

Variable-frequency one-drive-two split room air conditioner series

Installation & Maintenance Manual

KFR-50 (28X2) GW2/J0103

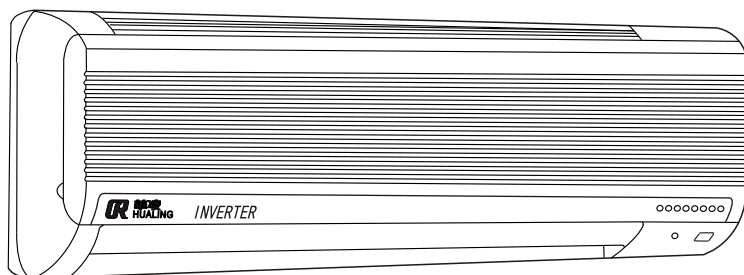
KFR-55 (25+35) GW2/J0101

KFR-60 (35X2) GW2/J0103

KFR-50 (28X2) GW2/J9393

KFR-55 (25+35) GW2/J9393

KFR-60 (35X2) GW2/J9393



Thank you for purchasing Hualing Air Conditioner

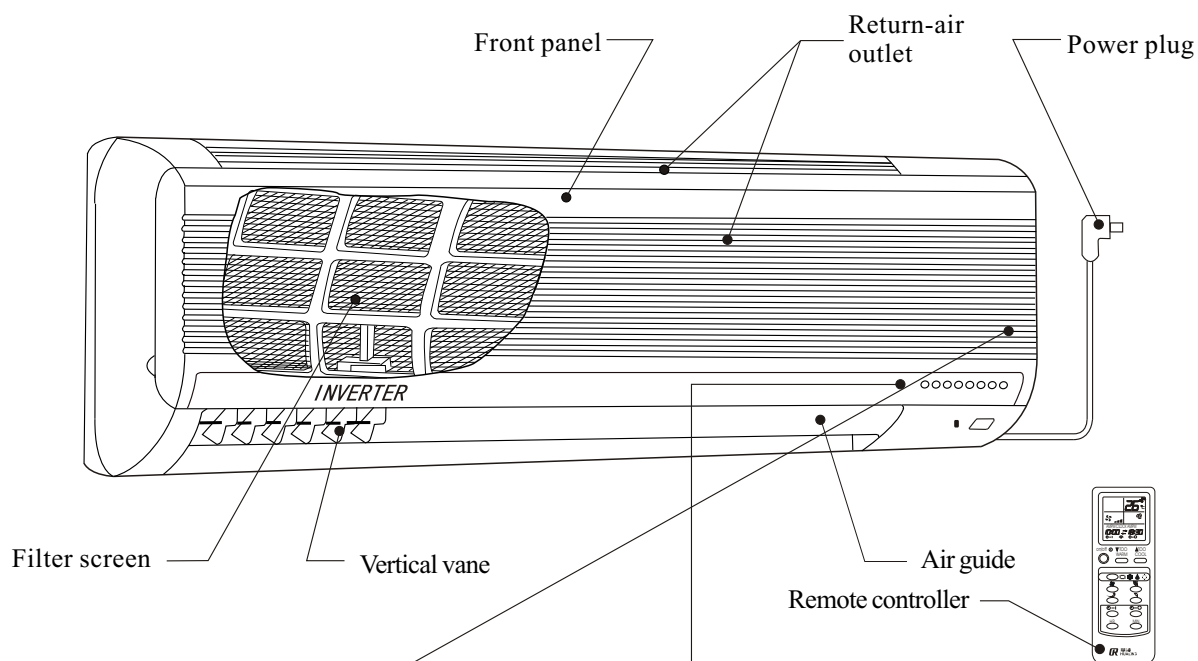
- Before operation, please read the instructions carefully so that you can operate the machine correctly, and keep it properly for future reference.
- In order that your air conditioner can realize satisfied operation and perfect service, please carefully read the “Guide to User Service” attached to this operating instructions, and contact the local “Franchised service department of Hualing Air Conditioner” for installation. If your air conditioner were installed by non-appointed organization, the installation quality would be difficult to be ensured while. In this condition, Company can only offer paid maintenance service.

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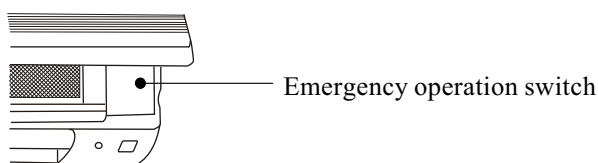
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Introduction to air conditioner parts

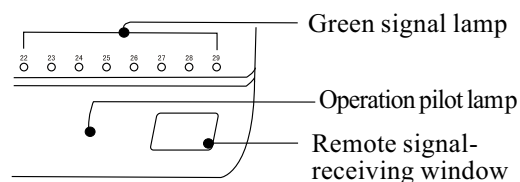
Indoor unit



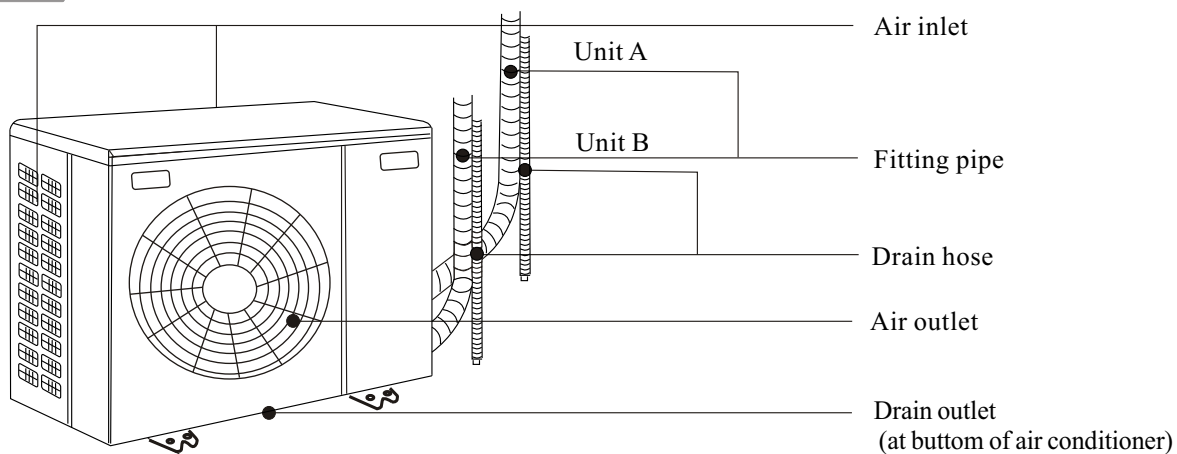
Operation section (with front panel opened)



Display section



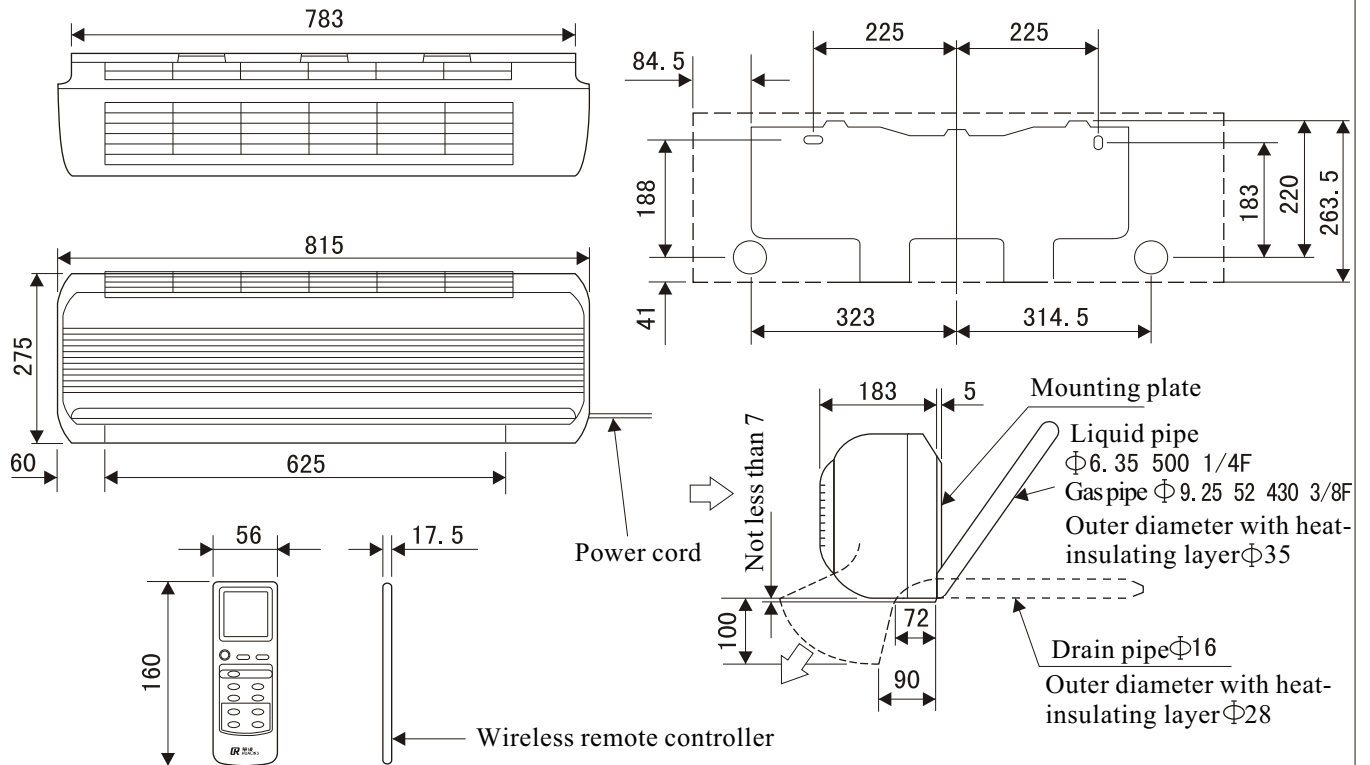
Outdoor unit



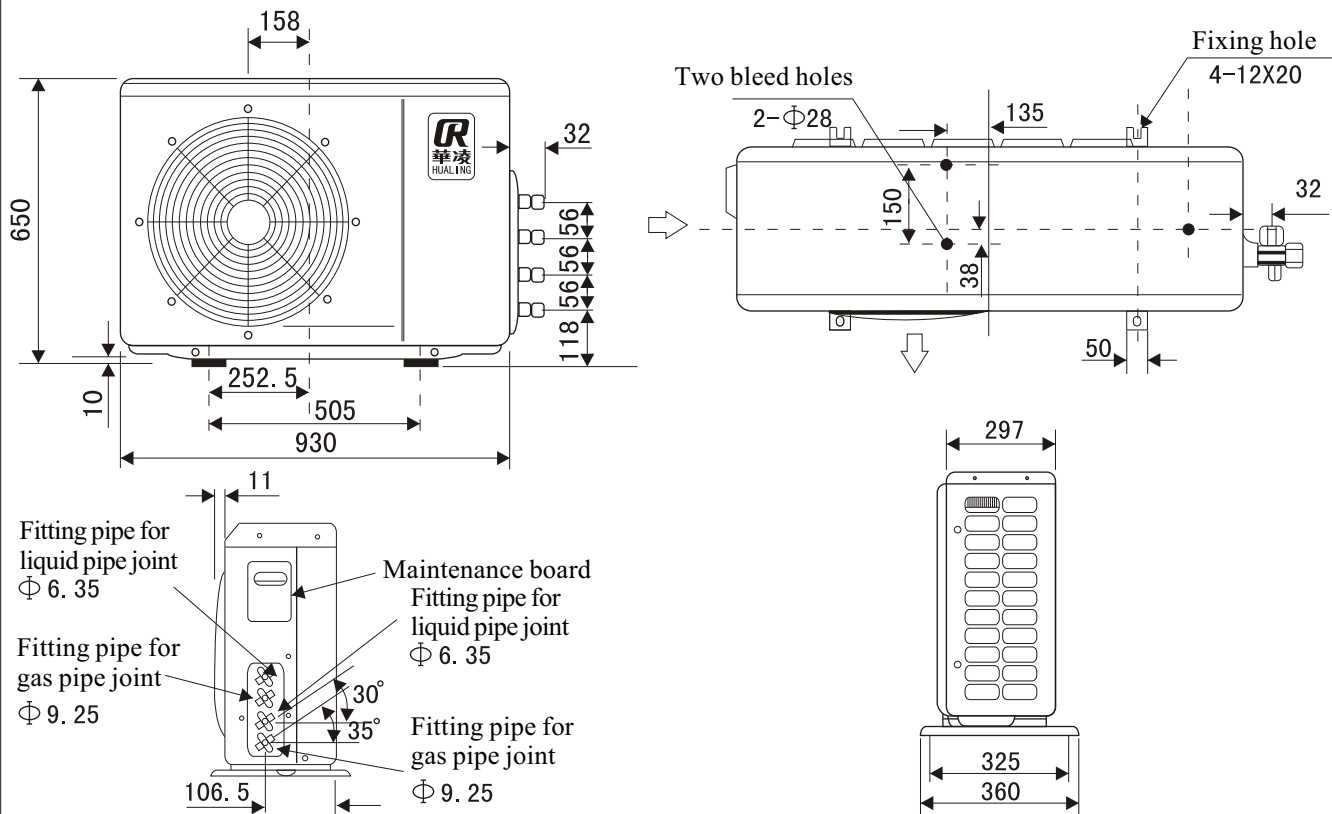
- Since the two sets of indoor unit are designed with identical structure, functions, operating method, repair & maintenance, and troubleshooting methods, the following instructions concerning indoor unit will involve only one of the two.

