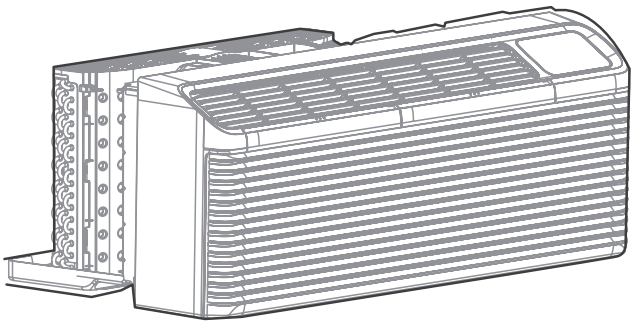
SM_PTHP_R32_US_INV_NB_2606

PACKAGED TERMINAL AIR CONDITIONER

SERVICE MANUAL



PTHP Series

North America Products



A2L

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Safety Precautions

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1. Safety Precautions

To prevent injury to the user or other people and property damage, the following instructions must be followed.

Incorrect operation due to ignoring of instructions may cause harm or damage. The seriousness is classified by the following indications.

Failure to adhere to all precautionary measures listed in this section may result in personal injury, damage to the unit or to property, or in extreme cases, death.

WARNING indicates a potentially hazardous situation which if not avoided could result in serious personal injury, or death.

CAUTION indicates a potentially hazardous situation which if not avoided could result in minor or moderate personal injury, or unit damage.

WARNING

- Plug in power plug properly. Otherwise, it may cause electric shock or fire due to excess heat generation. Do not operate or stop the unit by inserting or pulling out the power plug.It may cause electric shock or fire due to heat generation. Do not damage or use an unspecified power cord.It may cause electric shock or fire.
- The power cord plug should be inserted into a standard socket.
- Always install a circuit breaker and a dedicated power circuit. Incorrect installation may cause fire and electric shock. Do not operate with wet hands or in damp environment. It may cause electric shock . Do not direct airflow at room occupants only. This could damage your health.
- Always ensure efective grounding.Incorrect grounding may cause electric shock. Do not allow water to run into electric parts.It may cause failure of machine of electric shock.
- Do not modify power cord length or share the outlet with other appliances. It may cause electric shock or fire due to heat generation.
- Unplug the unit if strange sounds, smell, or smoke comes from it. It may cause fire and electric shock.
- Do not use the socket if it is loose or damaged. It may cause fire and electric shock. Do not open the unit during operation. It may cause electric shock.
- Keep firearms away. It may cause fire. Do not use the power cord close to heating appliances.It may cause fire and electric shock. Do not use the power cord near flammable gas or combustibles, such as gasoline, benzene, thinner, etc. It may cause an explosion or fire.
- Ventilate room before operating air conditioner if there is a gas leakage from another appliance. It may cause explosion, fire and, burns. Do not disassemble or modify unit. It may cause failure and electric shock.

CAUTION

- When the air filter is to be removed, do not touch the metal parts of the unit. It may cause an injury.
- Ventilate the room well when used together with a stove, etc. An oxygen shortage may occur.
- Do not use strong detergent such as wax or thinner but use a soft cloth.
- Appearance may be deteriorated due to change of product color or scratching of its surface. Do not clean the air conditioner with water.
- Water may enter the unit and degrade the insulation. It may cause an electric shock. Do not use for special purposes. Do not use this air conditioner to preserve precision devices, food, pets, plants, and art objects.It may cause deterioration of quality, etc.
- Stop operation and close the window in storm or hurricane. Operation with windows opened may cause wetting of indoor and soaking of household furniture.
- When the unit is to be cleaned, switch of, and turn off the circuit breaker.
- Do not clean unit when power is on as it may cause fire and electric shock, it may cause an injury.
- Always insert the filters securely. It can be caused failure if operated without filters. Please clean filter once every two weeks.
- Hold the plug by the head of the power plug when taking it out. It may cause electric shock and damage. Turn off the main power switch when not using the unit for a long time. It may cause failure of product or fire.
- Do not place obstacles around air-inlets or inside of air-outlet. It may cause failure of appliance or accident. Do not place heavy object on the power cord and ensure that the cord is not compressed. There is danger of fire or electric shock. Don't drink water drained from air conditioner. It contains contaminants and could make you sick.
- Use caution when unpacking and installing. Sharp edges could cause injury.
- If water enters the unit, turn the unit of at the power outlet and switch of the circuit breaker. Isolate supply by taking the power-plug out and contact a qualified service technician.
- 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 super vision 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.
- If the supply cord is damaged, it must be replaced by the manufacturer, its service agent or similarly qualified persons in order to avoid a hazard.
- The appliance shall be installed in accordance with national wiring regulations.
- Installation must be performed in accordance with the requirement of NEC and CEC by authorized personnel only.
- Do not operate your air conditioner in a wet room such as a bathroom or laundry room.
- The appliance with electric heater shall have at least 1 meter space to the combustible materials.
- Contact the authorised service technician for repair or maintenance of this unit.
- Contact the authorised installer for installation of this unit.

WARNING

Electrical Information

The complete electical rating of your new room air conditioner is stated on the serial plate. Refer to the rating when checking the electrical requirements.

- Be sure the air conditioner is properly grounded. To minimize shock and fire hazards, proper grounding is important. The power cord is equipped with a three-prong grounding plug for protection against shock hazards.
- Your air conditioner must be used in a properly grounded wall receptacle. If the wall receptacle you intend to use is not adequately grounded or protected by a time delay fuse or circuit breaker, have a qualified electrician install the proper receptacle. Ensure the receptacle is accessible after the unit installation.
- Do not run air conditioner without side protective cover in place.This could result in mechanical damage within the air conditioner.

Avoid fire hazard or electric shock. Do not use an extension cord or an adapter plug. Do not remove any prongs from the power cord.

For Your Safety

Do not store or use gasoline or other flammable vapors and liquids in the vicinity of this or any other appliance.

Prevent Accidents

To reduce the risk of fire, electrical shock, or injury to persons when using your air conditioner, follow basic precautions, including the following:

- Be sure the electrical service is adequate for the model you have chosen. This information can be found on the serial plate, which is located on the side of the the cabinet and behind the grille.
- Be sure the air conditioner has been securely and correctly installed according to the installation instructions in this manual. Save this manual for possible future use in removing or installing this unit. When handling the air conditioner, be careful to avoid cuts from sharp metal fins on front and rear coils.

Electrical Requirements

Electrical Shock and Personal Injury Hazard

Electrical ground is required on this appliance.

DO NOT ground to a gas line.

If cold water pipe is interrupted by plastic,non-metallic gaskets, or other insulating materials,

DO NOT use for grounding.

Check with a qualified electrician if you are in doubt as to whether the appliance is properly grounded.

DO NOT modify power supply cord plug. If it does not fit outlet, have a proper outlet installed by a qualified electrician.

DO NOT have a fuse in the neutral or grounding circuit.A fuse in the neutral, or grounding circuit could result in an electrical shock.

DO NOT use an extension cord with this appliance.

Failure to follow these instructions could result in electrical shock, serious injury, or death.

Observe all local governing codes and ordinances. Do not, under any circumstances, remove the power supply cord grounding prong.

NOTE: If codes permit, and a separate grounding wire is used; it is recommended that a qualified electrican determine that the grounding path is adequate and not interrupted by plastic, nonmetallic gaskets, or other insulating materials.

Receptacle wiring

Receptacle wiring should be a minimum of 14 gauge. Use copper wire only. It is your responsibility to provide proper and adequate receptacle wiring, installed by a qualified electrician.

Electrical requirements

A time delay fuse or time delay circuit breaker is also required. A separate circuit, serving only this appliance, MUST be provided.

NOTE: for details about the parameters of the electric heating function, see the nameplate on the unit.

2. Information on servicing(For flammable materials)

WARNING:

-Servicing shall only be performed as recommended by the equipment manufacturer. Maintenance and repair requiring the assistance of other skilled personnel shall be carried out under the supervision of the person competent in the use of flammable refrigerants.

-DO NOT modify the length of the power cord or use an extension cord to power the unit.

-DO NOT share a single outlet with other electrical appliances. Improper power supply can cause fire or electrical shock.

-Please follow the instruction carefully to handle, install, clear,

service the appliance to avoid any damage or hazard.

Flammable

Refrigerant R32 is used within appliance.

-When maintaining or disposing the appliance, the refrigerant (R32) shall be recovered properly, shall not discharge to air directly.

-Compliance with national gas regulations shall be observed.

-Keep ventilation openings clear of obstruction.

-The appliance shall be stored so as to prevent mechanical damage from occurring.

-A warning that the appliance shall be stored in a well-ventilated area where the room size corresponds to the room area as specified for operation.

-Any person who is involved with working on or breaking into a refrigerant circuit should hold a current valid certificate from an industry-accredited assessment authority, which authorises their competence to handle refrigerants safely in accordance with an industry recognised assessment specification. All training shall follow the ANNEX HH requirements of UL 60335-2-40.

Examples for such working procedures are:

• breaking into the refrigerating circuit;

• opening of sealed components;

• opening of ventilated enclosures.

-No any open fire or device like switch which may generate spark/arcing shall be around appliance to avoid causing ignition of the flammable refrigerant used. Please follow the instructions carefully when storing or maintaining the appliance to prevent mechanical damage from occurring.

-Do not use means to accelerate the defrosting process or to clean, other than those recommended by the manufacturer.

-The appliance shall be stored in a room without continuously operating ignition sources (for example: open flames, an operating gas appliance) and ignition sources or (for example: an operating electric heater) close to the appliance.

-Do not pierce or burn.

-Be aware that the refrigerants may not contain an odour.

2.1 Transport of equipment containing flammable refrigerants

- See transport regulations.

2.2 Marking of equipment using signs

- See local regulations.

2.3 Disposal of equipment using flammable refrigerants

- See national regulations.

2.4 Storage of equipment/appliances

- The storage of equipment should be in accordance with the manufacturer's instructions.

2.5 Storage of packed (unsold) equipment

- Storage package protection should be constructed such that mechanical damage to the equipment inside the package will not cause a leak of the refrigerant charge. The maximum number of pieces of equipment permitted to be stored together will be determined by local regulations.

2.6 Information on servicing

1)Checks to the area

- Prior to beginning work on systems containing flammable refrigerants, safety checks are necessary to ensure that the risk of ignition is minimised. For repair to the refrigerating system, the following precautions shall be complied with prior to conducting work on the system.

2)Work procedure

- Work shall be undertaken under a controlled procedure so as to minimise the risk of a flammable

gas or vapour being present while the work is being performed.

3)General work area

- All maintenance staf 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 of. Ensure that the conditions within the area have been made safe by control of flammable material.

4)Checking for presence of refrigerant

- The area shall be checked with an appropriate refrigerating detector prior to and during work, to ensure the technician is aware of potentially flammable atmospheres. Ensure that the leak detection equipment being used is suitable for use with flammable refrigerants, i.e. non-sparking, adequately sealed or intrinsically safe.

5)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.

6)No ignition sources

- No person carrying out work in relation to a refrigerating system which involves exposing any pipe work that contains or has contained flammable refrigerant 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 sufciently far away from the site of installation, repairing, removing and disposal, during which flammable 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.

7)ventilated area

- 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.

8)Checks to the refrigerating equipment

- Where electrical components are being changed, they shall be fit for the purpose and to the correct specifications. 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 actual refrigerant charge 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; marking to the equipment continues to be visible and legible. markings and signs that are illegible shall be corrected; and refrigerating 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.

9)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 there no live electrical components and wiring are exposed while charging, recovering or purging the system; that there is continuity of earth bonding.

2.7 Repairs to sealed components

1)During repairs to sealed components, all electrical supplies shall be disconnected from the equipment being worked upon prior to any removal of sealed covers, etc. If it is absolutely necessary to have an electrical supply to equipment during servicing, then a permanently operating form of leak detection shall be located at the most critical point to warn of a potentially hazardous situation.

2)Particular attention shall be paid to the following to ensure that by working on electrical components, the casing is not altered in such a way that the level of protection is affected.

- This shall include damage to cables, excessive number of connections, terminals not made to original specification, damage to seals, incorrect fitting of glands, etc.

- Ensure that apparatus is mounted securely.
- Ensure that seals or sealing materials have not degraded such that they no longer serve the purpose of preventing the ingress of flammable atmospheres. Replacement parts shall be in accordance with the manufacturer's specifications.

NOTE: The use of silicon sealant may inhibit the efectiveness of some types of leak detection equipment. Intrinsically safe components do not have to be isolated prior to working on them.

2.8 Repair to intrinsically safe components

Do not apply any permanent inductive or capacitance loads to the circuit without ensuring that this will not exceed the permissible voltage and current permitted for the equipment in use. Intrinsically safe components are the only types that can be worked on while live in the presence of a flammable atmosphere. The test apparatus shall be at the correct rating. Replace components only with parts specified by the manufacturer. Other parts may result in the ignition of refrigerant in the atmosphere from a leak.

2.9 Cabling

Check that cabling will not be subject to wear, corrosion, excessive pressure, vibration, sharp edges or any other adverse environmental efects. The check shall also take into account the efects of aging or continual vibration from sources such as compressors or fans.

2.10 Detection of flammable refrigerants

Under no circumstances shall potential sources of ignition be used in the searching for or detection of refrigerant leaks. A halide torch (or any other detector using a naked flame) shall not be used.

The following leak detection methods are deemed acceptable for systems containing flammable refrigerants. Electronic leak detectors shall be used to detect flammable refrigerants, but the sensitivity may not be adequate, or may need re-calibration. (Detection equipment shall be calibrated in a refrigerant-free area.) Ensure that the detector is not a potential source of ignition and is suitable for the refrigerant used. Leak detection equipment shall be set at a percentage of the LFL of the refrigerant and shall be calibrated to the refrigerant employed and the appropriate percentage of gas (25% maximum) is confirmed. Leak detection fluids are suitable for use with most refrigerants but the use of detergents containing chlorine shall be avoided as the chlorine may react with the refrigerant and corrode the copper pipe-work.

If a leak is suspected, all naked flames shall be removed/ extinguished. If a leakage of refrigerant is found which requires brazing, all of the refrigerant shall be recovered from the system, or isolated (by means of shut of valves) in a part of the system remote from the leak. Removal of refrigerant shall be according to Removal and evacuation.

2.11 Removal and evacuation

When breaking into the refrigerant circuit to make repairs—or for any other purpose - conventional procedures shall be used. However, for flammable refrigerants it is important that best practice be followed, since flammability is a consideration. The following procedure shall be adhered to:

a) safely remove refrigerant following local and national regulations;

b) purge the circuit with inert gas;

c) evacuate (optional for A2L);

d) purge with inert gas (optional for A2L);

e) open the circuit by cutting or brazing.

The refrigerant charge shall be recovered into the correct recovery cylinders if venting is not allowed by local and national codes. For appliances containing flammable refrigerants, the system shall be purged with oxygen-free nitrogen to render the appliance safe for flammable refrigerants. This process might need to be repeated several times. Compressed air or oxygen shall not be used for purging refrigerant systems. For appliances containing flammable refrigerants, refrigerants purging shall be achieved by breaking the vacuum in the system with oxygen-free nitrogen and continuing to fill until the working pressure is achieved, then venting to atmosphere, and finally pulling down to a vacuum (optional for A2L). This process shall be repeated until no refrigerant is within the system (optional for A2L). When the final oxygen-free nitrogen charge is used, the system shall be vented down to atmospheric pressure to enable work to take place. Ensure that the outlet for the vacuum pump is not close to any potential ignition sources and that ventilation is available.

2.12 Charging procedures

In addition to conventional charging procedures, the following requirements shall be followed. Ensure that contamination of diferent refrigerants does not occur when using charging equipment. Hoses or lines shall be as short as possible to minimise the amount of refrigerant contained in them. Cylinders shall be kept in an appropriate position according to the instructions. Ensure that the refrigeration system is earthed prior to charging the system with refrigerant. Label the system when

charging is complete (if not already). Extreme care shall be taken not to overfill the refrigeration system. Prior to recharging the system it shall be pressure tested with OFN. The system shall be leak tested on completion of charging but prior to commissioning. A follow up leak test shall be carried out prior to leaving the site.

2.13 Decommissioning

Before carrying out this procedure, it is essential that the technician is completely familiar with the equipment and all its detail. It is recommended good practice that all refrigerants are recovered safely. Prior to the task being carried out, an oil and refrigerant sample shall be taken in case analysis is required prior to re-use of reclaimed refrigerant. It is essential that electrical power is available before the task is commenced.

a)Become familiar with the equipment and its operation.

b)Isolate system electrically.

c)Before attempting the procedure ensure that: Mechanical handling equipment is available, if required, for handling refrigerant cylinders;

All personal protective equipment is available and being used correctly; The recovery process is supervised at all times by a competent person; Recovery equipment and cylinders conform to the appropriate standards.

d)Pump down refrigerant system, if possible.

e)If a vacuum is not possible, make a manifold so that refrigerant can be removed from various parts of the system.

f)Make sure that cylinder is situated on the scales before recovery takes place.

g)Start the recovery machine and operate in accordance with instructions.

h)Do not overfill cylinders. (No more than 80 % volume liquid charge).

i)Do not exceed the maximum working pressure of the cylinder, even temporarily.

j)When the cylinders have been filled correctly and the process completed, make sure that the cylinders and the equipment are removed from site promptly and all isolation valves on the equipment are closed of.

k)Recovered refrigerant shall not be charged into another refrigeration system unless it has been cleaned and checked.

2.14 Labelling

Equipment shall be labelled stating that it has been de-commissioned and emptied of refrigerant. The label shall be dated and signed.

Ensure that there are labels on the equipment stating the equipment contains flammable refrigerant.

2.15 Recovery

When removing refrigerant from a system, either for servicing or decommissioning, it is recommended good practice that all refrigerants are removed safely. When transferring refrigerant into cylinders, ensure that only appropriate refrigerant recovery cylinders are employed.

Ensure that the correct number of cylinders for holding the total system charge is available. All cylinders to be used are designated for the recovered refrigerant and labelled for that refrigerant (i.e. special cylinders for the recovery of refrigerant). Cylinders shall be complete with pressure relief valve and associated shut-of valves in good working order. Empty recovery cylinders are evacuated and, if possible, cooled before recovery occurs.

The recovery equipment shall be in good working order with a set of instructions concerning the equipment that is at hand and shall be suitable for the recovery of flammable refrigerants.In addition, a set of calibrated weighing scales shall be available and in good working order. Hoses shall be complete with leak-free disconnect couplings and in good condition. Before using the recovery machine, check that it is in satisfactory working order, has been properly maintained and that any associated electrical components are sealed to prevent ignition in the event of a refrigerant release. Consult manufacturer if in doubt. The recovered refrigerant shall be returned to the refrigerant supplier in the correct recovery cylinder, and the relevant Waste Transfer Note arranged.

Do not mix refrigerants in recovery units and especially not in cylinders. If compressors or compressor oils are to be removed, ensure that they have been evacuated to an acceptable level to make certain that flammable refrigerant does not remain within the lubricant. The evacuation process shall be carried out prior to returning the compressor to the suppliers. Only electric heating to the compressor body shall be employed to accelerate this process. When oil is drained from a system, it shall be carried out safely.

Non-duct connected appliances containing A2L refrigerants with the supply and return air openings in the conditioned space may have the body of the appliance may be installed in open areas such as false ceilings not being used as return air plenums, as long as the conditioned air does not directly communicate with the air of the false ceiling.

Specifications

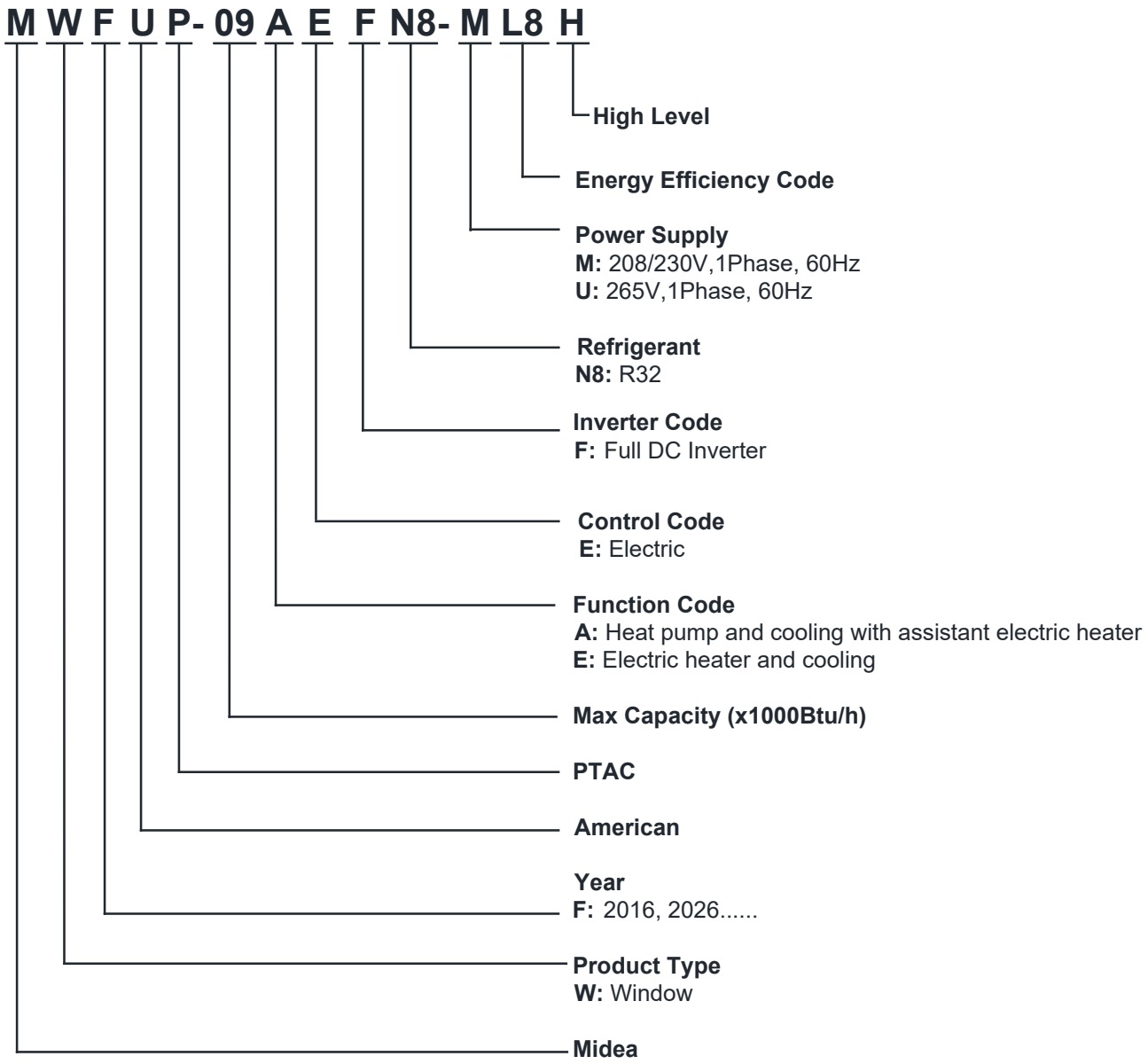
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1. Model Reference

Unit Model	Capacity (Btu/h)	Power Supply
MWFUP-09AEFN8-ML8H	9k Hyper	208/230V~, 60Hz, 1Phase
MWFUP-12AEFN8-MK6H	12k Hyper	
MWFUP-15AEFN8-MJ6H	15k Hyper	

