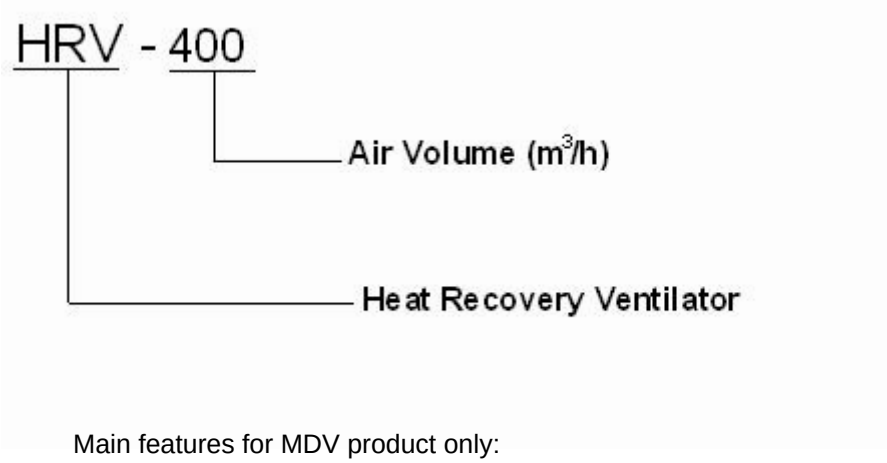
Библиотека СОК

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※ Manufacture reserves the right to discontinue, or change at any time, specifications or designs without notices and without incurring obligations.

1. Nomenclature



Main features for MDV product only:

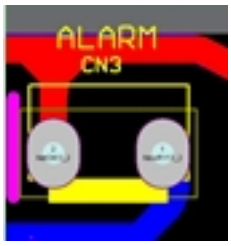
Possibility to connect additional air heater, electrical or water.

Capacity of the additional heater can be calculated according to the air flow of HRV and the ambient temp.

1. If temperature of inlet air lower than -5'C, electricity auxiliary switch ON.

2. If temperature of inlet air reach to 0'C, electricity auxiliary switch OFF.

Auxiliary switch connect to the CN3 connector on the main control board.



And rated current of electricity auxiliary is 500mA.

2. Product Schedule

Model	Air volume	Net dimension	Net weight	Power supply
	(m^3/h)	(L×W×H) (unit: mm)	(kg)	
HRV-200	200	866×655×264	23	220V-1Ph-50Hz
HRV-300	300	944×722×270	26	220V-1Ph-50Hz
HRV-400	400	944×927×270	31	220V-1Ph-50Hz
HRV-500	500	1038×1026×270	41	220V-1Ph-50Hz
HRV-800	800	1286×1006×388	62	220V-1Ph-50Hz
HRV-1000	1000	1286×1256×388	79	220V-1Ph-50Hz
HRV-1500	1500	1600×1270×540	163	380V-3Ph-50HZ
HRV-2000	2000	1650×1470×540	182	380V-3Ph-50HZ

External appearance:

HRV-(200, 300, 400, 500, 800, 1000)	HRV-(1500, 2000)
	

3. Features

HRV (Heat Recovery Ventilation) employ advanced technique and technics, the heat exchanged core forming by special paper that be processed with chemical treatment, which could create the optimum result in temperature, humidity and cooling recovery.

High efficiency heat exchanged core: When air flow formed by exhaust air and outdoor air through the heat exchanged core in cross way, because of temperature difference in the two sides of flat partition board, the heat transmission is occurred. In summer, outdoor air acquire cooling from air exhaust to decrease environment temperature; In winter, outdoor air acquire heating from air exhaust to increase temperature, that is to say, it realizing the energy recovery during air exhaust process to exchange the heating in heat exchanged core to outdoor air.

- **Energy saving**

Fresh-air and exhaust air are crossed through the exchanger. Temperature exchange was happened in the heat recovery ventilator. Fresh-air can beget a great deal of energy from exhaust air.

Adopt centrifugal fan with lower power consumption and longer air supply distance; Easy control, operation friendly.

- **High efficiency**

Adopt high quality heat-exchange core. Small air resistance.

Optional sprayer to increase unit heat-exchanger efficiency.



- **Low noise**

Add sound absorption material, quiet operation.

- **Flexible multi control ways**

Can be controlled together with other indoor units by controller.

- **Compact design, easy installation and maintenance.**

4. Specifications

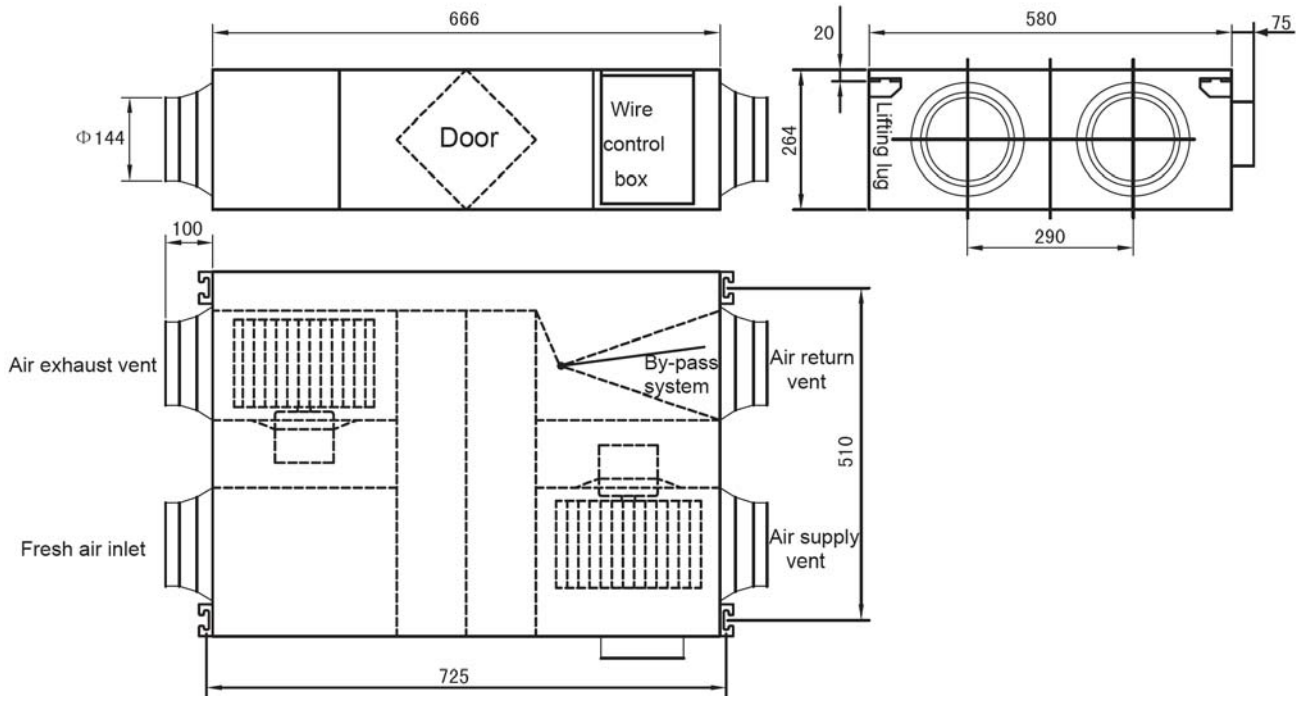
Sale Model			HRV-200	HRV-300	HRV-400
Power supply		V-Ph-Hz	220V-1Ph-50Hz	220V-1Ph-50Hz	220V-1Ph-50Hz
Cooling	Temp. efficiency	%	60	60	60
	Enthalpy efficiency	%	50	50	50
Heating	Temp. efficiency	%	65	65	65
	Enthalpy efficiency	%	55	55	60
Indoor fan motor	Model		YDK-10-4 992A1	YDK-20-4 992A2	YDK-40-4 991A2T
	Insulation class		B	B	B
	Safe class		IP34	IP34	IP34
	Input	W	20	40	80
	Capacitor	uF	1.5	2	3
	Speed	r/min	1050	1050	1150
Indoor fan	material		ABS	ABS	ABS
	Type		Centrifugal fan	Centrifugal fan	Centrifugal fan
	Diameter	mm	Φ154	Φ194	Φ194
	Height	mm	102	100	100
Indoor limit value of static pressure and air flow		Pa/m3/h	75/200	75/300	80/400
Indoor external static pressure (Hi)		Pa	75	75	80
Indoor sound level (sound pressure level)		dB(A)	34	38	41.3
Indoor unit	Dimension (L×W×H)	mm	866×655×264	944×722×270	944×927×270
	Packing (L×W×H)	mm	960×770×445	1020×810×452	1020×1020×452
	Net/Gross weight	kg	23/40	26/44	31/52
Connection wiring	Power wiring	mm^2	2×2.5	2×2.5	2×2.5
	Signal wiring	mm^2	3×0.75	3×0.75	3×0.75
Controller			Wired controller		
Fresh air	Fresh Air Diameter	mm	Φ144	Φ144	Φ144
	Air drop (static pressure)	Pa	75	75	80

Sale Model			HRV-500	HRV-800	HRV-1000
Power supply		V-Ph-Hz	220V-1Ph-50Hz	220V-1Ph-50Hz	220V-1Ph-50Hz
Cooling	Temp. efficiency	%	60	60	60
	Enthalpy efficiency	%	50	50	50
Heating	Temp. efficiency	%	70	70	70
	Enthalpy efficiency	%	60	60	60
Indoor fan motor	Model		YDK-60-4 991T	YDK-180-4 990B1T	YDK-180-4 990A4T
	Insulation class		B	B	B
	Safe class		IP34	IP34	IP34
	Input	W	120	360	360
	Capacitor	uF	3.5	8	10
	Speed	r/min	1250	1350	1350
Indoor fan	material		ABS	ABS	ABS
	Type		Centrifugal fan	Centrifugal fan	Centrifugal fan
	Diameter	mm	Φ203	Φ245	Φ245
	Height	mm	151	203	203
Indoor limit value of static pressure and air flow		Pa/m3/h	80/500	100/800	100/1000
Indoor external static pressure (Hi)		Pa	80	100	100
Indoor sound level (sound pressure level)		dB(A)	44	49.4	50.3
Indoor unit	Dimension (L×W×H)	mm	1038×1026×270	1286×1006×388	1286×1256×388
	Packing (L×W×H)	mm	1120×1120×452	1380×1100×573	1400×1370×573
	Net/Gross weight	kg	41/64	62/88	79/110
Connection wiring	Power wiring	mm^2	2×2.5	2×2.5	2×2.5
	Signal wiring	mm^2	3×0.75	3×0.75	3×0.75
Controller			Wired controller		
Fresh air	Fresh Air Diameter	mm	Φ194	Φ242	Φ242
	Air drop (static pressure)	Pa	80	100	100

