



Energy Recovery Ventilation System

Owner's Manual(Original Instruction)

Commercial Air Conditioners

Applicable Models:

CH-HRV30M

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.cooperandhunter.com.

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1. Preface

Our living environments are more and more affected by modern civilization. As the application of air-conditioning system and various composite materials, popularization of office equipments and development of closeness of constructions and for the purpose of energy saving and reduction of cost which cause decrease of fresh air volume, harmful gas and pollution of creature won't be diluted properly and replaced. Healthy, energy-saving, simple and reliable fresh-air system and equipment has been the focus for engineers and users. Cooper&Hunter energy recovery ventilation system has solved this problem. This kind of system has two-way air exchange function so that the change of indoor temp is little during air exchange. The indoor air can be efficiently filtered by the air filter. New technology and materials and special technique applied in the unit can ensure low energy consumption, great performance, low noise and easy installation.

2. Introduction to Products

2.1 Main Features

(1) Replacement and Ventilation Function

It introduces fresh air into room and discharges indoor air out of room to make you feel comfortable as in the nature.

(2) Energy-recovery Function

Internal heat exchanger makes the discharged air and introduced air for cooling and heating exchange. Energy-recovery rate above 70% makes heat insulating ventilation realized.

(3) Low-noise Design

Special low-noise ventilation fan is set.

(4) Air Filtration and Purge Function

Internal air filter keeps the fresh air introduced into room pure and dustless.

(5) Various Series and Multiple Specifications

There are various series to match with the buildings of various structures.

2.2 Features of Structure

Cooper&Hunter energy-recovery ventilation system consists of main unit, electric control system and so on.

2.3 Main Unit

Some parts like low-noise centrifugal fan, heat exchanger and so on are set in the main unit. The air can be filtered effectively against dust particles, fibre etc. before entering into heat exchanger. The filter in the unit can be taken out after opening the service door. The bonded place between case and service door is sealed with long-acting sealing materials to prevent leakage of case. The case is made of cold-rolled plate and its double sides are sprayed with plastic for anticorrosion. The inner side of case is adhered with rubber and plastic foaming material which can effectively absorb the noise from running of ventilation fan and prevent radiation of case.

Fig.1 is the sketch of main structure (service door has been taken out).

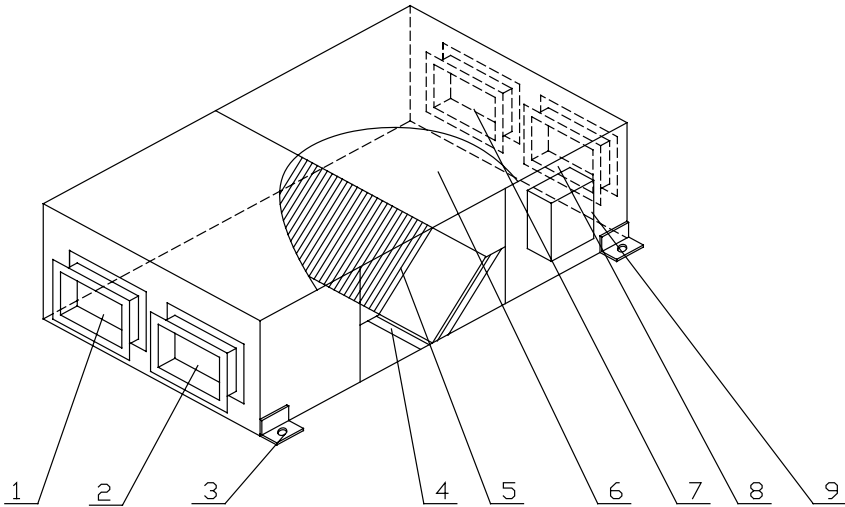


Fig 1 CH-HRV series energy recovery ventilation system (standard)

- 1.Fresh air inlet 2.Room air outlet 3.Lifting lug 4.Air filter 5.Heat exchanger
6.Case 7.Room air inlet 8.Fresh air outlet 9.Electric control box

2.4 Operational Panel

The front panel of ventilation system is concealed in the wall. The user should self-equip control line for trial running.

