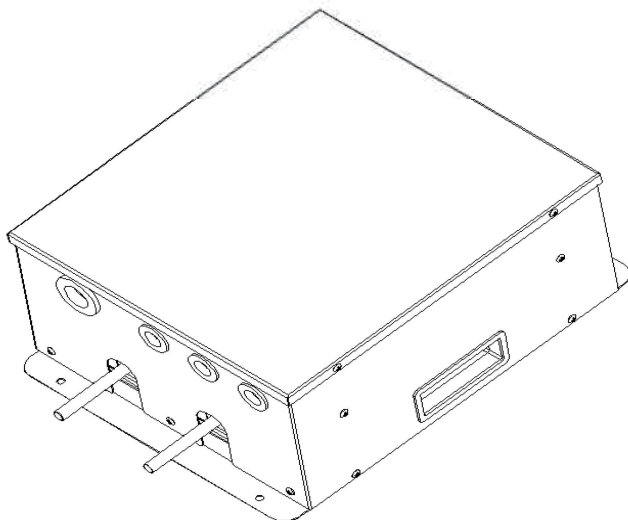




Installation and Operation Manual of AHU Independent

Control Box of Multi-connected Air Conditioner Unit

Model: NV6-BK1(E), NV6-BK2(E), NV6-BK3(E)
NV6-BK4(E), NV6-BK5(E), NV6-BK6(E)



IMPORTANT NOTE:

Thank you very much for purchasing our product.

Before using your unit, please read this manual carefully and keep it for future reference

1. Precautions

- A. Be sure to comply with local, national and international laws and regulations.
- B. Please carefully read the precautions before installation.
- C. Please pay attention to the important safety supplies included in the following preventive measures.
- D. Please keep this Manual in a convenient place for future reference.
- E. The product must be installed only by the authorized personnel according to the requirements of the Installation Manual.

The safety precautions listed here are divided into two categories: Attention and Warning.

The important information that must be read carefully is listed in both cases.

Attention

1. Failure to follow warnings may result in damage to the device.
2. After installation, make sure that the control box device works normally during the start-up operation.
3. Please guide customers to operate and maintain the device. Tell customers that they should store the Installation Manual and Owner's Manual for future reference.
4. Ground the air conditioner. Do not connect wires to gas or water pipes, lightning rods or telephone ground wires. Improper grounding operations may result in an electric shock.
5. Be sure to install a ground leakage circuit breaker. Otherwise, an electric shock may be resulted in.
6. Connect the outdoor unit, and then connect the wires of indoor unit; do not connect the air conditioner to the power supply until the installation of the unit (including the ventilation and pipeline of air conditioner) is completed.
7. Install drainage pipelines based on the guidelines in this Manual to ensure proper drainage and insulation and to prevent condensation of condensed water and electrical leakage. Improper installation of drainage pipelines will cause water leakage and property losses.
8. Install the device connecting indoor and outdoor units, power circuits and communication wires on the indoor side. The device and wires should be at least 1 meter away from the TV or radio to prevent image interference or noise. The distance of 1 meter may not be enough to abate noise under different radio waves.
9. Young children or the weak must use this product under supervision. Young children should be supervised to ensure that they will not play with this product.
10. Do not install the air conditioner in the following locations:
 - Outdoor areas.
 - A place with gasoline.
 - A place with salt air around (near the coast).
 - A place with corrosive gas (e.g. sulfur gas) in air (near a hot spring).
 - A place with violent vibration (in a factory).
 - A bus or a cupboard.
 - A place full of petroleum gas.
 - A place with strong electromagnetic waves.
 - A place with flammable materials or gases.
 - A place where acidic alkaline liquid is evaporated.
 - A laundry room.
 - Other special conditions.

Warning

Failure to follow warnings may result in death.