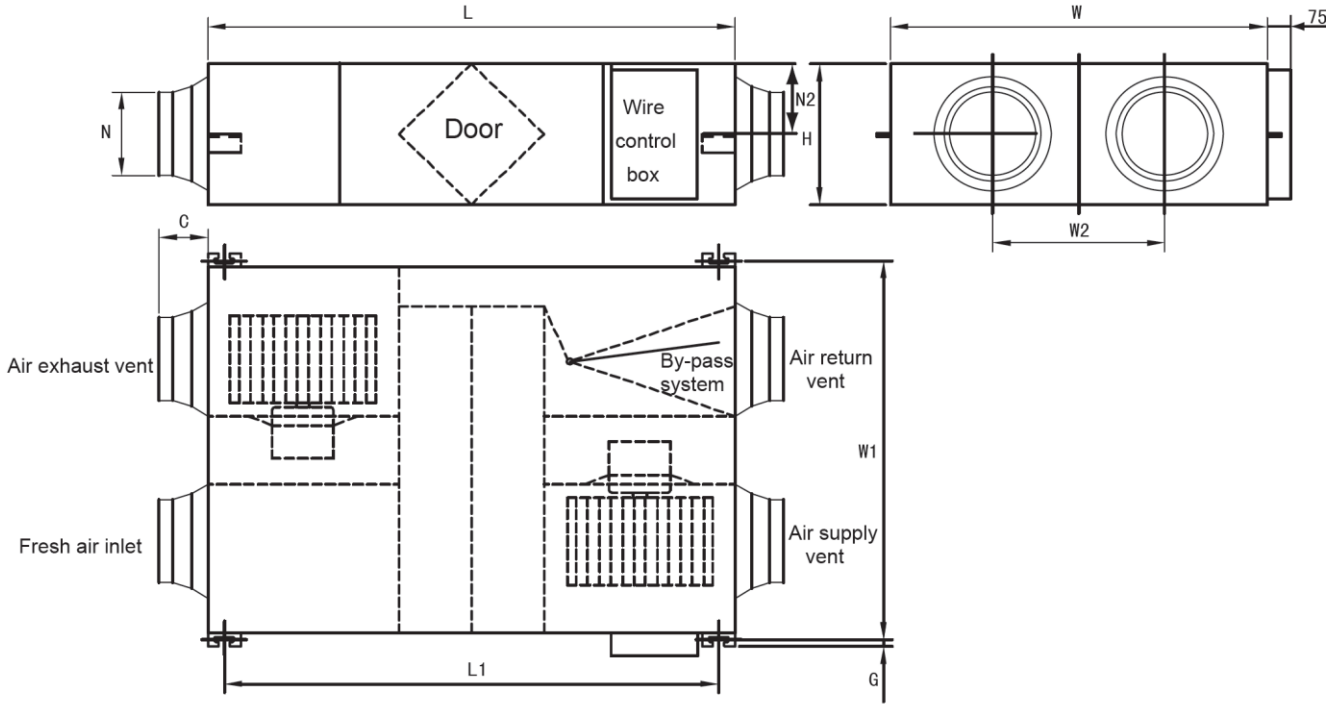
Sale Model			HRV-1500	HRV-2000
Power supply		V-Ph-Hz	380V-3Ph-50HZ	380V-3Ph-50HZ
Cooling	Temp. efficiency	%	60	60
	Enthalpy efficiency	%	50	50
Heating	Temp. efficiency	%	70	70
	Enthalpy efficiency	%	60	60
Indoor fan motor	Model		SYB-250I (0.45-4)	SYB-250II (0.45-4)
	Insulation class		B	B
	Safe class		IPX4	IPX4
	Input	W	450	450
	Capacitor	uF	/	/
	Speed	r/min	1350	1350
Indoor fan	material		metal	metal
	Type		Centrifugal fan	Centrifugal fan
	Diameter	mm	Φ234	Φ254
	Height	mm	253	285
Indoor limit value of static pressure and air flow		Pa/m3/h	160/1500	170/2000
Indoor external static pressure (Hi)		Pa	160	170
Indoor sound level (sound pressure level)		dB(A)	53.6	56.2
Indoor unit	Dimension (L×W×H)	mm	1600×1270×540	1650×1470×540
	Packing (L×W×H)	mm	1710×1410×720	1760×1610×720
	Net/Gross weight	kg	163/224	182/247
Connection wiring	Power wiring	mm^2	4×2.5	4×2.5
	Signal wiring	mm^2	3×0.75	3×0.75
Controller			Wired controller	
Fresh air	Fresh Air Diameter	mm	346×326	346×326
	Air drop (static pressure)	Pa	160	170

5. Dimension

5.1 HRV-200

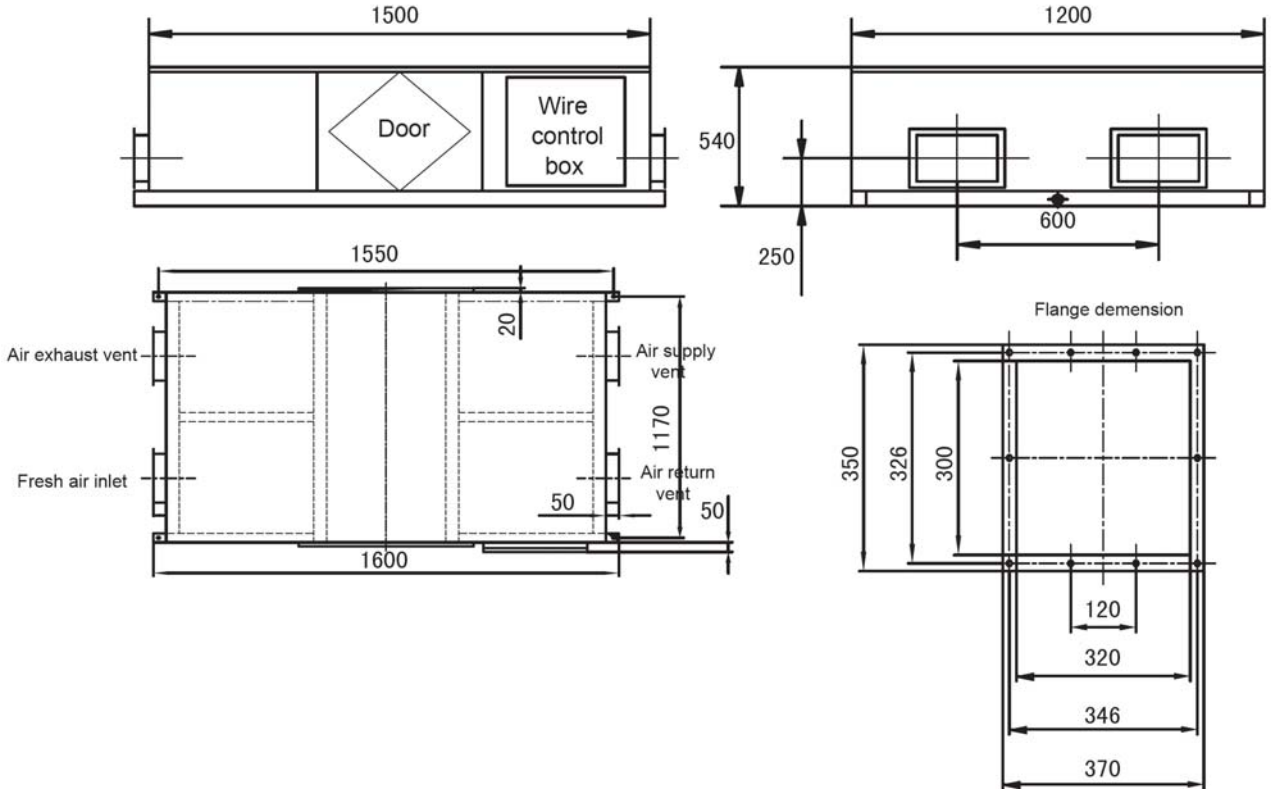


5.2 HRV-300 HRV-400 HRV-500 HRV-800 HRV-1000

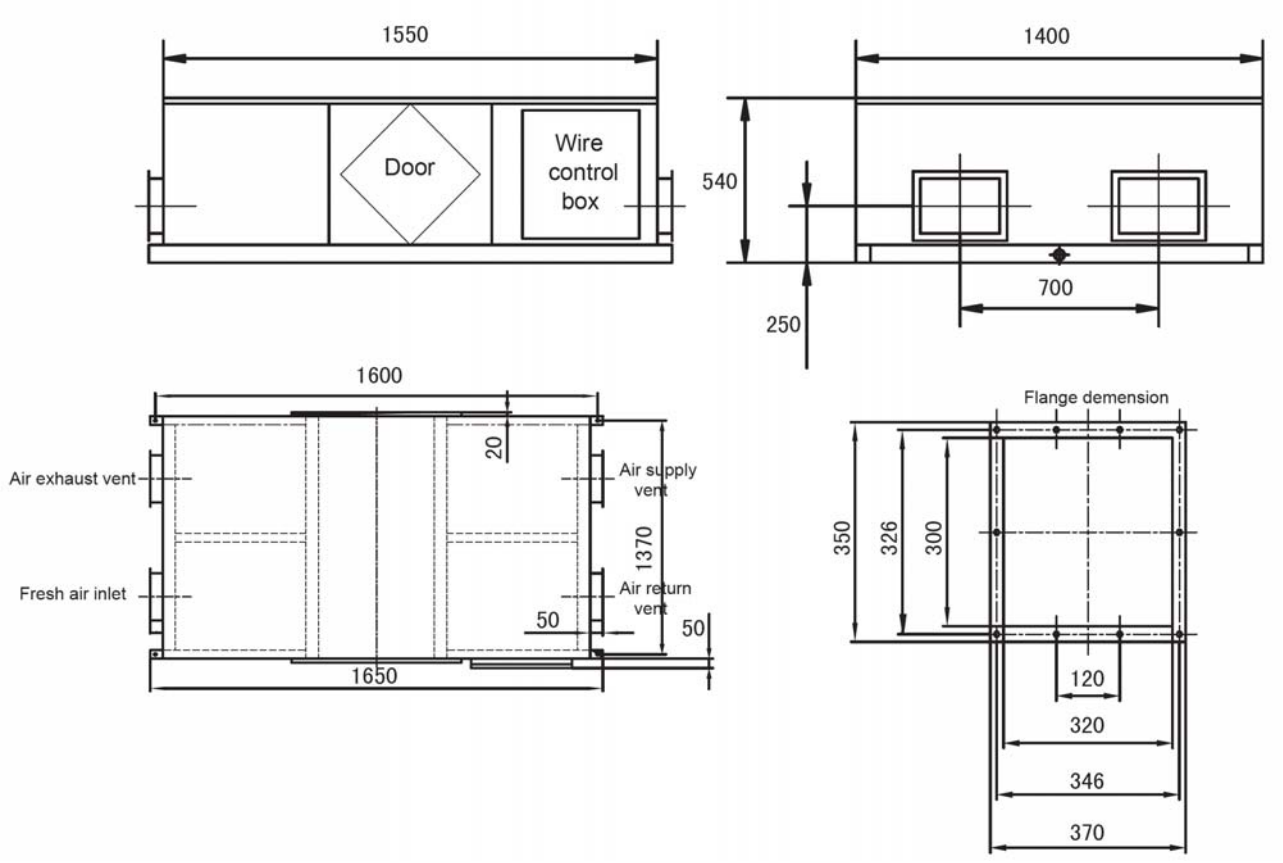


Model	L	L1	W	W1	W2	H	C	G	N	N2
HRV-300	744	675	599	657	315	270	100	19	Φ144	111
HRV-400	744	675	804	862	480	270	100	19	Φ144	111
HRV-500	824	754	904	960	500	270	107	19	Φ194	111
HRV-800	1116	1045	884	940	428	388	85	19	Φ242	170
HRV-1000	1116	1045	1134	1190	678	388	85	19	Φ242	170

