



# Installation, Startup and Maintenance Manual

## Energy Recovery Ventilation System

### Applicable models :

FHBQG-D3.5B-K

FHBQG-D5B-K

FHBQG-D6.5B-K

FHBQG-D8B-K

FHBQG-D10B-K

FHBQG-D13B-K

FHBQG-D15B-K

FHBQG-D20B-K

FHBQG-D25B-M

FHBQG-D30B-M

FHBQG-D40B-M

FHBQG-D50B-M

FHBQG-D60B-M

Thank you for choosing commercial air conditioners. Please read this Owner's Manual carefully before operation and retain it for future reference.

If you have lost the Owner's Manual, please contact the local agent or visit [www.gree.com](http://www.gree.com) or send an email to [global@cn.gree.com](mailto:global@cn.gree.com) for the electronic version.

## To users


Thank you for selecting Gree's product. Please read this instruction manual carefully before installing and using the product, so as to master and correctly use the product. In order to guide you to correctly install and use our product and achieve expected operating effect, we hereby instruct as below:


- (1) This equipment should be installed, operated or maintained by the qualified servicemen who have had specific training. During operation, all safety issues covered in the labels, User's Manual and other literature should be followed strictly. This equipment is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety. Children should be supervised to ensure that they do not play with the appliance.
- (2) This product has gone through strict inspection and operational test before leaving the factory. In order to avoid damage due to improper disassembly and inspection, which may impact the normal operation of unit, please do not disassemble the unit by yourself. You can contact our designated dealer or local service center for professional support if necessary.
- (3) When the product is faulted and cannot be operated, please contact our designated dealer or local service center as soon as possible by providing the following information.
  - 1) Contents of nameplate of product (model, cooling/heating capacity, product No., ex-factory date).
  - 2) Malfunction status (specify the situations before and after the error occurs).
- (4) All the illustrations and information in the instruction manual are only for reference. In order to make the product better, we will continuously conduct improvement and innovation without further notice.


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## Safety notices (please be sure to abide)

 **WARNING:** If not abide strictly, it may cause severe damage to the unit or the people.

 **CAUTION:** If not abide strictly, it may cause slight or medium damage to the unit or the people.

 **DANGER** This sign indicates that the operation must be prohibited. Improper operation may cause severe damage or death to people.

### **Read the safety guidelines before proceeding.**

- (1) Before installation, check for power supply and see if it complies with that on the nameplate.  
Besides, check for safety of the power supply.
- (2) Specialized components and parts should be used for installation; otherwise it would lead to water leakage, electrocution and fire hazards.
- (3) Size of the power lines should be large enough. Power lines and other electric connection lines should be replaced by specialized cables.
- (4) When the unit is installed, check that air ducts and wires are connected properly to prevent water leakage, electrocution and fire hazards.
- (5) Do not let this unit exposed to damp, wet or corrosive environment.
- (6) Air ducts, dampers and valves should be insulated to prevent condensate.
- (7) Do not lengthen the power cord by splicing to prevent overtemperature or fire hazard.
- (8) No foreign matters should block air vents. Clean filters periodically to ensure heat transfer effects and operation stability.
- (9) All electric lines and joints should be secure. The wired controller should be connected to electricity before use.

**⚠ WARNING**

- Installation should be done by qualified technicians. Never install, move or retrofit the unit by yourself. Improper installation could cause accidents such as falling, electrocution and fires.
- This product should be installed strictly in accordance with this manual.
- Electric wiring should be performed as per your state or local codes and regulations. Poor capacity and improper wiring of power lines poses electrocution and fire hazards.
- A protective net is required at the air vent. Bird nests and other foreign matters should be removed to prevent oxygen deficit.
- The outdoor air inlet/outlet should be kept far away from the vent where inflammable gas will be discharged to prevent indoor oxygen deficit.
- The air inlet should be where the discharged air does not return to avoid polluting the indoor air.
- The unit should be installed where it is strong enough to withstand the unit.
- The grounding wire cannot be connected with water pipes, lightning rods or telephone lines. Improper grounding could lead to electrocution.
- Cut off the power supply through the main circuit breaker before repairs, maintenance or servicing to prevent electrocution.
- Never insert the finger into air vents to avoid personal injury when fans run at a high speed.
- Ventilate the room by opening the windows if inflammable gas leaks, otherwise spark produced by the contactor could lead to explosion or fire.
- Keep the unit working under the rated voltage to prevent electrocution or fire.
- When any unusual situation arises, stop the unit and cut off the power supply to prevent electrocution or fire. If you need assistance, contact your local Gree service center.
- Animals or plants should not close to air vents to avoid harms.
- Metal pipes should be insulated before going through metal structures of a building to prevent electrocution or electrical leakage.