External dimensions

Indoor unit(KFR-25、28、35G/J01,KFR-25、28、35G/J93)

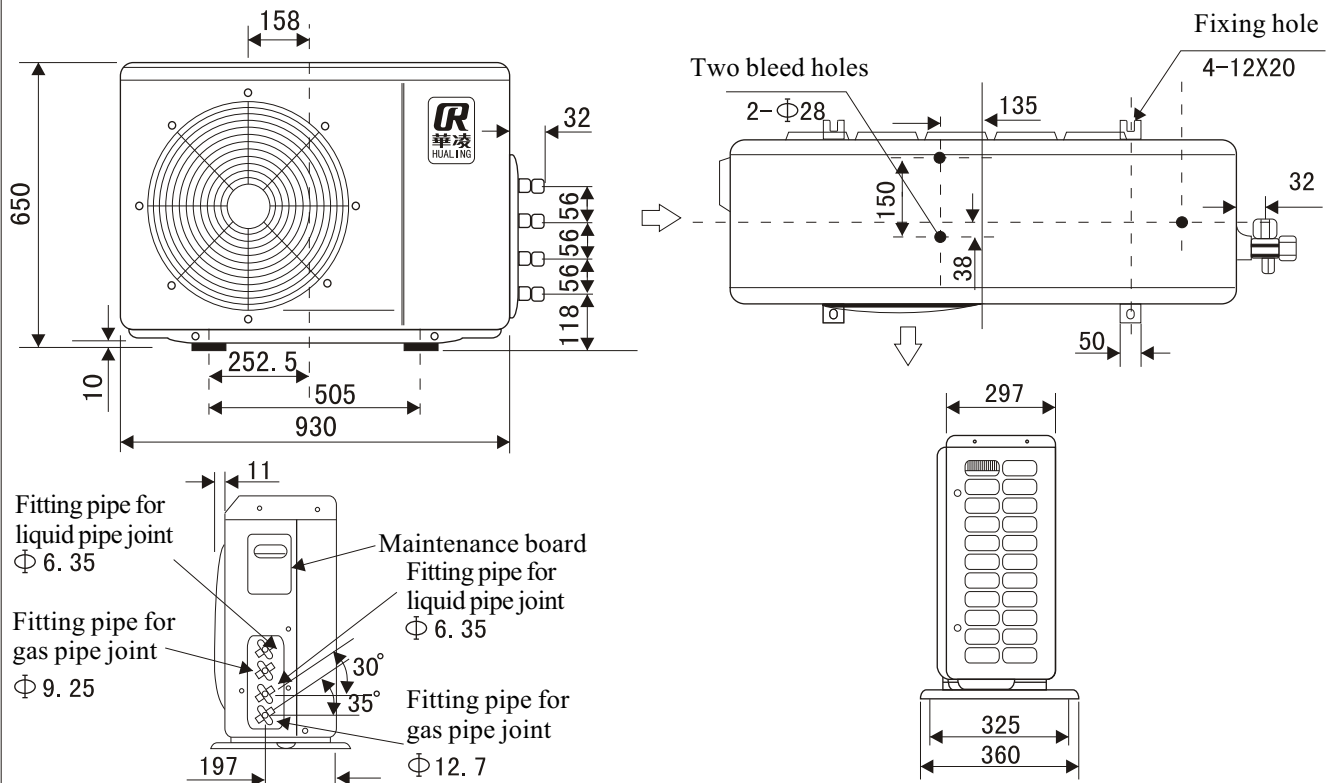


Outdoor unit(KFR-50W2/03,KFR-50W2/93)

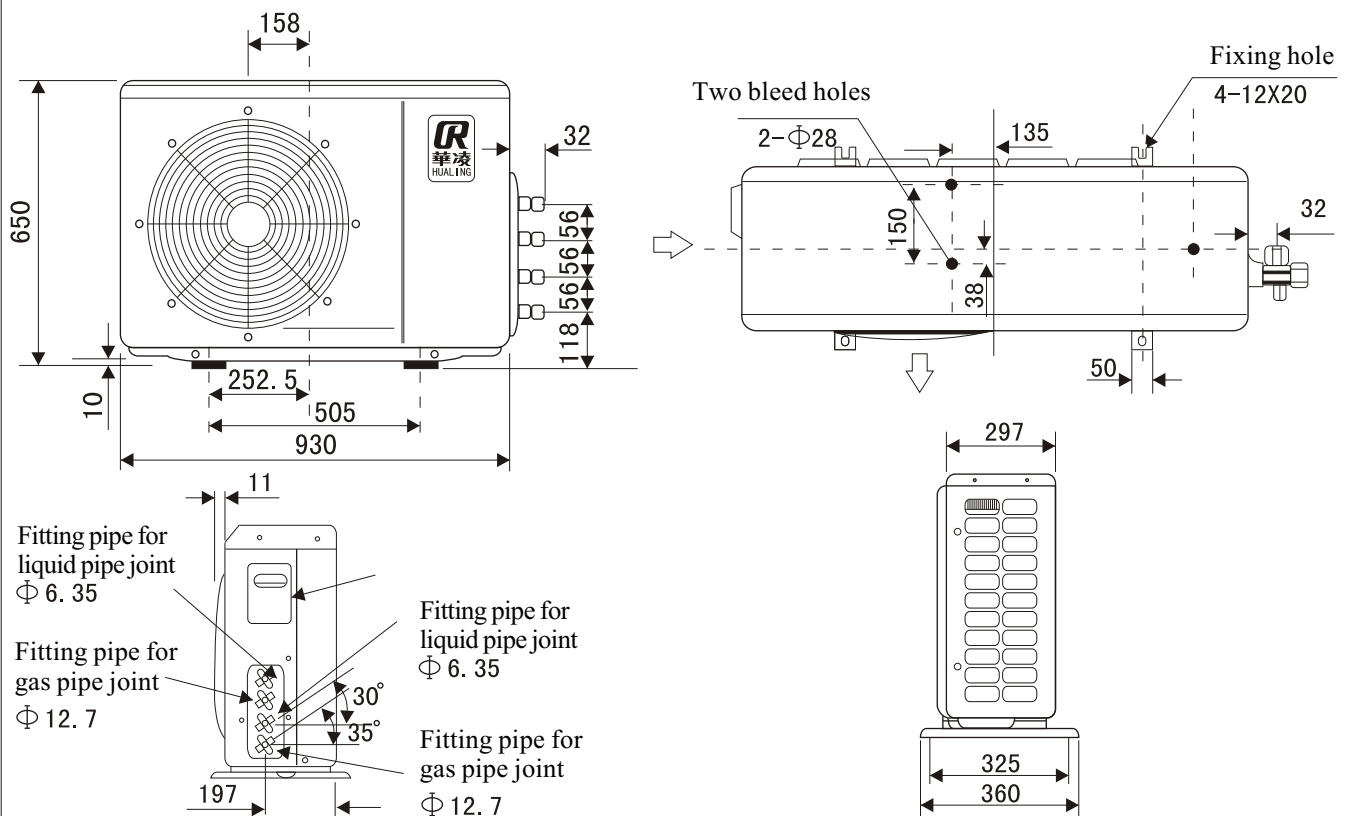


External dimensions

Indoor unit(KFR-55W2/01,KFR-55W2/93)

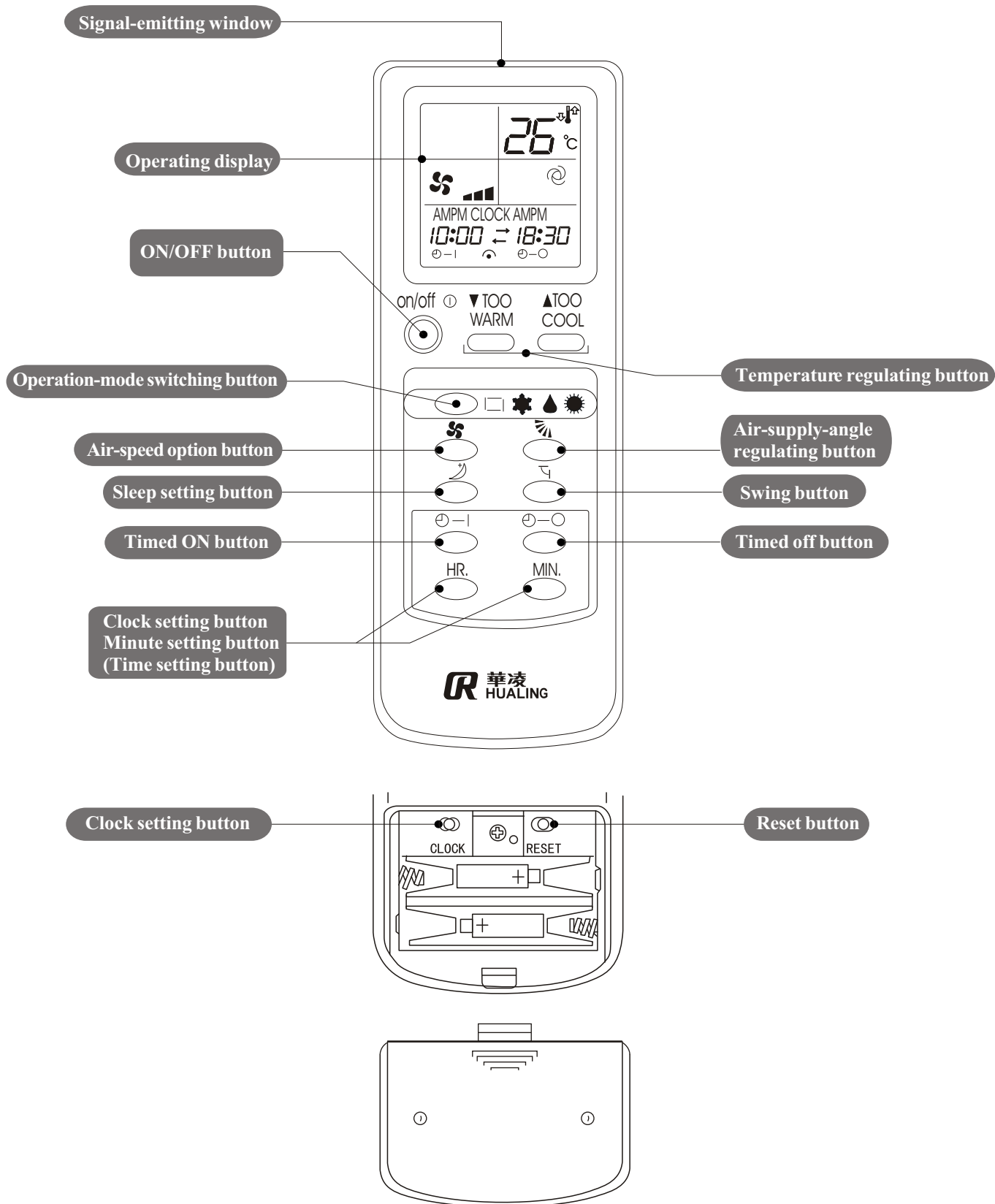


Outdoor unit(KFR-60W2/03,KFR-60W2/93)



Designations and functions of control buttons in remote controller

Hanging remote series controller



Performance parameters

Model			KFR-50 (28X2) GW2/J0103, J9393	
			Single unit	Double unit
Refrigerating capacity /heating capacity	kW		2.8(0.3~4.0)/4.0(0.3~6.0)	5.0(1.0~6.0)/6.8(1.0~8.0)
Input power (refrigerating/heating)	kW		0.9(0.2~1.5)/1.5(0.2~2.5)	1.85(0.4~2.5)/2.3(0.5~3.5)
Rated current (refrigerating/heating)	A		4.5/7.6	9.5/11.6
Power supply			220V~, 50Hz	
Electric data	Service line capacity	A	25	
	Power supply efficiency	%	90	
	Fan-motor current	A	Indoor0.35,Outdoor0.51	Indoor0.35,Outdoor0.51
Compressor	winding resistance (at 20℃)	Ω	0.6	0.6
	Rated input power	W	1320±5%	
	Rated input current	A	7.50±5%	
Indoor fan motor winding resistance (at 20℃)			Main winding 292,secondary winding 324	
Outdoor fan motor winding resistance (at 20℃)			Main winding 120,secondary winding 160	
External dimensions	Indoor unit	Width	mm	815
		Height	mm	275
		Depth	mm	183
	Outdoor unit	Width	mm	930
		Height	mm	650
		Depth	mm	297
Weight	Indoor unit	kg	8	
	Outdoor unit	kg	55	
Indoor unit /outdoor unit noise			dB (A)	
Rotation speed of indoor unit /outdoor unit fan			rpm	
Air-speed steps of indoor unit /outdoor unit			4/3	
Refrigerant replenishment volume			g	
Circulated air output			m ³ /h	
Thermister			kΩ	
			CN202、CN203、CN204 are 10 (25℃),CN201 is 3.3(100℃)	

Performance parameters

Model			KFR-55 (25+35) GW2/J0101, J9393		
			Single unit (25)	Single unit (35)	Double unit
Refrigerating capacity /heating capacity		kW	2.5(0.3~4.0)/4.0(0.3~6.0)	3.5(0.3~4.5)/4.5(0.3~6.8)	5.5(1.0~7.0)/7.4(1.0~9.0)
Input power (refrigerating/heating)		kW	1.0(0.2~2.0)/1.7(0.2~3.0)	1.3(0.2~2.0)/2.0(0.2~3.0)	2.3(0.5~3.5)/2.8(0.5~4.0)
Rated current (refrigerating/heating)		A	5/10	6.5/12	14/16
Power supply			220V~, 50Hz		
Electric data	Service line capacity	A	25		
	Power supply efficiency	%	90		
	Fan-motor current	A	Indoor0.35,Outdoor0.74		Indoor0.35,Outdoor0.74
Compressor	winding resistance (at 20℃)	Ω	0.6		0.6
	Rated input power	W	1640±5%		
	Rated input current	A	11.60±5%		
Indoor fan motor winding resistance (at 20℃)			Ω	Main winding 292,secondary winding 324	
Outdoor fan motor winding resistance (at 20℃)			Ω	Main winding 90,secondary winding 110	
External dimensions	Indoor unit	Width	mm	815	
		Height	mm	275	
		Depth	mm	183	
	Outdoor unit	Width	mm	930	
		Height	mm	650	
		Depth	mm	297	
Weight	Indoor unit	kg	8		
	Outdoor unit	kg	55		
Indoor unit /outdoor unit noise		dB (A)	37/56		
Rotation speed of indoor unit /outdoor unit fan		r pm	1260/800		
Air-speed steps of indoor unit /outdoor unit			4/3		
Refrigerant replenishment volume		g	1900		
Circulated air output		m ³ /h	480	550	550
Thermister		kΩ	CN202、CN203、CN204 are 10 (25℃),CN201 is 3.3(100℃)		

Performance parameters

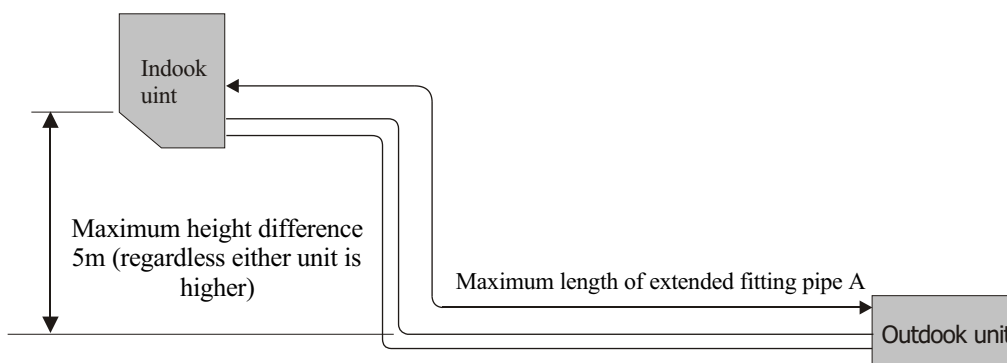
Model			KFR-60 (35X2) GW2/J0103, J9393	
			Single unit	Double unit
Refrigerating capacity /heating capacity	kW		3.5(0.3~4.5)/4.5(0.3~6.8)	6.0(1.0~7.0)/7.6(1.0~9.0)
Input power (refrigerating/heating)	kW		1.3(0.2~2.0)/2.0(0.2~3.0)	2.35(0.5~3.5)/2.8(0.5~4.0)
Rated current (refrigerating/heating)	A		6.5/12.0	14.5/16.0
Power supply			220V~, 50Hz	
Electric data	Service line capacity	A	25	
	Power supply efficiency	%	90	
	Fan-motor current	A	Indoor0.35,Outdoor0.741	Indoor0.35,Outdoor0.74
Compressor	winding resistance (at 20℃)	Ω	0.6	0.6
	Rated input power	W	1640±5%	
	Rated input current	A	11.60±5%	
Indoor fan motor winding resistance (at 20℃)			Main winding 292,secondary winding 324	
Outdoor fan motor winding resistance (at 20℃)			Main winding 90,secondary winding 110	
External dimensions	Indoor unit	Width	mm	815
		Height	mm	275
		Depth	mm	183
	Outdoor unit	Width	mm	930
		Height	mm	650
		Depth	mm	297
Weight	Indoor unit	kg	8	
	Outdoor unit	kg	55	
Indoor unit /outdoor unit noise			dB (A)	
Rotation speed of indoor unit /outdoor unit fan			rpm	
Air-speed steps of indoor unit /outdoor unit			4/3	
Refrigerant replenishment volume			g	
Circulated air output			m ³ /h	
Thermister			kΩ	
			CN202、CN203、CN204 are 10 (25℃),CN201 is 3.3(100℃)	

Refrigerating circuit

Maximum length of fitting pipe

Model	Maximum length of extended fitting pipe A (m)	Outer diameter of fitting pipe : (mm)	
		Gas pipe	Liquid pipe
KFR-50 (28X2) GW2/J0103	10	9.52	6.35
KFR-55 (25+35) GW2/J0101	10	9.52/12.7	6.35
KFR-60 (35X2) GW2/J0103	15	12.7	6.35
KFR-50 (28X2) GW2/J9393	10	9.52	6.35
KFR-55 (25+35) GW2/J9393	10	9.52/12.7	6.35
KFR-60 (35X2) GW2/J9393	15	12.7	6.35

Maximum height difference



Refrigerant replenishment (R22)

Connection fitting pipes of our indoor/outdoor unit are divided into the sizes 3m, 5m, and 7m. If the length of fitting pipe is over 7m, it is required to replenish refrigerant.