2. Nomenclature



3. Specifications

Model			MWFUP-09AEFN8-ML8H	MWFUP-12AEFN8-MK6H	MWFUP-15AEFN8-MJ6H
Power supply (Indoor)		V- Ph-Hz	208/230-1-60	208/230-1-60	208/230-1-60
Starting current		A	16	16	16
Compressor	Model		KSN103D42UEZ31	KSN140D58UFZ	KSN140D58UFZ
	Type		ROTARY	ROTARY	ROTARY
	Brand		GMCC	GMCC	GMCC
	Capacity	W	3220	4315	4315
	Input	W	813	1090	1090
	Rated current	A	4.9	7.15	7.15
	Refrigerant oil/oil charge	ml	POE VG74 280	ESTER OIL VG74 440	ESTER OIL VG74 440
Indoor side fan motor(DC)	Model		ZKFP-32-8-25L	ZKFP-32-8-25L	ZKFP-32-8-25L
	Speed(hi/mi/lo)	r/min	Cool 984/868/752 Heat 1024/898/772	Cool 984/868/752 Heat 1024/898/772	Cool 1092/984/876 Heat 1132/1014/896
	Insulation class		B	B	B
	Waterproofing class		IP20	IP20	IP20
Outdoor side fan motor	Model		ZKFN-53-10-1L	ZKFN-53-10-1L	ZKFN-53-10-1L
	Input	W	77	77	77
	Capacitor	uF	/	/	/
	Speed(hi/mi/lo)	r/min	1100/930/820	1150/930/820	1200/930/820
	Capacitor class		/	/	/
	Insulation class		B	B	B
Indoor air flow (Hi/Mi/Lo)		m3/h	710/600/500	640/540/450	686/601/510
		ft3/min	417.48/352.8/294	376.32/317.52/264.6	403.37/353.39/299.88
Indoor sound pressure level Hi/Mi/Lo)		dB(A)	48.5/45.5/41	48.5/44.5/40	51/47.5/44
Outdoor side noise level(Hi)		dB(A)	63	63	68
Refrigerant type		Type	R32	R32	R32
		kg	0.75	0.9	0.9
		oz	26.46	31.75	31.75
Design pressure(145psi=1MPa)(L/H)		psi	300/580	300/580	300/580
Power wiring			12#x3	12#x3	12#x3
Plug type			LCDI(6-20P)	LCDI(6-20P)	LCDI(6-20P)
Control type			Electronic Control	Electronic Control	Electronic Control
Operation temp	indoor(cooling/heating)	°C	16-32/0-30	16-32/0-30	16-32/0-30
		°F	60.8-89.6/32-86	60.8-89.6/32-86	60.8-89.6/32-86
	outdoor(cooling/heating)	°C	0-50/-30-30	0-50/-25-30	0-50/-30-30
		°F	32-122/-22-86	32-122/-13-86	32-122/-22-86
Dimension(W*D*H)		mm	1067x532x406	1067x532x406	1067x532x406
		in	42.0x20.9x15.9	42.0x20.9x15.9	42.0x20.9x15.9
Packing (W*D*H)		mm	1120x620x490	1120x620x490	1120x620x490
		in	44.1x24.4x19.3	44.1x24.4x19.3	44.1x24.4x19.3
Net/Gross weight		kg	45.9/50.2	48.6/52.8	48.6/52.8
		lb	101.19/110.67	107.14/116.40	107.14/116.40
Qty'per 20' /40' /40'HQ		Pieces	72/152/190	72/152/190	72/152/190

Notes:

1) Capacities are based on the following conditions:

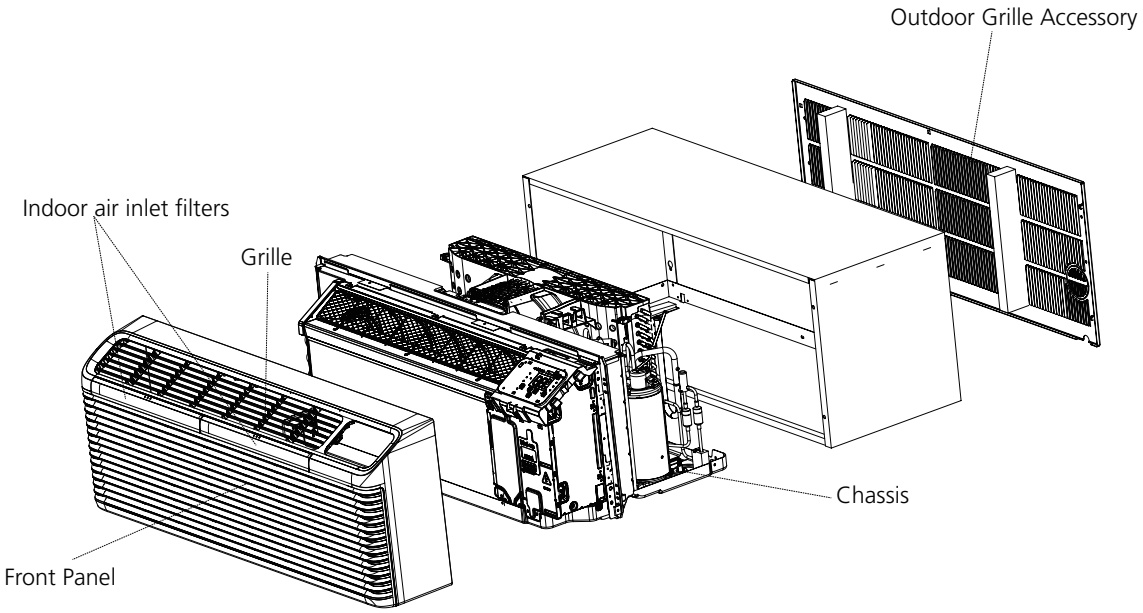
Cooling: - Indoor Temperature 26.7°C(80°F) DB /19.4 °C(67°F) WB
-Outdoor Temperature 35 °C(95°F) DB /23.9 °C(75°F) WB

Heating: - Indoor Temperature 21.1°C(70°F) DB / 15.6°C(60°F) WB
-Outdoor Temperature 8.3°C(47°F) DB / 6.1°C(43°F) WB

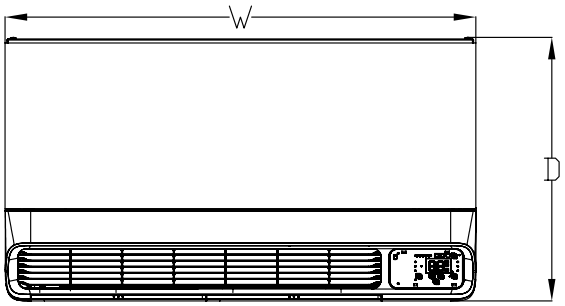
2) Capacities are Net Capacities.

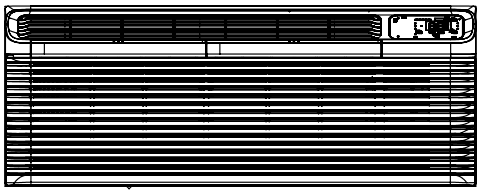
3) Due to our policy of innovation some specifications may be changed without notification.

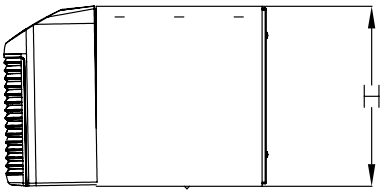
4. Unit Components



5. Dimension

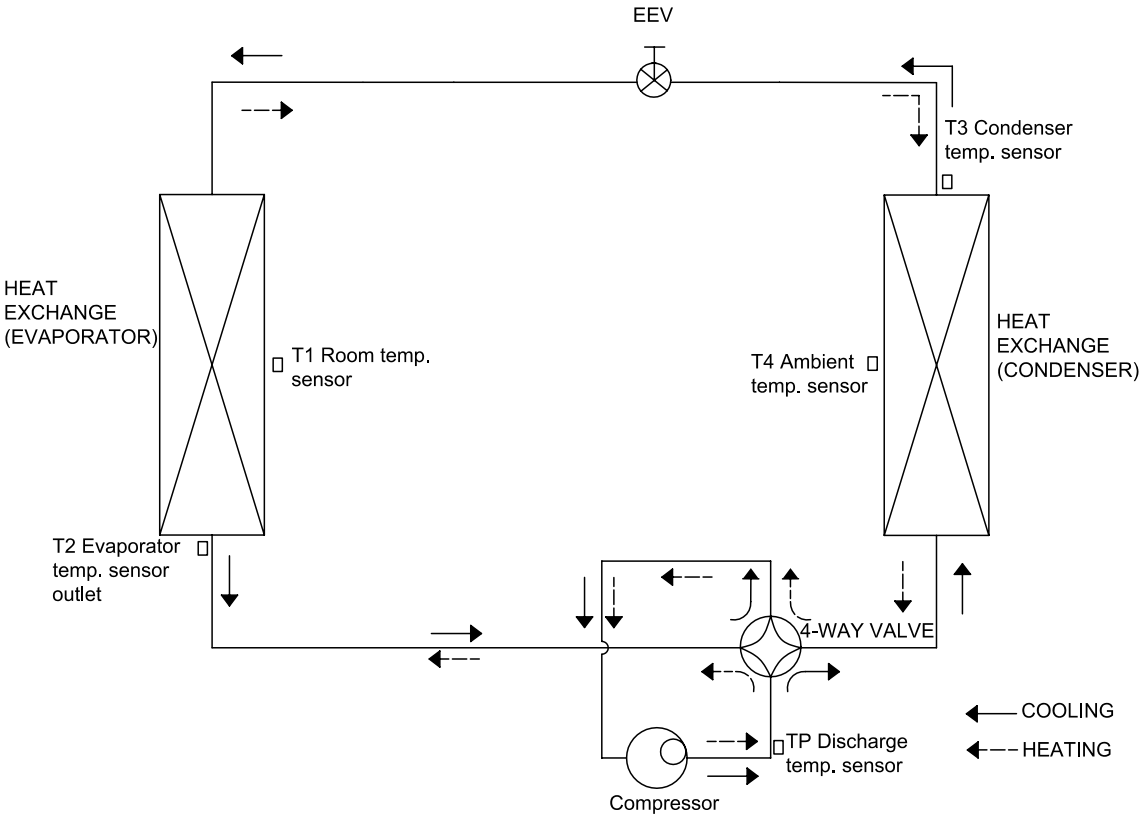




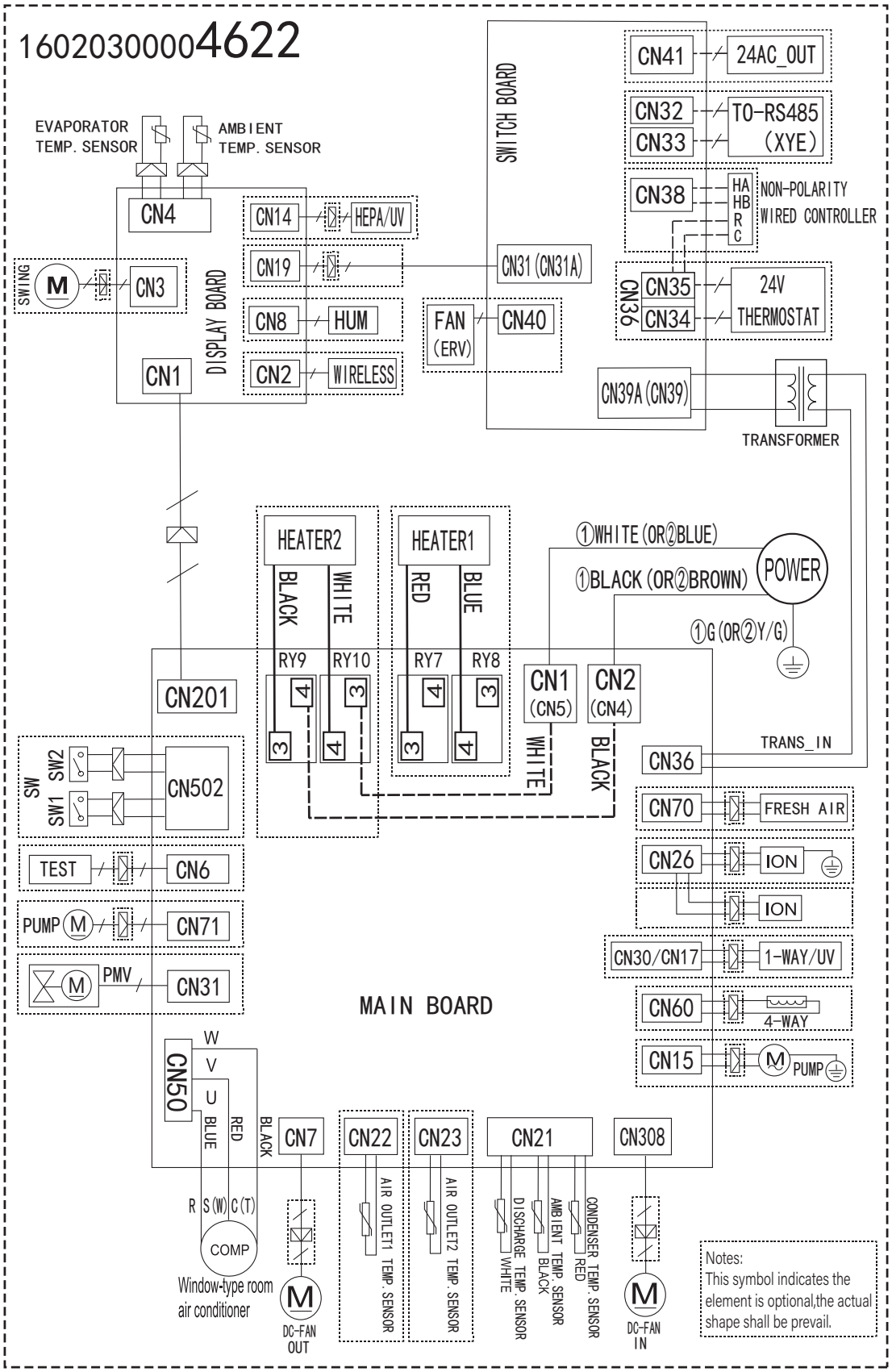


Dimension	WxHxD(mm) WxHxD(inch)
MWFUP-09AEFN8-ML8H MWFUP-12AEFN8-MK6H MWFUP-15AEFN8-MJ6H	1067x406x532 42.0x15.9x20.9

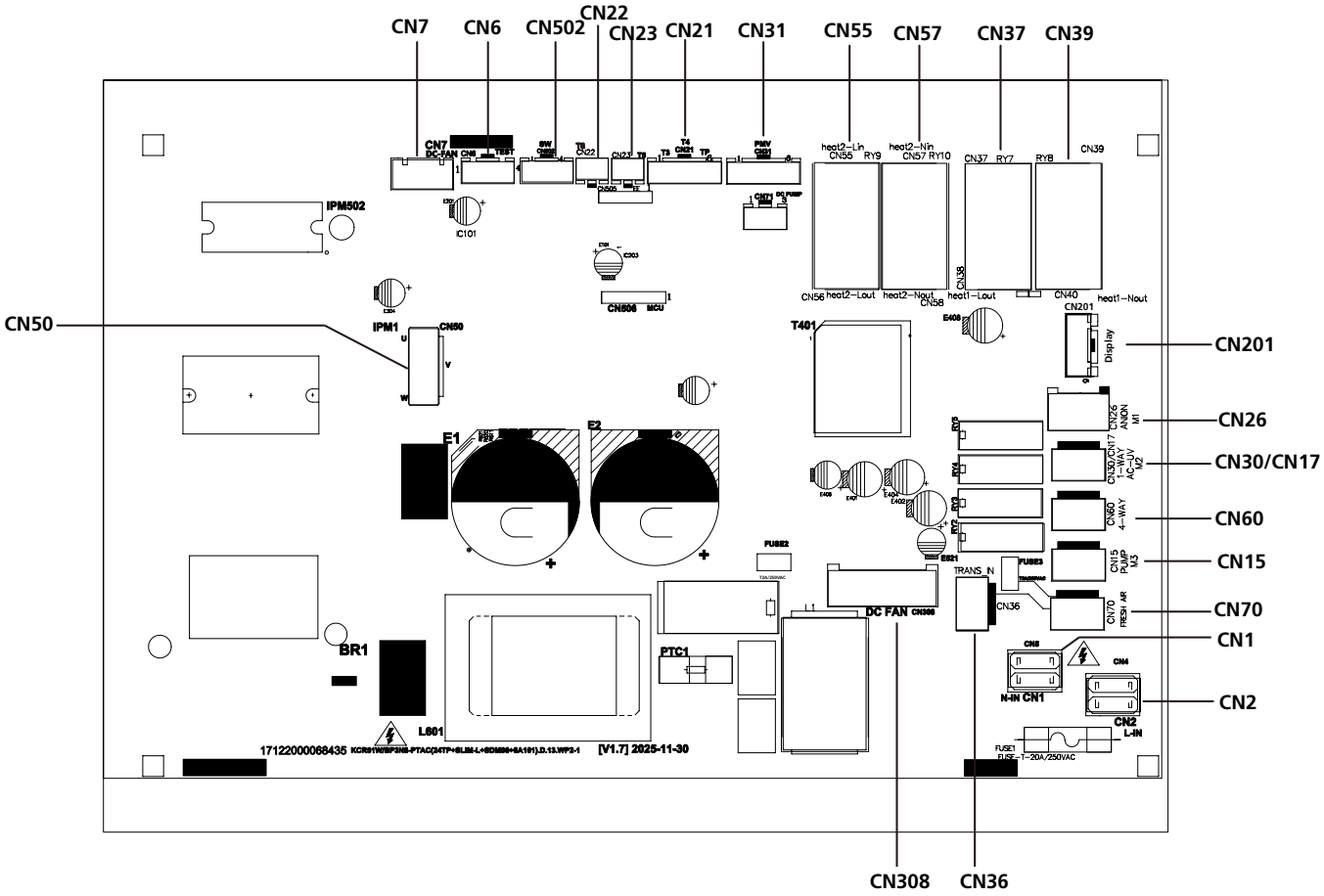
6. Refrigerant Cycle Diagrams



7. Electrical Wiring Diagrams



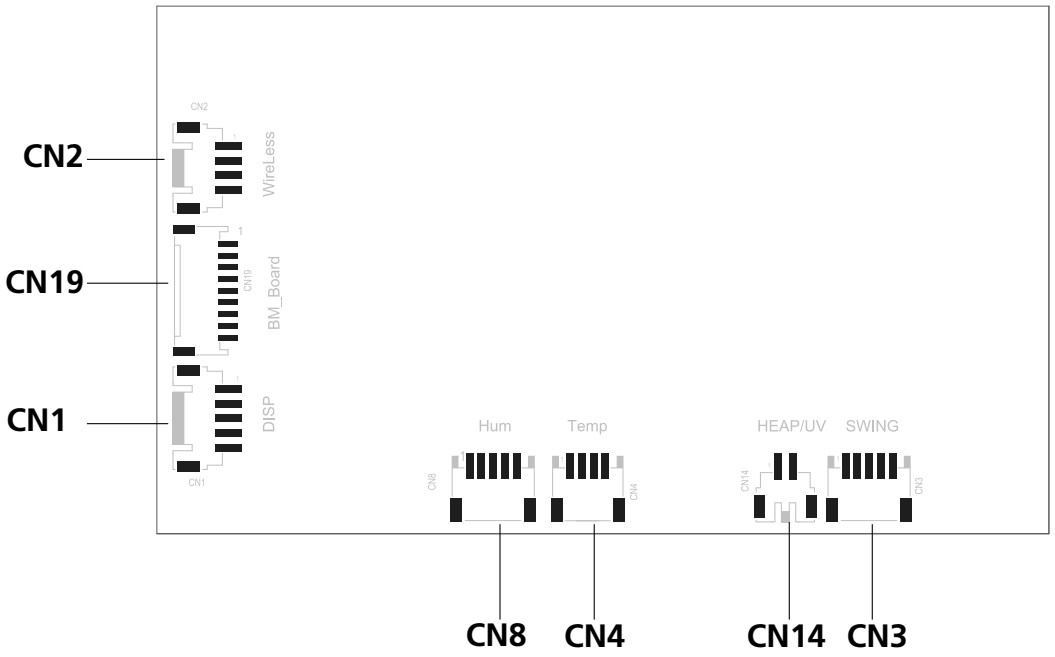
Main control board diagram: 17122000068435



Name	CN#	Meaning
UVW	CN50	Connect to compressor (Output: 0-310V AC)
DC-Fan OUT	CN7	Connect to DC fan
TESTPORT	CN6	Used for testing
T6	CN22	Connect to discharge temp. sensor T6(Output: 5V DC)
T5	CN23	Connect to discharge temp. sensor T5(Output: 5V DC)
T3 T4 TP	CN21	Connect to pipe temp. sensor T3, ambient temp. sensor T4 and discharge temp. sensor TP (Output: 5V DC)
PMV	CN31	Connect to electric expansion valve, (Output:12V DC)
HEAT2	CN55, CN56	Connect to heat2 L-line
	CN57, CN58	Connect to heat2 N-line
HEAT1	CN37, CN38	Connect to heat1 L-line
	CN39, CN40	Connect to heat1 N-line
Display	CN201	Connect to display board CN1
ANION	CN26	Connect to negative-ion generator(Output:208-230V AC)
1-Way/AC-UV	CN30/CN17	Connect to one-way valve or UV
4-Way	CN60	Connect to four way valve(Output:208-230V AC)
PUMP	CN15	Connect to drain pump
Fresh-Air	CN70	Connect to fresh-air
Power Supply	CN1	N_in: Connect to N-line (208-230V AC input)
	CN2	L_in: Connect to L-line (208-230V AC input)
Trans In	CN36	Connect to transformer(208-230V AC input)
DC FAN IN	CN308	Connect to indoor fan(Output:310V DC)

Note: This section is for reference only. Please take practicality as standard.

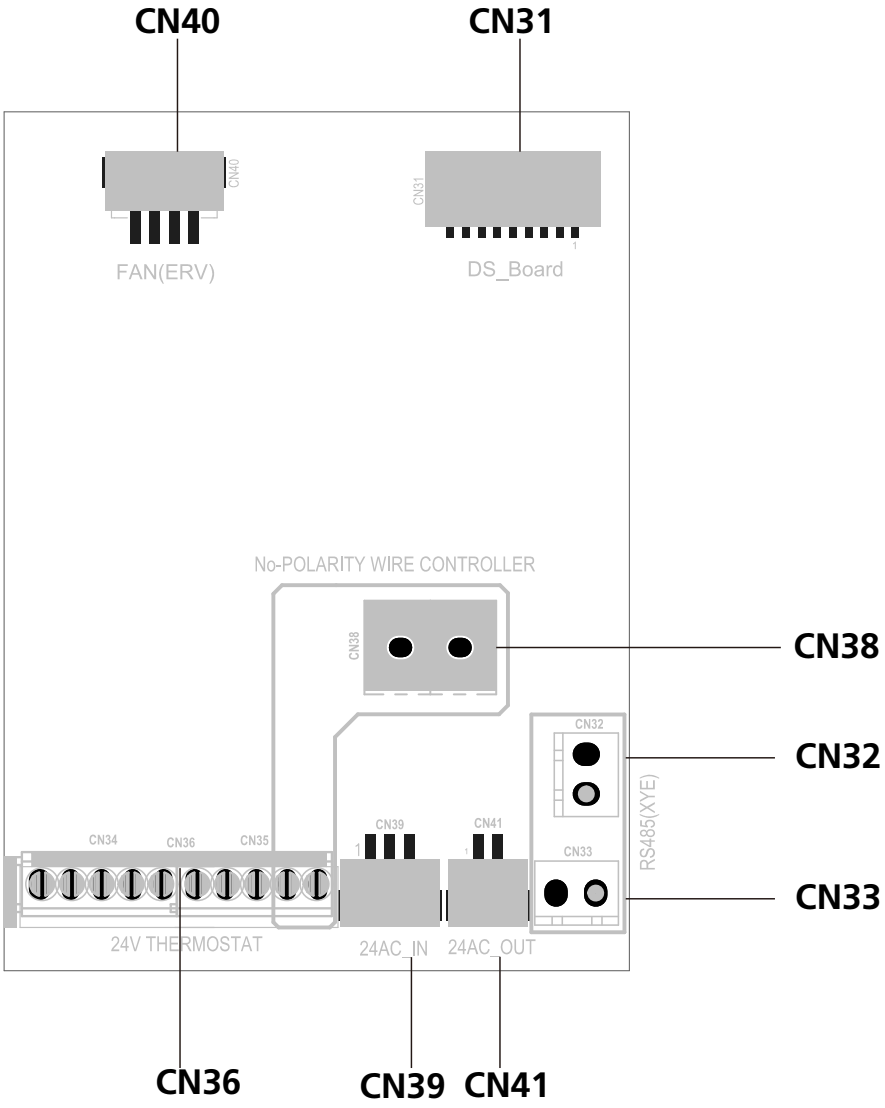
Display board diagram: 17120300007930



Name	CN#	Meaning
Wireless	CN2	Connect to wireless
BM_Board	CN19	Connect to 24V board CN31
DISP	CN1	Connect to main control board CN201(Output: 5V DC)
Hum	CN8	Connect to humidifier sensor (Output: 5V DC),
Temp	CN4	Connect to indoor ambient temperature sensor T1, indoor coil temperature sensor T2(Output: 5V DC)
HEAP/UV	CN14	Connect to HEAP or UV
Swing	CN3	Connect to swing motor (Output: 12V DC)

Note: This section is for reference only. Please take practicality as standard.