**⚠ CAUTION**

- Do not put the burner towards air vents to avoid inadequate burning.
- The top surface of the unit should be water-proof to prevent electrocution.
- Do not release inflammable gas near this unit to avoid fire hazard.
- Operate the switch correctly and never repeat frequently to prevent malfunction.
- Do not flush the unit to prevent electrocution.
- Do not operate the unit with wet hands to prevent electrocution.
- Clean the filter periodically, as heavy dust could lead to indoor oxygen deficit.
- Wear gloves when cleaning filters and heat exchangers to avoid injury.
- When the unit is not to be used for long time, please cut off the power supply. Heavy dust poses fire hazard.
- Do not install the unit in the bathroom and other places with high relative humidity to prevent electrocution.
- Do not install the unit where there is a fire source or open fire to prevent overheating or blaze.
- Do not install the unit where inflammable gas could leak to avoid fire hazard.
- Do not install the unit in chemical factories which produces acids, alkalis, organic solvents, coatings and other harmful and corrosive gases, as they could lead to toxication or fire.
- Provide enough space around the unit to allow the installation and maintenance personnel unrestricted access to all service points.

**⚠ DANGER**

This product cannot be used for air exchange of the burner. When a gas heater is used in the room, special ventilation equipment must be used.

## 1 General introduction

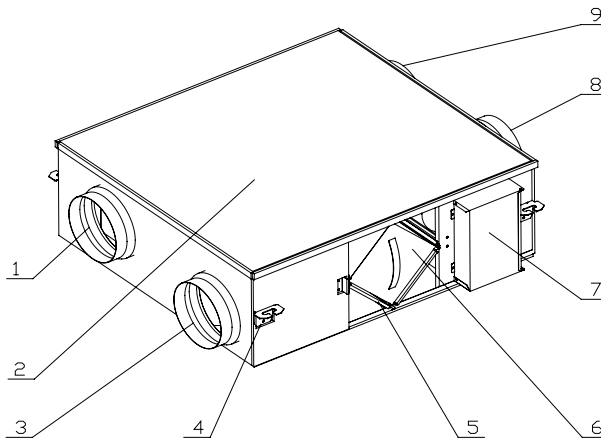
The energy recovery ventilation system (ERV) has the total heat recovery device as its core to achieve air-to-air total heat exchange and fresh air filtration.

### 1.1 Working principle

The unit takes fresh air in and discharge the indoor stagnant air to the outdoor. These flows go on to have a heat exchange through the heat recovery system.

### 1.2 Components

The key components are low-noise centrifugal fans, filters and heat exchangers. Before the take-in air flows to the heat exchanger, the filter removes dust particles, fibers and other impurities from the air. The access door is provided to pull out the filter. Durable seals are used to join the casing and access door to prevent air leakage.



1.Return air outlet 2.Outer casing 3.Fresh air inlet 4.Lug 5.Air filter  
6.Heat exchanger 7.Electric box 8.Fresh air outlet 9. Return air inlet

**Figure 1 Main structure of the ERV**

Note: The actual design of the ERV always prevails.

### 1.3 Operation conditions

It is recommended that the unit is operating in the conditions below, otherwise, condensate will be produced and damage to electric elements caused.

(1) Indoor—operation temperature: 0~40°C, relative humidity: 20~80%

(2) Outdoor—operation temperature: -10~48°C, relative humidity: 20~85%

The unit only serves locations that have to meet the need of comfort. It should be away from corrosives, explosives, oil mist and other hazardous substance, to ensure normal operation and expectation of life and to prevent fire hazard and any damage. Special locations require that the equipment have corrosion and explosion protection.

## 2 Installation

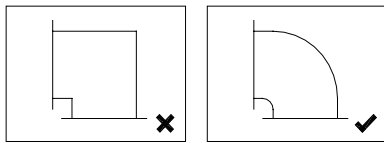
### 2.1 Engineering regulation compliance

The user should entrust HVAC engineers for equipment selection and design and invite the qualified construction organization for on-site construction. Both design and construction should comply with your state or local regulations and codes. When the unit fails to operate normally owing to improper installation, service charge will be required.

