NORDIC MULTI LIGHT SERIES
CONSOLE TYPE INDOOR UNIT

Service manual

Air conditioners

Models:

CHML-IK09RK

CHML-IK12RK

CHML-IK18RK

Thank you for choosing Cooper&Hunter air conditioner, please read this service manual carefully before operation and retain it for future reference.

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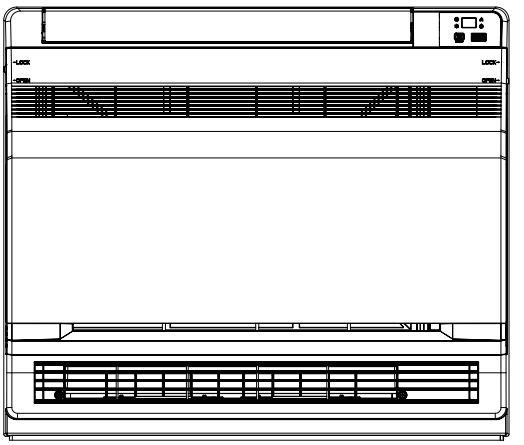
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Part Ⅰ : Technical Information

1. Summary

Indoor Unit

CHML-IK09RK
CHML-IK12RK
CHML-IK18RK



Remote Controller

YAA1FB8(WiFi)



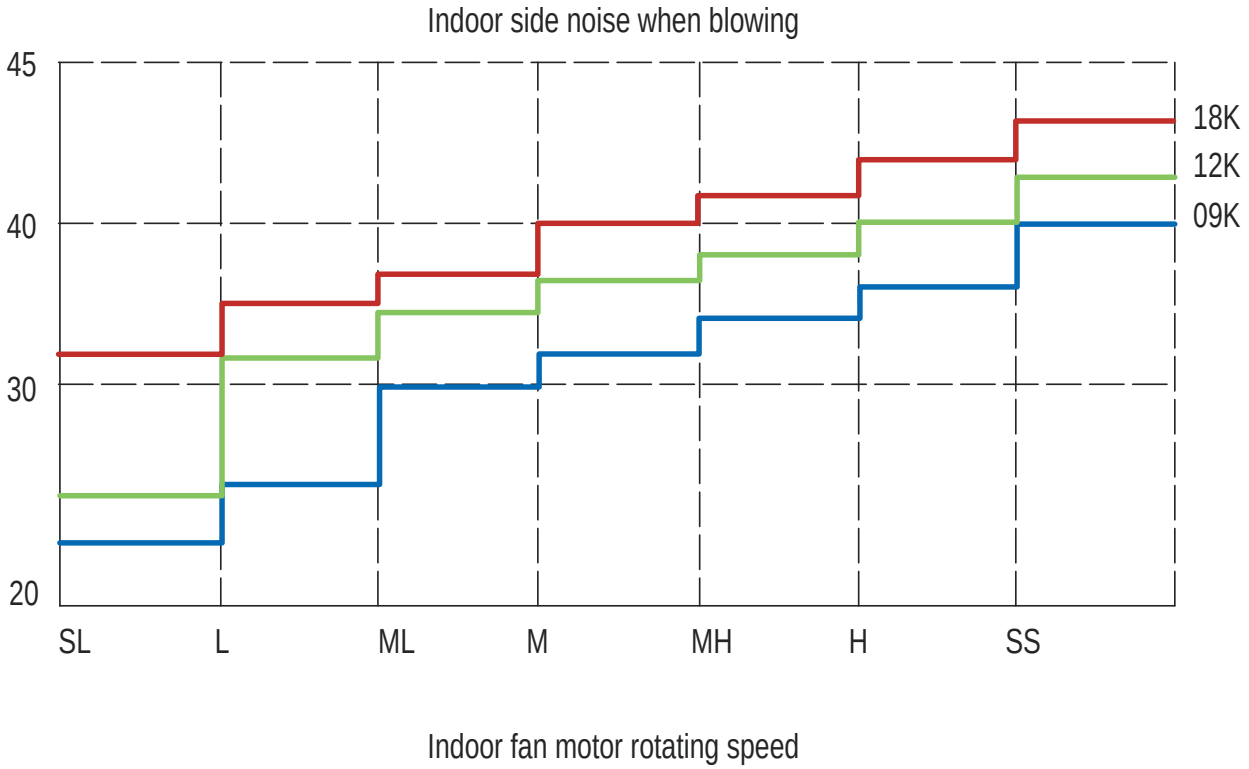
2. Specifications

2.1 Specification Sheet

Model		Console		
		CHML-IK09RK	CHML-IK12RK	CHML-IK18RK
Rated Voltage	V~	220-240	220-240	220-240
Rated Frequency	Hz	50	50	50
Phases		1	1	1
Cooling Capacity	W	2700	3500	5200
Heating Capacity	W	2800	3750	5330
Air Flow Volume (SH/H/M/L)	m^3/h	500/430/410/370/330/280/250	600/520/480/440/400/360/280	700/650/580/520/460/410/320
Dehumidifying Volume	L/h	0.8	1.2	3.8
Fan Type		Centrifugal	Centrifugal	Centrifugal
Fan Diameter-height	mm	Φ370X80	Φ370X80	Φ370X80
Fan Motor Speed (SH/H/HM/M/LM/L/SL) (Cool)	rpm	650/560/530/480/430/370/320	750/650/600/550/500/450/350	840/800/720/650/580 /530/410 810/770/690/620/550 /500/380
Fan Motor Speed (SH/H/HM/M/LM/L/SL) (Heat)	rpm	650/560/530/480/430 /370/320	750/650/600/550/500/450/350	930/840/760/690/620 /570/480 850/800/720/650/580 /530/470
Fan Motor Power Output	W	30	30	30
Fan motor running current	A	0.15	0.15	0.15
Evaporator Material		Aluminum Fin-copper Tube	Aluminum Fin-copper Tube	Aluminum Fin-copper Tube
Evaporator Pipe Diameter	mm	Φ7	Φ7	Φ7
Evaporator Number of Rows		2	2	2
Evaporator Fin Pitch	mm	1.3	1.3	1.3
Evaporator Length(L) X Height(H) X Width(W)	mm	511X25.4X400	511X25.4X400	511X25.4X400
Motor Model		MP24EB/MP24AE	MP24EB/MP24AE	MP24EB/MP24AE
Overload Protector		1.5/1.5	1.5/1.5	1.5/1.5
Motor Full Load Amp(FLA)	A	3.15	3.15	3.15
Sound Pressure Level (SH/H/HM/M/LM/L/SL)	dB(A)	40/36/34/32/30/26/23	42/40/38/36/34/31/25	47/45/42/40/37/35/31
Sound Power Level (SH/H/HM/M/LM/L/SL)	dB(A)	52/48/46/44/42/38/34	52/50/48/46/44/41/35	57/55/52/50/47/45/41
Outline Dimension (WXHXD)	mm	700X600X215	700X600X215	700X600X215
Package Carton Dimension (LXWXH)	mm	785X682X280	785X682X280	785X682X280
Package Dimension (LXWXH)	mm	788X697X283	788X697X283	788X697X283
Net Weight	kg	15.5	15.5	15.5
Gross Weight	kg	18.5	18.5	18.5
Liquid pipe	mm	Φ6	Φ6	Φ6
Gas Pipe(to indoor unit)	mm	Φ9.52	Φ9.52	Φ12

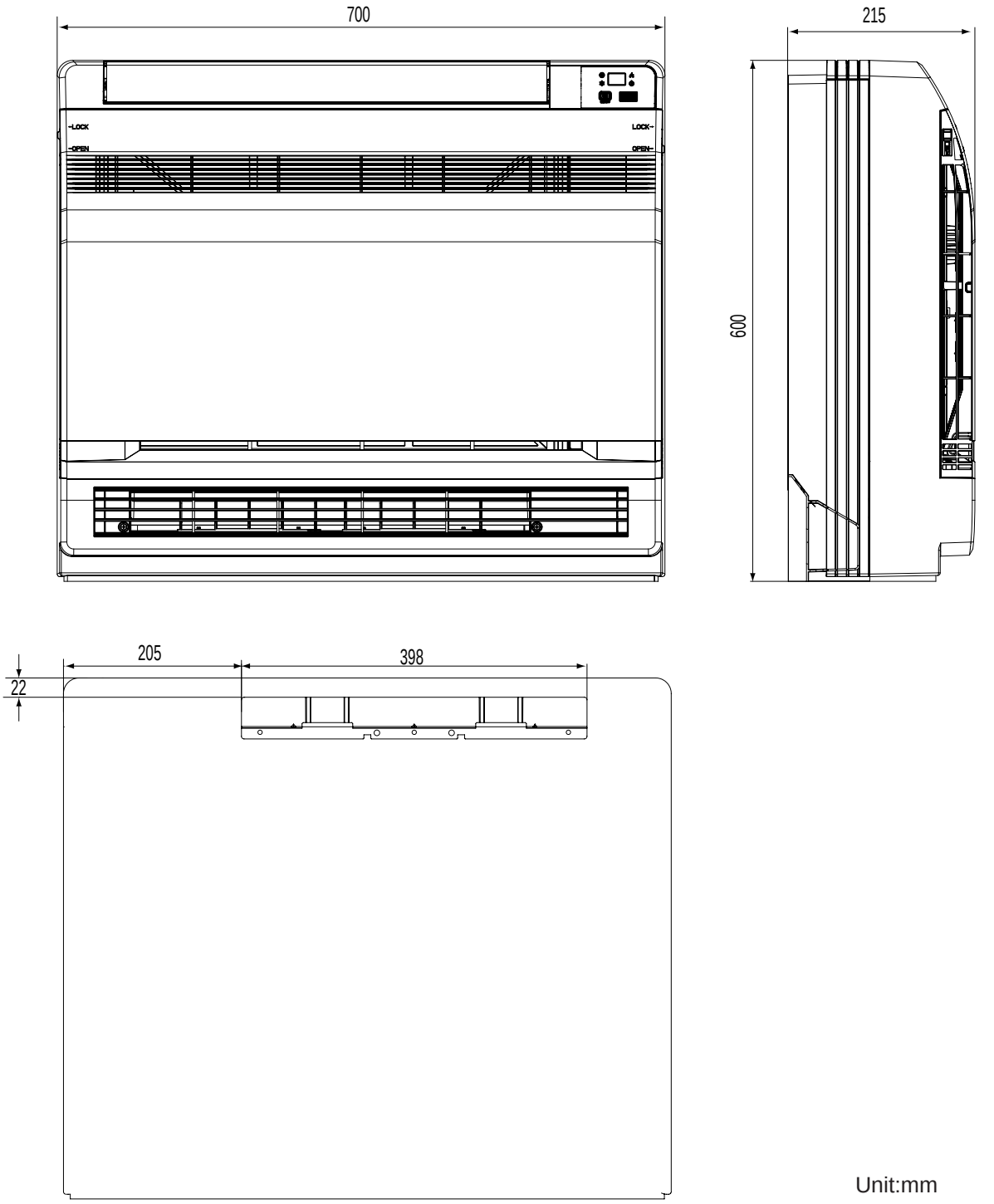
The above data is subject to change without notice. Please refer to the nameplate of the unit.

2.2 Noise Curve



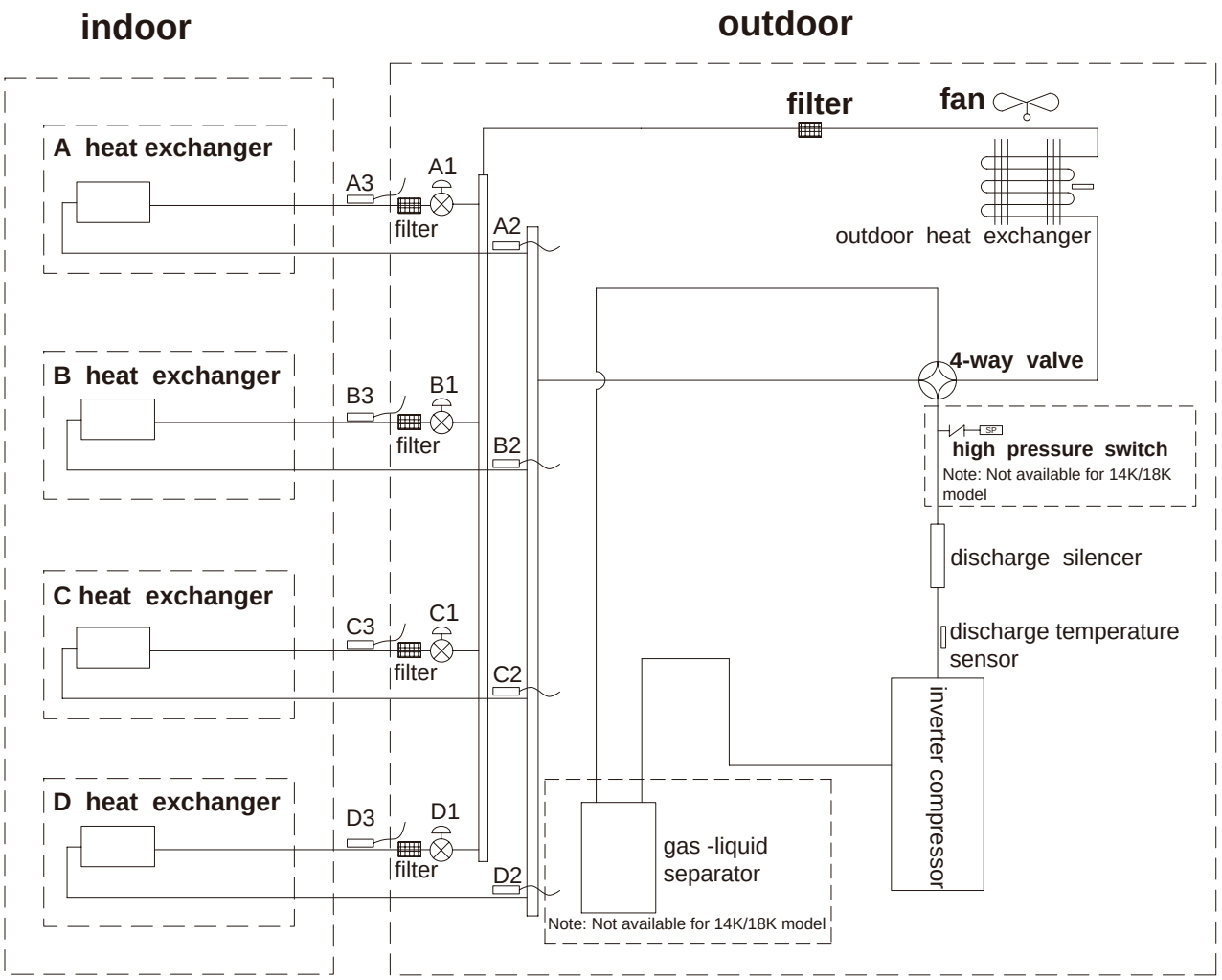
3. Outline Dimension Diagram

3.1 Indoor Unit



Unit:mm

4. Refrigerant System Diagram



A1:A–unit electronic expansion valve B1:B-unit electronic expansion valve
C1:C-unit electronic expansion valve D1:D-unit electronic expansion valve
A2:A-unit gas pipe temperature sensor B2:B-unit gas pipe temperature sensor
C2:C-unit gas pipe temperature sensor D2:D-unit gas pipe temperature sensor
A3:A–unit liquid pipe temperature sensor B3:B-unit liquid pipe temperature sensor
C3:C-unit liquid pipe temperature sensor D3:D-unit liquid pipe temperature sensor

5. Electrical Part

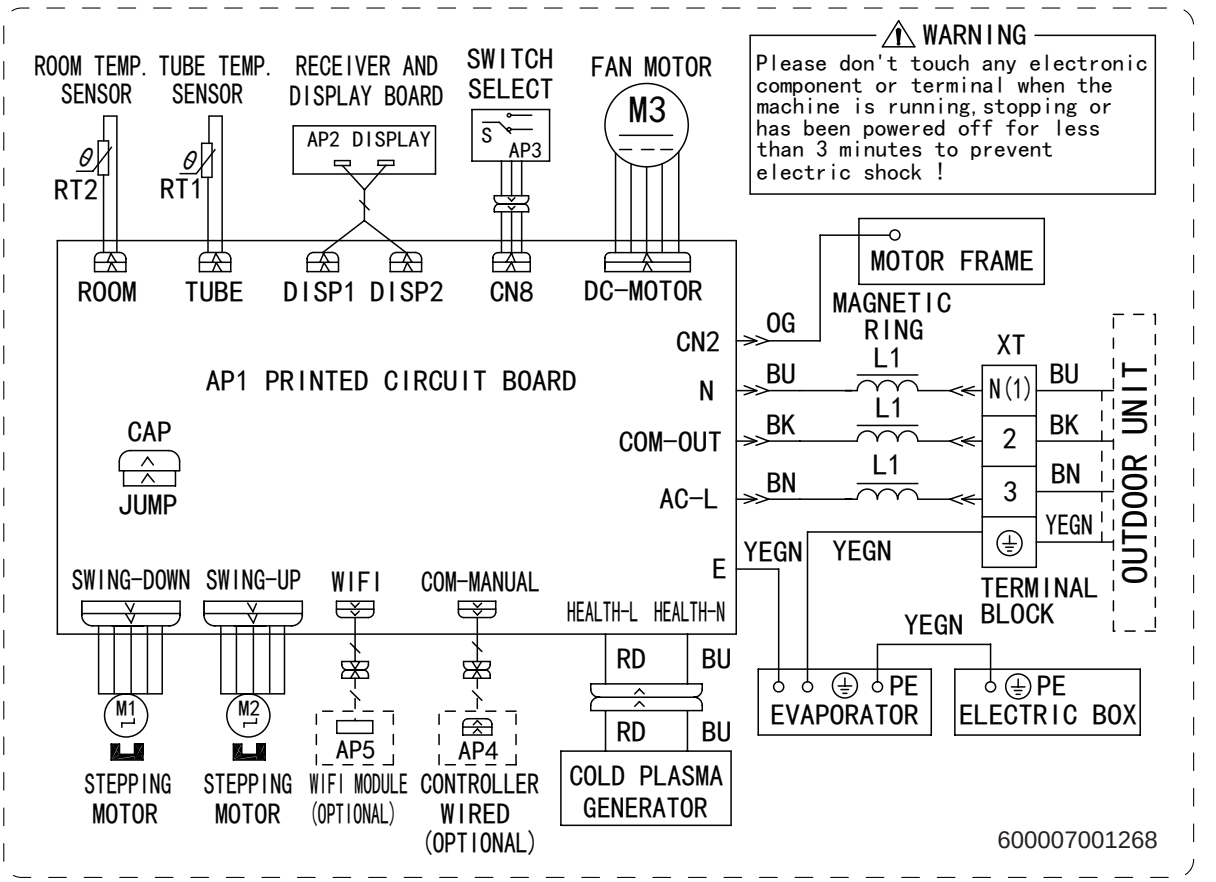
5.1 Wiring Diagram

● Instruction

Symbol	Symbol Color	Symbol	Symbol Color	Symbol	Name
WH	White	GN	Green	CAP	Jumper cap
YE	Yellow	BN	Brown	COMP	Compressor
RD	Red	BU	Blue	⏚	Grounding wire
YEGN	Yellow/Green	BK	Black	/	/
VT	Violet	OG	Orange	/	/

Note: Jumper cap is used to determine fan speed and the swing angle of horizontal lover for this model.