5.3 HRV-1500

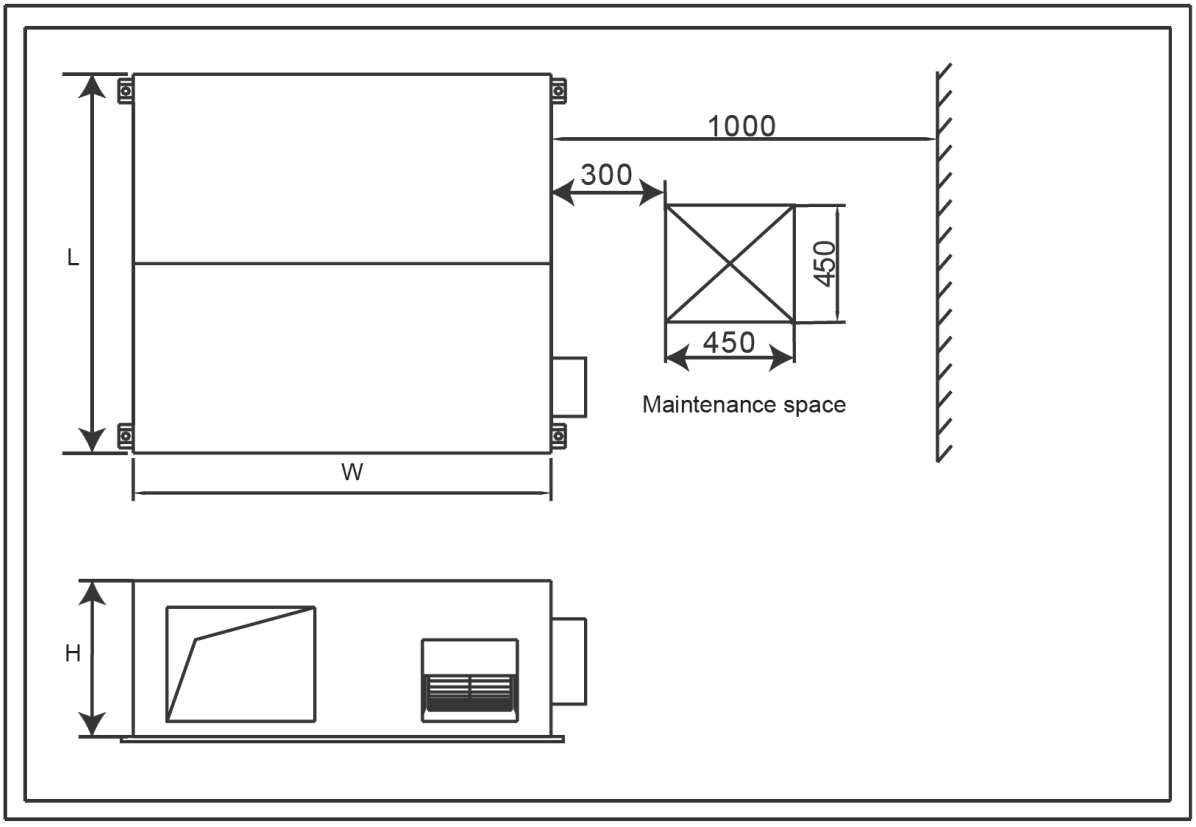


5.4 HRV-2000



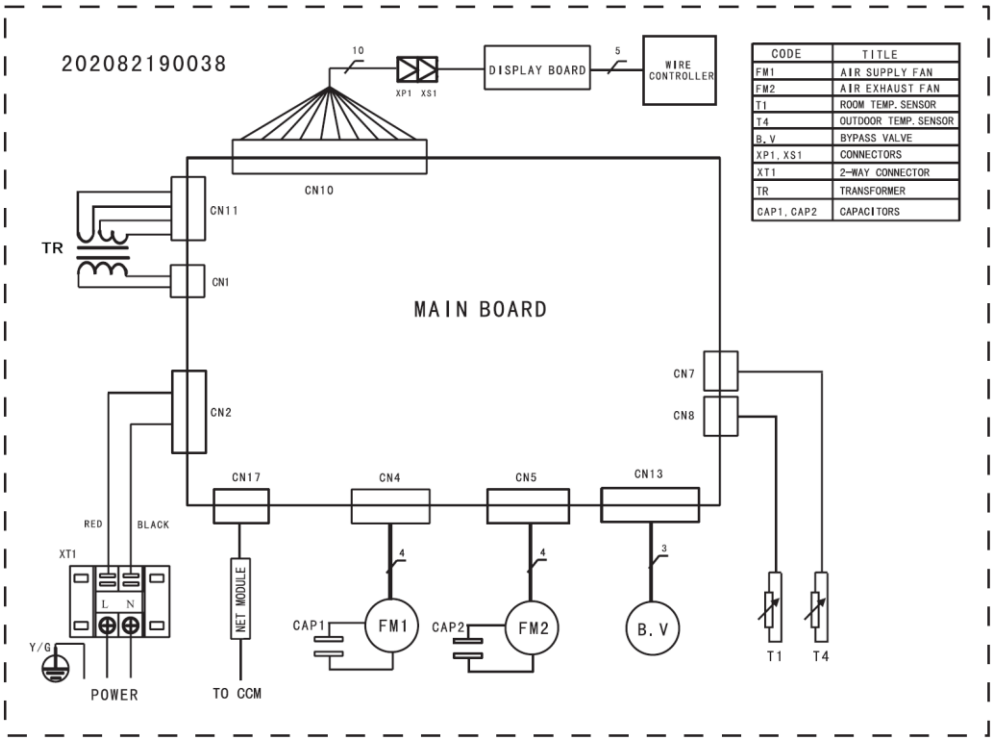
6. Maintenance Space

Unit：mm

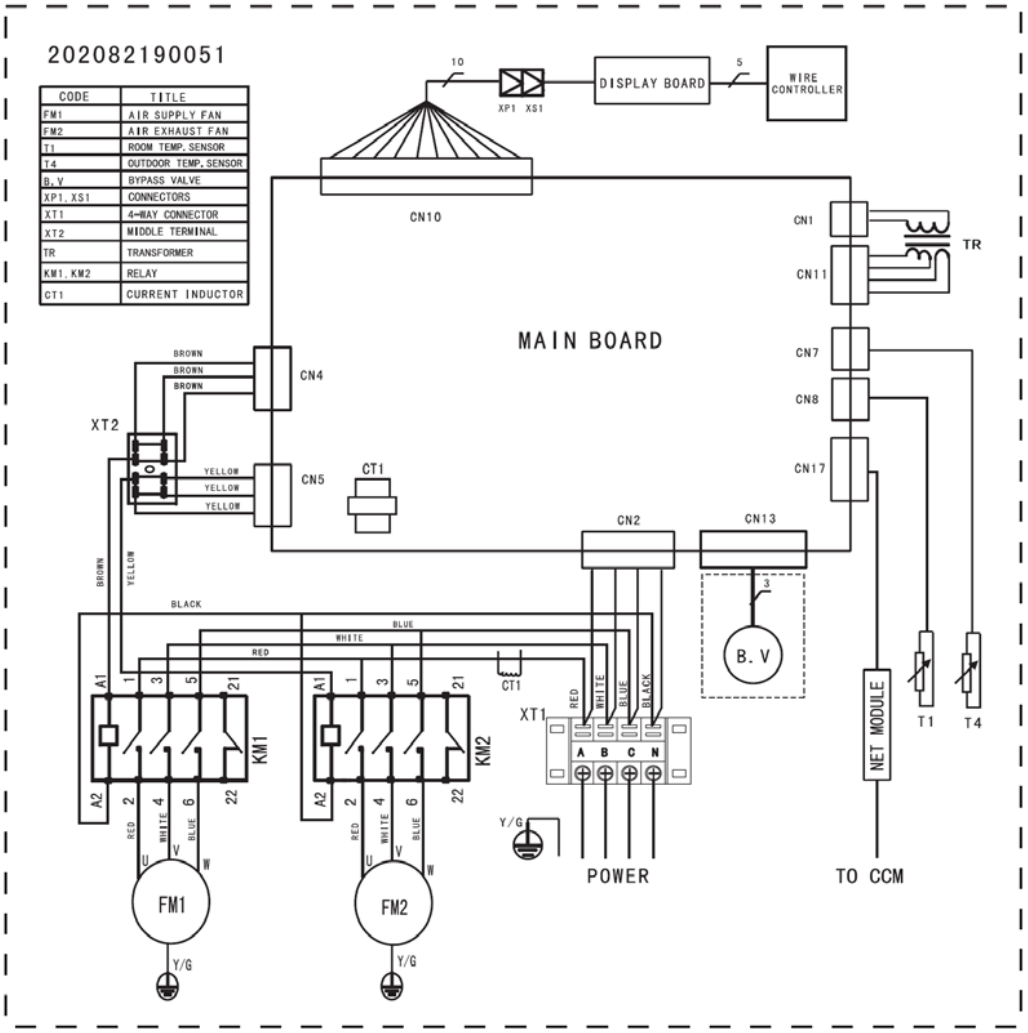


7. Wiring Diagrams

7.1 HRV-200 HRV-300 HRV-400 HRV-500 HRV-800 HRV-1000



7.2 HRV-1500 HRV-2000



8. Electric Characteristics

Model	Indoor Unit				Power Supply		IFM	
	Hz	Voltage	Min.	Max.	MCA	MFA	KW	FLA
HRV-200	50	220	198	242	0.625	15	0.02	0.5
HRV-300	50	220	198	242	0.7	15	0.04	0.56
HRV-400	50	220	198	242	1.25	15	0.08	1
HRV-500	50	220	198	242	1.25	15	0.12	1
HRV-800	50	220	198	242	2.5	15	0.36	2
HRV-1000	50	220	198	242	3	15	0.36	2.4
HRV-1500	50	380	342	418	4	15	0.9	3.2
HRV-2000	50	380	342	418	4.5	15	1.1	3.6

Remark:

MCA: Min. Current Amps. (A)

MFA: Max. Fuse Amps. (A)

FLA: Full Load Amps. (A)

KW: Rated Motor Input (kW)

IFM: Indoor Fan Motor

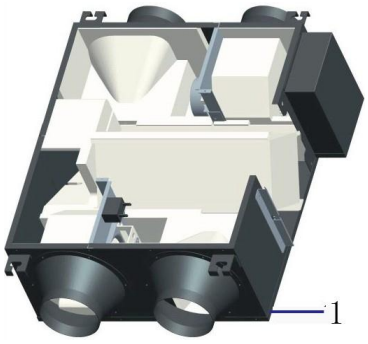
9. Operation Condition Limits

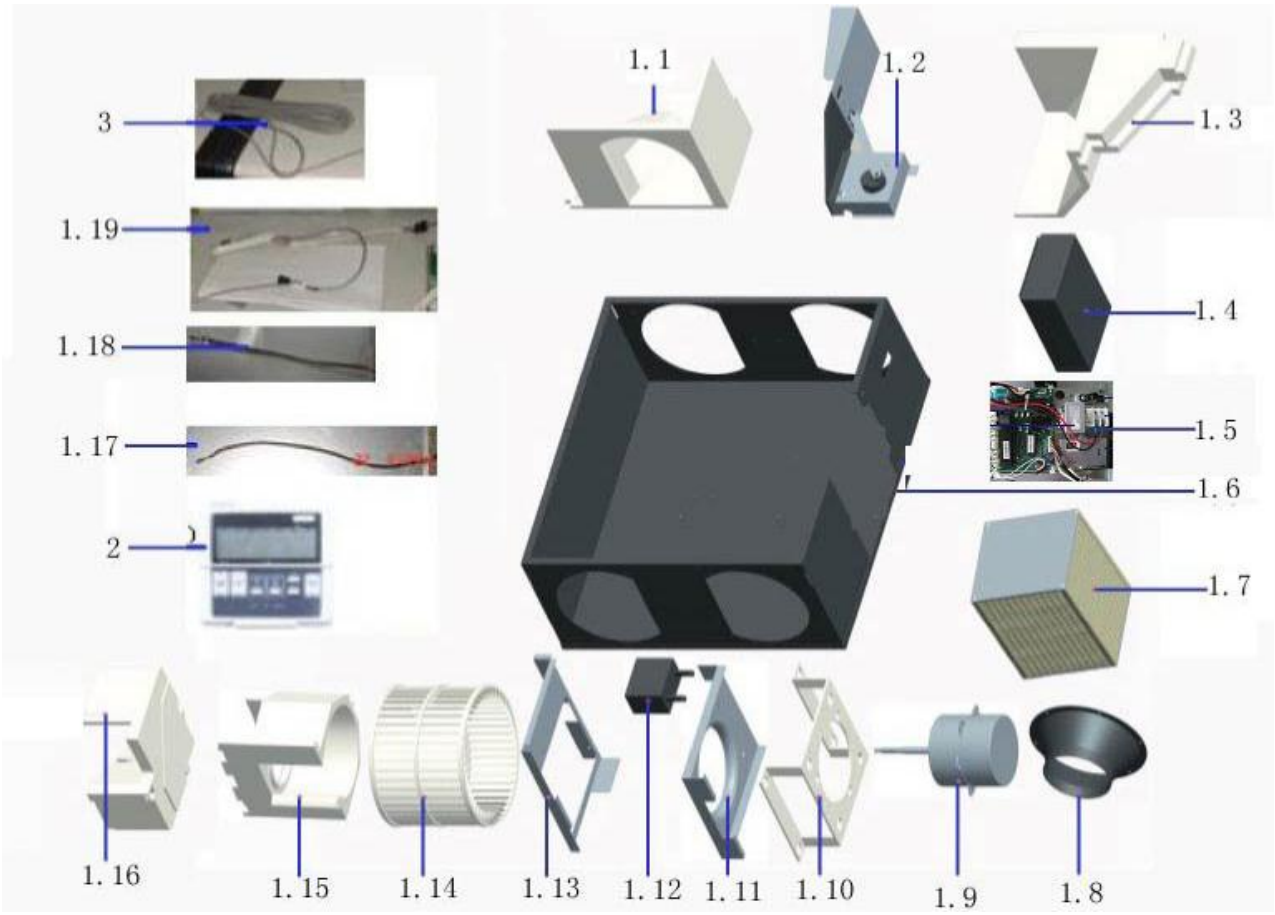
Model	Outdoor air temperature	Room temperature	Room humidity
All models	-7℃～43℃	-7℃～43℃	Lower than 80% If higher than 80%, the surface of indoor unit may be condensed or the condensate will be blown from air outlet.