Replenishing volume of refrigerant should be calculated according to the following formula:

$$\text{Replenishing volume (g)} = 30\text{g/m} \times (A - 7)$$

For example:

A indicates length of fitting pipe (m), and its maximum value is 10m or 15m.

Model	Existing refrigerant volume (g) of outdoor unit (outdoor unit)	Extended length of fitting pipe and replenishing volume		
		7m	10m	15m
KFR-50 (28X2) GW2/J0103	1900	0	90	—
KFR-55 (25+35) GW2/J0101	1900	0	90	—
KFR-60 (35X2) GW2/J0103	1900	0	90	240
KFR-50 (28X2) GW2/J9393	1900	0	90	—
KFR-55 (25+35) GW2/J9393	1900	0	90	—
KFR-60 (35X2) GW2/J9393	1900	0	90	240

Microcomputer control principle

Wireless remote controller

Once the control content is set properly, turn on the power supply switch, identical operation will be repeated.

Press a button in remote controller, and the indoor unit will give out a sound “toot” when it receives a signal.

When you want to restart up the unit, the “function for 3-minute delay protection” will be activated, and the compressor cannot be started up within 3 minute after shutdown, avoiding overload.

Run of “temperature-regulating operation” (I FEEL ···↔↔)

(I) Utilization of “temperature-regulating operation”

1. Press ON/OFF button in remote controller, operation pilot lamp of indoor unit is on, and it gives out a sound “toot”.
2. Utilize “peration-mode switching button” to select “emperature-regulating operation” (I FEEL ···), a sound “toot” can be heard.
3. Operation mode depends on initial temperature at startup, and the mode setting cannot be changed by later variation in room temperature.

Initial room temperature	Operation mode
Over 25 °C	Refrigerating operation of “temperature-regulating operation”
23 °C ~ 25°C	Dehumidifying operation of “temperature-regulating operation”
Below 23 °C	Heating operation of “temperature-regulating operation”

Note: 1. In timed ON mode, operation mode depends on room temperature at startup.

4. Initial temperature setting depends on initial temperature within the first 2 minutes after air conditioner startup.

Operation mode	Initial room temperature	Initial room-temperature setting
Refrigerating operation of “temperature-regulating operation”	Over 25 °C	24 °C
Dehumidifying operation of “temperature-regulating operation”	23 °C ~ 25°C	CInitial room temperature minus 2 °C
Heating operation of “temperature-regulating operation”	Below 23 °C	26 °C

5. “Temperature regulation” button ( )

In “temperature regulation” (I ···↔↔ FEEL) mode, temperature setting will be preset by microcomputer according to initial room temperature (as shown in table above). In addition, if you feel too cold or hot, just use “temperature regulation” button to control temperature setting. Press “temperature regulation” button, and the indoor unit will give out a sound “toot”.


Intelligentized logic control (which only runs in “emperature-regulating operation” mode)


If you press “temperature regulating” button (TOO COOL or TOO WARM), microcomputer will determine the user's temperature favorite and automatically preset temperature according to the detected room temperature and the frequency at which the user presses “temperature regulating” button; this is referred to as “intelligentized logic control”

Microcomputer control principle

Note:

In dehumidifying operation mode of “temperature-regulating operation” (I FEEL . . . DRY), temperature setting cannot be changed.

Press “” to raise temperature setting for 1~2 °C

Press “” to reduce temperature setting for 1~2 °C

When the system is in operation (automatic or manual refrigeration, manual dehumidification), the operation pilot lamp is on; as to the green signal lamps, the lamps displaying temperature setting are on while the lamps displaying room temperature flicker.

For example:

When room temperature is 24 °C, green signal lamp displays as below:

When it is 23.5 °C < room temperature < 24.5 °C, room temperature indicator flickers at 24 °C.

When temperature setting is equal to room temperature, temperature setting indicator will take the priority to be on.

If temperature setting is lower than 21 °C, temperature setting indicator is on at 21 °C; if room temperature is lower than 21 °C, room temperature indicator will flicker at 21 °C.

If temperature setting is higher than 30 °C, temperature setting indicator at 30 °C ON; if room temperature is higher than 30 °C, room temperature indicator will flicker at 30 °C.

If the system is operated by emergency operation switch, room temperature indicator will be on at 24 °C.

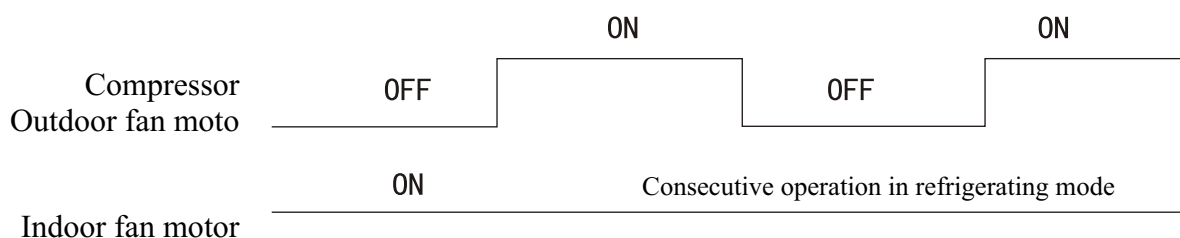
When the system is shut down, operation indicator and green signal lamp will be off.

When timed OFF is preset, indicator will be off along with the system shutdown.

When timed ON is preset, operation indicator will be ON, and green signal lamp will be off.

(II) Refrigerating mode of “temperature-regulating operation”

1. Control method



2. Antifrosting protection of indoor heat exchanger

In refrigerating operation, when temperature of indoor unit's coil pipe is down to $\leq 8^{\circ}\text{C}$, the indoor heat exchanger enters into antifrosting protection; in antifrosting protection mode, corresponding variations of temperature points and compressor frequency are shown as below:

$T \text{ coil pipe} \geq 9^{\circ}\text{C}$	Independent
$8^{\circ}\text{C} \leq T \text{ coil pipe} < 9^{\circ}\text{C}$	Frequency unchanged
$6^{\circ}\text{C} \leq T \text{ coil pipe} < 8^{\circ}\text{C}$	-2Hz/20s
coil pipe $< 6^{\circ}\text{C}$	The unit runs at zero frequency for 3 minutes
$T \text{ coil pipe} \geq 8^{\circ}\text{C}$	The unit runs at zero frequency for 4 minutes, and it restores normal operation

Microcomputer control principle

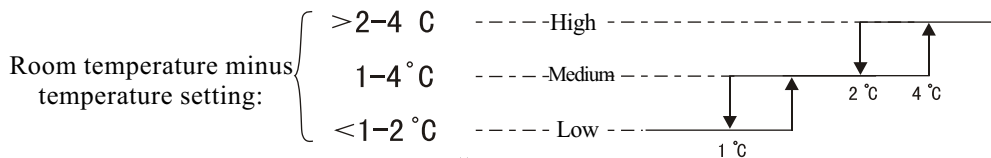
3. High-temperature protection of outdoor heat exchanger

In refrigerating operation, temperature T of outdoor unit's coil pipe rises to $\geq 58^\circ\text{C}$, it enters into high-temperature protection of outdoor heat exchanger; in high-temperature protection mode, the corresponding variations of temperature points and compressor frequency are shown as below:

$T \text{ coil pipe} < 52^\circ\text{C}$	Unindependent
$52^\circ\text{C} \leq T \text{ coil pipe} < 58^\circ\text{C}$	Frequency unchanged
$58^\circ\text{C} \leq T \text{ coil pipe} < 64^\circ\text{C}$	-2Hz/20s
coil pipe $< 64^\circ\text{C}$	Compressor stops operating
$T \text{ coil pipe} \geq 52^\circ\text{C}$	Compress or restores normal operation

4. Indoor fan runs at speed setting

The following are fan speeds in “automatic” (AUTO) mode



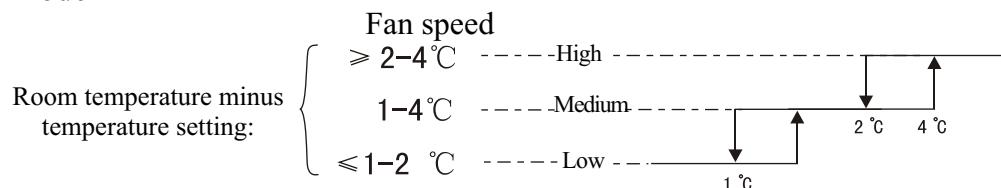
(III) Dehumidifying operation of “temperature-regulating operation”

- The system refrigerating circuit for dehumidifying operation and refrigerating operation is the same;
- Compressor and indoor fan are controlled by temperature and microcomputer;
- For dehumidifying operation free of obvious reduction of room temperature, indoor circulated air output will be reduced.
- Compressor's operation frequency is 35Hz-85Hz, and it detailed operation method is as below:
 - if temperature setting range is 16°C - 31°C , temperature setting will be indoor temperature minus 2°C according to dehumidifying operation method.
 - Select dehumidifying operation mode:
 - When $\Delta T \geq 0^\circ\text{C}$, it enters into dehumidifying operation, indoor blower fan runs for sleeping air supply, and it is unadjustable; in single-unit operation, compressor runs at 35Hz; in double-unit operation it runs at 40Hz-60Hz.
 - Room-temperature over-cooling protection: during dehumidifying operation, when $\Delta T < 0^\circ\text{C}$ or indoor temperature $\leq 13^\circ\text{C}$, compressor stops operation.
 - In dehumidifying operation, indoor blower fan automatically turns to sleeping air supply, speed regulation of outdoor blower fan is identical with that for refrigerating operation.

(IV) Heating operation of “temperature-regulating operation”

1. Indoor-fan speed control

(1) In AUTO mode



Microcomputer control principle

(2) Cold air prevention

- When temperature of indoor coil pipe is lower than 27°C , higher than or equal to 24°C , indoor blower fan runs for sleeping air supply;
- When temperature of indoor coil pipe is higher than 27°C , lower than or equal to 35°C , indoor blower fan runs for low air supply;
- During operation, when temperature of indoor coil pipe is gradually down to 30°C , indoor blower fan runs for sleeping air supply; when temperature of indoor coil pipe is down to below 22°C , indoor blower fan stops operation;
- When temperature of indoor coil pipe is higher than 35°C , indoor blower fan runs at speed setting;
- At shutdown in heating mode, when temperature of indoor coil pipe is higher than or equal to 31°C , indoor blower fan will run for another 40 seconds to supply remaining heat.

2. Overheat protection of coil pipe of indoor heat exchanger

In heating operation, temperature T of indoor coil pipe rises to $\geq 50^{\circ}\text{C}$ for consecutive 20 seconds, it enters into overheat protection of coil pipe of indoor heat exchanger. In overheat protection mode, the corresponding variations of temperature points and compressor frequency are as below:

$T \text{ coil pipe} \leq 48^{\circ}\text{C}$	Unindependent
$48^{\circ}\text{C} < T \text{ coil pipe} \leq 56^{\circ}\text{C}$	Frequency unchanged
$56^{\circ}\text{C} \leq T \text{ coil pipe} < 64^{\circ}\text{C}$	-2Hz/20s
$\text{coil pipe} > 64^{\circ}\text{C}$	Last for 1 minute, the unit will run at zero frequency
$T \text{ coil pipe} \leq 48^{\circ}\text{C}$	compressor restores normal operation

3. Defrosting operation

After compressor runs in heating mode for over 40 minutes, it consecutively detects temperature of outdoor coil pipe and outdoor ambient temperature. If one of the following conditions is satisfied for 5 minutes, it enters into defrosting mode.

- $T_{\text{ambient}} \geq 5^{\circ}\text{C}$ and $T \text{ outdoor coil pipe} \leq -3^{\circ}\text{C}$
- $-5^{\circ}\text{C} < T_{\text{ambient}} < 5^{\circ}\text{C}$ and $T \text{ outdoor coil pipe} > 7^{\circ}\text{C}$
- $T_{\text{ambient}} < -5^{\circ}\text{C}$ and $T \text{ outdoor coil pipe} \leq -12^{\circ}\text{C}$

Compressor will reduce frequency at a rate of 1HZ/S. 55 seconds after compressor shutdown, indoor/outdoor blower fan stop operation, four-way valve is power off; after 1 minute, compressor will rise to a frequency of 90HZ at a rate of 1HZ/S. the openness of electronic expansion valve is 480 impulses. In defrosting operation, it consecutively detects the temperature of outdoor coil pipe and times once defrosting operation begins. when temperature rises to $\geq 12^{\circ}\text{C}$, or defrosting operation time reaches 8 minutes, the defrosting operation will be terminated, and the compressor will stop operating at 1HZ/S. After 30 seconds, outdoor blower fan begins operation; 10 seconds later, four-way valve is powered on; 20 seconds later, the compressor is started up for normal operation while indoor blower fan runs in heating mode against cold air. In defrosting operation, anti-frosting protection is stopped. Indoor blower fan runs in heating mode against cold air.

