

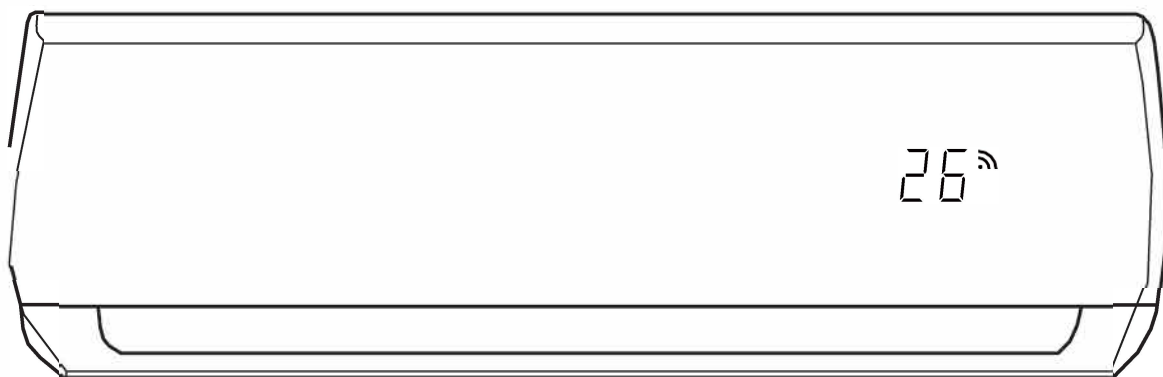


High Wall Inverter Heat Pumps Mini-Splits

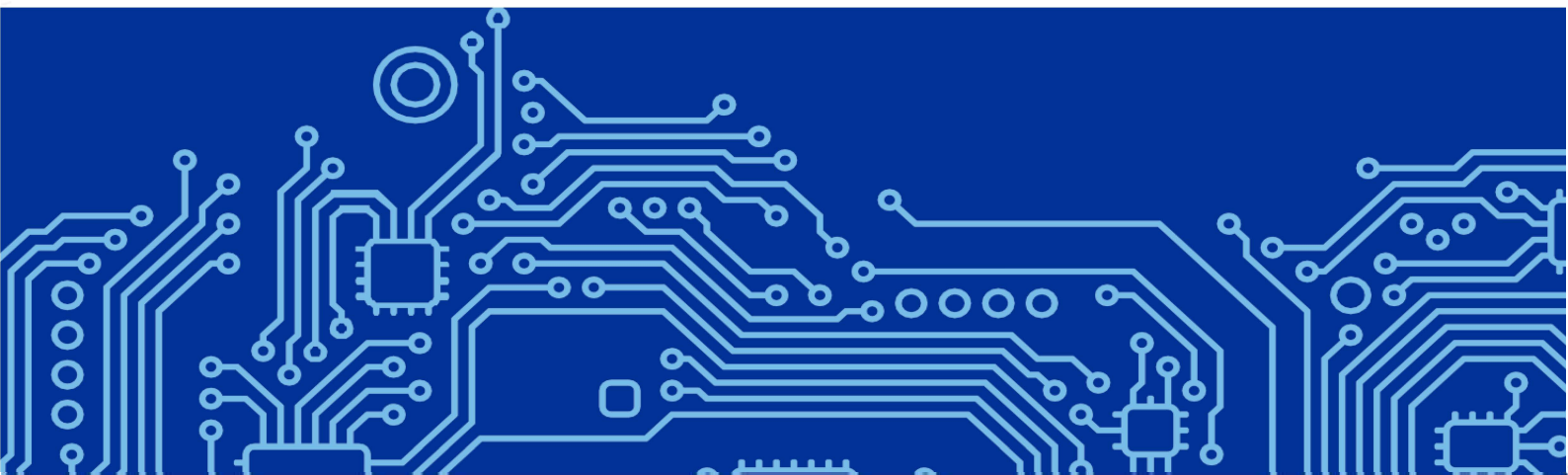
SERVICE MANUAL

Up to 20.5 SEER
8.5 HSPF

Models:
AIWH****VA1D3
ACSH****VA1D3

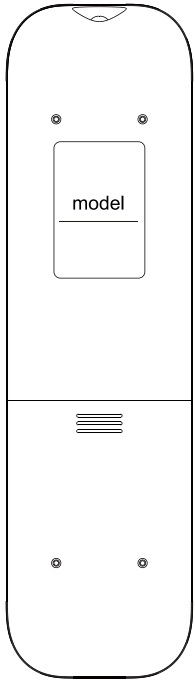


Capacities: 9K, 12K, 18K & 24K BTU



★ Remote controller instructions

Users can scan the following QR code to obtain instructions

						 NOTE: ※The model of the remote control is showed on the back.
YKR-H/009E	YKR-H/501E	YKR-K/231E	YKR-T/031E	YK-T/031E	YKR-Q/001E YKR-Q/051E	
YK-S/002E	YKR-S/001E	YKR-L/103E	YKR-L/201E YKR-L/202E	YKR-L/101E YKR-L/102E	YKR-H/133E YKR-H/103E	
YKR-K/001E YKR-K/002E	YKR-H/101E YKR-H/102E YKR-H/132E	YKR-H/531E YR-H/531E YK-M/003E	YKR-P/001E YKR-P/002E YKR-P/010E YKR-P/020E YKR-P/101E YKR-P/102E	YKR-T/011E YKR-T/012E YKR-T/021E YKR-T/121E YKR-T/111E YKR-T/051E YKR-T/061E YKR-C/001 YKR-T/131E	YKR-T/233E	
YKR-T/301E	YKR-C/101E YKR-M/101E YKR-C/111E	YKR-C/011E	YKR-M/111E YKR-M/121E			

★ WIFI instructions

Users can scan the following QR code to obtain Wifi operation instructions.

	 
	For Android For IOS
1.This QR code is the instruction for using WIFI	2.Download the WIFI app through this QR code
Note: Some models do not have this function, please subject to the actual purchase.	

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Note:

- All the illustrations in this manual are for explanation purpose only.
- Your air conditioner may be slightly different. The actual shape shall prevail.
- They are subject to change without notice for future improvement.
- When installing multi units, refer to the installation manual of the multi units for outdoor unit installation (Free Match DC Inverter Air-conditioner).

WARNING

NOTE : FCC and IC related content only applies to models with WiFi function.

※ FCC WARNING

WARNING: Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

※ FCC STATEMENT

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

(1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

※ IC STATEMENT

This device complies with Industry Canada licenceexempt RSS standard(s).

Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence.

L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

※ IC STATEMENT

This equipment complies with FCC's and IC's RF radiation exposure limits set forth for an uncontrolled environment. The antenna(s) used for this transmitter must be installed and operated to provide a separation distance of at least 7.87in(20cm) from all persons and must not be collocated or operating in conjunction with any other antenna or transmitter. Installers must ensure that 7.87in(20cm) separation distance will be maintained between the device (excluding its handset) and users.

Cet appareil est conforme aux limites d'exposition au rayonnement RF stipulées par la FCC et l'IC pour une utilisation dans un environnement non contrôlé. Les antennes utilisées pour cet émetteur doivent être installées et doivent fonctionner à au moins 7.87in(20cm) de distance des utilisateurs et ne doivent pas être placées près d'autres antennes ou émetteurs ou fonctionner avec ceux-ci. Les installateurs doivent s'assurer qu'une distance de 7.87in(20cm) sépare l'appareil (à l'exception du combiné) des utilisateurs.

Symbol	Note	Explanation
 A2L	WARNING	This symbol shows that this appliance uses a flammable refrigerant. If the refrigerant is leaked and exposed to an external ignition source, there is a risk of fire. (Only for the AC with UL or ETL-MARKING, UL60335-2-40)
	CAUTION	This symbol shows that the operation manual should be read carefully.
	CAUTION	This symbol shows that a service personnel should be handling this equipment with reference to the installation manual.
	CAUTION	This symbol shows that information is available such as the operating manual or installation manual.

WARNING

NOTE:

The Air conditioner with R32 refrigerant, if roughly treated, may cause serious harm to the human body or surrounding things.

- The room space and maximum refrigerant charge requirements are shown in the table to the right.
- If ice has formed on the unit, do not use means to accelerate the defrosting process other than those recommended by the manufacturer.
- Do not use any cleaners on the unit other than what's approved by the manufacture.
- Do not pierce or burn air conditioner and ensure that the refrigerant pipeline is not damaged.
- The appliance must be stored in a room without continuously operating ignition sources (for example: open flames, an operating gas appliance or an operating electric heater).
- Notice that the refrigerant may be odorless.
- The storage of the air conditioner should be in a location that's able to prevent unintentional damage to the unit.
- Be sure to follow all local codes and safety requirements.

Room Space and Maximum Refrigerant Charge Requirements

Refrigerant Type	Allowable Refrigerant Charge Amount, (oz(kg))	Min. Floor Area For Installation, (ft ² (m ²))
R32	< 64.9 (< 1.84)	75.35 (7)
	64.9~82.54 (1.84~2.34)	96.88 (9)
	82.58~100.18 (2.341~2.84)	113.02 (10.5)
	100.21~117.82 (2.841~3.34)	134.55 (12.5)
	117.85~135.45 (3.341~3.84)	150.69 (14)
	135.49~153.09 (3.841~4.34)	193.75 (18)

SAFETY PRECAUTIONS

Incorrect installation or operation by not following these instructions may cause harm or damage to people, properties, etc. The seriousness is classified by the following indications:

WARNING

This symbol indicates the possibility of death or serious injury.

CAUTION

This symbol indicates the possibility of injury or damage to properties.

WARNING

This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety.

Children should be supervised to ensure that they do not play with the appliance.

- Don't connect the ground wire to the gas pipeline, water pipeline, lightning rod, or telephone earth wire.
- The air conditioner must be grounded. Incomplete grounding may result in electric shocks.
- Do not pull the power cable. Pulling the power cable could result in damage to the unit and electrical shock.
- Always switch off the device and cut the power supply when the unit is not in use for long time so as to ensure safety.
- Don't cut off main power switch during operating or with wet hands. It may cause electric shock.
- Make sure that the system has its own dedicated electrical circuit and that all electrical work is conducted by an individual that is certified or licensed to do such work in the state or region in which the installation is taking place.
- Always switch off the device and cut the power supply before performing any maintenance or cleaning, otherwise, it may cause electric shock or damage.
- Don't let the remote control or indoor unit get too wet. Exposure to excessive moisture may cause damage to the unit and or electrical shock.
- Don't install the air conditioner in a place where there is flammable gas or liquid unless the distance is equal to or greater than 3.28ft(1m) apart.
- Don't use any unapproved liquid or cleaning agent to clean the air conditioner.

SAFETY PRECAUTIONS

⚠ WARNING

- Don't attempt to repair the air conditioner by yourself. Incorrect repairs may cause fire or explosion.
- Contact a qualified service technician for all service requirements.
- Don't operate the air conditioner during a lightning storm. The power supply should be switched off to prevent danger or injury.
- Don't put hands or any objects into the air inlets or outlets. This may cause personal injury or damage to the unit.
- Please mount the system on a secure surface to prevent the unit from falling and causing injury or damage.
- Don't block air inlet or air outlet. Otherwise, the cooling or heating capacity will be diminished, or cause the system to stop operating.
- The appliance shall be installed in accordance with national and local wiring codes, i.e. a circuit breaker.

This product contains fluorinated greenhouse gases.

- Refrigerant leakage will contribute to climate change.
- Never tamper with the refrigerant system or attempt repair without proper training and compliance to local and national codes.
- The refrigerant in this system has a lower global warming potential (GWP) than a refrigerant with higher GWP, if leaked to the atmosphere. This appliance contains a refrigerant fluid with a GWP equal to [675]. This means that if 35oz(1kg) of this refrigerant fluid would be leaked to the atmosphere, the impact on global warming would be [675] times higher than 35oz(1kg) of CO₂, over a period of 100 years.

Ensure the following objects are not under the indoor unit:

- Microwaves, ovens and other hot objects.
- Computers and other high electrostatic appliances.
- Electrical sockets.
- Items susceptible to water damage.

The piping between indoor and outdoor unit shall not be reused, unless they can be properly flushed and re-flared.

The specifications for electrical requirements are listed on the data plate of the unit.

⚠ CAUTION

- Don't operate the system with windows or doors open. Doing so will limit the system effectiveness.
- Don't stand on the top of the outdoor unit or place heavy objects on it. This could cause personal injuries or damage to the unit.
- Don't use the system for other purposes, such as drying clothes, preserving foods, etc.
- Appropriate adjustments of the setting temperature can prevent the waste of electricity.

Regarding the installation of the air conditioners, please refer to the below paragraphs in this manual.

E-Waste

Disposal requirements:

- Don't dispose of electrical appliances as unsorted municipal waste, use separate collection facilities.
- Contact your local government for information regarding the collection systems available.
- If electrical appliances are disposed of in landfills or dumps, hazardous substances can leak into the groundwater and get into the ground water and food chain, damaging your health and well-being. Always follow local codes for disposal of e-waste.



NOTICES FOR USAGE

Operating range

- Operating the unit outside the recommended temperature range may have an impact on the system performance.
- When the temperature is too high, the air conditioner may trip the circuit breaker causing the air conditioner to shut down.
- When the temperature is too low, the outdoor heat exchanger may generate excessive moisture, leading to water dripping from unit.
- In long-term cooling or dehumidification with a relative humidity of above 80%, doors and windows should be closed to prevent the indoor unit from generating too much water and causing leaks.

Range	Type	Indoor	Outdoor
SEER2≥17	Cooling	60.8~89.6°F(16-32℃)	60.8~118.4°F(16-48℃)
	Heating	50~89.6°F(10-32℃)	19.4~75.2°F(-7-24℃)
SEER2≥17 (with heating belt)	Cooling	60.8~89.6°F(16-32℃)	60.8~118.4°F(16-48℃)
	Heating	50~89.6°F(10-32℃)	5~75.2°F(-15~24℃)
SEER2≥22 (with heating belt)	Cooling	60.8~89.6°F(16-32℃)	5~125.6°F(-15~52℃)
	Heating	50~89.6°F(10-32℃)	5~75.2°F(-15~24℃)
SEER2≥24 (with heating belt)	Cooling	60.8~89.6°F(16-32℃)	5~125.6°F(-15~52℃)
	Heating	50~89.6°F(10-32℃)	-13~75.2°F(-25~24℃)

Note: When the temperature is below -7℃(19.4°F), it's recommended to use models with heating belt.

Notes for heating

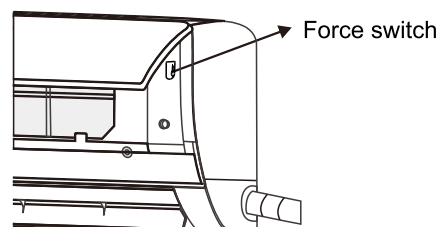
- The fan of the indoor unit will not start immediately when the heating cycle has started. The unit will warm up and then start blowing air to avoid blowing out cool air.
- When it is cold and wet outside, the outdoor unit will develop frost over the heat exchanger which over time will cause the system to start the defrost function.
- During defrost, the air conditioner will stop heating for about 5-12 minutes.
- Vapor may come out from the outdoor unit during defrost. This is not a malfunction, but a result of fast defrost.
- Heating will resume after defrost is complete.

Notes for turning off

- When the air conditioner is turned off, the main controller will automatically decide whether to stop immediately or after running for dozens of seconds with lower frequency and lower air speed.

Emergency operation

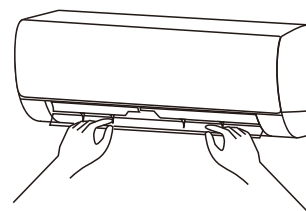
- If the remote controller is lost or broken, use force switch button to operate the air conditioner.
- If this button is pushed with the unit OFF, the air conditioner will operate in Mode: AUTO with a set temperature of 77°F (25℃) and Fan speed: AUTO.
- If this button is pushed with the unit ON, the air conditioner will stop running.



Airflow direction adjustment

1. Use up-down swing and left-right swing buttons on the remote controller to adjust the airflow direction. Refer to the operation manual of the remote controller for detail.
2. For models without left-right swing function, the air vent has to be moved manually.

Note: Move the air vents before the unit is in operation, or your finger might be injured. Never place your hand into the air inlet or outlet when the air conditioner is in operation.



NOTICES FOR INSTALLATION

❗ Important Notices

- This unit must be installed by a certified contractor to avoid:
 - Damage to the unit
 - Refrigerant leaking into the atmosphere
 - Electrical shock
 - Burns from refrigerant
 - Other serious injury to include death
- Leak test must be made after installation.
- To move and install air conditioner to another place, please contact our local authorized contractor.

Unpacking Inspections

- Open the box and check air conditioner in area with good ventilation and without ignition source.
- Note: Operators are required to wear anti-static devices
- It is necessary to check whether there is refrigerant leakage before opening the box of outdoor machine; stop installing the air conditioner if leakage is found.
- The fire prevention equipment shall be prepared well before checking.
- Then check the refrigerant pipeline to see if there is any damage or leaks.

Safety Principles for Installing Air Conditioner

- Fire prevention device shall be prepared before installation.
- Keep installing site ventilated. (open the door and window)
- Ignition source, smoking and calling is not allowed to exist in area where R32 refrigerant located.
- Anti-static precautions are necessary for installing air conditioner, e.g. wear pure cotton clothes and gloves.
- Keep leak detector in working state during the installation.
- If R32 refrigerant leakage occurs during the installation, you shall immediately detect the concentration in indoor environment until it reaches a safe level.
- If refrigerant leakage affects the performance of the air conditioner, please immediately stop the operation, and the air conditioner must be vacuumed firstly and be returned to the maintenance station for processing.
- Keep electric appliance, power switch, plug, socket, high temperature heat source and high static away from the area underneath sidelines of the indoor unit.
- The air conditioner shall be installed in an accessible location to installation and maintenance, without obstacles that may block air inlets or outlets of indoor /outdoor units, and shall keep away from heat source, inflammable or explosive conditions.
- When installing or repairing the air conditioner and the connecting line is not long enough, the entire connecting line shall be replaced with the connecting line of the original specification; extension is not allowed.