10. Exploded View

10.1 HRV-200 HRV-300 HRV-400 HRV-500 HRV-800 HRV-1000

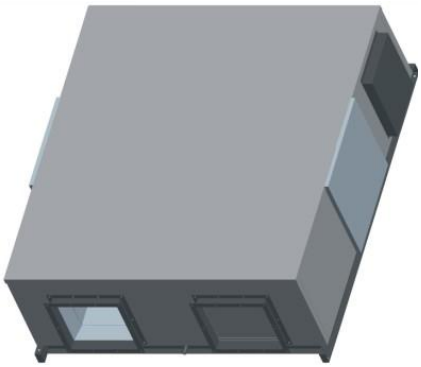


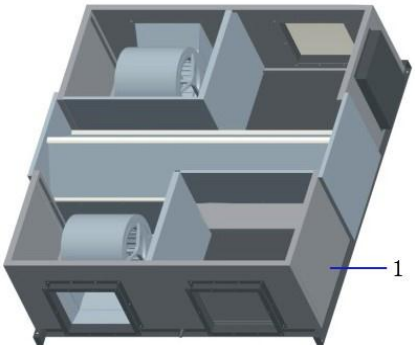


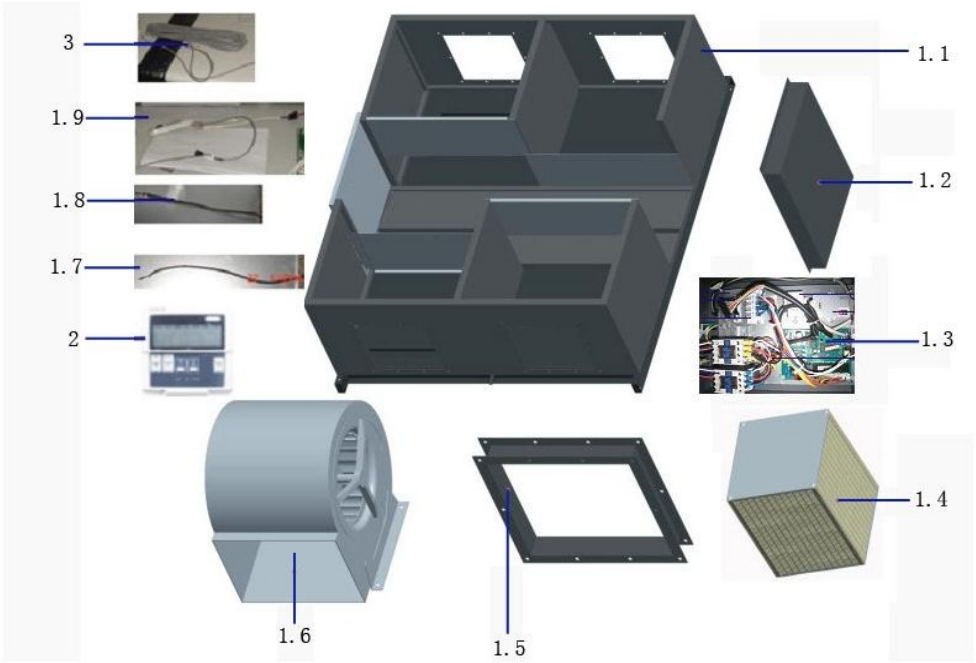


NO.	Part Name	Quantity
1.1	Inlet channel	2
1.2	Bypass part	1
1.3	Partition board	2
1.4	Electrical box	1
1.5	Electrical box ass'y (RoHS)	1
1.6	Chassis	1
1.7	Heat exchange core	1
1.8	Inlet/Outlet air	4
1.9	Fan Motor	2
1.10	Motor bracket	2
1.11	Guide plate	2
1.12	Motor capacitor	2
1.13	Fan bracket	2
1.14	Fan	2
1.15	Volute shell	2
1.16	Bypass channel	1
1.17	Room temp sensor ass'y (RoHS)	1
1.18	Temp. sensor (T1) (RoHS)	1
1.19	Display board ass'y (M54) (RoHS)	1
2	Wire Controller	1

10.2 HRV-1500 HRV-2000



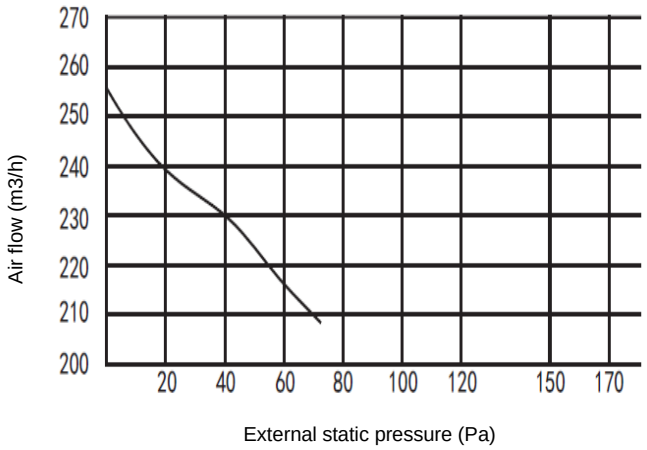




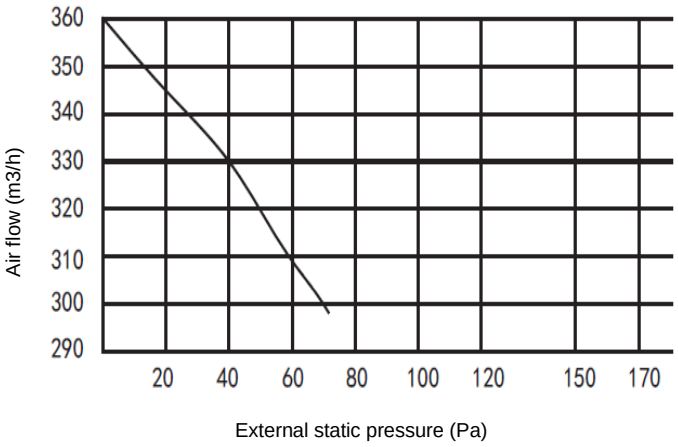
NO.	Part Name	Quantity
1.1	Chassis	1
1.2	Electrical box	1
1.3	Electrical box ass'y (RoHS)	1
1.4	Heat exchange core	2
1.5	Inlet/Outlet air	4
1.6	Fan	2
1.7	Room temp sensor ass'y (RoHS)	1
1.8	Temp. sensor (T1) (RoHS)	1
1.9	Display board ass'y (M54) (RoHS)	1
2	Wire Controller	1