1. Make sure that only the qualified repair personnel who have been trained can install, debug or repair the device. Improper installation, repair and maintenance may result in electric shock, short circuit, leakage, fire or damage to the device.
2. Install the device in strict accordance with this Installation Manual. Any defect in installation may result in water leakage, electric shock and fire.
3. When the device is installed in a small room, take measures to prevent the concentration of refrigerant in indoor space from exceeding the allowable safety limit due to leakage of refrigerant. For details, please contact the place of purchase. Too much refrigerant in a closed environment may lead to a lack of oxygen.
4. Choose the attached accessories and parts and designated parts for installation. Otherwise, fall, water leakage, electric shock and fire may be caused.
5. Install the product in a place that is secure enough to bear the weight of the product. In case of insufficient strength or improper installation, the device will fall, causing injury.
6. The product must be installed at a distance of 2.5 meters from the floor; it is not allowed to install the product in the laundry room.
7. Disconnect all power circuits before the terminals are connected. Install the product in a location in which the plug is easy to operate. The product housing should be marked with words or symbols and direction of fluid flow.
8. The electrical work must be done by using an independent circuit and a single socket in accordance with the local and national wiring standards and regulations and this Installation Manual. If the circuit capacity is insufficient or there is a defect in the electrical work, electric shock and fire may be caused.
9. Use the designated cable, connect the cable to the terminal tightly, and clamp and fix the cable so that no external force is applied to the terminal. Unreliable connection or fixing will cause overheating connection or fire.
10. Wires must be arranged vertically so as to fix the control panel cover properly. If the control panel cover is fixed improperly, the connecting terminals may be hot or a fire or electric shock may be caused.
11. When necessary, the power wire must be replaced by the manufacturer or its agent or similar qualified personnel to avoid danger.
12. Do not allow air to enter the refrigeration cycle when installing pipelines. Otherwise, reduction in capacity, abnormal high pressure in the refrigeration cycle, explosion and damage will be resulted in.
13. Do not change the length of power wire or use an extension wire or share a single socket with other electrical appliances. Otherwise, a fire or electric shock will be caused.
14. Connect to the designated network with consideration of impacts of strong winds, typhoons or earthquakes. Improper installation may make the device fall and cause accidents.
15. If the refrigerant leaks during installation, ventilate the area immediately; if the refrigerant enters the area in contact with fire, toxic gases may be produced.
16. Check whether the refrigerant leaks after the pipelines are installed. If the refrigerant leaks into a room and comes into contact with fire sources such as fan heater, stove or cooker, toxic gases will be produced.

2. Installation Information

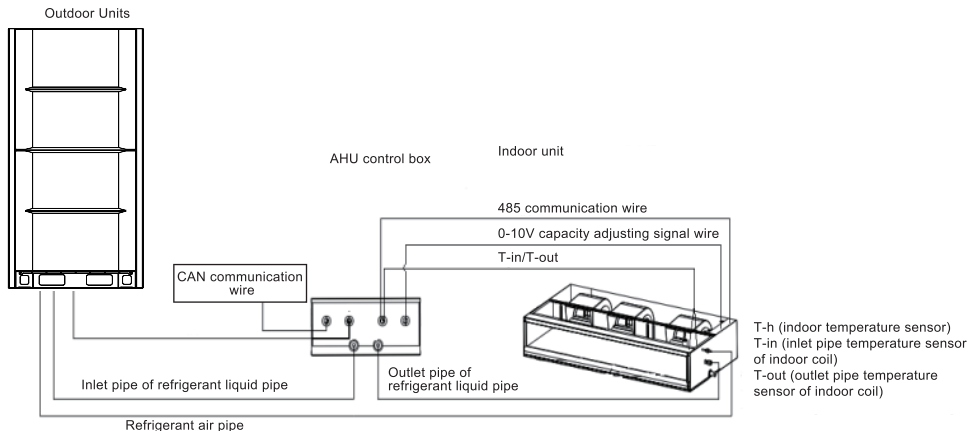
2-1 Installation Precautions

- In order to install the product properly, please read this "Installation Manual".
- The air conditioner must be installed by professionals.
- Please strictly follow this Manual while installing indoor wire sets, pipes and air ducts.
- If the air conditioner is placed on the metal part of a building, the electrical appliances must be electrically insulated according to the relevant standards.
- Please turn on the power supply for a thorough inspection after the installation work is completed.
- Any change to this Manual due to product improvement will not be further released.

2-2 Installation Sequence:






1. Choose a place;
2. Install the control box;
3. Install the outdoor devices;
4. Install the connecting pipes;
5. Arrange wires;
6. Carry out a test.

3. Wiring Diagram of Indoor and Outdoor Units



4. Additional Accessories

Please check whether the following accessories are complete. Please be careful to prepare alternative parts if some spare accessories are omitted.

No.	Name	Icon	Quantity
1	Installation and Operation Manual		1
2	Flat washer		4
3	Screw		4
4	Temperature sensor		2
5	Temperature sensor wire set		1

Precautions for installation of wire controller

- Never throw or hit the control box.
- Confirm that the control box is installed in the location where the wire is long enough to connect to the sensor before installation.
- Do not install the control box in direct sunlight or near heating sources such as a stove.
- Please make sure that the zero and fire wires are connected correctly while connecting the power wire.