DIP Swtich board diagram: 17122000068390



Name	CN#		Meaning
FAN_ERV	CN40		Connect to ERV fan
DS_Board	CN31		Connect to display board
Non-polarity wired controller	CN38		Connect to Non-polarity wired controller
RS485(XYE)	CN32		Connect to RS485 communication (Output:12V or 5V DC)
	CN33		
24V Thermostat	CN36	CN34	Connect to 24V Thermostat
		CN35	
24VAC IN	CN39		Connect to transformer(24VAC input)
24VAC OUT	CN41		Connect to general wall pad(Output:24V AC)

Note: This section is for reference only. Please take practicality as standard.

Function and Control Panel

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3.6 Auto Mode 7

3.7 DIP Switches Configurations 8

3.8 Panel Control Configurations (optional) 10

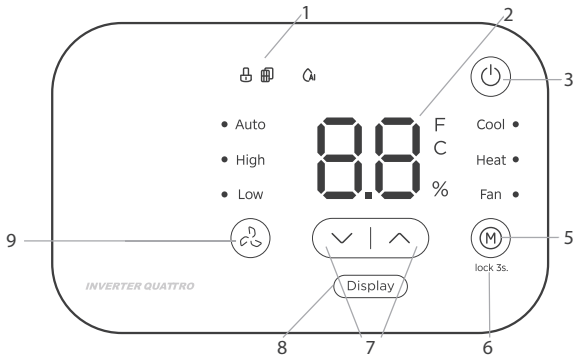
3.9 WALL THERMOSTAT TERMINAL (Optional) 15

3.10 Makeup Air Function (optional) 17

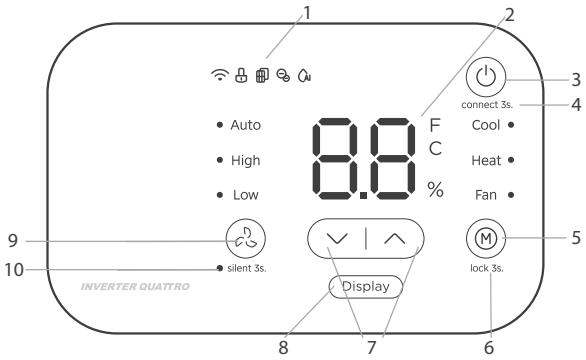
3.11 Panel Control Configurations of Makeup Air System 19

1. Control Panel

Standard



With optional functions



		Description
1	Lock Icon	· The icon appears to indicate that the panel lock has been turned on.
	Check Filter Icon	· The icon appears to indicate that the air filter, pump filter (some units), and make up air filter (optional) needs to be cleaned. The filter indicator will illuminate after 900 hours of operation. Contact an authorized service technician for cleaning filters. Pressing the Display button (Display) for 3 seconds will reset the filter clean indicator.
	Connect Icon (optional)	· The icon appears to indicate that the wireless module has been activated.
	Negative Ion Icon (optional)	· The icon appears to indicate that the negative ion function has been activated.
2	F C % **Display**	· Shows the set temperature in°C or °F. While on Fan only mode, it shows the room temperature. Control code (on some models): LC - Pads on the control panel is not available. The unit can be set by using wire controller only. FC - Pads on the control panel and wire controller are not available. The unit can be set by using FRONT DESK CONTROL only. Error codes: · The unit may stop operation due to a malfunction with the unit. If this occurs, an error code may appear on the display like below.Wait 10 minutes as the problem may resolve itself. If not, disconnect the power, then connect it again. Turn the unit on. If the problem persists, disconnect the power and contact customer service.Error codes appear and begin with the letters as noted below in the window display of the indoor unit: EH(xx), EL(xx), EC(xx), PH(xx), PL(xx), PC(xx). NOTE: When error occurs,unplug the unit and plug it back in. If error repeats, call for service.Other codes: LO - Room temperature is lower than 0°C/32°F; HI - Room temperature is higher than 37°C/99°F; FP - Low temperature protection. HP- High temperature protection. NOTE: All the illustrations in this manual are for explanation purpose only. Your air conditioner may be slightly dierent. The actual shape shall prevail.
3	POWER - Function	Press the POWER button to turn the unit on or off.
4	connect 3s Wireless connection (optional)	· To connect your equipment to wireless, press the power button for 3 seconds to initiate the wireless connection mode. The display shows 'AP' to indicate the unit is in the wireless connection mode. Refer to the wireless section for further instructions. · If the connection is successful within 8 minutes, the unit will exit wireless connection mode automatically, and the connect LED will illuminate. · If the connection fails within 8 minutes, the unit exits wireless connection mode automatically, and the connect LED will not illuminate. =· After the wireless connection is successful, you can press and hold the power and Down buttons for 3 seconds to turn o the wireless function, and the LED display will show 'OF' for 3 seconds. Press the power and up buttons for 3 seconds to turn the wireless function back on, and the LED display will show 'On' for 3 seconds.

5	 Mode - Function	· Push this button to cycle through the modes from Cool-Heat-FAN-Cool. The indicator light beside the “MODE” option will illuminate, To operate on Cool mode : Choose Cool Mode to set the cooling function. Use the Up (∧) and Down (∨) buttons to choose the desired temperature. When Cool Mode is selected, the fan speed can be adjusted by pressing the fan button.Use this function only when cooling is not desired. You can choose any fan speed you prefer. To operate in FAN Only During this function, the display will show the actual room temperature, not the set temperature as in the cooling mode.In Fan Only mode, the set temperature cannot be adjusted. To operate on Heat mode (not suitable for cooling only models): Choose Heat mode to set the heating function. Use the Up and Down buttons to choose the desired temperature .When heat Mode is selected, the fan speed can be adjusted by pressing the fan button. NOTE: The reverse cycle and electric heater cannot be run at the sametime. In following cases, it is normal that the reverse cycle does notoperate. NOTE: If the unit has DIP SWITCH feature, the temperature range is controlled by DIP switch. See DIP SWITCH CONFIGURATIONS for details.
6	 lock 3s PANEL LOCKING-Function	· Pressing the mode button for 3 seconds will turn on or o the lock panel function. The remote control still works. The panel locking indicator turns on when you lock the control panel. NOTE: When the control panel is locked, pressing any other keys will make the panel locking indicator flash for 3 seconds.
7	 Up and Down buttons	· Push the UP (or DOWN) button to increase (or decrease) the set temperature of the unit in cooling or heating mode.The temperature can be set by increments of 1°C (1°F).The setting temperature appears in the display. NOTE: When the machine is turned on, press and hold “ ∧ ” and “ ∨ ” buttons together for 3 seconds will alternate the temperature display between °C & °F scale.
8	 DISPLAY button	· Press the Display button to turn the LED display and air conditioner buzzer on and o, which creates a comfortable environment.
9	 FAN (FAN SPEED)- Function	· Each time you press this button, the fan speed cycles through the settings.
10	 silent 3s. SILENT- Function (optional)	· Pressing the Fan button for 3 seconds will turn on or off the silent function. The fan will run at the silent setting.

NOTE: When there are wide dierences between the USERS MANUAL and the Remote controller Illustration on function description, the description in the USERS MANUAL shall prevail.

2. Safety Features

Compressor three-minute delay at restart

The compressor must wait 3 minutes before starting each time.

Automatic shutoff based on discharge temperature

If the compressor discharge temperature exceeds a certain level for a period of time, the compressor ceases operation.

Automatic shutoff based on fan speed

If the indoor fan speed registers below 80RPM or over 2400RPM for an extended period of time, the unit ceases operation and the LED displays the fault information, and the fault is canceled after 30 seconds, and the fault is no longer canceled if there are 6 faults in a row and the protection interval between each time is less than 500 seconds. It can only be restored when the power is switched on or off or powered back on.

Inverter module protection

The inverter module has an automatic shutoff mechanism based on the unit's current, voltage, and temperature. If automatic shutoff is initiated, the corresponding error code is displayed on the indoor unit and the unit ceases operation.

Indoor fan delayed operation

- When the unit starts, the louver is automatically activated and the indoor fan will operate after a period of setting time.
- If the unit is in heating mode, the indoor fan is regulated by the anti-cold air function.

Sensor redundancy and automatic shutoff

- If one temperature sensor malfunctions, the air conditioner continues operation and displays the corresponding error code, allowing for emergency use.
- When more than one temperature sensor is malfunctioning, the air conditioner ceases operation.

3. Basic Functions

3.1 Abbreviation

Unit element abbreviations

Abbreviation	Element
T1	Indoor room temperature
T2	Coil temperature of evaporator
T3	Coil temperature of condenser
T4	Outdoor ambient temperature
Tsc	Adjusted setting temperature
TP	Compressor discharge temperature
DAHT	Temperature of discharge(T5)
DAHT	ETemperature of discharge(T6)
TCDE1	Exit defrost temperature1
TCDE2	Exit defrost temperature2 (maintain for a period of time)
TIMING_ DEFROST_TIME	Enter defrost time

In this manual, such as TCDE1, TCDE2, TIMING_DEFROST_ TIME...etc., they are well-setting parameter of EEPROM.

3.2 Fan Mode

When fan mode is activated:

- The outdoor fan and compressor cease operation.
- Temperature control is disabled and indoor room temperature is displayed.
- The indoor fan speed can be set to high, low, silent or auto.
- The louver operations are identical to those in cooling mode.
- Auto fan: In fan-only mode, AC operates the same as auto fan in cooling mode with the temperature set at 24°C.(Ts =24°C)

3.3 Cooling Mode

3.3.1 Compressor Control

Reach the configured temperature:

1) When the compressor runs continuously for within 120 minutes.
   - If the following conditions are satisfied, the compressor ceases operation.
     - Calculated frequency(fb) is less than minimum limit frequency(FminC).
     - Compressor runs at FminC more than 10 minutes
     - T1 is lower than or equal to (Tsc-2.5°C)
2) When the compressor runs continuously for more than 120 minutes.
   - If the following conditions are satisfied, the compressor ceases operation.
     - Calculated frequency(fb) is less than minimum limit frequency(FminC).
     - Compressor runs at FminC more than 10 minutes.
     - T1 is lower than or equal to (Tsc-2°C).
3) When the protective time is not reached, the

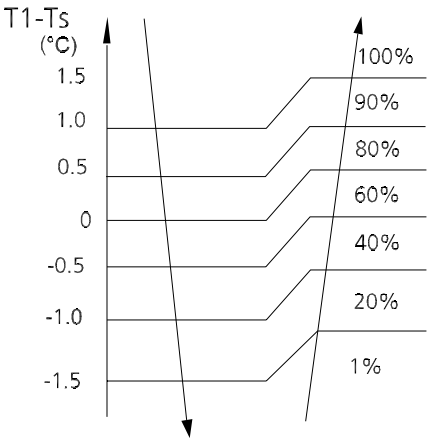
compressor cannot be shut down even if the shutdown conditions are met, but the compressor is kept running at the lowest frequency(FminC). If one of the following conditions is satisfied, not judge protective time.

- Compressor running frequency(fr) is more than test frequency(TestFre).
- Compressor running frequency is equal to test frequency, T4 is more than 15°C or T4 fault.
- Change setting temperature.
- Turning on/off turbo or Sleep feature
- Various frequency limit shutdown occurs.

3.3.2 Indoor Fan Control

1) In cooling mode, the indoor fan operates continuously. The indoor fan speed can be set to high, low, silent or auto.

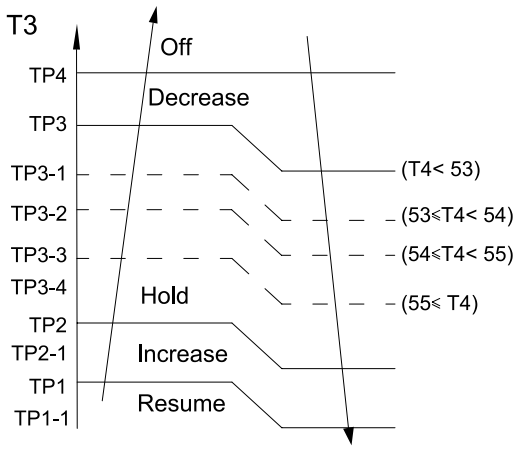
2) Auto fan



3.3.3 Outdoor Fan Control

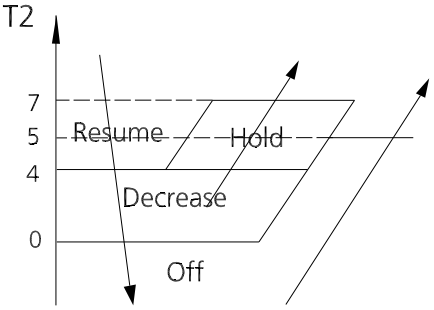
- The outdoor unit will be run at different fan speed according to T4 and compressor running frequency..
- For different outdoor units, the fan speeds are different.

3.3.4 Condenser Temperature Protection



- Off: Compressor stops.
- Decrease: Decrease the running frequency at 1Hz/s.
- Hold: Keep the current frequency.
- Increase: Increase the running frequency at 0.04Hz/s.
- Resume: No limitation for frequency.

3.3.5 Evaporator Temperature Protection



- Off: Compressor stops.
- Decrease: Decrease the running frequency to the lower level per 1 minute.
- Hold: Keep the current frequency.
- Resume: No limitation for frequency.

3.4 Heating Mode(Heat Pump Units)

3.4.1 Compressor Control

1) Reach the configured temperature

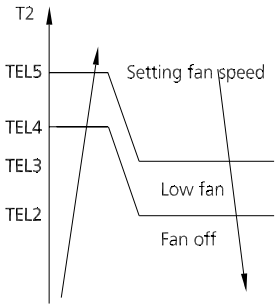
- If the following conditions are satisfied, the compressor ceases operation.
  - Calculated frequency(fb) is less than minimum limit frequency(FminH).
  - Compressor runs at FminH more than 10 minutes.
  - T1 is higher than or equal to Tsc+2°C.
- When the protective time is not reached, the compressor cannot be shut down even if the shutdown conditions are met, but the compressor is kept running at the lowest frequency(FminH). If one of the following conditions is satisfied, not judge protective time.
  - Compressor running frequency(fr) is more than test frequency(TestFre).
  - When compressor running frequency is equal to test frequency, T4 is more than 15°C or T4 fault.
  - Change setting temperature.
  - Turning on/off turbo or Sleep feature.

2) When the current is higher than the predefined safe value, surge protection is activated, causing the compressor to cease operations.

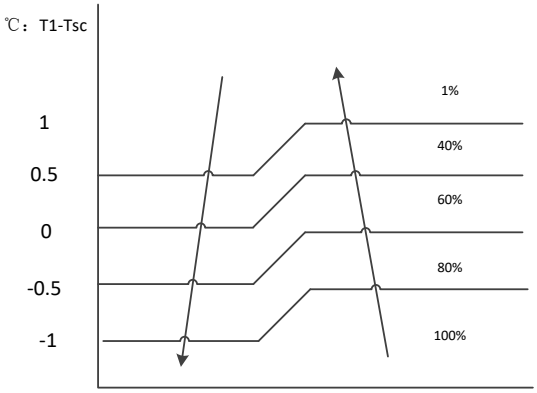
3.4.2 Indoor Fan Control:

1) In heating mode, the indoor fan operates continuously. The indoor fan speed can be set to high, low, silent or auto. And the anti-cold air function has the priority.

- Anti-cold air function
  - The indoor fan is controlled by the indoor unit coil temperature T2.



2) Auto fan



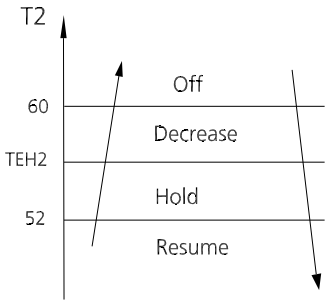
3.4.3 Outdoor Fan Control

- The outdoor unit will be run at different fan speed according to T4 and compressor running frequency.
- For different outdoor units, the fan speeds are different.

3.4.4 Defrosting mode

- The unit enters defrosting mode according to changes in the temperature value of T3, T4 as well as the compressor running time.
- In defrosting mode, the compressor continues to run, the indoor and outdoor motor will cease operation.
- If any one of the following conditions is satisfied, defrosting ends and the machine switches to normal heating mode:
  - T3 rises above TCDE1°C.
  - T3 maintained above TCDE2°C for 80 seconds.
  - Unit runs for 15 minutes consecutively in defrosting mode.
- If T4 is lower than or equal to -22°C and compressor running time is more than TIMING_DEFROST_TIME, if any one of the following conditions is satisfied, defrosting ends and the machine switches to normal heating mode:
  - Unit runs for 10 minutes consecutively in defrosting mode.
  - T3 rises above 10°C/50°F.
- If any one of the following conditions is satisfied, the unit enters defrosting mode
  - If T3 or T4 is lower than -3°C(27°F) for 30 seconds,Ts-T1 is lower than 5°C(10°F) and compressor running time is more than 90min.
  - If T3 or T4 is lower than -3°C(27°F) for 30 seconds and compressor running time is more than 120min.

3.4.5 Evaporator Temperature Protection



- Off: Compressor stops.
- Decrease: Decrease the running frequency to the lower level per 20 seconds.
- Hold: Keep the current frequency.
- Resume: No limitation for frequency.

3.5 Heating Mode(Electric heater control)

1. When T1≤Tsc, and fan speed is higher than ucSpdHLLow-100 for 3 seconds,the heater is on and when fan speed is below ucSpdHLLow-200 for 3 seconds, the heater is off. The indoor fan speed is at 1% within 30 seconds. After 30 seconds, it changes to the setting speed.

2. When T1≥Tsc +HDIFTEMP2, the heater is off, and the fan motor keeps on working at setting speed. If the DAHT temperature checked is lower than the protection temperature, and the operation time of fan motor is more than 10 seconds, then the fan motor is off.

3. If the DAHT temperature checked is higher than the protection temperature, the heater is off and the fan motor keeps on working. Until the DAHT temperature checked is lower than the protection temperature, the heater is on.

4. If the DAHT temperature sensor is in open circuit or has short circuited, the heater is off and the fan motor is off 30

seconds later.

5. If the ambient temperature sensor is in open circuit or has short circuited, the heater is off and the fan motor is off 30 seconds later.

3.6 Auto Mode

- In this mode, the fan speed cannot be adjusted and is automatically controlled based on the temperature setting and room temperature.
- In auto mode, the machine selects cooling, heating, or fan-only mode on the basis of **Δ**T (**Δ**T =T1-TS).

ΔT	Running mode
ΔT>1°C(2°F)	Cooling
-1°C(-2°F)≤ΔT≤1°C(2°F)	Fan-only
ΔT<-1°C(-2°F)	Heating

- Select the operation mode according to the room temperature(T1) and set temperature(Ts), determine the current actual operation mode, and judge once every 15 minutes after the compressor stops.
- If the setting temperature changes, re-judge the running mode.
- There is no need to wait 15 minutes to judge the mode in auto fan mode.

3.7 DIP Switches Configurations

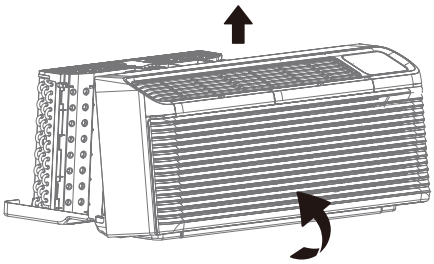
CAUTION

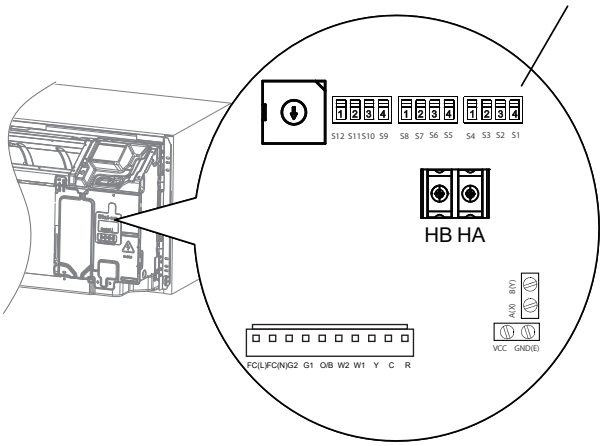
Unit must be powered OFF to effectively change their status.

Removing the front panel

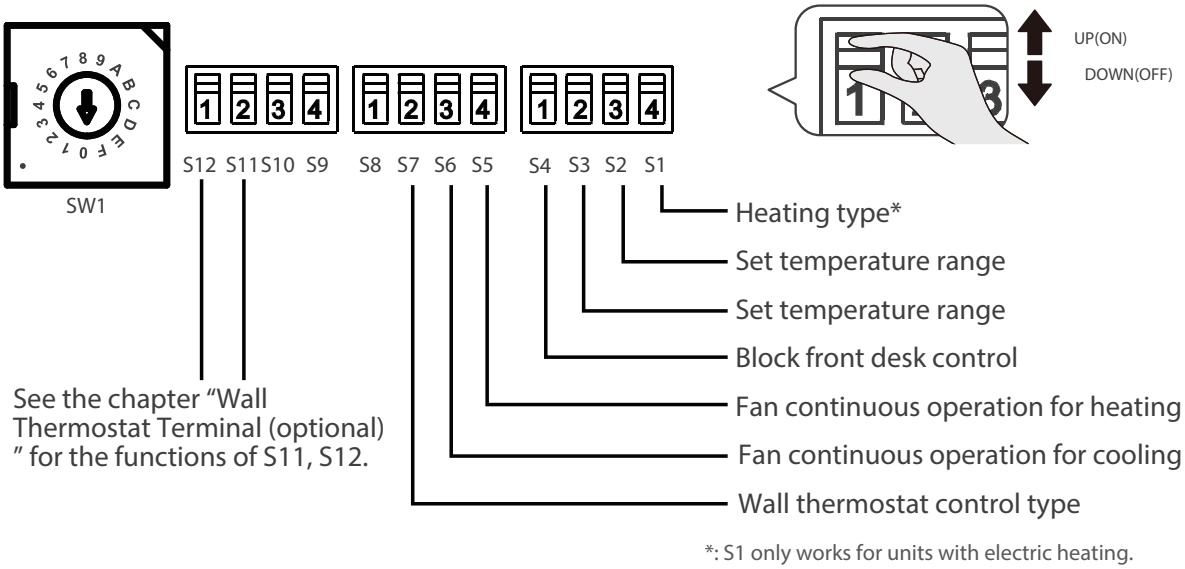
Step 1: Pull out at the bottom to release it from the tabs, then lift the front panel up.

Step 2: Remove the rubber grommet to set the DIP switches. Reinstall the rubber grommet after you finish. Do not discard the rubber grommet.





- See Table 1 (on the next page) and figure shown below for DIP Switches configurations and functions of each DIP switch position.



*: S1 only works for units with electric heating.

Table 1 DIP SWITCHES CONFIGURATIONS

Dip Switch	Up(ON)-1	Down(OFF)-0
S1	Heating mode with only electric heating	Heating mode with electric heating or heat pump heating
S2 S3	Setting Temperature Range: S2=OFF, S3=OFF: 60°F-86°F; S2=ON, S3=OFF: 63°F-80°F; S2=OFF, S3=ON: 65°F-78°F; S2=ON, S3=ON: 68°F-75°F.	
S4	Block front desk control	Allow front desk control
S5	Indoor fan continuous operation is enabled in heating mode. Allows the fan to run continuously, circulating air even when the temperature setting has been satisfied. This switch helps to maintain the room temperature closer to the thermostat setting.	Indoor fan continuous operation is disabled in heating mode. After both the compressor and electric heating are turned off, the fan will cycle on and off.
S6	Indoor fan continuous operation is enabled in cooling mode. Allows the fan to run continuously, circulating air even when the temperature setting has been satisfied. This switch helps to maintain the room temperature closer to the thermostat setting.	Indoor fan continuous operation is disabled in cooling mode. After the compressor is turned off, the fan will cycle on and off.
S7	The device can only be controlled by the wall thermostat.	The device can be controlled by the panel, wall thermostat, and wired controller. Signals from the wall thermostat have the highest priority.

