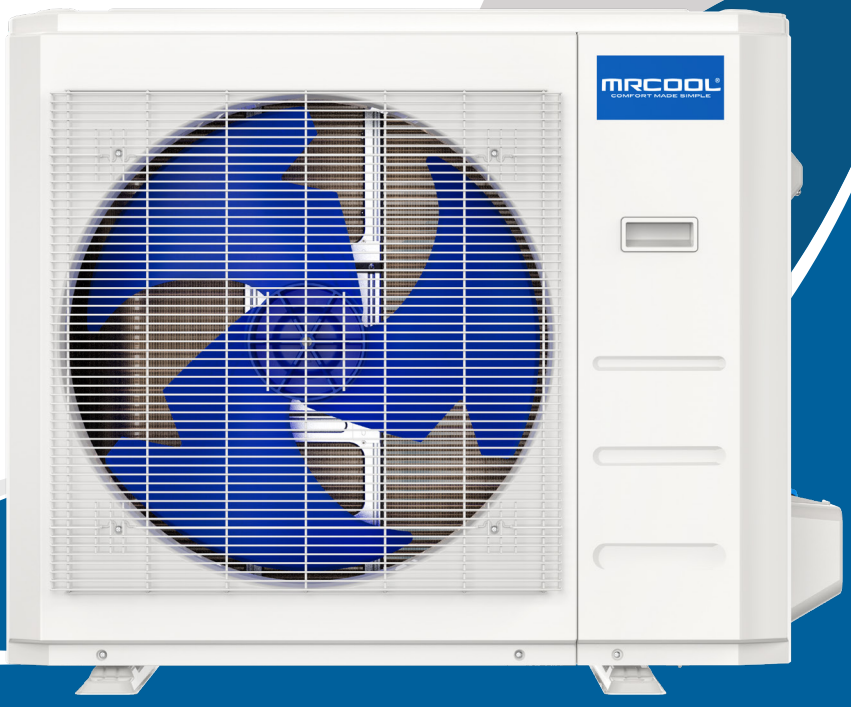
This product utilizes **R-454B** *refrigerant*

DIY® Series Hybrid Air Handler

SERVICE MANUAL

MODELS:

DIY-*-HP-MUAH-230D25-O
DIY-*-HP-C-230D25-O



Read this manual carefully before installation and keep it where the operator can easily find it for future reference.

Due to updates and constantly improving performance, the information and instructions within this manual are subject to change without notice.

Version Date: March 20, 2025
Please visit www.mrcool.com/documentation to ensure you have the latest version of this manual.

MRCOOL®
COMFORT MADE SIMPLE

CONTENTS

Safety Precautions

Read Before Using

Incorrect usage may cause serious damage or injury.

The symbols below are used throughout this manual to indicate instructions that should be followed closely or actions that should be avoided to prevent death, injury, and/or property damage.

WARNING	**Indicates the possibility of personal injury or loss of life.**
CAUTION	**Indicates the possibility of property damage or serious consequences.**

WARNINGS FOR PRODUCT INSTALLATION

INSTALLATION MUST BE PERFORMED BY AN AUTHORIZED DEALER OR SPECIALIST. DEFECTIVE INSTALLATION CAN CAUSE WATER LEAKAGE, ELECTRICAL SHOCK, OR FIRE.

******ELECTRICAL WORK MUST BE COMPLETED BY A QUALIFIED ELECTRICAL TECHNICIAN******

- ***DO NOT*** **install the unit in a location that may be exposed to combustible gas leaks. If combustible gas accumulates around the unit, it could cause fire.**
- ***DO NOT*** **turn on the power until the installation and all work has been completed.**
- ***DO NOT*** **install a unit equipped with an auxiliary electric heater within 3 ft (1 m) of any combustible materials.**

1. Turn off the unit and disconnect the power before performing any installation or repairs. Failure to do so can cause electric shock.
2. Installation must be performed according to the installation instructions. Improper installation could cause water leakage, electrical shock, fire, and could void the warranty. Contact an authorized service technician for repair or maintenance of this unit. This appliance must be installed in accordance with national wiring regulations.
3. Only use the included accessories, parts, and specified parts for installation. Using non-standard parts can cause water leakage, electrical shock, fire, and/or failure of the unit.
4. Install the unit in a firm location that can support the unit's weight. If the location cannot support the unit's weight, or the installation is not done properly, the unit may drop and cause serious injury and damage.
5. Install the drainage piping according to the instructions in this manual. Improper drainage could cause water damage to your home and/or property.
6. When moving or relocating the air conditioner, consult experienced service technicians for disconnection and re-installation of the unit.
7. For detailed information of how to install the indoor and outdoor units to their respective supports, please refer to the indoor unit installation and outdoor unit installation sections of this manual.
8. For units with a wireless network function, the USB device access, replacement, and maintenance operations must be carried out by professional staff.
9. Refer to details further in this manual regarding installing the unit to its support.