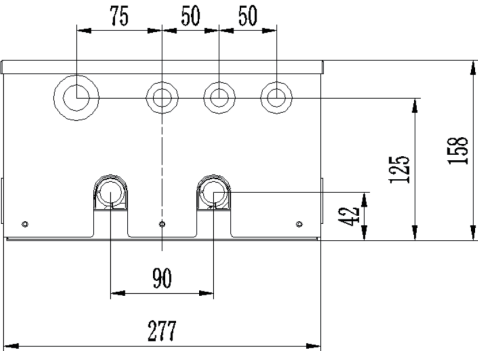
5. Installation Method and Dimension

5-1 Product Model

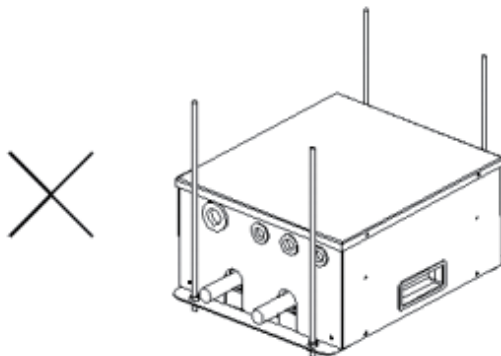
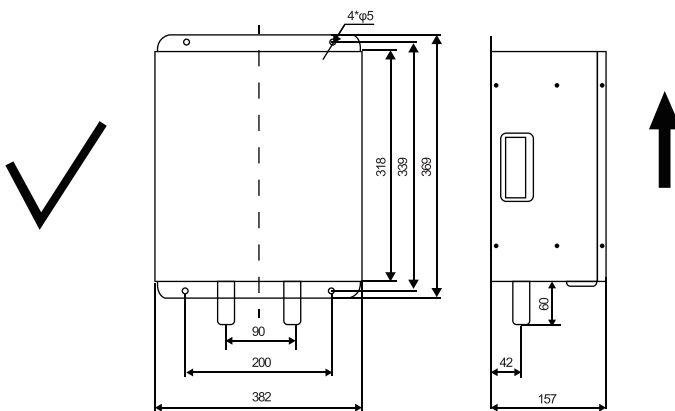
Product model	NV6-BK1(E)	NV6-BK2(E)	NV6-BK3(E)	NV6-BK4(E)
Scope of capacity W	2200-8000	8000-16000	16000-40000	40000-65000
Specification of expansion valve	UKV-25D205	UKV-25D158	UKV-32D210	UKV-40D08
Product model	NV6-BK5(E)	NV6-BK6(E)	(Reserved)	(Reserved)
Scope of capacity	65000-80000	80000-130000		
Specification of expansion valve	(UKV-32D210)*2	(UKV-40D08)*2		

5-2 Installation Diagram

- Installation dimension



● Installation method



⚠ Attention

- The controller box should not be installed outdoors. If it is unavoidable, preventive measures must be added.
- For specific methods, please contact the local transaction or technical support engineer.
- For suspension installation, please use ST3.9x25 screws.
- During suspension installation, the packaging box should be placed vertically, and should not be installed horizontally.
- Please make sure that the refrigerant liquid pipe is laid in the direction related to the connection location of connecting wires according to the above requirements.
- All pictures in this Manual are only for explanation. There may be a little difference between the pictures and the control box you purchase (depending on the model), and the actual shape should prevail.

6. Materials and Dimension of Pipeline

Attention

- The connection distance between the control box and the indoor unit should not exceed 8 meters.
- The control box can only be connected to the R410A refrigerant system.
- The control box can only be connected to a multi-connected system.
- The control box cannot be connected to the heat recovery system.
- Do not allow air, dust or other debris to enter the pipeline system during installation of connection.
- Install the connecting pipes only after the indoor and outdoor units are fixed.
- Keep the pipeline dry during installation and protect the pipeline system from water stain.
- Wrap the connecting copper pipes with thermal insulation materials (the wrapping thickness should be greater than 10 mm; it should be appropriately increased in some wet areas).