*** S1: Heating mode**

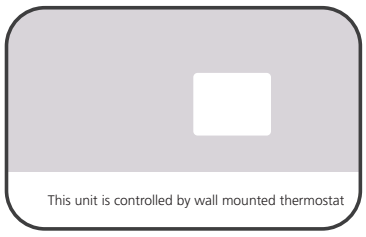
- When your unit doesn't come with electric heating, this switch doesn't take eetct.

*** S2, S3: Set Temperature range limits**

- Set the range of temperature control.

*** S7: Wall Thermostat control**

A wall thermostat can be connected to the unit. If the DIP switch is set to ON, the device will only process inputs from the thermostat. Inputs from the panel, remote control, etc., will be invalid. If the DIP switch is set to OFF, the device can be controlled by the panel, remote control, wired controller, and thermostat. When the thermostat outputs a control signal to the air conditioner, the air conditioner will prioritize the input from the thermostat.



Control panel sticker

NOTE: When S7 is set to ON ,the device displays LC. The control panel does not respond. The unit can be controlled by using the Wall Thermostat only. You can install the accessory on the control panel.When powering on and entering the LC for the first time, the buzzer will be turned o, and the display will automatically turn off.

NOTE: Each time you set the DIP switches, first turn o the unit and then disconnect the power. Then adjust the DIP switches. Wait for 2 minutes before reconnecting the power for the settings to take effect.

3.8 Panel Control Configurations (optional)

Activate panel control configurations

- Press the power button to switch the unit to standby status. Press and hold the and simultaneously for 3 seconds to activate panel control configurations.

Configuration

- See Table 2 for panel control configurations and functions.

- Press the button to adjust the serial number, press the down button to adjust the function corresponding to that serial number.

- The LED will display Sx, Fx, Hx(x could be 1, 2, 3, etc.), and other letters, such as ON, OF, HY, EH, etc., used to indicate the current function serial number and function switch status.

NOTE: Exit panel control configurations and turned on the device. Press and hold ﹀ and ﹀ simultaneously for 3 seconds will alternate the temperature display between °C & °F scales.

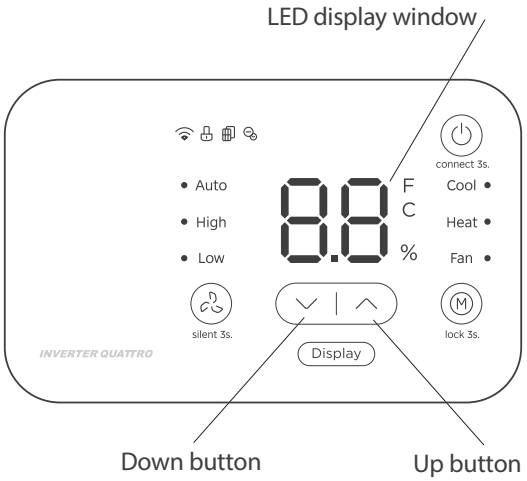
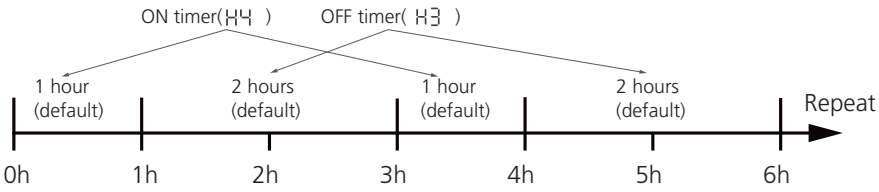


Table 2 - Panel control configurations

Aux Display	Function	Settings
S0	Control method	AC Panel control. DIP switches do not work. dP Configure through DIP switches. Status displayed for S1-S7 can only be viewed and cannot be adjusted on the panel.
S1	Heating mode (optional)	EH Electric heating only HY Electric heating or heat pump NOTE: When your unit doesn't come with electric heating, this switch doesn't take effetct.
S2 S3	Temperature range:	S2→ 60 S3→ 86 =60°F-86°F; S2→ 63 S3→ 80 =63°F-80°F; S2→ 65 S3→ 78 =65°F-78°F; S2→ 68 S3→ 75 =68°F-75°F. S2→ 60 S3→ 86 =60°F-86°F (Default range of the unit) NOTE: S2, S3 work together. When you change either S2 or S3, the other one will change accordingly,
S4	Blocking front desk control	ON Block front desk control OF Allow front desk control NOTE: Adjust the DIP switch S4 to OFF and FG on the panel to FC for configuration of S4 on the panel to take effect.

Aux Display	Function	Settings
S5	Indoor fan continuous operation in heating mode	ON Indoor fan continuous operation is enabled in heating mode. Allows the fan to run continuously, circulating air even when the temperature setting has been satisfied. This switch helps to maintain the room temperature closer to the thermostat setting. OF Indoor fan continuous operation is disabled in heating mode. After both the compressor and electric heating are turned off, the fan will cycle on and off. NOTE: This setting is invalid in 24V mode.
S6	Indoor Fan Continuous Operation in Cooling Mode	ON Indoor fan continuous operation is enabled in cooling mode. Allows the fan to run continuously, circulating air even when the temperature setting has been satisfied. This switch helps to maintain the room temperature closer to the thermostat setting. OF Indoor fan continuous operation is disabled in cooling mode. After the compressor is turned off, the fan will cycle on and off. NOTE: This setting is invalid in 24V mode.
S7	Wall thermostat control	TH The device can only be controlled by the wall thermostat HY The device can be controlled by the panel, remote control, wired controller, and thermostat. When the thermostat outputs a control signal to the air conditioner, the air conditioner will prioritize the input from the thermostat.
F1	Air flow speed of the makeup air system (optional)	Au Auto fan ...1... 00... 60CFM ..0... 70... 45CFM ..0...40... 30CFM ..0...90... 55CFM ..0...60... 40CFM ..0...01... 20CFM ..0...80... 50CFM ..0...50... 35CFM OF 0CFM NOTE: Airflow data are based on tests conducted without the MERV 8 filter installed.
F2	Smart dehumidification level	40~60 40%~60% (Percent RH) Au Auto OF The device won't control the humidity level NOTE: For F2 to take effect, you need to set the device to cooling mode when it's powered on, before you turn the unit to standby status and activate the panel control configurations. Switching to another mode will cancel this function.
F3	Negative ions function (optional)	ON On OF Off NOTE: Only works if the device comes with negative ions function. When the function is on, the ion generator is energized and will help to remove pollen and impurities from the air and trap them in the filter.

Aux Display	Function	Settings
F4	Indoor low temperature protection	Degree Fahrenheit 0 32 ~ 0 60 Degree Celsius 0 00 ~ 0 16 When the indoor temperature is below the set temperature(32°F~60°F or 0°C~16°C), the device automatically starts heating. When the low temperature protection is triggered, the panel displays FP . OF Low temperature protection is disabled.
F5	Indoor high temperature protection	Degree Fahrenheit 0 86 ~ 0 99 Degree Celsius 0 30 ~ 0 37 When the indoor temperature is above the set temperature(86°F~99°F or 30°C~37°C), the device automatically starts cooling. When the high temperature protection is triggered, the panel displays HP . OF High temperature protection is disabled.
F6	Front Desk Control Mode or Occupancy Control (optional)	FC Front Desk Control Mode OC Occupancy Control Mode. When your system is connected to an occupancy signal, you can fine-tune the response behavior of the makeup air system through channel H5 in the settings menu.
H1	Outdoor low temperature protection of makeup air system (optional)	Degrees Fahrenheit 0 23 ~ 0 41 Degrees Celsius 0 -5 ~ 0 05 When the outdoor temperature is below the set temperature(23°F~41°F or -5°C~5°C), the makeup air system stops working. OF Low temperature protection of makeup air system is disabled.
H2	Outdoor high temperature protection of makeup air system (optional)	Degrees Fahrenheit 0 99 ~ 1 13 Degrees Celsius 0 37 ~ 0 45 When the outdoor temperature is above the set temperature(99°F~113°F or 37°C~45°C), the makeup air system stops working. OF High temperature protection of makeup air system is disabled.

Aux Display	Function	Settings
H3	Makeup air system OFF timer (optional)	01~24 Makeup air system OFF timer: 1–24 hours, in 1-hour increments. OF Makeup air system OFF timer is disabled
H4	Makeup air system ON timer (optional)	01~24 Makeup air system ON timer: 1–24 hours, in 1-hour increments. OF Makeup air system ON timer is disabled. Make up air system cycle timer function description To keep indoor air fresh while saving energy, this system supports a "cycle ventilation" mode. You can customize how long the makeup air system runs each time and how long it remains off between runs. The system will then automatically cycle according to the set schedule. -Example: Within every 3-hour period, the device runs for 1 hour and stops for 2 hours.  - Operation Tips Flexible configuration: If you don't want to use this cycle function, set both H3 and H4 to OF. If you want to use the cycle function later, both the timer ON and timer OFF settings must be configured; otherwise, the system will operate with the default 1-hour setting.
H5	Makeup air system behavior when occupancy signal is received (optional)	OF When there are people in the room, the makeup air system doesn't run. When there's nobody in the room, the makeup air system runs according to relevant settings. ON When there are people in the room, the makeup air system runs according to relevant settings. When there's nobody in the room, the makeup air system doesn't run. -E The makeup air system ignores the occupancy signal, and runs according to relevant settings. NOTE: Only works when F6 is set to 0C.
H6	Humidity protection of the makeup air system behavior (optional)	35~85 Set an upper humidity limit (35%~85% RH). The system monitors the indoor humidity in real time. Once the current indoor humidity is detected to exceed your set value, the makeup air system stops working. OF The makeup air system ignores the humidity level, and works according to relevant settings.

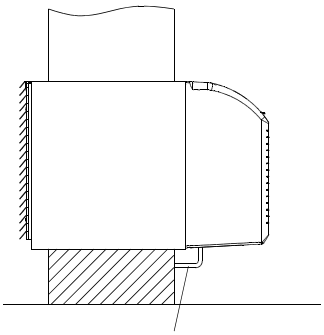
3.9 WALL THERMOSTAT TERMINAL (Optional)

IMPORTANT: Only trained, qualified personnel should access the electrical panel on unit and install electrical accessories. Please contact your local electrical contractor, dealer, ordistributor for assistance.

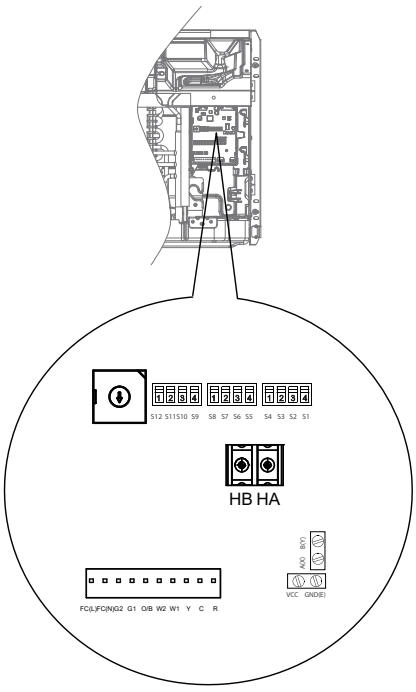
Stept1. Thermostat Wire Routing

Thermostat wire is field-supplied. Recommended wire gauge is 18-to 20-gauge solid thermostat wire.

NOTE: It is recommended that extra wires BE run to unit in case any are damaged during installation. Thermostat wire should always be routed around or under, NEVER through, the wall sleeve. The wire should then be routed behind the front panel to the easily accessible terminal connector.



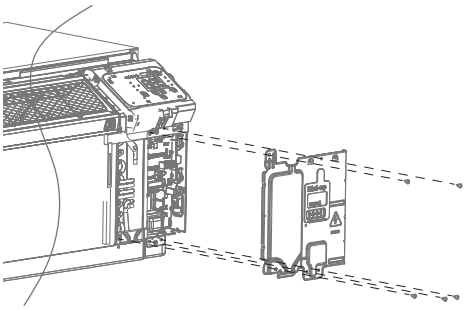
THE THERMOSTAT WIRE ROUTING
(UNDER SLEEVE, BEHIND FRONT PANEL)



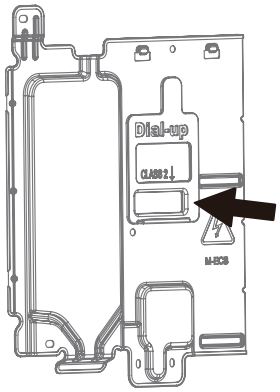
NOTE: Refer to thermostat installation instructions for details on installing wall thermostat.

Step2. Installation instruction of some types of wall thermostat (you can consult with the sales agency or manufacturer for details)

- Remove 5 screws as shown below and take the cover panel down.



CAUTION: It is very important to retighten these five screws after completion.



CAUTION:
If you need to route the wire out through the fireproof sheet-metal area, you may remove the rubber grommet, pierce it at the required spot, and then reinstall it. Do not discard the rubber grommet.

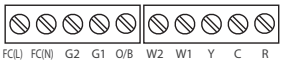
1. Wall Thermostat (24V AC) (optional)

PTHP terminal connections for other wall thermostats

MODE A (standard)



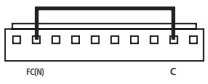
MODE B (optional)



TERMINAL	DESIGNATION	MODE B Wire color
FC(L)	Front desk control terminal L	Brown
FC(N)	Front desk control terminal N	Pink
G2	Low fan speed	Purple
G1	High fan speed	Green
O/B	4-wayvalve; Reverse cycle (Energized in Heat) For heat pump models	Blue
W2	Electrical heater 2	White
W1	Electrical heater 1	White
Y	Compressor	Yellow
C	24VAC terminal N(Neutral),Common	Black
R	24VAC terminal L	Red

Occupancy signal wiring (If the thermostat supports occupancy signal.)

If you decide to use the occupancy function, front desk control will not be available.

	Actual terminal	Wiring method
OC(L)	FC(L)	Connect to the thermostat's occupancy signal.
OC(N)	FC(N)	Connect FC(N) to C 

Note

1). If the thermostat has only one G signal, connect it to G1 first.

2). If the thermostat has only one W signal, connect it to W1 first. The system will automatically operate electric heater stage 1 or stage 2.

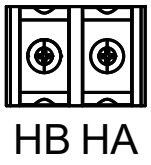
3). Thermostat output: O/B + G + Y signals, the unit will automatically operate in heat pump mode or electric heating mode, with heat pump operation given priority.

4). Thermostat output: G + W signals. The unit will operate electric heating only.

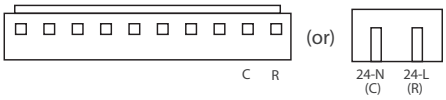
5). Please confirm the wiring method according to the unit's 24V control logic and the thermostat being used. If you are unable to confirm, please contact your dealer.

2. NON-POLARITY WIRED CONTROLLER(optional)



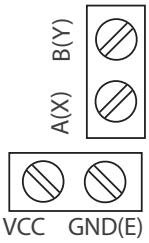


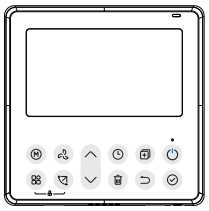
HB HA



HA	COMMUNICATION	NON-POLARITY WIRED CONTROLLER
HB		
R	24V AC	
C		

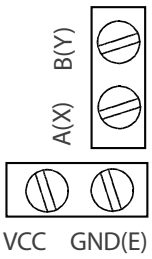
3. Wired Controller (12V)(optional)





VCC	12V, RS485 wired controller
GND	
A	
B	

4. CCM(optional)



E	RS485 CCM
X	
Y	

Network address is configured via DIP switch F1 and the rotary switch. The corresponding address assignment is as follows:

S12	S11	Base Address
OFF	OFF	0
OFF	ON	16
ON	OFF	32
ON	ON	48

FRONT DESK CONTROL

The controller can handle a switch signal from FC(L) and FC(N) inputs, called front desk control. Input must be 24VAC. If the system does not receive a 24VAC signal, it will turn off; otherwise, the unit runs in normal control. The S4 DIP switch can control the FRONT DESK CONTROL feature.

⚠CAUTION

- UNIT DAMAGE HAZARD Failure to follow this caution may result in equipment damage or improper operation.
- Improper wiring may damage unit electronics. Common busing is not permitted. Damage or erratic operation may result.

NOTE:

Use 4-way terminal for heat pump connection only.

The wall thermostat must energize the 4-way valve on heat pump mode.

For thermostats that have only one fan speed output (on or auto), the fan speed is determined by how the terminal connector is wired. If a Low fan is desired, wire the G output from the thermostat to (G2) on the unit's terminal block.

If a High fan is desired, wire the G output from the thermostat to (G1) on the units' terminal block.

The wall thermostat must be set according to the proper unit type: heat pump or no heat pump.

If the S7 is set to simultaneous control by the wall thermostat and the display panel, then when the terminal signal input is correct, the LED will display LC.

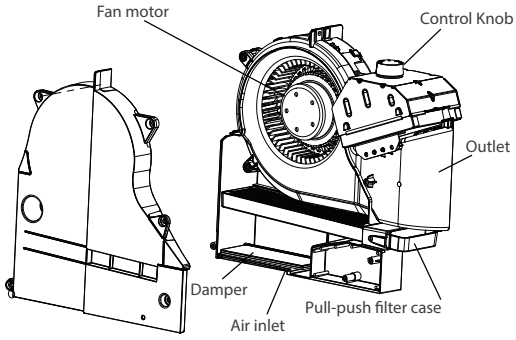
Please do not remove the control panel.

3.10 Makeup Air Function (optional)

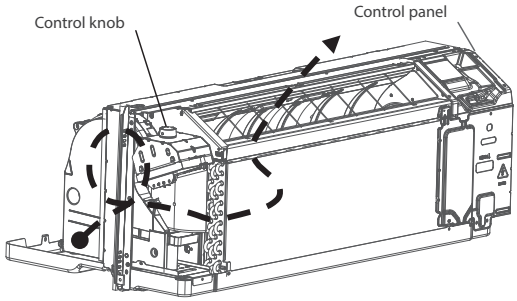
Makeup Air Introduction

Our PTHP can be equipped with a Makeup Air system, providing another option for standard building ventilation design. The Makeup air system is equipped with a dedicated fan, providing positive pressure fresh air for users that do not want to install the system on the roof and connect it to each individual room with ductwork. The Makeup air PTHP oers standard individual room zone control in both cooling and heating applications. The Makeup Air system is connected to the outdoors via a dedicated fan, providing continuous dehumidified fresh air at 10 preset speeds (0 - 60 CFM). Our PTHP and its inverter system can adjust cooling and dehumidification as needed.

The Makeup air system is an independent system that continuously provides makeup air from outdoor air.



Our makeup air system does not introduce humid air directly to indoor room. The air flow path forces the outside air to hit the evaporator first and so it helps to dehumidify (in Cooling mode) or heat up (in Heating mode) the air before mixing with indoor air.



Main Functions

- The module supports control through the control knob, panels, and the mobile app in multiple ways.
- A dedicated fan is set up in the makeup air system, which can be adjusted to 10 preset speeds, ranging from 0 to 60 cubic feet/ minute.
- The makeup air system will automatically adjust its operating conditions based on outdoor air conditions when the device is powered (even if the device is in standby mode).
- Paired with our patented inverter tel system, the makeup air system can achieve dehumidification/ pre-cooling (cooling) and pre-heating (heating) of the incoming fresh air.
- The makeup air system comes standard with a humidity sensor. The makeup air system stops operating when the humidity exceeds 60%.
- The humidity level can be set according to your preference. This feature is available when the control knob is set to AUTO mode.
- The drawer-style filter design allows for cleaning/ replacement of the filter without disassembling the entire unit from the wall sleeve.
- The module has a modular design, and easy to maintain.
- It is compatible with optional MERV 8 ventilation filter.
- The module comes with an electric damper, providing

better airflow adjustment and preventing heat leakage.

- Power-o memory function is standard. There is no need to reset even in case of power outage.
- The makeup air system is equipped with outdoor temperature protection. When the outdoor temperature is too high or too low, the makeup air system will stop operating. (When the control knob is set to low, medium, high mode, the temperature protection is disabled.
- It is recommended to use AUTO mode.)
- The unit is equipped with indoor temperature protection. When the indoor temperature is too high or too low, the unit will automatically start cooling or heating.
- The makeup air system is equipped with a purification filter cleaning and replacement reminder function. When cleaning/ replacement is needed, the check filter icon will illuminate.
- This system can be used in conjunction with an approved occupancy system, allowing the ventilation system to be turned on or o as needed when the room is unoccupied.

Notice

- It is not recommended to install a makeup air system within 1–2 miles of the coast, as the unit is not treated with anti-corrosion protection and avoid introducing corrosive air into living spaces.
- The makeup air module will increase the heating and cooling load requirements of the room.

- Please consult your architect or engineer to ensure the PTHP unit is appropriately upsized to accommodate this additional load.

- Due to this increased load, the energy costs for the room will rise after installation of the makeup air module.

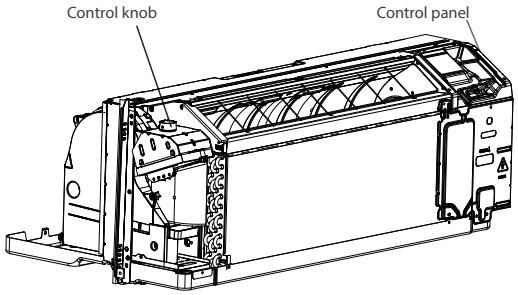
- It is recommended to set it to the AUTO mode and combine it with an approved occupancy system.

- Because makeup air raises the room's heat load and requires additional cooling or heating from the unit the building's electrical demand may be aected.

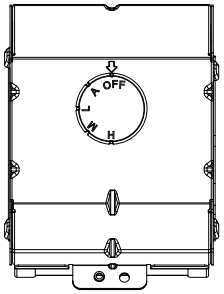
- Additional dehumidification of outdoor air will result in increased condensate production. Therefore, the use of an external drainage pipe is recommended.
- When using an occupancy sensor thermostat with makeup air functionality, the building's overall air design should be considered, as these units may shut o the makeup air function when the room is unoccupied.
- In areas with high external noise levels (e.g., trac, highways, airports), special consideration is needed to avoid unintentionally introducing noise into the room, which could disturb guests.The operation of makeup air will also generate additional noise, please confirm whether it is acceptable.
- Please keep a distance of at least 1 meter from the makeup air unit, as direct exposure to the airflow may cause discomfort due to either cold or hot air being blown onto your body.
- It is the responsibility of architects, engineers, contractors, and clients to ensure the product complies with all local regulatory requirements.

Operating Instructions

- The control knob can be preset to the most required mode for customers.
- The owner is responsible for ensuring that the makeup air is set to the required functions.



- There are various modes that can be set using the auxiliary setting button.
- The control knob has the highest priority. The control knob can be set to o, low, medium, high, and AUTO mode.



- When set to low, medium, or high mode, the makeup air system operates according to the room's makeup air requirements, temperature and humidity, and occupancy status.

Mechanical Knob Settings	Control Value
Low	30CFM
Mid	40CFM
High	50CFM

Airflow data are based on tests conducted without the MERV 8 filter installed.

- Setting the control knob to Low, Mid, or High may lead to condensation formation, increased energy consumption ,and reduced occupant comfort.

Selection of AUTO mode is therefore recommended.

- When the knob is set to o, the makeup air system stops operating.
- When the control knob is set to AUTO mode, you can activate the panel control configurations to alter the airflow settings as shown below. See “Panel Control Configurations of Makeup Air System” and table3 for detailed instructions.

Display	Control Value
Au	Auto fan
.. 1.. 00..	60CFM
.. 0.. 90..	55CFM
.. 0.. 80..	50CFM
.. 0.. 70..	45CFM
.. 0.. 60..	40CFM
.. 0.. 50..	35CFM
.. 0.. 40..	30CFM
.. 0.. 0 1..	20CFM
0F	0CFM

Airflow data are based on tests conducted without the MERV 8 filter installed.