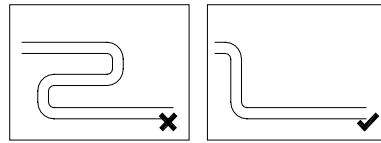
### 2.2 Engineering design

The unit inside has two air passages through ducts that help air-to-air exchange. One passage allows the fresh air outside to enter the room, and the other allows the polluted air (return air) inside the room to leave. There is resistance to air streams passing through the ducts. Larger resistance reduces the airflow. Duct lengths should be fit for the rated static pressure to prevent abnormal sound or damage to motors. Besides, duct sizes and bends also affect the airflow. Therefore, follow the instructions below to avoid troubles.

- (1) In general, each passage does not exceed 15 meters or up to 30 meters. The internal sectional area depends on the inside air speed (8m/s for the main duct, 5m/s for the branch). If rectangle ducts are used, the proportion of two neighboring sides will not exceed 4. Air ducts should be nonflammable.
- (2) The bends should be kept as few as possible and do not exceed 3 for each passage. The curving part of the bends should be round-arc, and the straight angle should be avoided, as shown in the figures below. Note that installation should be based on the field-supplied equipment.

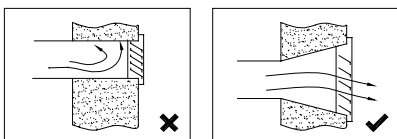


**Figure 2 Bend type**

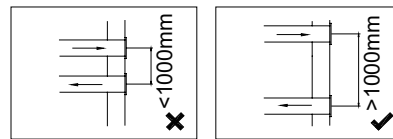


**Figure 3 Pipe arrangement**

- (3) The duct wall should be smooth, dustless and pucker-free.
- (4) Resistance to the air vents of the room should be kept as less as possible. It is suggested to install indoor rectangular aluminum alloy diffusers or dual-layer grilles (no less than 200×200mm in size). If a water-proof grille is used for outdoor air vents, its size should be 3 to 4 times the sectional area of a connected duct, and the blade shape of the grille should facilitate the air flow. See figure 4 to select diffusers and grilles.
- (5) In order to prevent discharged air returning back, at least 1000mm should be kept between two air vents at the outer wall, as shown in the figure 5. Note that installation should be based on the field-supplied equipment.



**Figure 4 Shape of the air opening**



**Figure 5 Distance between air openings**

- (6) When it is expected to minimize indoor noise, it is suggested to install a muffler inside the air passages. Please contact a specialist to select a muffler. Generally, the muffler can reduce the sound level at vents by 4dB to 6dB.

- (7) When an electric heater is installed, it should be interlocked with the ventilator. That is, the electric heater will work only when the ventilator has been started. Ducts within a distance of 800mm with the electric heater and ducts which go through a room where there is a fire source, they should be made of non-inflammable materials.
- (8) The filtering element should be replaced periodically. Therefore, a certain distance should be kept at one side for maintenance.
- (9) A steel hanger frame should be pre-embedded before installation. Its type and specification depends on the weight of the ERV to ensure stability. For the retrofitting project, drill holes at a ceiling for the hanger frame, as shown in the figure 6(a). When hole drilling is unavailable, locate the reinforcing steel inside a concrete ceiling and take it as the hanger frame, as shown in figure 6(b). Note that installation should be based on the field-supplied equipment.

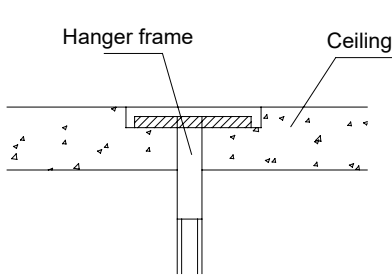


Figure 6 (a)

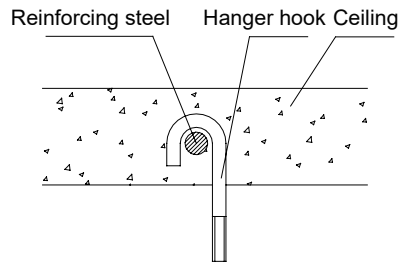


Figure 6 (b)

- (10) When the ceiling is damaged during installation, it should be repaired before completion of this project.