Requirements for installation position

- Avoid places of flammable or explosive gas leakage or where there is poor ventilation.
- Avoid places subject to strong electric/magnetic fields like microwaves and fluorescent lights.
- Avoid places like subject to noise and resonance like walls above a sleeping area.
- Avoid severe natural conditions (e.g. strong wind, direct sunshine or high temperature heat sources).
- Avoid places within the reach of children.
- Shorten the connection between the indoor and outdoor units as much as possible for best performance.
- Select a location where it is easy to perform service and repair.
- The outdoor unit shall not be installed in any way that could occupy an aisle, stairway, exit, fire escape, catwalk or any other public area.
- The outdoor unit shall be installed as far as possible from the doors and windows of the neighbors as well as plants.

Installation environment inspections

- Check nameplate of outdoor machine to make sure whether the refrigerant is R32.
- Check the floor space of the room. The space shall not be less than usable space in the specification.
- The outdoor unit shall be installed at a well-ventilated place.
- Check the surrounding environment of installation site: R32 shall not be installed in the enclosed reserved space of a building.
- When using electric drill to make holes in the wall, check first whether there is pre-buried pipeline for water, electricity and gas. It is suggested to use the reserved hole in the roof of the wall.

NOTICES FOR INSTALLATION

Requirements of the mounting structure

- The mounting rack must meet the relevant national or industrial standards
- It is recommended that the mounting rack and its load carry surface shall be able to withstand 4 times or above the weight of the unit.
- The mounting rack of the outdoor unit shall be fastened with expansion bolts or as recommended by the manufacture.
- Ensure the secure installation regardless of what type of wall on which it is installed, to prevent potential dropping that could cause damage or injury.

Electrical Safety Requirements

- Be sure to use the correct rated voltage for the air conditioner and a dedicated circuit for the power supply,
 - Follow local and national codes for the correct power cable AWG.
 - The operating range is 90%-110% of the local rated voltage. But insufficient power supply malfunction, electrical shock, or fire. If the voltage instability, proposed to increase the voltage regulator.
 - The minimum clearance between the air conditioner and the combustibles is 4.9ft (1.5m) or greater.
 - Use the correct wire size and type for connecting the indoor unit to the outdoor unit.
 - The size of the interconnection cord, power cable, fuse, and switch needed is determined by the maximum current of the unit.
 - The maximum current is indicated on the nameplate located on the side panel of the unit.
- Refer to this nameplate to choose the right wire size, breaker, or switch.

Requirements for operations at raised height

- When carrying out installation at 6.6ft (2m) or higher above the base level, safety belts must be worn and ropes of sufficient strength be securely fastened to the outdoor unit, to prevent falling that could cause personal injury or death as well as property loss.

Grounding Requirements

- Be sure to properly ground the unit. Follow all local and national codes as applicable.
- Do not connect the grounding wire to a gas pipe, water pipe, lightning rod, telephone line, or a circuit poorly grounded to the earth.
- The grounding wire is specially designed and shall not be used for other purpose, nor shall it be fastened with a common tapping screw.
- Ensure that all electrical connects are securely fastened and connected to the correct terminals.
- Local and national electrical codes must be utilized.

Others

- The connection method of the air conditioner and the power cable and the interconnection method of each independent element shall be subject to the wiring diagram affixed to the machine.
- The model and rating value of the fuse shall be subject to the silkscreen on corresponding controller or fuse sleeve.

INSTALLATION DIAGRAM

Accessories

Read these Safety Considerations carefully before installing the drain pan heater.
After completing the installation, check if the unit operates properly during the start-up operation.

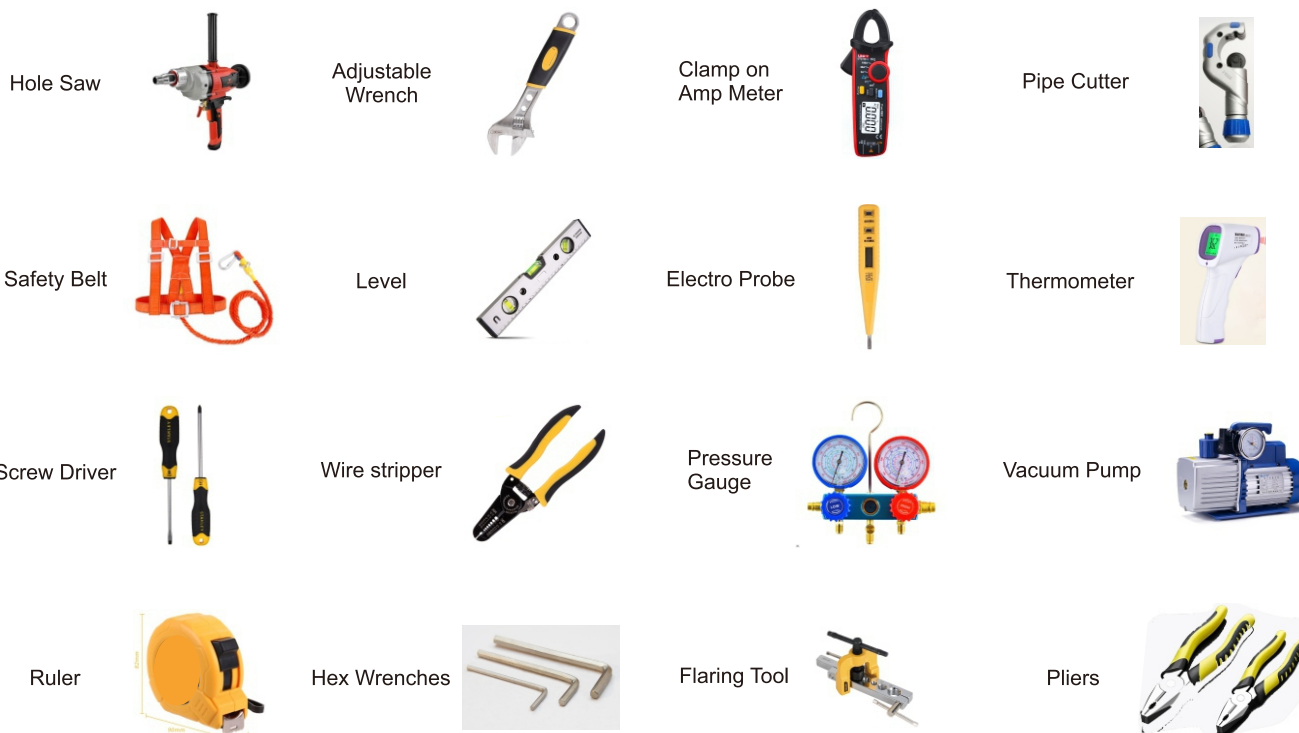
Packing List (Standard configuration)

Name	Quantity	Unit
Outdoor Unit	1	Set
Indoor Unit	1	Set
Remote Controller	1	PC
Batteries (AAA)	2	PC
Manual	2	Set
Drain pipe	1	PC
Power Cable	1	Set
Power Connecting Wire	1	Set
Connecting Pipes	2	PC
Plastic Strap	1	ROLL
Pipe Protection Ring	1	PC
Putty	1	PC
Mounting Plate	1	PC
Mounting Plate Indicator Diagram	1	PC

Packing List (Optional configuration)

Name	Quantity	Unit
Flare Nut	4	Set
Remote Controller Holder	2	PC
Fixing Screw for Remote Controller Holder	2	PC
Drain Elbow	1	PC
Drain Plug	5	PC
Mounting Plate Fixing Screw	8	PC
Screws	≥5	PC
WIFI	1	PC
Globe Valve Sheath	1	PC
Health Filter	2	PC
Sound Deadening Pads	4	PC

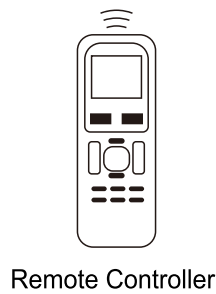
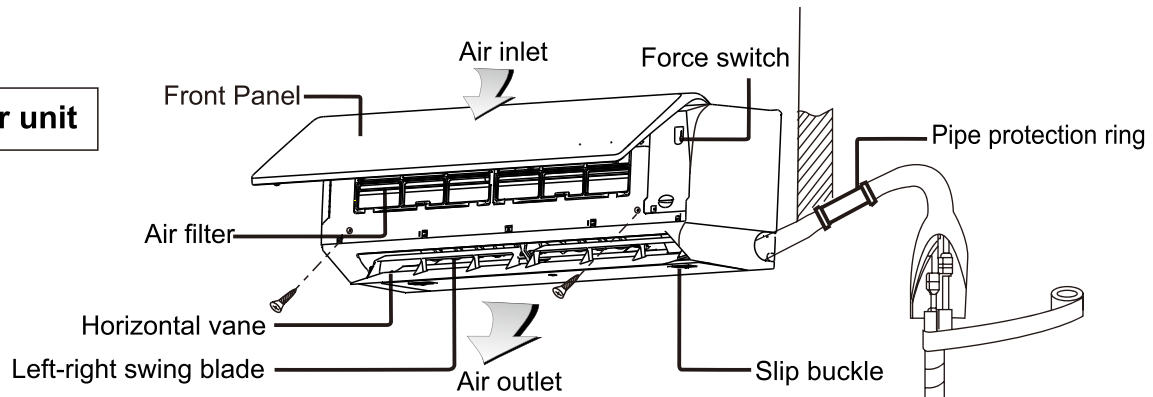
Tools Required



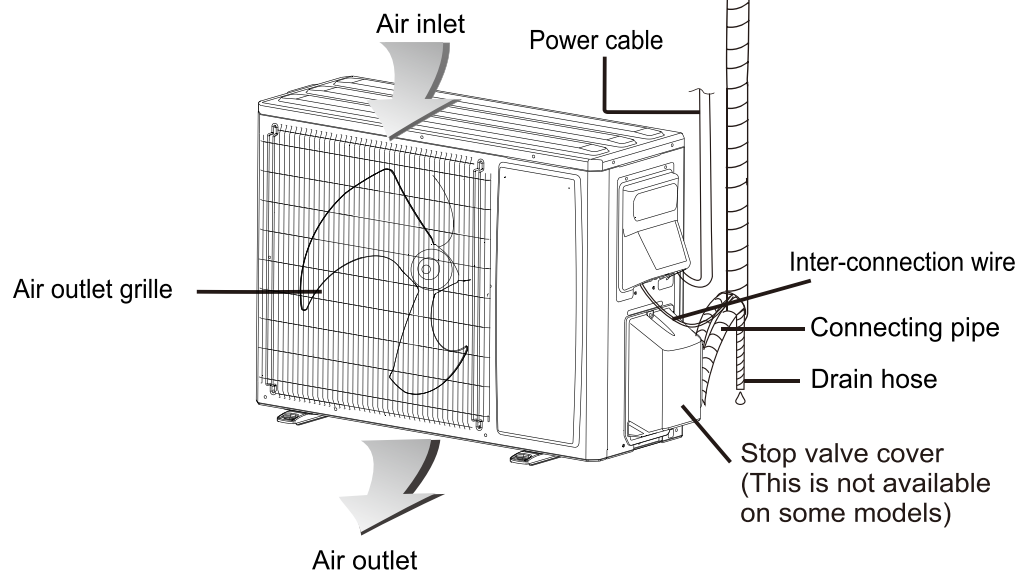
INSTALLATION DIAGRAM

Unit Parts

Indoor unit



Outdoor unit

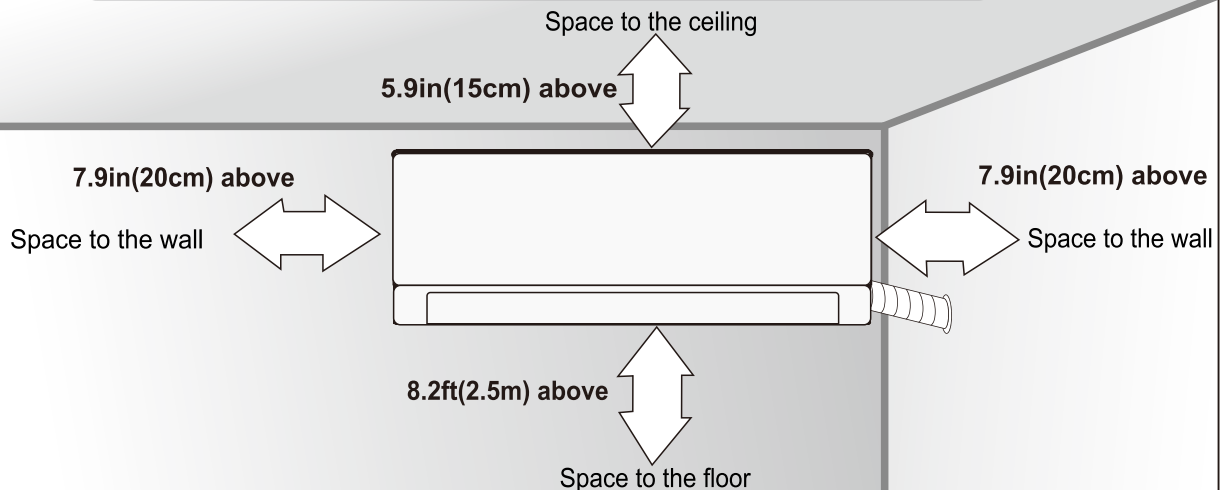


Note:

- 1.All the illustrations in this manual are for explanation purpose only.
- 2.Your air conditioner may be slightly different. The actual shape may vary.
- 3.They are subject to change without notice for future improvement.

INDOOR UNIT INSTALLATION

Dimension Drawing of Indoor Unit Installation

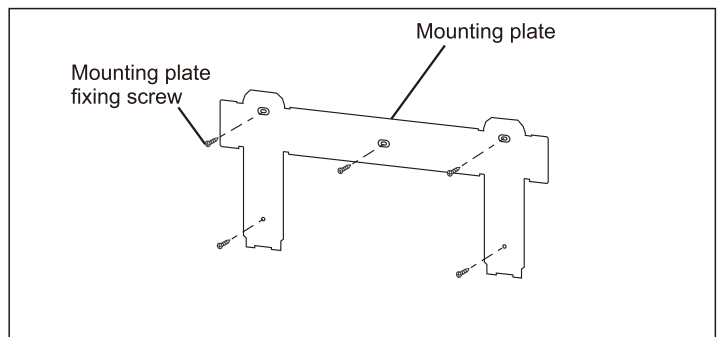


NOTE:

1. For safety requirements, the unit must be installed at least 8.2ft above the floor.
2. If installing the unit over a bookshelf or a shelf mounted to the wall, the unit must have 14in from the bottom of the unit to the top of the shelf.

Mounting Installation Plate

1. Ensure that the wall is strong enough to withstand the weight of the unit. Otherwise, it is necessary to reinforce the wall with plates, beams or pillars.
2. Use the "+" Phillips type screws in at least 5 suitable screws holes to fasten the plate to the wall.
3. Make sure the plate is horizontally level on the wall and there is enough room from the plate to the wall and ceiling to mount the unit.
4. Pull the mounting plate by hand after the installation, to confirm whether it is solid.
5. Use the installation dimensions to locate and punch holes (see figure)



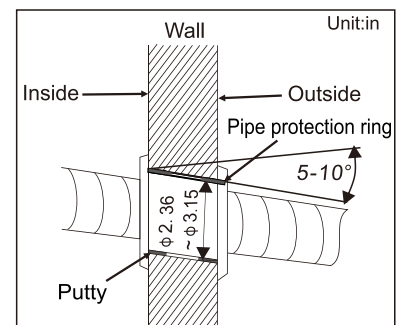
Wall-through Hole

1. Once a suitable location has been determined, drill hole with an outwardly slant of 5°-10° to ensure proper drainage.
2. Be sure to protect the piping and cables from damaged while running through the wall by using a pipe protecting ring or other field supplied protective device.
3. Use the supplied putty to seal the piping penetration to prevent mold buildup, rodents, and cold/hot air from entering the space.

Note:

Usually, the wall hole is $\Phi 2.36\text{in} \sim \Phi 3.15\text{in}$ ($\Phi 60\text{mm} \sim \Phi 80\text{mm}$).

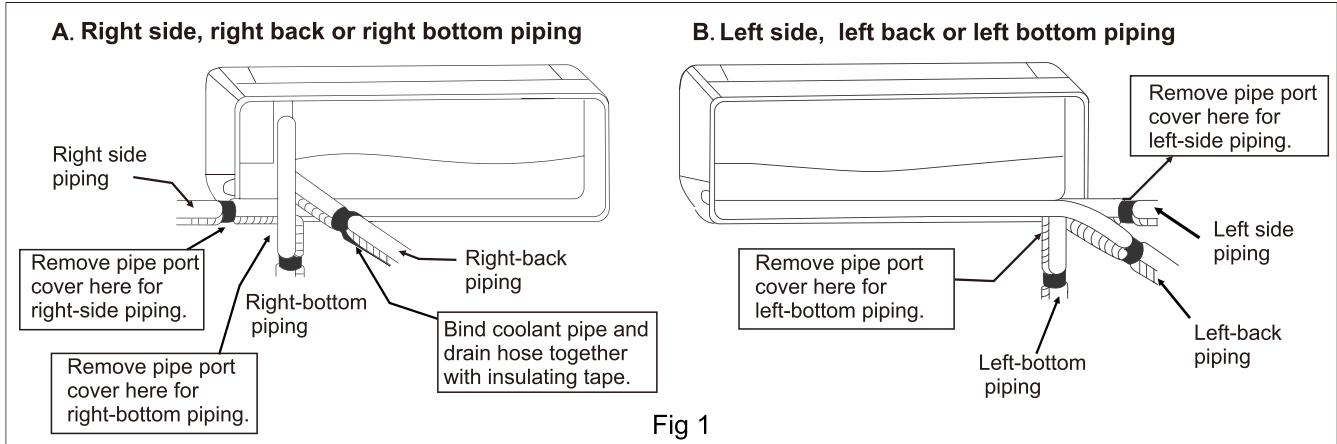
Avoid pre-buried power wire and hard wall when making the hole.