● Indoor Unit

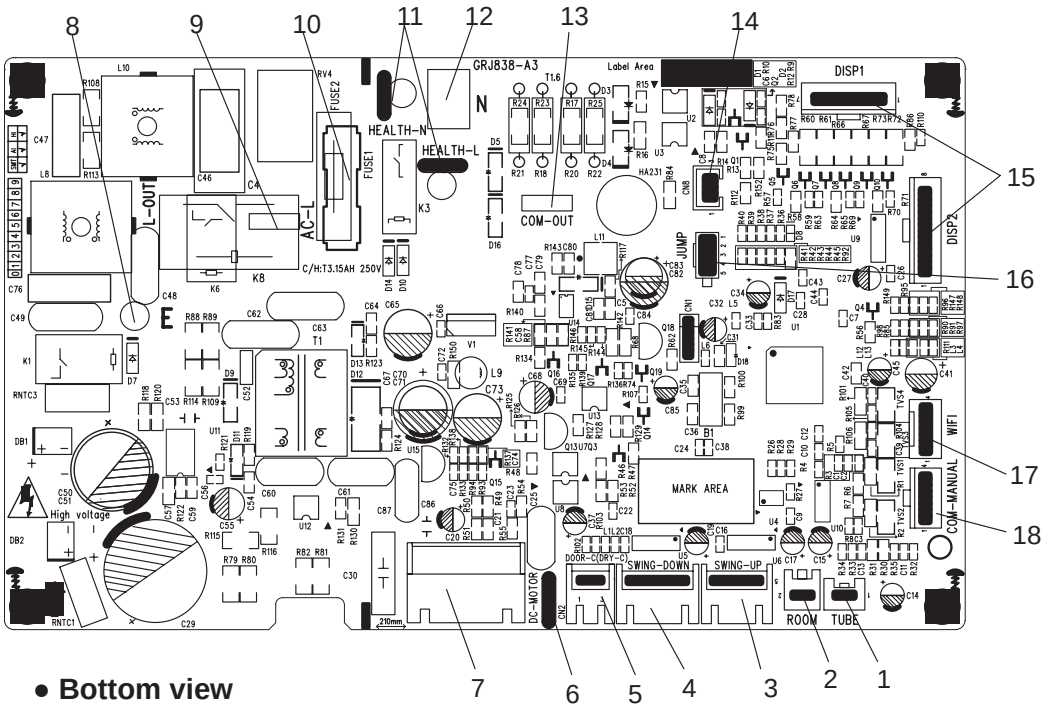


These circuit diagrams are subject to change without notice, please refer to the one supplied with the unit.

5.2 PCB Printed Diagram

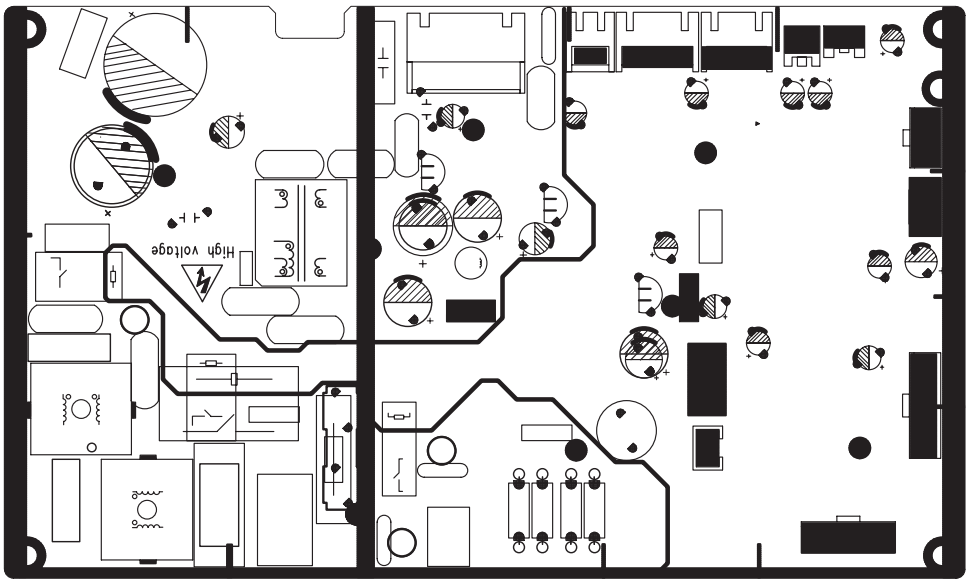
Indoor Unit

● Top view



NO.	Name
1	Interface of tube temperature sensor
2	Interface of ambient temperature sensor
3	Up swing interface
4	Down swing interface
5	Door control interface (this is only for the model with this function)
6	Interface of EMC shielding wire
7	DC motor interface
8	Earthing wire of main board
9	Terminal of live wire
10	Fuse
11	Terminal for health function
12	Terminal of neutral wire
13	Communication interface between indoor unit and outdoor unit
14	Control interface of Down swing
15	Interface of display board
16	Needle stand of jumper cap
17	WIFI interface
18	Wired controlled interface

● Bottom view



6. Function and Control

6.1 Remote Controller Introduction



1 ON/OFF
Press it to start or stop operation.

2 - : Press it to decrease temperature setting.

3 + : Press it to increase temperature setting.

4 MODE
Press it to select operation mode (AUTO/COOL/DRY/FAN/HEAT).

5 FAN
Press it to set fan speed.

6 SWING
Press it set swing angle.

7 I FEEL

8 /
Press it to set HEALTH or AIR function.

9 SLEEP

10 TEMP

11 QUIET
Press it to set QUIET function.

12 CLOCK
Press it set clock.

13 T-ON|T-OFF
Press it to set auto-off/auto-on timer.

14 TURBO

15 LIGHT
Press it to turn on/off the light.

16 WiFi

Remote Controller Description

Note:

- This is a general use remote controller, it could be used for the air conditioners with multifunction; For some function, which the model doesn't have, if press the corresponding button on the remote controller that the unit will keep the original running status.

1 ON/OFF :

Press this button to turn on the unit .Press this button again to turn off the unit.

2 —:

Press this button to decrease set temperature. Holding it down above 2 seconds rapidly decreases set temperature. In AUTO mode, set temperature is not adjustable.

3 + :

Press this button to increase set temperature.Holding it down above 2 seconds rapidly increases set temperature. In AUTO mode, set temperature is not adjustable.

4 MODE :

Each time you press this button,a mode is selected in a sequence that goes from AUTO, COOL,DRY, FAN,and HEAT *, as the following:

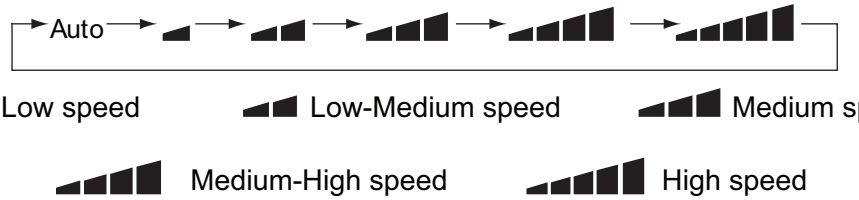


*Note:Only for models with heating function.

After energization, AUTO mode is defaulted. In AUTO mode, the unit will automatically select the suitable operation mode in accordance with the room temperature to make indoor room comfortable.

5 FAN :

This button is used for setting Fan Speed in the sequence that goes from AUTO, , , , to , then back to Auto.



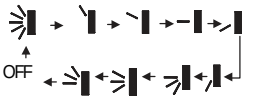
- X-FAN function: Hold fan speed button for 2s in COOL or DRY mode, the icon " " is displayed and the indoor fan will continue operation for a few minutes in order to dry the indoor unit even though you have turned off the unit. After energization, X-FAN OFF is defaulted. X-FAN is not available in AUTO, FAN or HEAT mode.

  This function indicates that moisture on evaporator of indoor unit will be blowed after the unit is stopped to avoid mould.

  - Having set X-FAN function on: After turning off the unit by pressing ON/OFF button indoor fan will continue running for a few minutes. at low speed. In this period, Hold fan speed button for 2s to stop indoor fan directly.
  - Having set X-FAN function off: After turning off the unit by pressing ON/OFF button, the complete unit will be off directly.

6 SWING:

Press this button to set up &down swing angle, which circularly changes as below:



This remote controller is universal . If any command , or is sent out, the unit will carry out the command as

indicates the guide louver swings as:

7 I FEEL:

Press this button to turn on I FEEL function. The unit automatically adjust temperature according to the sensed temperature. Press this button again to cancel I FEEL function. **When I FEEL function is turned on, the remote controller should be put within the area where indoor unit can receive the signal sent by the remote controller.**

8 /

Press this button to achieve the on and off of healthy and scavenging functions in operation status. Press this button for the first time to start scavenging function; LCD displays“ ”. Press the button for the second time to start healthy and scavenging functions simultaneously; LCD displays“ ” and “ ” . Press this button for the third time to quit healthy and scavenging functions simultaneously. Press the button for the fourth time to start healthy function; LCD display “ ” . Press this button again to repeat the operation above.

NOTE: This function is applicable to partial of models.

9 SLEEP:

- Press this button, can select Sleep 1 (1), Sleep 2 (2),Sleep 3 (3) and cancel the Sleep, circulate between these, after electrified, Sleep Cancel is defaulted.
- Sleep 1 is Sleep mode 1, in Cool, Dehumidify modes: sleep status after run for one hour, the main unit setting temperature will increase 1 ℃,setting temperature increased 2℃, the unit will run at this setting temperature; In Heat mode: sleep status after run for one hour, the setting temperature will decrease 1 ℃, 2 hours, setting temperature will decrease 2 ℃, then the unit will run at this setting temperature.
- Sleep 2 is sleep mode 2, that is air conditioner will run according to the presetting a group of sleep temperature curve .
- Sleep 3- the sleep curve setting under Sleep mode by DIY:

(1) Under Sleep 3 mode, press "Turbo" button for a long time, remote control enters into user individuation sleep setting status, at this time, the time of remote control will display "1 hour ", the setting temperature "88" will display the corresponding temperature of last setting sleep curve and blink (The first entering will display according to the initial curve setting value of original factory);

(2) Adjust "+" and "-" button, could change the corresponding setting temperature, after adjusted, press "Trubo "button for confirmation;

(3) At this time, 1 hour will be automatically increased at the timer postion on the remote control, (that are "2 hours " or "3 hours " or "8 hours "), the place of setting temperature "88" will display the corresponding temperature of last setting sleep curve and blink;

(4) Repeat the above step (2) ～ (3) operation, until 8 hours temperature setting finished, sleep curve setting finished, at this time, the remote control will resume the original timer display; temperature display will resume to original setting temperature.

Sleep3- the sleep curve setting under SLEEP mode by DIY could be inquired:

- The user could accord to sleep curve setting method to inquire the presetting sleep curve, enter into user individuation sleep setting status, but do not change the temperature, press "Turbo" button directly for confirmation.

Note: In the above presetting or enquiry procedure, if continuously within10s, there is no button pressed, the

sleep curve setting within10s, there is no button pressed, the sleep curve setting status will be automatically quit and resume to display the original displaying. In the presetting or enquiry procedure, press "ON/OFF" button, "Mode" button, "Timer"button or "Sleep" button, the sleep curve setting or enquiry status will quit similarly.

10 TEMP:

Press this button, could select displaying the indoor setting temperature or indoor ambient temperature.When the indoor unit firstly power on it will display the setting temperature, if the temperature's displaying status is changed from other status to" ",displays the ambient temperature, 5s later or within 5s, it receives other remote control signal that will return to display the setting temperature. if the users haven't set up the temperature displaying status,that will display the setting temperature.

11 QUIET:

Press this button, the Quiet status is under the Auto Quiet mode (display " " and "Auto" signal) and Quiet mode (display " " singal) and Quiet OFF (there is no signal of " " displayed), after powered on, the Quiet OFF is defaulted. Note: the Quiet function cannot be set up in Fan and Dry mode;Under the Quiet mode (Display " " signal), the fan speed is not available.

12 CLOCK :

Press CLOCK button, blinking . Within 5 seconds,pressing + or - button adjusts the present time. Holding down either button above 2 seconds increases or decreases the time by 1 minute every 0.5 second and then by 10 minutes every 0.5 second. During blinking after setting, press CLOCK button again to confirm the setting,and then will be constantly displayed.

13 T-ON / T-OFF:

Press T-ON button to initiate the auto-ON timer. To cancel the auto-timer program, simply press this button again.

After press of this button, disappears and "ON "blinks .00:00 is displayed for ON time setting.Within 5 seconds,press + or - butt on to adjust the time value.Every press of either button changes the time setting by 1minute. Holding down either button rapidly changes the time setting by 1 minute and then 10 minutes.Within 5 Seconds after setting,press TIMER ON button to confirm.

Press T-OFF button to initiate the auto-off timer. To cancel the auto-timer program, simply press the button again.TIMER OFF setting is the same as TIMER ON.

14 TURBO:

Press this button to activate / deactivate the Turbo function which enables the unit to reach the preset temperature in the shortest time. In COOL mode, the unit will blow strong cooling air at super high fan speed. In HEAT mode, the unit will blow strong heating air at super high fan speed.

15 LIGHT:

Press LIGHT button to turn on the display's light and press this button again to turn off the display 's light. If the light is turned on , is displayed. If the light is turned off, disappears.

16 WiFi:

Press " WiFi" button to turn on or turn off WiFi function. When WiFi function is turned on, the " WiFi " icon will be displayed on remote controller; Under status of unit off, press "MODE" and " WiFi " buttons simultaneously for 1s, WiFi module will restore to factory default setting.

● This function is only available for some models.

17 Combination of "+" and "-" buttons: About lock

Press " + " and "-" buttons simultaneously to lock or unlock the keypad. If the remote controller is locked, 🔒 is displayed. In this case, pressing any button, 🔒 blinks three times.

18 Combination of "MODE " and "-" buttons : About switch between Fahrenheit and centigrade

At unit OFF, press "MODE" and "-" buttons simultaneously to switch between ℃ and ℉ .

19 Combination of " TEMP " and "CLOCK" buttons : About Energy-saving Function

Press "TEMP" and "CLOCK" simultaneously in COOL mode to start energy-saving function. Nixie tube on the remote controller displays "SE". Repeat the operation to quit the function.

20 Combination of " TEMP " and "CLOCK" buttons : About 8℃ Heating Function

Press "TEMP" and "CLOCK" simultaneously in HEAT mode to start 8℃ Heating Function Nixie tube on the remote controller displays "$" and a selected temperature of "8℃". (46℉ if Fahrenheit is adopted). Repeat the operation to quit the function.

21 About Back-lighting Function

The unit lights for 4s when energizing for the first time, and 3s for later press.

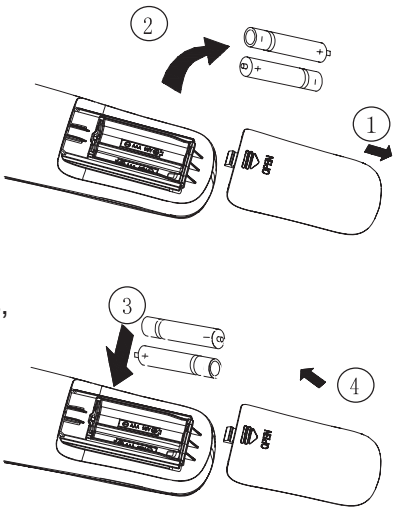
Replacement of Batteries

1.Remove the battery cover plate from the rear of the remote controller. (As shown in the figure)

2.Take out the old batteries.

3.Insert two new AAA1.5V dry batteries, and pay attention to the polarity.

4. Reinstall the battery cover plate.



Sketch map for replacing batteries

★ Notes:

- When replacing the batteries, do not use old or different types of batteries, otherwise, it may cause malfunction.
- If the remote controller will not be used for a long time, please remove batteries to prevent batteries from leaking.
- The operation should be performed in its receiving range.
- It should be kept 1m away from the TV set or stereo sound sets.
- If the remote controller does not operate normally, please take the batteries out and reinsert them after 30 seconds.If it still can't operate properly, replace the batteries.

6.2 Brief Description of Modes and Functions

1. Cooling mode

(1) Under this mode, the fan and the up swing will operate at setting status. The temperature setting range is 16~30ºC.
(2) The unit is stopped because of malfunction of outdoor unit or protection. The indoor unit keeps original operation status and the error code is displayed.
(3) Indoor unit is stopped due to mode shock.

2. Drying mode

(1) Under this mode, the fan operates at low speed and the swing operates at setting status. The temperature setting range is 16~30ºC.
(2) The unit is stopped because of malfunction of outdoor unit or protection. The indoor unit keeps original operation status and the error code is displayed.

3. Heating mode

(1) Under this mode, the temperature setting range is 16~30ºC.
(2) Working condition and process for heating
When the unit is turned on under heating mode, the indoor unit turns to cold air prevention status. When the unit is turned off and the indoor unit has been started up before, the indoor unit blows the residual heat.
(3) Protection function: When the compressor is stopped due to malfunction under heating mode, the indoor unit blows the residual heat.
(4) Blow residual heat
When the unit stops operation as it reaches the temperature point, indoor unit will continue to run for 60s. The fan speed cant be switched during blowing residual heat period. The upper horizontal louver will turn to the defaulted position in cooling. When the unit operates under heating mode or auto heating mode, compressor will be turned on and the corresponding electric expansion valve is more than 65 and the unit stops operation during the operation status of indoor unit. The upper horizontal louver will turn to the defaulted position in heating mode. The indoor unit operates at low speed for 10s and then the unit stops operation.
(5) Defrosting, oil-returning
As it received the signal of defrosting and oil-returning from outdoor unit, the upper horizontal louver will turn to the minimum angle in cooling. 10s later, the in door fan stop operation. During defrosting and oil-returning process and they are quitted within 5mins, all malfunctions for indoor tube temperature sensor wont be detected.