### 2.3 Installation diagram

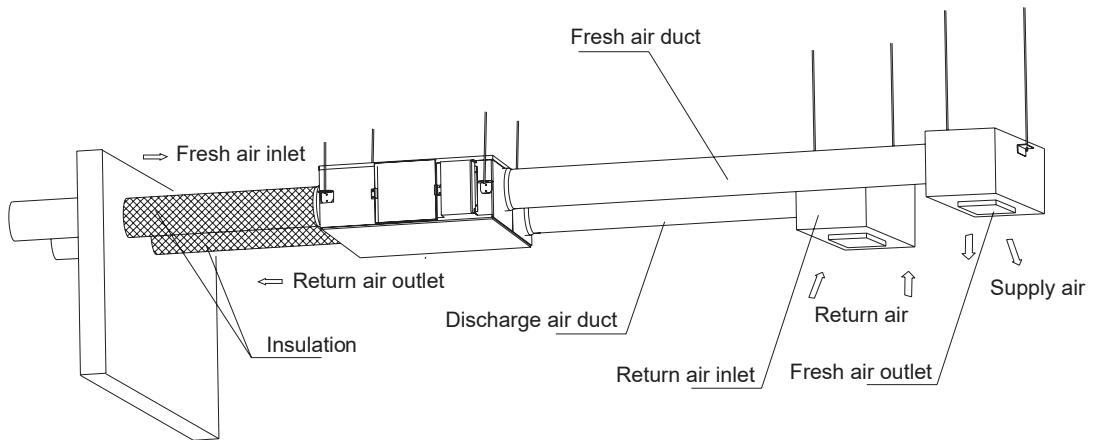


Figure 7

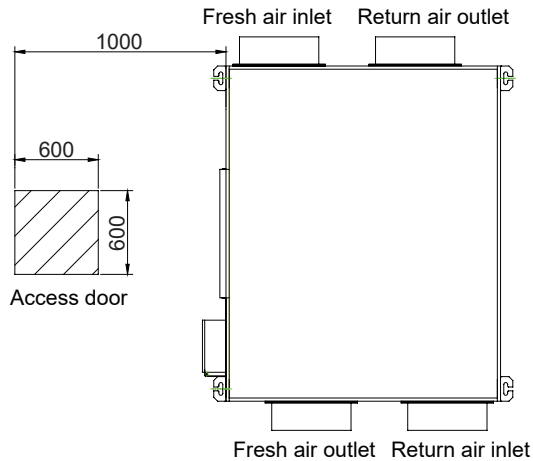
Note: the installation arrangement is based on the actual structures and unit design.

#### NOTE

Outdoor ducts connected with the fresh air inlet and polluted air (return air) outlet should be insulated, so do indoor ducts when temperature and humidity is quite high inside the ceiling. Besides, the indoor ducts should keep a certain gradient (1/50~1/30) to prevent water entering inside.



Keep adequate service clearances for convenient maintenance of the filter and heat exchanger. (See figure 8.)



**Figure 8 Service clearances**

Note: Service clearances are based on the actual structures and unit design.

## 2.4 Air ducts and flanges

- (1) All sheet and sectional materials should be with certificates of qualification.
- (2) Thickness of the steel should comply with requirements on the drawing.
- (3) There should be no cracks, scars and watermarks on the galvanized steel but crystal pattern.
- (4) Size of the duct should comply with design requirements.
- (5) Joint of the duct should be airtight, even and have no faults.
- (6) For the duct, angles should be straight, round arcs should be even and unevenness should be within 5mm.
- (7) Connection between the duct and the flange should be fastened and flanging width should be no less than 6mm. Holes spacing of flanges should meet design requirements and construction regulations.
- (8) The surface of carbon steel flanges should be applied with red anti-rust paint and coating should be even and closely-packed.
- (9) See the table below for allowances for ducts and flanges.

