×0.75 mm ²	5×1.5 mm ²	Outdoor single-phase power supply
	Cooling & Heating with Auxiliary heater	5×1.0 mm ²			
48~60 KBTu/h	Cooling only	3×1.0 mm ²	3×0.75 mm ² or 4×0.75 mm ²	5×2.5 mm ²	
	Cooling & Heating	3×1.0 mm ²	5×0.75 mm ² or 6×0.75 mm ²	5×2.5 mm ²	
	Cooling & Heating with Auxiliary heater	5×1.0 mm ²			
96 KBTu/h	Cooling only	3×1.0 mm ²	4×0.75 mm ²	5×4.0 mm ²	
	Cooling & Heating	3×1.5 mm ²	3×0.75 mm ² + 4×0.75 mm ²	5×4.0 mm ²	
	Cooling & Heating with Auxiliary heater	5×2.5 mm ²			

5. 5 Fault codes

Fault codes table(ZKX-FE-02/D , ZKX-FEM-02/D)

Faults	LCD display
Communicating faults of system main control panel	E1
Indoor temperature sensor goes wrong.	E2
Indoor coil temperature sensor goes wrong.	E3
Low-pressure protection	E4
Outdoor coil temperature sensor goes wrong.	E6
External feedback fault	E7
Frosting protection /Overheating protection	E8
Outdoor unit abnormality protection	E9
Blackout memory	P6

Fault codes table(ZKX-PFE-02)

Faults	LED flashing conditions	LCD display	Instruction
Probe of Room temp. sensor goes wrong	TIMER lamp flashes at the speed of 5 Hz	E2	The system will recover normal operation once faults are eliminated
Probe of Evaporator sensor goes wrong	RUN lamp flashes at the speed of 5 Hz	E3	
Probe of Condenser sensor goes wrong	Defrost lamp flashes at the speed of 5 Hz	E5	
Water fulfilled protection	Warning light flashes at the speed of 5 Hz	F5	
Outdoor unit protection	Both defrost lamp and warning light flash at the speed of 5 Hz	F2	
Communication fault	Both RUN lamp and defrost lamp flash at the speed of 5 Hz	E1	The display should be cleared up by manual
EEPROM Communication fault	Both RUN lamp and TIMER lamp flash at the speed of 5 Hz	P6	Recovered after blackout
Forced cooling indication	Both RUN lamp and warning light flash at the speed of 5 Hz	No	The display will be cleared up after exiting the operating mode.
Anti-cold wind indication in heating mode	Defrosting /preheating is ON	P1	The display will be cleared up after exiting the operating mode.
Defrosting indication	Defrosting /preheating is ON	P3	The display will be cleared up after exiting the operating mode.