INDOOR UNIT INSTALLATION

Route of Pipeline

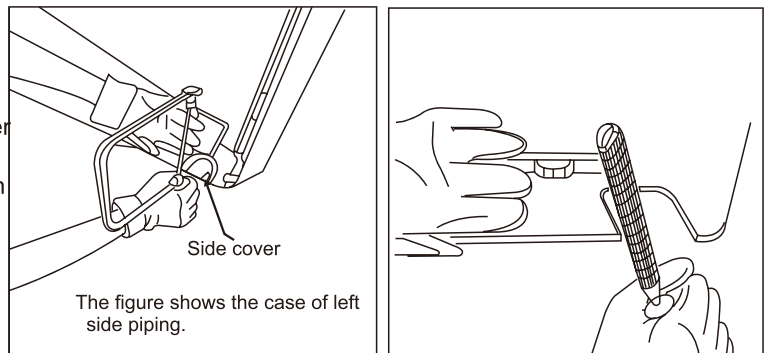
1. The refrigerant piping can be routed out of the indoor unit a number of ways. For left, right, or bottom routing, use the cut-out holes on the casing of the unit. Bend the pipes carefully to the required position in order to align it with the hole.
2. For back routing, be sure to drill the hole in the proper place according the mounting bracket.
3. Wrap the inter-unit wire, refrigerant pipes, and drain hose together with insulation tape. (see Fig 1)



4. Bottom or side piping (see Fig 2)
 - a. Cut off pipe port cover with a coping saw.
 - b. Apply the blade of the coping saw to the notch, and cut off the pipe port cover along the uneven inner surface.
 - c. After cutting off the pipe cover, use a file to smooth the edges.

NOTE:

Bottom piping only applies to some units.

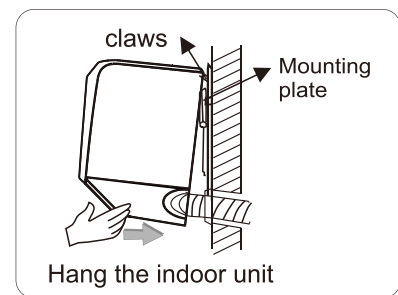


Mount the Indoor Unit

1. Mount the unit onto the installation plate

Hook the indoor unit onto the upper portion of the installation plate (Engage the two hooks at the rear top of the indoor unit with the upper edge of the installation plate). Ensure that the hooks are properly seated on the installation plate by moving it to the left and right.

2. Then connect the pipes of indoor unit as follows:



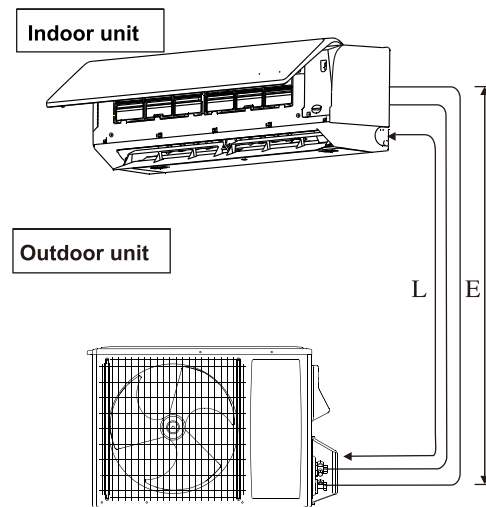
INDOOR UNIT INSTALLATION

Install the Refrigerant Piping

Allowable Piping Length

If the pipe is too long, both the capacity and reliability of the unit will drop. As the number of bends increases, resistance to the flow of refrigerant system increases, thus lowering cooling capacity. As a result, the compressor may become defective. Always choose the shortest path and follow the recommendations as tabulated below:

Model	Indoor	09	12	18	24	36
	outdoor	09	12	18	24	36
Min. Allowable Length (L), ft/(m)		9.84' (3)		9.84' (3)		
Max. Allowable Length (L), ft/(m)		65.6' (20)		98.4' (30)		
Max. Allowable Elevation (E), ft/(m)Gas		49.2' (15)		65.6' (20)		
Pipe Size, in/(mm)		3/8" (9.52)		1/2" (12.70)	5/8" (15.88)	
Liquid Pipe Size, in/(mm)		1/4" (6.35)		1/4" (6.35)		



* Be sure to add the proper amount of additional refrigerant. Failure to do so may result in reduced performance. (See table on page 16 for additional refrigerant amounts)

Remark:

The refrigerant pre-charged in the outdoor unit is for piping lengths up to 25ft (7.6m).

Piping Works And Flaring Technique

- Do not use contaminated or damaged copper tubing. If the evaporator, condenser, or any piping has been open and exposed to the atmosphere for 15 seconds or more, the system must be vacuumed. Do not remove plastic plugs or brass nuts from piping connections until the connections are ready to be made.
- If any brazing work is required, ensure that a nitrogen gas purge is utilized to prevent soot formation on the inside wall of copper tubing. Failure to do so may cause damage to the unit and void warranty.
- Cut the pipe as straight as possible (See Fig 1.). Make sure to use a deburring tool to remove any burrs. Hold the pipe with opening facing down to prevent metal chips from entering the pipe (See Fig2.).
- This will avoid unevenness on the flare faces which will cause gas leak.
- Insert the flare nuts, mounted on the connection parts of both the indoor unit and outdoor unit, into the copper pipes.
- The exact length of pipe protruding from the top surface of the swaging block is determined by the flaring tool. See Fig 3.
- Fix the pipe firmly on the swaging block. Match the centers of both the swaging block and the flaring punch, then tighten the flaring punch fully.
- The refrigerant pipe connection are insulated by closed cell polyurethane.

Install the connection pipe

- Apply a slight amount of POE oil to the inside of the flare to prevent binding.
- Align the center of the piping and tighten the flare nut sufficiently with fingers. See Fig 4.
- Adjust the torque wrench to the proper torque settings according to the table. Finally, tighten the flare nut with torque wrench until the wrench clicks. When tightening the flare nut with the torque wrench, ensure that the tightening direction follows the arrow indicated on the wrench.

Fig 1.

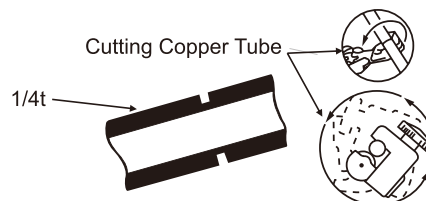


Fig 2.

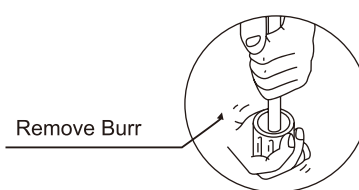
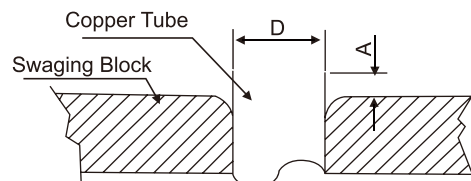


Fig 3.

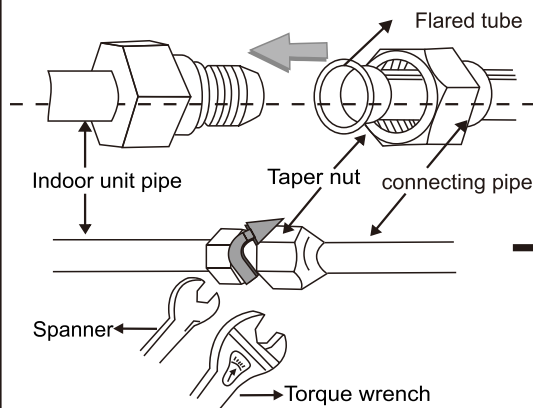


Ø Tube, D		A(Inch/mm)	
inch	mm	Imperial (Wing-nut Type)	Rigid (Clutch Type)
1/4"	6.35	0.051" (1.3)	0.028" (0.7)
3/8"	9.52	0.063" (1.6)	0.039" (1.0)
1/2"	12.70	0.075" (1.9)	0.051" (1.3)
5/8"	15.88	0.087" (2.2)	0.067" (1.7)
3/4"	19.05	0.098" (2.5)	0.079" (2.0)

INDOOR UNIT INSTALLATION

Install the Refrigerant Piping

Fig 4.



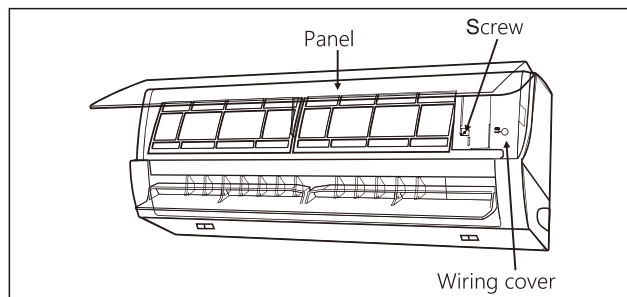
Tightening torque table

The size of pipe ,in(mm)	Torque,ft-lb(N·m)
Ø1/4" (Ø6.35)	11.0-18.4 (15-25)
Ø3/8" (Ø9.52)	25.8-29.5 (35-40)
Ø1/2" (Ø12.7)	33.2-44.3 (45-60)
Ø5/8" (Ø15.88)	53.9-57.6 (73-78)
Ø3/4" (Ø19.05)	55.3-59.0 (75-80)

Electrical Wiring Connection

● Connect interconnection wire of indoor unit

1. Open the front panel of the unit and remove the screw on the wiring cover to access the unit wiring terminals.
2. Pull the wire through the cable-cross hole at the back of indoor unit and then pull it out from the front side of the unit with enough length to make the connections.
3. Remove the wire clip; connect the interconnection wires to the correct terminals according to the wiring diagram; Tighten the screw, and then fix the interconnection wire with wire clip.
4. Put wiring cover back and then tighten the screw.
5. Close the front panel.



Electrical Wiring Connection

NOTE:

✖This manual usually includes the wiring mode for the different kind of air conditioner. We cannot exclude the possibility that some special type of wiring diagrams are not included.

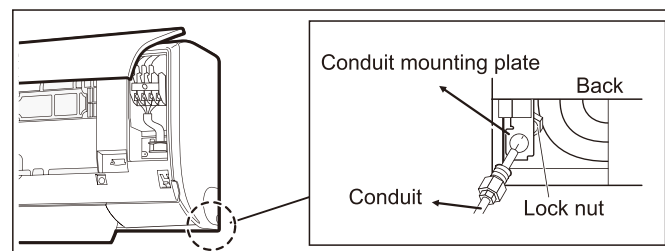
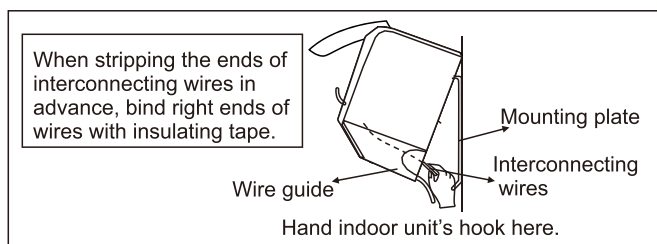
✖The diagram are for reference only. If the entity is difference with this wiring diagram, please refer to the detailed wiring diagram adhered on the unit which you purchased.

● After installation check

1. Make sure that the screws are tight and there is no risk of the wiring coming loose.
2. Verify that all wiring is tucked into unit nicely and there is no risk of wires being smashed by cover or touching the control board.
3. Inspect control box cover to verify proper installation.

Note:

Take care to ensure that all wiring between indoor unit and outdoor unit has a consistent connection. Any splices or breaks can cause communication errors and failure to start.



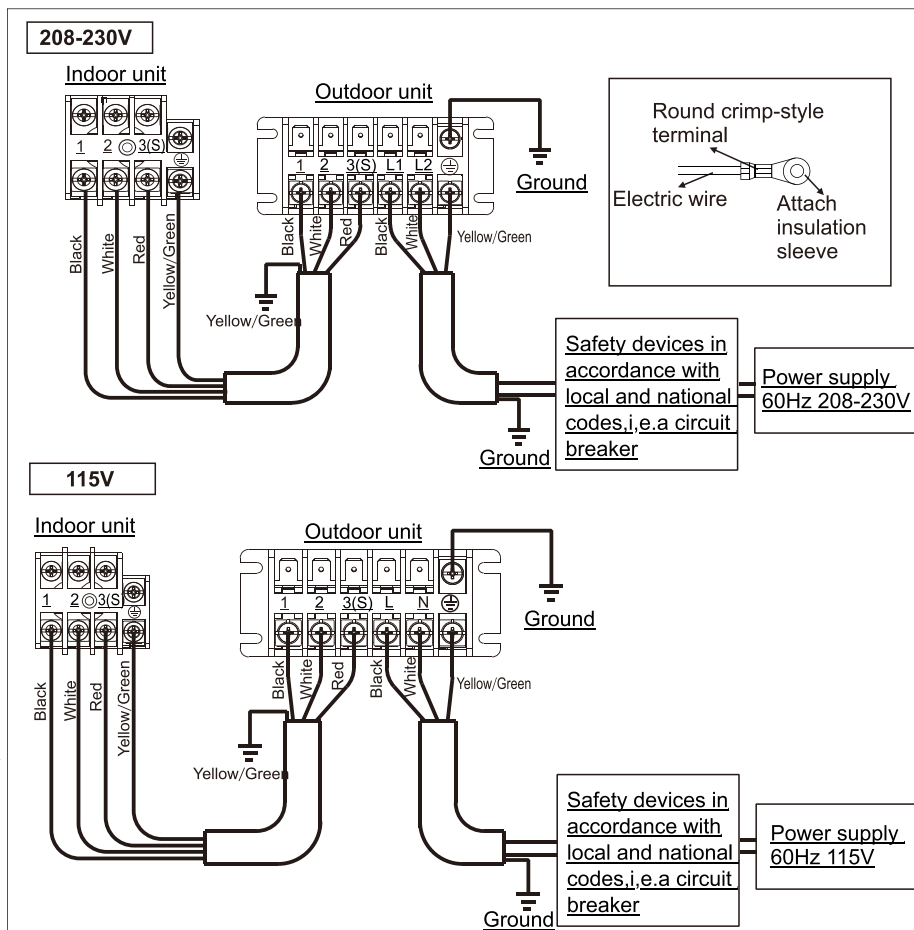
INDOOR UNIT INSTALLATION

Electrical Wiring Connection

● Entire PCB replacement required if fuse failure occurs.

All wires must be firmly connected.

1. Make sure that none of the wiring is grounded to piping or compressor. Make sure no external pressure is applied to the terminal connectors and wires. Make sure all the covers are properly fixed to avoid any gaps. Use round crimp-style terminal connectors for connecting wires to the power supply terminal block. Connect the wires by matching the indication marks on the terminal block. (Refer to the wiring diagram attached on the unit).
2. Use the correct screwdriver for tightening the terminal screws. Unsuitable screwdrivers can damage the screw head. Over tightening can damage the terminal screws.
3. Do not connect wires of different gauge to same terminal.
4. Keep wiring in an orderly manner.
5. Prevent the wiring from obstructing other parts and the terminal box cover from closing.



Power: 60Hz 208-230V

Recommended Wire Mode

Model(Btu)	Power line(AWG)	Power connection line(AWG)
9000	3 Core*14AWG or 3Core*16AWG	4 Core*18AWG
12000		
18000		
24000		
> 24000		

Power: 60Hz 115V

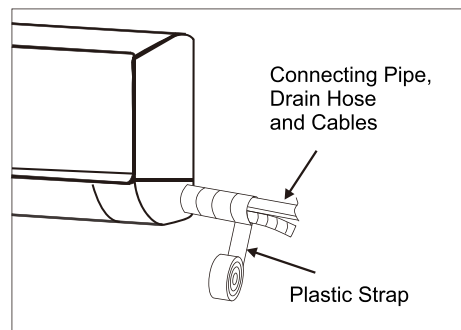
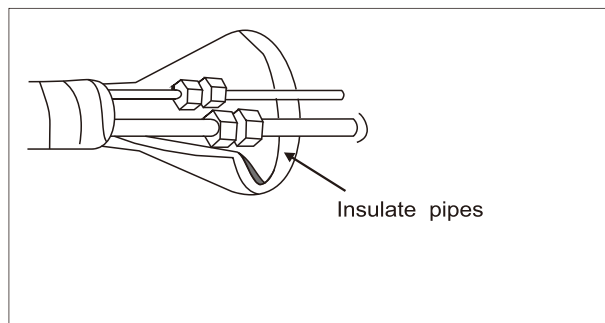
Recommended Wire Mode

Model(Btu)	Power line(AWG)	Power connection line(AWG)
9000	3 Core*14 AWG	4 Core*18 AWG
12000		

INDOOR UNIT INSTALLATION

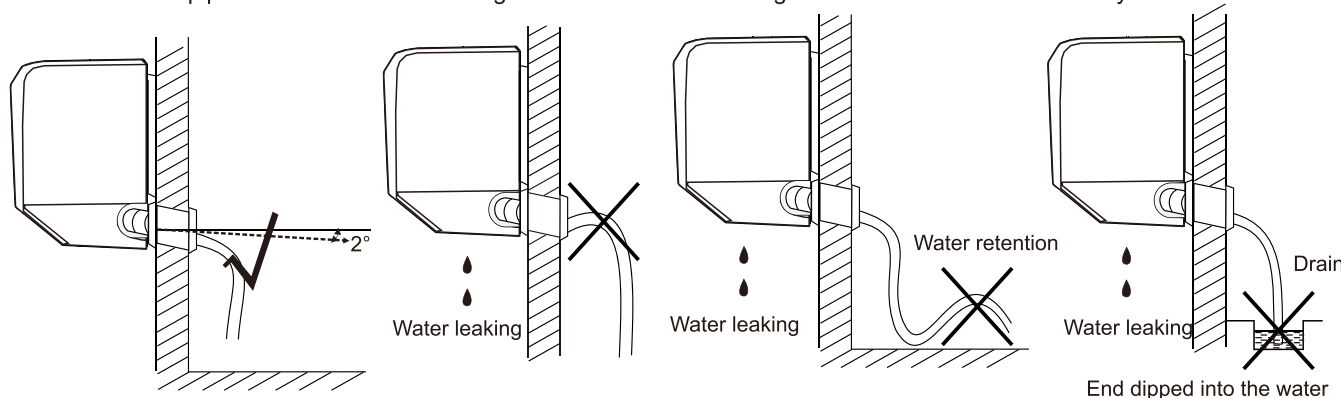
Wrap the Piping

1. Use the insulation sleeve to wrap the joint part the indoor unit and the connection pipe, and then use insulating material to pack and seal insulation pipe, to prevent generation of condensate water on the joint part.
2. Connect the water outlet with drain pipes, and make the connection pipe, cables, and the drain hose straight.
3. Use plastic cable ties to wrap the connecting pipes, cables and drain hose. Run the pipe sloping downward.