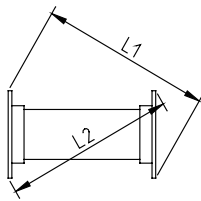
**Allowances for ducts and flanges**

No.	Item		Allowance (mm)	Inspection method
1	OD of the round duct	$\phi \leq 300\text{mm}$	0 -1	Measurement by the ruler
		$\phi > 300\text{mm}$	0 -2	
2	Long side of the rectangular duct	$\leq 300\text{mm}$	0 -1	Measurement by the ruler
		$> 300\text{mm}$	0 -2	
3	Diameter of the round flange		+2 0	Measurement by the ruler

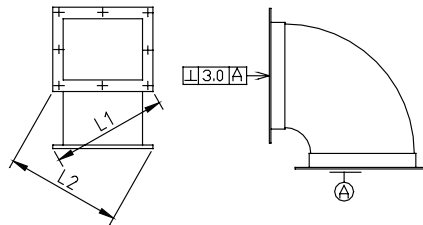
No.	Item	Allowance (mm)	Inspection method
4	Longer side of the rectangular duct	+2 0	Measurement by the ruler
5	Differential of diagonals	3	Measurement by the ruler
6	Evenness	2	Measurement by the feeler
7	Smoothness of welding joints	1	

**NOTE**

- The absolute value of differentials of diagonals of the rectangular duct should be  $|L1-L2| \leq 3$ , as shown in figure 9.
- For flanges at two ends of the bend of the rectangular duct, the squareness tolerance should be 3.0 (90°), as shown in figure 10.



**Figure 9**



**Figure 10**

Note: Installation should be based on the field-supplied equipment.

## 2.5 On-site construction requirements

- (1) Never lay wires, cables and pipes with toxic, inflammable or explosive gas or liquid in the duct.
- (2) The dismantlable ports and adjustable parts of duct and fittings cannot be installed in the wall or ceiling.
- (3) Foreign matters in or on the duct and fittings should be cleaned before installation.
- (4) The construction of bracket or hanger of the duct should accord with the following specifications:
  - 1) The build-in fitting, setting nail or expansion bolt for bracket or hanger should be placed correctly and firmly. The inlet part should be free of oil stains and painting.
  - 2) The layout of the bracket or hanger should accord with design specifications. If there is no design specification, following specifications will apply.
    - Pole bracket or inclined bracket is applicable for horizontal duct against wall or pole and support bracket for that far from wall or pole. Strip hangers are applicable for ducts with diameters or lengths of sides less than 400mm.
    - Arm bracket or inclined bracket is applicable for vertical duct against wall or pole and anchor ear bracket for that far from wall or pole. The vertical pipe outside the room or on the roof should be fixed with derrick or dragline.
  - 3) The hanger's rod should be flat and its screw thread should be intact and smooth. Either threaded connection or welding is suitable for joints of hangers. If the former one is adopted, connecting thread of either end should be longer than diameter of hanger; moreover, anti-loosing measure should be made. If the latter one is adopted, lapping joint is applicable and its length should be 6 times longer than diameter of hanger at least at two sides.
  - 4) Holes on the bracket and hanger should be drilled mechanically and never by gas cutting.