11. Blast Pressure Graphic

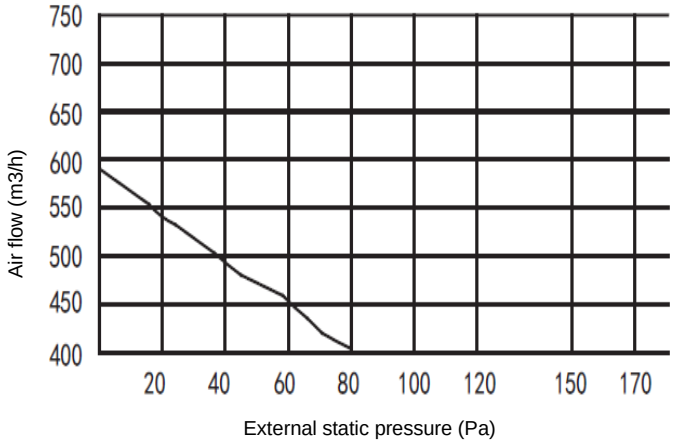
HRV-200



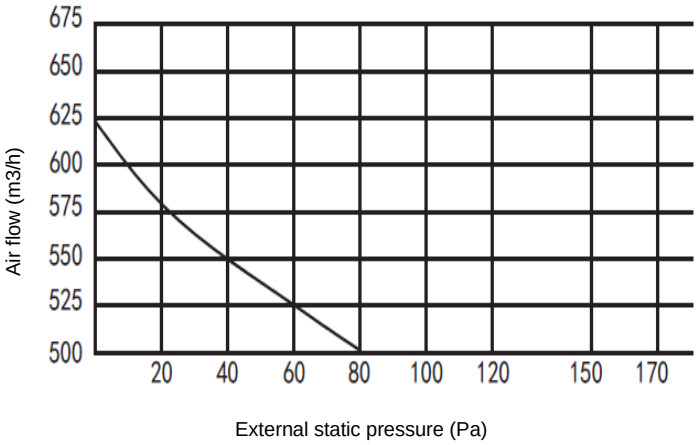
HRV-300



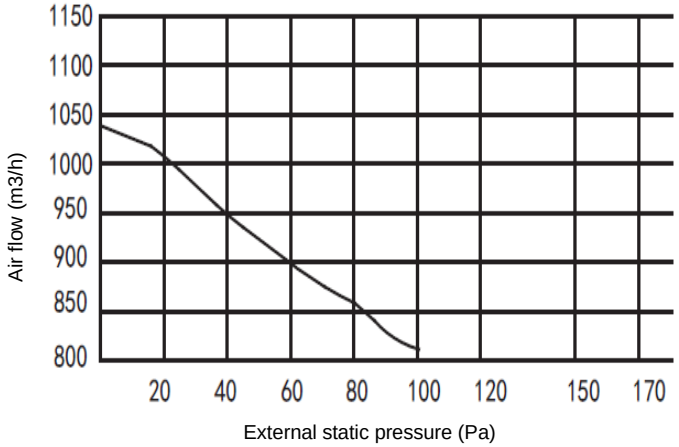
HRV-400



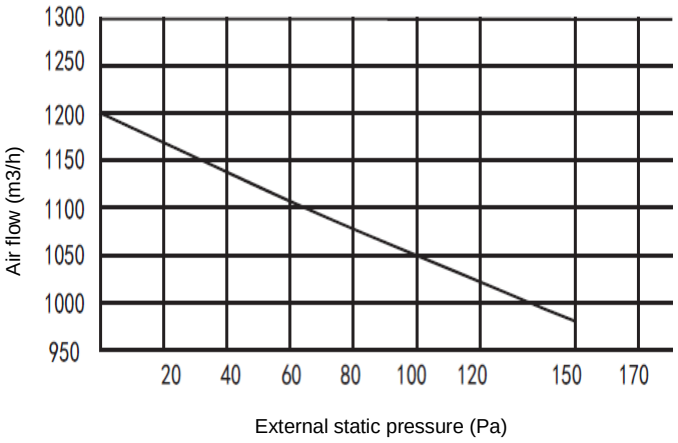
HRV-500



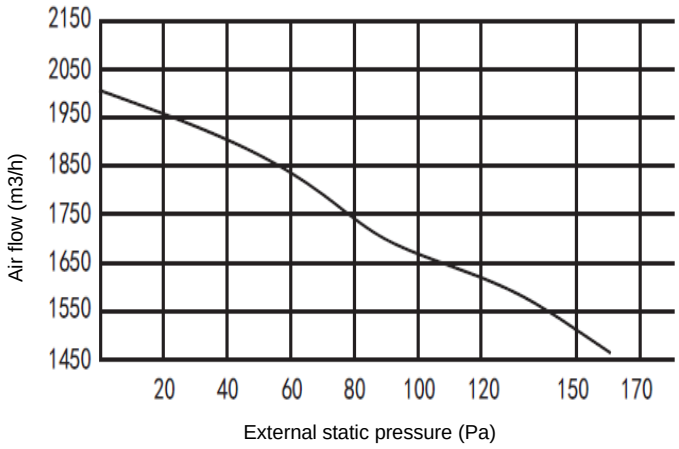
HRV-800



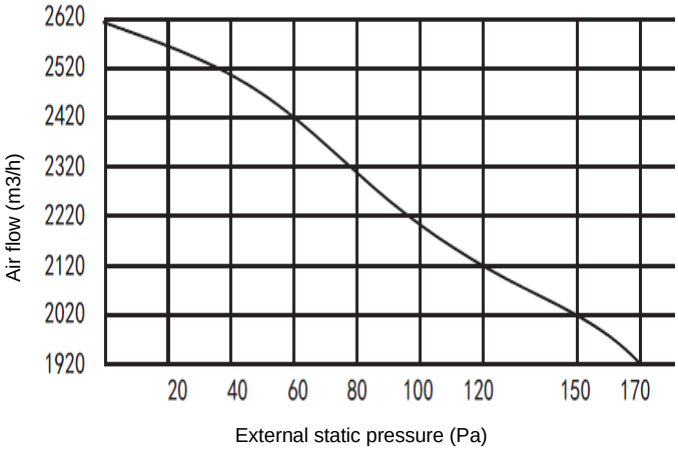
HRV-1000



HRV-1500



HRV-2000



12. Installation

12.1 Installation Preparation

Warning: The accessories needed for installation must be retained in your custody until the installation work is completed. Do not discard them.

1) Leave the unit inside its packaging while moving, until reaching the installation site. Where unpacking is unavoidable, use a sling of soft material or protective plates together with a rope when lifting, to avoid damage or scratches to the unit.

2) Hold the unit by the hanger brackets when opening the crate and moving it, and do not lift it holding on to any other part (especially the duct connecting flange).

Note: Be sure to instruct customers how to properly operate the unit (especially maintenance of air filter, and operation procedure) by having them carry out operations themselves while looking at the, manual.

12.2 Select the Installation Site

1) Select an installation site where the following conditions are fulfilled and meet with your customer's approval.

a. HRV should be installed far away from office, recreation or any other place silent requiring environment (install that in special machine room or wash room is recommended)

b. install in a place which has sufficient strength and stability. (Beam, ceiling and other locations capable of fully supporting the weight of the unit.) Insufficient strength is dangerous. It may also cause vibration and unusual operating noise.

c. Do not install the unit directly against a ceiling or wall. (If the unit is in contact with the ceiling or wall, it can cause vibration.)

d. Where sufficient clearance for maintenance and service can be ensured.

Caution:

- Install the units, power supply wiring and connecting wires at least 1 meter away from televisions or radios in order to prevent image interference or noise. (Depending on the radio waves, a distance of 1 meter may not be sufficient enough to eliminate the electric noise.)
- The bellows may not be able to be used in some districts, so exercise caution. (Contact your local government office or fire department for details.)
- When discharging exhaust air to a common duct, the Building Standard Law requires the use of fire proof materials, so attach a 2m copper plate standing duct.

2) Do not install the unit in the following locations:

- Place subjected to high temperature or direct flame. May result in fire or overheating.
- Place such as machinery plant and chemical plate where gas, which contains noxious gas or corrosive components of materials such as acid, alkali organic solvent and plaint, is generated. Place where combustible gas leakage is likely.

Copper piping and brazed joins may corrode, causing refrigerant to leak or poisoning and fore due to leaked gas.

- Place such as bathroom subjected to moisture.

Electric leak or electric shocks and other failure can be caused.

- Near machinery emitting electromagnetic waves.

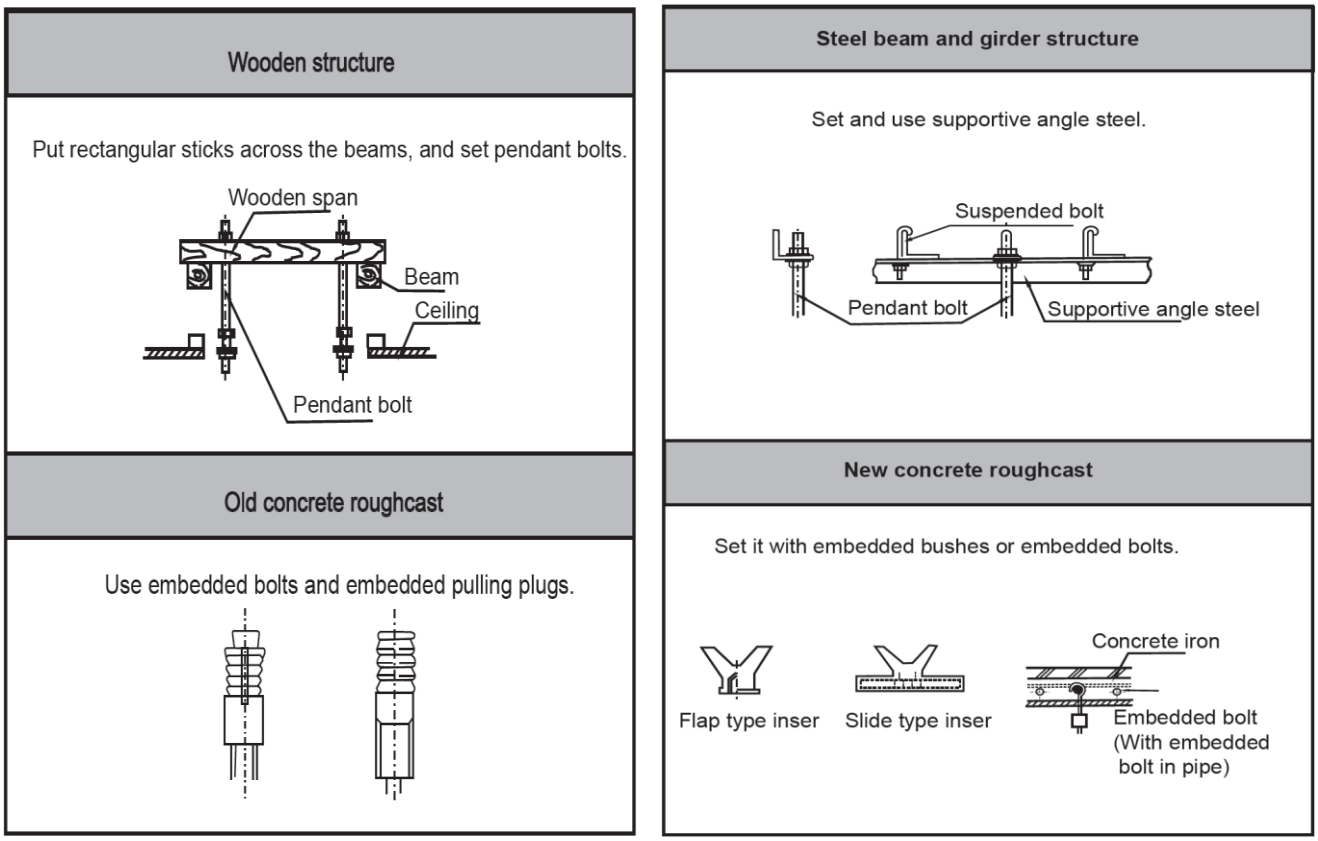
Electromagnetic waves may disturb the operation of the control system and result in a malfunction of the equipment.

12.3 Preparations before Installation

1. Confirm the positional relationship between the unit and suspension bolts.

Leave space for servicing the unit and include inspection hatches. (Always open a hole on the side of the

electric parts box so that the air filters, heat exchange elements, fans, can easily be inspected and serviced.)
2. Make sure the range of the unit's external static pressure is not exceeded.
3. Open the installation hole (Pre-setting ceilings)
Once the installation hole is opened in the ceiling where the unit is to be installed, pass transmission wiring, and remote controller wiring to the unit's wiring holes.
After opening the ceiling hole, make sure ceiling is level if needed. It might be necessary to reinforce the ceiling frame to prevent shaking.
Please consult architect or woodworker, if necessary.
4. Install the suspension bolts. (Use M10 to M12 suspension bolts.) Use a hole-in anchor, sunken insert anchor for existing ceilings, or other parts to be procures in the field to reinforce the ceiling to bearing the weight of the unit.
5. Install vibration damping feet. (For vibration damping)



12.4 Installation the Unit

1. Before installation, please confirm all external parts are stand in their place and without damage.
2. The surrounding environment of the unit, especially the sides of wiring cabinet and water collecting side should reserve sufficient wiring and maintenance and space; additionally, one should ensure the removing space for filter griller.
3. Unit should mount steadily and without sustain the weight form condensate water pipe and air duct. The vents of air inlet/outlet and return should be connected with flexible tube.
4. Unit in AC 220V/50Hz or 380V/50Hz, reliable grounding; each one possesses of independent cut-off and protection device.
5. The installation dimension and maintenance space. (See the maintenance space.)

13. Wiring

Warning: Before obtaining access to terminal device, all power supply circuits must be interrupted.

13.1 Precautions When Laying Power Supply Wiring

A circuit breaker of shutting down power supply to the entire system be installed.

A single switch can be used to supply power to units on the same system. However, branch switches and circuit breakers must be selected carefully.

Fit the power supply wiring of each unit with a switch and fuse as shown in the drawing.

Install a wiring interrupter or ground-fault circuit interrupter for the power wiring.

Make sure the ground resistance is no greater than 100Ω.

This value can be as high as 500Ω when using a grounding fault circuit interrupter since the protective ground resistance can be applied.

Be sure to give the electric grounding (earth) connection.

Do not let the grounding wire should come in contact with gas pipes, water pipes, lighting rods, or telephone ground wires.

● Gas pipes: gas leaks can cause explosions and fire.

Water pipes: can not be grounded if hard vinyl pipes are used.

● Telephone grounded and lightning rods: The ground potential when struck by lightning gets extremely high.

Do no turn on the power supply (wiring interrupter or ground-fault circuit interrupter) until all other work is done.

Tightening torque for the terminal screws.

Use the correct screwdriver for lighting the terminal screws. If the blade of screwdriver is too small, the head of the screw might be damaged, and the will not be properly tightened.

If the terminal screws are tightened too hard, screws might be damaged.

Refer to the table below for the tightening torque of the terminal screws.