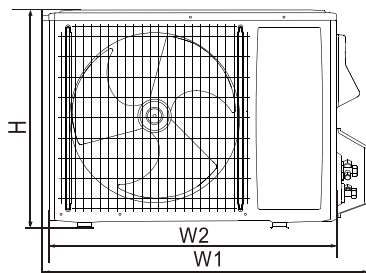
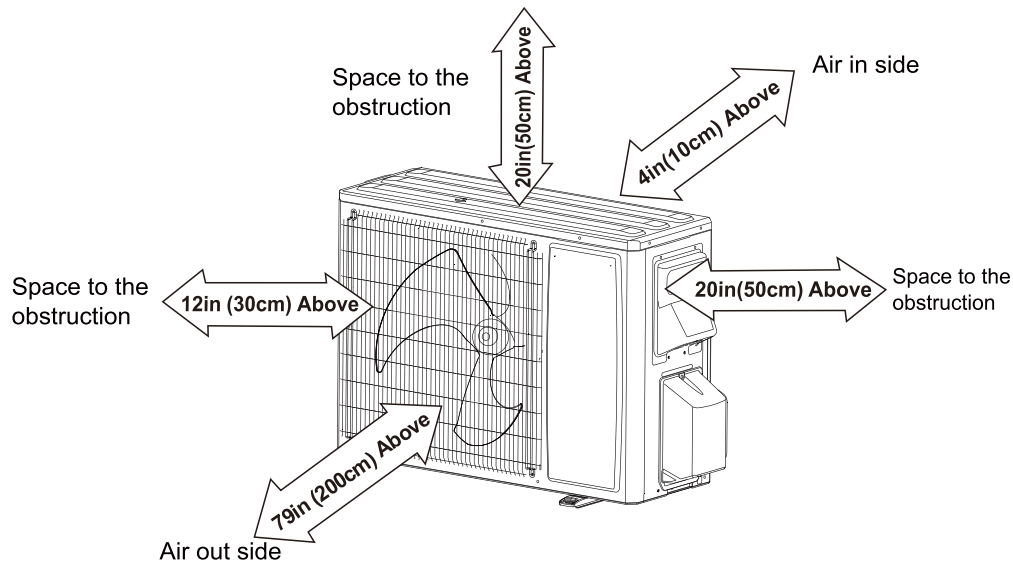
Water Drainage Piping

The indoor drain pipe must be in a downward gradient for smooth drainage. Avoid situations that are likely to cause water to leak.



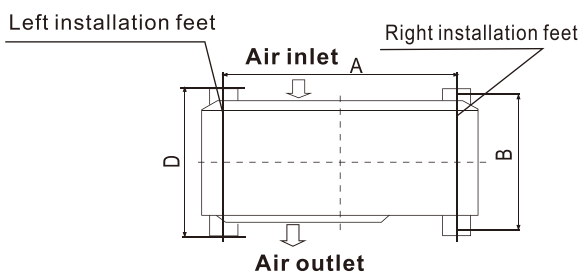
OUTDOOR UNIT INSTALLATION

Dimension Drawing of Outdoor Unit Installation



Installation outdoor unit bolt

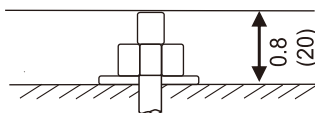
Outdoor Unit Size of Shape W1 (W2)*H*D, in (mm)	A, in (mm)	B, in (mm)
28.7(25.6)×18.0×11.0 730(651)×456×278	18.9 (480)	10.0(253)
31.7(28.0)×21.2×12.2 805(712)×538×309	18.9 (480)	11.1 (283)
34.7(31.0)×21.9×13.9 880(787)×557×353	21.5 (546)	12.4 (316)
36.0(32.6)×25.9×14.6 913(827)×657×370	21.3(540)	13.1(334)
38.6(35.3)×27.6×15.3 980(897)×700×388	24.9 (632)	13.9 (352)
41.3(38.4)×31.6×18.0 1049(975)×803×455	26.6(675)	15.4(390)



Installation:

- 1.Install a drainage channel to allow the condensate to flow smoothly away.
- 2.During installation please ensure that the foundations are secure and level to avoid vibration and noise
- 3.Please bolt(M8 or M10) the outdoor unit down securely.
- 4.The bolts for connecting the outdoor unit should protrude 0.8in(20mm) above the surface of the base.
- 5.Do not just use the four comers as a foundation to support the unit.

Unit:in(mm)



OUTDOOR UNIT INSTALLATION

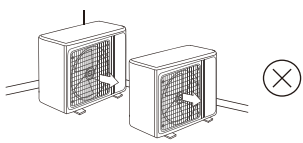
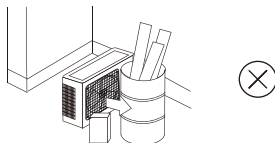
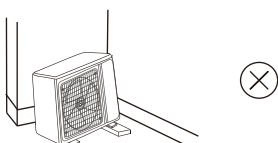
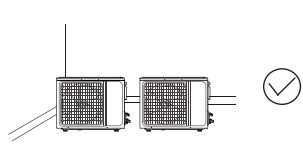
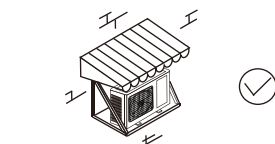
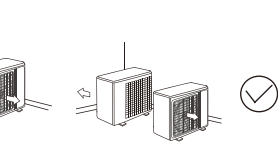
Dimension Drawing of Outdoor Unit Installation

Where you install the outdoor unit will have a direct affect upon its performance.

In order for the outdoor unit to operate at its best you should carefully follow these instructions. In particular its important to prevent discharge air to return to the rear of the unit. This should be avoided as this will significantly reduce the cooling and heating performance.

- 1.The discharge air which is expelled from the front of the unit should not be allowed to immediately enter the return inlet of the back of the unit.
- 2.Ensure there is ample space in front of the unit will help prevent this from happening.
- 3.Ensure the unit is installed on a level surface and that there is plenty of room to service the equipment. Do not allow a slope of more than 5°.

The following figures show the right installation and wrong installation :

Wrong installation			
Right installation			

Installation Guide at the Seaside

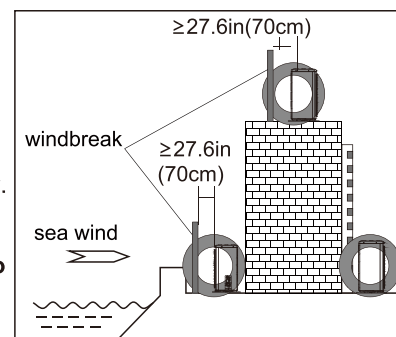
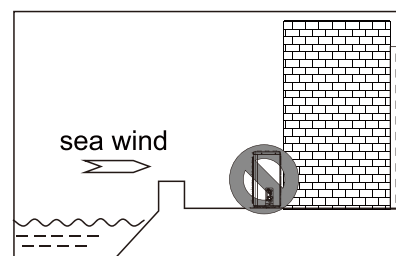
1. Air conditioners should not be installed in areas where corrosive gases, such as acid alkaline gas, are produced.
- 2.Do not install the product where it could be exposed to direct salt air. Sea air exposure can result in corrosion on the unit. Corrosion, particularly on the condenser and evaporator fins, could cause product malfunction, inefficient performance, and refrigerant leaks.
- 3.If the outdoor unit is installed close to the seaside, it should avoid direct exposure to the sea wind. Otherwise, it may need additional anti corrosion treatment.

• Selecting the location (outdoor unit)

- The windbreak should be strong enough like concrete to prevent the sea wind from hitting the unit. The height and width should be more than 150% of the outdoor unit.
- 4.Select a well-drained place. Install the outdoor unit on the opposite side of the direction of the sea wind, or set up a windbreak to avoid exposed to the sea wind. Seaside applications will require more frequent maintenance checks and cleaning. Be sure to keep the system free of salt build up by washing the unit with clean water at low pressure.
- The unit should be kept more than 27.6in (70cm) from the windbreak for easy air flow.

• The mounting rack of the outdoor unit shall be fastened with expansion bolts or as the manufacture recommends.

• If installing on a wall, ensure the secure installation regardless of the type of to prevent potential dropping that could damage the unit or cause injury.

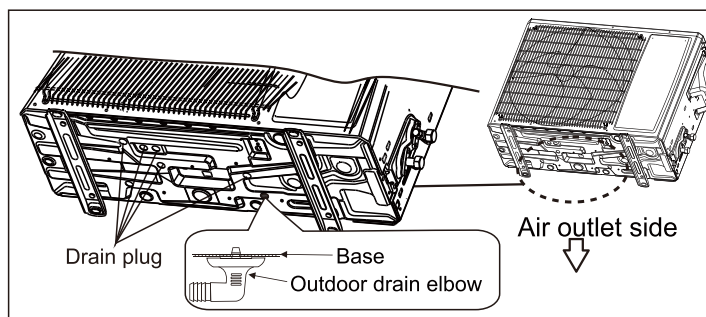


Outdoor Condensation Drainage(Heat pump type only)

When the unit is in heating mode, the outdoor unit can generate water that will drip from the bottom of the unit. To control the flow of that water, please use the provided drain elbow.

Installation:

- 1).Install the drain elbow in the 1in(Φ25mm) hole on the bottom of the base plate, and connect the drain hose to the elbow. Route the hose to a location so that the water formed in the outdoor unit can be drained out to a proper location.
- 2).In cold areas, do not use a the drain elbow or drain plugs on the outdoor unit. Plugging the holes will cause ice to buildup in the base pan which could result in damage to the unit. In cold climates, make sure the unit has plenty of space to drain and avoid snow drifts.



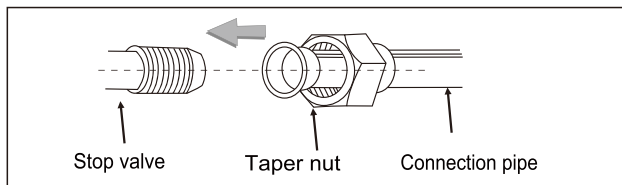
OUTDOOR UNIT INSTALLATION

Install the Connection Pipe

Additional refrigerant may be required based on the length of the refrigerant pipe. The chart below shows the requirements of refrigerant needed based of the piping length.

The additional refrigerant is required to ensure proper performance and prevent damage to the unit.

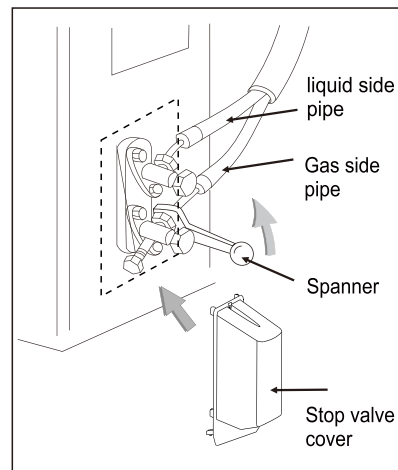
Apply thin layer of refrigeration oil to seating surfaces of flare being cautious not to get oil on the threads of the flare.



Size of unit	Length of connection pipe	Added refrigerant
All	9.8-25ft (3-7.6m)	Not needed
07K,9K, &12K	25-65.6ft (7.6-20m)	add 0.172oz/ft(16g/m)
18K, 24K, & 36K	25-98.4ft (7.6-30m)	add 0.258oz/ft(24g/m)

Note:

- 1.The flares shall not be reused. It is important to always re-flare pipes upon their removal and reinstallation.
- 2.After installation, check the stop valve cover for proper installation.

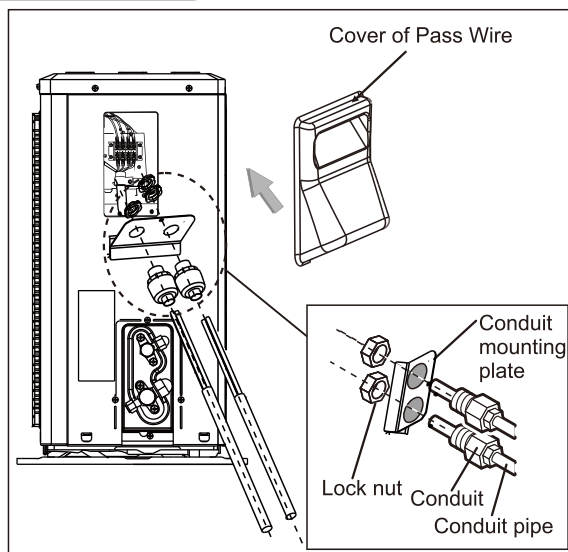


Wiring Connection

- 1.Loosen the screws and remove the E-parts cover from the unit.
- 2.Connect the cables respectively to the corresponding terminals of the terminal board of the outdoor unit (see the wiring diagram), using ring connectors.
- 3.Ground wire: Remove the grounding screw out of the electric bracket, connect the grounding wire end onto the grounding screw and screw it into the grounding hole.
- 4.Fix the cable securely with ring connectors
- 5.Put the E-parts cover back in its original place and fasten it with screws.

NOTE:

- This manual usually includes the wiring mode for the different kind of air conditioner. We cannot exclude the possibility that some special types of wiring diagrams are not included.
- The diagrams are for reference only. Please refer to the detailed wiring diagram adhered on the unit which you purchased.

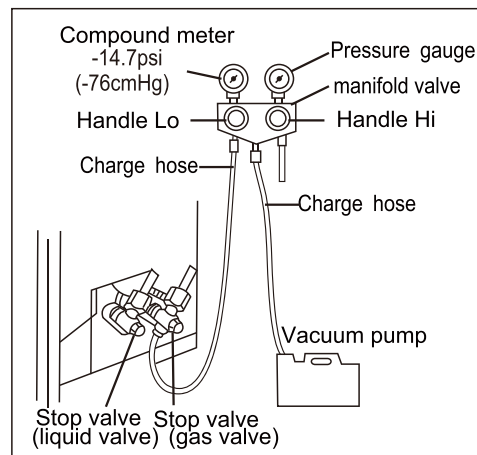


Vacuuming

The refrigerant of R32 model must be evacuated (R410A vacuum pump can be used).

Before working on the air conditioner, remove the cover of the stop valve (gas and liquid valves, be sure to re-tighten it afterward to prevent the potential air leakage).

1. To prevent air leakage, make sure all flares are properly connected and torqued.
2. Connect the stop valve, charge hose, manifold valve, and vacuum pump to the unit.
3. Fully open the handle of the manifold valve and apply vacuum for at least 15 minutes and check that the compound vacuum gauge reads -14.7psi (-76cmHg).
4. After applying vacuum, fully open the stop valve with a hex wrench.
5. Check that both indoor and outdoor connections are free of air leakage.



TESTING AND INSPECTION

Check After Installation

- **Electrical Safety Check**

1. If the supply voltage is within tolerance.(90%~110% of the rated voltage)
2. If the indoor and outdoor units are properly wired.
3. If the grounding wire of the air conditioner is securely grounded.

- **Installation Safety Check**

1. If the unit is mounted properly and securely.
2. If the water drains smoothly from indoor unit to outdoor drain.
3. If the wiring and piping are correctly installed and free of leaks.
4. Check that no foreign matter or tools are left inside the unit.
5. Check the refrigerant pipeline and connections are properly insulated.

- **Leak test of the refrigerant**

Depending on the installation method, the following methods may be used to check for suspect leak, on areas such as the connections of the outdoor unit and the cores of the cut-off valves and t-valves:

1. Bubble method: Apply of spray a uniform layer of soap water over the suspected leak spot and observe carefully for bubble.
2. Instrument method: Checking for leak by pointing the probe of the leak detector according to the instruction to the suspect points of leak.

Note:

Make sure that the ventilation is good before checking.

Test Operation

- **Test Operation preparation:**

1. Verify that all piping and wiring is properly connected.
2. Confirm that the valve at the gas side and the liquid-side are fully open.
3. Verify that power is turned on to the unit.
4. Install batteries in the remote control.

Note:

Make sure that the ventilation is good before testing.

- **Test Operation method:**

1. Turn on the power and push the ON/OFF switch button of the remote controller to start the air conditioner.
2. Select COOL or HEAT, adjust the SWING and other operation modes with the remote controller to verify proper operation.

- **Attention:**

1. For maintenance or scrap, please contact authorized service contractors.
2. Maintenance by unqualified person may cause injury or death.
3. Charge the air conditioner with R32 refrigerant, and maintain the air conditioner in strict accordance with manufacturer's requirements. The chapter is mainly focused on special maintenance requirements for appliance with R32 refrigerant.
4. Ask repairer to read after-sales technical service handbook for detailed information.

CARE AND CLEANING

WARNING

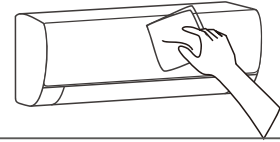
Before cleaning the air conditioner, the unit must be shut down and the electricity must be cut off for more than 5 minutes, otherwise there might be the risk of electric shock.

- Do not expose electrical connections or electronics to moisture which can cause an electric shock.
- Volatile liquid such as thinner or gasoline will damage the air conditioner, therefore only clean the housing of air conditioner with soft dry cloth or a cloth that is slightly dampened with water.
- Make sure to check filters regularly to prevent the accumulation of dust which may affect the air conditioner performance. If the unit is installed in an environment that has more dust, the number of cleanings will need to increase. After removing the filter, do not touch the fin part of the indoor unit with your fingers as it may result in damage to the unit or injury.