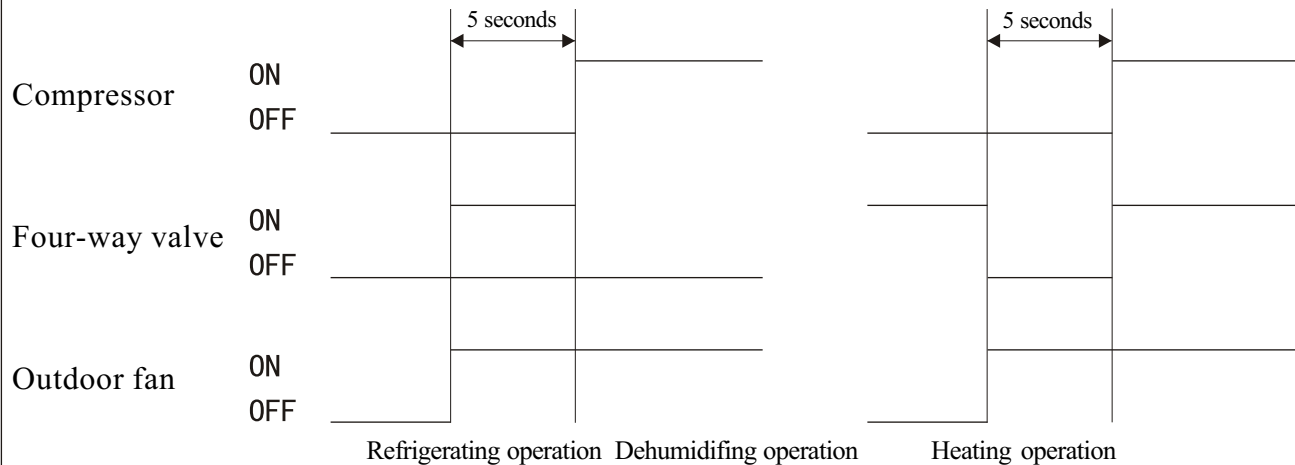
Microcomputer control principle

4. Control of four-way valve

Heating operationON (coil powerd on)

Refrigerating operation.....ON (coil powered off)

Dehumidifying operation.....ON (coil powered off)



Note: four-way valve will commutate for 5 seconds after compressor startup. when it is not powered off because of shutdown , four-way valve will remain in heating mode for 2 minutes before commutation.

Refrigerating operation (❄️)

1. Press ^{on/off} button

Indoor unit's operation pilot lamp is on and it gives out a sound “toot” .

2. Select refrigerating mode (❄️).
3. Use temperature-regulating button (together with buttons TOO WARM and TOO COOL) to select temperature setting.

Regulating range is 16 °C~31 °C.

Consecutive operation of indoor fan is independent of temperature control circuit.

Dehumidifying operation (💧)

1. Press ^{on/off} button

Indoor unit's operation pilot lamp is on and gives out a sound “toot ” .

2. Select dehumidifying mode (💧).
3. Indoor fan runs for sleeping air supply.
4. Temperature setting is room temperature minus 2°C.
5. Temperature regulating button does not function, and other operations are the same with dehumidifying operation mode of “emperature-regulating operation” .
6. When room temperature ≤ 13 C, dehumidifying operation cannot be carried out.


Microcomputer control principle

Heating operation operation ()

1. Press  button

Indoor unit's operation pilot lamp is on and gives out a sound “toot ” .

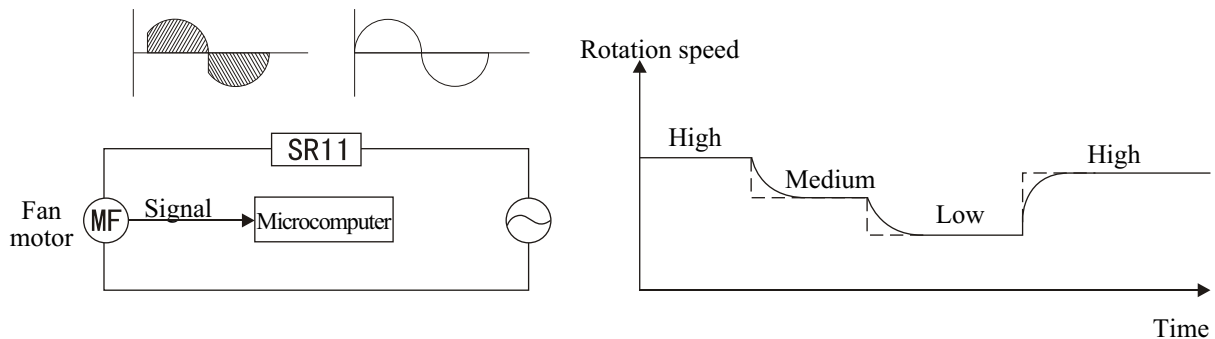
Indoor unit operation , pilot lamp is on and gives out a sound “toot ” .

2. Select heating mode ().
3. Use temperature regulating button to select temperature setting within a range 16 C-31 C.
4. Indoor fan control, overheat protection of indoor coil pipe, and defrosting operation are the same with heating mode of “temperature-regulating operation” .

Fan motor control

1. Rotation speed feedback control

Indoor fan motor is equipped with rotation speed sensor , which feeds back the frequency signals of rotation speed to microcomputer. By the agency of comparing current rotation speed and target rotation speed (high, medium, low, sleep), microcomputer can control solid-state relay D103, regulates fan-motor current so as to force rotation speed to approach rotation speed. By such controls, rotation speed transition can be more smooth at a shift of fan rotation speed.



2. Fan-motor seizing protection

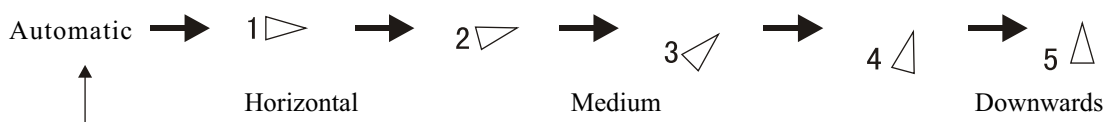
If microcomputer cannot receive feedback signals of rotation speed for 12 seconds, it will consider that the fan motor is seized, cut off fan-motor current, and the operation indicator flickers, displaying trouble in fan motor .

Air guidecontrol ()

1. Vane motor driving

Indoor unit's vane motor is a stepping motor, and its rotation direction, speed and angle is controlled by 12V impulse signals issued by indoor unit microcomputer.

2. Press “ vane control ” (air-supply-angle regulating button), vane angle will be automatically changed according to the following principle.



Microcomputer control principle

3. Positioning

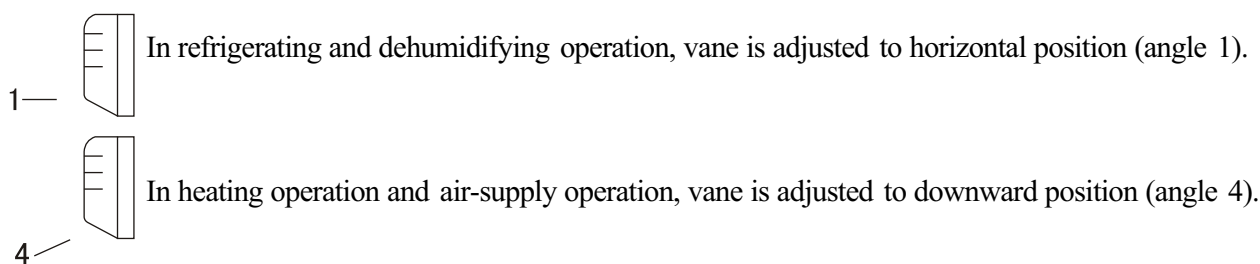
When air-supply angle is changed, vane will firstly turn downwards to its lowest position, and then reach the angle setting.

The following conditions may lead to positioning action:

- (1) When switch button is pressed (ON or OFF);
- (2) When air guide is switched from automatic to manual;
- (3) When swing function is canceled;
- (4) Test run startup;
- (5) When the unit is powered on once again.

4. Automatic functions of vane (🌀)

Microcomputer can automatically make certain the angle and action of vane according to room temperature so that the distribution of room temperature is in optimal status.



5. Condensation prevention

When the unit is in refrigerating or dehumidifying operation, and vane angle is 4 or 5, vane angle will be automatically adjusted to angle 1 so as to avoid condensed water when compressor's accumulated operation time reached 1 hour.

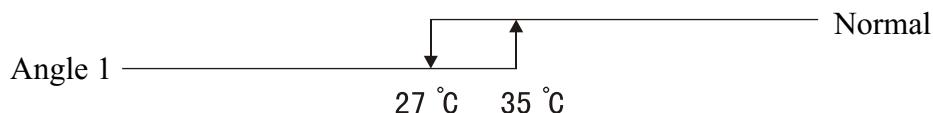
6. Swing function (↕)

Press swing button (↕), vane will swings upward and downward, and the remote controller displays (↕) swing mode. If you press once more the swing button, or if the unit is shut down, or if the mode is changed, or the air-supply-angle regulating button is pressed, swing function will be canceled.

7. Cold air prevention in heating operation

When any of the following conditions occurs, vane angle will be automatically adjusted to angle 1, preventing cold air from blowing at user.

- (1) Compressor does not run.
- (2) Defrosting operation is under way.
- (3) Indoor pipe-temperature thermistor RT12 detects a temperature equal to or below 27 °C
- (4) indoor pipe-temperature thermistor RT12 rises from below 27 °C, but fails to reach 35 °C



Air guide control (🌀)

- (1) Press sleep setting button, indoor fan's rotation speed will be reduced, and air noise will be reduced as well.
- (2) Remote controller displays “🌀” and “🌀”.
- (3) Press air-speed option button “🌀”, sleep function will be canceled.

Microcomputer control principle

Timer operation



1. Timer setting

- (1) Press ON/OFF button to start up air conditioner .
- (2) Check if the current time setting is correct: if current time is not set, timer cannot function. Use clock setting button to set current time.
- (3) Press timed ON button or timed OFF button to select timed operation.

“ ” Timed ON button

“ ” Timed OFF button



- (4) Press clock setting button for “HR” and “MIN” setting.


Time setting is in 10 minutes. Only when the mark “ ” or “ ” is displayed in the display, “HR” and “MIN” button can function, and the mark will flicker for 1 minute.


- (5) When automatic ON function is selected, check if the indoor unit's operation pilot lamp is ON

Note: When you use timing function, ensure that the remote controller should be located at correct position so that its signals can reach the indoor unit. After a power cut or circuit failure, timer should be reset, otherwise deflection or misoperation may occur.

2. Canceling


Timed setting can be canceled by timed control button “ ” or “ ” .

To cancel automatic ON function, press once more the button  .

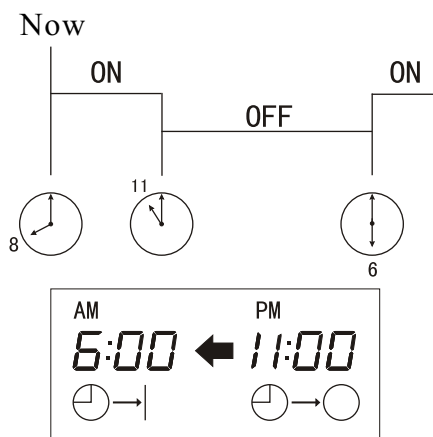
To cancel automatic OFF function , press once more the button  .

Once the timed setting is canceled, setting time will disappear from the display as well.

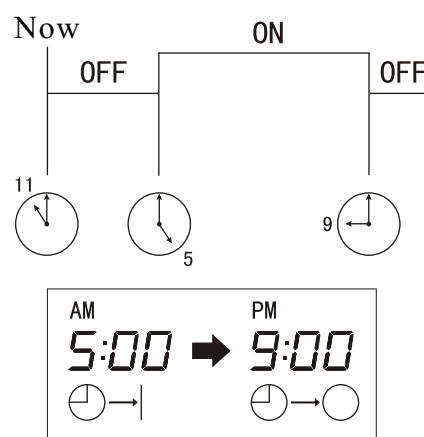
3. Program timer

Automatic startup and automatic stop functions can be unitedly utilized. “ ” displays the action sequence.

Example 1: Now it is 8 PM, shutdown is preset at 11 PM, and startup is preset at 6 AM on the next morning.



Example 2: Now it is 11 AM, startup is preset at 5 PM, and shutdown is preset at 9 PM.

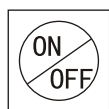
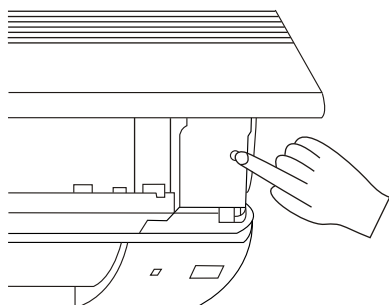


Note: Timing function will be canceled by a power cut or circuit failure,

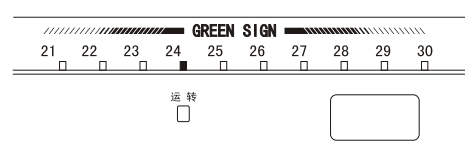
Microcomputer control principle

Emergency -- test run

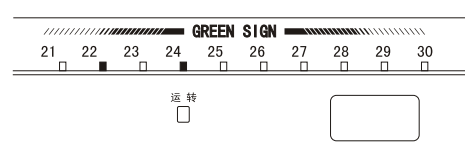
- (1) If remote controller is lost, damaged or its battery is used up, press emergency operation switch on indoor unit's front panel to start up the air conditioner, and the operation pilot lamp is ON.
- (2) The first 30 minutes is for test run, providing convenience for maintenance reference. indoor fan runs at high speed , air conditioner consecutively run, the temperature control loop is on, and timer is normally restored.
- (3) After 30 minutes, air conditioner turns to emergency operation, temperature setting for refrigerating/heating operation is 24 °C , and fan runs at medium speed.
- (4) Let the unit run till you press once more the emergency operation button or a certain button in remote controller, and the air conditioner turns to normal operation
- (5) During emergency operation, antifrosting, heating and defrosting functions can work.
- (6) During emergency heating operation, outdoor unit's defrosting operation can be carried out.
- (7) during test run or emergency operation, ,air guide is in automatic mode, and temperature seting is 24°C .
- (8) During normal operation, do not press emergency operation switch .



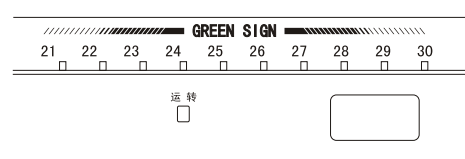
Press once for
refrigerating operation



Press once more for heating operation



Press once more for shutdown



Lamp is on■

Lamp flickers■

Auxiliary functions

Forced defrosting operation in maintenance

Shortcircuit the socket CN105 on outdoor unit's circuit board, defrosting operation function can be compulsorily executed regardless of the interval of defrosting operation. Here the defrosting operation thermister must be $<10^{\circ}\text{C}$.

Time compression function

During maintenance, shortcircuit the socket J1 on indoor control circuit board to compress timed time, as shown below:

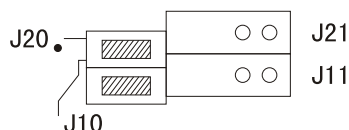
Timed automatic startup: 1 hours 6 minutes
Timed automatic shutdown: 1 hours 6 minutes } Shortcircuit the socket in timed status

Circuit board installation when several sets of air conditioner are controlled indepedently

In a room, at most 4 sets of air conditioner equipped with wireless remote controller can be operated, and here it is required to recondition the circuit board and remote controller if it is necessary to use respective remote controller to control each indoor unit separately.