WARNINGS FOR PRODUCT USE

- ⊘ ***DO NOT*** **insert fingers, rods, or other objects into the air inlet or outlet. This could cause injury, since the fan may be rotating at high speeds.**
- ⊘ ***DO NOT*** **use flammable sprays such as hair spray, lacquer or paint near the unit, as this could cause fire and/or an explosion.**
- ⊘ ***DO NOT*** **operate the unit in places near or around combustible gases. Emitted gas may collect around the unit and cause an explosion.**
- ⊘ ***DO NOT*** **allow children to play with the appliance. Children must be supervised around the unit at all times.**
- ⊘ ***DO NOT*** **operate the unit in a room where it could be exposed to excessive amounts of water, such as a bathroom or laundry room. Exposure to excessive water amounts can cause the electrical components to short circuit.**
- ⊘ ***DO NOT*** **expose your body directly to direct cool airflow from the unit for a prolonged period of time.**

1. If the unit operates abnormally (emits strange noises or a burning smell), immediately turn off the unit and disconnect the power in order to avoid electric shock, fire, and/or injury. Call your local dealer, or MRCOOL® tech support at (270) 366-0457, for further assistance.
2. If the air conditioner is used together with burners or other heating devices, thoroughly ventilate the room in order to avoid an oxygen deficiency.
3. In certain functional environments (such as kitchens and server rooms etc.), the use of specially designed air-conditioning units is highly recommended.
4. This appliance can be used by children (8 years and older) and persons with reduced physical, sensory or mental capabilities, or lack of experience and knowledge if they have been given instruction concerning the use of the appliance and understand the hazards involved.
5. Improper installation, adjustment, alteration, service, or maintenance can cause property damage, personal injury or loss of life. Installation and service must be performed by a licensed professional HVAC installer, service agency, or the gas supplier.

ELECTRICAL WARNINGS

******ELECTRICAL WORK MUST BE COMPLETED BY A QUALIFIED ELECTRICAL TECHNICIAN******

- ⊘ ***DO NOT*** **share the power supply with other appliances. The unit must be installed on a dedicated electrical circuit. An improper or insufficient power supply could cause fire and/or electrical shock.**

1. The product must be properly grounded during installation or electrical shock could occur.
2. Appropriate wiring standards, regulations, and the installation manual must be followed for all electrical work.
3. If connecting power to fixed wiring, an all-pole disconnection device must be incorporated in the fixed wiring in accordance with the wiring rules and must meet the following requirements: at least 3 mm of clearances in all poles, a leakage current that may exceed 10 mA, and a residual current device (RCD) having a rated residual operating current not exceeding 30 mA.
4. For all electrical work, fuse the specified cables. Connect cables tightly and clamp them securely to prevent external forces from damaging the terminal. Improper electrical connections could overheat, causing fire and/or electrical shock.
5. All electrical connections must be made according to the Electrical Connection Diagram located on the panels of the indoor and outdoor units.
6. All wiring must be properly arranged to ensure that the control board cover can close properly. If the control board cover is not properly closed, it can lead to corrosion and cause the connection points on the terminal to heat up, catch fire, or cause electrical shock.
7. Only use the specified wire. If the wire is damaged, it must be replaced by the manufacturer, its service agent, or similarly qualified person in order to avoid a hazard.
8. Disconnection must be incorporated in the fixed wiring in accordance with the NEC, CEC, or local codes.