CARE AND CLEANING

Clean the Panel

When the panel of the indoor unit is dirty, clean it with soft dry cloth or a cloth that is slightly dampened with water.



Clean the Air Filter

■ Remove the air filter

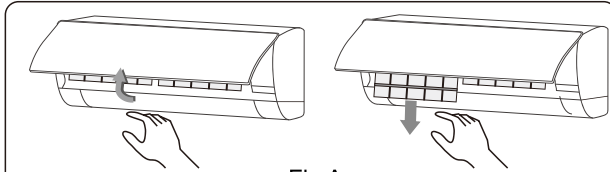


Fig A

1. Use both hands to open the front panel to gain access to the filters.
2. Gently release the air filter from the slot and remove.

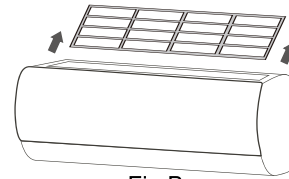
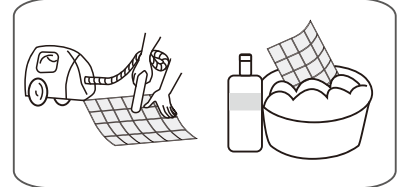


Fig B

1. The air filter is located above the fuselage.
2. Take it out facing upward.

■ Clean the Air Filter

Use a vacuum cleaner or water to rinse the filter clean. If the filter is very dirty (for example, with greasy dirt), clean it with warm water (below 113°F (45°C)) with a mild detergent. Put the filter in a shady area to dry in the air.

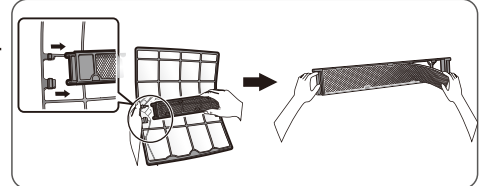


■ Clean or replacement the Activated carbon filter screen (Only for some models)

1. Cleaning: you can clean with the Air Filter;
2. Replacement: remove the filter from the filter frame and attach a new one.

Note:

1. Do not throw away the filter frame.
 2. Reuse the filter frame when replacing the activated carbon filter screen.
- When attaching the filter, check that the filter is properly set in the tabs.
Dispose of the old filter as non-flammable waste.



■ Mount the Filter

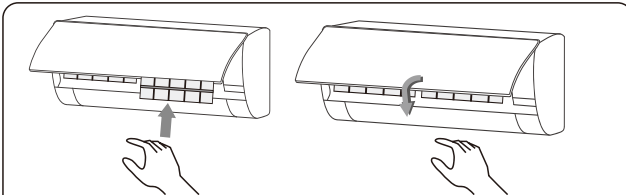


Fig A

Reinstall the dried filter in reverse order of removal, then gently close the front cover and lock the panel.

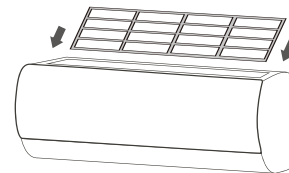


Fig B

Reinstall the dried filter in reverse order of removal.

Check Before Using

1. Make sure that all the air inlets and outlets of the units are unblocked.
2. Check whether the indoor unit drains properly.
3. Check the ground wire is securely grounded.
4. Check whether the remote-control batteries are installed and in proper operating condition.
5. Verify that the outdoor unit is securely mounted and free from damage. If any issues, please contact our local contractor for inspection.

Maintain After Using

1. Turn off the power source of the air conditioner at the outdoor unit.
2. Clean the indoor unit panel and filter.
3. Remove the dust and debris from the outdoor unit.
4. Verify that the outdoor unit is securely mounted and free from damage. If any issues, please contact our local contractor for inspection.

TROUBLESHOOTING

⚠ CAUTION

Do not attempt to repair the air conditioner by yourself as wrong maintenance may cause electric shock, fire, or explode. Please contact a authorized contractor and let the professionals conduct the maintenance and repairs. Checking the below items prior to contacting a contractor can help identify a potential problem.

Phenomenon

Troubleshooting

The air blows out of the indoor unit, but the air is not being cooled/heated.



- Excessive accumulation of dust on filter, blocking the air inlet or outlet → Please clean the filter, remove the obstacles at the air inlet
- The louver blades are at an excessively angle limiting airflow. → Please adjust the louvers to pointing straight.
- Poor cooling and heating effect caused by doors and windows opening, and unclosed exhaust fan. → Please close the doors, windows, the exhaust fan, etc.
- Auxiliary heating function is not turned on while heating, which may lead to poor heating effect. → Turn on the auxiliary heating function. (only for models with auxiliary heating function)
- Mode setting is incorrect, and the temperature and wind speed settings are not appropriate. → Please select the mode, and set the appropriate temperature and wind speed.

The indoor unit blows out odor.



- The air conditioner itself does not have undesirable odor. If there is odor, it may be due to accumulation of the odor in the environment. → Clean the air filter or activate the cleaning function.

There is sound of running water during operation of the system.



- When the air conditioner is started up or stopped the system can make a "hissing" sound that might sound like running water. → This is the sound of the flow of the refrigerant and not a malfunction.

A slight "click" sound is heard at the of start-up or shut-down.



- Due to temperature changes, panel and other parts will swell, causing the sound of friction. → This is normal, not a fault.

The indoor unit makes abnormal sound.



- The sound of fan or compressor relay switched on or off.
- When the defrosting is started or stop running, it will create sound. → That is due to the refrigerant flows to reverse direction. They are not malfunctions.
- Too much dust accumulation on the air filter of the indoor unit may result in fluctuation of the sound. → Clean the air filters in time.
- Too much air noise when "Strong wind" is turned on. → This is normal, if feeling uncomfortable, please deactivate the "Strong wind" function.

There are water drops over the surface of the indoor unit.



- When ambient humidity is high, water drops will be accumulated around the air outlet or the panel, etc. → This is a normal physics phenomenon.
- Prolonged cooling run in open space produces water drops. → Close the doors and windows.
- Too small opening angle of the louver blades may also result in water drops at the air inlet. → Increase the angle of the louver blades.

TROUBLESHOOTING

Phenomenon	Troubleshooting
During the cooling operation, the indoor unit outlet sometimes will blow out mist.	When the indoor temperature and humidity are high, it happens sometimes. → This is because the indoor air is cooled rapidly. After it runs for some time, the indoor temperature and humidity will be reduced and the mist will disappear.
The air conditioner does not work.	- There might be power outages. → Wait until power is restored. - The wires may loose. → Re-tighten the wires. - Power switch fuse may blow. → Replace the fuse. - The time for timing boot is yet to come. → Wait or cancel the timer settings.
The air conditioner can't run after the immediate start-up after it is shut down.	If the air conditioner is turned on immediately after it is turned off, the protective delay switch will delay the operation for 3 to 5 minutes.
The air conditioner stops running after it starts up for a while.	- May have reached the setting temperature. → It is a normal function phenomenon. - May be at a defrosting state. → It will automatically restore and run again after defrosting. - Shutdown Timer may be set. → If you continue to use, please turn it on again.



Immediately stop all operations and cut the power supply ,contact our Service center locally in following situations.

- ▲ Hear any harsh sound or smell any awful odor during running.
- ▲ Abnormal heating of power cable .
- ▲ Circuit breaker continuously trips.

MAINTENANCE NOTICE

Attention :

For maintenance or scrap, please contact a authorized contractor.

Maintenance by unqualified person may cause injury or damage to the unit.

Charge air conditioner with R32 refrigerant only, and maintain the air conditioner in a strict accordance with manufacturer's requirements.

Qualification Requirements of Maintenance Personnel

1. Special training is required to work on equipment with A2L refrigerants. Only rely on qualified contractors to install, service, and repair this system.
 2. The maintenance and repair of the air conditioner must be conducted according to the method recommended by the manufacturer.
- If other professionals are needed to help maintain and repair the equipment, it should be conducted under the supervision of individuals who have the qualification to repair AC equipped with flammable refrigerants.

Inspection of the Site

Safety inspection must be conducted before maintaining equipment with R32 refrigerant to make sure the risk of fire is minimized.

Check whether the space is well ventilated and whether anti-static or fire prevention equipment is required.

While maintaining the refrigeration system, observe the following precautions before operating the system.

Operating Procedures

1. General work area:

All maintenance staff and others working in the local area shall be instructed on the nature of work being carried out. Work in confined spaces shall be avoided. The area around the workspace shall be sectioned off. Ensure that the conditions within the area have been made safe by control of flammable material.

2. Checking for presence of refrigerant:

The area shall be checked with an appropriate refrigerant detector prior to and during work, to ensure the technician is aware of potentially toxic or flammable atmospheres.

Ensure that the leak detection equipment being used is suitable for use with all applicable refrigerants, i.e. non-sparking, adequately sealed or intrinsically safe.

3. Presence of fire extinguisher:

If any hot work is to be conducted on the refrigeration equipment or any associated parts, appropriate fire extinguishing equipment shall be available to hand. Have a dry powder or CO₂ fire extinguisher adjacent to the charging area.

4. No ignition sources:

No person carrying out work in relation to a refrigeration system which involves exposing any pipe work shall use any sources of ignition in such a manner that it may lead to the risk of fire or explosion. All possible ignition sources, including cigarette smoking, should be kept sufficiently far away from the site of installation, repairing, removing and disposal, during which refrigerant can possibly be released to the surrounding space. Prior to work taking place, the area around the equipment is to be surveyed to make sure that there are no flammable hazards or ignition risks. 'No Smoking' signs shall be displayed.

5. Ventilated Area(open the door and window):

Ensure that the area is in the open or that it is adequately ventilated before breaking into the system or conducting any hot work. A degree of ventilation shall continue during the period that the work is carried out. The ventilation should safely disperse any released refrigerant and preferably expel it externally into the atmosphere.

6. Checks to the refrigeration equipment:

Where electrical components are being changed, they shall be fit for the purpose and to the correct specification. At all times the manufacturer's maintenance and service guidelines shall be followed. If in doubt, consult the manufacturer's technical department for assistance. The following checks shall be applied to installations using flammable refrigerants:

- The charge size is in accordance with the room size within which the refrigerant containing parts are installed.
- The ventilation machinery and outlets are operating adequately and are not obstructed.
- If an indirect refrigerating circuit is being used, the secondary circuit shall be checked for the presence of refrigerant.
- Refrigeration pipe or components are installed in a position where they are unlikely to be exposed to any substance which may corrode refrigerant containing components, unless the components are constructed of materials which are inherently resistant to being corroded or are suitably protected against being so corroded.

MAINTENANCE NOTICE

Operating Procedures

7. Checks to electrical devices:

Repair and maintenance to electrical components shall include initial safety checks and component inspection procedures. If a fault exists that could compromise safety, then no electrical supply shall be connected to the circuit until it is satisfactorily dealt with. If the fault cannot be corrected immediately but it is necessary to continue operation, an adequate temporary solution shall be used. This shall be reported to the owner of the equipment so all parties are advised. Initial safety checks shall include:

- That capacitors are discharged: this shall be done in a safe manner to avoid possibility of sparking.
- That no live electrical components and wiring are exposed while charging, recovering or purging the system.
- Keep continuity of earthing.

Inspection of Cable

Check the cable for wear, corrosion, overvoltage, vibration and check if there are sharp edges and other adverse effects in the surrounding environment. During the inspection, the impact of aging or the continuous vibration of the compressor and the fan on it should be taken into consideration.

Leakage check of R32 refrigerant

Note: Check the leakage of the refrigerant in an environment where there is no potential ignition source.

No halogen probe (or any other detector that uses an open flame) should be used.

Leak detection method:

For systems with refrigerant R32, electronic leak detection instrument is available to detect and leak detection should not be conducted in environment with refrigerant. Make sure the leak detector will not become a potential source of ignition, and is applicable to the measured refrigerant. Leak detector shall be set for the minimum ignitable fuel concentration (percentage) of the refrigerant. Calibrate and adjust to proper gas concentration (no more than 25%) with the used refrigerant.

The fluid used in leak detection is applicable to most refrigerants. But do not use chloride solvents to prevent the reaction between chlorine and refrigerants and the corrosion of copper pipeline.

If you suspect a leak, then remove all the fire from the scene or put out the fire.

If the location of the leak needs to be welded, then all refrigerants need to be recovered, or, isolate all refrigerants away from the leak site (using cut-off valve). Before and during the welding, use OFN to purify the entire system.

Removal and Vacuum Pumping

1. Make sure there is no ignited fire source near the outlet of the vacuum pump and the ventilation is well.

2. Allow the maintenance and other operations of the refrigeration circuit should be carried out according to the general procedure, but the following best operations that the flammability is already taken into consideration are the key.

You should follow the following procedures:

- Remove the refrigerant.
 - Decontaminate the pipeline by inert gases.
 - Evacuation.
 - Decontaminate the pipeline by inert gases again.
 - Cut or weld the pipeline.
3. The refrigerant should be returned to the appropriate storage tank. The system should be blown with oxygen free nitrogen to ensure safety. This process may need to be repeated for several times. This operation shall not be carried out using compressed air or oxygen.
4. Through blowing process, the system is charged into the anaerobic nitrogen to reach the working pressure under the vacuum state, then the oxygen free nitrogen is emitted to the atmosphere, and in the end, vacuumize the system. Repeat this process until all refrigerants in the system is cleared. After the final charging of the anaerobic nitrogen, discharge the gas into the atmosphere pressure, and then the system can be welded. This operation is necessary for welding the pipeline.

MAINTENANCE NOTICE

Procedures of Charging Refrigerants

As a supplement to the general procedure, the following requirements need to be added:

- Make sure that there is no contamination among different refrigerants when using a refrigerant charging device. The pipeline for charging refrigerants should be as short as possible to reduce the residual of refrigerants in it.
- Storage tanks should remain vertically up.
- Make sure the grounding solutions are already taken before the refrigeration system is charged with refrigerants.
- After finishing the charging (or when it is not yet finished), label the mark on the system.
- Be careful not to overcharge refrigerants.

Scrap and Recovery

Scrap:

Before this procedure, the technical personnel shall be thoroughly familiar with the equipment and all its features, and make a recommended practice for refrigerant safe recovery. For recycling the refrigerant, shall analyze the refrigerant and oil samples before operation. Ensure the required power before the test.

1. Be familiar with the equipment and operation.
2. Disconnect power supply.
3. Before carrying out this process, you have to make sure:
 - If necessary, mechanical equipment operation should facilitate the operation of the refrigerant tank.
 - All personal protective equipment is effective and can be used correctly.
 - The whole recovery process should be carried out under the guidance of qualified personnel.
 - The recovering of equipment and storage tank should comply with the relevant national standards.
4. If possible, the refrigerating system should be vacuumized.
5. If the vacuum state can't be reached, you should extract the refrigerant in each part of the system from many places.
6. Before the start of the recovery you should ensure that the capacity of the storage tank is sufficient.
7. Start and operate the recovery equipment according to the manufacturer's instructions.
8. Don't fill the tank to its full capacity (the liquid injection volume does not exceed 80% of the tank volume).
9. Even the duration is short, it must not exceed the maximum working pressure of the tank.
10. After the completion of the tank filling and the end of the operation process, you should make sure that the tanks and equipment should be removed quickly and all closing valves in the equipment are closed.
11. The recovered refrigerants are not allowed to be injected into another system before being purified and tested.

Note: The identification should be made after the appliance is scrapped and refrigerants are evacuated.

The identification should contain the date and endorsement. Make sure the identification on the appliance can reflect the flammable refrigerants contained in this appliance.

Recovery:

1. The clearance of refrigerants in the system is required when repairing or scrapping the appliance. It is recommended to completely remove the refrigerant.
2. Only a special refrigerant tank can be used when loading the refrigerant into the storage tank. Make sure the capacity of the tank is appropriate to the refrigerant injection quantity in the entire system. All tanks intended to be used for the recovery of refrigerants should have a refrigerant identification (i.e. refrigerant recovery tank).
Storage tanks should be equipped with pressure relief valves and globe valves and they should be in a good condition. If possible, empty tanks should be evacuated and maintained at room temperature before use.
3. The recovery equipment should be kept in a good working condition and equipped with equipment operating instructions for easy access. The equipment should be suitable for the recovery of R32 refrigerants.
Besides, there should be a qualified weighting apparatus which can be normally used.
The hose should be linked with detachable connection joint of zero leakage rate and be kept in a good condition.
Before using the recovery equipment, check if it is in a good condition and if it gets perfect maintenance.
Check if all electrical components are sealed to prevent the leakage of the refrigerant and the fire caused by it.
If you have any question, please consult the manufacturer.
4. The recovered refrigerant shall be loaded in the appropriate storage tanks, attached with a transporting instruction, and returned to the refrigerant manufacturer. Don't mix refrigerant in recovery equipment, especially a storage tank.
5. The space loading R32 refrigeration can't be enclosed in the process of transportation. Take anti electrostatic measures if necessary in transportation. In the process of transport, loading and unloading, necessary protective measures must be taken to protect the air conditioner to ensure that the air conditioner is not damaged.
6. When removing the compressor or clearing the compressor oil, make sure the compressor is pumped to an appropriate level to ensure that there is no residual R32 refrigerants in the lubricating oil. The vacuum pumping should be carried out before the compressor is returned to the supplier. Ensure the safety when discharging oil from the system.

Troubleshooting Guide

Many error codes may appear on this air conditioner, and this troubleshooting guide is prepared for the maintenance personnel to detect the error position and the parts to be replaced during the troubleshooting process. In this Guide, the Troubleshooting Method is guided by the Error Name, and the Reference Code under the General Index is the error code of the Indoor Unit of the mainstream model supplied by the Company.

Example: "Indoor Unit coil sensor error" is coded as E3 in the error code of the Indoor Unit, but appears as flash-out via the trouble light of the Outdoor Unit machine. However, their troubleshooting method is the same, and use the same table as well.