4. Working process for AUTO mode (Mode judgment will be performed every 30s)

Under AUTO mode, standard cooling Tpreset=25ºC (77ºF), standard heating Tpreset=20ºC (68ºF), and standard fan Tpreset= 25ºC (77ºF).
(1) When Tamb≥26ºC (79ºF), the unit operation in cooling mode;
(2) Heating pump unit: When Tamb≤19ºC (66ºF), the unit operates in heating mode;
(3) Cooling only unit: Tamb≤19ºC (66ºF), the unit operates in fanmode;
(4) When 19ºC<Tindoor amb.<26ºC, if it turns to auto mode as the unit is turned on for the first time the unit will operates at auto fan mode. If it switch to auto mode from other modes, the unit will keep previous operation mode (when it turns to dry mode, the unit operates at auto fan mode).
(5) Protection function
Protection function is the same as that in cooling or heating mode.

5. Fan mode

Under fan mode, only indoor fan and swing operates. When it operates at auto fan speed, it will operate according to auto fan speed condition in cooling.

6. Mode shock

If the mode shock is 1 which is received by indoor unit from outdoor unit, the loads of indoor unit (indoor unit, auxiliary heating,swing) stop operation and the error code is displayed. The mode sent to outdoor unit is still remote control receiving mode. The unit will be turned off during mode shock.
If timer ON is reached, and the mode shock is 1 which is received by indoor unit from outdoor unit, the loads of indoor unit (indoor unit,auxiliary heating, swing) stop operation and the error code is displayed. The mode sent to outdoor unit is still remote control receiving mode.

7. Other control

7.1 Buzzer

Upon energization or availably operating the unit or remote controller, the buzzer will give out a beep.

7.2 Auto button

If this button is pressed, the unit will operate in AUTO mode and indoor fan will operate at auto speed; meanwhile, the swing motor operates. Press this button again to turn off the unit.

7.3 8 ºC heating function

Under heating mode, press TEMP+CLOCK buttons simultaneously. Under this mode, “cold air prevention protection” will be shielded.

7.4 I FEEL function

When I FEEL command is received, the controller will operate according to the ambient temperature sent by the remote controller (For defrosting and cold blow prevention, the unit operates according to the ambient temperature sensed by the air conditioner). The remote controller will send ambient temperature data to the controller every 10min. When the data has not been received after 11mins,the unit will operate according to the temperature sensed by the air conditioner. If I FEEL function is not selected, the ambient temperature will be that sensed by the air conditioner. I FEEL function will not to be memorized.

7.5 Timer function

General timer and clock timer functions are compatible by equipping remote controller with different functions.

(1)General Timer

Timer ON can be set at unit OFF. If selected ON time is reached, the unit will start to operate according to previous setting status. Time setting range is 0.5-24hr in 30-minute increments.

Timer OFF can be set at unit ON. If selected OFF time is reached, the unit will stop operation. Time setting range is 0.5-24hr in 30-minute increments.

(2)Clock Timer

Timer ON

If timer ON is set during operation of the unit, the unit will continue to operate. If timer ON is set at unit OFF, upon ON time reaches the unit will start to operate according to previous setting status.

Timer OFF

If timer OFF is set at unit OFF, the system will keep standby status. If timer OFF is set at unit ON, upon OFF time reaches the unit will stop operation.

Timer Change

Although timer has been set, the unit still can be turned on/off by pressing ON/OFF button of remote controller. You can also set the timer once again, and then the unit will operate according to the last setting. If timer ON and timer OFF are set at the same time during operation of the unit, the unit will keep operating at current status till OFF time reaches. If timer ON and timer OFF are set at the same time at unit OFF, the unit will keep stop till ON time reaches. In the future's every day, the system will operate according to presetting mode till OFF.

7.6 Sleep function

This mode is only valid in cooling and heating modes. The unit will select proper sleep curve to operate according to different set temperature.

7.7 Compulsory defrosting function

When the unit is turned on in heating by remote controller and the set temperature is 16^{o}C, press "+,-,+,-,+,-"continuously within 5s, the indoor unit turns to compulsory defrosting setting and it will send compulsory defrosting mode to outdoor unit.

When indoor unit received the compulsory defrosting signal from outdoor unit, the indoor unit will quit from the compulsory defrosting setting and it will cancel to send compulsory defrosting mode to outdoor unit.

7.8 Refrigerant recovery function

Turn to Freon recovery mode: After the unit is energized for 5min, and the unit is turned on at 16ºC under cooling mode, press light button on remote controller for 3 times successively within 3s to turn to Freon recovery mode. Fo is displayed and it will send Freon recovery mode to outdoor unit.

Quit from Freon recovery mode:After it turns to Freon mode, if it receives any signal from remote controller or it turns to Freon recovery mode for 25 mins, it will quit from Freon recovery mode.

Turn to the action for Freon recovery mode: indoor unit will be turned on in cooling mode. The fan speed is super-high fan speed and the set temperature is 16^{o}C. The horizontal louver will turn to the minimum operation angle.

Quit the action for Freon recovery mode: The indoor fan operates at the previous set status by remote controller.

7.9 Pilot run function

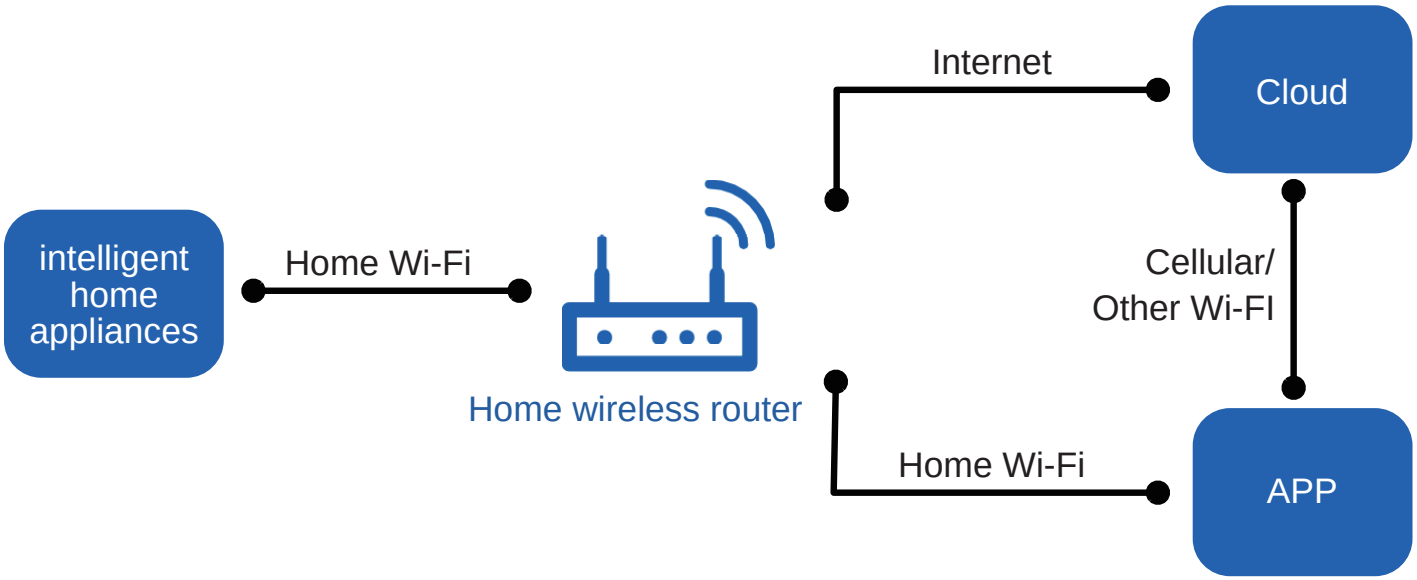
When the set temperature is 30°C under cooling mode, press “+,-,+,-,+,-”continuously within 3s, the indoor unit turns to pilot run setting mode and it will send pilot run mode to outdoor unit.

Pilot run mode: it operates under cooling mode and “dd” is displayed.

Quit the pilot run mode and indoor unit cancels “dd” display. If it receives “wrong wire connection of malfunction of expansion valve” from outdoor unit, “dn” will be displayed.

6.4 Ewpe Smart App Operation Manual

Control Flow Chart



Operating Systems

Requirement for User's smart phone:

iOS system
Support iOS7.0 and above version

Android system
Support Android 4.4 and above version

Download and installation

App Download Linkage

Scan the QR code or search "Ewpe Smart" in the application market to download and install it. When "Ewpe Smart" App is installed, register the account and add the device to achieve long-distance control and LAN control of smart home appliances.
For more information, please refer to "Help" in App.

Part Ⅱ : Installation and Maintenance

7. Notes for Installation and Maintenance

Safety Precautions: Important!

Please read the safety precautions carefully before installation and maintenance.
The following contents are very important for installation and maintenance.

Please follow the instructions below.

●The installation or maintenance must accord with the instructions.
●Comply with all national electrical codes and local electrical codes.
●Pay attention to the warnings and cautions in this manual.
●All installation and maintenance shall be performed by distributor or qualified person.
●All electric work must be performed by a licensed technician according to local regulations and the instructions given in this manual.
●Be caution during installation and maintenance. Prohibit incorrect operation to prevent electric shock, casualty and other accidents.

Warnings

Electrical Safety Precautions:

1. Cut off the power supply of air conditioner before checking and maintenance.
2. The air condition must apply specialized circuit and prohibit share the same circuit with other appliances.
3. The air conditioner should be installed in suitable location and ensure the power plug is touchable.
4. Make sure each wiring terminal is connected firmly during installation and maintenance.
5. Have the unit adequately grounded. The grounding wire cant be used for other purposes.
6. Must apply protective accessories such as protective boards, cable-cross loop and wire clip.
7. The live wire, neutral wire and grounding wire of power supply must be corresponding to the live wire, neutral wire and grounding wire of the air conditioner.
8. The power cord and power connection wires cant be pressed by hard objects.
9. If power cord or connection wire is broken, it must be replaced by a qualified person.
10. If the power cord or connection wire is not long enough, please get the specialized power cord or connection wire from the manufacture or distributor. Prohibit prolong the wire by yourself.
11. For the air conditioner without plug, an air switch must be installed in the circuit. The air switch should be all-pole parting and the contact parting distance should be more than 3mm.
12. Make sure all wires and pipes are connected properly and the valves are opened before energizing.
13. Check if there is electric leakage on the unit body. If yes, please eliminate the electric leakage.
14. Replace the fuse with a new one of the same specification if it is burnt down; dont replace it with a cooper wire or conducting wire.
15. If the unit is to be installed in a humid place, the circuit breaker must be installed.

Installation Safety Precautions:

1. Select the installation location according to the requirement of this manual.(See the requirements in installation part)
2. Handle unit transportation with care; the unit should not be carried by only one person if it is more than 20kg.
3. When installing the indoor unit and outdoor unit, a sufficient fixing bolt must be installed; make sure the installation support is firm.
4. Ware safety belt if the height of working is above 2m.
5. Use equipped components or appointed components during installation.
6. Make sure no foreign objects are left in the unit after finishing installation.

Refrigerant Safety Precautions:

1. Avoid contact between refrigerant and fire as it generates poisonous gas; Prohibit prolong the connection pipe by welding.
2. Apply specified refrigerant only. Never have it mixed with any other refrigerant. Never have air remain in the refrigerant line as it may lead to rupture or other hazards.
3. Make sure no refrigerant gas is leaking out when installation is completed.
4. If there is refrigerant leakage, please take sufficient measure to minimize the density of refrigerant.
5. Never touch the refrigerant piping or compressor without wearing glove to avoid scald or frostbite.

Improper installation may lead to fire hazard, explosion, electric shock or injury.

Safety Precautions for Installing and Relocating the Unit:

To ensure safety, please be mindful of the following precautions.

Warnings

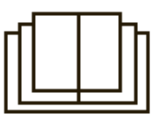
1. When installing or relocating the unit, be sure to keep the refrigerant circuit free from air or substances other than the specified refrigerant.
Any presence of air or other foreign substance in the refrigerant circuit will cause system pressure rise or compressor rupture, resulting in injury.
2.When installing or moving this unit, do not charge the refrigerant which is not comply with that on the nameplate or unqualified refrigerant.
Otherwise, it may cause abnormal operation, wrong action, mechanical malfunction or even series safety accident.
3.When refrigerant needs to be recovered during relocating or repairing the unit, be sure that the unit is running in cooling mode.Then, fully close the valve at high pressure side (liquid valve).About 30-40 seconds later, fully close the valve at low pressure side (gas valve), immediately stop the unit and disconnect power. Please note that the time for refrigerant recovery should not exceed 1 minute.
If refrigerant recovery takes too much time, air may be sucked in and cause pressure rise or compressor rupture, resulting in injury.
4.During refrigerant recovery, make sure that liquid valve and gas valve are fully closed and power is disconnected before detaching the connection pipe.
If compressor starts running when stop valve is open and connection pipe is not yet connected, air will be sucked in and cause pressure rise or compressor rupture, resulting in injury.
5.When installing the unit, make sure that connection pipe is securely connected before the compressor starts running.
If compressor starts running when stop valve is open and connection pipe is not yet connected, air will be sucked in and cause pressure rise or compressor rupture, resulting in injury.
6.Prohibit installing the unit at the place where there may be leaked corrosive gas or flammable gas.
If there leaked gas around the unit, it may cause explosion and other accidents.
7.Do not use extension cords for electrical connections. If the electric wire is not long enough, please contact a local service center authorized and ask for a proper electric wire.
Poor connections may lead to electric shock or fire.
8.Use the specified types of wires for electrical connections between the indoor and outdoor units. Firmly clamp the wires so that their terminals receive no external stresses.
Electric wires with insufficient capacity, wrong wire connections and insecure wire terminals may cause electric shock or fire.

Safety Precautions for Refrigerant

●To realize the function of the air conditioner unit, a special refrigerant circulates in the system. The used refrigerant is the fluoride R32,which is specially cleaned. The refrigerant is flammable and inodorous. Furthermore, it can leads to explosion under certain conditions. But the flammability of the refrigerant is very low. It can be ignited only by fire.
●Compared to common refrigerants, R32 is a nonpolluting refrigerant with no harm to the ozonosphere. The influence upon the greenhouse effect is also lower. R32 has got very good thermodynamic features which lead to a really high energy efficiency. The units therefore need a less filling.

WARNING:

●Do not use means to accelerate the defrosting process or to clean, other than those recommended by the manufacture. Should repair be necessary,contact your nearest authorized Service Centre. Any repairs carried out by unqualified personnel may be dangerous. The appliance shall be stored in a room without continuously operating ignition sources. (for example:open flames , an operating gas appliance or an operating electric heater.)
●Do not pierce or burn.
●Appliance shall be installed, operated and stored in a room with a floor area larger than 4m (or 6m).
●Appliance filled with flammable gas R32. For repairs, strictly follow manufacturers instructions only.Be aware that refrigrants not contain odour.
●Read specialists manual.



Safety Operation of Flammable Refrigerant

Qualification requirement for installation and maintenance man

●All the work men who are engaging in the refrigeration system should bear the valid certification awarded by the authoritative organization and the qualification for dealing with the refrigeration system recognized by this industry. If it needs other technician to maintain and repair the appliance, they should be supervised by the person who bears the qualification for using the flammable refrigerant.

●It can only be repaired by the method suggested by the equipments manufacturer.

Installation notes

●The air conditioner is not allowed to use in a room that has running fire (such as fire source,working coal gas ware, operating heater).

●It is not allowed to drill hole or burn the connection pipe.

●The air conditioner must be installed in a room that is larger than the minimum room area.

The minimum room area is shown on the nameplate or following table a.

●Leak test is a must after installation.

table a - Minimum room area(m^2)

Minimum room area(m^2)	Charge amount (kg)	≤1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2	2.1	2.2	2.3	2.4	2.5
	floor location	/	14.5	16.8	19.3	22	24.8	27.8	31	34.3	37.8	41.5	45.4	49.4	53.6
	wall mounted	/	5.2	6.1	7	7.9	8.9	10	11.2	12.4	13.6	15	16.3	17.8	19.3
	window mounted	/	1.6	1.9	2.1	2.4	2.8	3.1	3.4	3.8	4.2	4.6	5	5.5	6
	ceiling mounted	/	1.1	1.3	1.4	1.6	1.8	2.1	2.3	2.6	2.8	3.1	3.4	3.7	4

Maintenance notes

●Check whether the maintenance area or the room area meet the requirement of the nameplate.

— Its only allowed to be operated in the rooms that meet the requirement of the nameplate.

●Check whether the maintenance area is well-ventilated.

— The continuous ventilation status should be kept during the operation process.

●Check whether there is fire source or potential fire source in the maintenance area.

— The naked flame is prohibited in the maintenance area; and the "no smoking" warning board should be hanged.

●Check whether the appliance mark is in good condition.

— Replace the vague or damaged warning mark.

Welding

●If you should cut or weld the refrigerant system pipes in the process of maintaining, please follow the steps as below:

a. Shut down the unit and cut power supply

b. Eliminate the refrigerant

c. Vacuuming

d. Clean it with N2 gas

e. Cutting or welding

f. Carry back to the service spot for welding

●Make sure that there isnt any naked flame near the outlet of the vacuum pump and its well-ventilated.

●The refrigerant should be recycled into the specialized storage tank.

Filling the refrigerant

●Use the refrigerant filling appliances specialized for R32. Make sure that different kinds of refrigerant wont contaminate with each other.

●The refrigerant tank should be kept upright at the time of filling refrigerant.

●Stick the label on the system after filling is finished (or havent finished).

●Dont overfilling.

●After filling is finished, please do the leakage detection before test running; another time of leak detection should be done when its removed.

Safety instructions for transportation and storage

●Please use the flammable gas detector to check before unload and open the container.

●No fire source and smoking.

●According to the local rules and laws.

Main Tools for Installation and Maintenance

1. Level meter, measuring tape 	2. Screw driver 	3. Impact drill, drill head, electric drill 
4. Electroprobe 	5. Universal meter 	6. Torque wrench, open-end wrench, inner hexagon spanner 
7. Electronic leakage detector 	8. Vacuum pump 	9. Pressure meter 
10. Pipe pliers, pipe cutter   	11. Pipe expander, pipe bender  	12. Soldering appliance, refrigerant container  

8. Installation

8.1 Requirements for Electric Connection

1. Safety Precaution

(1) Must follow the electric safety regulations when installing the unit.
(2) If the supply cord is damaged, it must be replaced by the manufacturer or its service agent or a similarly qualified person in order to (avoid a hazard.
(3) According to the local safety regulations, use qualified power supply circuit and air switch.
(4) A air switch having a contact separation of at least 3mm in all poles should be fixed in fixed wiring.
(5) The appliance shall be installed in accordance with national wiring regulation.
(6) The air switch must have the functions of magnetic tripping and heat tripping in order to prevent short circuit or overload. Please install the air switch with suitable capacity according to the sheet below.
(7) Make sure the power supply matches with the requirement of air conditioner.Unstable power supply or incorrect wiring may result in electric shock, fire hazard or malfunction. Please install proper power supply cables before using the air conditioner.
(8) Properly connect the live wire, neutral wire and grounding wire of power socket.
(9) Be sure to cut off the power supply before proceeding any work related to electric safety.
(10) Do not put through the power before finishing installation.