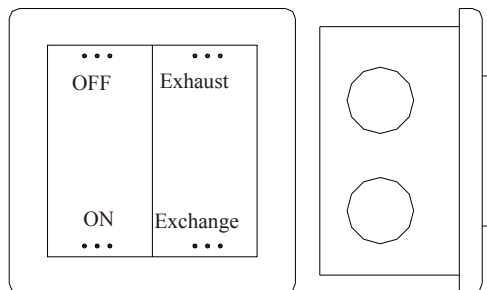


Fig. 2 Sketch of Operational Panel

3. Outline and Dimension

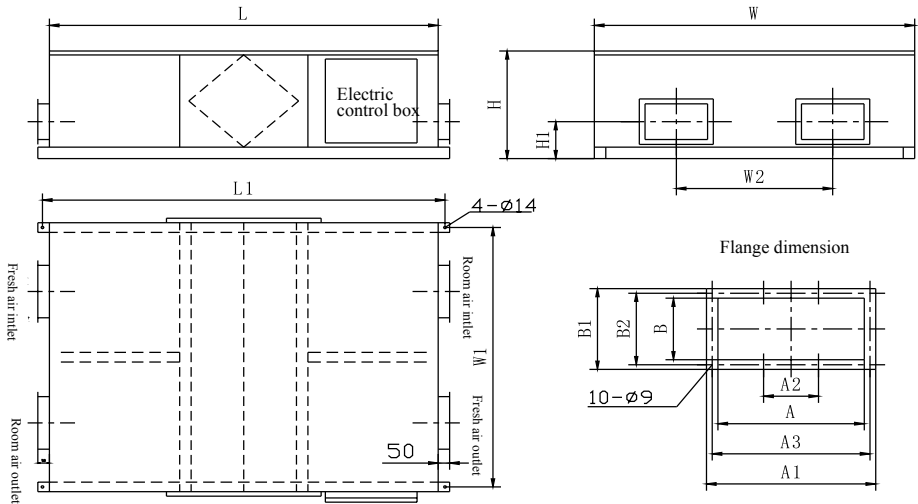


Fig. 3 Outline and Dimension

Models	L	L1	W	W1	W2	H	H1	A	A1	A2	A3	B	B1	B2
CH-HRV30M	1500	1650	1340	1310	670	572	249	346	386	180	366	332	372	352

4. Equipment Installation

4.1 General Description

Models selection and project design should be performed by professional engineer of heating and ventilation. The project should be constructed by experienced construction organizations according to national criteria and rules. Once the unit can not operate normally for the user fails to conform to the requirements for installation, our company will charge the user for after-sales service.

4.2 Project Design

◆ Main Points

This unit should be equipped with two ventilating ducts for two-way ventilation between room and outdoors. One duct is used to introduce fresh air into room and the other one is used to discharge indoor air out of room. The duct will resist the air flow which passes the duct. The greater the resistance is, the lower the ventilation quantity is, so long duct, small caliber, or big quantities of elbows will result in great resistance to the air in the duct and low ventilation quantity. Please perform design and installation according to the following principles:

- (1) Neither of the ducts can exceed 15–30m long (according to models). Internal cross-sectional area of the duct is decided by internal fan speed, about 8m/s in main pipe and about 5m/s in branch pipe. If rectangular duct is used, the scale of length between two sides can not exceed. The duct should be made of noncombustible materials.
- (2) Use elbows as few as possible, which should be within 3 for either duct. The bending part can never be 90° but arc, as shown in fig.4 and 5.

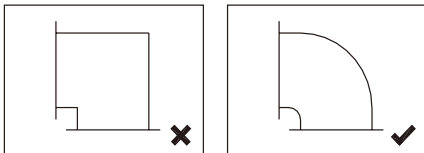


Fig.4 Elbow type

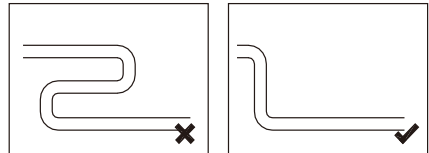


Fig.5 Arrangement of duct

- (3) The inwall of the duct should be slick, dustless and unfolding.
- (4) Keep air resistance of decorative vent on outdoor wall and indoor ceiling low. It is better to install rectangular aluminum alloy diffuser or two-layer louver with caliber of above 200×200mm. If the outdoor vent is waterproof louver, its caliber area should be 3-4 times bigger than cross-sectional area of duct connecting with it so that air flow can pass through the louver smoothly. The selection of outdoor vent is shown as fig.6.
- (5) The distance between the two vents should be above 1000mm to prevent exhausted air from returning into room from fresh air inlet, as shown in Fig.7.