WARNINGS FOR CLEANING & MAINTENANCE

DO NOT **clean the unit with excessive amounts of water.**

DO NOT **clean unit with combustible cleaning agents, as these could cause deformation and/or fire.**

1. Turn off the device and disconnect the power before cleaning. Failure to do this could result in electrical shock.

CAUTION

DO NOT **allow the air conditioner to operate for extended periods of time with the doors or windows open, or in very high humidity.**

DO NOT **operate the air conditioner with wet hands, as this could cause electric shock.**

DO NOT **use device for any other purpose than its intended use.**

DO NOT **climb onto or place objects on top of the outdoor unit.**

1. Make sure that water condensation can drain smoothly and unhindered from the unit.
2. Turn off the unit and disconnect the power if the unit will not be used for an extended period of time.
3. As with any mechanical equipment, contact with sharp metal edges can result in personal injury. Ensure care is taken when handling the unit and any of its accessories by wearing gloves and protective clothing.

NOTE ON FLUORINATED GASES (NOT APPLICABLE FOR R-290 UNITS):

1. This unit contains fluorinated greenhouse gases.
2. For specific information on the type of gas and the amount, please refer to the relevant label on the unit itself.
3. Service, maintenance, and repair of this unit must be performed by a certified technician.
4. Product un-installation and recycling must be performed by a certified technician.
5. When checking the unit for leaks, maintain proper record-keeping of all checks.

FLAMMABLE REFRIGERANT WARNINGS

1. The installation of pipe-work should be kept to a minimum and should be protected from physical damage.
2. Refrigerant pipes should comply with national gas regulations.
3. All mechanical connections and ventilation openings should be kept clear of obstruction.
4. Utilize proper disposal processes based on national regulations.
5. Any person involved with working on or breaking into a refrigerant circuit should hold a current valid certificate from an industry-accredited assessment authority, which authorizes their competence to handle refrigerants safely in accordance with an industry recognized assessment specification.
6. 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.
7. Do not use any means to accelerate the defrosting process or to clean, other than those recommended by the manufacturer.
8. The appliance shall be stored in a room without continuously operating ignition sources (for example: open flames, an operating gas appliance, or an operating electric heater).
9. Do not allow foreign matter (oil, water, etc.) to enter the piping, and securely seal the opening by pinching, taping, etc.
10. Do not pierce or burn.
11. Refrigerants may not contain an odor.
12. Working procedures that affect safety should only be carried out by competent persons.
13. The unit should be stored in a well-ventilated area where the room size corresponds to the room area as specific for operation, and should be stored so as to prevent potential mechanical damage from occurring.
14. Joints should be tested with detection equipment with a capability of 5 g/year of refrigerant or better, with the equipment in standstill and under operation or under a pressure of at least these standstill or operation conditions after installation. Detachable joints should NOT be used in the indoor side of the unit (brazed, welded joint could be used).
15. A leak detection system is installed. The unit must be powered except for service. For units with a refrigerant sensor, the indoor unit will display an error code and emit a buzzing sound, the compressor of the outdoor unit will immediately stop, and the indoor fan will start running. The service life of the refrigerant sensor is 15 years. When the refrigerant sensor malfunctions, the indoor unit will display the error code "FHCC". The refrigerant sensor cannot be repaired and can only be replaced by the manufacturer. It should only be replaced with the sensor specified by the manufacturer.
16. Prior to beginning work on systems containing flammable refrigerants, safety checks are necessary to ensure that the risk of ignition is minimized. For repairs to the refrigerating system, the following precautions shall be complied with prior to conducting work on the system.
17. Work should be undertaken under a controlled procedure so as to minimize the risk of a flammable gas or vapor being present while the work is being performed.
18. All maintenance staff and others working in the local area should be instructed on the nature of work being carried out. Avoid work in confined spaces.
19. The area should be checked with an appropriate refrigerant 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. no sparking, adequately sealed, or intrinsically safe.
20. If any hot work is to be conducted on the refrigeration equipment or any associated parts, appropriate fire extinguishing equipment should be on site and readily available. Have a dry power or CO2 fire extinguisher adjacent to the charging area.
21. No person carrying out work in relation to a refrigerating system which involves exposing any pipe work should use any sources of ignition in such a manner that it may lead to the risk of fire or explosion. All possible ignition sources, including cigarette smoking, should be kept sufficiently far away from the site of installation, repairing, removing, and disposal, during which refrigerant can possibly be released to the surrounding space. Prior to work taking place, the area around the equipment is to be surveyed to make sure that there are no flammable hazards or ignition risks. "No Smoking" signs should be displayed.
22. 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.