2. Grounding Requirement

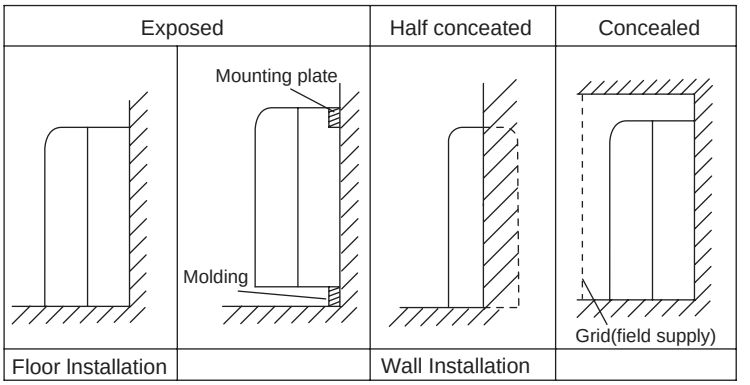
(1) The air conditioner is first class electric appliance. It must be properly grounded with specialized grounding device by a professional. Please make sure it is always grounded effectively, otherwise it may cause electric shock.
(2) The yellow-green wire in air conditioner is grounding wire, which can't be used for other purposes.
(3) The grounding resistance should comply with national electric safety regulations.

Air-Conditioner	Air Switch Capacity
09/12/18K	16A

8.2 Installation of indoor unit

1. Selection of Installation Location

(1) Such a place where cool air can be distributed throughout the room.
(2) Such a place where condensation water is easily drained out.
(3) Such a place that can handle the weight of indoor unit.
(4) Such a place which has easy access for maintenance.
(5) The appliance shall not be installed in the laundry.



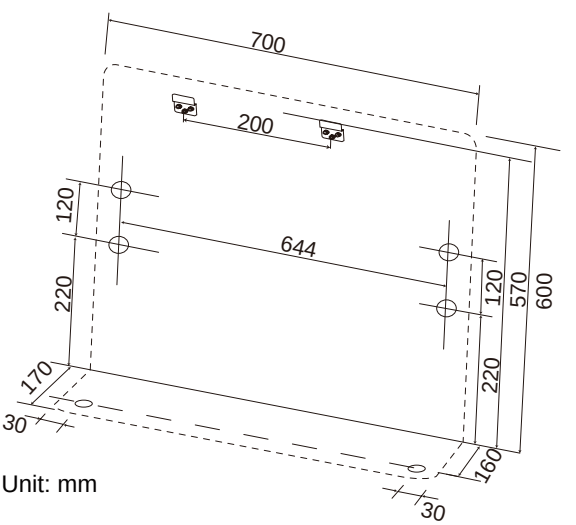
There are 2 styles of installation

● Ceiling type ● Floor type

Each type is similar to the other as follows:

The indoor unit should be sited in a place where:
(1) The restrictions on installation specified in the indoor unit installation drawings are met.
(2) Both air intake and exhaust have clear paths met.
(3) The unit is not in the path of direct sunlight.
(4) The unit is away from the source of heat or steam.
(5) There is no source of machine oil vapour (this may shorten indoor unit life).
(6) Cool(warm) air is circulated throughout the room.
(7) The unit is away from electronic ignition type fluorwscent lamps (inverter or rapid stert type) as they may shorten the remote controller range.
(8) The unit is at least 1 metre away from any television or radio set(unit may cause interference with the picture or sound).

Location for securing the installation panel.

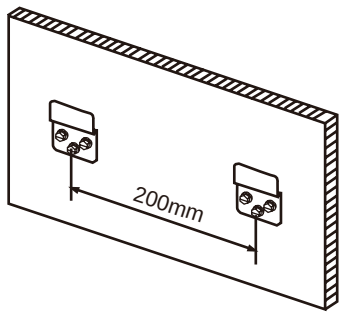


Unit: mm

Cautions for installation where air conditioner troubleis liable tooccur.

Where there is toomuch of oil area.
Where it is acid base area.
Where there is irregular electrical supply.

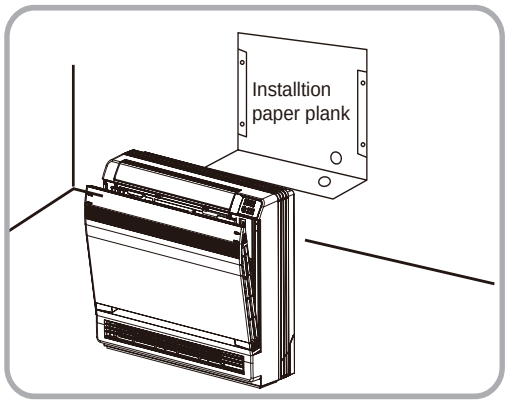
Schematic drawing of hooks:

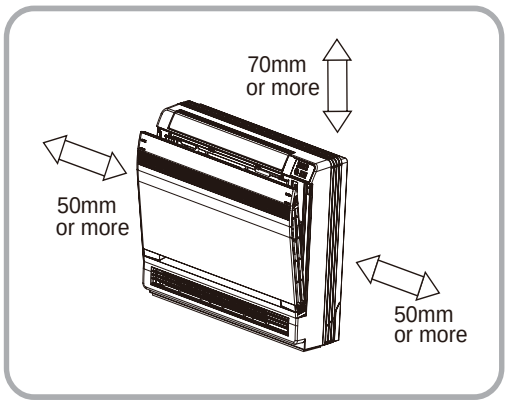


2. Indoor Unit Installation Drawings

The indoor unit may be mounted in any of the three styles shown here.

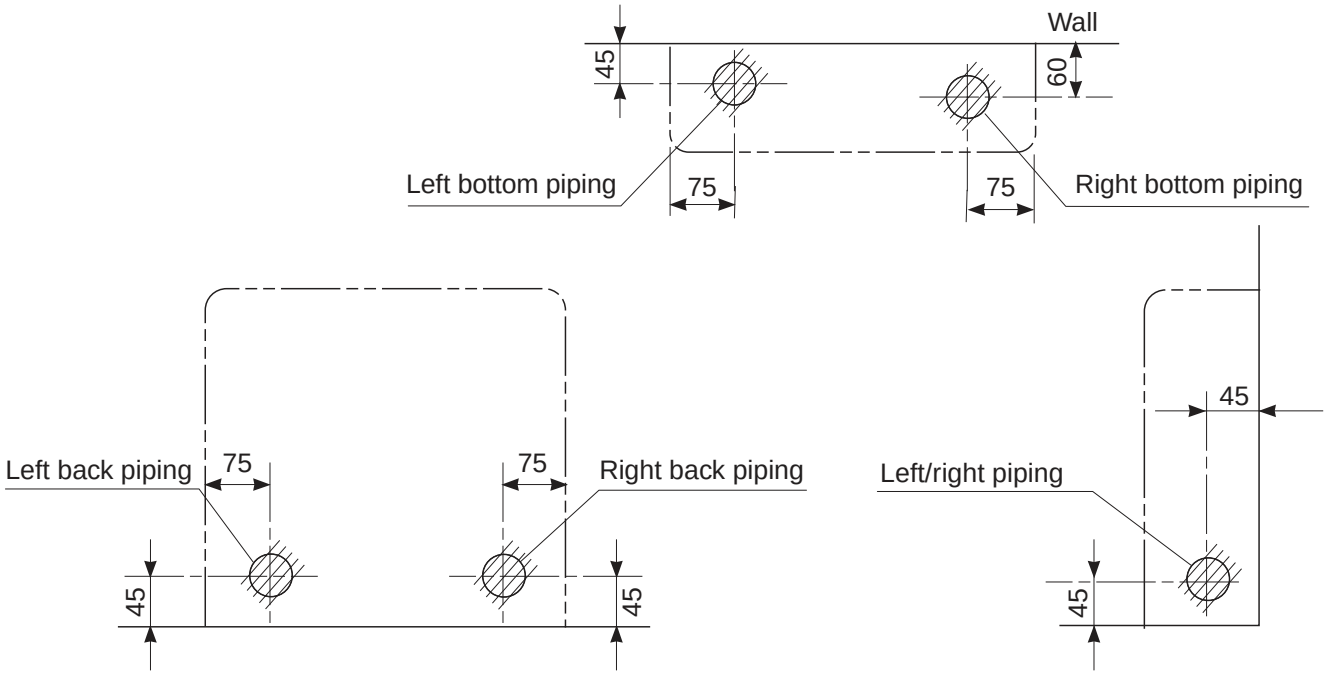
Console unit shall be installed on the ground or the position where is 0.3m from the floor.





3. Refrigerant Piping

(1) Drill a hole (65mm in diameter) in the spot indicated by the symbol in the illustration ad below .
(2) The location of the hole is different depending on which side of the pipe is taken out .
(3) For piping ,see6.Connecting the refrigerant pipe , under Indoor Unit Installation.
(4) Allow space around the pipe for a easier indoor unit pipe connection.



Unit: mm

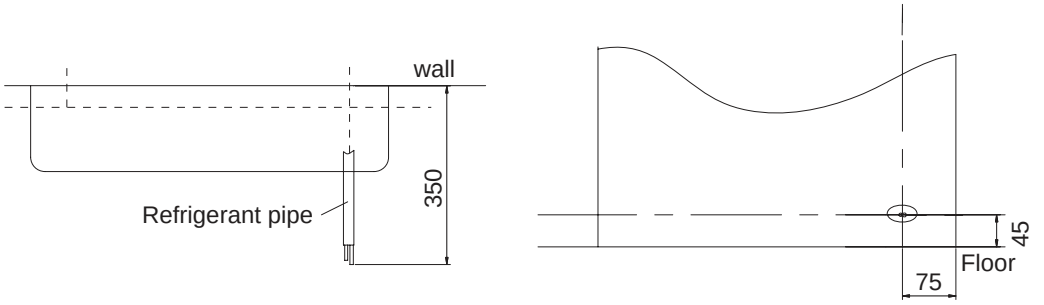
⚠ CAUTION

Min.allowable length

●The suggested shortest pipe length is 2.5m,in order to avoid noise from the outdoor unit and vibration. (Mechanical noise and vibration may occur depending on how the unit is installed and the environment in which it is used.)

●See the installation manual for the outdoor unit for the maximum pipe length.

●For multi-connections ,see the installation manual for the multi-outdoor unit.



Unit: mm

4. Boring a Wall Hole and Installing Wall Embedded Pipe

● For walls containing metal frame or metal board ,be sure to use a wall embedded pipe and wall cover in the feed-through hole to

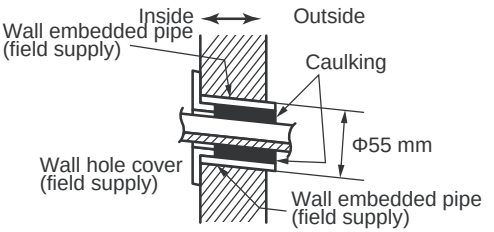
● Be sure to caulk the gaps around the pipes with caulking material to prevent water leakage.

(1) Bore a feed-through hole of 55mm in the wall so it has a down slope toward the outside.

(2) Insert a wall pipe into the hole.

(3) Insert a wall cover into wall pipe .

(4) After completing refrigerant piping, wiring, and drain piping, caulk pipe hole gap with putty.



5. Drain Piping

(1) Use commercial regid polyvinyl chloride pipe general VP 20 pipe, outer diameter 26mm, inner diameter 20mm for the drain pipe.

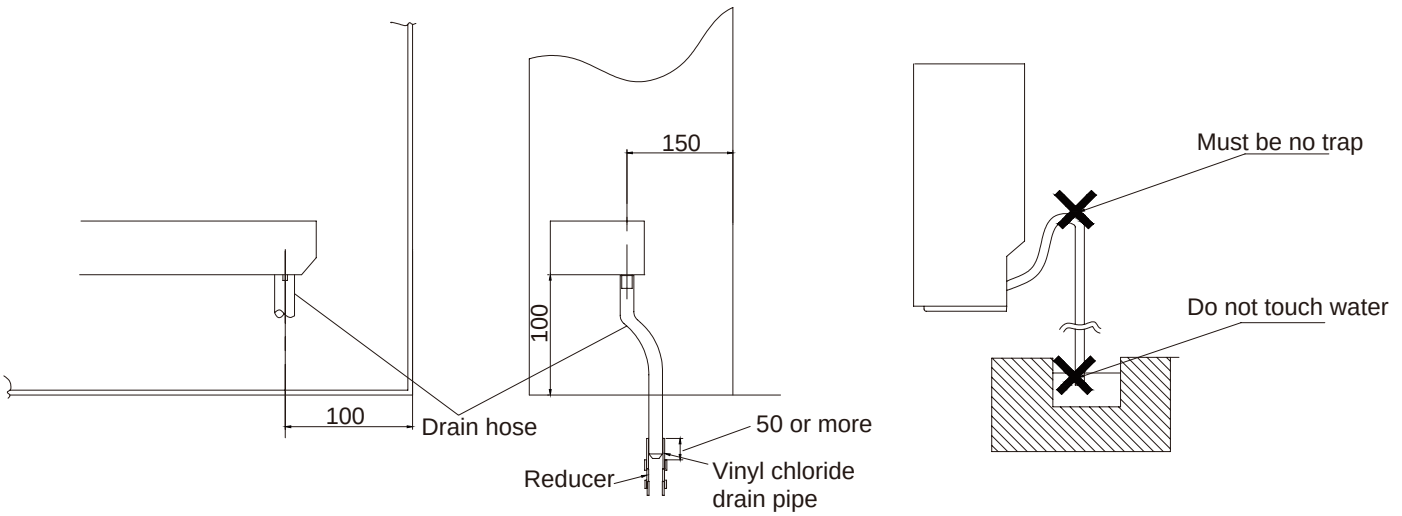
(2)The drain hose (outer diameter 18mm at connecting end, 220mm long)is supplied with the indoor unit. Prepare the drain pipe picture below position.

(3) The drain pipe should be inclined downward so that water will flow smoothly without any accumulation.(Should not be trap.)

(4) Insert the drain hose to this depth so it wont be pulled out of the drain pipe.

(5) Insulate the indoor drain pipe with 10mm or more of insulation material to prevent condensation.

(6) Remove the air filters and pour some water into the drain pan to check the water flows smoothly.



Unit: mm

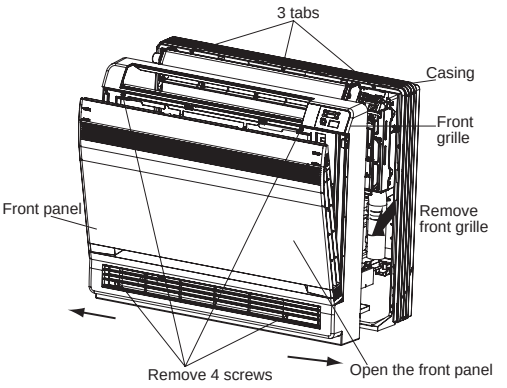
6. Installing Indoor Unit

Preparation

●Open the front panel, remove the 4 screws and dismount the front grille while pulling it forward.

●Follow the arrows to disengage the clasps on the front case to remove it.

●Follow the procedure below when removing the slit portions.



■For Moldings

●Remove the pillars. (Remove the slit portions on the bottom frame using nippers.)

■For Side Piping

●Remove the pillars.

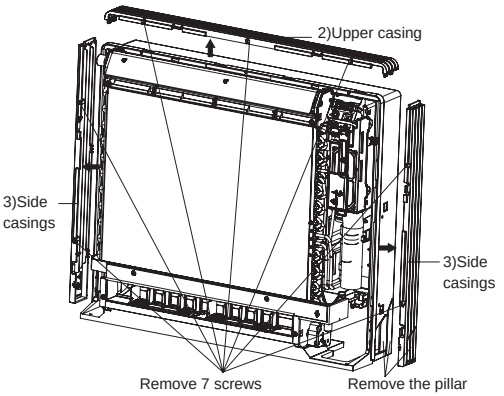
(1) Remove the 7screws.

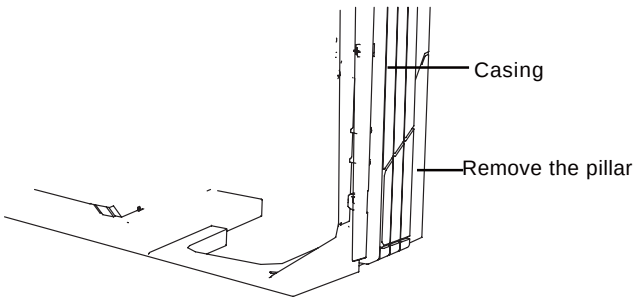
(2) Remove the upper casing (2 tabs).

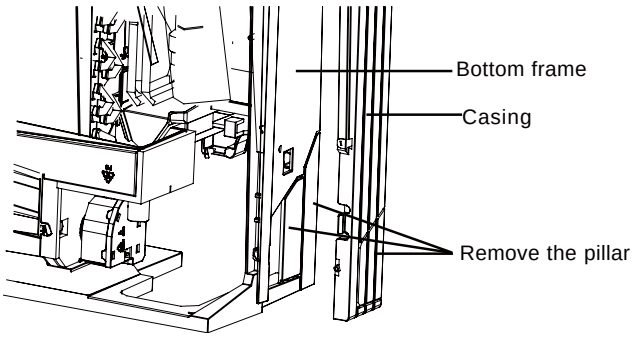
(3) Remove the left and right casings (2 tabs on eachside).

(4) Remove the slit portions on the bottom frame and casings using nippers .

(5) Return by following the steps in reverse order(3>2>1).







Installation

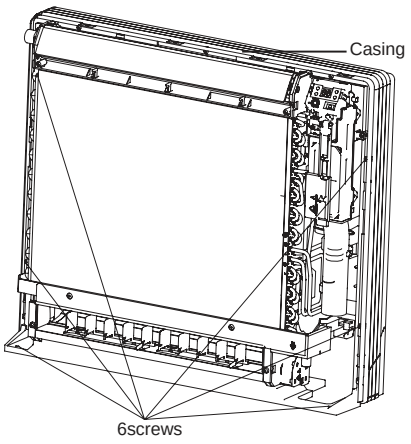
●Secure using 6 screws for floor installations.(Do not forget to secure to the rear wall.)