(1) Recondition of remote controller's circuit board

Before recondition, remove the battery, and the circuit board is printed with:



Note: after recondition is over, replace the battery , and press the reset button

Existing status: several pieces are installed at one side of J10 and J20, and the other side is provided with no substrate.

As shown in table below, weld off substrate J10 and J20, and connect them to J11, J21.

Nos of air conditioners Recondition point	1 set	2 set	3 set	4 set
Unit #1	Recondition is unnecessary	Same as the left	Same as the left	Same as the left
Unit #2	---	Adopt J11 instaed of J10	Same as the left	Same as the left
Unit #3	---	---	Adopt J21 instaed of J20	Same as the left
Unit #4	---	---	---	Adopt J11 instaed of J10 Adopt J21 instaed of J20

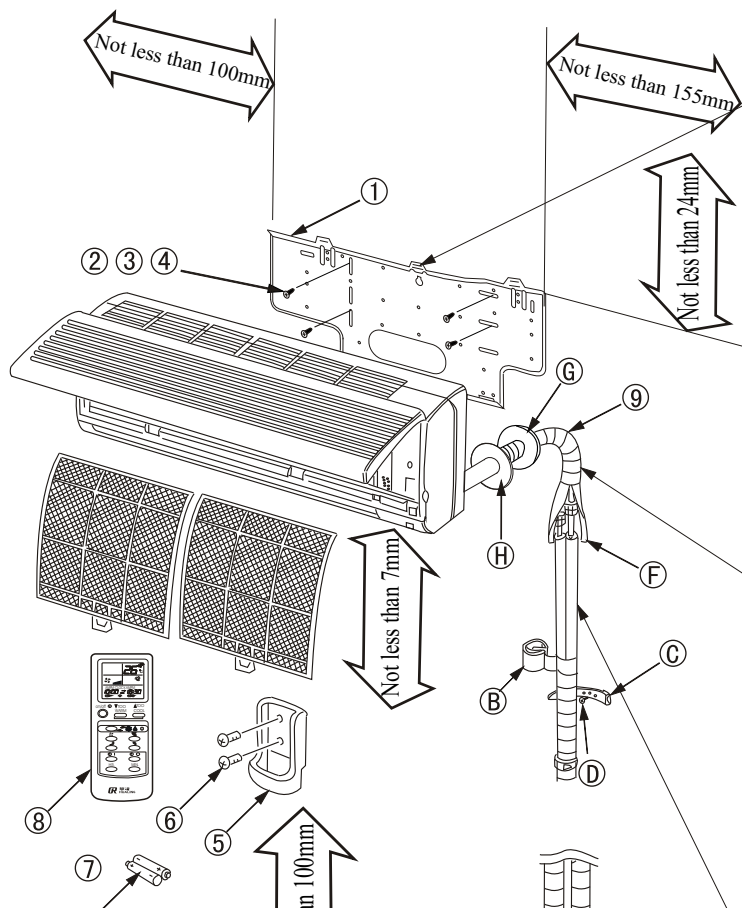
Note: when you cut off power supply or when you set time, indoor unit will not keep the remote signal, and remote controller should transmit signals once more after power supply is restored signal.

Installation instructions

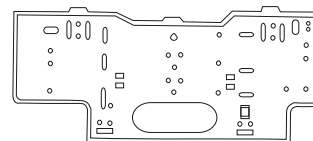
Installation diagram and installation attachments

● Installation diagram

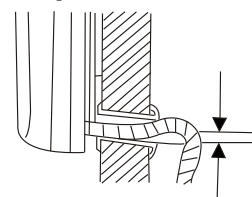
Indoor unit



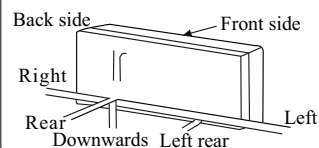
Utilize the marks on indoor unit's mounting plate to determine installing location.



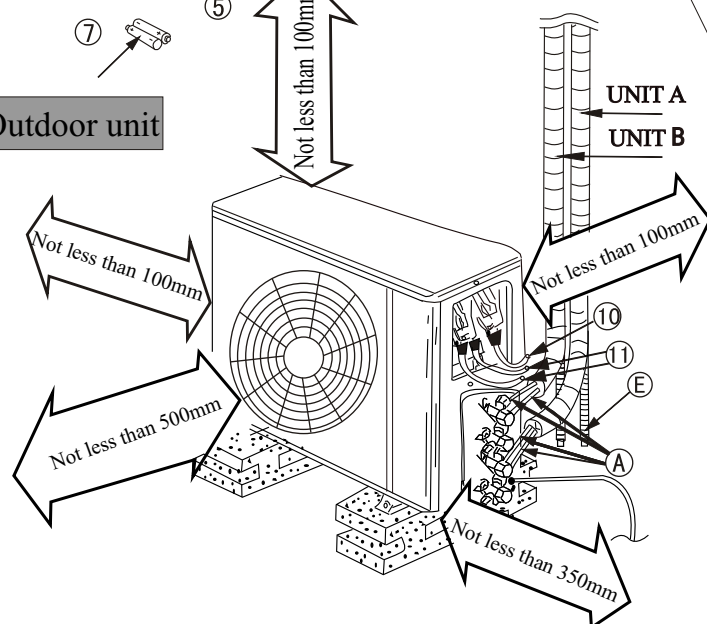
Be careful! Do not let drain hose run up.



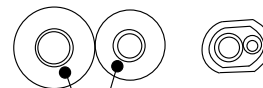
Fitting pipe of pipeline may be led out from back side, right side, lower side, left side or left rear side.



Outdoor unit



Connect the pipeline at two sides, and insulation should be carried out respectively.



Aerated plastics with a thickness of 8mm for heat insulation

If the pipeline is to be installed upon a wall equipped with steel sheet (galvanized sheet) or metal net, plank with a thickness of 20mm should be positioned between the wall and the pipeline, or the pipeline should be wrapped with 7-8 layers of insulating plastic tape.

■ Since the two sets of indoor unit are designed with identical structure and installation mode, the following instructions concerning indoor unit will involve only one of the two.

Installation instructions

Installation attachments

- Before installation, check if the following attachments are complete:

Enclosed attachments		Qty.	Mounting plate		Qty.
1	Mounting plate	2	A	Connecting pipe	2
2	Self-tapping screw ST4*25	10	B	Bandage	4
3	Expansion plug	8	C	Retaining clamp	6
4	Expansion bolt	4	D	Masonry nail	10
5	Remote controller rest	2	E	Drain hose	2
6	Self-tapping screw ST3.5*16	4	F	Open-end pipe casing	2
7	Remote controller battery	4	G	Wall hole cover	2
8	Remote controller	2	H	Indoor wall hole cover	2
9	Felt tape	2	I	Putty	2
10	Connecting cable	2	J	Sealing oil	1
11	Power cord (optional)	1	K	Shockproof rubber foot (optional)	4
12	Duplex drain joint(optional)	1			

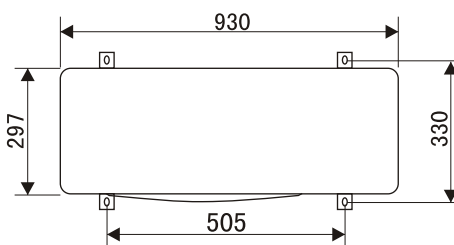
- How to select installing location:

1. How to select installing location for indoor unit

- Air inlet/ air outlet should be far away from obstacles, ensuring that air flow must not be kept back;
- Do not install the unit at a spot with direct sunshine;
- Select a spot convenient for removal of condensed water and easy connection to outdoor unit;
- The distance between the spot and TV set or acoustic equipment should be 1m at least;
- Keep away from fluorescent lamps or incandescent lamps; (otherwise, it is possible that the wireless remote controller cannot not be normally utilized ot controlled)
- Select a solid wall which can bear weight of machine body, free of increase of operating noises or vibration;
- Maximum height difference between indoor unit and outdoor unit should be 5m.
- Installing height of indoor unit must not be lower than 2m.

2. How to select installing location for outdoor unit

- The installing location can bear weight of machine body, free of strong vibration.
- Select a spot with good ventilation, less dust, free of rainwater and direct sunshine;
- Select a spot from which the operating noise and exhausted hot air can not affect the neighbors;
- There should be no obstacles around the outdoor unit, which keep back inlet air/outlet air for the unit;
- Select a spot free of leakage of inflammable gases or erosive gases;
- Outdoor unit should be installed at a spot, which is not easily infused in water. If it must be installed on the ground, ensuring that the unit bottom should be 100mm higher above the ground.

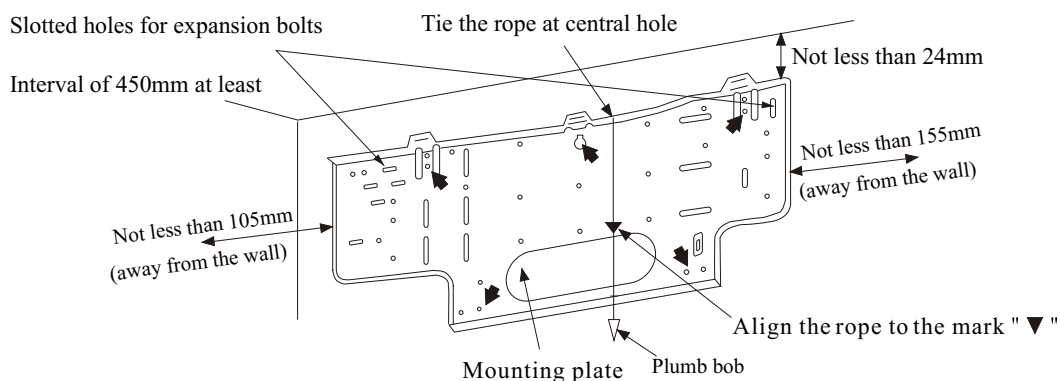


Installation instructions

How to install indoor unit

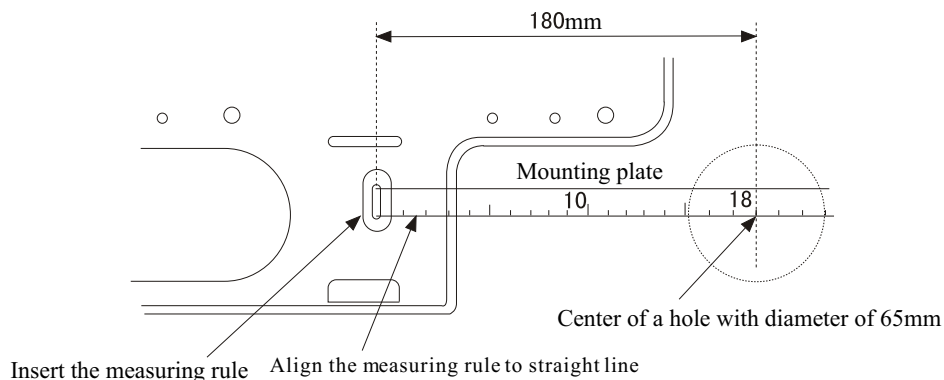
● How to fix the mounting plate

Find a structural member of a wall (e.g. column etc.), and fix the mounting plate onto it horizontally.



- Note: 1. To avoid microshock of mounting plate, the hole pointed at by solid arrow must be secured.
2. If expansion bolt is adopted, it is required to adopt slotted holes 11*20or 11*26 with interval of over 450mm to fix the mounting plate

● Drill holes on the wall



Detailed procedures are shown as below:

1. Determine the position of wall holes according to figures, and the wall hole at left side of mounting plate should be positioned in the same way as right side;
2. Use drill bit to drill a wall hole with diameter of 65mm.

● Power supply and specifications of connecting wires

It is required to use the special lines for air conditioners.

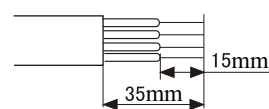
Specifications of power cord for outdoor unit	3-core YZW cable with section area of 2.5mm ²
Specifications of connecting cables for indoor/outdoor unit	4-core YZW cable with section area of 1.5mm ²

Installation instructions

How to install indoor unit

● How to connect wires for indoor/ outdoor units

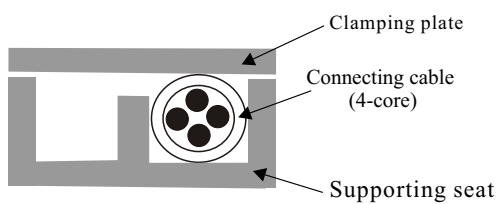
Insulation layer at 2 ends of connecting wire (or extended wire) should be removed. If wire is too long or it is connected at medium section, remove the insulation layer as per dimensions shown in right figure.



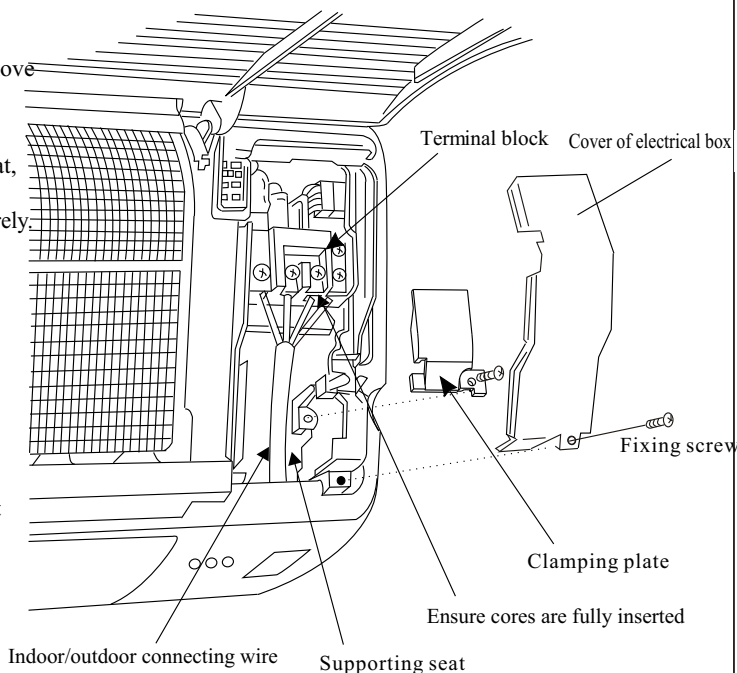
Indoor unit section:

- ❶ Open front panel grille;
- ❷ Remove fixing screws of electrical box cover, and remove cover of electrical box;
- ❸ Remove fixing screws of clamping plate, and remove clamping plate;
- ❹ Lead the connecting cable through hole of supporting seat, connect it to terminal block and plug properly;
- ❺ Replace the clamping plate and cover of electrical box securely.