- In AUTO mode, turning o the unit or setting the fan to OFF will cancel fan operation. The next time you need to turn it on, you must set it again.
- If you do not want to use the fresh-air function, simply turn the control knob to the OFF position.
- In AUTO mode, the following conditions may prevent the makeup air system from turning on:

-The makeup air function may have been cancelled because the unit was turned o or the function was disabled.

-It may be turned o due to excessively high humidity.

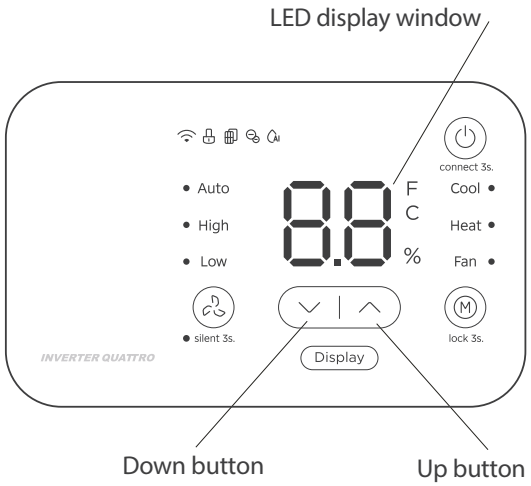
-It may be turned o due to outdoor high-temperature or low-temperature protection.

-The system may be operating during the timer OFF period.

-The occupancy function may prevent operation, if it is involved.

Other fault protections for the makeup air system may be active.

3.11 Panel Control Configurations of Makeup Air System



Activate panel control configurations

- Press the power button to switch the unit to standby status. Press and hold the and simultaneously for 3 seconds to activate panel control configurations.

Configuration

- See Table 2 for panel control configurations and functions.

- Press the up button to adjust the serial number, press the down button to adjust the function corresponding to that serial number.

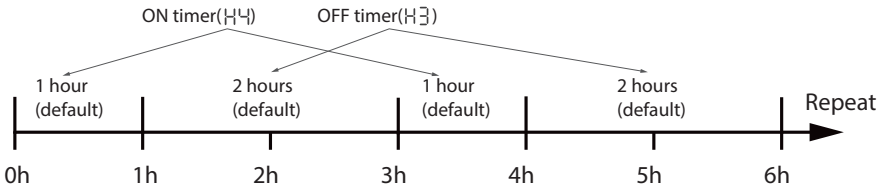
- The LED will display Sx, Fx, Hx(x could be 1, 2, 3, etc.), and other letters, such as ON, OF, HY, EH, etc., used to indicate the current function serial number and function switch status.

Exit panel control configurations

- Press the up and down buttons together for 3 seconds again, or wait for 30 seconds to exit panel control configurations. The unit will save the last settings.

NOTE: Exit panel control configurations and turn on the unit. Press and hold and simultaneously for 3 seconds will alternate the temperature display between °C & °F scales.

Aux Display	Function	Settings
F1	Air flow speed of the makeup air system	Au Auto fan ...100... 60CFM ..070... 45CFM ..040... 30CFM ..090... 55CFM ..060... 40CFM ..001... 20CFM ..080... 50CFM ..050... 35CFM OF 0CFM NOTE: Airflow data are based on tests conducted without the MERV 8 filter installed.
F2	Smart dehumidification level	40~60 40%~60% (Percent RH) Au Auto OF The device won't control the humidity level NOTE: For F2 to take effect, you need to set the device to cooling mode when it's powered on, before you turn the unit to standby status and activate the panel control configurations. Switching to another mode will cancel this function.
H1	Outdoor low temperature protection of makeup air system	Degrees Fahrenheit ...023... ~...041... When the outdoor temperature is below the set temperature(23°F~41°F or -5°C~5°C), the makeup air system stops working. Degrees Celsius ...0-5... ~...005... OF Low temperature protection of makeup air system is disabled.
H2	Outdoor high temperature protection of makeup air system	Degrees Fahrenheit ...099... ~...113... When the outdoor temperature is above the set temperature(99°F~113°F or 37°C~45°C), the makeup air system stops working. Degrees Celsius ...037... ~...045... OF High temperature protection of makeup air system is disabled.

Aux Display	Function	Settings
H3	Makeup air system OFF timer	01~24 The makeup air system OFF timer: 1–24 hours, in 1-hour increments. OF The makeup air system OFF timer is disabled
H4	Makeup air system ON timer	01~24 The makeup air system ON timer: 1–24 hours, in 1-hour increments. OF The makeup air system ON timer is disabled. The makeup air system cycle timer function description To keep indoor air fresh while saving energy, this system supports a "cycle ventilation" mode. You can customize how long the makeup air system runs each time and how long it remains off between runs. The system will then automatically cycle according to the set schedule. -Example: In every 3-hour period, the device runs for 1 hour and stops for 2 hours.  - Operation Tips Flexible configuration: If you don't want to use this cycle function, set both H3 and H4 to OF. If you want to use the cycle function later, both the timer ON and timer OFF settings must be configured; otherwise, the system will operate with the default 1-hour setting.
H5	Makeup air system behavior when occupancy signal is received	OF When there are people in the room, the makeup air system doesn't run. When there's nobody in the room, the makeup air system runs according to relevant settings. ON When there are people in the room, the makeup air system runs according to relevant settings. When there's nobody in the room, the makeup air system doesn't run. -E The makeup air system ignores the occupancy signal, and runs according to relevant settings. NOTE: Only works when F6 is set to 0C .
H6	Humidity protection of the makeup air system behavior	35~85 Set an upper humidity limit (35%~85% RH). The system monitors the indoor humidity in real time. Once the current indoor humidity is detected to exceed your set value, the makeup air system stops working. OF The makeup air system ignores the humidity level, and works according to relevant settings.

Installation Details

Contents

1. Note about installation 2
2. Before you get start 4
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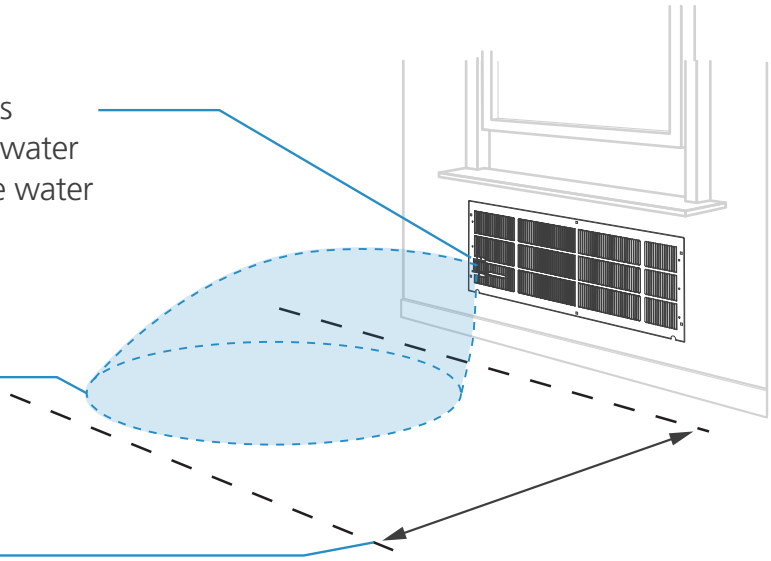
1. Note about installation

WARNING about installation position:

When the PTHP water system is operating, there may be slight water sounds and vibrations from the water pump.

Water mist area

The clearance should be over 2 meters (79 in)



Outdoor view of the machine

The air conditioner might be spraying water on the outside when working. When installing the machine, within a TWO-METER range outside the machine, there must be:



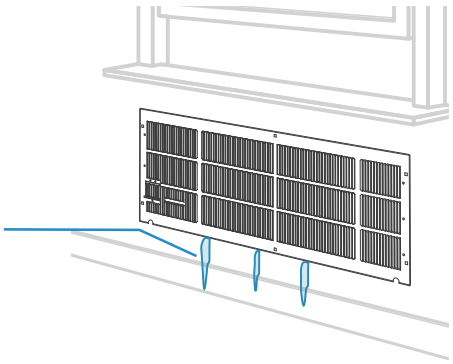
No Roads | No Stairs | No Sidewalks | No Corridors | No Trees or Other Objects

CAUTION

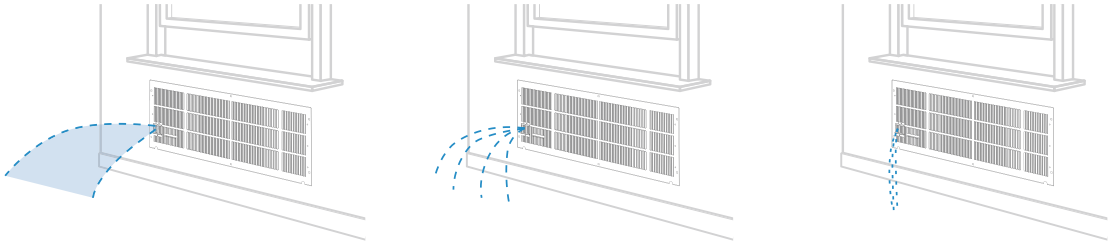
The property owner needs to provide appropriate warnings and reminders near the site, as well as prepare an emergency response plan.

CAUTION about icicles:

In cold weather, icicles may form on the outside of the grille.



Note about misting states:



Fan-shaped mist

water column or large water droplets

dripping downward.

The misting state of the PTHP water system is related to the amount of water in the drain pan.

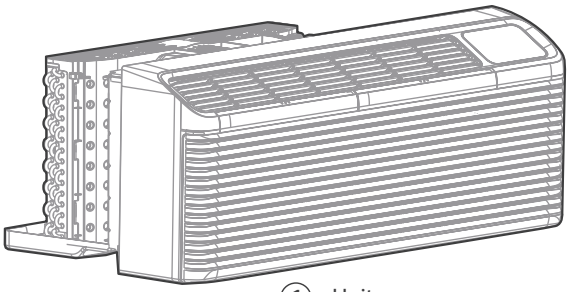
When the humidity of the machine's working environment is high, the drainage state is as shown in the left diagram. When the humidity is low, there is little water in the drain pan, and the misting state is as shown in the right diagram. Alternatively, the misiting state may fall between the two diagrams.

Additionally, to prevent water accumulation in the drain pan, the PTHP water system will automatically activate (for 5 minutes) when the user turns o the machine. Therefore, if you notice the PTHP spraying water after shutting it down, please do not worry, as this is the normal operating logic of the PTHP.

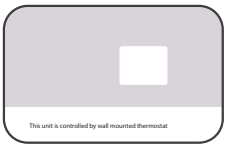
Note: The property owner needs to provide appropriate warnings and reminders near the site, as well as prepare an emergency response plan.

2. Before you get start

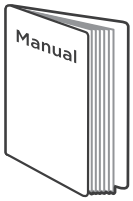
What is in the Package



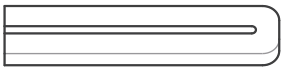
① Unit



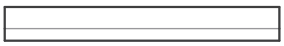
② Control panel sticker



③ Owner's manual



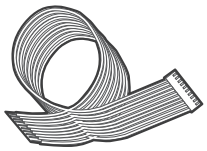
④ Insulation A



⑤ Insulation B * 2

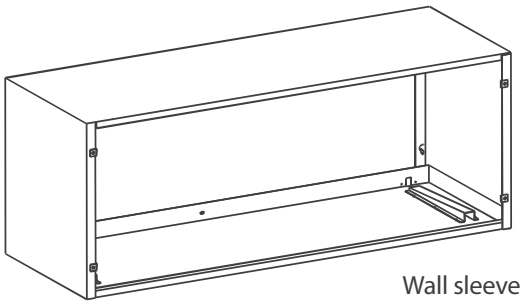


⑥ Screws* 4
(for installing the wall sleeve)



⑦ Cable (optional)

What you need to purchase



Wall sleeve

(Not Included)

Prepare the following tools



Gloves



Goggles & masks



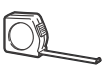
Screwdriver



Pencil



Drill



Ruler or tape measure

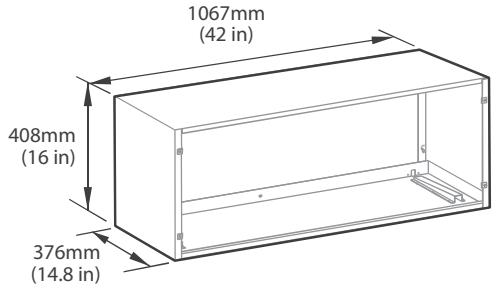


Level

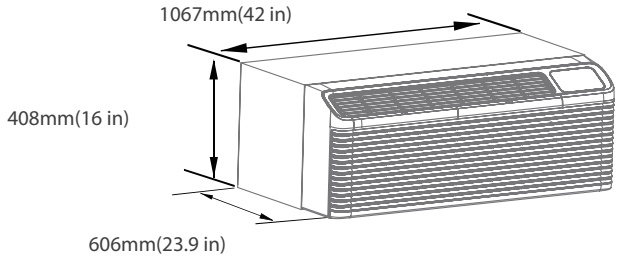
(Not Included)

3. Before the installation

Installation size confirmation:

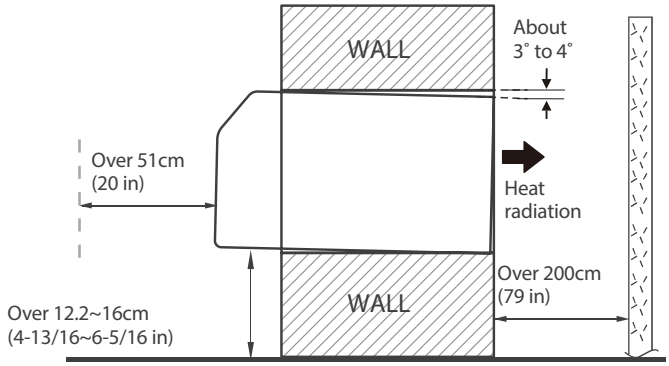


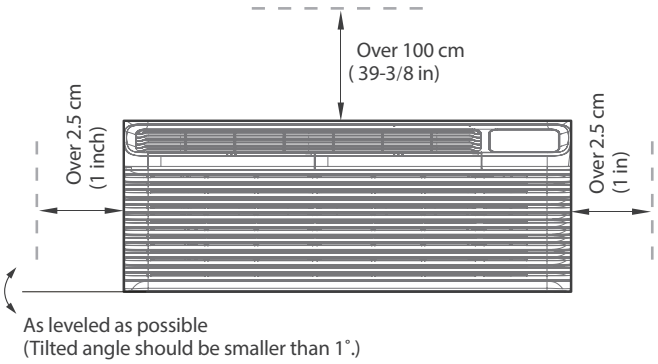
Wall sleeve size requirements (wall hole size should refer to the wall sleeve size)



Product size

Confirmation of installation position :





- For the existing sleeve, you should measure the wall sleeve dimensions.

- Install the new air conditioner according to these installation instructions to achieve the best performance.

All wall sleeves used to mount the new air conditioner must be in good structural condition and have a rear grille that securely attaches to the sleeve or the flange of the sleeve to secure the new air conditioner.

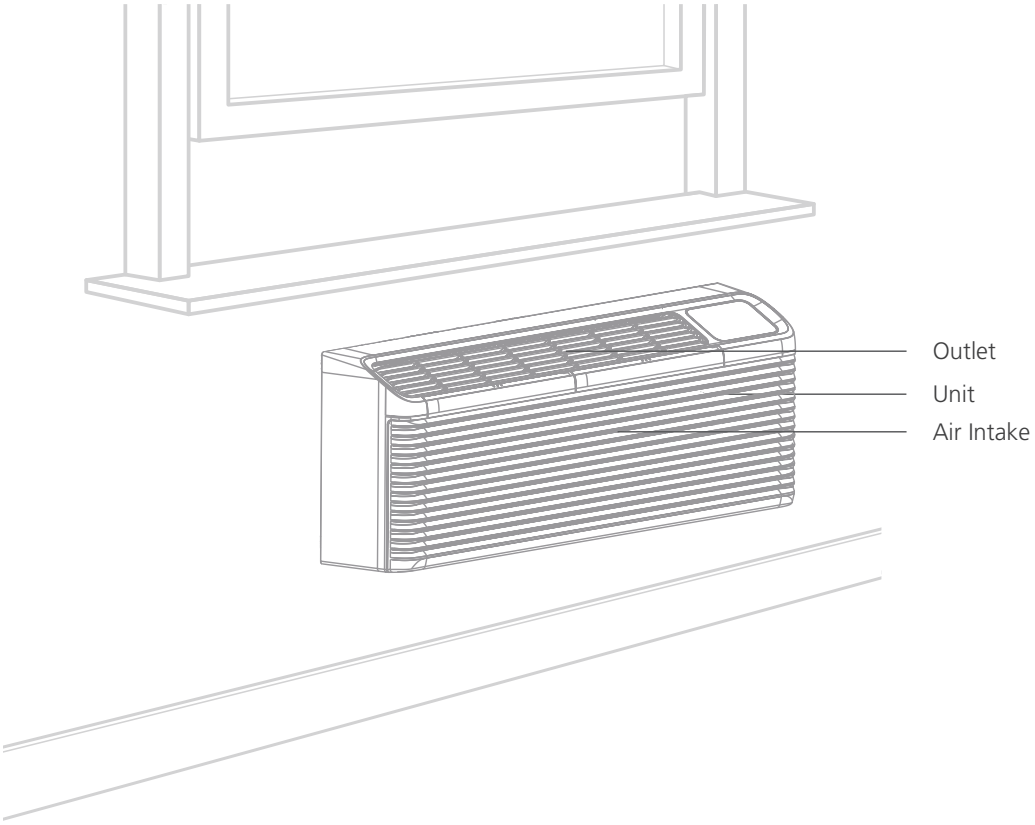
- To avoid vibration and noise, make sure the unit is installed securely and firmly.

- When installing the sleeve, make certain there is nothing within 20 inches of the back that would interfere with heat radiation and exhaust airflow.

NOTE: To ensure better performance, do not place any obstacles near the air outlet

4. Installation overview

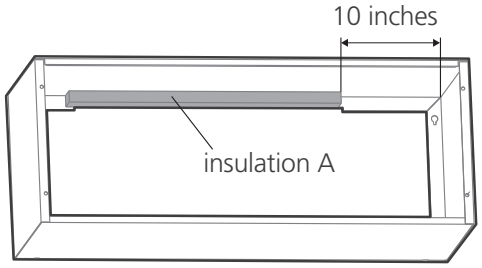
Installing unit into the wall



Installation Instructions

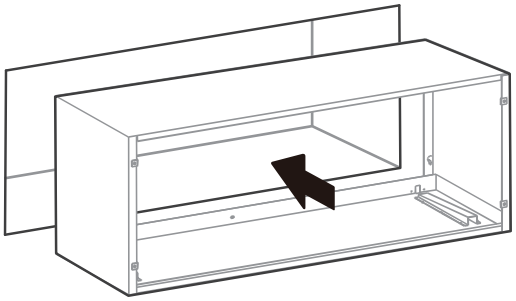
Step 1: Attach insulation A to the wall sleeve.

- If using the old wall sleeve, the insulation on the wall sleeve needs to be replaced. First, remove the old insulation from the sleeve, then attach insulation A from the accessories.
- If using the new wall sleeve, simply attach insulation A.



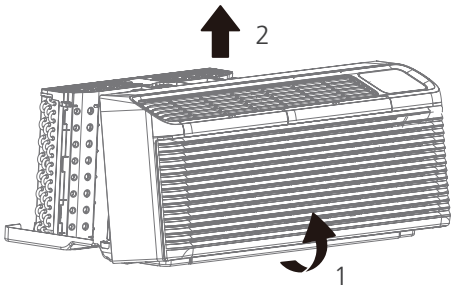
Step 2: Attach the wall sleeve (if any).

Refer to the installation instructions of the sleeve assembly for details. To avoid vibration and noise, make sure the wall sleeve is installed securely and firmly.



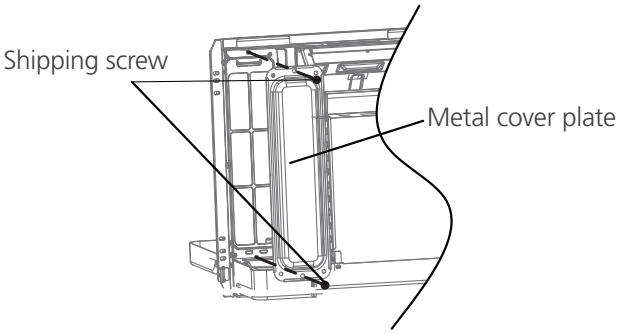
Step 3: Remove the front panel.

1. Pull out at the bottom to release it from the tabs.
2. Lift the front panel up.



Step 4: Open and close the vent door (if needed).

- Remove the 2 shipping screws and the metal cover plate to open the vent door.
- Reinstall the metal cover plate to close the vent door.



NOTE:

The metal cover plate should be properly stored when removed. It needs to be reinstalled to close the vent door.

After removing the metal cover plate, reinstall the screws back into their original holes.

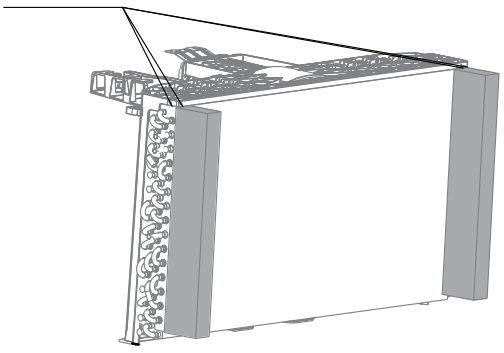
NOTE: When the metal cover plate is removed, some outdoor air will be drawn into the room. This will reduce heating or cooling efficiency.

Energy Tip: Keep the metal cover plate in the closed position to prevent unconditioned air from entering the room.

Step 5: Attach insulation B to the rear panel.

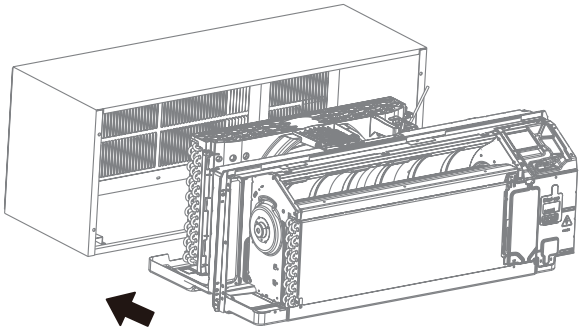
Attach insulation B to the unit's condenser. If you are using an existing grille, first remove any insulation attached to it.

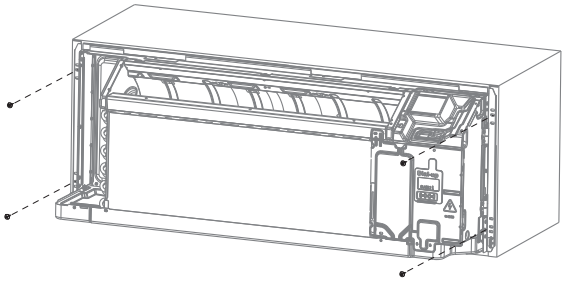
Align the two insulation B strips the edge of the condenser.



Step 6: Install the unit.

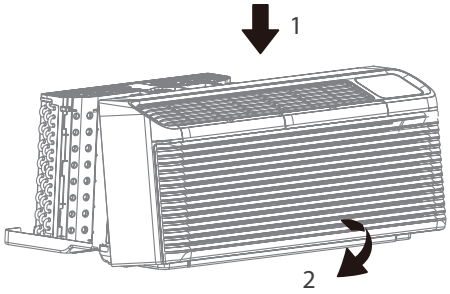
Lift the unit level and then slide unit into the wall sleeve until firmly against the front of the wall sleeve and secure with 4 screws and washers (supplied in the SLEEVE ASSEMBLY) through the unit flange holes.





Step 7: Install the front panel.

1. Place tabs over the top rail.
2. Push inward at the bottom until the panel snaps into place.



⚠ CAUTION

- Do not put obstacles around the air inlet or outlet of the unit, such as window curtain etc. Always insert the filter securely, clean the filter once every 3 months, as required.