	Tightening torque (N•m)
Terminal base of remote controller/ Signal transmission wire (X2M)	0.79-0.97
Terminal base of power supply (XIM)	1.18-1.44
Grounding terminal (M4)	1.44-1.94

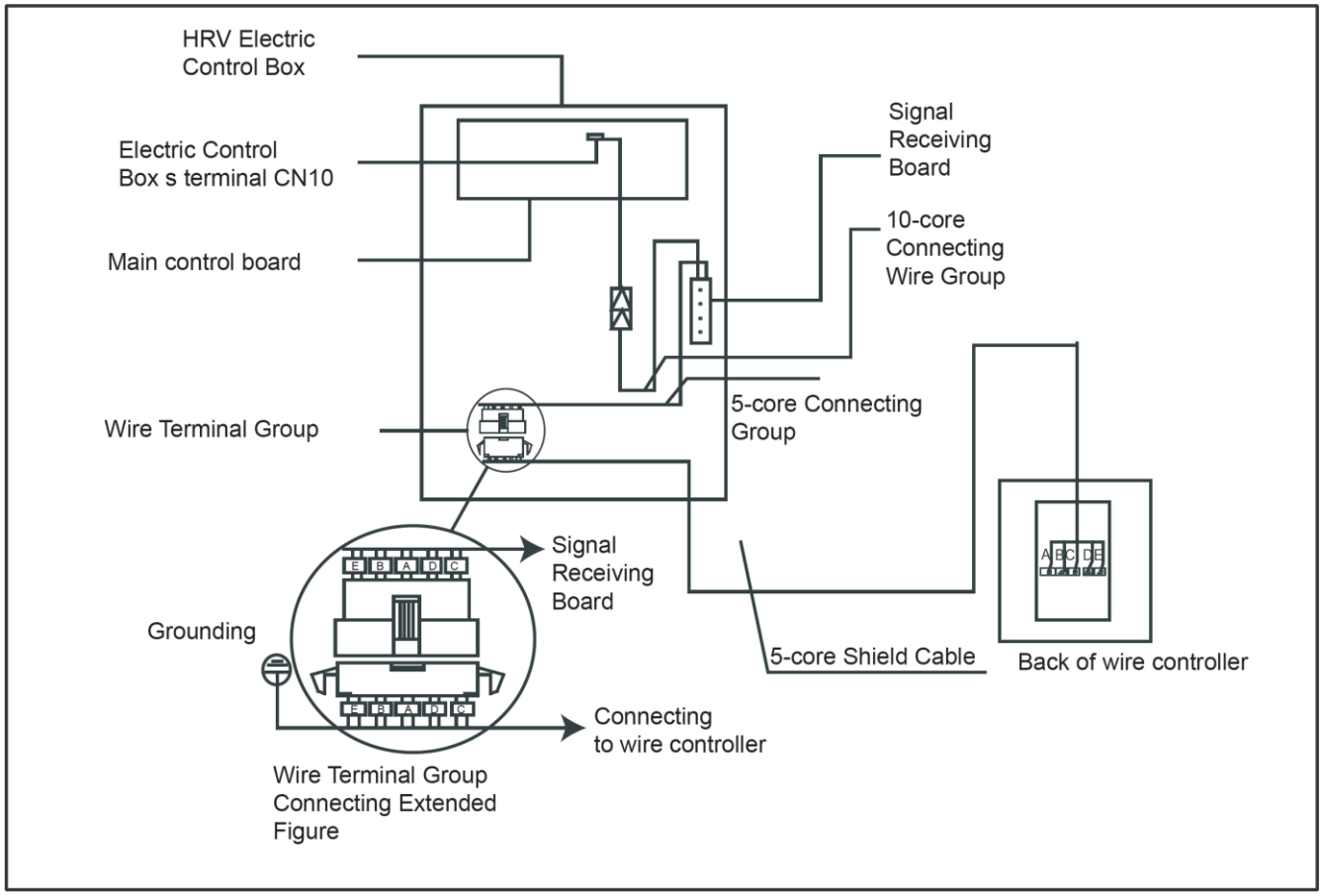
● After wiring, please confirm all connections are correct, and then power to the unit.

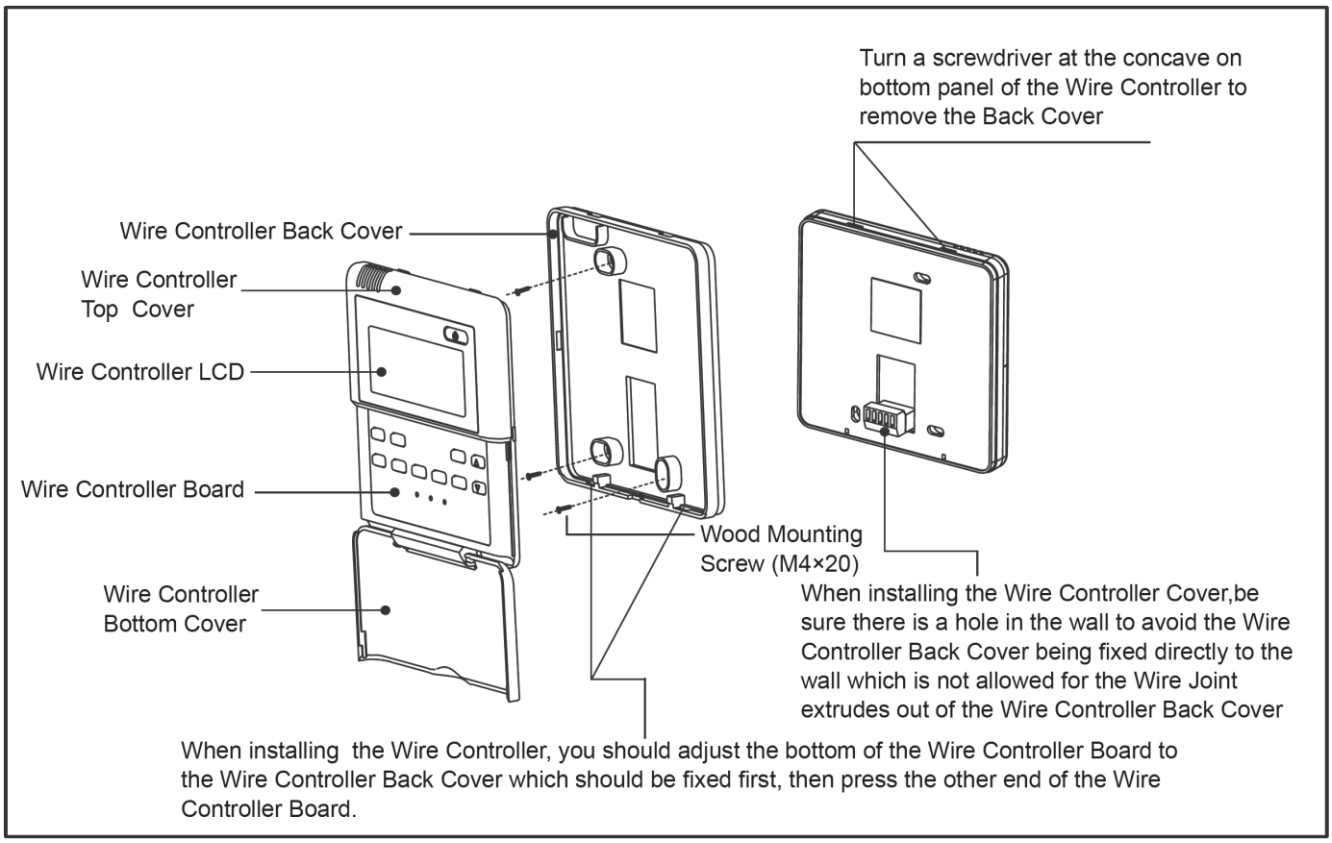
● Pay attention to the power supply wire of three-phase model; confirm the phase sequence of which is correct.

13.2 Power Specification

Model	Power supply		Input current main switch /fuse(A)	Power supply wire dimension	
HRV-	Phase	Frequency/voltage		Wire's quantity	Code wire cross-section (mm^2)
200,300,400, 500, 800, 1000	Single phase	220V～50Hz	15/15	3 (Yellow/green wire is grounding wire)	2.5
1500,2000	Three phase	380V 3N～50Hz	15/15	5 (Yellow/green wire is grounding wire)	2.5

13.3 System connection diagram





Caution:

1. Never turn screws too tightly, or else the cover would be dented or the Liquid Crystal breaks.
2. Please leave enough space for maintain and upkeep the wire controller.

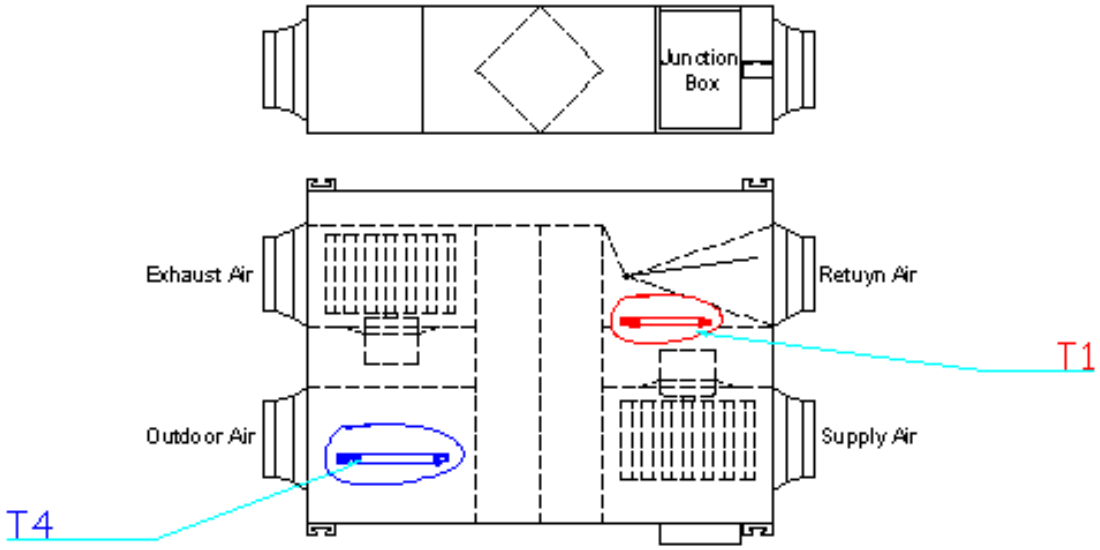
14. Troubleshooting

14.1 Lamp flashes:

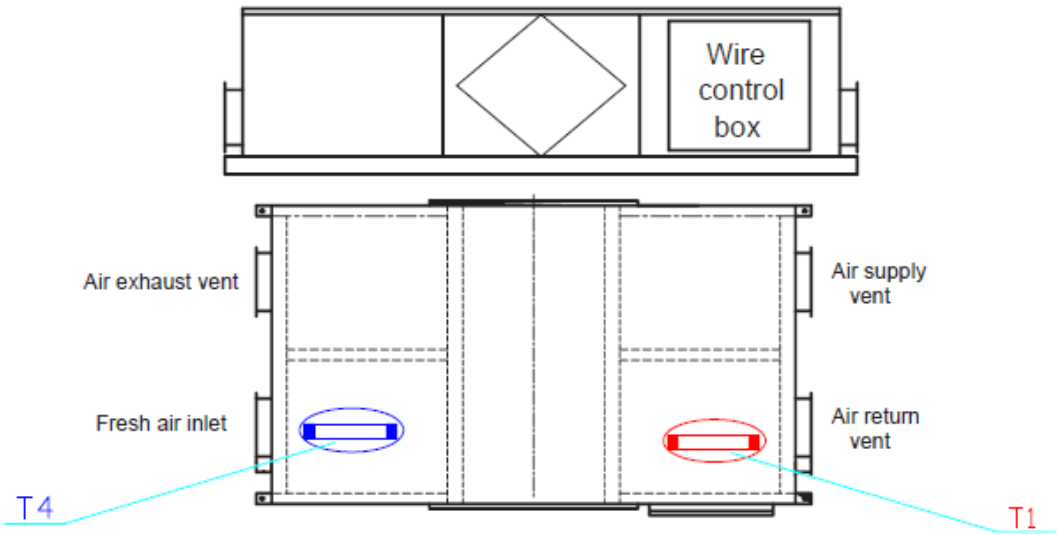
No.	Operation lamp	Timer lamp	Defrosting lamp	Alarm lamp	Explanation
1	★	○	○	○	T4 sensor error
2	★	★	○	○	T1 sensor error
3	★	○	★		Current protection
4	★	○	○	★	Phase absent, phase error