●For wall installations, secure the mounting plate using 5 screws and the indoor unit using 4 screws.The mounting plate should be installed on a wall which can support the weight of the indoor unit.

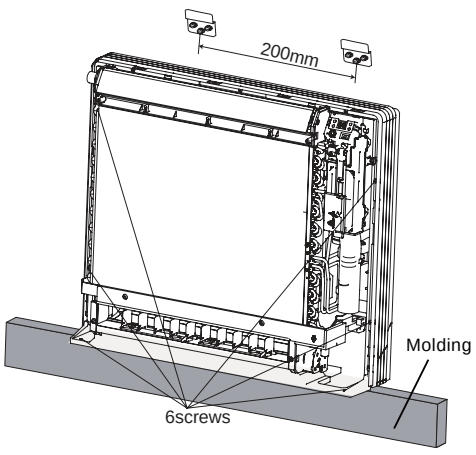
(1) Temporarily secure the mounting plate to the wall, make sure that the panel is completely level, and mark the boring points on the wall.

(2) Secure the mounting plate to the wall with screws.

Floor Installation



Wall Installation

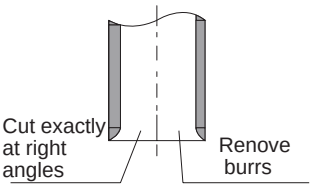


(3) Once refrigerant piping and drain piping connections are complete, fill in the gap of the through hole with putty. A gap can lead to condensation on the refrigerant pipe, and drain pipe, and the entry of insects into the pipes.
(4) Attach the front panel and front grille in their original positions once all connections are complete.

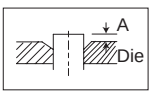
7. Flaring the Pipe End
(1) Cut the pipe end with a pipe cutter.
(2) Remove burrs with the cut surface facing downward so that the chips do not enter the pipe.
(3) Fit the flare nut on the pipe.
(4) Flare the pipe.
(5) Check that the flaring is properly made.

⚠ CAUTION

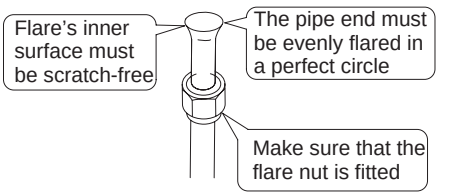
(1) DO not use mineral oil on flared part.
(2) Prevent mineral oil from getting into the system as this would reduce the lifetime of the units.
(3) Never use piping which had been used for previous installations. Only use parts which are delivered with the unit.
(4) Do never install a drier to this R410A unit in order to guarantee its lifetime.
(5) The drying material may dissolve and damage the system.
(6) Incomplete flaring may cause refrigerant gas leakage.



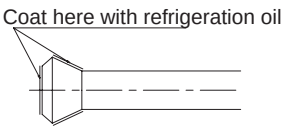
Flaring
Set exactly at the position shown below

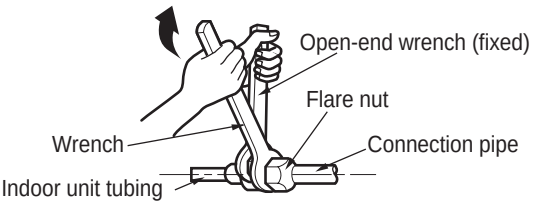


	Flare tool for R410A	Conventional flare tool	
	Clutch-type	Clutch-type (Rigid-type)	Wing-nut type (Imperial-type)
A	0-0.5mm	1.0-1.5mm	1.5-2.0mm



8. Connecting the Refrigerant Pipe
(1) Use torque wrenches when tightening the flare nuts to prevent damage to the flare nuts and gas leaks.

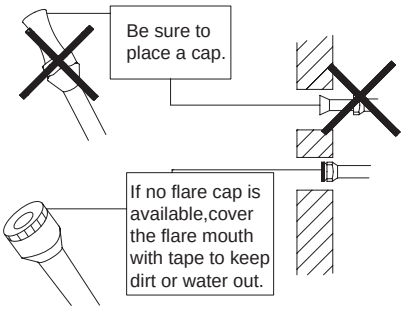




(2) Align the centres of both flares and tighten the flares and tighten the flare nuts 3 or 4 turns by hand.
Then tighten them fully with the torque wrenches.
(3) To prevent gas leakage, apply refrigeration oil on both inner and outer surfaces in the flare. (Use refrigeration oil for R410A.)

Flare nut tightening torque		
Gas side		Liquid side
09/12K	18K	09K/12K/18K
3/8 inch	1/2 inch	1/4 inch
31-35 N.m	50-55 N.m	15-20 N.m

Caution on Piping Handling
(1) Protect the open end of the pipe against dust and moisture.
(2) All pipe bends should be as gentle as possible. Use a pipe bender for bending.
(Bending radius should be 30 to 40mm or larger.)



Selection of Copper and Heat Insulation Materials

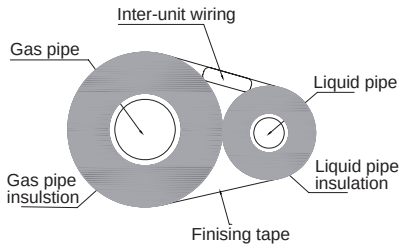
When using commercial copper pipes and fittings, observe the following:

(1) Insulation material: Polyethylene foam

Heat transfer rate:0.041 to 0.052W/mK(0.035 to 0.045kca/(mh°C

Refrigerant gas pipes surface temperature reaches 110 max.

Choose heat insulation materials that will withstand this temperature.



(2) Be sure to insulate both the gas and liquid piping and to provide insulation dimensions as below.

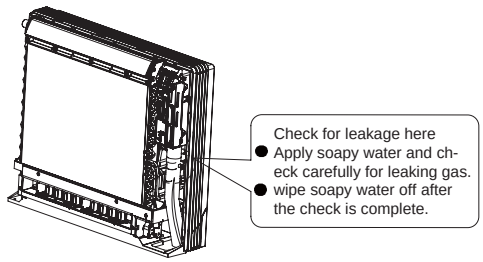
Gas side	Liquid side	Gas pipe thermal insulation	Liquid pipe thermal insulation
09K		09K	
O.D. 9.55mm	O.D. 6.4mm	I.D. 12-15mm	I.D. 8-10mm
Thickness 0.8mm		Thickness 10mm Min.	

(3) Use separate thermal insulation pipes for gas and liquid refrigerant pipes.

9. Checking for Gas Leakage

(1) Check for leakage of gas after air purging

(2) See the sections on air purges and gas leak checks in the installation manual for the outdoor unit.



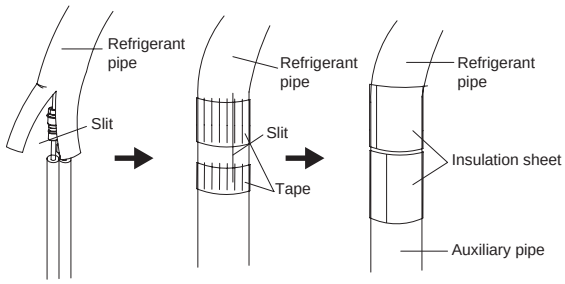
10. Attaching the Connection Pipe

●Attach the pipe after checking for gas leakage, described above.

(1) Cut the insulated portion of the on-site piping, matching it up with the connecting portion.

(2) Secure the slit on the refrigerant piping side with the butt joint on the auxiliary piping using the tape, making sure there are no gaps.

(3) Wrap the slit and butt joint with the included insulation sheet, making sure there are no gaps.



⚠ CAUTION

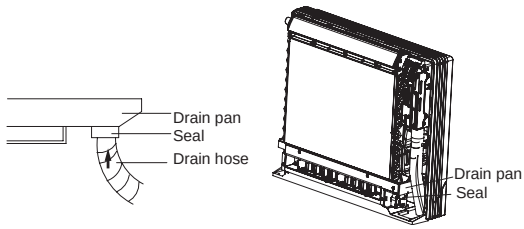
(1) Insulate the joint of the pipes securely. Incomplete insulation may lead to water leakage.

(2) Push the pipe inside so it does not place undue force on the front grille.

11. Connecting the Drain Hose

Insert the supplied C drain hose into the socket of the drain pan.

Fully insert the drain hose until it adheres to a seat of the socket.



12. Wiring

With a Multi indoor unit, install as described in the installation manual supplied with the Multi outdoor unit.

●Live the sensor securing plate, remove the front metal plate cover, and connect the branch wiring to the terminal block.

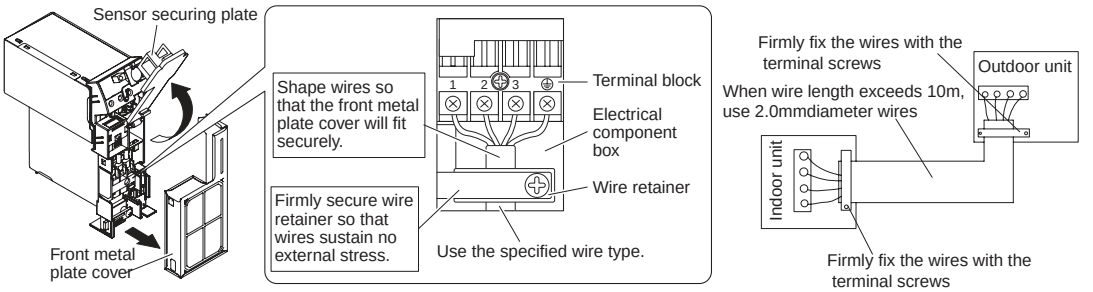
(1) Strip wire ends (15mm)

(2) Mach wire colours with terminal numbers on indoor and outdoor units terminal blocks and firmly screw wires to the corresponding terminals.

(3) Connect the earth wires to the corresponding terminals.

(4) Pull wires to make sure that they are securely latches up, then retain wires with wire retainer.

(5) In case of connecting to an adapter system, Run the remote controller cable and attach the S21. (Refer to 11. When connecting go an system.)



⚠ CAUTION

(1) Do not use tapped wires, stranded wires, extensioncords, or starburst connections, as they may cause overheating, electrical shock, or fire.
(2) Do not use locally purchased electrical parts inside the product. (Do not branch the power for the drain pump, etc, from the terminal block.) Doing so may cause electric shock or fire.)

9. Maintenance

9.1 Error Code List

Malfunction and Mode Display Sheet					
Malfunction name	Malfunction type	Double 8	Display of indicator		
			Operation indicator	Cooling indicator	Heating indicator
Zero-cross detection circuit malfunction	Hardware malfunction	U8	blinks 17 times		
Malfunction protection of jumper cap	Hardware malfunction	C5	blinks 15 times		
No feedback of indoor motor	Hardware malfunction	H6	blinks 11 times		
Indoor ambient temperature sensor is open/short- circuited	Hardware malfunction	F1		blinks 1 times	
Indoor evaporator temperature sensor is open/short-circuited	Hardware malfunction	F2		blinks 2 times	
Liquid valve temperature sensor is open/short-circuited	Hardware malfunction	b5		blinks 19 times	
Gas valve temperature sensor is open/short-circuited	Hardware malfunction	b7		blinks 22 times	
Module temperature sensor is open/short-circuited	Hardware malfunction	P7			blinks 18 times
Outdoor ambient temperature sensor is open/short- circuited	Hardware malfunction	F3		blinks 3 times	
Outdoor condenser inlet pipe temperature sensor is open/short- circuited	Hardware malfunction	A5			
Outdoor condenser middle pipe temperature sensor is open/short- circuited	Hardware malfunction	F4		blinks 4 times	
Outdoor condenser outlet pipe temperature sensor is open/short- circuited	Hardware malfunction	A7	/	/	/
Outdoor discharge temperature sensor is open/short- circuited	Hardware malfunction	F5		blinks 5 times	
Communication malfunction of indoor unit and outdoor unit	Hardware malfunction	E6	blinks 6 times		
Compressor phase current circuit detection malfunction	Hardware malfunction	U1			blinks 12 times
Compressor demagnetization protection	Hardware malfunction	HE			blinks 14 times
DC busbar voltage drop malfunction	Hardware malfunction	U3			blinks 20 times
Module temperature protection	Hardware malfunction	P8			blinks 19 times
shortage of freon or blockage protection for the system	Hardware malfunction	F0		blinks 10 times	
Capacitor charging malfunction	Hardware malfunction	PU			blinks 17 times
High pressure protection for the system	Hardware malfunction	E1	blinks 1 times		
Low pressure protection for the system	Hardware malfunction	E3	blinks 3 times		
Compressor blockage	Hardware malfunction	LE	/	/	/
Drive module reset	Hardware malfunction	P0	/	/	/
Overspeed	Hardware malfunction	LF	/	/	/
Drive board ambient temperature sensor malfunction	Hardware malfunction	PF	/	/	/
AC contactor protection	Hardware malfunction	P9	/	/	/

Temperature drift protection	Hardware malfunction	PE	/	/	/
Sensor connection protection	Hardware malfunction	Pd	/	/	/
Drive board communication malfunction	Hardware malfunction	P6	blinks 16 times		
Compressor heat overload protection	Hardware malfunction	H3			blinks 3 times
Indoor unit and outdoor unit do not match	Hardware malfunction	LP	blinks 19 times		
Memory chip malfunction	Hardware malfunction	EE			blinks 15 times
Wrong connection of communication cable or expansion valve malfunction	Hardware malfunction	dn	/	/	/
Complete unit current detection malfunction	Hardware malfunction	U5		blinks 13 times	
Wrong connection of communication cable or expansion valve malfunction detection mode	Running mode	dd	/	/	/
Mode conflict	Running mode	E7	blinks 7 times		
Refrigerant recovery mode	Running mode	Fo	blinks 1 times	blinks 1 times	
Defrosting or oil return in heating mode	Running mode	H1			blinks 1 times
Rating cooling or heating	Running mode	P1	/	/	/
Max cooling or heating	Running mode	P2	/	/	/
Middle cooling or heating	Running mode	P3	/	/	/
Min cooling or heating	Running mode	P0	/	/	/
Compressor losing of synchronism	Displayed on the remote controller in 200s; display on the nixie tube after 200s	H7			blinks 7 times
Compressor start failure		Lc			blinks 11 times
High discharge temperature protection of compressor		E4	blinks 4 times		
Overload protection		E8	blinks 8 times		
Complete unit overcurrent protection		E5	blinks 5 times		
Phase current overcurrent protection		P5			blinks 15 times
Module current protection		H5			blinks 5 times
4-way valve commutation malfunction		U7		blinks 20 times	
Complete unit current protection with limiting frequency or lowing down frequency	Displayed on the remote controller	F8		blinks 8 times	
Module current protection with limiting frequency or lowing down frequency	Displayed on the remote controller	En	/	/	/
Overhigh discharge with limiting frequency or lowing down frequency	Displayed on the remote controller	F9		blinks 9 times	
Freeze protection with limiting frequency or lowing down frequency	Displayed on the remote controller	FH		blinks 2 times	blinks 2 times
Overload with limiting frequency or lowing down frequency	Displayed on the remote controller	F6		blinks 6 times	
Module temperature protection with limiting frequency or lowing down frequency	Displayed on the remote controller	EU		blinks 6 times	blinks 6 times
Oil return in cooling mode	Displayed on the remote controller	F7		blinks 7 times	
Cold blow protection	Displayed on the remote controller	E9	blinks 9 times		
Freeze protection	Displayed on the remote controller	E2	blinks 2 times		
外风机故障保护（外风机堵转或未接——当有双外风机时 L3 表示风机 1 而 LA 表示风机 2）	Hardware malfunction	LA	blinks 24 times		
直流风机故障 / 外风机故障保护（外风机堵转或未接——当有双外风机时 L3 表示风机 1 而 LA 表示风机 2）	Hardware malfunction	L3	blinks 23 times		

9.2 Troubleshooting for Main Malfunction

(1) Troubleshooting for malfunction of temperature sensor

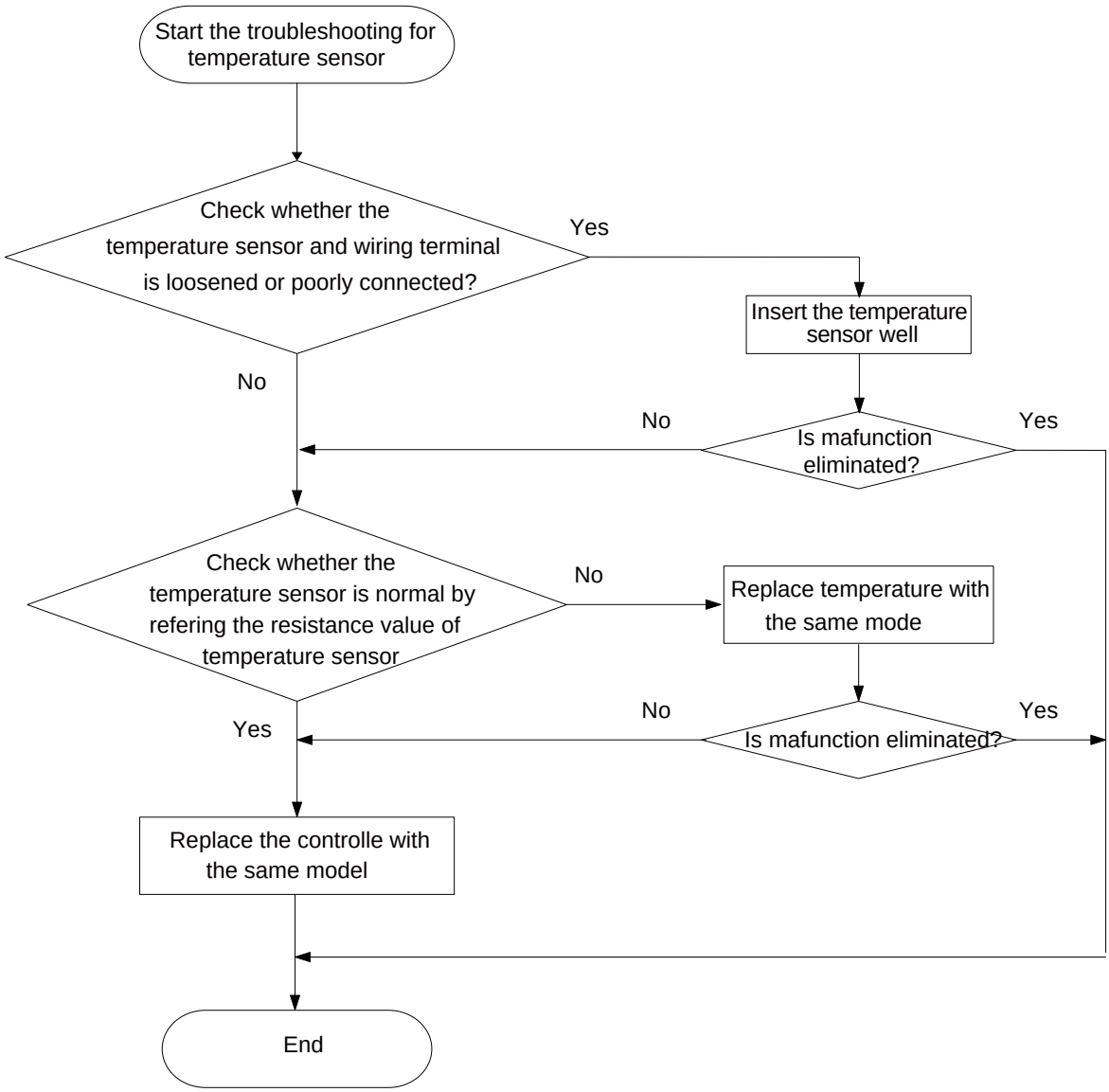
main check point:

●Whether the temperature sensor is broken or damaged;

●Whether the temperature sensor terminal is loosened or not connected;

●Whether the mainboard is damged;

Check flow chart:



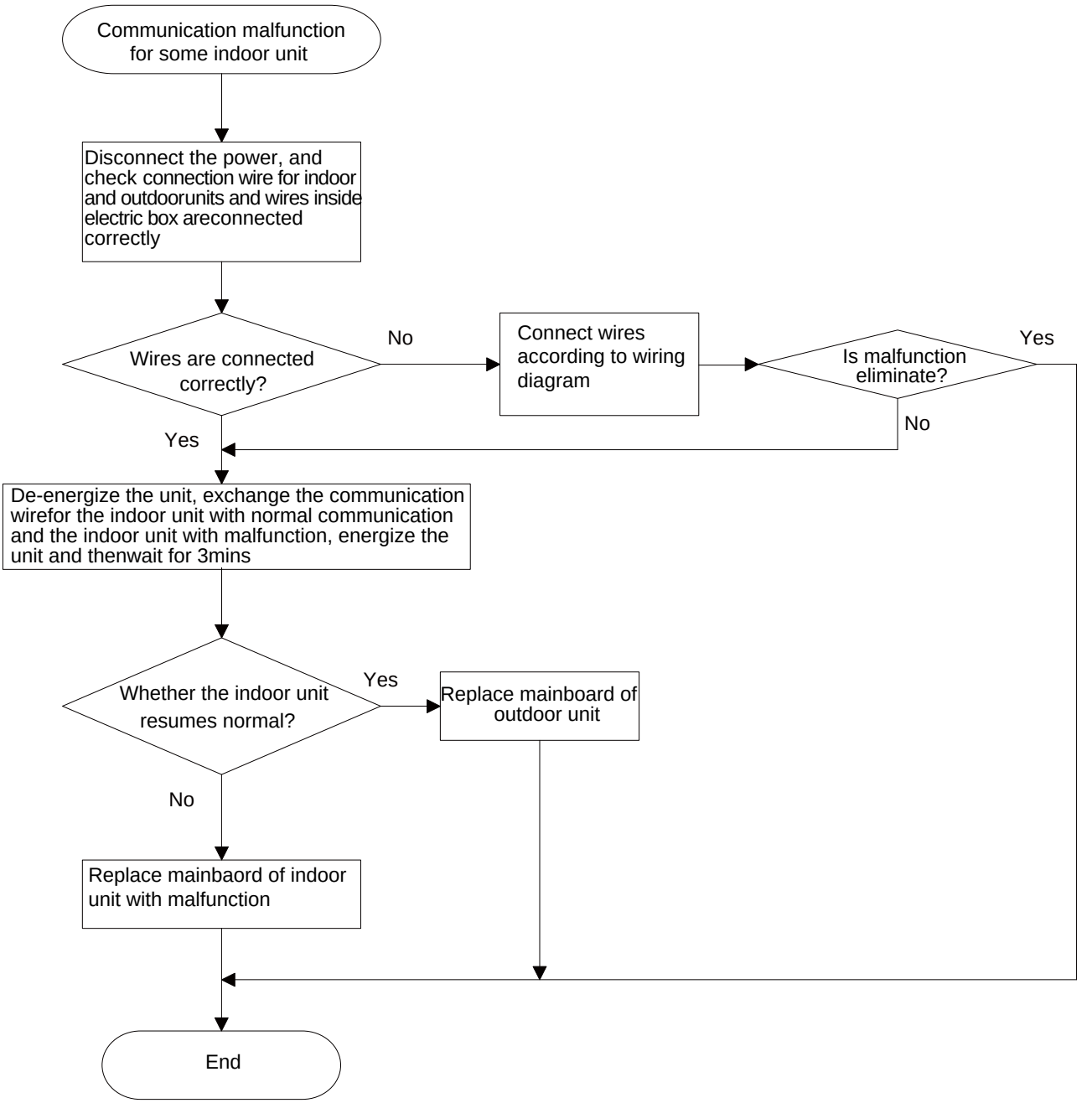
(2) Troubleshooting for communiction malfunction

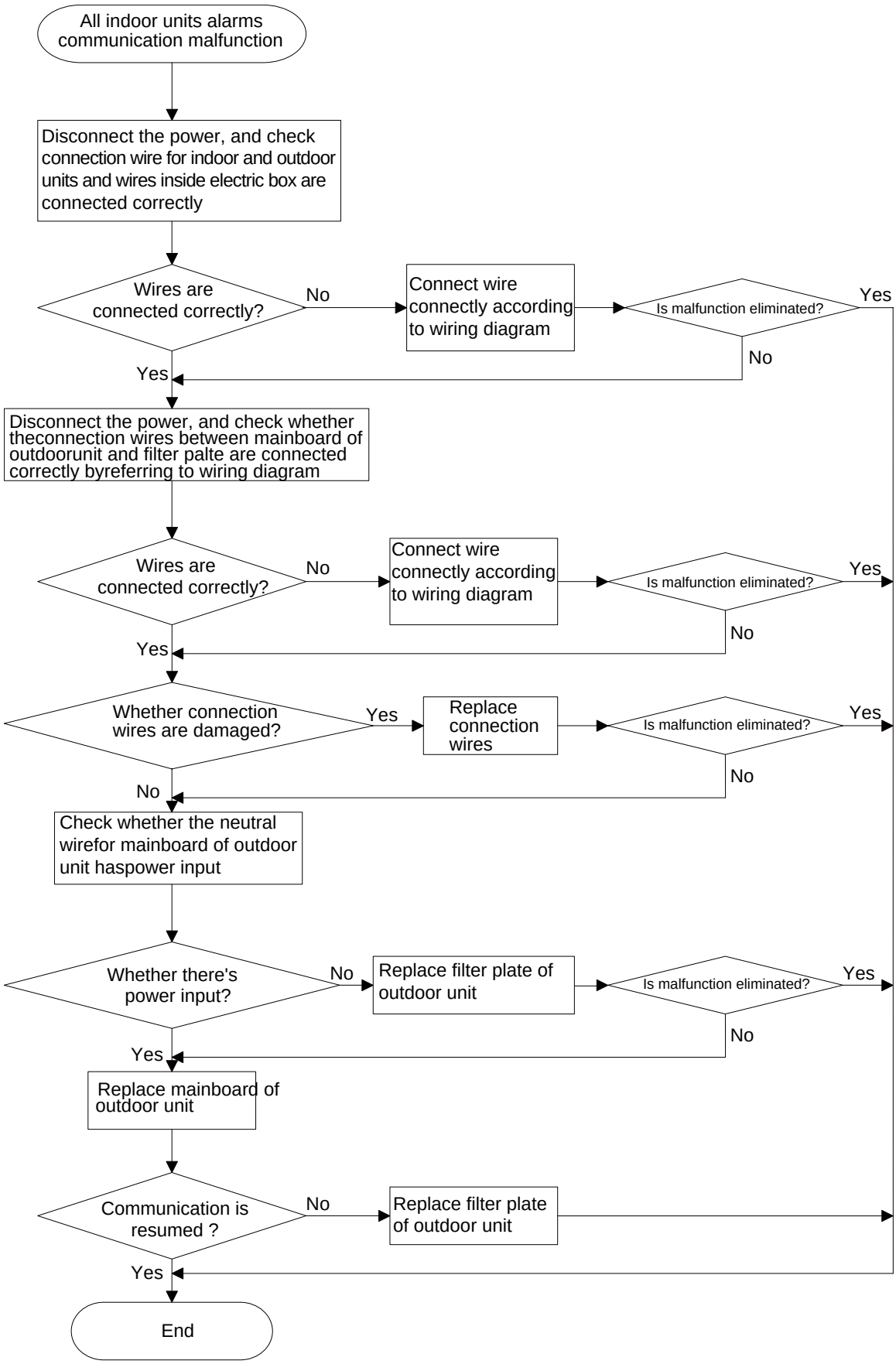
Main check point:

●Check whether the connection wire for indoor and outdoor units and the wires inside the indoor unit is connected well;

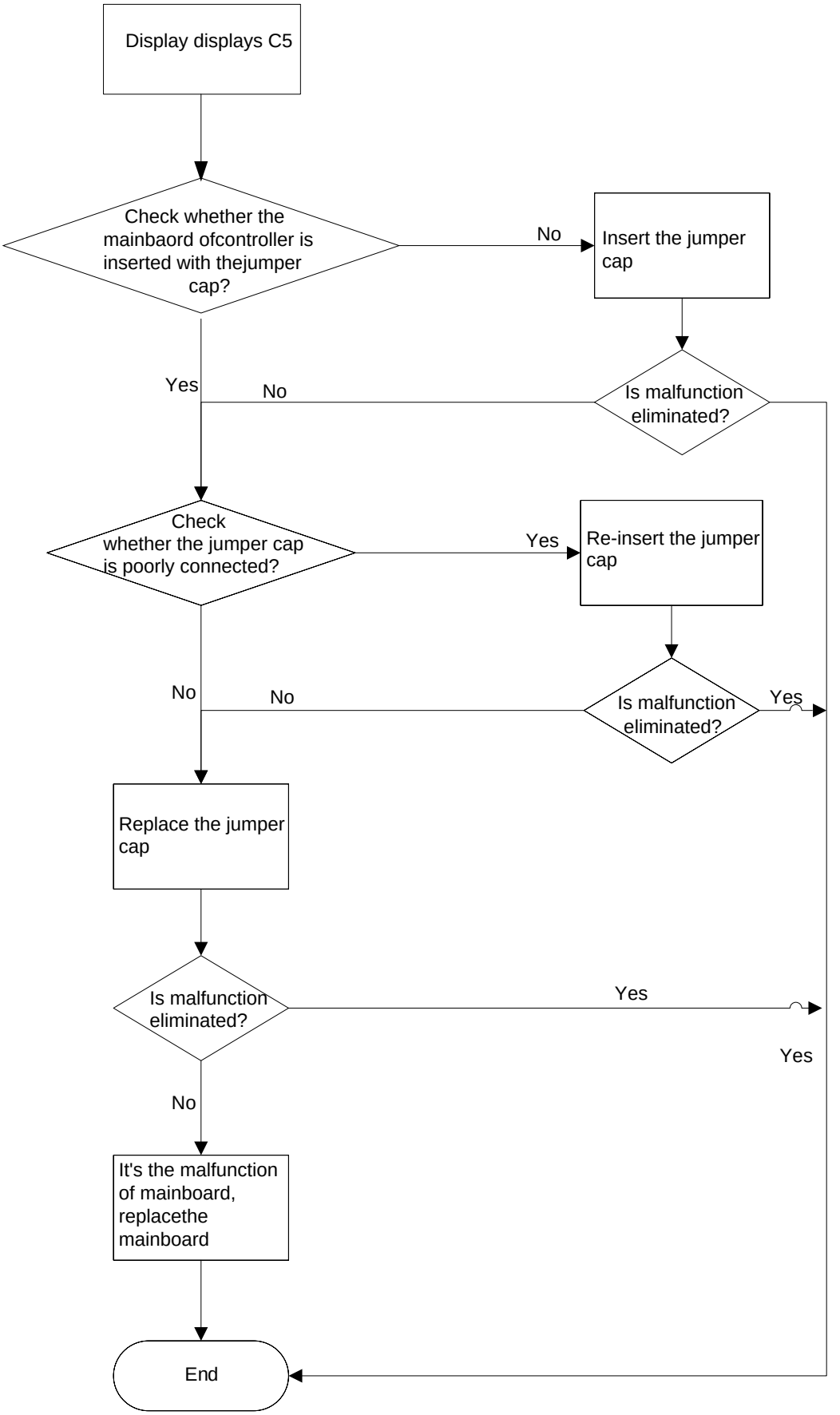
●Check whether the mainboards of indoor unit or outdoor unit are damaged;

Check flow chart:

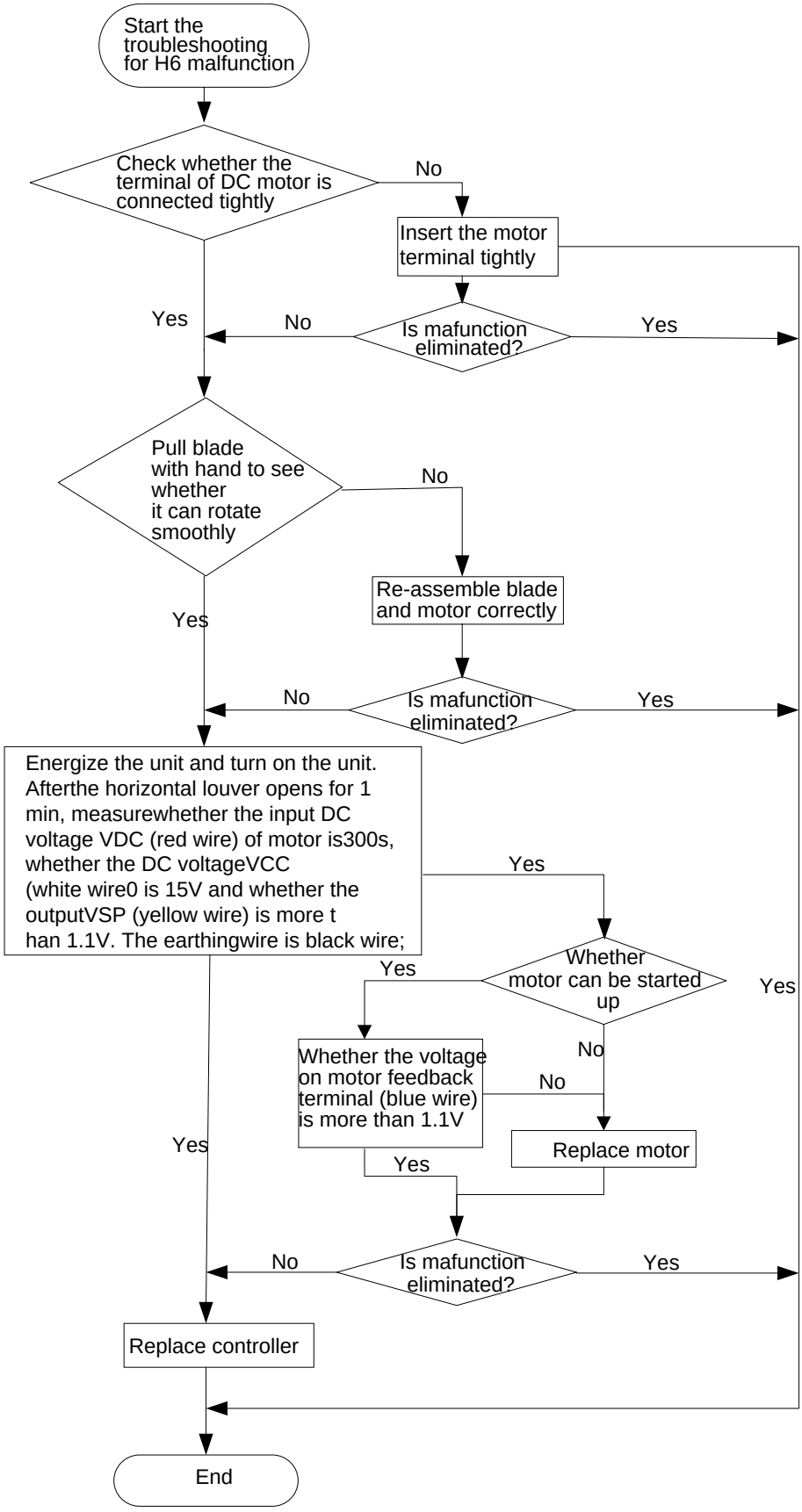



All indoor units alarms communication malfunction
Disconnect the power, and check connection wire for indoor and outdoor units and wires inside electric box are connected correctly
Wires are connected correctly?
No
Connect wire connectly according to wiring diagram
Is malfunction eliminated?
Yes
No
Yes
Disconnect the power, and check whether theconnection wires between mainboard of outdoorunit and filter palte are connected correctly byreferring to wiring diagram
Wires are connected correctly?
No
Connect wire connectly according to wiring diagram
Is malfunction eliminated?
Yes
No
Yes
Whether connection wires are damaged?
Yes
Replace connection wires
Is malfunction eliminated?
Yes
No
No
Check whether the neutral wirefor mainboard of outdoor unit haspower input
Whether there's power input?
No
Replace filter plate of outdoor unit
Is malfunction eliminated?
Yes
No
Yes
Replace mainboard of outdoor unit
Communication is resumed ?
No
Replace filter plate of outdoor unit
Yes
End

(3) Troubleshooting for C5 malfunction



(4) Troubleshooting for H6 malfunction



9.3 Maintenance Method for Normal Malfunction

1. Air Conditioner Can't be Started Up

Possible Causes	Discriminating Method (Air conditioner Status)	Troubleshooting
No power supply, or poor connection for power plug	After energization, operation indicator isn't bright and the buzzer can't give out sound	Confirm whether it's due to power failure. If yes, wait for power recovery. If not, check power supply circuit and make sure the power plug is connected well.
Wrong wire connection between indoor unit and outdoor unit, or poor connection for wiring terminals	Under normal power supply circumstances, operation indicator isn't bright after energization	Check the circuit according to circuit diagram and connect wires correctly. Make sure all wiring terminals are connected firmly
Electric leakage for air conditioner	After energization, room circuit breaker trips off at once	Make sure the air conditioner is grounded reliably Make sure wires of air conditioner is connected correctly Check the wiring inside air conditioner. Check whether the insulation layer of power cord is damaged; if yes, place the power cord.
Model selection for air switch is improper	After energization, air switch trips off	Select proper air switch
Malfunction of remote controller	After energization, operation indicator is bright, while no display on remote controller or buttons have no action.	Replace batteries for remote controller Repair or replace remote controller