General index: fix speed air conditioners only involve E1, E2, E3 and E4

No.	Error Name	Error Code
1	Overcurrent Protection of Indoor Unit	E0
2	Indoor Unit temperature sensor error	E1
3	Outdoor Unit coil sensor error	E2
4	Indoor Unit coil sensor error	E3
5	Indoor Unit motor error of wall mounted air conditioner (PG motor)	E4
6	Indoor Unit motor error of wall mounted air conditioner (DC motor)	E4
7	Indoor Unit and Outdoor Unit communication error	E5(5E)
8	Indoor EE Failure	Eb
9	Outdoor Unit DC motor error (3-core terminal motor)	F0
10	Module protection error	F1
11	PFC protection error	F2

12	Compressor startup error	F3
13	Discharge sensor error	F4
14	Pressing top head sensor error	F5
15	Outdoor Unit temperature sensor error	F6
16	OVP or UVP error	F7
17	Outdoor Unit main PCB and module panel communication error	F8
18	Outdoor EE error	F9
19	Recirculated sensor error (four-way valve switch error)	FA
20	High-pressure protection	P2
21	Liquid Deficiency Protection	P3
22	Refrigeration Overload Protection	P4
23	Discharge Protection	P5
24	Indoor High Temperature Protection	P6
25	Anti-freezing Protection in Refrigeration Room	P7
26	Overcurrent Protection	P8
27	DC Over/Under-voltage Failure	L0
28	Overcurrent Protection on Phase Current of Compressor	L1
	Out-of Step Failure of Compressor	L2
29	Phase Failure of Compressor	L3
30	Driver Module IPM Failure of Compressor	L4
31	PFC Overcurrent Hardware Protection	L5
	PFC Overcurrent Software Protection	L6
	AD Abnormal Protection in Current Detection	L7
	AD Abnormal Protection in PFC Current Detection	LC
	Dc fan motor detection AD abnormal protection	Ld
32	Shunt Resistance Imbalance Failure	L8
33	IPM Temperature Sensor Failure	L9
34	Compressor Startup Failure	LA
35	DC fan motor phase error	LE
	DC fan motor lost step protection	LF
36	DC fan motor IPM protection	LH

Example:

Explanation of error	Cause: explain the principle of the specific error. Inspection path: The basic order of troubleshooting. Related key position
Tools required for inspection	Tools that should be carried for such troubleshooting, and replacing parts that may be necessary for such error.
Common faulty components	Any possibly broken part related to the error may be the parts that need to be replaced.
Inspection procedure and key points	All the troubleshooting procedures for the reference of maintenance staff are prepared from simple to complex, from surface to Indoor Unit, and from test to replacement. Although these key points do not cover all the error, and difficult or special problems are not included as well, but they can cover most of the common error.
Special attention	Here are some often-overlooked problems for the reference of the maintenance personnel.

The problems in the market are always more than we think, so it is necessary for the maintenance personnel to understand the principle of air conditioning operation, and to make a flexible judgment of the fault in combination with the actual conditions. We welcome the maintenance personnel to constantly put forward new problems in the actual work, record the solutions and enrich our troubleshooting guide

list.

(1) E0- Overcurrent Protection of Indoor Unit

Explanation of error	Cause: The main PCB detects that the working current of the system exceeds the upper limit of protection, and will indicate "indoor unit overcurrent protection". The air conditioner stops running for protection and displays the failure code E0. Inspection path: current transformer → power line → compressor line → connector assembly
Tools required for inspection	Current clamp and multimeter
Common faulty components	Indoor unit panel, power line, compressor and complete machine
Inspection procedure and key points	1. If it is a fixed-frequency model, observe whether the live line passes through the current transformer; if not, lay the line accordingly and reboot for inspection. 2. The current clamp is used to measure the working current and determine whether it is within the normal working current range of the nameplate. If normal working current is detected, it may be the fault of the current transformer and replace the main PCB of the indoor unit. 3. Measure whether the power supply voltage is within the normal operating voltage range; if the working voltage is not normal, it is necessary to consider whether the local grid

	voltage is stable. 4. If the working current exceeds the range and the working voltage is normal, the system may be blocked and the air-conditioning may be overloaded, which needs to be checked according to the actual situation.
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(2) E1- Indoor Unit temperature sensor error

Explanation of error	Cause: The detection of short circuit or open circuit of Indoor Unit temperature sensor during the inspection of main PCB in the Indoor Unit machine, indicated by "Indoor Unit temperature sensor error" . Inspection path: Sensor→Sensor wire→Connectors→Indoor Unit main PCB
Tools required for inspection	Multimeter, 15KΩ standard sensor (25°C)
Common faulty components	Indoor Unit temperature sensor, Indoor Unit main PCB

Inspection procedure and key points	1. Check whether there' s resistance problem, short circuit or open circuit in the sensor; the resistance value shall be within a reasonable range (15KΩ under the temperature of 25°C for frequency conversion machine) 2. Check whether the sensor wire is broken. 3. Check whether the terminal connectors are well fixed; check whether the weld between the terminal and the main PCB is loose, and pull the terminal slightly for inspection if necessary. 4. Check whether the sensor is affected with damp. 5. In case no standard sensor is available at present, replace the Indoor Unit temperature sensor by other sensor asides, and then check whether the error still exists; if the error disappears, replace the sensor; if the error still exists, check the Indoor Unit main PCB and change if necessary.
Special attention	Most Indoor Unit temperature sensors of the frequency conversion machine have a resistance value of 15KΩ. Do not use improper sensor during repairing and maintenance, or it may led to the wrong temperature sensing of the machine, the start error or shutdown error. You can switch the air conditioner to the “Blowing” mode, and judge the accuracy of sensor though environmental temperature displayed on the screen. In case a sensor with the resistance value over 15KΩ is used, the detected temperature will be much lower than the actual temperature, which may lead to the shutdown error under heating mode, or the startup error under cooling mode. In case a sensor with the resistance value below 15KΩ is used, the detected temperature will be much higher than the actual temperature, which may lead to the startup error under heating mode, or the shutdown error under cooling mode.

(3) E2 -Outdoor Unit coil sensor error

Explanation of error	Cause: The detection of short circuit or open circuit of Outdoor Unit coil sensor during the inspection of Outdoor Unit main PCB, indicated by “Outdoor Unit coil sensor error” . Inspection path: Sensor→Sensor wire→Connectors→Outdoor Unit main PCB
Tools required for inspection	Multimeter, 20K Ω standard sensor (25°C)
Common faulty components	Outdoor Unit coil sensor, Outdoor Unit main PCB

Inspection procedure and key points	1. Check whether there' s resistance problem, short circuit or open circuit in the sensor; the resistance value shall with a reasonable range (about 20KΩ for frequency conversion machine) 2. Check whether the sensor wire is broken. 3. Check whether the terminal connectors are well fixed; check whether the weld between the terminal and the main PCB is loose, and pull the terminal slightly for inspection if necessary. 4. Check whether the sensor is affected with damp. The coil sensor is quite easy to be affected with damp in case the lead of coil sensor is above the copper pipe. 5. In case no standard sensor is available at present, replace the temperature sensor of Outdoor Unit coil by other sensor asides, and then check whether the error still exists; if the error disappears, replace the sensor; if the error still exists, check the Indoor Unit main PCB and change if necessary.
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Special attention	Most Indoor Unit temperature sensors of the frequency conversion machine have a resistance value of 20KΩ. Do not use improper sensor during repairing and maintenance, or it may lead to the start of protection mode due to wrong temperature sensing of the machine, or the protection error. In case a sensor with the resistance value over 20KΩ is used, the detected temperature will be much lower than the actual temperature, which may lead to the frequent entering of defrost mode, the illusory defrosting or the protection error during the cooling process. In case a sensor with the resistance value below 20KΩ is used, the detected temperature will be much higher than the actual temperature, which may lead to defrost error during the heating process, or the start of protection during the cooling process.
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(4) E3 -Indoor Unit coil sensor error

Explanation of error	Cause: The detection of short circuit or open circuit of Indoor Unit coil sensor during the inspection of Indoor Unit main PCB, indicated by "Indoor Unit coil sensor error" . Inspection path: Sensor→Sensor wire→Connectors→Indoor Unit main PCB
Tools required for inspection	Multimeter,, 5KΩ or 20KΩ standard sensor (25°C)
Common faulty components	Indoor Unit temperature sensor, Indoor Unit main PCB
Inspection procedure and key points	1. Check whether there' s resistance problem, short circuit or open circuit in the sensor; the resistance value shall with a reasonable range (about 20KΩ for frequency conversion machine) 2. Check whether the sensor wire is broken. 3. Check whether the terminal connectors are well fixed; check whether the weld between the terminal and the main PCB is loose., and pull the terminal slightly for inspection if necessary. 4. Check whether the sensor is affected with damp. The coil sensor is quite easy to be affected with damp in case the lead of coil sensor is above the copper pipe. 5. In case no standard sensor is available at present, replace the temperature sensor of Indoor Unit coil by other sensor asides, and then check whether the error still exists; if the error disappears, replace the sensor; if the error still exists, check the Indoor Unit main PCB and change if necessary.

Special attention	Most Indoor Unit temperature sensors of the frequency conversion machine have a resistance value of 20KΩ. Do not use improper sensor during repairing and maintenance, or it may led to the start of anti-frosting or overheat protection mode due to wrong temperature sensing of the machine. In case a sensor with the resistance value over 20KΩ is used, the detected temperature will be much lower than the actual temperature, which may lead to the high pressure of cold-blast protection system during the heating process, or the frequent start of anti-freezing protection during the cooling process. n case a sensor with the resistance value below 20KΩ is used, the detected temperature will be much higher than the actual temperature, which may lead to the frequent start of overheat protection mode during the heating or the overload protection during the cooling process.
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(5) E4 -Indoor Unit motor error of wall mounted air conditioner (PG motor)

Explanation of error	Cause: PG motor is equipped with speed feedback signal line. When the feedback signal of speed is not received by the Indoor Unit main PCB, it has no way to recognize the rotating speed of motor, which will be indicated as “Indoor Unit motor error” . Main causes for the disappearance of speed feedback signal are as follows: The fan is stucked; 2. The speed feedback component in the motor is broken; 3. Error of receiving circuit for the speed feedback signal from the Indoor Unit main PCB.
Tools required for inspection	Multimeter, A PG motor in normal working condition
Common faulty components	Mechanical jam problem of Indoor Unit motor, PG motor, Indoor Unit main PCB

Inspection procedure and key points	1. Check whether the motor can work for a period of time before the error occurs. If yes, the reason of mechanical jam can be exclude. 2. Disconnect the power supply and move the fan blade of Indoor Unit machine by hand to see if there' s any resistance. Some occasional Indoor Unit motor error may relate to bearing coordination. 3. Reconnect the drive wire and speed feedback wire, thus to exclude any motor error due to connector loosening. 4. Check whether the plug-in terminal of speed feedback on the PCB is loose, and pull the terminal slightly for inspection if necessary. 5. Replace the motor in the faulted air conditioner with other PG motor (do not fix it with the fan for the time being), if the main PCB still indicates "Indoor Unit motor error" , then replace the Indoor Unit main PCB; if the error disappears, replace the Indoor Unit motor.
Special attention	The Indoor Unit main PCB will not indicates "Indoor Unit motor error" when the Indoor Unit motor is still rotating; sometimes such error will not be reported when obvious motor problems exist (such as the low-speed rotation due to damaged motor capacitors, or non-uniform rotating speed due to abnormal speed feedback. Therefore, patience of the maintenance staff is required for the troubleshooting of motor error. You shall compare it with the normal condition, and detect and solve the problem in a flexible way.

(6) E4- Indoor Unit motor error of wall mounted air conditioner (DC motor)

Explanation of error	Cause: The Indoor Unit motor of some highly energy efficient models is DC motor using a green plug through which the Indoor Unit main PCB can drive the motor and sense the current rotational speed feedback. When the Indoor Unit main PCB cannot receive the rotational speed feedback signal of the motor, it will indicate "DC motor error" . Disappearance of the rotational speed feedback signal may be caused by: 1 The fan is stuck and cannot work; 2 The speed feedback element inside the motor is destroyed; 3 There' s something wrong with the speed feedback signal receiving circuit of the Indoor Unit main PCB. Inspection path: Is DC motor stuck by foreign matter→ motor destroyed → Motor terminal connectors→Indoor Unit main PCB
Tools required for inspection	Multimeter, a DC motor in normal working condition
Common faulty components	Mechanical jam of Indoor Unit motor, Indoor Unit DC motor, Indoor Unit main PCB

Inspection procedure and key points	1. Check whether the motor accelerates to extremely high speed before the error occurs. If it can work for a period, the reason of mechanical jam can be excluded. 2. Plug and unplug the terminal of the DC motor again to exclude any motor error due to connector loosening, and pull the terminal slightly for inspection if necessary. 3. Replace the motor in the faulted air conditioner with other DC motor to plug in the Indoor Unit main PCB (do not fix it with the fan for the time being), if the main PCB still indicates "DC motor error" , then replace the Indoor Unit main PCB; if the error disappears, replace the DC motor. 4. Multimeter can be used to distinguish whether it is main PCB problem or motor problem by: connect the motor with the main PCB and pay attention to the second (yellow) and fourth (black) wire from the outermost side among four lines of the terminal of the DC motor. After the air conditioner powers on in the cooling mode for a while, the voltage between the yellow and black wires should rise gradually and the motor should accelerates slowly, if the DC motor still won' t rotate, then the DC motor is destroyed.
Special attention	Five lead wires division: Count from the outermost side of the four wires of the DC motor terminal, the first blue wire is the speed feedback wire with a voltage of 0.5-5V when the motor rotates; the second yellow wire is the motor driving wire with a voltage of 2.0-7.5V when the motor rotates; the second white wire is 15V power cord with a voltage of 15V in normal condition; the fourth black wire is 0V DC earth wire which is the benchmark of all the voltage tests; the fifth (red) wire is 310V wire which is strong with a voltage of 310V in normal condition, so be careful of electric shock.

(7) E5(5E) -Indoor Unit and Outdoor Unit communication error

Explanation of error	Cause: The frequency converter needs Indoor Unit and Outdoor Unit communication. When the communication cannot be reached, the Indoor Unit and Outdoor Units will indicate "Indoor Unit and Outdoor Unit communication error". Only "Indoor Unit main PCB, connecting cable and Outdoor Unit main PCB" are related to communication; but sometimes the communication error will be indicated when the Outdoor Unit has no power and the Indoor Unit cannot connect with the Outdoor Unit due to other errors, then such situation shall be distinguished from "pure communication error" and treated in a different way. Inspection path: Check if the Outdoor Unit can power on and work (normally, the indicator light will turn off after lighting for several seconds, relay picks up, and PTC won't heat seriously) 1. Can power on and work: Are the Indoor Unit and Outdoor Unit matched→is the phase sequence of connecting wires of Indoor Unit and Outdoor Units correct (the live wire of the Indoor Unit connects with that of the Outdoor Unit, the null wire of the Indoor Unit connects with that of the Outdoor Unit)→Connecting wires touched well→Indoor Unit main PCB replacement→Outdoor Unit main PCB replacement 2. Cannot power on and work: Can AC 220V be delivered to the terminal block of the Outdoor Unit→Can the bridge rectifier and module panel generate DC 310V→Can the Outdoor Unit main PCB generate a low voltage power supply of DC 5V→Does the Outdoor Unit main PCB show the status of periodical reset.
Tools required for inspection	Multimeter, Indoor Unit main PCB in normal condition

Common faulty components	Connecting wire phase sequence and contact, Indoor Unit main PCB, Outdoor Unit main PCB, module panel
Inspection procedure and key points	1. Firstly, the IDU and the ODU should be matched and connected properly. 2. Observe the Outdoor Unit main PCB, turn on the air conditioner, three lights are all lighted up then off and the relay pulls in. If not, it is power supply problem. 3. Connect the black signal line S to terminal N of ODU. Turn on the A/C, if "E5" is still reported, the Outdoor Unit main PCB need to be replaced. If "E5" is still reported at this time, go to step 4. 4. Change a new Indoor Unit main PCB, if the error code E5 remains, then the problem should be on the Outdoor Unit main PCB.
Special attention	When the Outdoor Unit not power on: If the Indoor Unit terminal board does not transmit 220V power, replace the Indoor Unit main PCB; if the Outdoor Unit terminal board has 220V power, first check if (fuse, reactor and bridge rectifier) are normal. There is still something wrong, replace the whole set of Outdoor Unit control unit; for the control unit composed of several function boards, try disconnecting the weak-current data wires among several control boards and then power the Outdoor Unit on, if the main PCB can be powered on and initialized successfully, then it' s the module panel problems; if the Outdoor Unit main PCB still cannot be powered on and initialized, replace the Outdoor Unit main PCB.

(8) Eb –Indoor EE Failure

Explanation of error	Cause: Many parameters need to be preset for the running of the indoor unit of the air conditioner and such parameters are placed in a data storage 8-foot chip, which is called "EEPROM" or "EE" for short. The motor on the Indoor Unit main PCB can only work after reading the data stored in EE and if not read, the failure code "Outdoor EE Failure" will be indicated and raised in the indoor unit. Reasons for data not being read are as follows: 1. wrong EE chip data format; 2. EE chip is broken; 3. bad contact of EE or fault of EE reading circuit; 4. backward installation of EE chip. Inspection path: Indoor Unit main PCB.
Tools required for inspection	/
Common faulty components	Bad contact of EE, Indoor Unit main PCB.
Inspection procedure and key points	Replace the Indoor Unit main PCB directly.