Note: ●：Light, ○：Extinguish, ☆：Slow flash, ★：Quick flash

HRV-200 HRV-300 HRV-400 HRV-500 HRV-800 HRV-1000



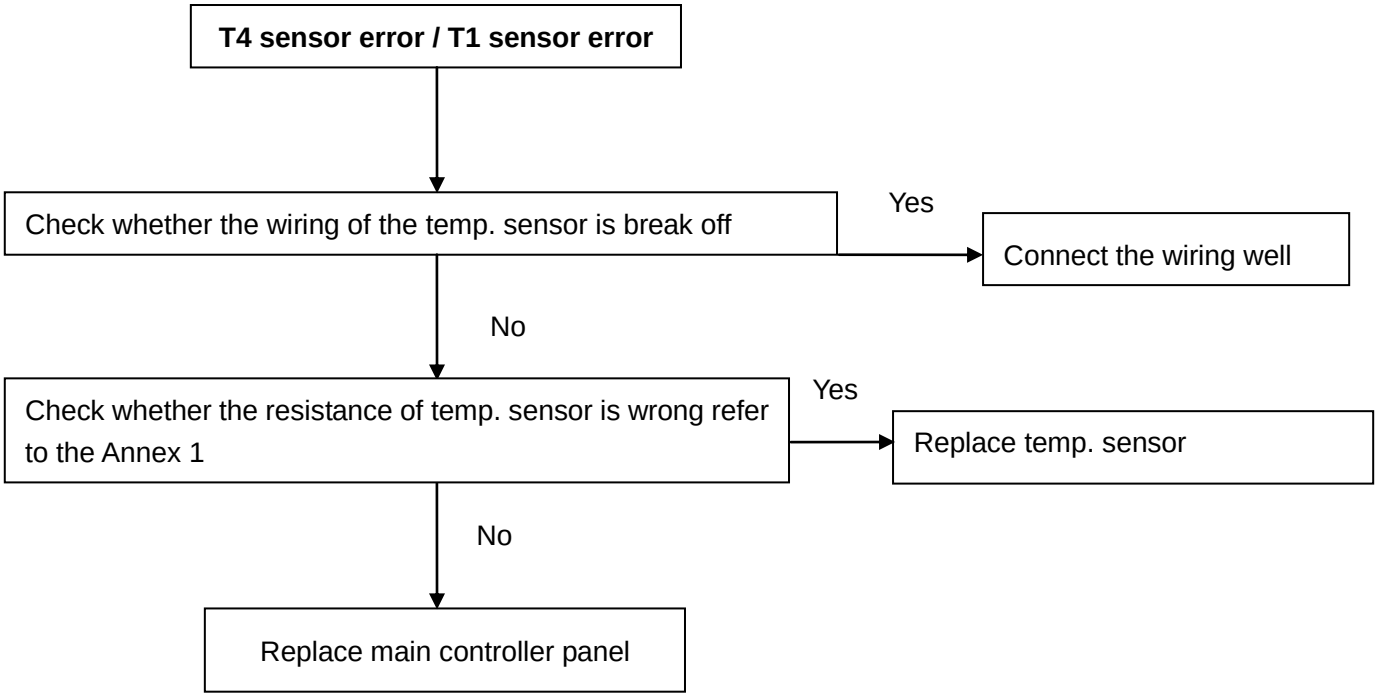
HRV-1500 HRV-2000

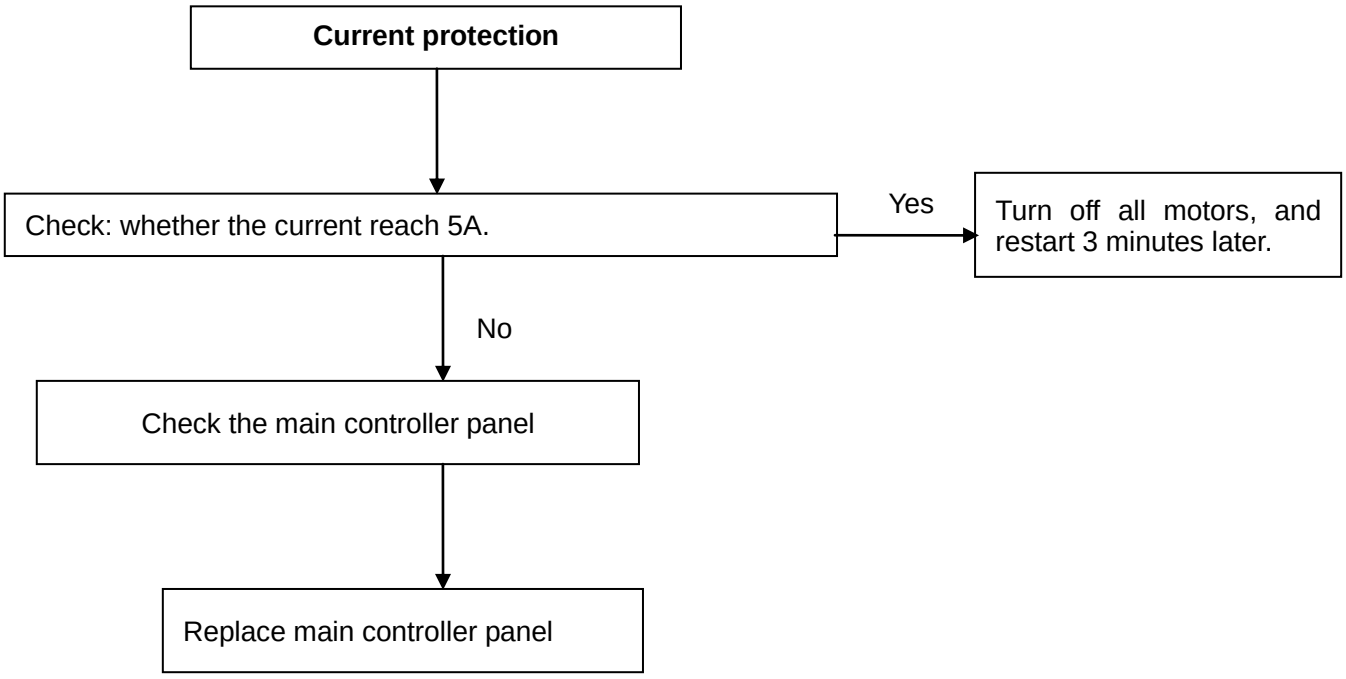


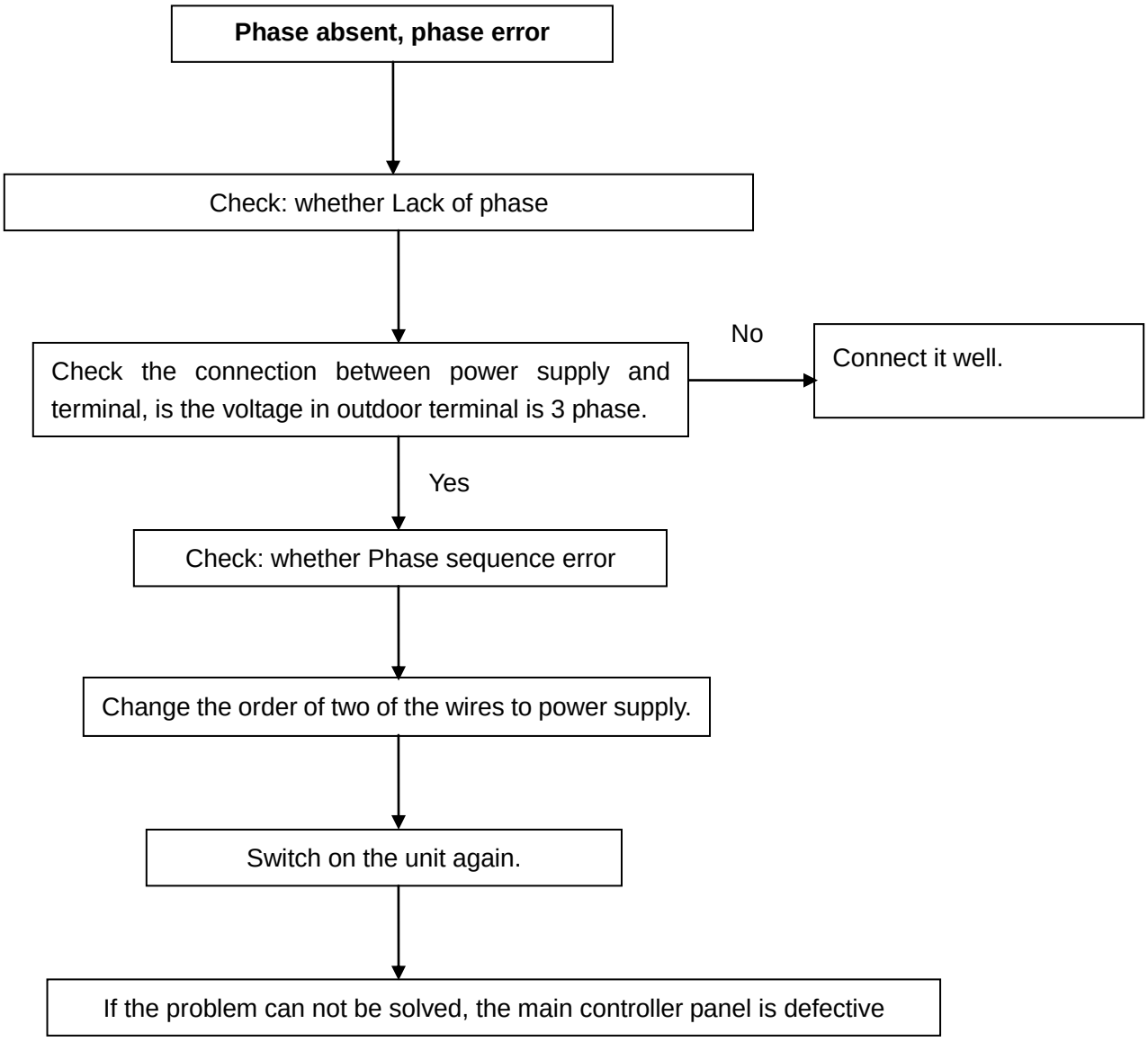
T1 temp. sensor: site at the return air cavity.

T4 temp. sensor: site at the outdoor air inlet cavity.