FLAMMABLE REFRIGERANT WARNINGS

23. Where electrical components are being changed, they shall be fit for the purpose and to the correct specification. At all times the manfacturer's maintenance ad service guidelines shall be followed. If in doubt, consult the manufacturer's technical department for assistance. The following checks should 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 circuits should be checked for the presence of refrigerant;
    - marking to the equipment continues to be visible and legible, marking and signs that are illegible should be corrected;
    - refrigeration pipe or components are installed in a position where they are unlikely to be exposed to any substance which may corrode refrigerant containing components, unless the components are constructed of materials which are inherently resistant to being corroded or are suitably protected against being so corroded.
24. 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 should be used.
25. Initial safety checks should include:
    - that capacitors are discharged: this should be done in a safe manner to avoid the possibility of sparking;
    - that there are no live electrical components and wiring are exposed while charging, recovering, or purging the system;
    - that there is continuity of earth bonding.
26. Sealed electrical components should be replaced if damaged.
27. Intrinsically safe components should be replaced if damaged.
28. Check that wiring will not be subject to wear, corrosion, excessive pressure, vibration, sharp edges, or any other adverse environmental effects. The check shall also take into account the effects of aging or continual vibration from sources such as compressors or fans.
29. Under no circumstances should potential sources of ignition be used in the search for or detection of refrigerant leaks. A halide torch (or any other detector using a naked flame) should not be used.

The following leak detection methods are deemed acceptable for refrigerant systems. Electronic leak detectors may be used to detect refrigerant leaks but, in the case of flammable refrigerants, 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 should be calibrated to the refrigerant employed, and the appropriate percentage of gas (25% minimum) is confirmed. Leak detection fluids are also suitable for use with most refrigerants but the use of detergents containing chlorine may react with the refrigerant and corrode the copper work. Examples of leak detection fluids are the bubble method, fluorescent method agents, etc. If a leak is suspected, all naked flames should be removed/extinguished. If a leakage of refrigerant is found which requires brazing, all of the refrigerant should be recovered from the system, or isolated (by means of shut-off valves) in a part of the system remote from the leak. See the following instructions of removal of refrigerant.

30. When breaking into the refrigerant circuit to make repairs, or for any other purpose, conventional procedures should be used. However, for flammable refrigerants, it is even more vital to follow best practice. The following procedure should be adhered to:
    - safely remove refrigerant following local and national regulations;
    - evacuate;
    - purge the circuit with inert gas;
    - evacuate;
    - continuously flush or purge with inert gas when using flame to open circuit;
    - open the circuit

FLAMMABLE REFRIGERANT WARNINGS

31. The refrigerant charge should be recovered into the correct recovery cylinders if venting is not allowed by local and national codes. For units containing flammable refrigerants, the system should 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, refrigerant purging should be achieved by breaking the vacuum in the system with oxygen-free nitrogen and continuing to fill the working pressure is achieved, then venting to atmosphere, and finally pulling down to a vacuum. This process should be repeated until no refrigerant is within the system. When the final oxygen-free nitrogen charge is used, the system should be vented down to atmospheric pressure to enable work to take place. The outlet for the vacuum pump should not be close to any potential ignition sources, and ventilation should be available.
32. In addition to conventional charging procedures, the following requirements should be followed:
    - Work should be undertaken with appropriate tools only (in case of uncertainty, please consult the manufacturer of the tools for use with flammable refrigerants).
    - Ensure that contamination of different refrigerants does not occur when using charging equipment. Hoses or lines shall be as shot as possible to minimize the amount of refrigerant contained in them.
    - Cylinders should be kept upright.
    - Ensure that the refrigeration system is grounded prior to charging the system with refrigerant.
    - Label the system when charging is complete (if not already).
    - Extreme care should be taken not to overfill the refrigeration system.
    - Prior to recharging the system, it should be pressure tested with oxygen-free nitrogen (OFN). The system should 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.
33. Before carrying out this procedure, it is essential that the technician is completely familiar with the equipment and all its detail. It is good recommended practice that all refrigerants are recovered safely. Prior to the task being carried out, an oil and refrigerant sample should be taken in case analysis is required prior to re-use of recovered 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 the 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 the 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 equipment are removed from the site promptly and all isolation valves on the equipment are closed off.
    k. Recovered refrigerant should not be charged into another refrigeration system unless it has been cleaned and checked.
34. Equipment shall be labeled stating that it has been decommissioned and emptied of refrigerant. The label should be dated and signed. For appliances containing flammable refrigerants, ensure that there are labels on the equipment stating the equipment contains flammable refrigerant.