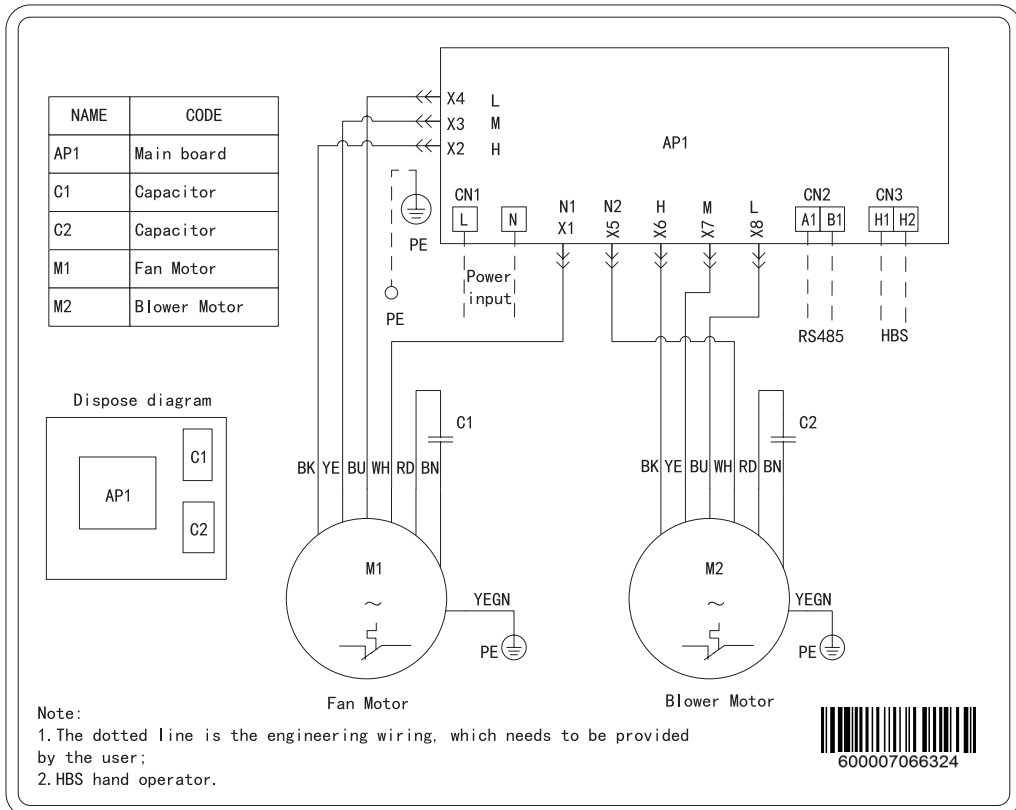
- 5) For the rectangular duct, clamps for the rectangular should contact the duct tightly, angle should be straight, and space for the screw at the joint should be reserved. For the round duct, clamps should be arranged evenly and its inner diameter should be the same with the outer diameter of the duct so as to contact the duct tightly.
- (5) The bracket and hanger cannot be set at air vent, valve or service door. The hanger cannot be directly fixed at flange. The distance between horizontal duct bracket and hanger cannot exceed 4 meters. If the duct is installed vertically, the distance between them should not exceed 4m and the built-in fittings of each vertical duct should be more than 2 pieces.
- (6) The duct flange, hanger and hanger for equipment should be coated with anticorrosion paint.
- (7) The floor and wall which the duct passes should be repaired after construction. The holes on the external wall should be kept 2/100 gradient at level direction (the internal is higher) to avoid rainwater into the room.
- (8) Installation of ducts and connections should be secure. The frame and decorative surface should be solid, external surface should be level and in-deformable and adjustment should be flexible.

### 3 Electrical connection

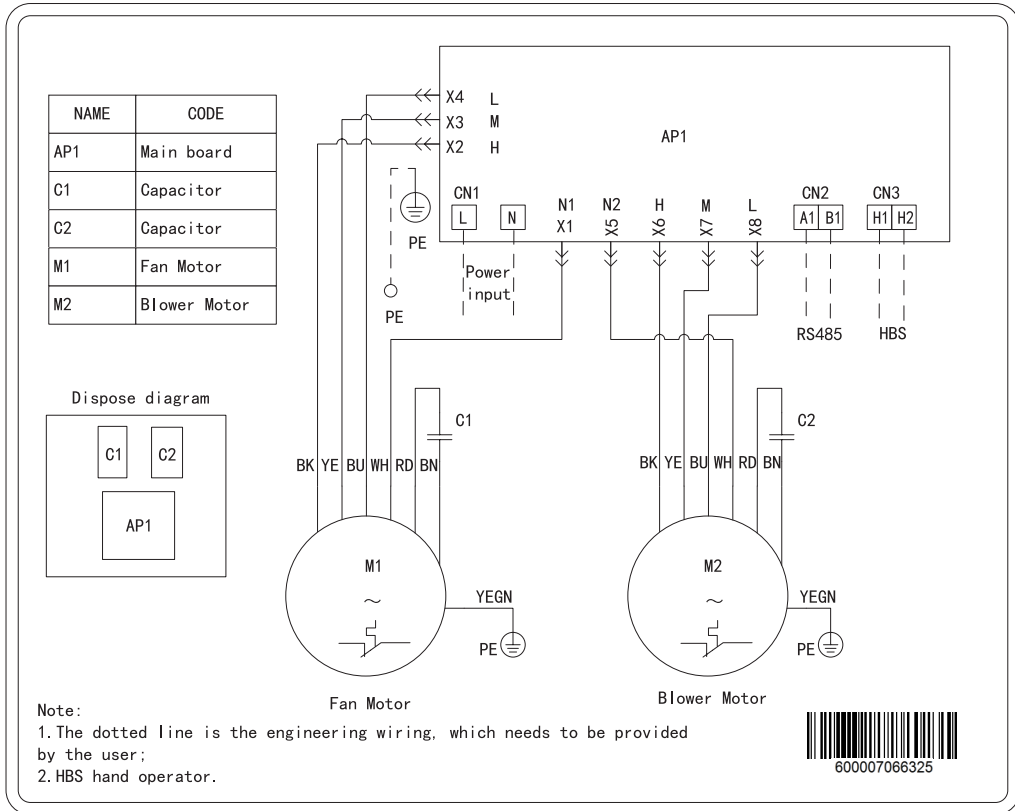
#### 3.1 Wiring diagram

The electric wiring diagram attached to the electric box always prevails.