14.2 Troubleshooting





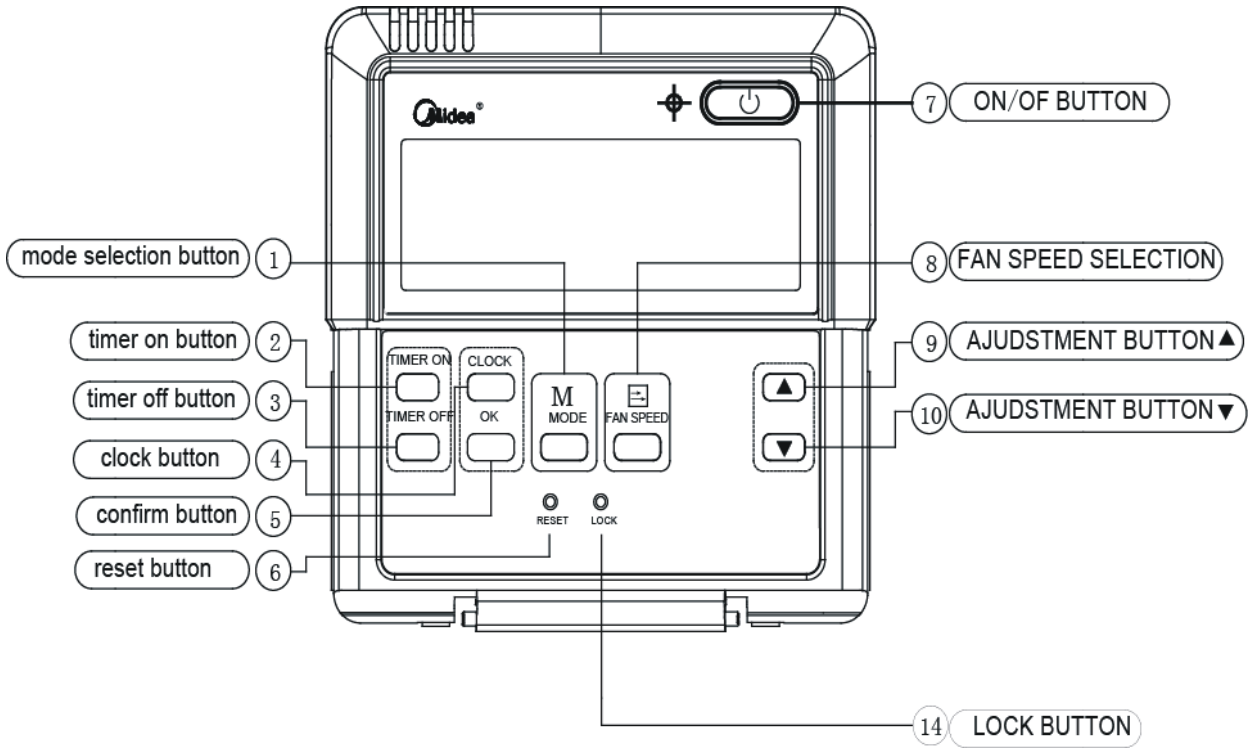

Phase absent, phase error
Check: whether Lack of phase
Check the connection between power supply and terminal, is the voltage in outdoor terminal is 3 phase.
No
Connect it well.
Yes
Check: whether Phase sequence error
Change the order of two of the wires to power supply.
Switch on the unit again.
If the problem can not be solved, the main controller panel is defective

15. Maintenance

1. During new use stage, one should check the fan operation regularly.
2. The cleaning regulation for filter mesh depends on local environment. It could be clean by vacuum dirt exhauster or water, if heavy dust accumulates, it should use neutral detergent to clean it, and then dry it in shady and cool place for 20 to 30 minutes and replace it.
3. Clean the core at least 2 years a time by vacuum dirt exhauster to remove dust and foreign substance in the unit assemblies, do not touch the assemblies by exhauster and flush by water to avoid core damage.
4. Check the fan every half a year to maintain the well balance of it and check whether the axletree has loosed.

16. Controller

KJR-27B/E:



The basic operation conditions of wired controller are as follows:

1. The range of power supply voltage: the voltage input is 5V DC.
2. Ambient temperature range: -15℃～+43℃.
3. Ambient humidity range: RH40%～RH90%.
4. The safety certification of electric control should conform to GB4706.32-2004, GB/T7725-2004.

16.1 Name and functions of buttons on wired controller

1 Mode selection button:

It is used to select mode, push the button one time, then the operation modes will change in turn as follows: AUTO→HEAT RECOVERY→EXHAUST→BYPASS→SUPPLY

2 Timer on button:

Push the button to set TIMER ON, each time you push the button the time moves forward by o.5 hours. When the set time is over 10 hours, each time you push the button the time moves forward by 1 hour. If want to cancel the TIMER ON, then adjust the time of TIMER ON as 0.0

3 Timer off button:

Push the button to set TIMER OFF, each time you push the button the time moves forward by o.5 hours. When the set time is over 10 hours, each time you push the button the time moves forward by 1 hour. If want to cancel the TIMER OFF, then adjust the time of TIMER OFF as 0.0

4 CLOCK button:

Normally display the clock set currently (display 12:00 for the first electrifying or resetting). When push the button for 4 seconds, the hour part on the clock display flashes every 0.5 seconds, then push button ▲ and ▼ to adjust hour; push the button CLOCK again, the minute part flashes every 0.5 seconds, then push and button to adjust minute. When set clock or alter clock setting, must push the confirm button to complete the setting.

5 Confirm button:

The button is used at the state of CLOCK adjustment. After select the time, push the button to confirm then

exit, the current clock will display.

6 RESET button (hidden):

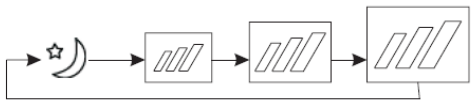
Use a small stick with a diameter of 1mm to push the RESET button to cancel the current settings and get into the condition of resetting

7 ON/OFF button:

Push the button at the condition of OFF, the OPERATION lamp lights, and the wire controller enters into ON operation, simultaneously sends the information of operation mode set currently, temperature, fan speed, timer etc. Push the button at the condition of ON, the OPERATION lamp extinguishes simultaneously sends the OFF. If having set TIMER ON or TIMER OFF, the wire controller will cancel these settings before entering into OFF, close the concern indicator, and then send the OFF information.

8 Fan speed selection button (FAN SPEED)

Select any one fan speed from "", "LOW"," MED", and "HIGH". Each time push the button, the fan speed will change in turn as follow.



9 Adjustment button:

The button is only for time adjustment. Push the ▲ button, time increases.

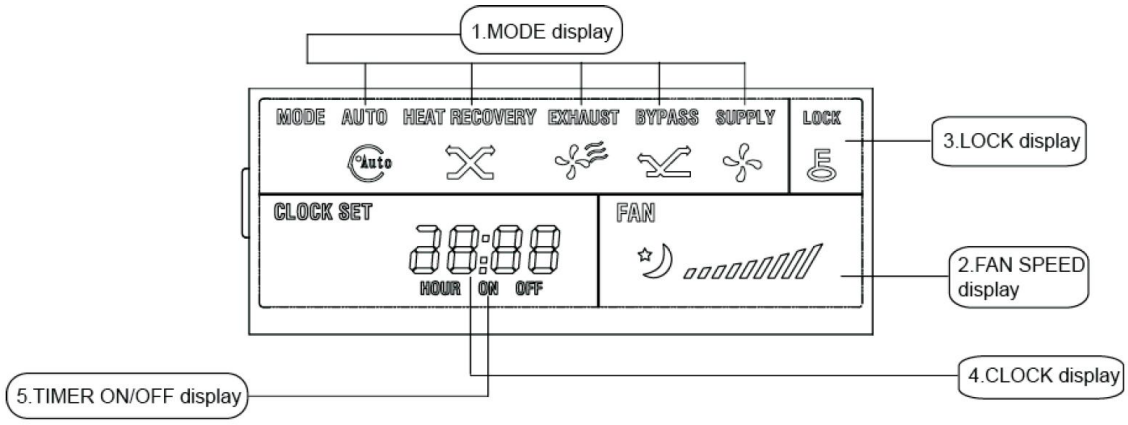
10 Adjustment button:

The button is only for time adjustment. Push the ▼ button, time decreases.

11 LOCK button (hidden):

Use a small stick with the diameter of 1mm to push the LOCK button to lock the current setting, push the button again then cancel the setting.

16.2 Name and functions of LCD on wired controller



1 Mode select display (MODE):

Press MODE button to select “AUTO”, “HEAT RECOVERY”, "EXHAUST","BYPASS", or "SUPPLY” mode.

2 Fan speed display (FAN SPEED)

Press FAN SPEED to select fan speed from "", "LOW"," MED”, and "HIGH".

NOTE: "" stand for fan working speed in sleep mode.

3 Lock display

Press LOCK to display the icon of LOCK. Press the button again then the icon of LOCK disappears. In the mode of LOCK, all the buttons are invalid except for LOCK button.

4 CLOCK display

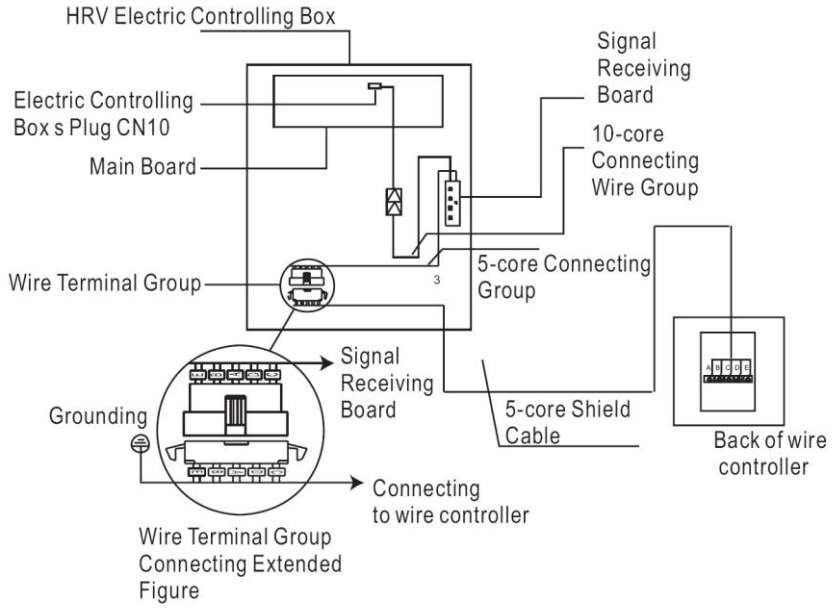
Usually display the clock set currently. Press the button CLOCK for 4 seconds, the HOUR part will flash, press button ▲and▼ to adjust HOUR. Press the button CLOCK again, the minute part flash, press button ▲or▼to adjust MINUTE. After clock set or clock operation, it must press CONFIRM to complete the set.

5 TIMER ON/OFF display:

Display ON at the state of TIMER ON adjustment or after only set the TIMER ON; Display OFF at the state of TIMER OFF adjustment or after only set the TIMER OFF; Display ON/OFF if simultaneously set the mode of TIMER ON and TIMER OFF.

16.3 Installation

Connection method and the principle diagram show as follow:



17. Accessory

Name	Quantity	shape	Purpose
Installation and owner's manual	1		must be delivered to the customer
Butt-joint wire of wire control display panel (6 meters)	1		For connect wire control and display control box
HRV wire controller	1		For controlling HRV units

Annex 1

Characteristic of temp. sensor

Temp.˚C	Resistance KΩ		Temp.˚C	Resistance KΩ		Temp.˚C	Resistance KΩ
-10	62.2756		17	14.6181		44	4.3874
-9	58.7079		18	13.918		45	4.2126
-8	56.3694		19	13.2631		46	4.0459
-7	52.2438		20	12.6431		47	3.8867
-6	49.3161		21	12.0561		48	3.7348
-5	46.5725		22	11.5		49	3.5896
-4	44		23	10.9731		50	3.451
-3	41.5878		24	10.4736		51	3.3185
-2	39.8239		25	10		52	3.1918
-1	37.1988		26	9.5507		53	3.0707
0	35.2024		27	9.1245		54	2.959
1	33.3269		28	8.7198		55	2.8442
2	31.5635		29	8.3357		56	2.7382
3	29.9058		30	7.9708		57	2.6368
4	28.3459		31	7.6241		58	2.5397
5	26.8778		32	7.2946		59	2.4468
6	25.4954		33	6.9814		60	2.3577
7	24.1932		34	6.6835		61	2.2725
8	22.5662		35	6.4002		62	2.1907
9	21.8094		36	6.1306		63	2.1124
10	20.7184		37	5.8736		64	2.0373
11	19.6891		38	5.6296		65	1.9653
12	18.7177		39	5.3969		66	1.8963
13	17.8005		40	5.1752		67	1.830
14	16.9341		41	4.9639		68	1.7665
15	16.1156		42	4.7625		69	1.7055
16	15.3418		43	4.5705		70	1.6469