Table 6-1 Model and dimension of connecting pipe

Product model	NV6-BK1(E)	NV6-BK2(E)	NV6-BK3(E)	NV6-BK4(E)
Scope of capacity W	2200-8000	8000-16000	16000-40000	40000-65000
Diameter of inlet pipe	φ9.52	φ9.52	φ12.7	φ16
Diameter of outlet pipe	φ9.52	φ9.52	φ12.7	φ16
Product model	NV6-BK5(E)	NV6-BK6(E)	(Reserved)	(Reserved)
Scope of capacity	65000-80000	80000-130000		
Diameter of inlet pipe	φ19	φ19		
Diameter of outlet pipe	φ19	φ19		

7. Installation of Electrical Appliances

Attention

The air conditioner should be connected to a separate power supply with rated voltage.

- The external power supply of air conditioner should be equipped with a ground wire connected with the ground wires of indoor and outdoor devices.
- Wires should be connected by professionals according to the circuit diagrams.
- A 3mm electric shock distance must be equipped for fixed connecting wires during installation.
- The leakage protector should be in dead state according to local electrical standards.
- Make sure that the power and signal wires are well twisted to avoid cross interference and contact with connecting pipes or units. Do not twist two connecting wires together unless the joint is welded and covered with insulating tape.
- Do not turn on the power supply until the electrical wiring has been properly completed.

7-1 Power Specification

The power specification is shown in the table below. If the wiring capacity is too small, the circuit will overheat, thus burning out the machine.

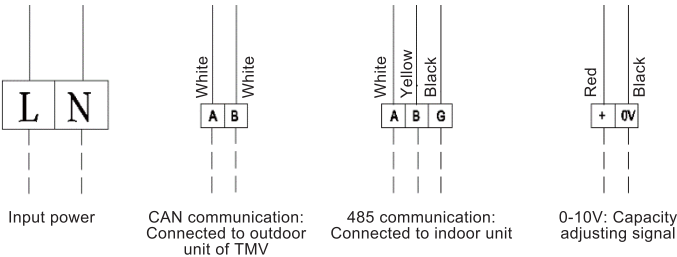
Model		NV6-BK1(E)-NV6-BK6(E)
Specification of power supply	Number of phases	Single phase
	Voltage and frequency	220-240V-50HZ
Specification of power wire of control box (mm)		≥1.0 (< 50m)
Indoor and outdoor signal wires (mm)		≥0.75

⚠ Attention

The air gap slot on the circuit breaker is used to insulate the flexible conductors, so it must be connected to fixed circuits in accordance with the national wire requirements.

7-2 Terminal Module Design

- For connecting conductors, please refer to the indoor wiring diagram.
- Instructions for terminals and wiring:



Wiring diagram of electrical control box

Inlet pipe temperature sensor of indoor evaporator (T-in)
 Outlet temperature sensor of indoor evaporator (T-out)
 Please connect wires based on the wiring nameplate.

⚠ Attention

- Each of NV6-BK1(E)-NV6-BK6(E) only has a main control panel, and the temperature sensors T-in and T-out must be connected to the main control panel before they are powered for the first time
- T-in is the inlet pipe temperature sensor of indoor evaporator installed at the inlet of liquid pipe of evaporator.
- T-out is the outlet sensor of indoor evaporator installed at the outlet of evaporator.
- Installation location of pipeline thermistor:

The thermistor should be properly installed to ensure good operation:

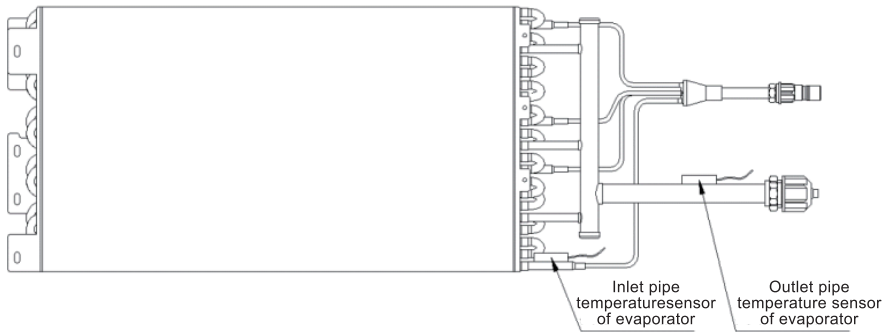
- T-in: It is the sensor installed behind the distributor and in the bottom inlet pipe of evaporator in the r efrigeration cycle.
- T-out: It is the sensor installed on the main outlet pipe of evaporator in the refrigeration cycle. The installation location should be as close to the heat exchanger as possible.