FLAMMABLE REFRIGERANT WARNINGS

35. When removing refrigerant from a system, either for servicing or decommissioning, it is good recommended 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 should be designated for the recovered refrigerant and labeled for that refrigerant (i.e. special cylinders for the recovery of refrigerant). Cylinders shall be complete with pressure-relief valve and associated shut-off valves in good working order. Empty recovery cylinders are evacuated and, if possible, cooled before recovery occurs. The recovery equipment should be in good working order with a set of instructions concerning the equipment that is at hand and should be suitable for the recovery of the flammable refrigerant. If in doubt, the manufacturer should be consulted. In addition, a set of calibrated weighing scales should be available and in good working order. Hoses should be complete with leak-free disconnect couplings and in good condition. The recovered refrigerant should be processed according to local legislation 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 compressor body should not be heated by an open flame or other ignition sources to accelerate this process. When oil is drained from a system, it should be carried out safely.
36. An unventilated area where the appliance using flammable refrigerants is installed should be constructed so that should any refrigerant leak, it will not stagnate so as to create a fire or explosion hazard. If appliances connected via an air duct system to one or more rooms below the ventilation requirements, that room should never contain potential ignition sources. A flame-producing device may be installed in the space if the device is provided with an effective flame arrest. Auxiliary devices which may be a potential ignition source should not be installed in the duct work. Examples of such are hot surfaces with a temperature exceeding 1292°F (700°C) and electric switching devices. Only auxiliary devices (such as a certified heater kit) approved by the manufacturer or declared suitable with the refrigerant should be installed in connecting ductwork. False or drop ceilings may be used as a return air plenum if a refrigerant detection system is provided in the appliance and any external connections are also provided with a sensor immediately below the return air plenum duct joint. Refrigerant sensors for refrigerant detection systems should only be replaced with sensors specified by the manufacturer. A leak detection system is installed. The unit must be powered except for service.
37. Transport of equipment containing flammable refrigerants should comply with transportation regulations.
38. Marking of equipment using signs should comply with local regulations.
39. Disposal of equipment using flammable refrigerants should comply with national regulations.
40. Storage of equipment/appliances should be in accordance with the manufacturer's instructions.
41. Storage of packed (unsold) equipment should be constructed so 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.

Symbols Displayed on Indoor & Outdoor Unit		
	**WARNING**	This symbol shows that this appliance uses a flammable refrigerant. If the refrigerant is leaked and exposed to an external ignition source, there is a risk of fire.
	**CAUTION**	This symbol shows that the operation manual should be read carefully.
	**CAUTION**	This symbol shows that a service personnel should be handling this equipment with reference to the installation manual.
	**CAUTION**	
	**CAUTION**	This symbol shows that information is available such as the operating manual or installation manual.

Room Size Restriction

The units are connected via an air duct to one or more rooms, the bottom of the air outlet of the air duct in the room should be at a height ≥7.3 ft (2.2m) from the floor. In UL/CSA 60335-2-40, the R454B refrigerant belongs to mildly flammable refrigerants, which will limit the room area of the system service. Similarly, the total amount of refrigerant in the system should be less than or equal to the maximum allowable refrigerant charge, which depends on the room area serviced by the system.

SECTION TERMINOLOGY

Mc: the actual refrigerant charge in the system
A: the actual room area where the appliance is installed
Amin: the required minimum room area
Mmax: the allowable maximum refrigerant charge in a room
Qmin: the minimum circulation airflow
Anvmin: the minimum opening area for connected rooms
TAmin: the total area of the conditioned space (for appliances serving one or more rooms with an air duct system)
TA: The total area of the conditioned space connected by air ducts.

Refrigerant Charge and Room Area Limitations

For the purpose of determination of room area (A) when used to calculate the maximum allowable refrigerant charge (mmax) in an unventilated space, the following shall apply.

The room area (A) shall be defined as the room area enclosed by the projection to the floor of the walls, partitions and doors of the space in which the appliance is installed. Spaces connected by only drop ceilings, ductwork, or similar connections shall not be considered a single space.

For units mounted higher than 6 ft (1.8m), spaces divided by partition walls which are no higher than 5.3ft/1.6m shall be considered a single space.