2. Poor Cooling (Heating) for Air Conditioner

Possible Causes	Discriminating Method (Air conditioner Status)	Troubleshooting
Set temperature is improper	Observe the set temperature on remote controller	Adjust the set temperature
Rotation speed of the IDU fan motor is set too low	Small wind blow	Set the fan speed at high or medium
Filter of indoor unit is blocked	Check the filter to see it's blocked	Clean the filter
Installation position for indoor unit and outdoor unit is improper	Check whether the installation postion is proper according to installation requirement for air conditioner	Adjust the installation position, and install the rainproof and sunproof for outdoor unit
Refrigerant is leaking	Discharged air temperature during cooling is higher than normal discharged wind temperature; Discharged air temperature during heating is lower than normal discharged wind temperature; Unit's pressure is much lower than regulated range	Find out the leakage causes and deal with it. Add refrigerant.
Malfunction of 4-way valve	Blow cold wind during heating	Replace the 4-way valve
Malfunction of capillary	Discharged air temperature during cooling is higher than normal discharged wind temperature; Discharged air temperature during heating is lower than normal discharged wind temperature; Unit't pressure is much lower than regulated range. If refrigerant isn't leaking, part of capillary is blocked	Replace the capillary
Flow volume of valve is insufficient	The pressure of valves is much lower than that stated in the specification	Open the valve completely
Malfunction of horizontal louver	Horizontal louver can't swing	Refer to point 3 of maintenance method for details
Malfunction of the IDU fan motor	The IDU fan motor can't operate	Refer to troubleshooting for H6 for maintenance method in details
Malfunction of the ODU fan motor	The ODU fan motor can't operate	Refer to point 4 of maintenance method for details
Malfunction of compressor	Compressor can't operate	Refer to point 5 of maintenance method for details

3. Horizontal Louver Can't Swing

Possible Causes	Discriminating Method (Air conditioner Status)	Troubleshooting
Wrong wire connection, or poor connection	Check the wiring status according to circuit diagram	Connect wires according to wiring diagram to make sure all wiring terminals are connected firmly
Stepping motor is damaged	Stepping motor can't operate	Repair or replace stepping motor
Main board is damaged	Others are all normal, while horizontal louver can't operate	Replace the main board with the same model

4. ODU Fan Motor Can't Operate

Possible causes	Discriminating method (air conditioner status)	Troubleshooting
Wrong wire connection, or poor connection	Check the wiring status according to circuit diagram	Connect wires according to wiring diagram to make sure all wiring terminals are connected firmly
Capacity of the ODU fan motor is damaged	Measure the capacity of fan capacitor with an universal meter and find that the capacity is out of the deviation range indicated on the nameplate of fan capacitor.	Replace the capacity of fan
Power voltage is a little low or high	Use universal meter to measure the power supply voltage. The voltage is a little high or low	Suggest to equip with voltage regulator
Motor of outdoor unit is damaged	When unit is on, cooling/heating performance is bad and ODU compressor generates a lot of noise and heat.	Change compressor oil and refrigerant. If no better, replace the compressor with a new one

5. Compressor Can't Operate

Possible causes	Discriminating method (air conditioner status)	Troubleshooting
Wrong wire connection, or poor connection	Check the wiring status according to circuit diagram	Connect wires according to wiring diagram to make sure all wiring terminals are connected firmly
Capacity of compressor is damaged	Measure the capacity of fan capacitor with an universal meter and find that the capacity is out of the deviation range indicated on the nameplate of fan capacitor.	Replace the compressor capacitor
Power voltage is a little low or high	Use universal meter to measure the power supply voltage. The voltage is a little high or low	Suggest to equip with voltage regulator
Coil of compressor is burnt out	Use universal meter to measure the resistance between compressor terminals and it's 0	Repair or replace compressor
Cylinder of compressor is blocked	Compressor can't operate	Repair or replace compressor

6. Air Conditioner is Leaking

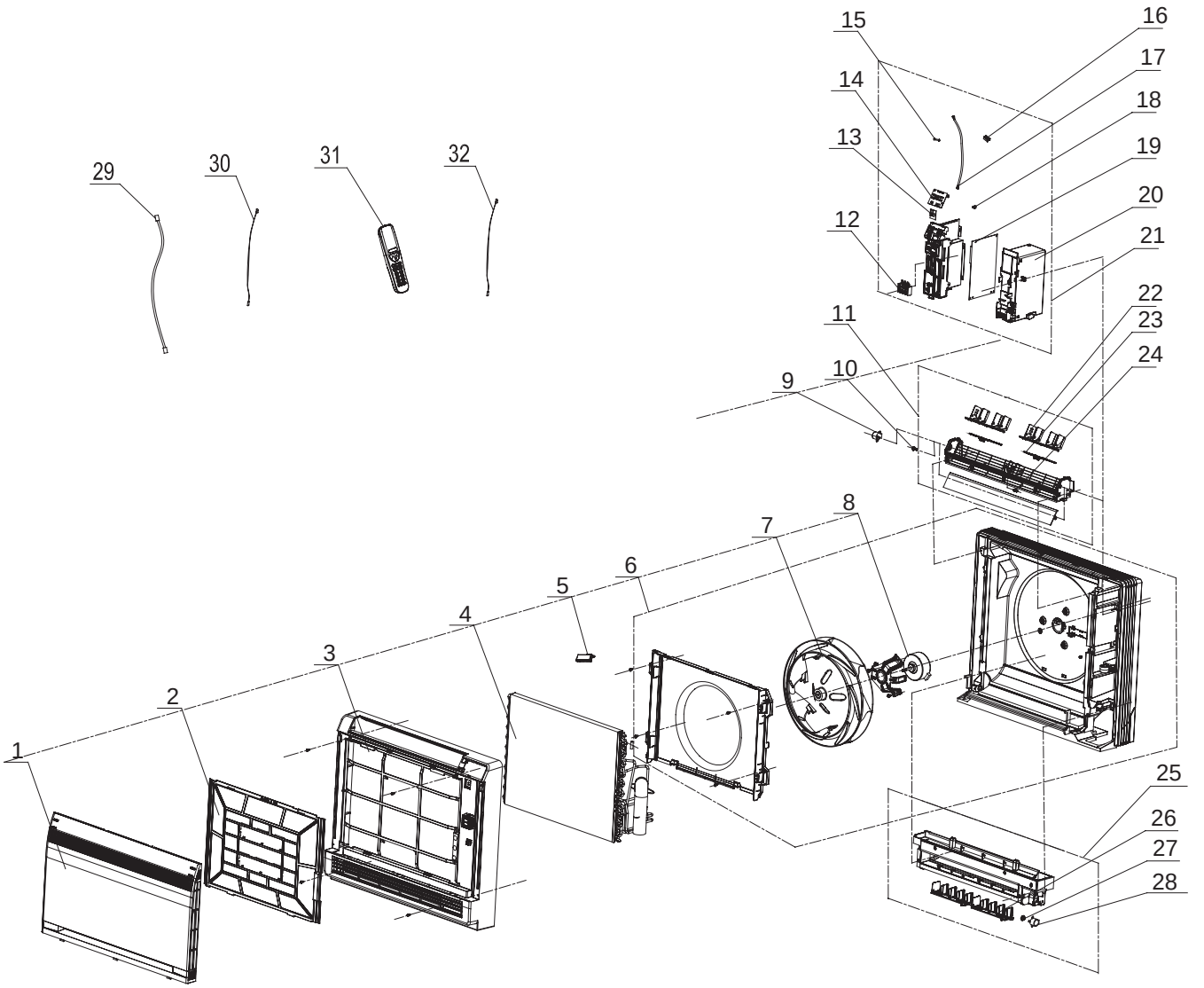
Possible causes	Discriminating method (air conditioner status)	Troubleshooting
Drain pipe is blocked	Water leaking from indoor unit	Eliminate the foreign objects inside the drain pipe
Drain pipe is broken	Water leaking from drain pipe	Replace drain pipe
Wrapping is not tight	Water leaking from the pipe connection place of indoor unit	Wrap it again and bundle it tightly

7. Abnormal Sound and Vibration

Possible causes	Discriminating method (air conditioner status)	Troubleshooting
When turn on or turn off the unit, the panel and other parts will expand and there's abnormal sound	There's the sound of "PAPA"	Normal phenomenon. Abnormal sound will disappear after a few minutes.
When turn on or turn off the unit, there's abnormal sound due to flow of refrigerant inside air conditioner	Water-running sound can be heard	Normal phenomenon. Abnormal sound will disappear after a few minutes.
Foreign objects inside the indoor unit or there're parts touching together inside the indoor unit	There's abnormal sound fro indoor unit	Remove foreign objects. Adjust all parts' position of indoor unit, tighten screws and stick damping plaster between connected parts
Foreign objects inside the outdoor unit or there're parts touching together inside the outdoor unit	There's abnormal sound fro outdoor unit	Remove foreign objects. Adjust all parts' position of outdoor unit, tighten screws and stick damping plaster between connected parts
Short circuit inside the magnetic coil	During heating, the way valve has abnormal electromagnetic sound	Replace magnetic coil
Abnormal shake of compressor	Outdoor unit gives out abnormal sound	Adjust the support foot mat of compressor, tighten the bolts
Abnormal sound inside the compressor	Abnormal sound inside the compressor	If add too much refrigerant during maintenance, please reduce refrigerant properly. Replace compressor for other circumstances.

10. Exploded View and Parts List

10.1 Indoor Unit



The component is only for reference;please refer to the actual product.

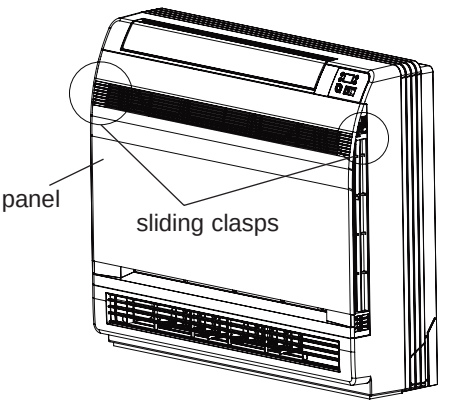
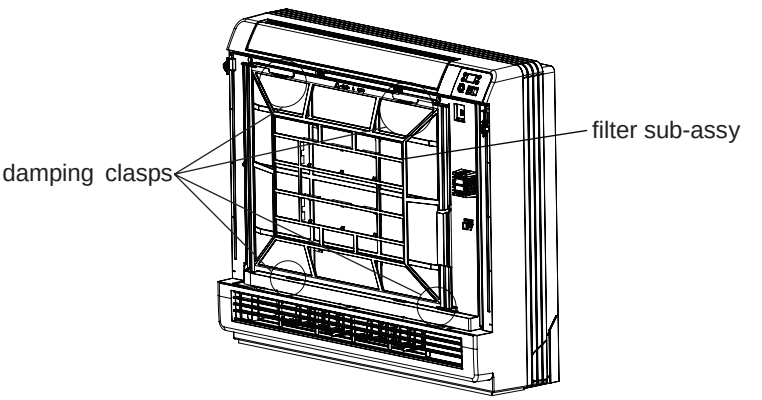
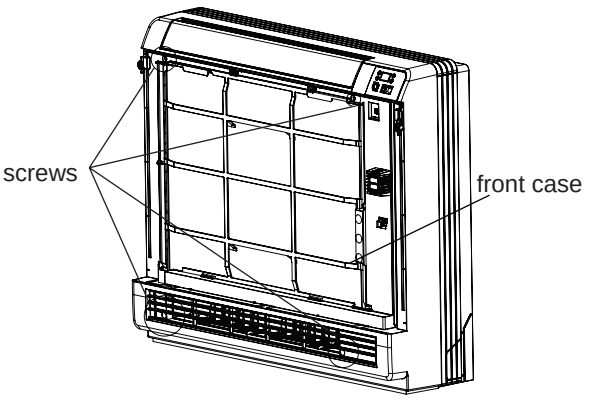
NO.	Description	Part Code			Qty
		CHML-IK09RK	CHML-IK12RK	CHML-IK18RK	
1	Front Panel Assy	20012756	20012756	20012756	1
2	Filter Sub-Assy	11122139	11122139	11122139	1
3	Front Case Assy	20012601	20012601	20012601	1
4	Evaporator Assy	01100100160	01100100160	01100100164	1
5	Cold Plasma Generator	1114001604	1114001604	1114001604	1
6	Rear Case Assy	000001000051	000001000051	000001000051	1
7	Centrifugal Fan	10312005	10312005	10312005	1
8	Fan Motor	1570410001201	1570410001201	1570410001201	1
9	SteppingMotor	1521210101	1521210101	1521210101	1
10	Crank	73012005	73012005	73012005	1
11	Swing Assy	10102042	10102042	10102042	1
12	Terminal Board	42011233	42011233	42011233	1
13	Switch Board	30112007	30112007	30112007	1
14	Display Board	30568131	30568131	30568131	1
15	Fuse	46010055	46010055	46010055	1
16	Radiator	/	/	/	/
17	Signal Wire	4003004202	4003004202	4003004202	1
18	Jumper	4202300111	4202300112	4202300114	1
19	Main Board	300002000631	300002000631	300002000631	1
20	Electric Box	20112116	20112116	20112116	1
21	Electric Box Assy	100002002848	100002002951	100002002386	1
22	Air Louver (upper)	10512143	10512143	10512143	2
23	Swing Lever	10582096	10582096	10582096	1
24	Shaft of Guide Louver	10542020	10542020	10542020	1
25	Water Tray Assy	20182141	20182141	20182141	1
26	Air Louver (lower)	10512144	10512144	10512144	1
27	Axis (lower step motor)	10542034	10542034	10542034	1
28	SteppingMotor	1521210805	1521210805	1521210805	1
29	Connecting Cable	4002052317	4002052317	4002052317	0
30	Temperature Sensor	3900004508	3900004508	3900004508	1
31	Remote Controller	305001000111	305001000111	305001000111	1
32	Temperature Sensor	3900004508	3900004508	3900004508	1

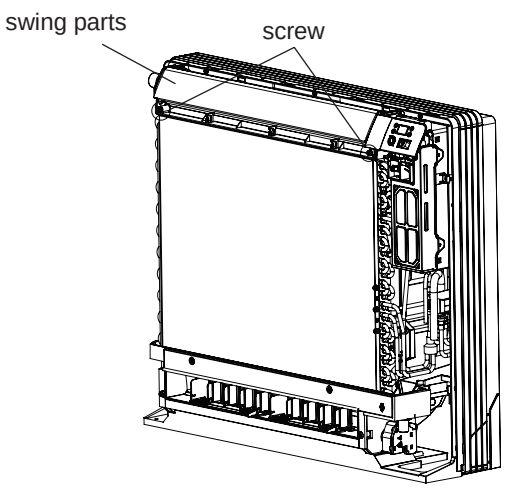
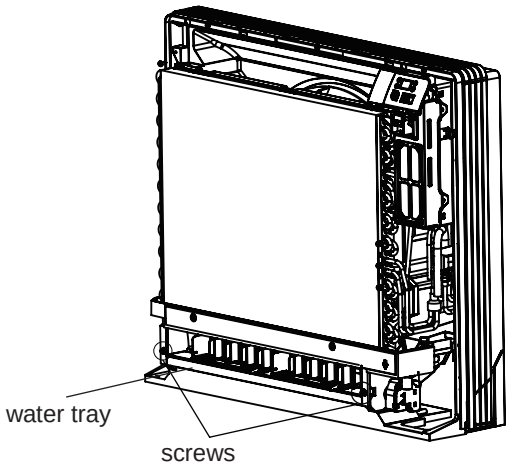
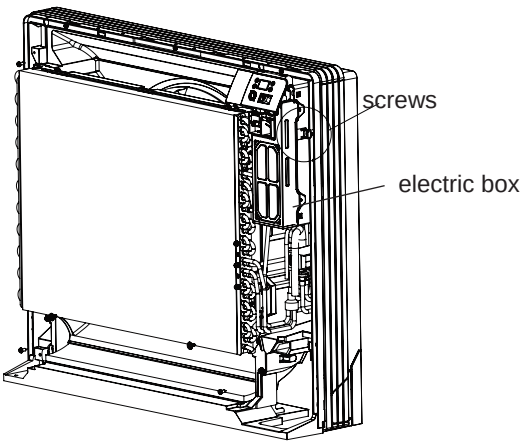
Above data is subject to change without notice.

11. Removal Procedure

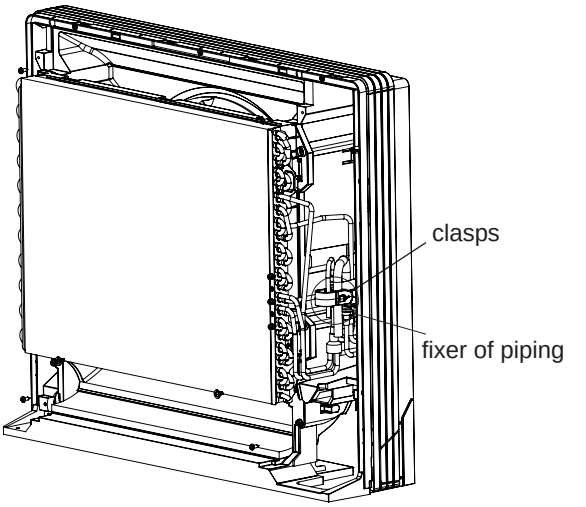
⚠ **Warning: Be sure to wait for a minimum of 20 minutes after turning off all power supplies and discharge the refrigerant completely before removal.**

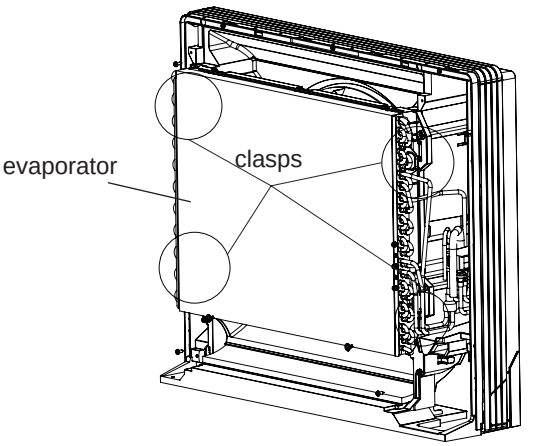
11.1 Removal Procedure of Indoor Unit

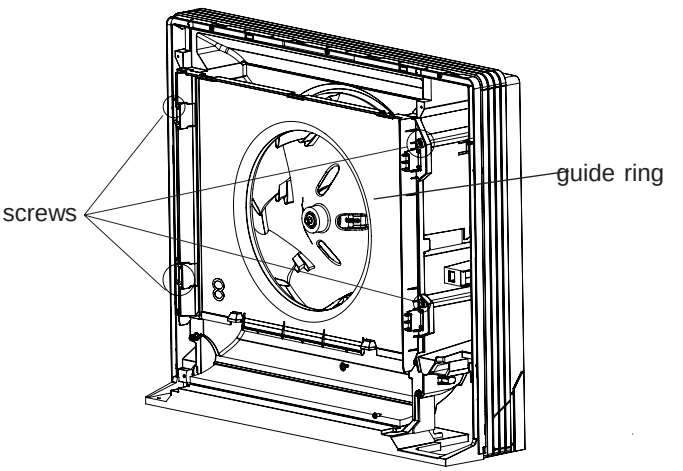
Steps	Procedure
1. Remove panel Pull sliding clasps at both sides of panel, pull out the panel outwards and then move the panel upwards to remove it.	
2. Remove filter sub-assy Pull the damping clasps at upper/lower side of filter sub-assy, and then move the filter sub-assy outwards to remove it.	
3. Remove front case Remove 4 screws fixing the front case, and then pull the front case outwards to remove it.	