⚠ Attention

Assess the sensor after it is installed, and check whether the evaporator can be protected to prevent the bias flow from freezing continuously.

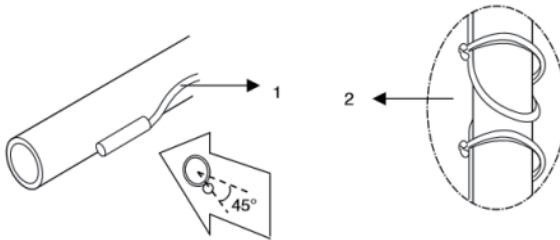
Carry out a test and check the freezing.

1. T-in (inlet pipe of evaporator)
2. T-out (outlet pipe of evaporator)



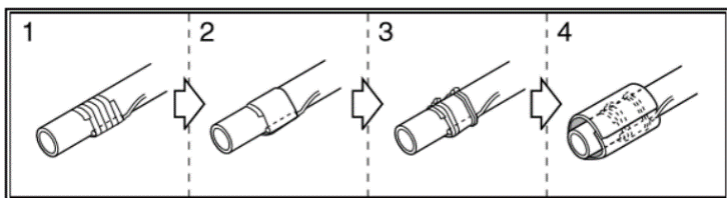
7-3 Installation of indoor thermistor

1. Put the sensor probe into a separate copper pipe wall.
 2. Tighten the sensor probe by using more tension ties to prevent it from being loosened on the copper pipe.
- The strain or looseness of sensor probe on the copper pipe can cause poor contact and errors of temperature measurement.



● Installation and fixing of pipeline sensor (on-site work)

1. Fix the sensor probe with aluminum tape to ensure good heat transfer performance.
2. Place the attached rubber sheet around the sensor probe to prevent the thermistor from being loosened in a few years.
3. Fix the sensor probe with 2 ties.
4. Isolate the sensor probe with an insulation device (more than 5t)



⚠ Attention

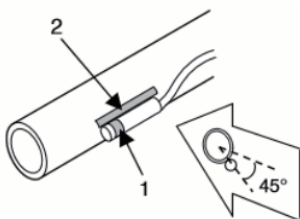
Slightly place the wire of sensor probe on the top to prevent water from gathering on the sensor probe.



2. In order to sense the temperature of inlet and outlet pipeline of evaporator in the sensor, place the top of thermistor on the inlet and outlet copper pipe of evaporator which is the most sensitive point of thermistor.

1 Most sensitive point of thermistor

2 Maximized contact



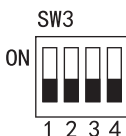
8. Application Control

8-1 Control of Application Program

Set the PCB dial codes in the control box of indoor unit depending on different purposes. Please be sure to turn off the main power switch before setting, and turn on the power switch after setting.





If the power switch is not turned on after setting, the setting function cannot be executed.

“■” refers to the dial switch and it has been set before leaving the factory. Non-professionals are not allowed to move the dial switch.





- Device address of the BK control board



By adjusting the DIP switch of the BK control board, the device address of the BK control board can be set for the upper computer to control multiple air conditioning systems at the same time. Up to 4 device addresses can be set (i.e., the host computer can control up to 4 BK control boards at the same time).

DIP switch(SW2-1&2)	 ON 1 2	 ON 1 2	 ON 1 2	 ON 1 2
Device address of the BK control board	128	129	130	131

- Definition of model dial code (SW3):

Air duct type air conditioner	Fresh air machine
 ON 1 2 3 4	 ON 1 2 3 4

- Definition of capacity dial code (SW2-3&4+KN0B1):

 ON 3 4		 ON 3 4	
Capacity kW	KN0B1	Capacity kW	KN0B1
2.2	0	56.0	0
2.8	1	61.5	1
3.6	2	68.0	2
5.6	3	73.0	3
7.1	4	78.5	4
8.0	5	85.0	5
11.2	6	90.0	6
14.0	7	95.0	7
16.0	8	100.0	8
22.0	9	106.0	9
25.2	A	112.0	A
28.0	B	118.0	B
33.5	C	124.0	C
40.0	D	130.0	D
45.0	E	135.0	E
50.0	F	140.0	F

Definition of rotating disc dial code (KN0B1):

Attention

The capacity set after leaving the factory before installation should not be changed by anyone except repair, installation and debugging personnel.