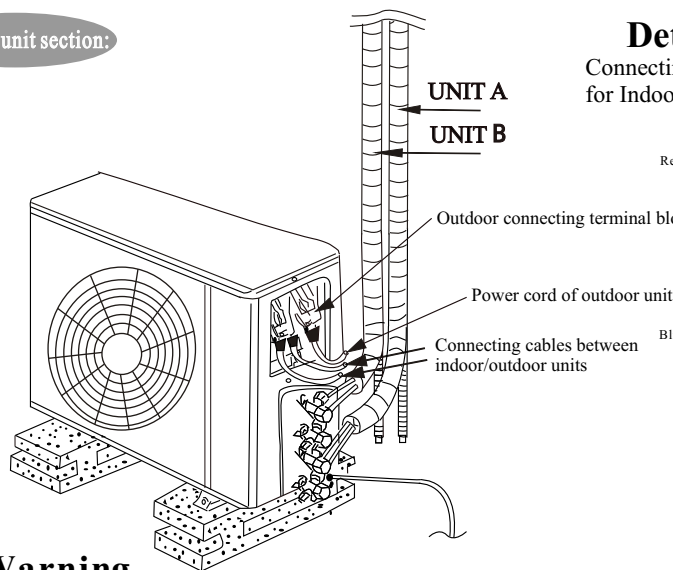
How to fix connecting cable of indoor/outdoor units



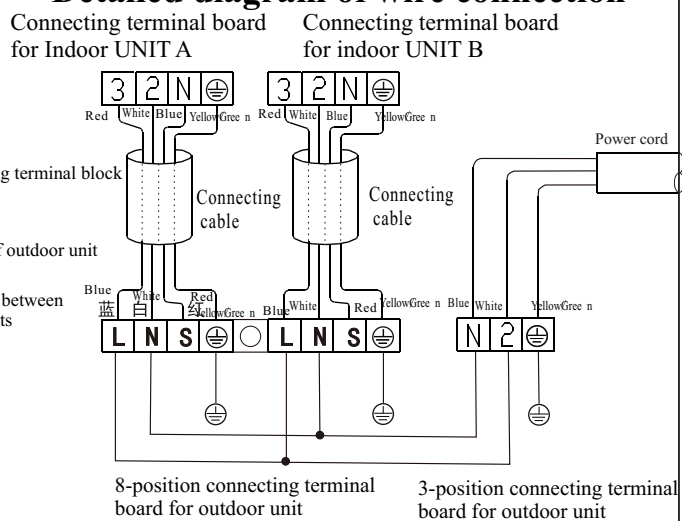
To ensure that the connecting cable is free of application of external forces, do fix the cable as per the method shown in the figure.



Outdoor unit section:



Detailed diagram of wire connection



⚠ Warning

1. It is required to adopt specified cable for wiring between indoor/outdoor units, ensuring that the connecting terminas must be securely fixed, free of the direct influence of external forces. if it is improperly connected or fixed, it is possible to cause a fire.
2. Indoor unit's cover of electrical box must be properly fixed. Otherwise, dust or water might cause a fire or electrical shock.

Installation instructions

How to install indoor unit

● Installation of fitting pipe

1. Precautions:

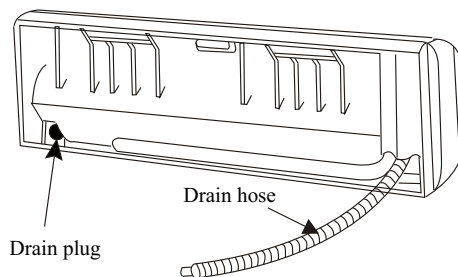
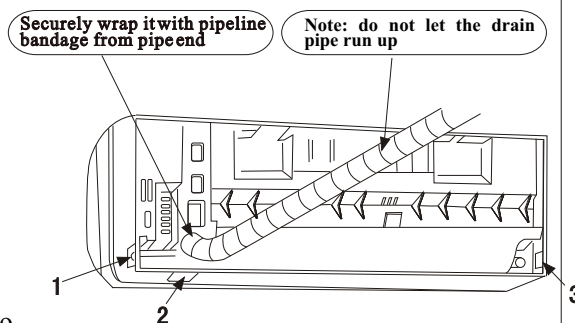
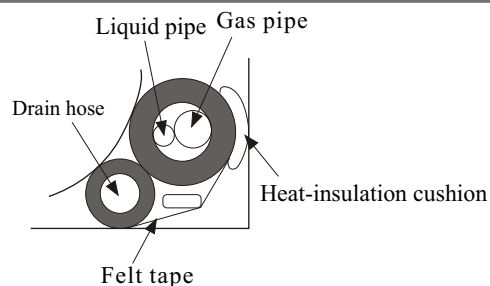
- Drain hose must be located below the coolant pipeline;
- Do not hunch up or bend the drain hoses;
- Do not pull at the drain hose to carry out wrapping operation;
- If drain hose must pass through indoors, it must be wrapped with heat-insulating material available in the market;
- Use felt tape to wrap up fitting pipe and drain hose, and place heat-insulation cushion upon the wall that contacts the aforesaid two.

2. direction of fitting pipe

- As shown in the figure, part 1 of the case should be cut off if fitting pipe is led out from right side; part 2 of the case should be cut off if fitting pipe is led out from right lower side, part 3 of the case should be cut off if fitting pipe is led out from left side.

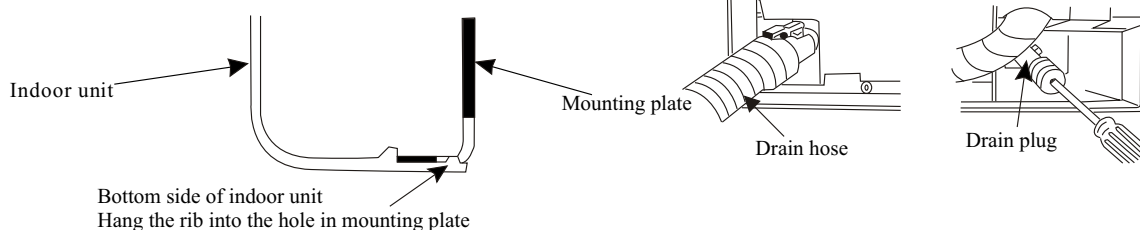
3. Recondition of drain hose:

- If fitting pipe is led out from right or right lower side, it is required to condition the drain hose, for fear of water leakage.
- Recondition method: interchange the positions of drain plug and drain hose. To ensure no water leakage occurs, use screw driver to insert the drain plug into the bottom of drain outlet, and the locking hook on drain pipe should be properly fitted into the buckle at drain outlet of the case body.



● Installation of indoor unit

Lead pipeline through wall hole, and hoist the unit onto the mounting plate.



● How to locate the remote controller

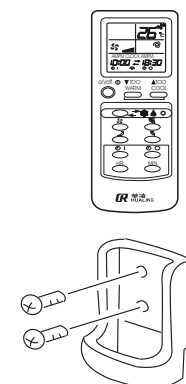
1. How to select installation position of remote controller:

- The position must be visible and convenient for operation;
- The position must be out of the reach of infants.

2. Installation

- Select a position 1.2m higher above the ground, ensuring that signal issued by remote controller here can be actually received by air conditioner (when a signal is received, it will give out sound " beep " or " beep, beep "). Fix a remote controller bracket on wall or column, and insert the remote controller into the bracket.。

In a room equipped with high-voltage impulse-cycle ignition-point stabilizer or squitter, the unit cannot receive the signal issued by remote controller sometimes.



Installation instructions

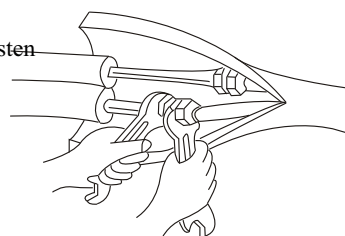
How to install outdoor unit

● How to install indoor unit

- The number of bends in pipeline of indoor unit must not be over 10, and the number of bends in the entire the system must not be over 15;
- Pipeline bending radius must be greater than 10cm;
- Before pipeline connection, firstly apply a layer of sealing oil on joint and flared opening;
- During pipeline connection, align the centers and screw down the nuts, and then fasten them with wrench (as shown in the figure) .

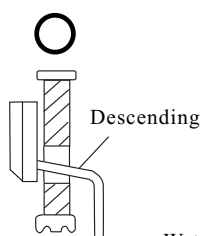
Note: do not apply excessive force, for fear of damage in flared pipe.

Pipeline	Pipe diameter	Torque (N·M)
Liquid pipe	6.35mm (1/4")	13.7--17.6
Gas pipe	9.52mm (3/8")	34.3--41.2
Gas pipe	12.7mm (1/2")	34.3--41.2

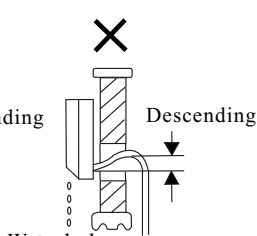


● Arrangement of drain pipeline

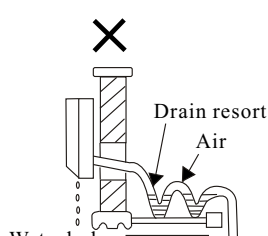
- To ensure easy drainage of condensed water out of drain pipe, the drain pipe should be positioned in a descending mode (as shown in figure 1). Do not connect the drain pipe as shown in figure 2- figure 5.



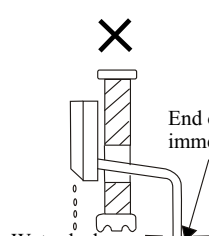
(Figure 1)



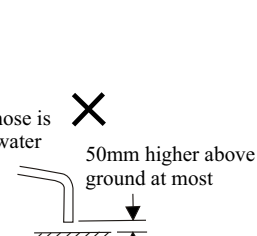
(Figure 2)



(Figure 3)

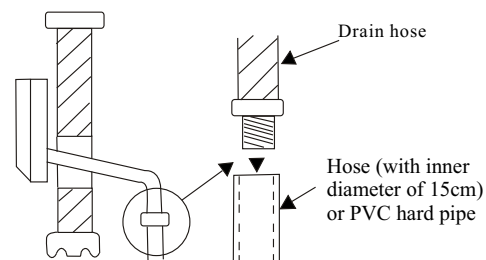


(Figure 4)



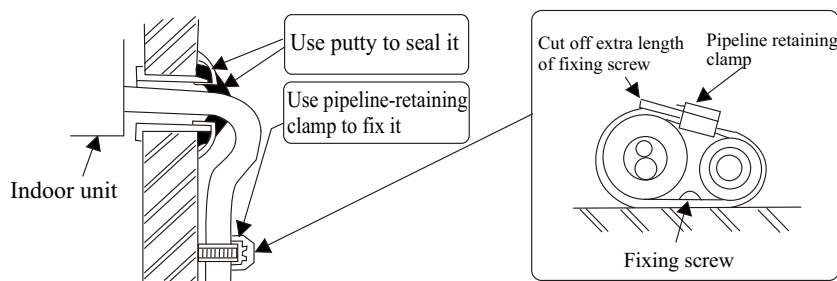
(Figure 5)

- If the drain hose of indoor unit is not long enough in application, just connect the drain hose inside the attachments
- If drain hose must pass through indoors, it must be wrapped with heat-insulation material available in the market.



● Wall hole sealing and pipeline fixing

1. Use putty to seal wall holes;
2. Use pipeline-retaining clamp to fix pipeline onto appointed position.



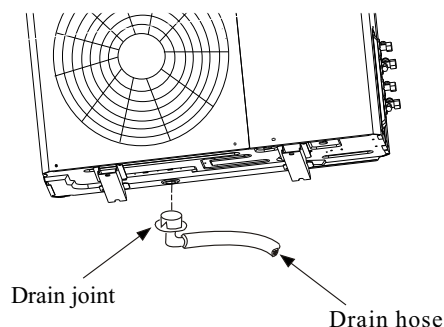
Installation instructions

How to install indoor unit

● Installation of drain joint

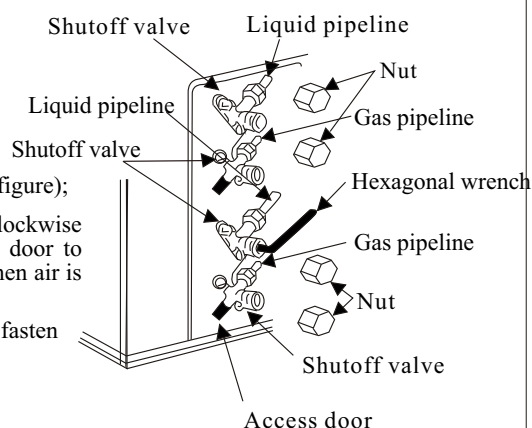
When air conditioner is in heating operation, condensed water from outdoor unit, and defrosting water from defrosting operation can be drain to appropriate place via drain pipe.

Installation method: as shown in right figure, press the outdoor drain joint into the hole of 28mm in the base, and then connect the drain pipe to the drain joint



● Air-drain method

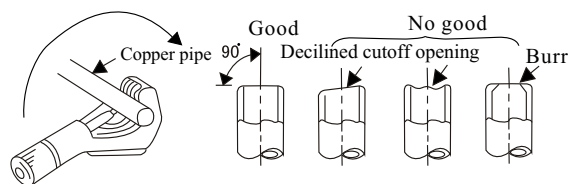
1. Remove bonnets of gas/liquid valves and nuts of access door (as shown in right figure);
2. Use a hexagonal wrench to slightly open the liquid valve (turn for 90° in anticlockwise direction), press down the protruding part at valve zone of gas valve's access door to drain air for about 10 seconds, and then release it (misty agent will overflow when air is completely drained), finally replace and fasten down the nut of access door;
3. Use a hexagonal wrench to open the gas valve completely, and replace and fasten down the nut;
4. Use soap water to detect the leak in all connection openings.