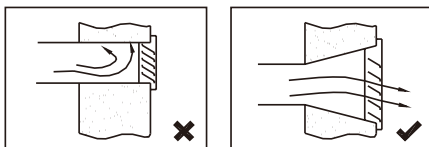


Fig.6 Outdoor vent

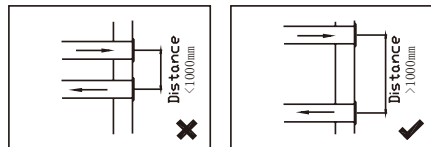


Fig.7 Distance between outdoor vents

- (6) If the user intends to lower the indoor noise as much as possible, silencer can be concatenated in the duct and should be installed under the guidance of professionals. The noise at vent of unit can usually be decreased by 4-6 dB after installation of suitable silencer.
- (7) If electric heater is set in the duct, its switch should be interlocked with that of ventilation system, i.e. it only can start after ventilation fan start running. The duct within 800mm in the front or at the back of electric heater or the duct passing through the room where there is fire source should adopt incombustible materials for heat insulation.
- (8) The air filter core should be replaced periodically, so maintenance space should be reserved at one side of fresh air ventilation system during installation.
- (9) The steel hanger should be pre-built in the ceiling for cassette type ventilation system and its type and specification should accord to its weight to ensure firmness and reliability of installation. If the project is reconstructed, the hanger should be put after drilling holes in the ceiling, as shown in Fig.8 (a). If it is not convenient to drill holes, through chiseling the concrete, find out the inner steel bars which can hang the hanger as shown in fig.8 (b).

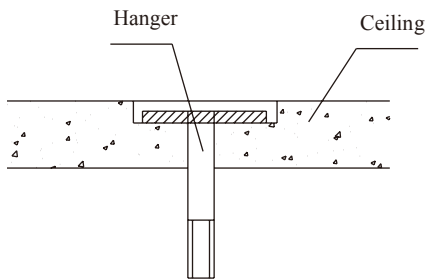


Fig.8(a)

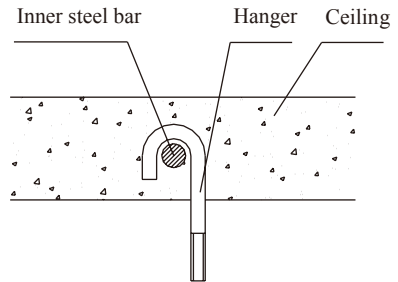


Fig.8(b)

The damaged ceiling during installation of hanger should be repaired and recovered before completion of the project.

◆ Installation Sketch of CH-HRV Series Energy Recovery Ventilation System

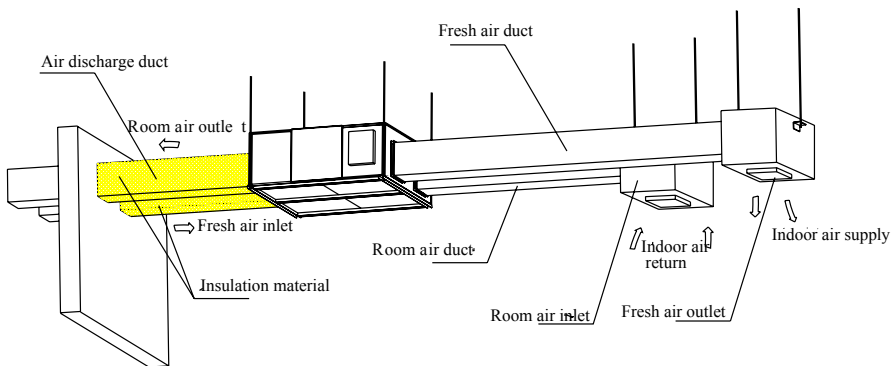


Fig.9 Installation Sketch of CH-HRV

During installation, the two ducts (fresh air inlet and room air outlet) outside the room must be installed with anti-condensate and heat insulating materials, and the ones inside the room should also be installed with them if temperature and humidity in the ceiling is high. The ducts outside the room should be kept inclined 1/50~1/30 to avoid water into the room.