5. Care and Maintenance

⚠CAUTION

UNIT DAMAGE HAZARD Failure to follow this caution may result in equipment damage or improper operation. Airflow restriction may cause damage to the unit.

FRONT PANEL AND CASE

- Always TURN OFF your AC system and disconnect its power supply before cleaning or maintenance.

- Only use a soft, dry cloth to wipe the unit clean. You can use a cloth soaked in warm water to wipe it clean if the unit is especially dirty.

- Do not use chemicals or chemically treated cloths to clean the unit

- Do not use benzene, paint thinner, polishing powder or other solvents to clean the unit. They can cause the plastic surface to crack or deform.

- Do not use water hotter than 40°C (104°F) to clean the front panel. This can cause the panel to deform or become discolored.

OUTDOOR COIL

- The coil on the outdoor side of the unit should be checked regularly.

- Any maintenance and cleaning of the outdoor coil should be performed by an authorized dealer or a licensed service provider.

NOTE: Never use a high-pressure spray on the coil.

AIR FILTERS

⚠CAUTION

Failure to follow this caution may result in equipment damage or improper operation. Do not operate the unit without

filters in place. If a filter becomes torn or damaged, it should be replaced immediately. Operating without filters in place or with a damaged filter will allow dirt and dust to reach the indoor coil and reduce cooling, heating, airflow, and efficiency ofthe unit. Airflow restriction may cause damage to the unit.

- The most important thing you can do to maintain unit eciency is to clean the filters once every two weeks as required. Clogged filters reduce cooling, heating, and airflow.

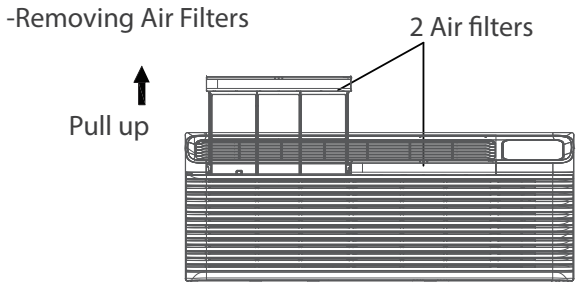
- Keeping filters clean will:

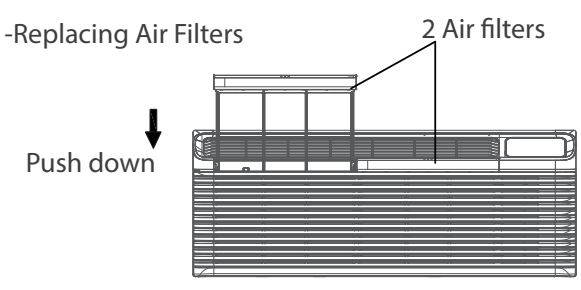
- Decrease the cost of operation.
- Save energy.
- Prevent clogged indoor coil.
- Reduce risk of premature component failure.

- To Clean Air Filters:

Vacuum o heavy soil. Run water through the filter.

Dry thoroughly before replacing.





VENT DOOR FILTER

Contact the authorized service technician for cleaning the vent door filter of this unit.

IMPORTANT: TURN THE UNIT OFF BEFORE CLEANING.

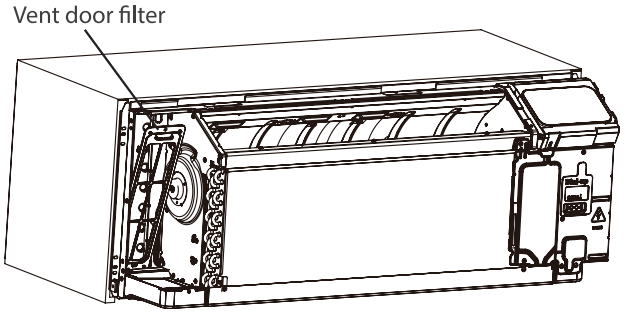
Clean the vent every 3 months or as required.

- Make sure to remove the shipping screw from the vent door.

-Press down and remove the vent door filter as shown below.

-Clean the filter. Dry thoroughly before replacing.

-Reinstall the vent door filter.



Troubleshooting

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5.2 EC51(Main control board EEPROM malfunction) diagnosis and solution 10

5.3 EH03 (The indoor fan speed is operating outside of normal range) diagnosis and solution 11

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5.5 EH60/EH61(Open circuit or short circuit of indoor temperature sensor(T1, T2))diagnosis and solution 16

5.6 EC52/EC53/EC54(Open circuit or short circuit of outdoor temperature sensor(T3, T4, TP)) diagnosis and solution 17

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5.9 PC00(IPM malfunction or IGBT over-strong current protection) diagnosis and solution 20

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Troubleshooting

Contents

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5.14 P1 Bottom tray is full Error Diagnosis and Solution 24

1. Safety Caution

WARNING

Be sure to turn off all power supplies or disconnect all wires to avoid electric shock.
While checking indoor/outdoor PCB, please equip oneself with antistatic gloves or wrist strap to avoid damage to the board.

WARNING

Electricity remains in capacitors even when the power supply is off.
Ensure the capacitors are fully discharged before troubleshooting.

2. General Troubleshooting

2.1 Error Display (Indoor Unit)

The error codes are described in the following tables:

Display	Information	Solution
EH00	Display board EEPROM malfunction	TS09
EH03	The indoor fan speed is operating outside of the normal range	TS11
EC51	Main control board EEPROM malfunction	TS10
EC52	Condenser coil temperature sensor T3 is in open circuit or has short circuited	TS17
EC53	Outdoor ambient temperature sensor T4 is in open circuit or has short circuited	TS17
EC54	Compressor discharge temperature sensor TP is in open circuit or has short circuited	TS17
EH60	Indoor room temperature sensor T1 is in open circuit or has short circuited	TS16
EH61	Evaporator coil middle temperature sensor T2 is in open circuit or has short circuited	TS16
EC07	The outdoor fan speed is operating outside of the normal range	TS13
EH0b	Main PCB/Display board communication error	TS18
ELOC	System lacks refrigerant	TS19
PC00	IPM malfunction or IGBT over-strong current protection	TS20
PC01	Over voltage or over low voltage protection	TS21
PC02	High temperature protection of IPM module	TS22
PC04	Inverter compressor drive error	TS23
P1	Bottom tray is full	TS24
PC0L	Low ambient temperature protection	TS24

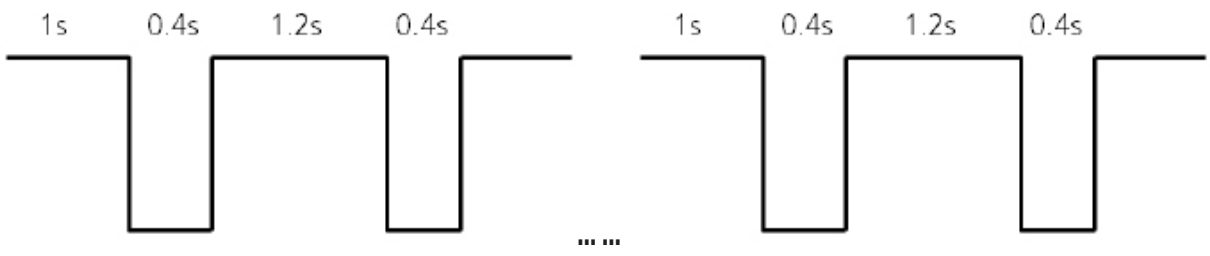
For other errors:

The display board may show a garbled code or a code undefined by the service manual. Ensure that this code is not a temperature reading.

Troubleshooting:

Test the unit using the remote control. If the unit does not respond to the remote, the main PCB requires replacement. If the unit responds, the display board requires replacement.

88 flash frequency:



3. Information Inquiry

- In order to enter to the engineering mode, and check the data of the system (data checking mode), Please make the following steps:
- 1- Make sure that the AC is on the standby status, or working normally in a non-locked conditions.
- 2- Press "Power" + "Fan" buttons together for 5s until the remote controller screen shows "0", and also "Auto, Cool, Heat, Battery " icons will be displayed at the same time or press "MODE"+"UP"+"DOWN" for 5s on control panel.
- 3- Press "Up" or "Down" button to choose different channel number that you want to check (from 0-30) on the remote controller, and then the display will show the parameter value. If you use the control panel, you can query 239, 238& 237 by pressing the down button on channel 0.

Please note that:

1-The Channel number indicates a certain parameter value (Check the below table).

2-The indoor unit display will show the code for 2s, and then the parameter value.

3-In the engineering mode, the other keys or operations are invalid except for the following buttons "Power", "Up", "Down" and "Ok".

4-In order to exit from the engineering mode, press "Power" + "Fan" buttons together for 2s to quit Checking and back to the home screen.

5-The engineering mode will be exited if there is no valid input data for 60s.

Channel	Code	Query Content	Additional Notes
0	nR	Error code	
1	T1	Room temperature	Display 3 digits in 2 times (with decimal point) (°C/°F)
2	T2	Indoor coil temperature	Display 3 digits in 2 times (with decimal point) (°C/°F)
3	T3	Outdoor coil temperature	Display 3 digits in 2 times (with decimal point) (°C/°F)
4	T4	Ambient temperature	Display 3 digits in 2 times (with decimal point) (°C/°F)
5	TP	Discharge temperature	Display 3 digits in 2 times(°C/°F)
6	FT	Targeted frequency	Display 3 digits in 2 times(HZ)
7	Fr	Actual frequency	Display 3 digits in 2 times(HZ)
8	dL	Running current	Display 3 digits in 2 times(A)
9	Uo	Outdoor AC voltage	The value is 0
10	Sn	Indoor capacity test	N/A
11	nR	Reserve	N/A
12	Pr	Outdoor fan speed	Display 3 digits in 2 times
13	Lr	EXV opening steps	Display 3 digits in 2 times
14	ir	Indoor fan speed	Display 3 digits in 2 times
15	Hu	Humidity (if a sensor there)	N/A
16	TT	Set temperature including compensation	Display 3 digits in 2 times
17	SH	Reserved	SH

18	iF	WIFI signal strength	N/A
19	FL	Filter time	Display 3 digits in 2 times(hour)
20	oT	Target Frequency calculated by indoor	Display 3 digits in 2 times
21	nR	Reserved	N/A
22			
23			
24	HP	Total power-on running time	Displays decimal with 3 times double 8
25	HO	Total operation time	Displays decimal with 3 times double 8
26	TS	T5 temperature	Display 3 digits in 2 times (with decimal point) (°C/°F)
27	nR	Reserved	N/A
28			
29			
30			

Error code of engineer mode

Display	Error Information
EH00	Indoor EEPROM malfunction
EH03	The indoor fan speed is operating outside of the normal range
EC51	Outdoor unit EEPROM parameter error
EC52	Condenser coil temperature sensor T3 is in open circuit or has short circuited
EC53	Outdoor ambient temperature sensor T4 is in open circuit or has short circuited
EC54	Compressor discharge temperature sensor TP is in open circuit or has short circuited
EC55	Outdoor IPM module temperature sensor fault
EH60	Indoor room temperature sensor T1 is in open circuit or has short circuited
EH61	Evaporator coil temperature sensor T2 is in open circuit or has short circuited
EC07	The outdoor fan speed is operating outside of the normal range(
EH0b	Main PCB/Display board communication error
ELOC	System lacks refrigerant
FH0P	Wireless module self-test failure
PC00	IPM malfunction or IGBT over-strong current protection
PC10	Over low voltage protection
PC11	Over voltage protection
PC12	DC voltage protection
PC02	High temperature protection of IPM module
PC41	Current Input detection protection

PC42	Compressor start error
PC43	Lack of phase (3 phase) protection
PC44	No speed protection
PC45	341PWM error
PC46	Compressor speed malfunction
PC49	Compressor over current protection
PC06	Compressor discharge temperature protection
PC08	Outdoor current protection
PH09	Anti-cold air in heating mode
PHRI	Lower water full protection
PC66	Outdoor water level protection
PC0F	PFC module malfunction
PC0L	Outdoor ambient temperature too low
PH90	Evaporator coil temperature over high protection
PH9I	Evaporator coil temperature over low Protection
PC0R	Condenser coil temperature over high protection
LH00	Frequency limit caused by T2(L0)
FH0C	Humidity sensor is faulty
LC0I	Frequency limit caused by T3(L1)
LC02	Frequency limit caused by TP(L2)
LC05	Frequency limit caused by voltage(L5)
LC03	Frequency limit caused by current(L3)
LC06	Frequency limit caused by PFC
LH07	Frequency limit caused by remote controller
nR	no malfunction or protection

4. Quick Maintenance by Error Code

If you do not have the time to test which specific parts are faulty, you can directly change the required parts according the error code. You can find the parts to replace by error code in the following table.

Part requiring replacement	Error Code					
	EH00	EH03	EH60	EH61	EH0b	EL0C
Main PCB	x	✓	x	x	✓	x
Display board	✓	x	✓	✓	✓	✓
Indoor fan motor	x	✓	x	x	x	x
T1 sensor	x	x	✓	x	x	x
T2 Sensor	x	x	x	✓	x	✓
Filter/ strainer	x	x	x	x	x	x
Nozzle	x	x	x	x	x	x
Pump	x	x	x	x	x	x
Water Level Switch	x	x	x	x	x	x
Additional refrigerant	x	x	x	x	x	✓

Part requiring replacement	EC53	EC52	EC54	EC51	EC07	PC00	PC01	PC02	PC04
Main PCB	✓	✓	✓	✓	✓	✓	✓	✓	✓
Outdoor fan motor	x	x	x	x	✓	✓	x	✓	✓
T3 Sensor	x	✓	x	x	x	x	x	x	x
T4 Sensor	✓	x	x	x	x	x	x	x	x
TP Sensor	x	x	✓	x	x	x	x	x	x
Compressor	x	x	x	x	x	✓	x	x	✓
IPM module board	x	x	x	x	x	✓	✓	✓	✓
Additional refrigerant	x	x	x	x	x	x	x	x	x

5. Troubleshooting by Error Code

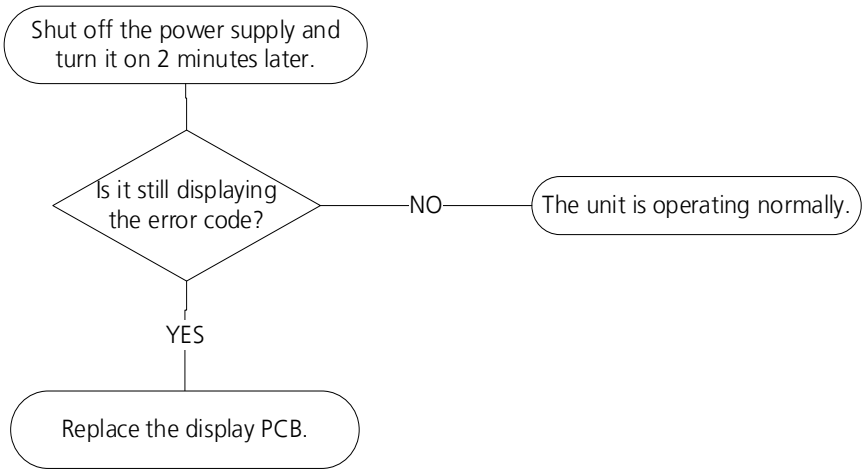
5.1 EH00(Display board EEPROM malfunction) diagnosis and solution

Description: Display PCB main chip does not receive feedback from EEPROM chip.

Recommended parts to prepare:

- Display PCB

Troubleshooting and repair:



Remarks:
EEPROM: A read-only memory whose contents can be erased and reprogrammed using a pulsed voltage.

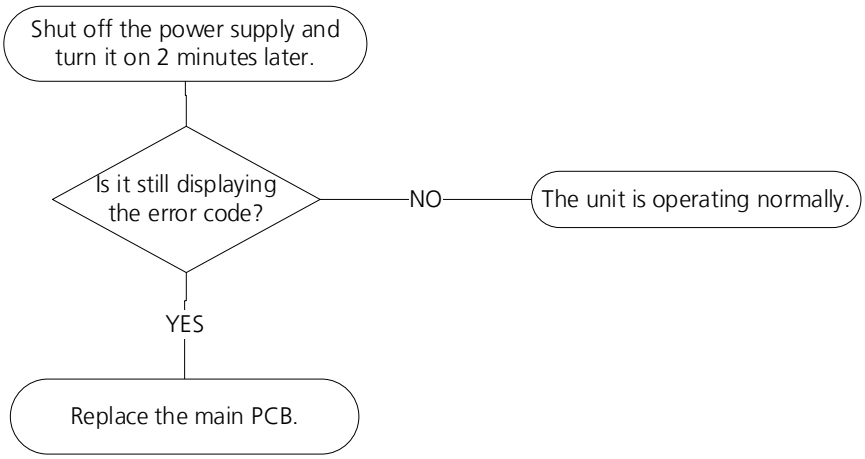
5.2 EC51(Main control board EEPROM malfunction) diagnosis and solution

Description: main chip does not receive feedback from EEPROM chip.

Recommended parts to prepare:

- Main PCB

Troubleshooting and repair:



Remarks:
EEPROM: A read-only memory whose contents can be erased and reprogrammed using a pulsed voltage.

5.3 EH03 (The indoor fan speed is operating outside of normal range) diagnosis and solution

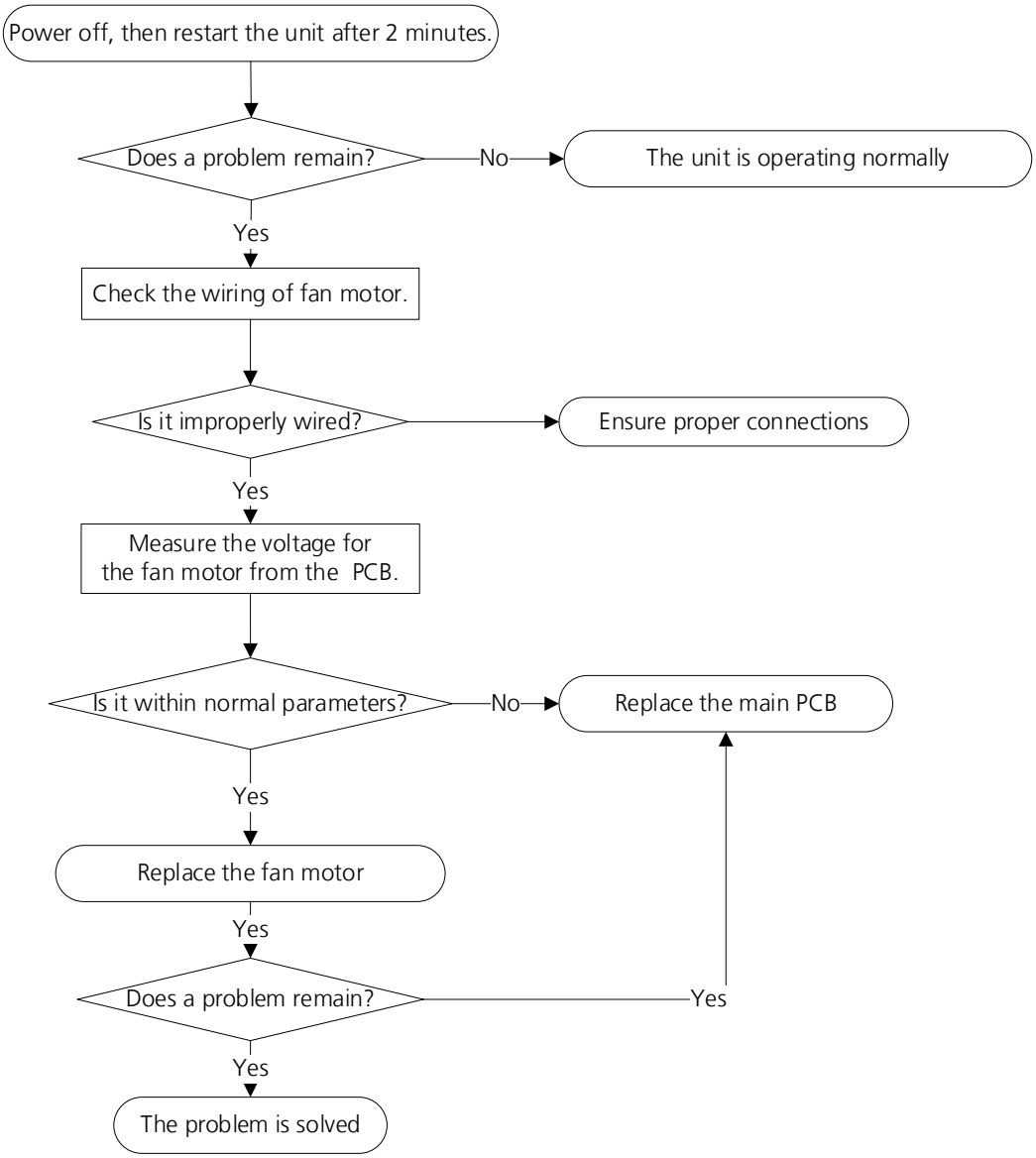
Description: When indoor fan speed keeps too low or too high for a certain time, the LED displays the failure code and the AC turns off.

When outdoor fan has over-current protection, phase lack protection, zero speed protection, IPM protection and so on, the LED displays the failure code and the AC turns off.

Recommended parts to prepare:

- Connection wires
- Fan assembly
- Fan motor
- Main PCB

Troubleshooting and repair:



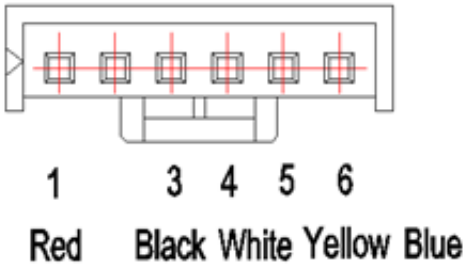
Index:

1. Indoor DC Fan Motor(control chip is in fan motor)

Power on and when the unit is in standby, measure the voltage of pin1-pin3, pin4-pin3 in fan motor connector. If the value of the voltage is not in the range showing in below table, the PCB must has problems and need to be replaced.

- DC motor voltage input and output:

No.	Color	Signal	Voltage
1	Red	Vs/Vm	50-400V
2	---	---	---
3	Black	GND	0V
4	White	Vcc	13.5-16.5V
5	Yellow	Vsp	0~6.5V
6	Blue	FG	13.5-16.5V



5.4 EC07(The outdoor fan speed is operating outside of normal range) diagnosis and solution

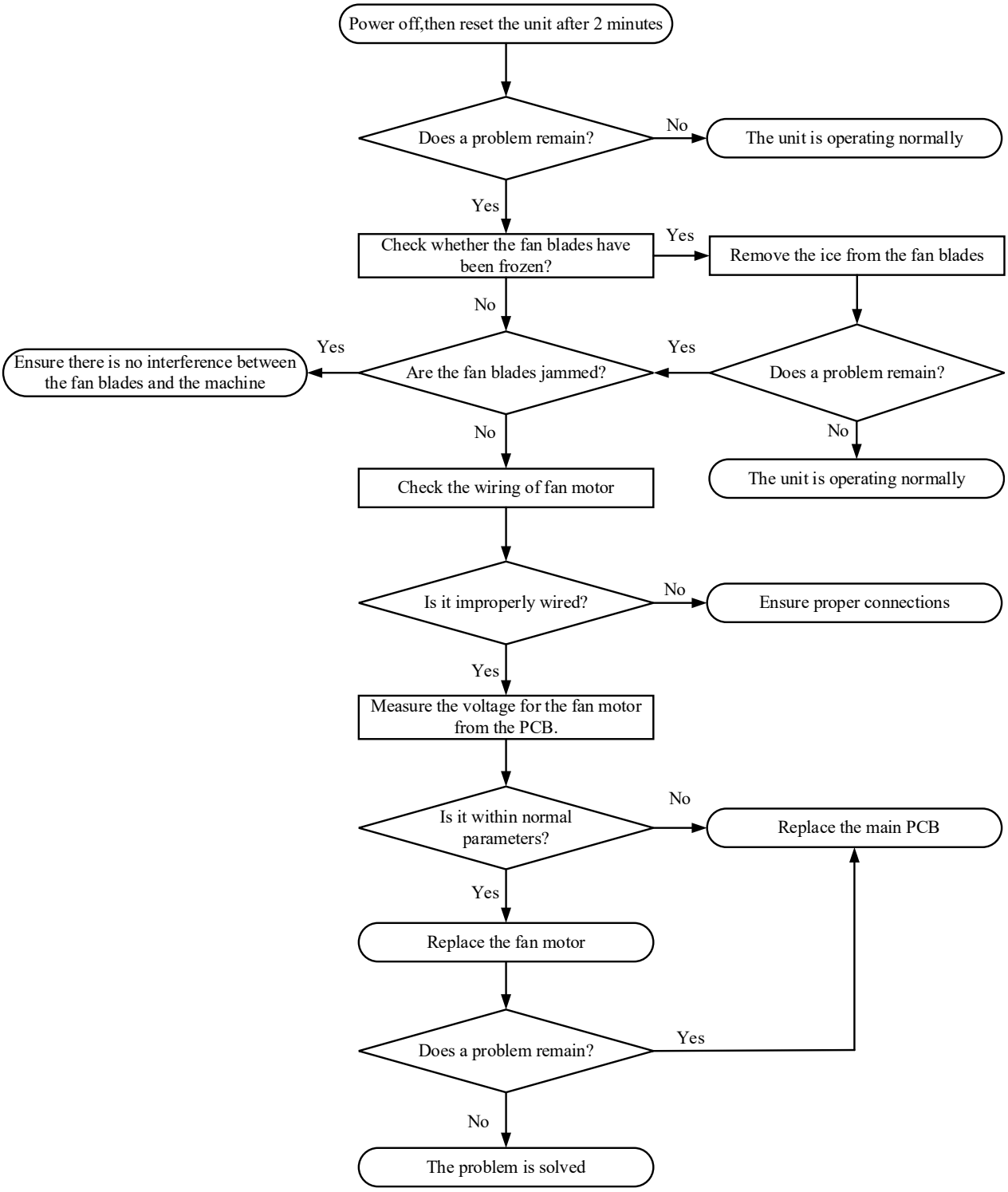
Description: When indoor fan speed keeps too low or too high for a certain time, the LED displays the failure code and the AC turns off.