(9) F0- Outdoor Unit DC motor error (3-core terminal motor)

Explanation of error	Cause: Our frequency changing Outdoor Unit uses the 3-lead-wire DC motor, or “Outdoor Unit driven DC motor” for short, after 2012. It has no speed feedback circuit but 3 drive lead wires and its driving principle is similar to that of the compressor. The main PCB will indicate “Outdoor Unit DC motor error” when it detects imbalanced current on the three lead wires of the driving motor. Inspection path: Is the DC motor stuck by foreign matters→ Motor terminal connectors → Outdoor Unit main PCB → Motor
Tools required for inspection	Outdoor Unit main PCB in normal condition
Common faulty components	Mechanical jam of Outdoor Unit motor, Outdoor Unit main PCB, Outdoor Unit DC motor

Inspection procedure and key points	1. First exclude the possibility of mechanical jam of Outdoor Unit motor blades. 2. Observe if the terminal of the motor is not connected firmly or the order of lead wires is correct. If the Outdoor Unit motor of the newly installed air conditioner rotates reversely, first observe if the color order of the three lead wires is correct, or change the order of any two of the three lead wires of the motor to see if the motor can rotate in the forward direction. 3. The DC motor of this scheme is relatively simple and reliable, so the problem is more likely to be caused by the drive part of the motor of the Outdoor Unit main PCB. The maintenance personnel may as well prepare matched Outdoor Unit main PCB before maintenance. If the motor returns to normal after replacing the main PCB, then it's the main PCB problem; if it still indicates Outdoor Unit DC motor error, then replace the Outdoor Unit DC motor.
Special attention	Unlike the 5-core Indoor Unit DC motor, there will be a process of motor blade position locking before the 3-core DC motor with Outdoor Unit drive starts to rotate. The motor blades will shake mechanically for 3-5 seconds and then rotate slowly, which is normal phenomenon.

(10) F1 -Module protection error

Explanation of error	Cause: The power module is the part to directly drive the compressor to work. It can protect the machine in time when overcurrent, overvoltage or overheat occurs and stops the compressor from working. It will, at the same time, send "shutdown request" to the module panel. The error triggered by the "shutdown request" is called "module protection error" . Inspection path: Supply voltage → Compressor wire, reactor wire → System blocked → Module panel damaged → Outdoor Unit main PCB destroyed → Compressor destroyed
Tools required for inspection	Multimeter, pressure gauge, megameter, module panel in normal condition
Common faulty components	Supply voltage, compressor wire, reactor, system pressure, module panel, Outdoor Unit main PCB, compressor

Inspection procedure and key points	1. Is the order of compressor wires not correct, which makes the compressor rotate reversely? Try exchanging the compressor wires on U-V phase to see if the problem can be solved? 2. Check if the supply voltage is unstable and highly volatile, and test if the system pressure is normal. High system pressure will cause rotating problems to the compressor. 3. Is the module panel fixed to the radiator firmly? Will it cause pool cooling? Is the Indoor Unit and Outdoor Unit heat exchanger dirty, which lead to poor heat transfer and high system pressure? 4. If " module protection error " will be indicated immediately after starting up, it is almost certain that it's a substantial error, having nothing to do with supply voltage and system pressure, it is suggested to observe if there is any component destroyed by strike arc near the module panel; use the multimeter to test if the resistances between any two compressor wires are the same. The resistances between any two compressor wires in normal condition are tiny resistances at ohm level and are basically equal; then use the megameter to measure if the resistance insulation of the three compressor wires against the earth wire is good (normally at MΩ level), and check if the reactor wire is well connected or the reactor is destroyed. 5. Test if the 15V and 5V (3.3V) power supply on the module panel is stable and exclude the module panel error caused by power supply of the Outdoor Unit main PCB. 6. Methods for judging whether the power module is damaged: use the "diode position" of the multimeter to measure the features of P of the module panel against U-V-W three phases respectively. Measure the power module P-U, P-V and P-W, there is always infinite resistance at one side and fixed on-state voltage at the other side (generally 0.5V);
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	measure the features between N-U, N-V and N-W in the same way, if short circuit occurs during any measurement, then the module is destroyed. 7. Replace with the module panel in normal condition for test. If the test is normal after changing the module panel, then the original module panel is destroyed. 8. After excluding problems of module, connecting wires, system and power supply, distinguish by ear. If there is only electromagnetic sound and the compressor does not work; or the sound of irregular running appears after the compressor works for a while and then it shuts down and indicates error; chances are that the compressor is blocked or destroyed, consider replacing the compressor.
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(11) F2- PFC protection error

Explanation of error	Cause: PFC board is a component of the inverter air conditioner for power factor correction and voltage boosting. When the PFC board cannot perform power calibration as normal because of overcurrent and overvoltage, it will indicate "PFC protection error" and its function may also be integrated with the module panel or main PCB. Inspection path: Supply voltage→AC and DC power path→PFC board data wire→PFC board→Main PCB
Tools required for inspection	Multimeter, PFC board in normal condition

Common faulty components	Supply voltage, reactor, PFC board, module panel, Outdoor Unit main PCB
Inspection procedure and key points	1. Check if the supply voltage is unstable and highly volatile or the voltage is too low (below AC 135V) 2. The reactor is one of core parts of PFC. Check if the reactor itself is destroyed and the reactor connecting wire is in poor connection, which makes PFC functions not performed. Do not remove the reactor and replace with short circuit by no means. 3. If “PFC protection error” will be indicated immediately after starting up, it is almost certain that it’s substantial error, having nothing to do with supply voltage, it is suggested to observe if there is any component destroyed by strike arc near the module panel 4. Test if the 15V and 5V (3.3V) power supply on the PFC board is stable and exclude the PFC board error caused by power supply of the Outdoor Unit main PCB. 5. Replace with the PFC board in normal condition for test. If the test is normal after changing the PFC board, then the original PFC board is destroyed. 6. The possibility that there is something wrong with 15V or 5V power of the module panel that causes the control power supply problem of the PFC board is not excluded. 7. Some module panels integrate PFC function and compressor drive function in one, so just replace with an integrated module panel. 8. For single-panel single-chip main PCBs, if PFC protection error appears, and there is no problem in supply voltage, reactor connection or reactor, just replace the controller of the Outdoor Unit.

(12) F3- Compressor out-of-step error

Explanation of error	Cause: The module panel will constantly test the current of lead wires of the compressor and calculate the position of the rotator of the compressor when driving the compressor to work. When the compressor deviates far from the normal operating status , it will indicate “compressor out-of-step error” because the current of the compressor wires is too high or it cannot detect the position of the rotator. This error always follows “module protection error” , so they have similar inspection methods. Inspection path: supply voltage→Compressor wire, reactor wire→ System blocked→Module panel damaged→Outdoor Unit main PCB destroyed→Compressor destroyed
Tools required for inspection	Multimeter, pressure gauge, module panel in normal condition
Common faulty components	Supply voltage, compressor wire, reactor, system pressure, module panel, Outdoor Unit main PCB, compressor
Inspection procedure and key points	1. Is the order of compressor wires not correct, which makes the compressor rotate reversely? Try exchanging the compressor wires on U-V phase to see if the problem can be solved? 2. Check if the supply voltage is unstable and highly volatile, and test if the system pressure is normal. High system pressure will cause rotating problems to the compressor. 3. Is the module panel fixed to the radiator firmly? Will it

	cause pool cooling? Is the Indoor Unit and Outdoor Unit heat exchanger dirty, which lead to poor heat transfer and high system pressure? 4. If “compressor out-of-step error” will be indicated immediately after starting up, it is almost certain that it’s substantial error, having nothing to do with supply voltage and system pressure, it is suggested to observe if there is any component destroyed by strike arc near the module panel; use the multimeter to test if the resistances between any two compressor wires are the same. The resistances between any two compressor wires in normal condition are tiny resistances at ohm level and are basically equal; then use the megameter to measure if the resistance insulation of the three compressor wires against the earth wire is good (normally at MΩ level), and check if the reactor wire is well connected or the reactor is destroyed. Check if the DC voltage between P-N is too high (above 200V). 5. Test if the 15V and 5V (3.3V) power supply on the module panel is stable and exclude the module panel error caused by power supply of the Outdoor Unit main PCB. 6. Replace with the module panel in normal condition for test. If the test is normal after changing the module panel, then the original module panel is destroyed. 7. After excluding problems of module, connecting wires, system and power supply, distinguish by ear. If there is only electromagnetic sound and the compressor does not work; or the sound of irregular running appears after the compressor works for a while and then it shuts down and indicates error; chances are that the compressor is blocked or destroyed, consider replacing the compressor.
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Special attention	For the “compressor out-of-step error” and “module protection error” , the former is calculated by the main chip of the module panel and the latter is detected by the power module itself. They are abnormal operating phenomenon of the compressor essentially. If there is uncertainty about either error, analyze both together with similar method. For inverter air conditioners that are in poor electrical environment or are old, occasional occurrence of such errors is a normal protection.
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(13) F4- Discharge sensor error

Explanation of error	Cause: The Outdoor Unit main PCB will indicate “discharge sensor error” and send it to the Indoor Unit main PCB when it detects short circuit or open circuit of the discharge sensor. Inspection path: Discharge sensor → Sensor wire → Connectors→Outdoor Unit main PCB
Tools required for inspection	Multimeter, 50KΩ standard discharge sensor (25°C)
Common faulty components	Discharge sensor, Outdoor Unit main PCB

Inspection procedure and key points	1. Check if there is any evident resistance problem in the sensor. Whether in short circuit or open circuit, the resistance should maintain in a reasonable range (about 50KΩ when the compressor is not working and between 3 KΩ and 30 KΩ after the compressor works for a while, the corresponding discharge temperature should be 100°C-38°C). 2. Check if the sensor wire or the sensor connecting wire is damaged. 3. Check if the connecting terminal is connected firmly, the weld between the terminal and the main PCB is loose; pull the terminal slightly for inspection if necessary. 4. Check whether the sensor is affected with damp. The coil sensor is quite easy to be affected with damp in case the lead wire of coil sensor is above the copper pipe. 5. If there is no standard sensor at hand, exchange the discharge sensor with the one beside it to see if the error changes. If yes, there is something wrong with the sensor and it should be replaced; if it still indicates "Outdoor Unit coil sensor error" , replace the Outdoor Unit main PCB.
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Special attention	Most discharge sensors have a standard resistance of 50KΩ (25°C). Do not use improper sensor during maintenance, or the machine will sense the discharge temperature mistakenly and enters the protection state frequently. For example, in the case where replace the 20K Ω coil sensor for the discharge sensor by mistake, the discharge temperature that the Outdoor Unit main PCB senses will be higher than the actual discharge temperature, which will make normal air conditioners enter the high discharge temperature protection state frequently, and the compressor frequency threshold will rise and lead to shutdown of the compressor.
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(14) F5 -Compressor top head sensor error

Explanation of error	Cause: The compressor top head sensor is a compressor top head temperature protection switch most of the time. It keeps closed (short circuit) when the compressor temperature is normal and switches off (open circuit) when the temperature is too high. The Outdoor Unit main PCB will indicate "compressor top head sensor error" when it senses disconnection of the compressor top head protection switch. Inspection path: Compressor top head sensor (temperature protection switch) → Sensor wire → Connectors → Outdoor Unit main PCB
Tools required for inspection	Pressure gauge, multimeter

Common faulty components	System pressure, liquid deficiency, compressor top head sensor (temperature protection switch), Outdoor Unit main PCB
Inspection procedure and key points	1. First check if the compressor top head temperature is too high (above 110°C) and causes action of the compressor top head sensor (temperature protection switch); reasons why the compressor top head temperature is too high may be: the system is deficient in liquid and the compressor idles; the system is blocked and the pressure of the compressor is too high. 2. After excluding the possibility of the system problem, please note that the temperature protection switch is closed normally. Test if the terminals of the sensor are in the short-circuit condition with the multimeter. In the case of open circuit, then there is something wrong with the sensor or lead wires. 3. Check if the sensor wire or the sensor connecting wire is damaged. 4. Check if the connecting terminal is connected firmly, the weld between the terminal and the main PCB is loose; pull the terminal slightly for inspection if necessary. 5. Disconnect the power supply and short circuit a metal with the compressor top head terminal of the Outdoor Unit main PCB. If the compressor top head sensor error disappears after start up, then replace the sensor; if the error still occurs, it's probably the main PCB problem, replace the Outdoor Unit main PCB.

Special attention	The compressor top head sensor is just a temperature switch which is highly reliable and is less likely to go wrong generally. Pay more attention to the system pressure and the compressor temperature.
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(15) F6- Outdoor Unit temperature sensor error

Explanation of error	Cause: The detection of short circuit or open circuit of Outdoor Unit temperature sensor during the inspection of Outdoor Unit main PCB, indicated by "Outdoor Unit temperature sensor error". Inspection path: Sensor→Sensor wire→Connectors→Outdoor Unit main PCB
Tools required for inspection	Multimeter, 15KΩ standard sensor (25°C)
Common faulty components	Outdoor Unit temperature sensor, Outdoor Unit main PCB.

Inspection procedure and key points	1. Check whether there's resistance problem, short circuit or open circuit in the sensor; the resistance value shall be within a reasonable range ($15K\Omega$ under the temperature of 25°C). 2. Check whether the sensor wire is broken. 3. Check whether the terminal connectors are well fixed; check whether the weld between the terminal and the main PCB is loose, and pull the terminal slightly for inspection if necessary. 4. Check whether the sensor is affected with damp. 5. In case no standard sensor is available at present, replace the Outdoor Unit temperature sensor with the other sensor asides, and then check whether the error still exists; if the error disappears, replace the sensor; if the error still exists, it's possible that the main PCB is faulted, change the Outdoor Unit main PCB.
Special attention	Most of the standard resistance values of the Outdoor Unit temperature sensors are $15K\Omega$ (when temperature is at 25°C), and the higher the temperature is, the lower the resistance value is, and the lower the temperature is, the higher the resistance value is. Do not use improper sensor during repairing and maintenance, or it may lead to the wrong temperature sensing of the machine.

(16) F7-OVP or UVP error

Explanation of error	Cause: All the inverter air conditioners are equipped with voltage inspection circuits, but different models of machines have different locations for the voltage inspection (on the module panel or Outdoor Unit main PCB). When the supply voltage is lower than 135V or higher than 275V, the inspection circuit would detect over or under voltage protection signal and send it to the Outdoor Unit main PCB and the Outdoor
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	Unit main PCB would raise the alarm "OVP or UVP error" and indicate it through the Indoor Unit motor. Inspection path: supply voltage → Indoor Unit direct current voltage → reactor wiring → module panel → Outdoor Unit main PCB.
Tools required for inspection	Multimeter
Common faulty components	Supply voltage, reactor, module panel and Outdoor Unit main PCB.
Inspection procedure and key points	1. First, check the supply environment of the user, especially shall check when the compressor of the air conditioner has been running for a while. The normal supply voltage shall be between 198V and 242V and the minimum work assurance range of the air conditioner shall be within 165V and 265V and it shall be especially noted that the voltage value shall not be decreased significantly after running of the compressor (voltage decreasing by over 25V), because if the supply voltage is decreased by a lot, it means the supply line capacity is insufficient and the user is usually suggested to replace the circuit or install a specialized air conditioner supply voltage stabilizer. 2. For the Outdoor Unit machines with PFC panels (without separate rectifier bridges), the operator shall ensure if the PFC function is on with the direct current voltage grade of the multimeter. When the compressor is running, voltage between P and N ends detected on the test module panel or Outdoor Unit main PCB shall be over 200V and if the voltage is below that range, it is possible that the reactor is faulted or the PFC is broken. 3. When the air conditioner is switched on, if the compressor

	is not running but there is a alarm of "OVP or UVP error" and the power voltage detected with the multimeter is not below 150V, it's probably the voltage inspection circuit is faulted. The operator shall check and confirm the voltage inspection circuit is on which PCB first and then replace it. The regular replacement: for the Outdoor Unit machine of single panel single chip, replace the Outdoor Unit controller directly; and for the machine of two panels, replace the module panel.
Special attention	For some models, OVP or UVP error signal is delivered through the connector wires between the module panel and the Outdoor Unit main PCB, thus it is possible the voltage signal is not delivered when the communication between teh module panle and the Outdoor Unit main PCB is not good. It is possible that the error is fause raised but after some minutes that the error is finally confirmed as "Outdoor Unit main PCB and module pannel communication error", which shall be specially noted.

(17) F8-Outdoor Unit main PCB and module panel communication error (exclusive of Outdoor Unit machine of single panel)

Explanation of error	Cause: Only the models with the module panels separated with the Outdoor Unit main PCBs may have this error. When the machine is running normally, the module panel and the Outdoor Unit main PCB would coordinate with each other on the communication to work and when the communication is off, the Outdoor Unit main PCB would raise the alarm of "main PCB and module panel communication error". Only "module panel, data line and Outdoor Unit main PCB" are related to such communication. Inspection path: data line connection → module panel power →module panel →Outdoor Unit main PCB
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Tools required for inspection	Multimeter and regular module panel.
Common faulty components	Module panel and main control data line, module panel and Outdoor Unit main PCB.
Inspection procedure and key points	1. First check if the communication connection line (mostly 4 chips) between the module panel and main control panel gets loose and if the connection is faulted. 2. Measure and check with a multimeter if the power from the Outdoor Unit main PCB is normal and especially note that if the 5V (3.3V) power is led to the module panel. Eliminate the possibility that it's not running normally because there is no 5V (3.3V) power at the module panel. 3. The maintenance personnel shall replace the module panel of the faulted air conditioner with a regular module panel taken with him and if the communication error disappears when the Outdoor Unit machine is switched on, it means the original module panel is faulted and if the error is still there, maybe the Outdoor Unit main PCB shall be replaced.

(18) F9- outdoor EE error

Explanation of error	Cause: Many parameters need to be preset for the running of the Outdoor Unit of the air conditioner and such parameters are placed in a data storage 8-foot chip, which is called "EEPROM" or "EE" for short. The motor on the Outdoor Unit main PCB can only work after reading the data stored in EE and if not read, the alarm "outdoor EE error" would be reported and raised in the Indoor Unit machine. Reasons for data not being read are as follows: 1. wrong EE chip data format; 2. EE chip is broken; 3. bad contact of EE or fault of EE reading circuit; 4. backward installation of EE chip. Inspection path: Outdoor Unit main PCB.
Tools required for inspection	None.
Common faulty components	Bad contact of EE, Outdoor Unit main PCB.
Inspection procedure and key points	1. Replace the Outdoor Unit main PCB directly.