● Flared pipe processing

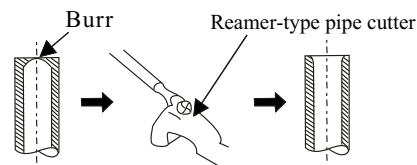
Defect in flared pipe processing will be a major cause of gas leak. Please carry out flared pipe processing properly according to the following method:

1. Use pipe cutter to cut off all damaged flared pipe;



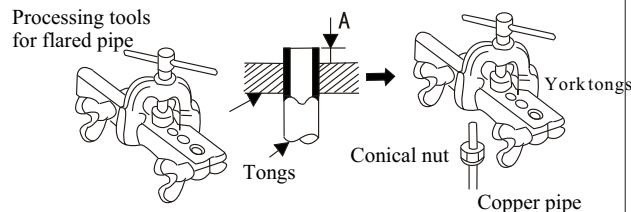
2. Completely remove the burr in cut-off section of the pipe;

Note: To prevent burr from deopping into the pipe, the cutoff opening of pipe line should be positioned downwards during deburring operation



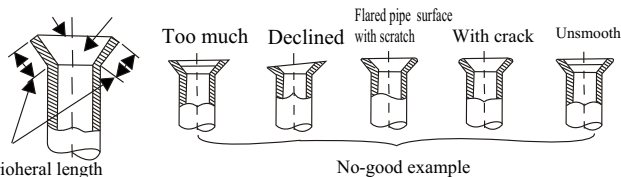
3. Put the conical nut into the pipe on which the burr has been completely removed, and process the flared pipe according to the data in following table;

Outer diameter	A (mm)
6.35mm	2.0—2.5
9.52mm	3.0—3.5



4. Check if visible defects can be found out in the processed flared pipe. If yes, carry out the flared pipe processing once more

Smooth perimeters Smooth inside free of scratch



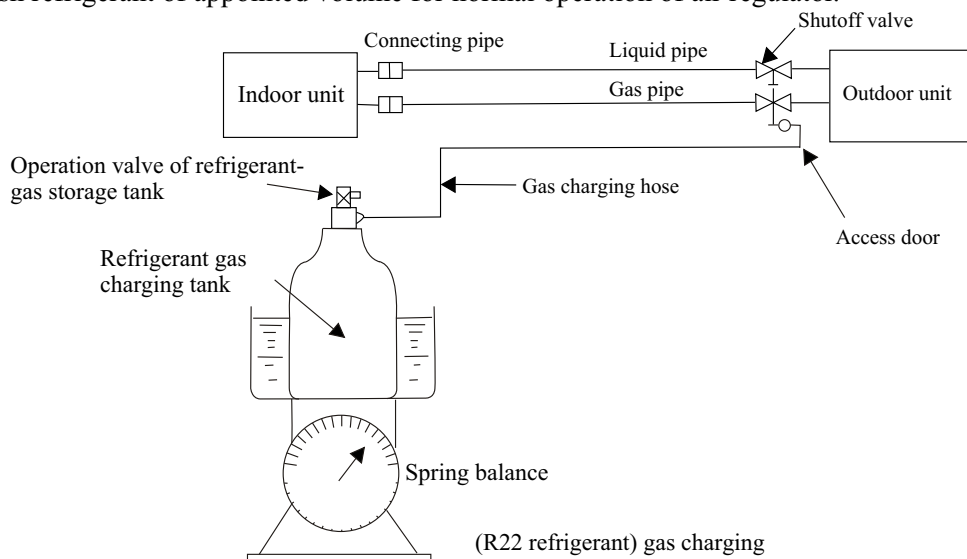
Installation instructions

Refrigerant replenishing method and test run

● Refrigerant replenishing method

Detailed procedures:

- ❶ Connect the gas storage cylinder to access door of gas valve;
- ❷ Utilize the gas from pipeline (or hose) of refrigerant gas storage cylinder to carry out air purge;
- ❸ Replenish refrigerant of appointed volume for normal operation of air regulator.



- Note:
1. During gas charging, do not reverse gas storage tank to charge refrigerant, for fear of some problems;
 2. To keep high pressure in gas storage tank, heat it by warm water (40°C) in cold weather. But never heat it on fire or by hot steam;
 3. For refrigerant replenishing volume, see page 9 (performance data).

● Test run

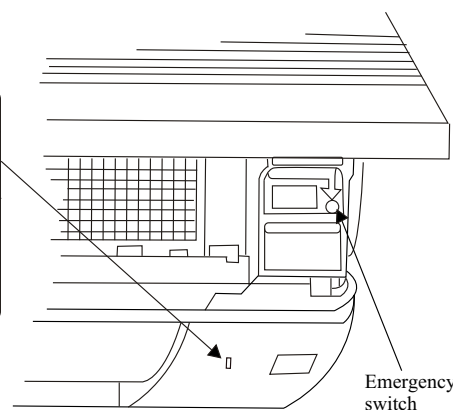
Note:

1. Before test run, check once more if there is incorrect wire connection, if air leak occur in pipe mouthpiece (by soap water);
2. It is also all right to use emergency operation switch to start operation. Once you press the emergency operation switch, the unit begins consecutive operation for 30 minutes in refrigerating mode. Within the 30 minutes, the temperature setting does not function. After the 30 minutes, the unit begins emergency operation in refrigerating mode at a certain temperature setting (24°C).

Test run procedure:

1. Press emergency operation switch for the first time, the air conditioner begins emergency cooling operation. Press it for the second time, the air conditioner begins heating operation. Press it once more, the air conditioner stops all operation;
2. Press "ON/OFF" button in remote controller, check if the indoor unit gives a sound "toot". If yes, it indicates that the remote controller functions, and the emergency operation is released. And then, operate with each button in the remote controller, and observe whether the operation mode of the unit is changed respectively or not.

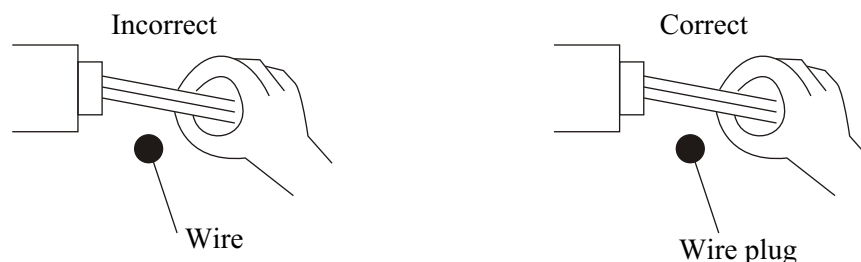
	Mode	Operation indicator
❶	Cooling	(ON)
❷	Heating	
❸	Stop	



Installation instructions

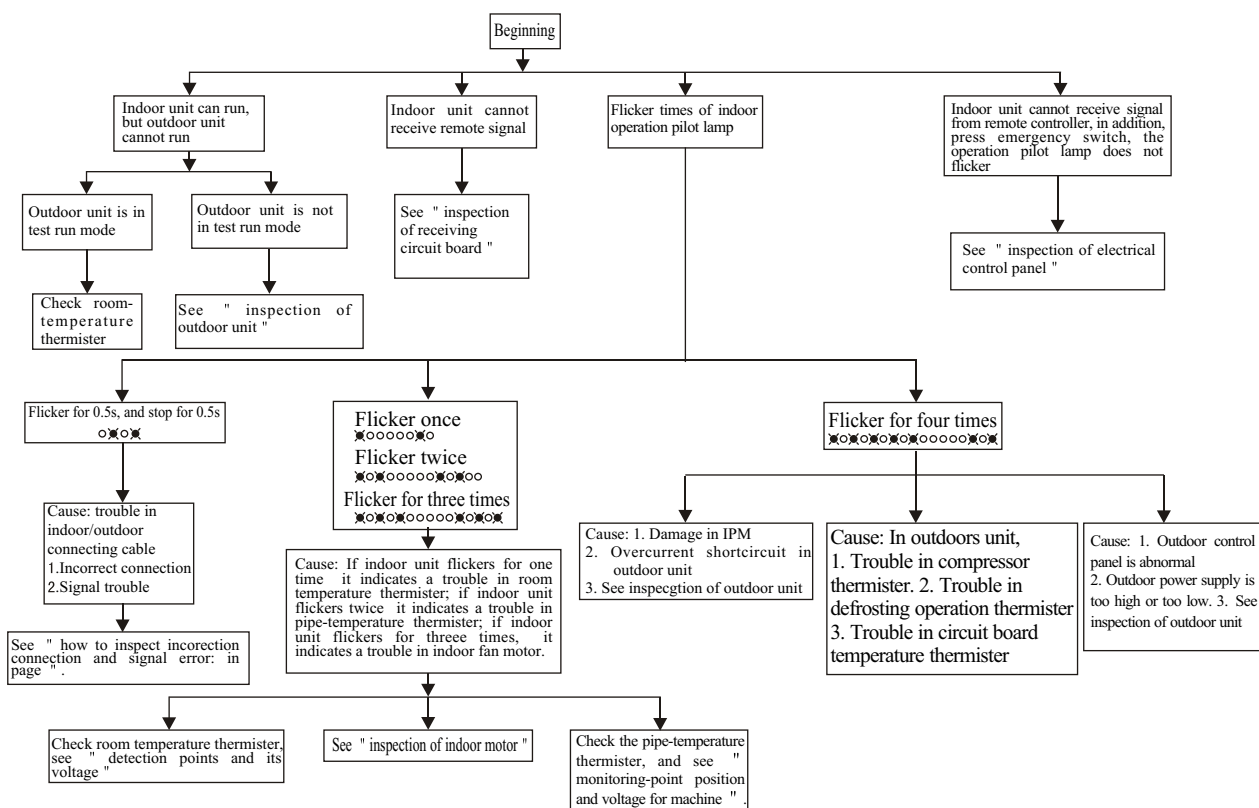
Precautions on troubleshooting

- I. Before troubleshooting, check if the supply voltage is normal, and check if the connecting wires of indoor/outdoor are correctly connected.
- II. The following aspects should be taken into account during maintenance:
 1. Before you remove the front panel, casing, top plate and control panel, power plug must be unplugged.
 2. Outdoor wire or circuit board must not be removed before the LED101 indicator on outdoor panel is off, for fear of high-voltage electrical shock.
 3. It is required to move the control panel by grapping the edge of conductors. Do not press the elements and parts.
 4. Remove or reassemble the connecting wire by grapping wire plug, do not pull it out violently.



- III. The following aspects should be taken into account during troubleshooting:
 1. Check if the indoor unit's operation pilot lamp flickers, and make sure the flicker times and the abnormality indicated by flickers times.
 2. If it is considered that trouble occurs in control panel, check if the elements or parts are burnt or discolored, and check if the wire terminals are properly connected.
 3. Once a trouble occurs, overhaul the unit according to troubleshooting flow chart and trouble selfcheck

Troubleshooting flow chart



Installation instructions

Trouble selfcheck table

I. Selfcheck table for trouble in indoor unit:

NO	Operation lamp flickers	Trouble content	Maintenance
1	Flicker once, and stop flickering for 3 seconds	Indoor sensor is damaged	1. Replace indoor sensor 2. If the trouble remains the same, replace indoor control panel
2	Flicker twice, and stop flickering for 3 seconds	Indoor coil pipe sensor is damaged	1. Replace indoor coil pipe sensor 2. If the trouble remains the same, replace indoor control panel
3	Flicker thrice, and stop flickering for 3 seconds	Indoor blower fan is damaged	1. Replace indoor blower fan 2. If the trouble remains the same, replace indoor control panel
4	Flicker for 0.5 times, and stop flickering for 0.5 seconds	Communication is abnormal	1. Check if wire connection is correct 2. Replace indoor control circuit board or outdoor control circuit board
5	Flicker for 4 times, and stop flickering for 3 seconds	Outdoor unit is abnormal	Overhaul according to " selfcheck table for trouble in outdoor unit "

II. Selfcheck table for trouble in outdoor unit:

Four LEDs on outdoor control circuit board for displaying trouble in outdoor unit

● : Indicator OFF ○ : Indicator ON

NO	LED1	LED2	LED3	LED4	Trouble content	Maintenance
1	○	●	●	●	Indoor ambient sensor is abnormal	1. Replace outdoor ambient sensor 2. If the trouble remains the same, replace outdoor control panel
2	●	○	●	●	Outdoor coil pipe sensor is abnormal	1. Replace outdoor coil pipe sensor 2. If the trouble remains the same, replace outdoor control panel
3	○	○	●	●	Compressor exhaust sensor is abnormal	1. Replace compressor exhaust sensor 2. If the trouble remains the same, replace outdoor control panel
4	●	●	○	●	General return-air sensor is abnormal	1. Replace general return-air sensor 2. If the trouble remains the same, replace outdoor control panel
5	○	●	○	●	UNIT A's return-air sensor is abnormal	1. Replace UNIT A's return-air sensor 2. If the trouble remains the same, replace outdoor control panel
6	●	○	○	●	UNIT B's return-air sensor is abnormal	1. Replace UNIT B's return-air sensor 2. If the trouble remains the same, replace outdoor control panel
7	○	○	○	●	Overvoltage/undervoltage	1. Check mains voltage, and very whether voltage is correct 2. Replace big electrolytic capacitor of electric box 3. Replace outdoor control circuit board
8	●	●	●	○	Overcurrent	1. Check if short circuit occurs in peripheral electric appliances 2. Check if short circuit occurs in module 3. Replace outdoor control circuit board
9	○	●	●	○	Module is abnormal	1. Replace module 2. If the trouble remains the same, replace outdoor control panel
10	●	○	●	○	Compressor overheat (switching volume)	1. Check if refrigerant leak occurs 2. Check if short circuit occurs in compressor set
11	○	○	●	○	EEPROM is abnormal	Replace outdoor control circuit board

Trouble and maintenance

Trouble selfcheck table

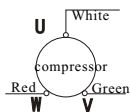
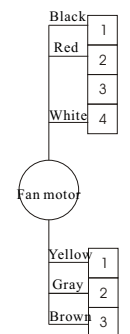
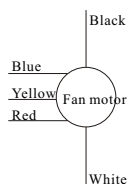
IV. Power indicator LED101 of outdoor unit

After outdoor circuit board is powered on, the LED is normally on.

When LED101 is off, it indicates that the outdoor circuit board is uncharged.

Caution: Since the outdoor electrolytic capacitor has a storage effect, and the residual high-voltage charge still remains in the outdoor circuit board after power-off, no operation on the outdoor circuit board shall be performed unless the LED101 is off.

Fault standards of main components

Part designation	Inspection method and standard		Schematic drawing		
Room-temperature thermistor. Pipe-temperature thermistor.	Use instrument to determine the resistance values (10~40℃)				
	Normal	Abnormal			
	20K□~5K□	Short circuit or open circuit			
Defrosting thermistor	Use instrument to determine the resistance values (10~30℃)				
	Normal	Abnormal			
	39K□~98K□	Short circuit or open circuit			
Compressor	Use instrument to determine the resistance values 40℃				
	Normal	Abnormal			
	1.0□~1.3□	Short circuit or open circuit			
Indoor fan motor	power cord	Use instrument to determine the resistance values between the wiring terminals (the winding temperature is 10~30℃)			
		Normal		Abnormal	
		White - black		175~201□	Short circuit or open circuit
		Black - red		238~274□	
	Signal wire	Switch on the power supply, and determine the resistance values between the wires.		Kept at 0V and 5V	
		Normal			Abnormal
Brown - yellow	4.5~5.5V				
Yellow - gray	fan rotates once 0V—5V—0V				
Outdoor motor	Use instrument to determine the resistance values between the wiring terminals (the winding temperature is 10~40℃)				
	Normal	Abnormal			
	White - black	115~130□		Short circuit or open circuit	
	Black - blue	20~23□			
	Blue - yellow	30~35□			
	Yellow - red	101~115□			
Stepper motor	Use instrument to determine the resistance values between the wiring terminals (10~30℃)				
	Normal	Abnormal			
	353~407□	Short circuit or open circuit			

Trouble and maintenance

Module Judgment

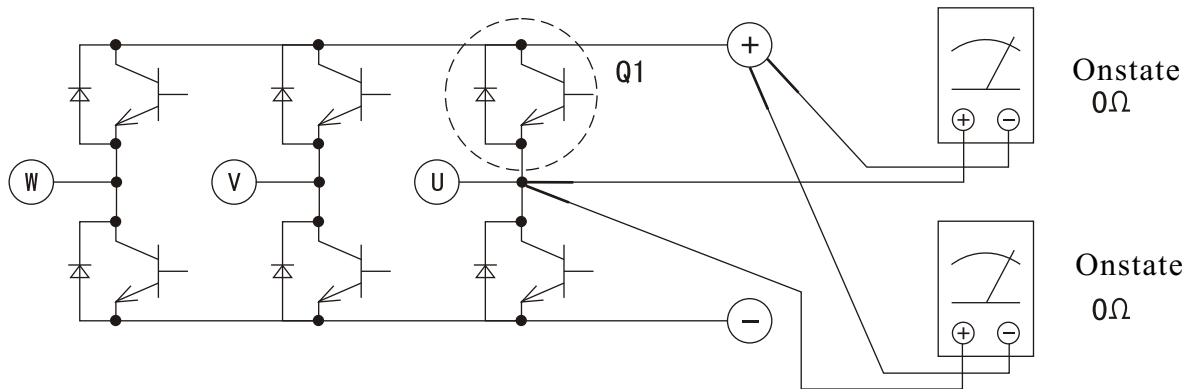
How to judge short circuit in power transistor:

Unplug the 10-core plug of module, the plug of link module of compressor, and the plugs of " + " and " - " .