Do keep service space for maintenance and cleaning of the filter and heat exchanger core in the system, as shown in fig.10.

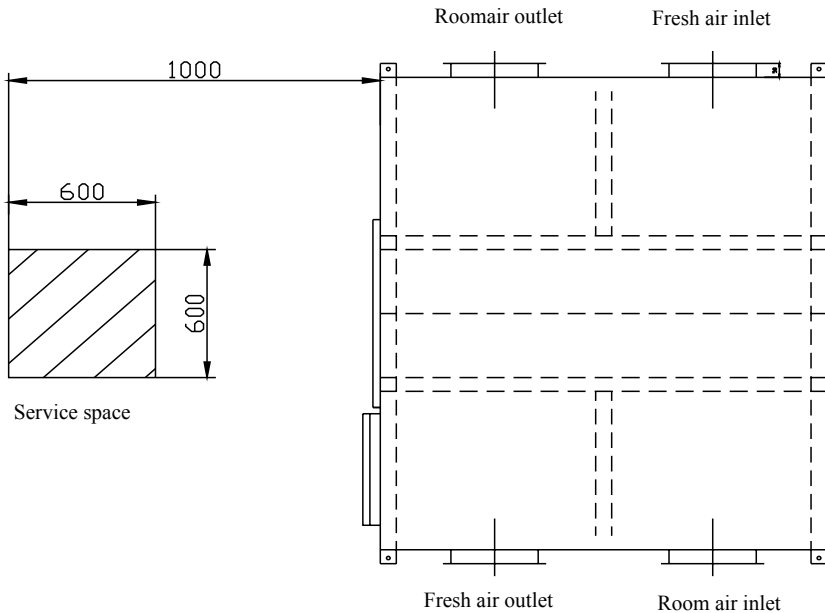


Fig.10 Sketch of Service Space

4.2 Project Construction

◆ Duct and Parts

- (1) The plates or sectional material used should have factory certificate of qualification or quality identification document.
- (2) The thickness of steel plate for manufacturing duct should accord with requirements in drawing.
- (3) The surface of galvanized steel metal should be free of crack, scar and watermark but crystal texture.
- (4) The specification and dimension of duct must accord with design requirements.
- (5) The joints of duct must be tight, with even width and free of defects like holes, half lock joint and crack etc.
- (6) For appearance of duct, the break angle should be flat, arc should be uniform, two ends should be parallel without rake angle and warp of the surface can not exceed 5mm.
- (7) The duct and flange should be connected tightly. Flanging should be flat, wider than 6mm and appressed to flange. The hole distance between flanges should accord with design requirements and other criteria of construction.

Energy Recovery Ventilation System

(8) The surface of carbon steel should be evenly and compactly coated with iron-red anticorrosion paint.

(9) The allowable deviation to duct and flange is as below:

Allowable deviation to making of duct and flange

No.	Item	Allowable deviation mm	Check Method
1	External diameter of round duct.	$\varphi \leq 300\text{mm}$	Diameters form 90° measured by ruler.
		$\varphi > 300\text{mm}$	
2	The longer edge of rectangle duct.	$\leq 300\text{mm}$	Check by ruler.
		$> 300\text{mm}$	
3	Diameter of round flange	+2 0	Diameters form 90° measured by ruler.
4	Diameter of rectangle flange.	+2 0	Check by ruler.
5	Difference between diagonal lines of rectangle flange.	3	Check by ruler.
6	Planeness of flange.	2	Put them on the platform to check with feeler.
7	Planeness of weld joints of flange.	1	

(10) The absolute value of difference between diagonal lines of rectangle flange should be $|L1 - L2| \leq 3$, as shown in fig.11.