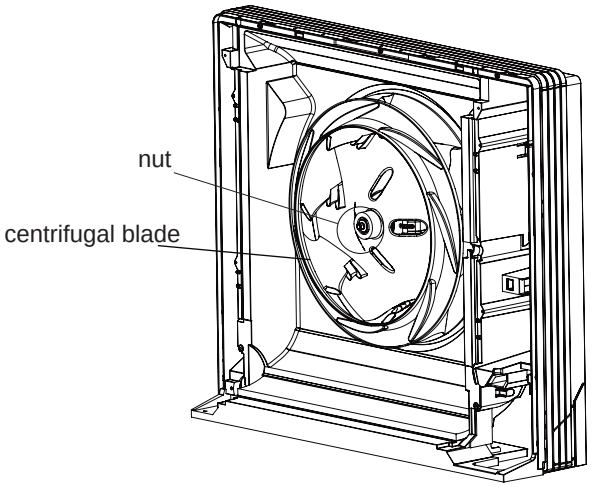
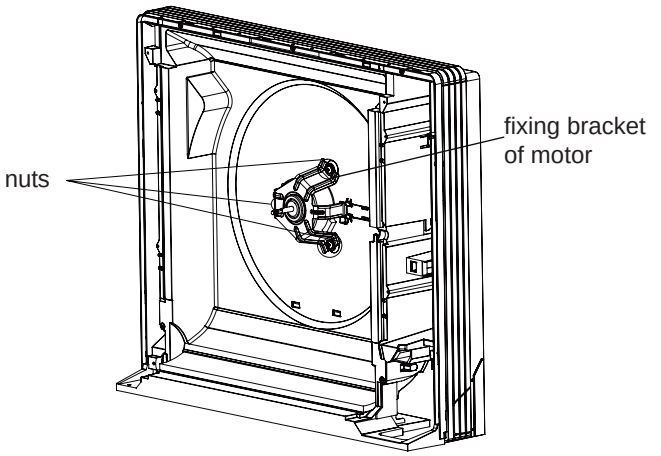
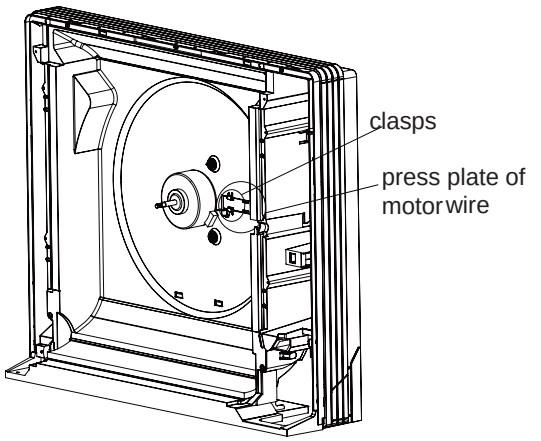
Steps	Procedure
4. Remove swing parts	
Remove 2 screws fixing the swing parts, and then pull the swing parts outwards to remove it.	
5. Remove water tray	
Remove 2 screws fixing water tray, and then pull the water tray outwards to remove it.	
6. Remove electric box	
Remove one screw fixing the electric box, and then pull the electric box outwards to remove it.	

Steps	Procedure
7. Remove fixer of piping	
	Pry out the clasps connecting fixer of piping and bottom case, and then pull the fixer of piping outwards to remove it.
8. Remove evaporator	
	Pry out the clasps connecting evaporator and bottom case, and then pull the evaporator outwards to remove it.
9. Remove guide ring	
	Remove 4 screws fixing guide ring, and then pull the guide ring outwards to remove it.







Steps	Procedure
10. Remove centrifugal blade	
	Remove one nut fixing the centrifugal blade, and then pull the centrifugal blade outwards to remove it.
	
11. Remove fixing bracket of motor	
	Remove 3 nuts on fixing bracket of motor, and then pull the fixing bracket of motor outwards to remove it.
	
12. Remove press plate of motor wire	
	Loosen clasps between press plate of motor wire and bottom case, and then pull the press plate of motor wire outwards to remove it.
	

Appendix:

Appendix 1: Reference Sheet of Celsius and Fahrenheit

Conversion formula for Fahrenheit degree and Celsius degree: Tf=Tcx1.8+32

Set temperature

Fahrenheit display temperature (℉)	Fahrenheit (℉)	Celsius (℃)		Fahrenheit display temperature (℉)	Fahrenheit (℉)	Celsius (℃)		Fahrenheit display temperature (℉)	Fahrenheit (℉)	Celsius (℃)
61	60.8	16		69/70	69.8	21		78/79	78.8	26
62/63	62.6	17		71/72	71.6	22		80/81	80.6	27
64/65	64.4	18		73/74	73.4	23		82/83	82.4	28
66/67	66.2	19		75/76	75.2	24		84/85	84.2	29
68	68	20		77	77	25		86	86	30

Ambient temperature

Fahrenheit display temperature (℉)	Fahrenheit (℉)	Celsius (℃)		Fahrenheit display temperature (℉)	Fahrenheit (℉)	Celsius (℃)		Fahrenheit display temperature (℉)	Fahrenheit (℉)	Celsius (℃)
32/33	32	0		55/56	55.4	13		79/80	78.8	26
34/35	33.8	1		57/58	57.2	14		81	80.6	27
36	35.6	2		59/60	59	15		82/83	82.4	28
37/38	37.4	3		61/62	60.8	16		84/85	84.2	29
39/40	39.2	4		63	62.6	17		86/87	86	30
41/42	41	5		64/65	64.4	18		88/89	87.8	31
43/44	42.8	6		66/67	66.2	19		90	89.6	32
45	44.6	7		68/69	68	20		91/92	91.4	33
46/47	46.4	8		70/71	69.8	21		93/94	93.2	34
48/49	48.2	9		72	71.6	22		95/96	95	35
50/51	50	10		73/74	73.4	23		97/98	96.8	36
52/53	51.8	11		75/76	75.2	24		99	98.6	37
54	53.6	12		77/78	77	25				

Appendix 2: Configuration of Connection Pipe

1.Standard length of connection pipe

● 5m, 7.5m, 8m.

2.Min. length of connection pipe is 3m.

3.Max. length of connection pipe and max. high difference.(More details please refer to the specifications)

4.The additional refrigerant oil and refrigerant charging required after prolonging connection pipe

● After the length of connection pipe is prolonged for 10m at the basis of standard length, you should add 5ml of refrigerant oil for each additional 5m of connection pipe.

● The calculation method of additional refrigerant charging amount (on the basis of liquid pipe):

● Basing on the length of standard pipe, add refrigerant according to the requirement as shown in the table. The additional refrigerant charging amount per meter is different according to the diameter of liquid pipe. See the following sheet.

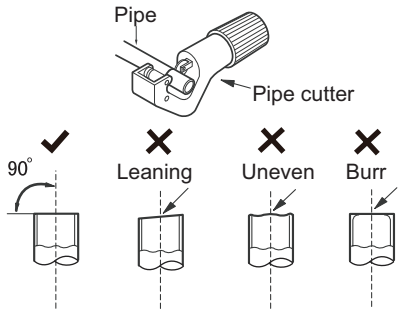
● Additional refrigerant charging amount = prolonged length of liquid pipe X additional refrigerant charging amount per meter

Additional refrigerant charging amount for R22, R407C, R410A and R134a			
Diameter of connection pipe		Outdoor unit throttle	
Liquid pipe(mm)	Gas pipe(mm)	Cooling only(g/m)	Cooling and heating(g/m)
Φ6	Φ9.5 or Φ12	15	20
Φ6 or Φ9.5	Φ16 or Φ19	15	50
Φ12	Φ19 or Φ22.2	30	120
Φ16	Φ25.4 or Φ31.8	60	120
Φ19	/	250	250
Φ22.2	/	350	350

Appendix 3: Pipe Expanding Method

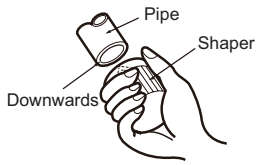
⚠ **Note:**

Improper pipe expanding is the main cause of refrigerant leakage.Please expand the pipe according to the following steps:



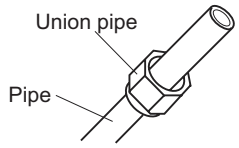
A:Cut the pip
- Confirm the pipe length according to the distance of indoor unit and outdoor unit.
- Cut the required pipe with pipe cutter.

B:Remove the burrs
- Remove the burrs with shaper and prevent the burrs from getting into the pipe.



C:Put on suitable insulating pipe

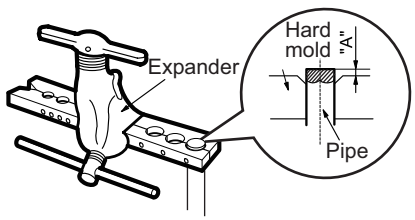
D:Put on the union nut
- Remove the union nut on the indoor connection pipe and outdoor valve; install the union nut on the pipe.



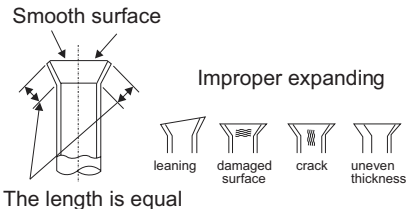
E:Expand the port
- Expand the port with expander.

⚠ **Note:**
- "A" is different according to the diameter, please refer to the sheet below:

Outer diameter(mm)	A(mm)	
	Max	Min
Φ6 - 6.35 (1/4")	1.3	0.7
Φ9.52 (3/8”)	1.6	1.0
Φ12 - 12.70 (1/2”)	1.8	1.0
Φ16 - 15.88 (5/8”)	2.4	2.2



F:Inspection
- Check the quality of expanding port. If there is any blemish, expand the port again according to the steps above.



Appendix 4: List of Resistance for Temperature Sensor

Resistance Table of Ambient Temperature Sensor for Indoor and Outdoor Units(15K)

Temp(°C)	Resistance(kΩ)		Temp(°C)	Resistance(kΩ)		Temp(°C)	Resistance(kΩ)		Temp(°C)	Resistance(kΩ)
-19	138.1		20	18.75		59	3.848		98	1.071
-18	128.6		21	17.93		60	3.711		99	1.039
-17	121.6		22	17.14		61	3.579		100	1.009
-16	115		23	16.39		62	3.454		101	0.98
-15	108.7		24	15.68		63	3.333		102	0.952
-14	102.9		25	15		64	3.217		103	0.925
-13	97.4		26	14.36		65	3.105		104	0.898
-12	92.22		27	13.74		66	2.998		105	0.873
-11	87.35		28	13.16		67	2.896		106	0.848
-10	82.75		29	12.6		68	2.797		107	0.825
-9	78.43		30	12.07		69	2.702		108	0.802
-8	74.35		31	11.57		70	2.611		109	0.779
-7	70.5		32	11.09		71	2.523		110	0.758
-6	66.88		33	10.63		72	2.439		111	0.737
-5	63.46		34	10.2		73	2.358		112	0.717
-4	60.23		35	9.779		74	2.28		113	0.697
-3	57.18		36	9.382		75	2.206		114	0.678
-2	54.31		37	9.003		76	2.133		115	0.66
-1	51.59		38	8.642		77	2.064		116	0.642
0	49.02		39	8.297		78	1.997		117	0.625
1	46.6		40	7.967		79	1.933		118	0.608
2	44.31		41	7.653		80	1.871		119	0.592
3	42.14		42	7.352		81	1.811		120	0.577
4	40.09		43	7.065		82	1.754		121	0.561
5	38.15		44	6.791		83	1.699		122	0.547
6	36.32		45	6.529		84	1.645		123	0.532
7	34.58		46	6.278		85	1.594		124	0.519
8	32.94		47	6.038		86	1.544		125	0.505
9	31.38		48	5.809		87	1.497		126	0.492
10	29.9		49	5.589		88	1.451		127	0.48
11	28.51		50	5.379		89	1.408		128	0.467
12	27.18		51	5.197		90	1.363		129	0.456
13	25.92		52	4.986		91	1.322		130	0.444
14	24.73		53	4.802		92	1.282		131	0.433
15	23.6		54	4.625		93	1.244		132	0.422
16	22.53		55	4.456		94	1.207		133	0.412
17	21.51		56	4.294		95	1.171		134	0.401
18	20.54		57	4.139		96	1.136		135	0.391
19	19.63		58	3.99		97	1.103		136	0.382

Resistance Table of Tube Temperature Sensors for Outdoor and Indoor(20K)

Temp(°C)	Resistance(kΩ)		Temp(°C)	Resistance(kΩ)		Temp(°C)	Resistance(kΩ)		Temp(°C)	Resistance(kΩ)
-19	181.4		20	25.01		59	5.13		98	1.427
-18	171.4		21	23.9		60	4.948		99	1.386
-17	162.1		22	22.85		61	4.773		100	1.346
-16	153.3		23	21.85		62	4.605		101	1.307
-15	145		24	20.9		63	4.443		102	1.269
-14	137.2		25	20		64	4.289		103	1.233
-13	129.9		26	19.14		65	4.14		104	1.198
-12	123		27	18.13		66	3.998		105	1.164
-11	116.5		28	17.55		67	3.861		106	1.131
-10	110.3		29	16.8		68	3.729		107	1.099
-9	104.6		30	16.1		69	3.603		108	1.069
-8	99.13		31	15.43		70	3.481		109	1.039
-7	94		32	14.79		71	3.364		110	1.01
-6	89.17		33	14.18		72	3.252		111	0.983
-5	84.61		34	13.59		73	3.144		112	0.956
-4	80.31		35	13.04		74	3.04		113	0.93
-3	76.24		36	12.51		75	2.94		114	0.904
-2	72.41		37	12		76	2.844		115	0.88
-1	68.79		38	11.52		77	2.752		116	0.856
0	65.37		39	11.06		78	2.663		117	0.833
1	62.13		40	10.62		79	2.577		118	0.811
2	59.08		41	10.2		80	2.495		119	0.77
3	56.19		42	9.803		81	2.415		120	0.769
4	53.46		43	9.42		82	2.339		121	0.746
5	50.87		44	9.054		83	2.265		122	0.729
6	48.42		45	8.705		84	2.194		123	0.71
7	46.11		46	8.37		85	2.125		124	0.692
8	43.92		47	8.051		86	2.059		125	0.674
9	41.84		48	7.745		87	1.996		126	0.658
10	39.87		49	7.453		88	1.934		127	0.64
11	38.01		50	7.173		89	1.875		128	0.623
12	36.24		51	6.905		90	1.818		129	0.607
13	34.57		52	6.648		91	1.736		130	0.592
14	32.98		53	6.403		92	1.71		131	0.577
15	31.47		54	6.167		93	1.658		132	0.563
16	30.04		55	5.942		94	1.609		133	0.549
17	28.68		56	5.726		95	1.561		134	0.535
18	27.39		57	5.519		96	1.515		135	0.521
19	26.17		58	5.32		97	1.47		136	0.509

Resistance Table of Discharge Temperature Sensor for Outdoor(50K)

Temp(°C)	Resistance(kΩ)		Temp(°C)	Resistance(kΩ)		Temp(°C)	Resistance(kΩ)		Temp(°C)	Resistance(kΩ)
-29	853.5		10	98		49	18.34		88	4.75
-28	799.8		11	93.42		50	17.65		89	4.61
-27	750		12	89.07		51	16.99		90	4.47
-26	703.8		13	84.95		52	16.36		91	4.33
-25	660.8		14	81.05		53	15.75		92	4.20
-24	620.8		15	77.35		54	15.17		93	4.08
-23	580.6		16	73.83		55	14.62		94	3.96
-22	548.9		17	70.5		56	14.09		95	3.84
-21	516.6		18	67.34		57	13.58		96	3.73
-20	486.5		19	64.33		58	13.09		97	3.62
-19	458.3		20	61.48		59	12.62		98	3.51
-18	432		21	58.77		60	12.17		99	3.41
-17	407.4		22	56.19		61	11.74		100	3.32
-16	384.5		23	53.74		62	11.32		101	3.22
-15	362.9		24	51.41		63	10.93		102	3.13
-14	342.8		25	49.19		64	10.54		103	3.04
-13	323.9		26	47.08		65	10.18		104	2.96
-12	306.2		27	45.07		66	9.83		105	2.87
-11	289.6		28	43.16		67	9.49		106	2.79
-10	274		29	41.34		68	9.17		107	2.72
-9	259.3		30	39.61		69	8.85		108	2.64
-8	245.6		31	37.96		70	8.56		109	2.57
-7	232.6		32	36.38		71	8.27		110	2.50
-6	220.5		33	34.88		72	7.99		111	2.43
-5	209		34	33.45		73	7.73		112	2.37
-4	198.3		35	32.09		74	7.47		113	2.30
-3	199.1		36	30.79		75	7.22		114	2.24
-2	178.5		37	29.54		76	7.00		115	2.18
-1	169.5		38	28.36		77	6.76		116	2.12
0	161		39	27.23		78	6.54		117	2.07
1	153		40	26.15		79	6.33		118	2.02
2	145.4		41	25.11		80	6.13		119	1.96
3	138.3		42	24.13		81	5.93		120	1.91
4	131.5		43	23.19		82	5.75		121	1.86
5	125.1		44	22.29		83	5.57		122	1.82
6	119.1		45	21.43		84	5.39		123	1.77
7	113.4		46	20.6		85	5.22		124	1.73
8	108		47	19.81		86	5.06		125	1.68
9	102.8		48	19.06		87	4.90		126	1.64