When outdoor fan has over-current protection, phase lack protection, zero speed protection, IPM protection and so on, the LED displays the failure code and the AC turns off.

Recommended parts to prepare:

- Connection wires
- Fan assembly
- Fan motor
- Main PCB

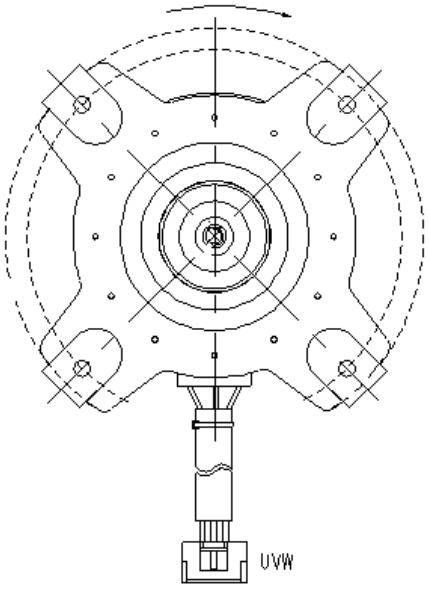
Troubleshooting and repair:


Power off,then reset the unit after 2 minutes
Does a problem remain?
No
The unit is operating normally
Yes
Check whether the fan blades have been frozen?
Yes
Remove the ice from the fan blades
No
Yes
Ensure there is no interference between the fan blades and the machine
Are the fan blades jammed?
Yes
Does a problem remain?
No
No
The unit is operating normally
Check the wiring of fan motor
Is it improperly wired?
No
Ensure proper connections
Yes
Measure the voltage for the fan motor from the PCB.
Is it within normal parameters?
No
Replace the main PCB
Yes
Replace the fan motor
Does a problem remain?
Yes
No
The problem is solved

Index:

1. Outdoor DC Fan Motor (control chip is in outdoor PCB)

Release the UVW connector. Measure the resistance of U-V, U-W, V-W. If the resistance is not equal to each other, the fan motor must has problems and need to be replaced. otherwise the PCB must has problems and need to be replaced.



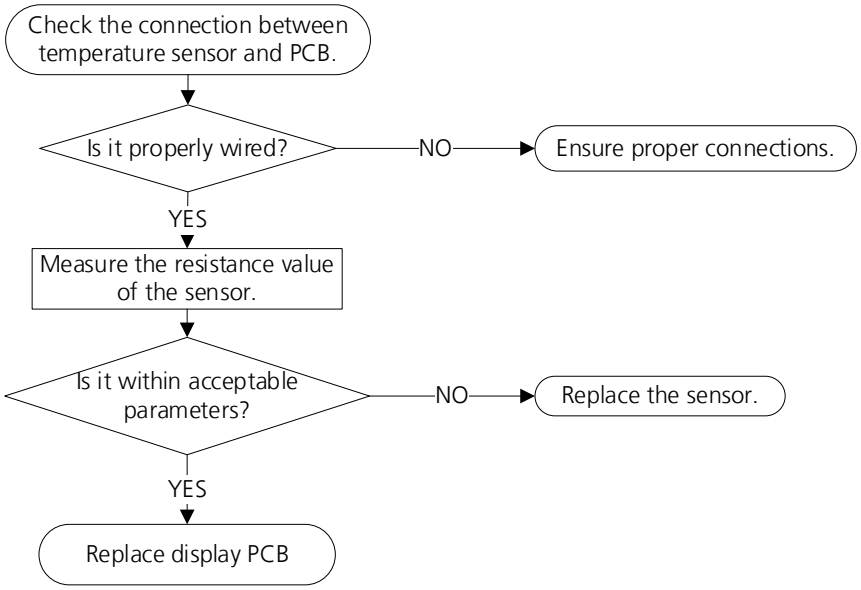
5.5 EH60/EH61(Open circuit or short circuit of indoor temperature sensor(T1, T2)) diagnosis and solution

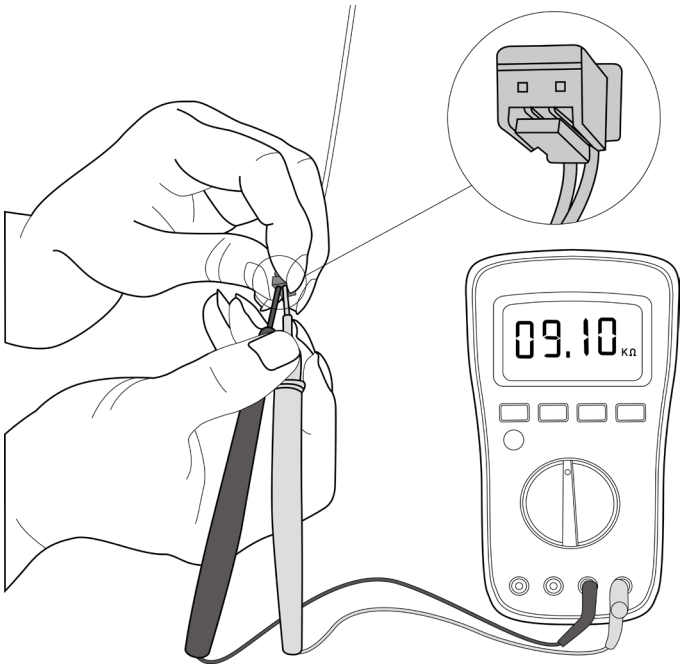
Description: If the sampling voltage is lower than 0.06V or higher than 4.94V, the LED displays the failure code.

Recommended parts to prepare:

- Connection wires
- Sensors
- Display PCB

Troubleshooting and repair:





Note: This picture and the value are only for reference, actual appearance and value may vary.

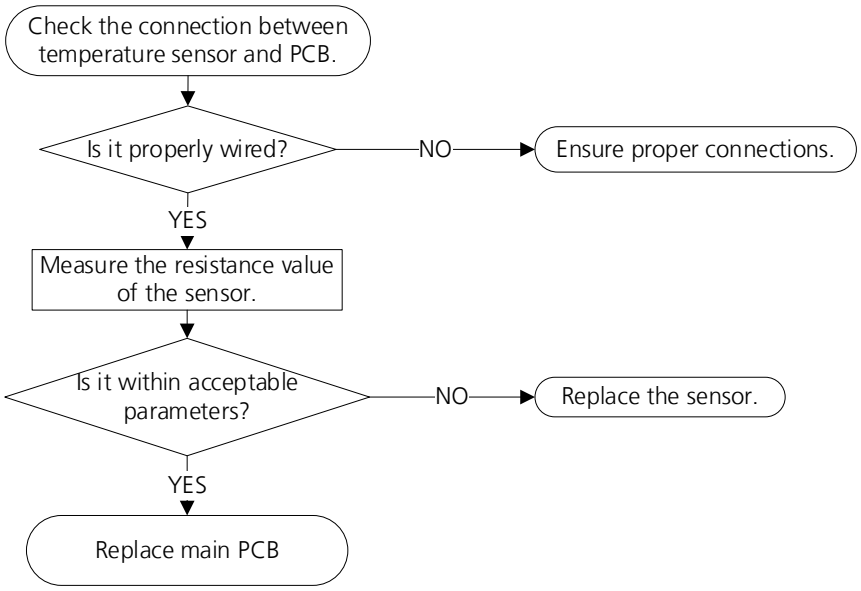
5.6 EC52/EC53/EC54(Open circuit or short circuit of outdoor temperature sensor(T3, T4, TP)) diagnosis and solution

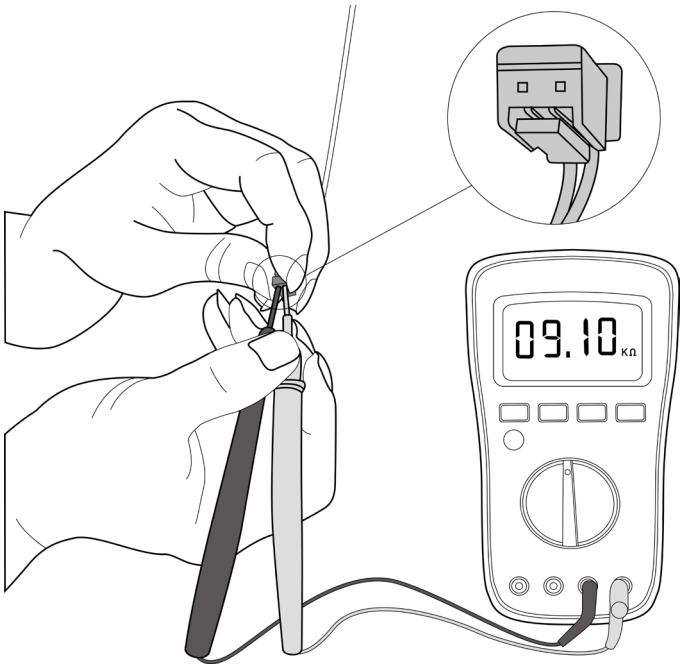
Description: If the sampling voltage is lower than 0.06V or higher than 4.94V, the LED displays the failure code.

Recommended parts to prepare:

- Connection wires
- Sensors
- Main PCB

Troubleshooting and repair:





This picture and the value are only for reference, actual appearance and value may vary.

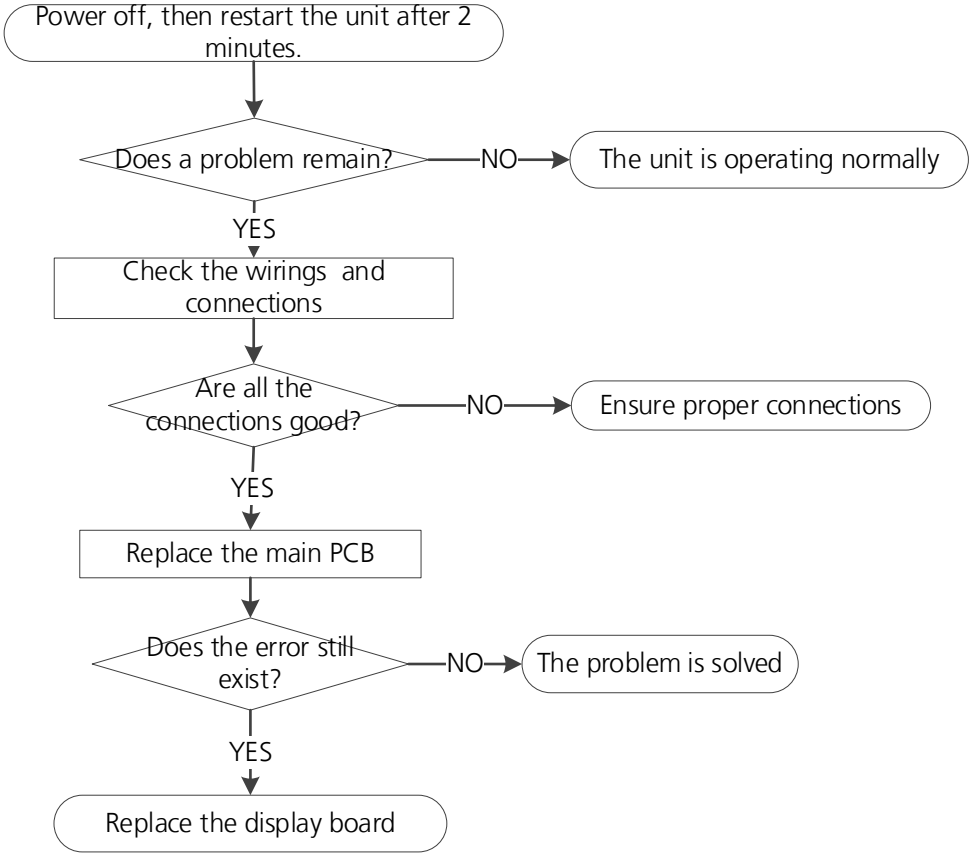
5.7 EH0b(Main PCB/Display board communication error) diagnosis and solution

Description: The main board does not receive feedback from the display board.

Recommended parts to prepare:

- Communication wire
- Main PCB
- Display board

Troubleshooting and repair:



5.8 EL0C(System lacks refrigerant) diagnosis and solution

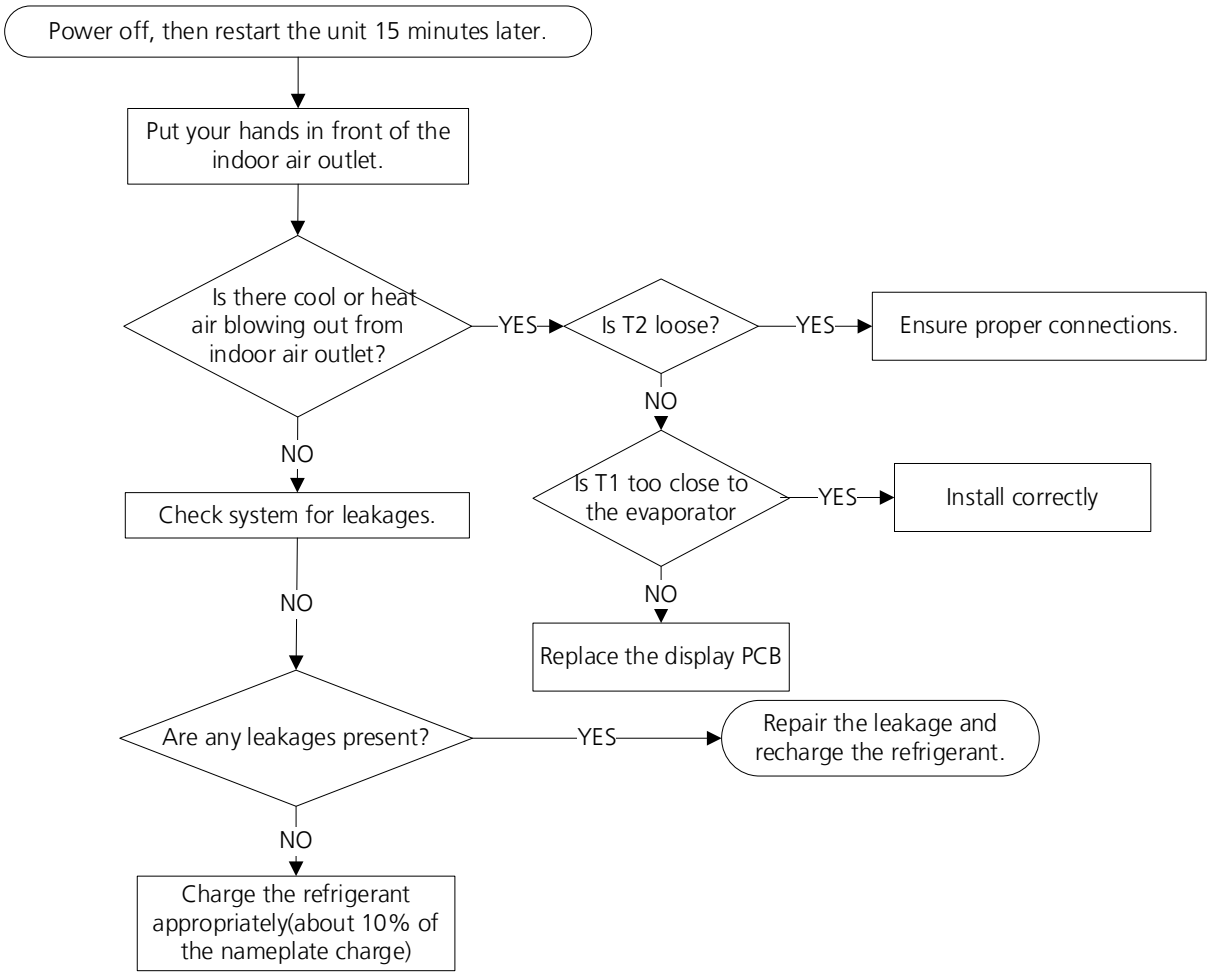
Description:

Judging the abnormality of the refrigeration system according to the number of compressor stops and the changes in operating parameters caused by excessive exhaust temperature.

Recommended parts to prepare:

- Display PCB
- Additional refrigerant

Troubleshooting and repair:



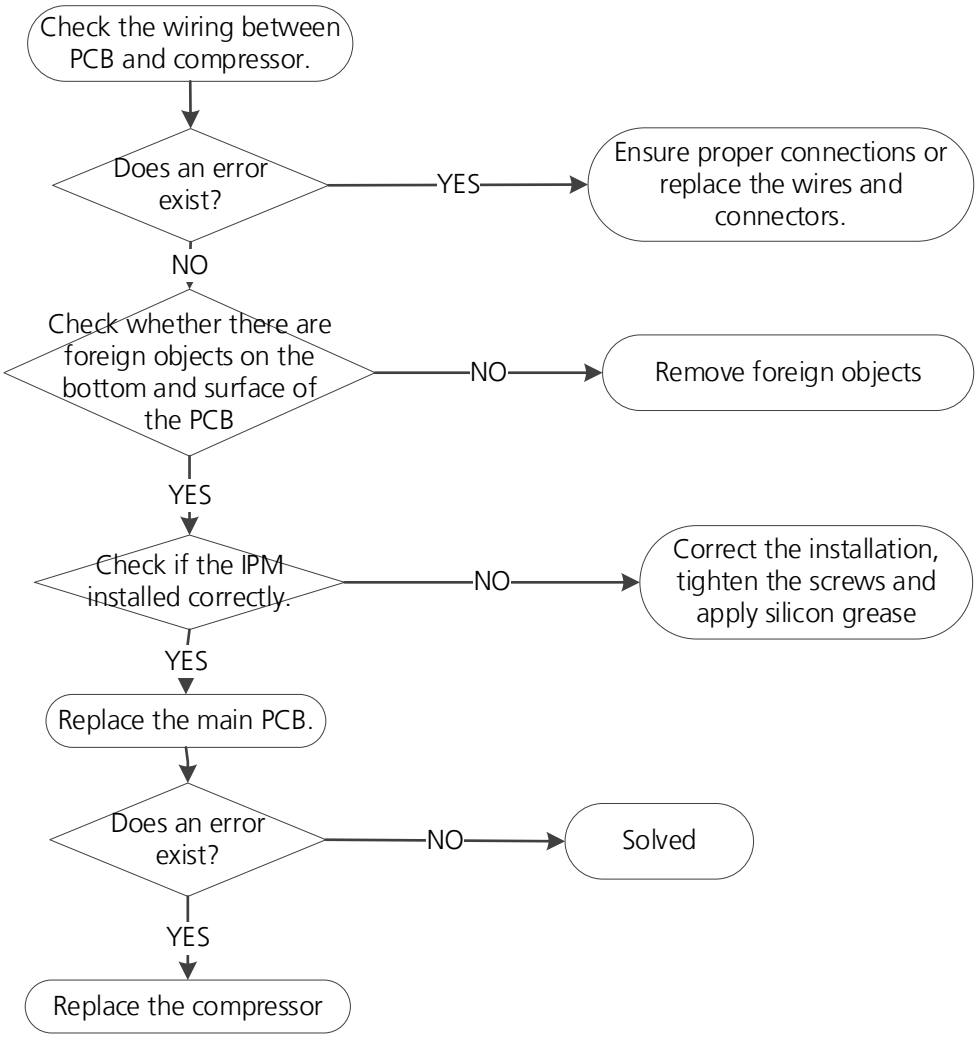
5.9 PC00(IPM malfunction or IGBT over-strong current protection) diagnosis and solution

Description: When the voltage signal the IPM sends to the compressor drive chip is abnormal, , the LED displays the failure code and the AC turn off.

Recommended parts to prepare:

- Main PCB
- Compressor

Troubleshooting and repair:



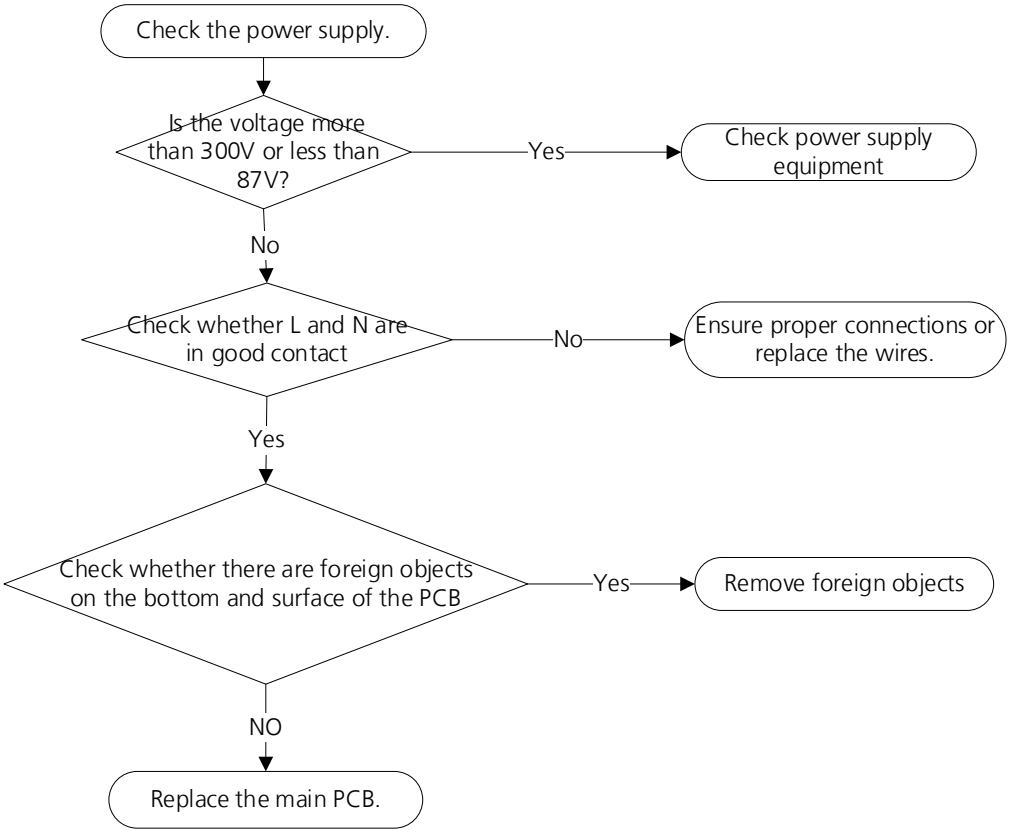
5.10 PC01(Over voltage or too low voltage protection) diagnosis and solution

Description: Abnormal increases or decreases in voltage are detected by checking the specified voltage detection circuit.