(11) The verticality tolerance between the flanges at two ends of the elbow of rectangle flange should be $3.0(90^\circ \text{elbow})$, and the absolute value of difference between diagonal lines should be $|L1 - L2| \leq 3$, as shown in fig.12.

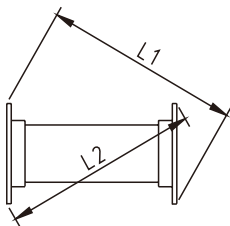


Fig.11 Rectangle duct

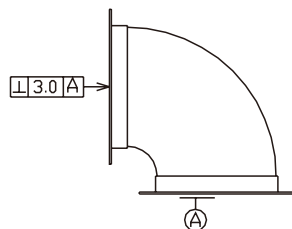
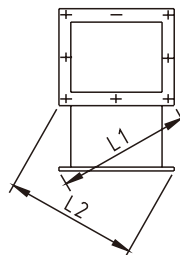


Fig.12 Elbow

4.3 Field Construction

- (1) Never lay wires, cables and pipes with toxic, inflammable or explosive gas or liquid in the duct.
- (2) The dismountable ports and adjustable parts of duct and fittings can not be installed in the wall or floor slab.
- (3) The sundries and filth 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 soil 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.

- ① 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 hanger is applicable for the duct with diameter or length of side below 400mm.

- ② Arm bracket or inclined bracket is applicable for vertical duct against wall or pole and hoop 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 full and smooth. Either threaded connection or welding is suitable for joint 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 later 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) The holes on the bracket and hanger should be drilled mechanically and not with gas cutting.

- 5) Hoop bracket for rectangle duct should be appressed to the duct. Break angle should be flat. The distance for tightening of bolt should be kept at connecting place. Hoop arc for round duct should be uniform and its external diameter should accord with that of duct. Hoop should hold the duct as much as possible.

- (5) The bracket and hanger can not be set at air vent, valve or service door. The hanger can not be directly fixed at flange. The distance between horizontal duct bracket and hanger can not exceed 4m.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 plate 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 duct and connection between air vent and duct should be firm. The frame and decorative surface should be solid, external surface should be level and in deformable and adjustment should be flexible.

5. Electric Project

Electric diagram If it is not accord with that on terminal box be subject to terminal box.

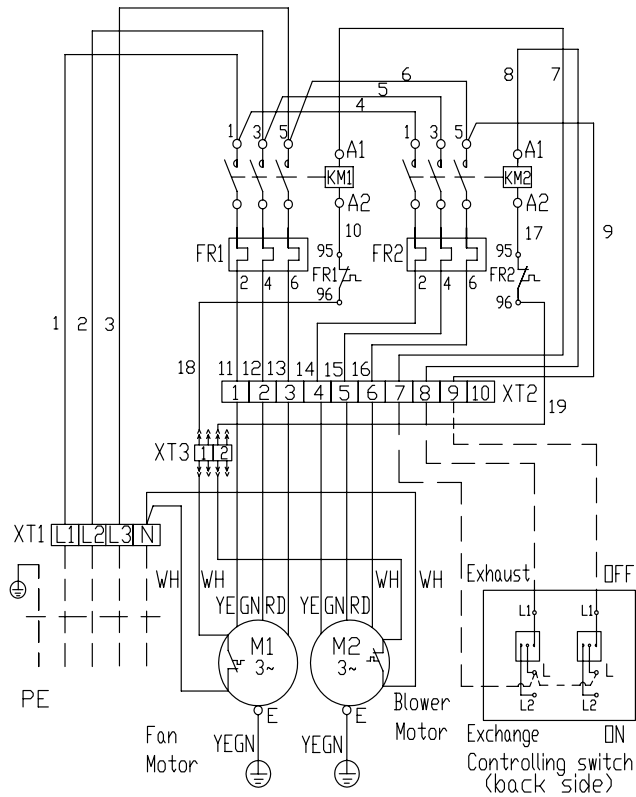


Fig.13 Electric diagram

5.1 Electric Installation

(1) Disassemble the cover of the terminal box. Power supply of equipment is AC380/50Hz allowable voltage fluctuation should be between 380V-15% and 380V+10% The voltage fluctuation of each phase should be $\pm 2\%$. Connect the power cord with the power terminal in the unit. The user should self-equip control line (not lower than RV90 0.75mm²)

(2) User should equip special circuit breaker and make the power cord through the circuit breaker connect with leading-in end of power supply for the unit.