(19) FA- recirculated sensor error (only models of electronic

expansion valves are involved)

Explanation of error	Cause: The recirculated sensors are only used on machine models of electronic expansion valves and the back temperature value is considered as the basis for adjustment of the electronic expansion valve and determination if the four-way valve changes the position normally during heating. When the main PCB detects open circuit or short circuit of the recirculated sensor, it would raise an alarm of "recirculated sensor error" and send it to the Indoor Unit main PCB to indicate it. Inspection path: four-way valve → recirculated sensor → sensor wire → connectors → Outdoor Unit main PCB
Tools required for inspection	Multimeter, pressure meter, normal 20K Ω recirculated sensor
Common faulty components	Four-way valve, recirculated sensor, Outdoor Unit main PCB.

Inspection procedure and key points	1. If the error appears in heating but not in cooling, first check if the four-way valve failed to change the position or there is a back flow, which can be estimated by measuring the high and low pressures with the pressure meter; for the consideration of electricity control, we can use a multimeter. During heating, check if the four-way valve terminal can switch a circuit of 220V, if yes and the four-way valve still is faulted in the position changing, the four-way valve is faulted; and if there is no circuit over 220V in heating, it means the Outdoor Unit main control valve is faulted. 2. If it is not the four-way valve that is faulted, check on the resistance value and short circuit problems and the resistance value shall be within a proper range (around 20K Ω at temperature of 25°C). 3. Check whether the terminal connectors are well fixed; check whether the weld between the terminal and the main PCB is loose, and pull the terminal slightly for inspection if necessary. 4. Check whether the sensor is affected with damp. For the recirculated sensor, if the led is on the above and the copper pipe is below, it is possible to be damped. 5. The maintenance personnel can replace the possibly faulted recirculated sensor with a normal one and if the error disappears, it means the original recirculated sensor is faulted and needs to be replaced; and if the error is still there, consider to replace the Outdoor Unit main PCB.
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(20) P2 - High-pressure protection

Explanation of error	Cause: In standby state or when the equipment is running, the High-pressure switch is disconnected three times (within 20 minutes) and reported as "High-pressure protection"; Inspection path: High-pressure switch cable → connector → High-pressure switch → main PCB
Tools required for inspection	Multimeter, connectoin line and High-pressure swtich
Common faulty components	High-pressure swtich connectoin line, fluorine deficiency of unit and High-pressure switch
Inspection procedure and key points	1. Check whether the plug-in terminals are firmly connected and whether the terminals and the main PCB are welded loosely. If necessary, gently pull them to check; 2. Use a multimeter to measure whether it is disconnected; 3. Use the multimeter to check the state of the High-pressure switch and check whether it is in the OFF state (normally OFF, unusual disconnection); 4. If the pressure is normal and the High-pressure switch is kept open, it is positive that the pressure voltage is faulted; 5. If the pressure switch is normal and the connection line is tact and the failure is still reported, replace the corresponding main PCB.

Special attention	The reason why High-pressure switches are often disconnected is the leakage of equipment. When the high voltage switch is off, first check whether the air conditioner's pressure is normal. If it is normal but the failure is still displayed after replacing the Outdoor Unit main PCB, it is possible that the connecting pipe may be too long or the Outdoor Unit ambient temperature is too low
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(21) P3 –Liquid Leakage Protection

Explanation of error	Cause: The liquid volume of the system is less than 30%, which leads to non-refrigeration and liquid shortage protection. Inspection path: whether the valves of the outdoor unit are opened → whether the evaporator, condenser, connection pipe are damaged or cracked → whether the environmental temperature sensor and the coil temperature sensor are damaged at the same time
Tools required for inspection	Hex nut, multimeter, pressure gauge
Common faulty components	Stop valve, evaporator, condenser and connection pipe

(22) P4 –Refrigeration Overload Protection

Explanation of error	Cause: Outdoor coil sensor senses excessive temperature, prevents compressor from overloading, and reduces frequency. Inspection path: the system is dirty or blocked → the condenser is dirty → Outdoor Unit coil sensor is faulted → AC motor not running → failure of divider resistance of controller
Tools required for inspection	Multimeter and pressure gauge
Common faulty components	Coil sensor, condenser and outdoor unit controller
Inspection procedure and key points	1. Check the coil sensor with a multimeter to see if the resistance value is normal (20KΩ standard sensor, 25°C) 2. Use a pressure gauge to detect system pressure. If the system pressure is high, it may cause Indoor Unit dirty blockage or poor Outdoor Unit heat transfer, which may lead to high coil temperature. 3. Observe whether the speed of AC motor is too low, which leads to poor heat transfer and high coil temperature. 4. Use a multimeter to check whether the voltage dividing resistance of temperature sensor circuit of Outdoor Unit controller coil is abnormal. If you don't know how to measure it, try to replace the Outdoor Unit controller to check whether it returns to normal state.

(23) P5–Discharge Protection

Explanation of error	Cause: the discharge sensor detects that the discharge temperature is too high and triggers the discharge protection shutdown. Inspection path: system pressure → indoor / outdoor air inlet → discharge sensor → Outdoor Unit panel
Tools required for inspection	Multimeter, pressure gauge, regular 50KΩ exhaust sensor (25°C)
Common faulty components	Indoor coil sensor
Inspection procedure and key points	1. Check if the system pressure is low, if is, usually it the shortage of liquid that leads to excessive discharge temperature protection; 2. Check whether the indoor/outdoor air inlet is blocked, such as whether the evaporator or condenser is dirty or whether the filter is dirty or blocked and if inlet is affected, remove the shield. 3. Check whether the air volume at the teh tuyere is too small, observe whether the Indoor Unit fan blades are dirty blocked, and if dirty blocked blades are found, clean the blades. 4. Measure the resistance drift of the discharge sensor with a multimeter at ambient temperature.

(24) P6–Indoor High Temperature Protection

Explanation of error	Cause: Protection shutdown due to temperature of indoor coil. Inspection path: indoor air inlet → indoor unit filter → indoor motor → indoor coil sensor
Tools required for inspection	Multimeter, pressure gauge, regular 20KΩ exhaust sensor (25°C)
Common faulty components	1. Check whether the indoor air inlet is blocked or not, if it affects the wind, remove the shield; 2. Check whether the filter is dirty or not. If dirty blockage is found in the filter, clean the filter. 3. Check if the air volume at the tuyere is too small and if the indoor unit fan is blocked, if is, clean the fan. 4. Measure the drift of the inner disk sensor with a multimeter at ambient temperature.
Inspection procedure and key points	P6 usually refers to the high temperature protection of the Indoor Unit heating coil due to poor air inlet.

(25) P7–Anti-freezing Protection in Refrigeration Room

Explanation of error	Cause: Protection shutdown due to temperature of indoor coil. Inspection path: indoor air inlet → indoor unit filter → indoor motor → indoor coil sensor
Tools required for inspection	Multimeter, pressure gauge, regular 20KΩ exhaust sensor (25°C)
Common faulty components	Indoor coil sensor
Inspection procedure and key points	1. Check whether the indoor air inlet is blocked or not, if it affects the wind, remove the shield; 2. Check whether the filter is dirty or not. If dirty blockage is found in the filter, clean the filter. 3. Check if the air volume at the tuyere is too small and if the indoor unit fan is blocked, if is, clean the fan. 4. Measure the drift of the indoor coil sensor with a multimeter at ambient temperature.
Special attention	P7 usually refers to the anti-freezing protection of the refrigeration room due to poor air inlet.

(26) P8–Overcurrent Protection

Explanation of error	Cause: Controller detects AC bus current exceeding the set protection value, then limits and reduces the frequency. Inspection path: system blockage → grid voltage → outdoor unit controller
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Tools required for inspection	Multimeter, pressure gauge
Common faulty components	Grid voltage and outdoor unit controller
Inspection procedure and key points	1. Use a mutlimeter to detect and check if the bus voltage is too low, causing the overcurrent protection. 2. Use a pressure gauge to check whether the pressure of the system exceeds the standard. If the pressure exceeds the standard, it may lead to dirty blockage of the system. 3. Replace the outdoor unit controller and if the unit returns to normal, it is the problem of the controller.
Special attention	Generally, such protection occurs at high load, but should not occur at low load and low temperature, and the priority of this protection is after the protection of refrigeration against overload and discharge.

(27) L0- Dc overvoltage error

Explanation of error	Cause: Voltage too low or too high, or suddenly change of voltage
Tools required for inspection	Multimeter

Common faulty components	ODU PCB board
Inspection procedure and key points	1. Check if the voltage is too low or too high, and if there is suddenly change of voltage 2. Check if there is any broken of ODU PCB board After check mentioned 2 steps, if the L0 error is still occur, pls check as the guidance of Error code "F1" .

(28) L1- Compressor Phase current overcurrent protection

L2- Compressor Lost step protection

Explanation of error	Cause: ODU PCB board broken, voltage too low or too high, or suddenly change of voltage, connecting wire is broken, compressor issue
Tools required for inspection	Multimeter
Common faulty components	Connecting wire, external main control panel, compressor
Inspection procedure and key points	1. Check the ODU PCB board if there is any broken; 2. Check whether the connecting wire is broken; 3. Check whether the compressor terminal line is connected wrongly; whether the compressor is blocked, whether the system pressure is too high; After check mentioned 3 steps, if the L1 or L2 error is still occur, pls check as the guidance of Error code "F1" .

(29) L3- Compressor phase error

Explanation of error	Cause: mainly because the compressor wire wrongly connected
Common faulty components	Compressor wire

(30) L4-Compressor drive module IPM fault

Explanation of error	Cause: mainly because the compressor wire wrongly connected
Tools required for inspection	Multimeter
Common faulty components	Supply voltage, compressor wire, system pressure, ODU PCB board, compressor

Inspection procedure and key points	1. Check the ODU PCB board if there is any broken; 2. Check the compressor connecting wire if the wire is broken, or not connect fasten. 3. Check the compressor if there is any broken. After check mentioned 3 steps, if the L4 error is still occur, pls check as the guidance of Error code "F1" .
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(31) L5- PFC overcurrent hardware protection

L6- PFC overcurrent software protection

L7- Current detection AD abnormal protection

LC- PFC current detection AD abnormal protection

Ld- Dc fan motor detection AD abnormal protection

Explanation of error	Cause: ODU PCB board broken, voltage too low or too high, or suddenly change of voltage
Tools required for inspection	Multimeter
Common faulty components	Supply voltage

Inspection procedure and key points	1. Check the ODU PCB board if there is any broken; 2. Check if the voltage is too low or too high, and if there is suddenly change of voltage After check mentioned 2 steps, if the error is still occur, pls check as the guidance of Error code "F1" .
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(32) L8- shunt Resistance imbalance fault

Explanation of error	Cause: ODU PCB board broken, connecting wire broken or connected loose, compressor issue
Tools required for inspection	Multimeter
Common faulty components	Supply voltage, connecting wire, system pressure, module board, ODU PCB board, compressor
Inspection procedure and key points	1. Check the ODU PCB board if there is any broken; 2. Check the connecting wire if the wire is broken, or not connect fasten. 3. Check the compressor if there is any broken. After check mentioned 3 steps, if the L8 error is still occur, pls check as the guidance of Error code "F1" .

(33) L9- IPM temperature sensor error

Explanation of error	Cause: ODU PCB board broken, Wind speed of ODU fan is abnormal, high system pressure
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Tools required for	Multimeter
Common faulty	System pressure, ODU PCB board, ODU fan
Inspection procedure and key points	1. Check the ODU PCB board if there is any broken; 2. Check whether the wind speed of ODU fan is abnormal; 3. Check if system pressure is too high; After check mentioned 3 steps, if the L9 error is still occur, pls check as the guidance of Error code "F1" .

(34) LA- Compressor startup failure

Explanation of error	Cause: ODU PCB board broken, connecting wire broken or connected loose, compressor issue
Common faulty components	Supply voltage, connecting wire, system pressure, module board, ODU PCB board, compressor
Inspection procedure and key points	1. Check the ODU PCB board if there is any broken; 2. Check the connecting wire if the wire is broken, or not connect fasten. 3. Check the compressor if there is any broken. After check mentioned 3 steps, if the L8 error is still occur, pls check as the guidance of Error code "F1" .

(34) LE- DC fan motor phase error

LF- DC fan motor Lost step protection

Explanation of error	Cause: ODU PCB board broken, voltage too low or too high, plug too loose, module error, DC fan error
Common faulty	ODU PCB board, module, DC fan
Inspection procedure and key points	1. Check the ODU PCB board if there is any broken; 2. Check whether the wind speed of external fan is abnormal; 3. Check if system pressure is too high; After check mentioned 3 steps, if the L9 error is still occur, pls check as the guidance of Error code "F1" .

(36) LH- DC fan motor IPM protection

Explanation of error	Cause: ODU PCB board broken, voltage too low or too high, The connecting wire is broken, module board error, the condenser is blocked.
Common faulty components	connecting wire, voltage, module, condenser
Inspection procedure and key points	1. Check the ODU PCB board if there is any broken; 2. Check the connecting wire if the wire is broken, or not connect fasten; 3. Check whether the dc fan is damaged; 4. Check whether the condenser is blocked; After check mentioned 3 steps, if the LH error is still occur, pls check as the guidance of Error code "F1" .

1 PRODUCT SPECIFICATION SHEET						
Nameplate Parameter	Items	model	1			
			A1WH0900VA1A3 ACSH0919VA1A3	A1WH0900VA1D3 ACSH0919VA1D3	A1WH1200VA1A3 ACSH1219VA1A3	A1WH1200VA1D3 ACSH1219VA1D3
	Rated Capacity	Cooling	Btu	9100 (2046~10918)	12000 (2728~13981)	18000 (4430~18700)
			W	2666 (600~3200)	3517 (800~4100)	5280 (1300~5500)
		Heating	Btu	10000 (2046~15012)	12300 (2728~15004)	18700 (4430~19100)
			W	2930 (600~4400)	3605 (800~4400)	5500 (1300~5600)
		Dehumidifying	Kg/h	1	1	1.6
	Rated Power Consumption	Cooling	W	830 (180~1100)	1040 (230~1400)	1650 (290~2100)
		Heating	W	850 (180~1400)	1080 (250~1400)	1650 (250~1800)
	Rated Running Current	Cooling	A	7.3 (1.6~9.5)	9.1 (2.0~12.4)	7.3 (2.2~10)
		Heating	A	7.5 (1.6~12.4)	9.6 (2.2~12.4)	7.3 (2.0~9)
		Electric heating power	W	/	/	68
	SEER Cooling	Max. Input Power	W	1600	1600	2200
		Max. Input Current	A	14	14	12
		SEER	W/W	20.5	20	19
		COP Heating	W/W	HSPF2=8.5	HSPF2=8.5	HSPF2=9
		Power supply source	V/Ph/Hz	115V~60Hz	115V/60Hz	208V~230V/60Hz
	Refrigerant	Refrigerant Charged	g	500g/17.6oz	500g/17.6oz	1000g/35.3oz
			Mpa	4.3	4.3	4.3
		Max. Discharge Pressure	Mpa	2.5	2.5	2.5
		Max. Suction Pressure	Mpa	2.5	2.5	2.5
		Air Flow Volume	m3/h	560	600	850
	Noise level	Indoor unit weight (Net)	dB (A)	42/40/38/35/27	42/40/38/35/27	47/43/40/37/29
			dB (A)	52	52	54
		Outdoor unit weight (Net)	Kg/Lb	8/17.64	8/17.64	11.5/23
	Fan system	Type	Kg/Lb	23.5/51.8	23.5/51.8	29.5/59
			AC/DC	DC	DC	DC
	Indoor unit configuration	Dimension	mm	792*292*201	792*292*201	940*316*224
				880*370*290	880*370*290	1010*385*307
		Net Dimension (Width*Depth*Height)	mm	792*292*201	792*292*201	1132*330*232
	Connection	Stop Valve	Material	copper	copper	copper
				Dg4	Dg4	Dg4
		Gas Valve		Dg8	Dg8	Dg13
	Outdoor unit configuration	Compressor Parameter	Brand	GMCC	GMCC	GMCC
				DC	DC	DC
		Fan system	Type	DC	DC	DC
	Dimension	Net Dimension (Width*Depth*Height)	mm	705*279*530	705*279*530	823*300*555
				825*345*595	825*345*595	903*382*615
		Packing Dimension (Width*Depth*Height)	mm	825*345*595	825*345*595	945*715*400
	Container Loading 40HC			IDU: 760; ODU: 360	IDU: 760; ODU: 360	IDU: 444; ODU: 204

DE-COMMISSIONING,DISMANTLING&DISPOSAL

This product contains refrigerant under pressure, rotating parts, and electrical connections which may be a danger & cause injur. All work must only be carried out by competent persons using suitable protective clothing and safety precautions.



Read the Manual



Risk of Electric Shock

RoHS



Unit is Remotely controlled
& may start without warning



1. Isolate all sources of electrical supply to the unit including any control system supplies switched by the unit.
Ensure that all points of electrical and gas isolation are secured in the OFF position.
The supply cables and gas pipe work may then be disconnected and removed.
For points of connection refer to unit installation instructions.
2. Remove all refrigerant from each system of the unit into a suitable container using a refrigerant reclaim or recovery unit.
This refrigerant may then be reused, if appropriate, or returned to the manufacturer for disposal.
Under no circumstances should refrigerant be vented to atmosphere Where appropriate, drain the refrigerant oil from each system into a suitable container and dispose of according to local laws and regulations governing disposal of oily wastes.
3. Packaged units can generally be removed in one piece after disconnection as above.
Any fixing down bolts should be removed and then unit lifted from position using the points provided and equipment of adequate lifting capacity.
Reference **MUST** be made to the unit installation instructions for unit weight and correct methods of lifting.
Note that any residual or spilt refrigerant oil should be mopped up and disposed of as described above.
4. After removal from position the unit parts may be disposed of according to local laws and regulations.
5. Meaning of crossed Out wheeled dustbin: Do not dispose of electrical appliances as unsorted municipal waste, use separate collection facilities.
Contact your local government for information regarding the collection systems available. If electrical appliances are disposed of in landfills or dumps, hazardous substances can leak into the groundwater and get into the food chain, damaging your health and well being. When replacing old appliances with new ones, the retailer is legally obligated to take back your old appliance for disposals at least free of charge.



MADE IN CHINA