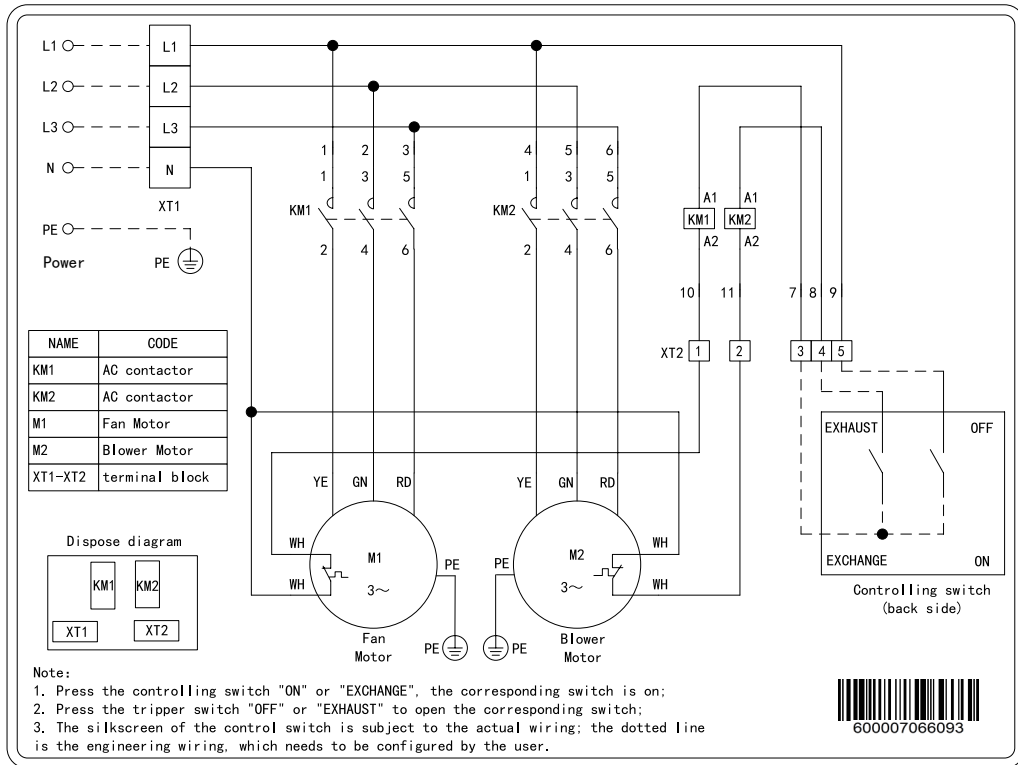
- (1) Applicable models: FHBQG-D6.5B-K, FHBQG-D8B-K, FHBQG-D10B-K



(2) Applicable models: FHBQG-D3.5B-K, FHBQG-D5B-K, FHBQG-D13B-K, FHBQG-D15B-K, FHBQG-D20B-K



(3) Applicable models: FHBQG-D25B-M, FHBQG-D30B-M, FHBQG-D40B-M, FHBQG-D50B-M, FHBQG-D60B-M



### 3.2 Wiring requirements

- (1) All of the electric installation must be performed by qualified technicians according to local laws and regulations and instructions.
- (2) The power supply must be under rated voltage and used especially for this product.
- (3) The power supply should be reliable to prevent terminals from being stressed. Never pull the power cord forcibly.
- (4) Size of the power supply lines must be large enough. The broken power line should be replaced with the dedicated line.
- (5) Ground wires should be reliably connected with dedicated grounding devices.
- (6) Air switch and leakage switch which can cut off the general power supply should be installed.
- (7) The air switch should integrate the functions of magnetic release and hot release to protect it for short circuit or overload.
- (8) The field wiring should be subject to circuit diagram attached on the unit.