For fixed appliances, rooms on the same floor and connected by an open passageway between the spaces can be considered a single room when determining compliance to Amin, if the passageway complies with all of the following:

- it is a permanent opening
- it extends to the floor
- it is intended for people to walk through

For fixed appliances, the areas of the adjacent rooms, on the same floor, connected by a permanent opening in the walls and/or doors between occupied spaces, including gaps between the wall and the floor, can be considered a single room when determining compliance to Amin, provided all of the following are met:

- the space shall have appropriate openings
- the minimum opening area for natural ventilation Anvmin shall not be less than the following:

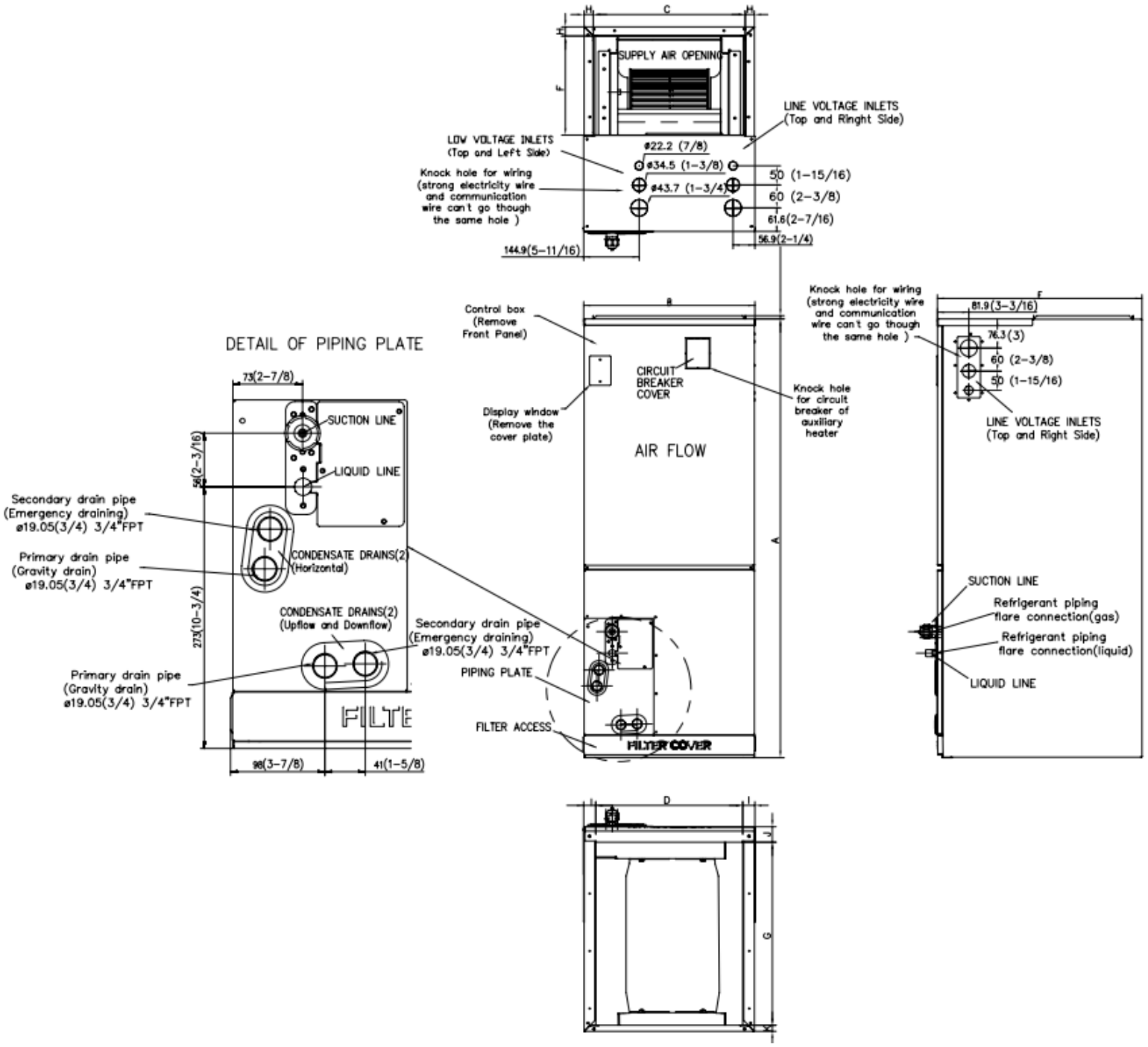
Height of Outlet/m	A/m²	Mc/kg	Mmax/kg	Anvmin/m²
2.2	5	5.0	2.685	0.045
2.2	6	5.0	2.941	0.042
2.2	7	5.0	3.177	0.038
2.2	8	5.0	3.396	0.035
2.2	9	5.0	3.602	0.031
2.2	10	5.0	3.797	0.028
2.2	11	5.0	3.983	0.024
2.2	12	5.0	4.160	0.020
2.2	13	5.0	4.330	0.016
2.2	14	5.0	4.493	0.013
2.2	15	5.0	4.651	0.009
2.2	16	5.0	4.803	0.005
2.2	17	5.0	4.951	0.001