- Definition of 0-10V capacity control:

Capacity output of indoor unit=rated capacity of indoor unit*coefficient; the coefficient depends on the 0-10V input voltage adjusting signal, as shown below:

Coefficient	Pull-up voltage (V)	Pull-down voltage (V)
105%	/	9.2
101%	9.4	8.9
97%	9.1	8.6
93%	8.8	8.3
89%	8.5	8
85%	8.2	7.7
81%	7.9	7.4
77%	7.6	7.1
73%	7.3	6.8
69%	7	6.5
65%	6.7	6.2
61%	6.4	5.9
57%	6.1	5.6
53%	5.8	5.3
49%	5.5	5
45%	5.2	4.7
41%	4.9	4.4
37%	4.6	4.1
33%	4.3	3.8
29%	4	3.5
25%	3.7	3.2
21%	3.4	2.9
17%	3.1	2.6
13%	2.8	2.3
9%	2.5	2
5%	2.2	1.7
0%	1.9	0

9. Maintenance

- Fault type and handling method:

If any of the following situations occurs, please stop the air conditioner from operating immediately, turn off the power supply and contact the local repair personnel	
Fault type	The outdoor unit displays a fault and is shut down
	The fuse is frequently blown or the circuit breaker frequently makes errors
	Foreign material or water enters the air conditioner
	The indoor unit fails to receive commands or the switch operates abnormally
	Other abnormal situations occur

If any of the following situations occurs, please conduct inspection according to the following requirements. If the problem still exists, please contact the dealer or the customer service center of Company and inform them of product model, barcode and fault details		
Fault	Cause	Handling method
The air conditioner fails to start	Power failure	Wait for power recovery
	The power switch is not turned on	Turn on the power switch
	The fuse of power switch is blown	Replace the fuse
The air conditioner blows air with poor refrigeration (heating) effect	The temperature is set inappropriately	Set the temperature appropriately and turn up or turn down the temperature
	The heat exchanger is blocked by dust or dirt	Clean the heat exchanger
	The air inlet or outlet of indoor or outdoor unit is blocked	Remove the blockages
	Doors and windows are open	Close doors and windows
The air conditioner blows air, but it cannot refrigerate (heat)	The air inlet and outlet of indoor or outdoor unit are blocked by some objects	Remove the blockages and then restart the operation
	The compressor is in a three-minute protection mode	Wait
	The temperature is set inappropriately	Set the temperature appropriately and turn up or turn down the temperature

Attention

Do not replace the power wire by yourself or repair the controller by yourself to avoid danger;

- Non-fault phenomena of air conditioner

The following phenomena do not mean that the air conditioner is abnormal, but indicate the common protection functions of air conditioner

- Compressor protection function

The compressor is shut down and cannot be started within 3 minutes.

- Defrosting (refrigeration and heating)

When the temperature is low, but the humidity is high in the outdoor environment, the heat exchanger of outdoor unit may be frosted, which will reduce the heating capacity of air conditioner. In this case, the air conditioner will stop heating and enter the automatic defrosting mode. It will restore heating after defrosting is completed.

(1) The fan of outdoor unit stops operating and the indoor unit operates normally during defrosting.

(2) The defrosting time depends on the outdoor temperature and degree of frosting, and it is generally 4-10 minutes.

(3) The outdoor unit may let out steam during defrosting, which is caused by quick defrosting and is a normal phenomenon.

- An oil return control program is added to the system. The air conditioner will forcibly conduct refrigeration after startup, and the original setting operation will be restored after the oil return is completed;

Cleaning

Attention

For safety purposes, please be sure to shut down the air conditioner and turn off the power supply while cleaning the air conditioner.

Maintenance

1. When the air conditioner is idle for a long term, complete the following work

A. Turn on the fan and let it operate for 3-4 hours in the air supply mode to completely dry the inside of air conditioner.

B. Even if the air conditioner is idle for a long term, the power supply of indoor unit should not be turned off, unless all the indoor units in the same outdoor unit system are powered off simultaneously.

2. When the air conditioner is used after long-term shutdown

A. Clean the dust filter and indoor unit body when the machine is stopped and the power supply is turned off.

Please wipe the indoor unit body with a soft cloth, and do not clean the machine with gasoline, benzene, dilute lye, grinding powder, detergent, insecticide and other substances that may damage the machine.

B. Confirm that no debris blocks any inlet and outlet of indoor and outdoor units.

C. Check whether the ground wires are loose and turn on the power supply.

After-sales service

When your air conditioner fails to operate normally, shut down the machine immediately, turn off the power supply, and then contact local customer service center of Company or special technical service department.