Applied models	Power supply	Capacity of air switch (A)	Min. sectional area of power supply line (mm <sup>2</sup> )
FHBQG-D3.5B-K	220V ~ 50Hz	6	1.0
FHBQG-D5B-K	220V ~ 50Hz	6	1.0
FHBQG-D6.5B-K	220V ~ 50Hz	6	1.0
FHBQG-D8B-K	220V ~ 50Hz	6	1.0

Applied models	Power supply	Capacity of air switch (A)	Min. sectional area of power supply line (mm <sup>2</sup> )
FHBQG-D10B-K	220V ~ 50Hz	6	1.0
FHBQG-D13B-K	220V ~ 50Hz	6	1.0
FHBQG-D15B-K	220V ~ 50Hz	6	1.0
FHBQG-D20B-K	220V ~ 50Hz	6	1.0
FHBQG-D25B-M	380V ~ 50Hz	16	2.5
FHBQG-D30B-M	380V ~ 50Hz	16	2.5
FHBQG-D40B-M	380V ~ 50Hz	16	2.5
FHBQG-D50B-M	380V ~ 50Hz	16	2.5
FHBQG-D60B-M	380V ~ 50Hz	16	2.5

#### ⚠ NOTE

- The power supply lines for this product must be copper cored cable, and working temperature cannot exceed the specified value.
- When the power supply lines exceeds 15 meters, please enlarge its sectional area to avoid incidents caused by overloading.

### 3.3 Grounding

- (1) Reliable grounding measure must be adopted. The yellow green grounding can never be cut off and fixed with tapping screws so as to avoid electrocution.
- (2) The grounding resistance should comply with your state or local regulations.
- (3) Power supply must be reliably earthed. The ground wire cannot connect to tap water pipe, gas pipe, drain pipes and other unsecure positions.

#### ⚠ WARNING

Cut off the power supply before installation and maintenance to avoid electrocution. Electric wiring must comply with your state or local electrical codes.

#### ⚠ NOTE

GREE is not responsible for adverse results caused by modification of the electric control system by users themselves without consent of GREE.

## 4 Commissioning and routine maintenance

Check wirings and perform trial run after installation work.

- ◆ Check before trial run

- (1) Check of the pipeline system

According to design drawing and this manual check layout of ducts, firmness of hangers, anticorrosion paint and items stated above which should be paid attention to, operation space for replacement of the air filter, installation location of the duct silencer, inside or top of the duct or equipment, and firmness of installation.

- (2) Check of the electric circuit system

According to the circuit diagram, check the incoming lines, connection method, connections and power voltage.

◆ Trial run

(1) Turn on the unit. Refer to *Owner's Manual* of the controller for more details.

(2) When there is any unusual condition, cut off the power supply immediately for troubleshooting.

◆ Routine maintenance

The air filter must be installed; if not, the heat exchanging core will be covered with feculence and dust so that its performance will be reduced. If airflow volume or discharge air volume is obviously decreased, the filter should be replaced. Replacement period can be displayed through the controller and can be changed according to actual conditions in each area. The replacement method is quite simple. That is, open the access door, take out the old filter, place the new one, and then close the access door.

Remember to cut off the power supply before installation and maintenance to avoid electrocution. Wiring arrangement should comply with corresponding requirements, otherwise it would lead to electrocution or fire.

## 5 Troubleshooting

After trial run, the unit can be normally used by the user. If any fault occurs, resolve it firstly by yourself according to the following table.

Symptoms	Possible causes	Recommended action
Airflow volume at air outlet/inlet is obviously decreased after a period of time.	Too much dust gathers on the air filter.	Replace or clean the air filter.
Abnormal sound level arises at air vents.	Installation of the air vent is loose.	Re-fix the air vent.
The system fails to be started.	<ul style="list-style-type: none"> <li>• Power failure or incorrect power lines</li> <li>• Loose transformer terminals at the main board</li> <li>• Communication error (E6)</li> <li>• Damper or relative parts error (L0)</li> <li>• Unconnected damper control at the main board (L0)</li> </ul>	<ul style="list-style-type: none"> <li>• Recover power supply and check for wiring of the power supply.</li> <li>• Reconnect the transformer terminal.</li> <li>• Check for connection between the controller and the main board.</li> <li>• Check for the by-pass damper and the drive.</li> <li>• Connect it.</li> </ul>



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