1. In the case of short circuit

Whenever a short circuit occurs in the power transistor, it must be a short circuit between the collector anode and the semiconductor.

For example, when a short circuit occurs in Q1, you may utilize a multi-meter to carry out conduction adjustment by placing the multi-meter probe at any point between the power transistor and " U " (see figure below).

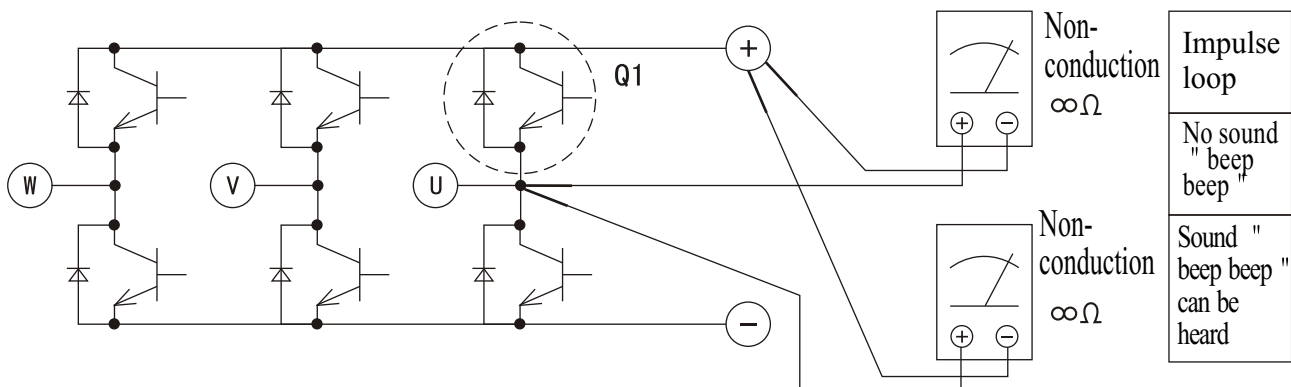


When you use a LCD multi-meter to carry out the adjustment, you may adjust it as per the buzz sound. If the short circuit occurs in power supply, the multi-meter can tell you the conduction condition wherever you place the multi-meter probe.

Treat other transistors in the same way, and just adjust them between the collector anode and the semiconductor.

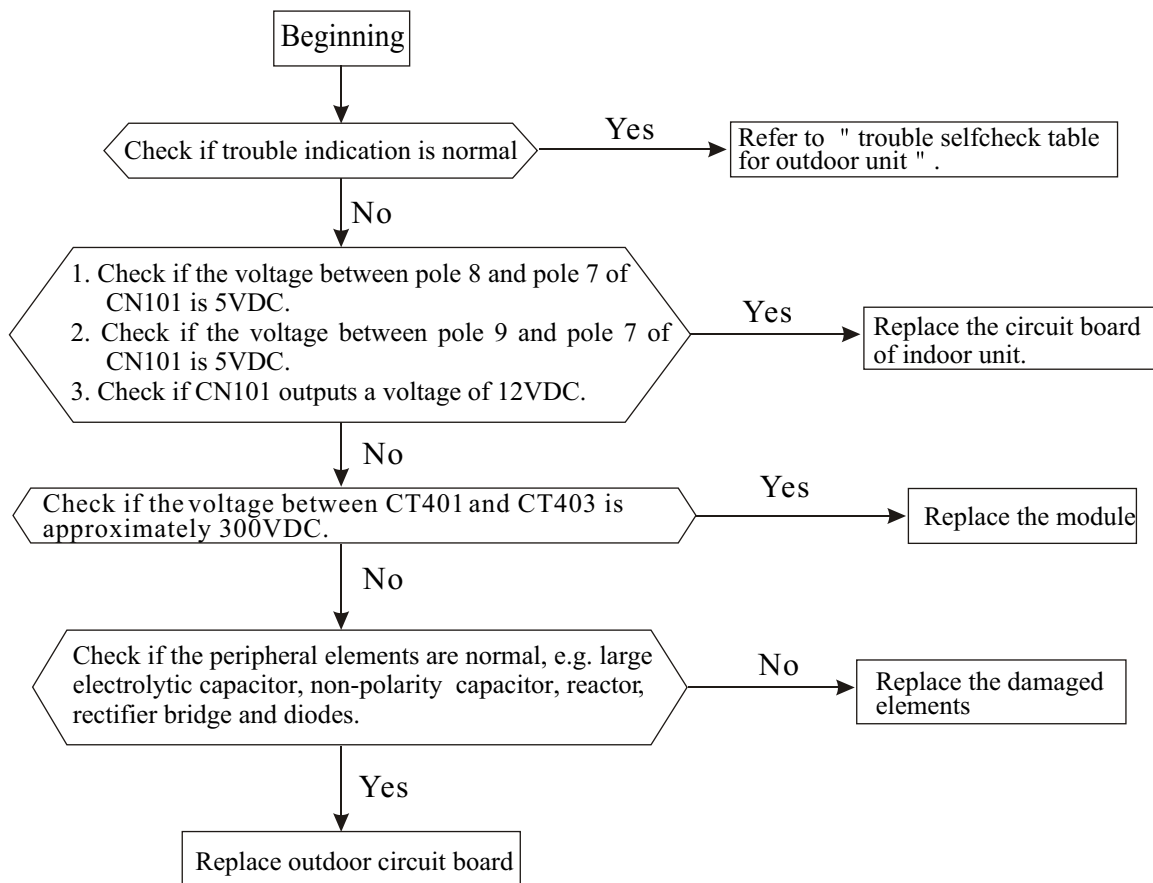
2. In the case of not a short circuit

Use " + " side of multi-meter to touch wiring terminal " U " of IPM, use " - " side of multi-meter to touch wiring terminal " - " of IPM, and no onstate is detected. If another multi-meter can detect conduction, it indicates that circuit is alright (see figure below).

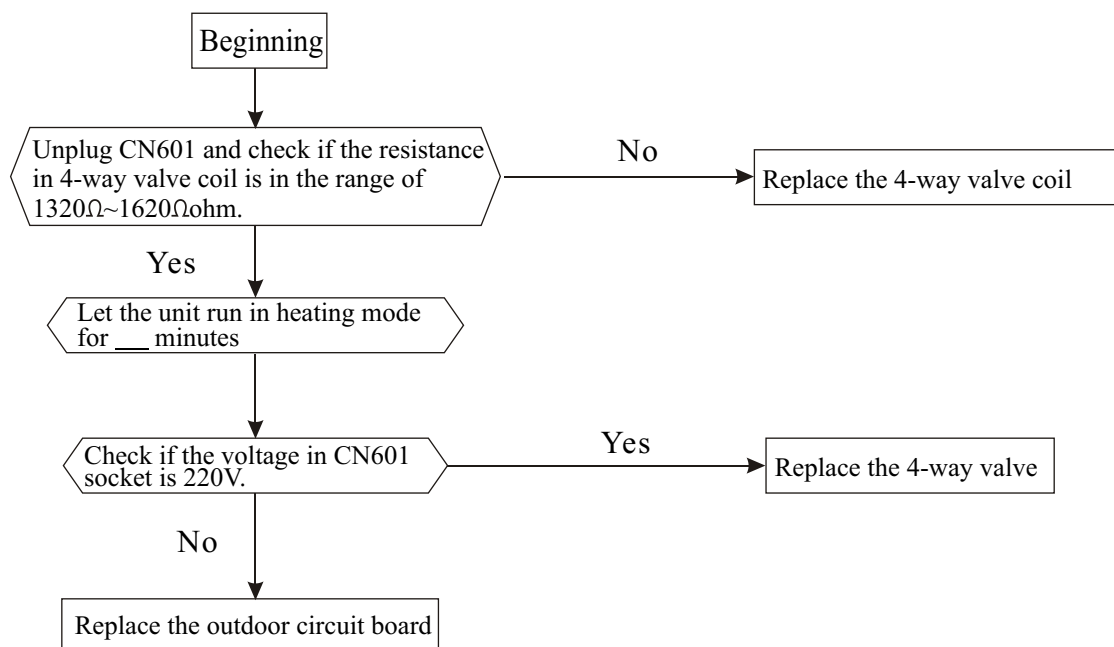


Trouble and maintenance

Outdoor unit inspection

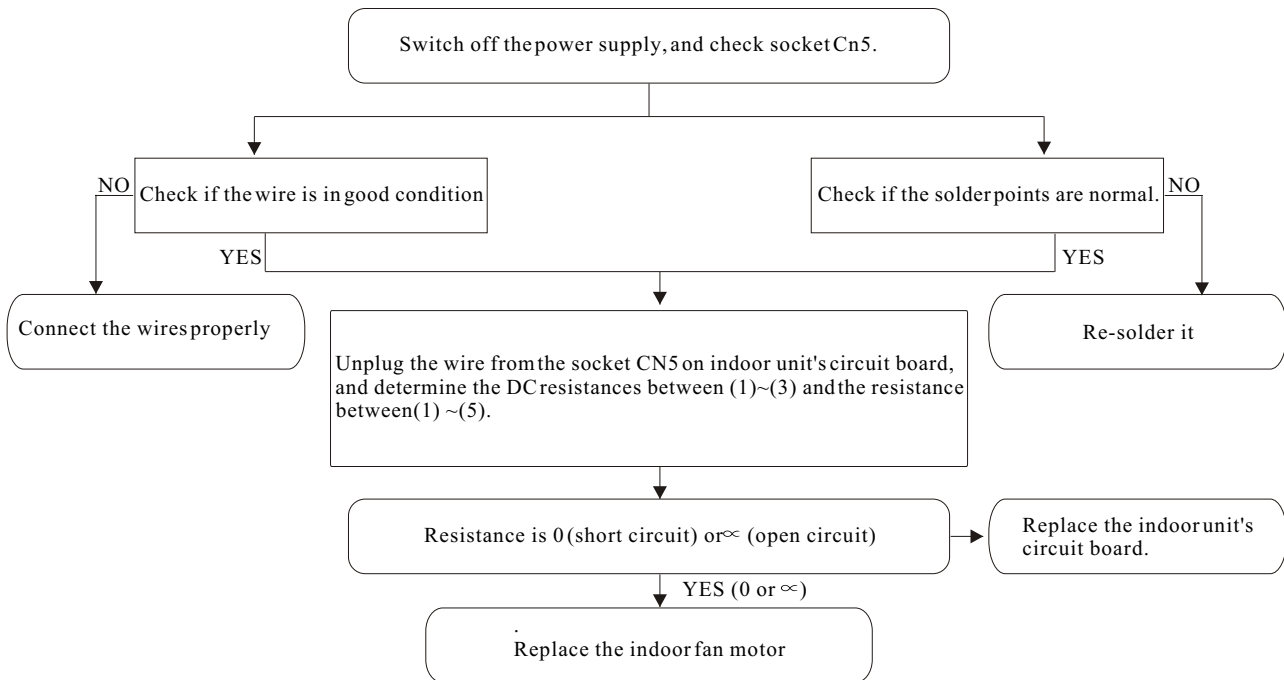


Troubleshooting for heating failure of outdoor unit



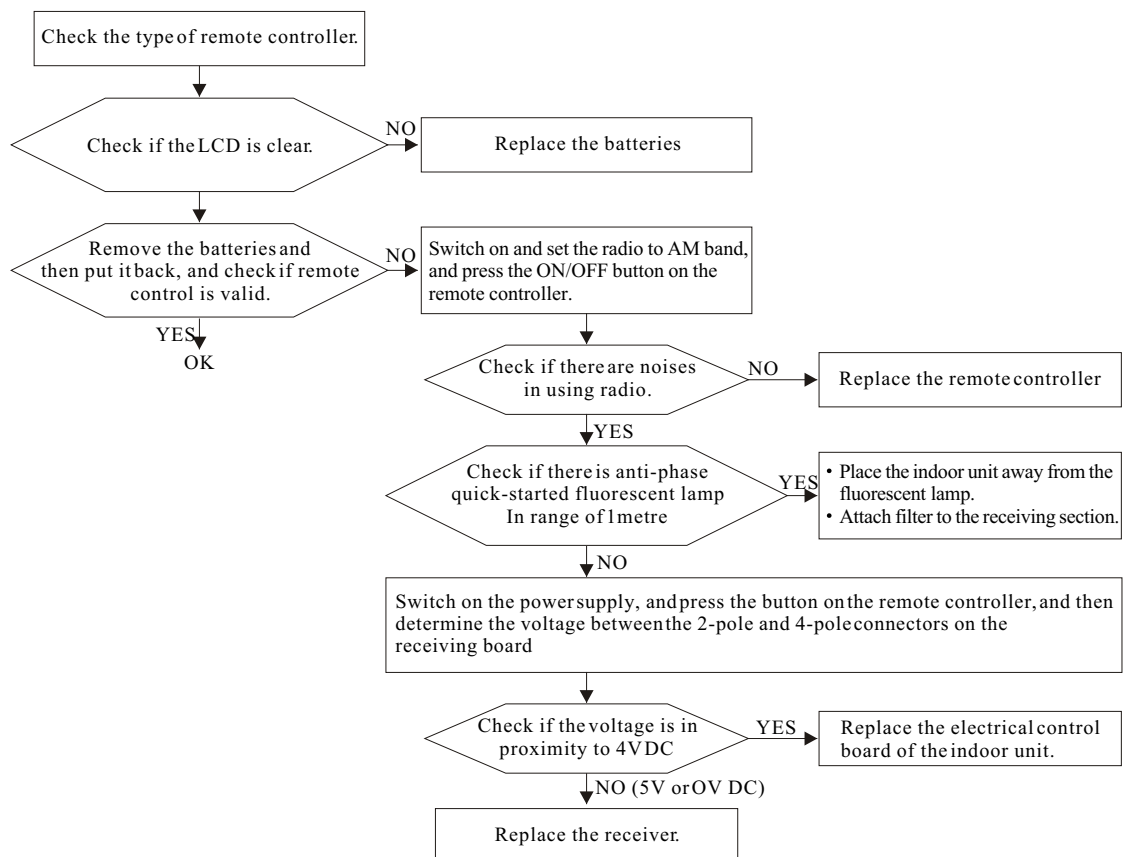
Trouble and maintenance

A. Inspection of indoor fan motor



B. Inspection on the receiver circuit board

Indoor unit can run by pressing panic button, but can't run by using remote controller.





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