Recommended parts to prepare:

- Power supply wires
- Main PCB

Troubleshooting and repair:



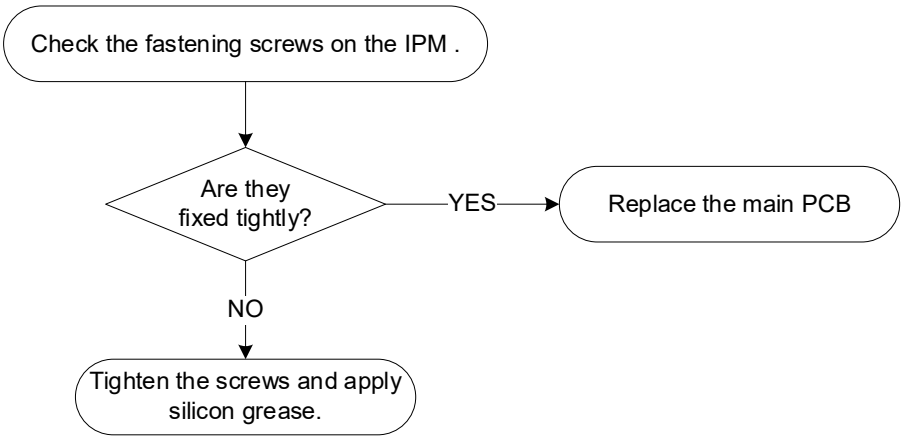
5.11 PC02(High temperature protection of IPM module) diagnosis and solution

Description: If the temperature of IPM module is higher than a certain value, the LED displays the failure code.

Recommended parts to prepare:

- Main PCB

Troubleshooting and repair:



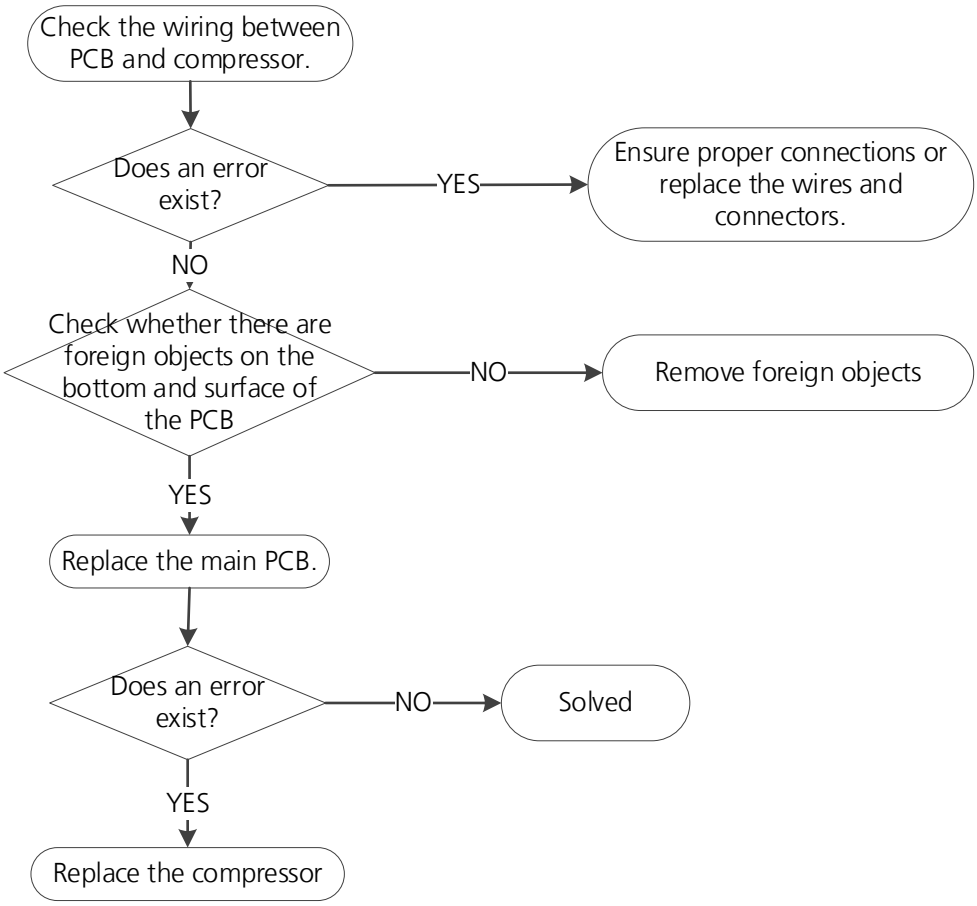
5.12 PC04(Inverter compressor drive error) diagnosis and solution

Description: An abnormal inverter compressor drive is detected by a special detection circuit, including communication signal detection, voltage detection, compressor rotation speed signal detection and so on.

Recommended parts to prepare:

- Compressor
- Main PCB

Troubleshooting and repair:



5.13 PC0L Low ambient temperature protection Error Diagnosis and Solution

Description: It is a protection function. When compressor is off, outdoor ambient temperature(T4) is lower than -35°C. for 10s, the AC will stop and display the failure code.

When compressor is on, outdoor ambient temperature(T4) is lower than -40°C.for 10s, the AC will stop and display the failure code.

When outdoor ambient temperature(T4) is no lower than -32°C. for 10s, the unit will exit protection.

5.14 P1 Bottom tray is full Error Diagnosis and Solution

Description: Water in tank is full.

Troubleshooting and repair:

Connect the drain hose and drain the collected water away. If protection repeats, call for service.

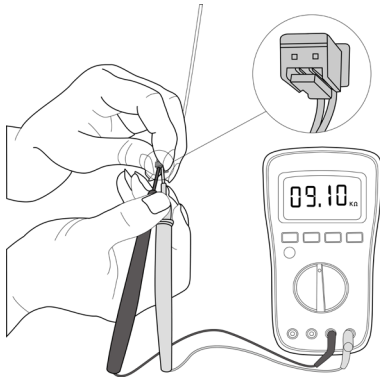
6. Check Procedures

6.1 Temperature Sensor Check

WARNING

Be sure to turn off all power supplies or disconnect all wires to avoid electric shock.
Operate after compressor and coil have returned to normal temperature in case of injury.

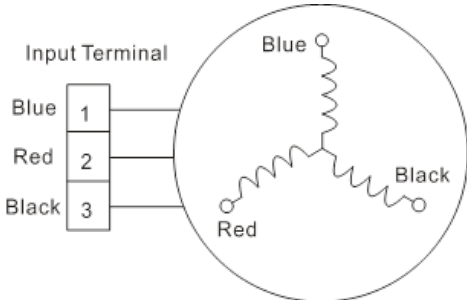
1. Disconnect the temperature sensor from PCB (Refer to Chapter 5&6. Indoor&Outdoor Unit Disassembly).
2. Measure the resistance value of the sensor using a multi-meter.
3. Check corresponding temperature sensor resistance value table (Refer to Chapter Appendix).



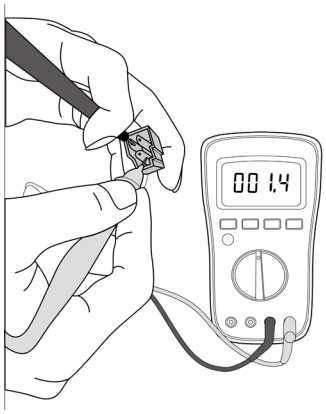
Note: The picture and the value are only for reference, actual condition and specific value may vary.

6.2 Compressor Check

1. Disconnect the compressor power cord from outdoor PCB (Refer to Chapter 6. Outdoor Unit Disassembly)).
2. Measure the resistance value of each winding using a multi-meter.
3. Check the resistance value of each winding in the following table.



Resistance Value	KSN103D42UEZ31	KSN140D58UFZ
Blue-Red	2.35±5%Ω	1.86±5%Ω
Blue-Black		
Red-Black		



Note: The picture and the value are only for reference, actual condition and specific value may vary.

6.3 IPM Continuity Check

WARNING

Electricity remains in capacitors even when the power supply is off.
Ensure the capacitors are fully discharged before troubleshooting.

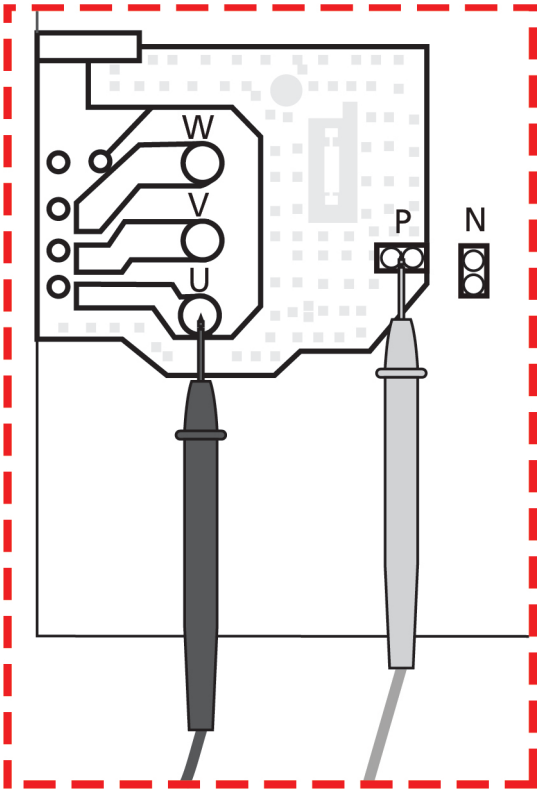
1. Turn off outdoor unit and disconnect power supply.
2. Discharge electrolytic capacitors and ensure all energy-storage unit has been discharged.
3. Disassemble outdoor PCB or disassemble IPM board.
4. Measure the resistance value between P and U(V, W, N); U(V, W) and N.

Digital tester		Resistance value	Digital tester		Resistance value
(+)Red	(-)Black		(+)Red	(-)Black	
P	N	∞ (Several MΩ)	U	N	∞ (Several MΩ)
	U		V		
	V		W		
	W		-		

Or test the conductivity of IPM with diode mode.

Needle-type Tester		Normal Value	Needle-type Tester		Normal Value
Red	Black		Red	Black	
P	U	Open-circuit	N	U	0.3-0.5V
	V			V	
	W			W	

Needle-type Tester		Normal Value	Needle-type Tester		Normal Value
Black	Red		Black	Red	
P	U	0.3-0.5V	N	U	Open-circuit
	V			V	
	W			W	



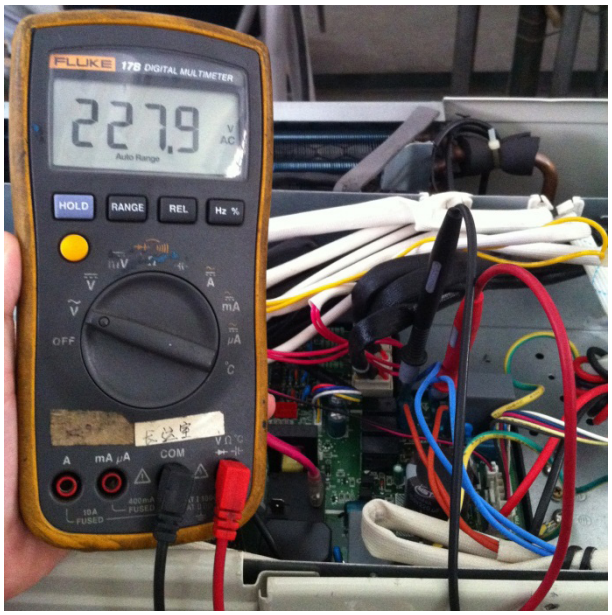
Note: The picture and the value are only for reference, actual condition and specific value may vary.

6.4 4-way Valve Check

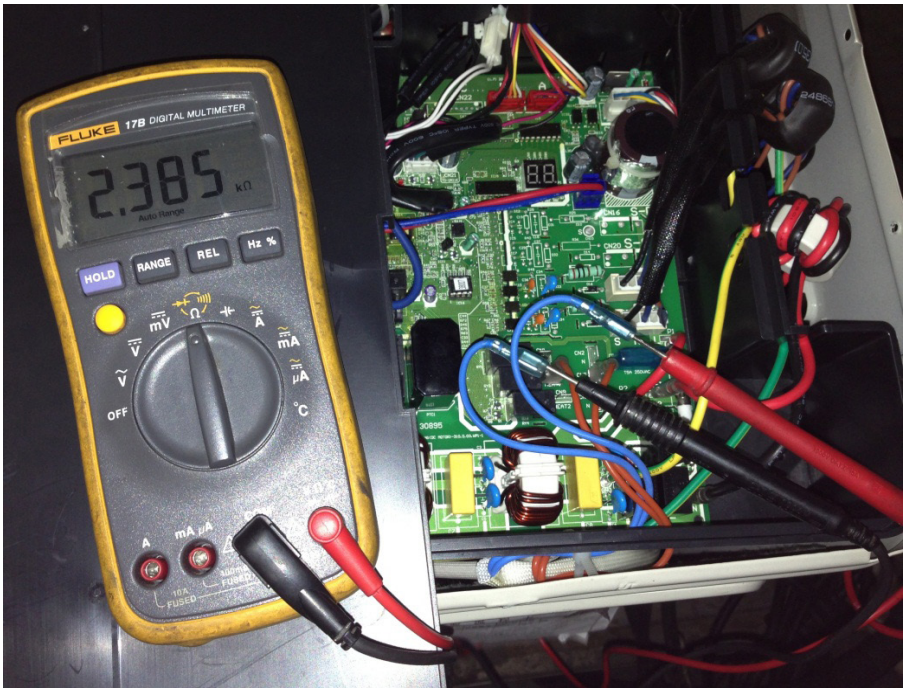
1. Power on, use a digital tester to measure the voltage, when the unit operates in cooling, it is 0V. When the unit operates in heating, it is about 115VAC.

If the value of the voltage is not in the range, the PCB must have problems and need to be replaced.





2 Turn off the power, use a digital tester to measure the resistance. The value should be 1.8~2.5 KΩ.



Appendix

Contents

i) Temperature Sensor Resistance Value Table for T1, T2, T3, and T4 (°C – K) 2

ii) Temperature Sensor Resistance Value Table for T5&T6(°C --K) 3

iii) Pressure On Service Port 4

i) Temperature Sensor Resistance Value Table for T1,T2,T3 and T4 (°C – K)

°C	°F	K Ohm	°C	°F	K Ohm	°C	°F	K Ohm	°C	°F	K Ohm
-20	-4	115.266	20	68	12.6431	60	140	2.35774	100	212	0.62973
-19	-2	108.146	21	70	12.0561	61	142	2.27249	101	214	0.61148
-18	0	101.517	22	72	11.5	62	144	2.19073	102	216	0.59386
-17	1	96.3423	23	73	10.9731	63	145	2.11241	103	217	0.57683
-16	3	89.5865	24	75	10.4736	64	147	2.03732	104	219	0.56038
-15	5	84.219	25	77	10	65	149	1.96532	105	221	0.54448
-14	7	79.311	26	79	9.55074	66	151	1.89627	106	223	0.52912
-13	9	74.536	27	81	9.12445	67	153	1.83003	107	225	0.51426
-12	10	70.1698	28	82	8.71983	68	154	1.76647	108	226	0.49989
-11	12	66.0898	29	84	8.33566	69	156	1.70547	109	228	0.486
-10	14	62.2756	30	86	7.97078	70	158	1.64691	110	230	0.47256
-9	16	58.7079	31	88	7.62411	71	160	1.59068	111	232	0.45957
-8	18	56.3694	32	90	7.29464	72	162	1.53668	112	234	0.44699
-7	19	52.2438	33	91	6.98142	73	163	1.48481	113	235	0.43482
-6	21	49.3161	34	93	6.68355	74	165	1.43498	114	237	0.42304
-5	23	46.5725	35	95	6.40021	75	167	1.38703	115	239	0.41164
-4	25	44	36	97	6.13059	76	169	1.34105	116	241	0.4006
-3	27	41.5878	37	99	5.87359	77	171	1.29078	117	243	0.38991
-2	28	39.8239	38	100	5.62961	78	172	1.25423	118	244	0.37956
-1	30	37.1988	39	102	5.39689	79	174	1.2133	119	246	0.36954
0	32	35.2024	40	104	5.17519	80	176	1.17393	120	248	0.35982
1	34	33.3269	41	106	4.96392	81	178	1.13604	121	250	0.35042
2	36	31.5635	42	108	4.76253	82	180	1.09958	122	252	0.3413
3	37	29.9058	43	109	4.5705	83	181	1.06448	123	253	0.33246
4	39	28.3459	44	111	4.38736	84	183	1.03069	124	255	0.3239
5	41	26.8778	45	113	4.21263	85	185	0.99815	125	257	0.31559
6	43	25.4954	46	115	4.04589	86	187	0.96681	126	259	0.30754
7	45	24.1932	47	117	3.88673	87	189	0.93662	127	261	0.29974
8	46	22.5662	48	118	3.73476	88	190	0.90753	128	262	0.29216
9	48	21.8094	49	120	3.58962	89	192	0.8795	129	264	0.28482
10	50	20.7184	50	122	3.45097	90	194	0.85248	130	266	0.2777
11	52	19.6891	51	124	3.31847	91	196	0.82643	131	268	0.27078
12	54	18.7177	52	126	3.19183	92	198	0.80132	132	270	0.26408
13	55	17.8005	53	127	3.07075	93	199	0.77709	133	271	0.25757
14	57	16.9341	54	129	2.95896	94	201	0.75373	134	273	0.25125
15	59	16.1156	55	131	2.84421	95	203	0.73119	135	275	0.24512
16	61	15.3418	56	133	2.73823	96	205	0.70944	136	277	0.23916
17	63	14.6181	57	135	2.63682	97	207	0.68844	137	279	0.23338
18	64	13.918	58	136	2.53973	98	208	0.66818	138	280	0.22776
19	66	13.2631	59	138	2.44677	99	210	0.64862	139	282	0.22231

ii) Temperature Sensor Resistance Value Table for T5&T6(for some units) (°C --K)

°C	°F	K Ohm	°C	°F	K Ohm	°C	°F	K Ohm	°C	°F	K Ohm
°C	°F	K Ohm	°C	°F	K Ohm	°C	°F	K Ohm	°C	°F	K Ohm
-20	-4	542.7	20	68	68.66	60	140	13.59	100	212	3.702
-19	-2	511.9	21	70	65.62	61	142	13.11	101	214	3.595
-18	0	483	22	72	62.73	62	144	12.65	102	216	3.492
-17	1	455.9	23	73	59.98	63	145	12.21	103	217	3.392
-16	3	430.5	24	75	57.37	64	147	11.79	104	219	3.296
-15	5	406.7	25	77	54.89	65	149	11.38	105	221	3.203
-14	7	384.3	26	79	52.53	66	151	10.99	106	223	3.113
-13	9	363.3	27	81	50.28	67	153	10.61	107	225	3.025
-12	10	343.6	28	82	48.14	68	154	10.25	108	226	2.941
-11	12	325.1	29	84	46.11	69	156	9.902	109	228	2.86
-10	14	307.7	30	86	44.17	70	158	9.569	110	230	2.781
-9	16	291.3	31	88	42.33	71	160	9.248	111	232	2.704
-8	18	275.9	32	90	40.57	72	162	8.94	112	234	2.63
-7	19	261.4	33	91	38.89	73	163	8.643	113	235	2.559
-6	21	247.8	34	93	37.3	74	165	8.358	114	237	2.489
-5	23	234.9	35	95	35.78	75	167	8.084	115	239	2.422
-4	25	222.8	36	97	34.32	76	169	7.82	116	241	2.357
-3	27	211.4	37	99	32.94	77	171	7.566	117	243	2.294
-2	28	200.7	38	100	31.62	78	172	7.321	118	244	2.233
-1	30	190.5	39	102	30.36	79	174	7.086	119	246	2.174
0	32	180.9	40	104	29.15	80	176	6.859	120	248	2.117
1	34	171.9	41	106	28	81	178	6.641	121	250	2.061
2	36	163.3	42	108	26.9	82	180	6.43	122	252	2.007
3	37	155.2	43	109	25.86	83	181	6.228	123	253	1.955
4	39	147.6	44	111	24.85	84	183	6.033	124	255	1.905
5	41	140.4	45	113	23.89	85	185	5.844	125	257	1.856
6	43	133.5	46	115	22.89	86	187	5.663	126	259	1.808
7	45	127.1	47	117	22.1	87	189	5.488	127	261	1.762
8	46	121	48	118	21.26	88	190	5.32	128	262	1.717
9	48	115.2	49	120	20.46	89	192	5.157	129	264	1.674
10	50	109.8	50	122	19.69	90	194	5	130	266	1.632
11	52	104.6	51	124	18.96	91	196	4.849			
12	54	99.69	52	126	18.26	92	198	4.703			
13	55	95.05	53	127	17.58	93	199	4.562			
14	57	90.66	54	129	16.94	94	201	4.426			
15	59	86.49	55	131	16.32	95	203	4.294			
16	61	82.54	56	133	15.73	96	205	4.167			
17	63	78.79	57	135	15.16	97	207	4.045			
18	64	75.24	58	136	14.62	98	208	3.927			
19	66	71.86	59	138	14.09	99	210	3.812			

iii) Pressure On Service Port

System Pressure Table-R32

Pressure			Temperature		Pressure			Temperature	
Kpa	bar	PSI	°C	°F	Kpa	bar	PSI	°C	°F
100	1	14.5	-51.909	-61.436	1850	18.5	268.25	28.425	83.165
150	1.5	21.75	-43.635	-46.543	1900	19	275.5	29.447	85.005
200	2	29	-37.323	-35.181	1950	19.5	282.75	30.448	86.806
250	2.5	36.25	-32.15	-25.87	2000	20	290	31.431	88.576
300	3	43.5	-27.731	-17.916	2050	20.5	297.25	32.395	90.311
350	3.5	50.75	-23.85	-10.93	2100	21	304.5	33.341	92.014
400	4	58	-20.378	-4.680	2150	21.5	311.75	34.271	93.688
450	4.5	65.25	-17.225	0.995	2200	22	319	35.184	95.331
500	5	72.5	-14.331	6.204	2250	22.5	326.25	36.082	96.948
550	5.5	79.75	-11.65	11.03	2300	23	333.5	36.965	98.537
600	6	87	-9.150	15.529	2350	23.5	340.75	37.834	100.101
650	6.5	94.25	-6.805	19.752	2400	24	348	38.688	101.638
700	7	101.5	-4.593	23.734	2450	24.5	355.25	39.529	103.152
750	7.5	108.75	-2.498	27.505	2500	25	362.5	40.358	104.644
800	8	116	-0.506	31.089	2550	25.5	369.75	41.173	106.111
850	8.5	123.25	1.393	34.507	2600	26	377	41.977	107.559
900	9	130.5	3.209	37.777	2650	26.5	384.25	42.769	108.984
950	9.5	137.75	4.951	40.911	2700	27	391.5	43.55	110.39
1000	10	145	6.624	43.923	2750	27.5	398.75	44.32	111.776
1050	10.5	152.25	8.235	46.823	2800	28	406	45.079	113.142
1100	11	159.5	9.790	49.621	2850	28.5	413.25	45.828	114.490
1150	11.5	166.75	11.291	52.324	2900	29	420.5	46.567	115.821
1200	12	174	12.745	54.941	2950	29.5	427.75	47.296	117.133
1250	12.5	181.25	14.153	57.475	3000	30	435	48.015	118.427
1300	13	188.5	15.52	59.936	3050	30.5	442.25	48.726	119.707
1350	13.5	195.75	16.847	62.325	3100	31	449.5	49.428	120.970
1400	14	203	18.138	64.648	3150	31.5	456.75	50.121	122.218
1450	14.5	210.25	19.395	66.911	3200	32	464	50.806	123.451
1500	15	217.5	20.619	69.114	3250	32.5	471.25	51.482	124.668
1550	15.5	224.75	21.813	71.263	3300	33	478.5	52.15	125.87
1600	16	232	22.978	73.360	3350	33.5	485.75	52.811	127.060
1650	16.5	239.25	24.116	75.409	3400	34	493	53.464	128.235
1700	17	246.5	25.229	77.412	3450	34.5	500.25	54.11	129.398
1750	17.5	253.75	26.317	79.371	3500	35	507.5	54.748	130.546
1800	18	261	27.382	81.288					