◆ **Cut off the power supply before installation and maintenance to avoid electric shock.**

Arrange.

◆ **wirings according to requirements strictly to avoid malfunction, electric shock or fire.**

5.2 Special Notice

The company won't be responsible for bad results for the users self-modify the electric control system without consent of the company.

6. Operation and Maintenance

Check the connecting wires and perform trial run after installation work.

6.1 Check before Trial Run

(1) Check of pipeline system

According to design drawing and this Instruction check layout of ducts, firmness of hanging of the equipment, anticorrosion paint of hanger and the said items which should be paid attention to, operation space for replacement of air filter, installation location of duct silencer, the inside or top of the duct or equipment for sundries or mounting tool and firmness of installation of duct vent.

(2) Check of circuit system

According to circuit diagram, check the connection and voltage of power cords, voltage (AC380/50Hz, between 323 and 418VAC is normal)

Warning: If the power supply is 3-phase, you should confirm if there is missing phase to ensure normal running of unit and avoid damage to the unit.

6.2 Trial Run

(1) Turn on the unit. Refer to the next section about operation of front panel.

(2) If there is any malfunction, turn off the special circuit breaker immediately and check the items according to the table below:

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Phenomenon	Possible causes	Solutions
There is not air from indoor or outdoor vent after opening the switch	1. No power supply or power cord is incorrectly connected. 2. Control wire is not or incorrectly connected	1. Check power and power supply 2. Check the connecting line between operational box and main unit.
Normal air in or out from outdoor vent but small air volume from indoor vent	Leakage of indoor duct	Find out the leaking place and seal it
There is a little air from indoor or outdoor vent	Phase sequence of 3-phase power supply is wrong and fan of the unit reverses	Adjust the phase sequence

6.3 Startup of Unit

(1) Turn on the unit. Adjust the functional switch at “Exchange”, in which case, there is air flow passing through air inlet and air outlet at the same time; furthermore, air exchanger starts to run. Adjust the functional switch at “Exhaust”, in which case, there is only air exhaust without air supply, and the air exchanger stops running. Adjust the power switch at OFF, the unit will stop running. Refer to fig. 2 about sketch of operational panel.

6.4 Daily Maintenance

Air filter must be installed, if not, heat exchange 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, filter should be replaced for too much dust. Setting of replacement period may be displayed in the displayer or according to actual condition in each area. The replacement method is that opening the sealing door and pulling out the old filter for replacement.

Warning:

- ① Cut off the power supply before installation and maintenance to avoid electric shock.
- ② Arrange wirings according to requirements strictly to avoid malfunction, electric shock or fire.

6.5 Fault Diagnose

After debugging and trial run, the unit can be normally used by the user. If any fault occurs during air exchange, resolve it firstly by yourself according to the following table before you contact us.




Phenomenon	Possible causes	Solutions
Airflow volume at air outlet/inlet is obviously decreased after a period of time.	oo much dust gathers on the air filter.	Replace or clean air filter.
Noise occurs at air vent.	Installation of air vent is loose.	Re-fix the collecting place of air vent.
The system can not be started.	No power supply or missing phase Fuse burns out or circuit breaker trips.	Resume the power supply Replace fuse.

7. Notice for Safety




(1) Before installation, please carefully read Notice for Safety.

(2) Be sure to conform to the following items to prevent damage to users or others.

The damage and degrees resulted from incorrect operation are as follow:

 Danger	This mark means that dangerous cases like death or grievous harm will happen.
 Warning	This mark means that dangerous cases like death or grievous harm may happen.
 Notice	This mark means that injury or damage to property may happen.

The contents to be conformed are defined as follows.

	This mark means "can't" or "prohibit".
 	These marks means "must" or "force" .



Warning

- Please ask professionals for installation. Never install, move or refit the unit by yourself.



Forbid

Improper operation will cause falling, electric shock, fire and so on.

- Install the unit strictly according to the instruction.



Dangerous

Improper operation will cause electric shock, fire and so on.

- The electric project should be constructed according to national rules and construction instruction.



Dangerous

Poor capacity of power cord or improper construction will cause electric shock, fire and so on.

- Install bird net and suchlike things at air exchange vent.



Notice

Clean up sundries like nest to avoid deficiency of oxygen in the room.

- The air inlet should be installed at the place far from exhaust vent for fuel gas.



Dangerous

It's easy to cause deficiency of oxygen in the room.

- Install the air inlet at the place where exhausted air can not flow backwards.



Force

It's easy to cause pollution of the room and damage the health.

- The unit should be installed at the place with enough strength and reliability.



Notice

Some places are not strong enough for structure of the buildings.

- The earthing wire can not connect with gas pipe, water pipe, lightning rod, phone line and so on.



Dangerous

Improper earthing will cause electric shock.

- Turn off the switch and special circuit breaker during maintenance of the unit.



Dangerous

It's easy to cause electric shock.



Notice

- Do not put the burning appliances at the place against the air vent.



Forbid

It is easy to cause insufficient burning of the burning appliances.

If water leaks, it will enter into the unit and damage electrical insulator.

- Take waterproof measures for the unit.



Danger

If water leaks, it will enter into the unit and damage electrical insulator and cause electric shock.

- Do not use flammable spayer near the main unit.



Forbid

It is easy to cause fire.

- Operate the switch correctly. Never quickly repeat.



Notice

It is easy to cause incorrect operation and result in bad effect to switch and internal relay.

- Never wash the main unit with water.



Danger

It is easy to cause electric shock.

- Never operate the switch with wet hand.



Forbid

It is easy to cause electric shock.

- Periodically clean the filter.



Notice

Too much dust attached on the filter will cause hypoxia in the room.

- Do wear gloves to clean filter and heat exchanger.



Notice

It is easy to cause injury.

- Turn off the breaker if the unit will not be in use for a long time to ensure safety.



Notice

Too much dust will heat and cause fire.

- Do not install the unit at the wet place like bathroom, etc.



Forbid

It is easy to cause electric shock or leakage.

- Do not install the unit against fire source or at the place where there is naked flame.



Forbid

It is easy to cause heat or fire.

- Do not install the unit at the place where there is leakage of flammable gas.



Forbid

If there is leaked gas around the unit, fire is easy to result.

- Do not install the unit at the place where there is acid, alkaline, organic solvent, paint and other harmful or corrosive gas, like chemical plant, etc.



Forbid

It is easy to cause poisoning and fire.

- Maintenance space must be reserved. (maintenance place)



Notice

It is convenient to clean heat exchanger core and filter and maintain the equipment.

Warning

- Never insert finger or stick into suction or discharge vent.



It is easy to cause injury that the fan runs at high speed.

Forbid

- Ventilate the room by opening the window if flammable gas leaks.



The spark electric contact may cause explosion or fire after the unit starts.

Danger

- Never refit ,disassemble or repair the unit by yourself.



Improper repair may cause electric shock or fire.

Forbid

- Use the unit according to rated voltage.



It is easy to cause electric shock or fire.

Forbid

- Stop the unit and turn off special breaker once particular smell occurs.



Continuous operation in abnormal state may cause malfunction electric shock or fire.

Danger

- Never put animals or plants against air vent.



It may cause bad effect to animals and plants.

Notice

- Make insulated layer between pipe and wall if metal pipe goes through metal sheet or mesh of wooden building



It is easy to cause electric shock or leakage.

Must

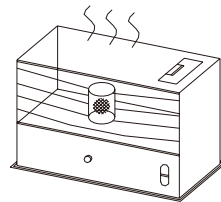
Danger

- Open system burning equipments (warm air) for air exchange can not be used.



If gas or oil heater is used in the room, special ventilation equipment must be used.

Forbid



8. Parameters Table

Model	Rated airflow volume (m ³ /h)	External static pressure (Pa)	Enthalpy recovery efficiency (%)		Noise dB(A)	Current (A)	Rated power (KW)	Power supply
			Winter	Summer				
CH-HRV30M	3000	220	58	62	54	7.1	2.8	380V 3N~ 50Hz

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