Indoor Unit Model	Outdoor Unit Model	Capacity (Btu/h)	Power Supply
DIY-24-HP-MUAH-230D25-O	DIY-24-HP-C-230D25-O	24K	208/230V~, 60Hz, 1 Phase
DIY-36-HP-MUAH-230D25-O	DIY-36-HP-C-230D25-O	36K	

Air Handler Apperance

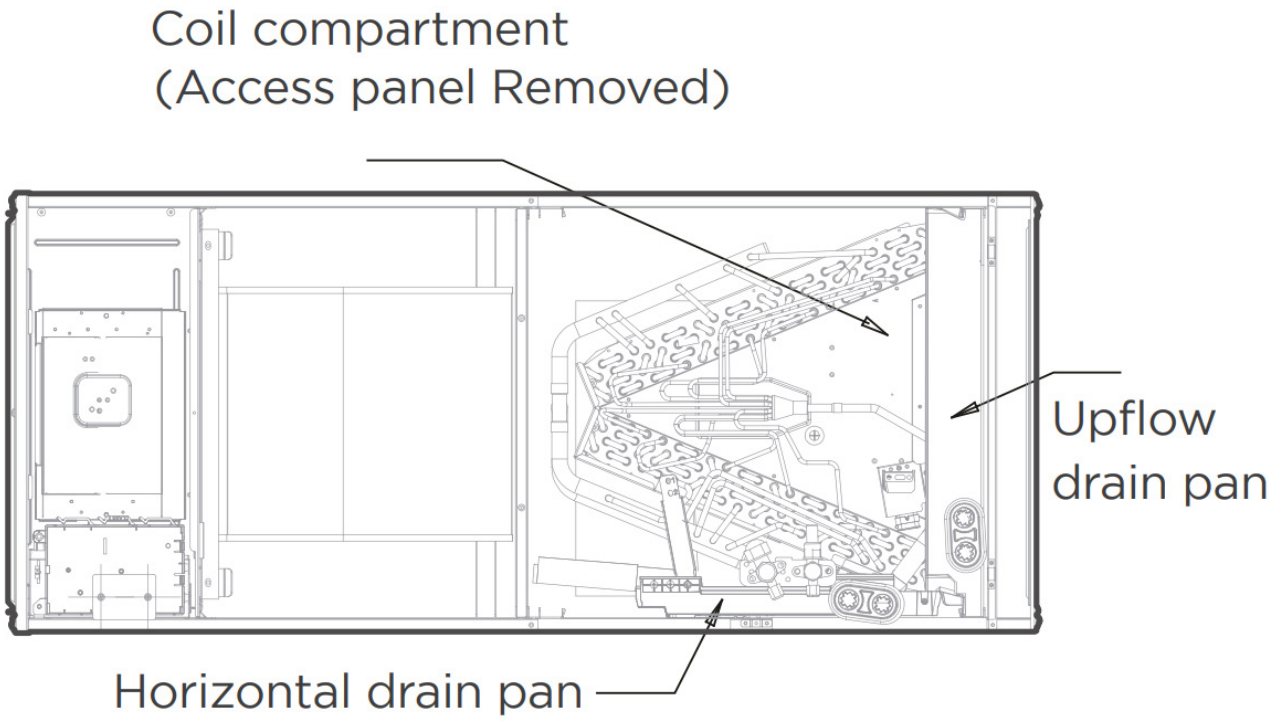
Condenser Apperance

3.1 Dimensional Drawing



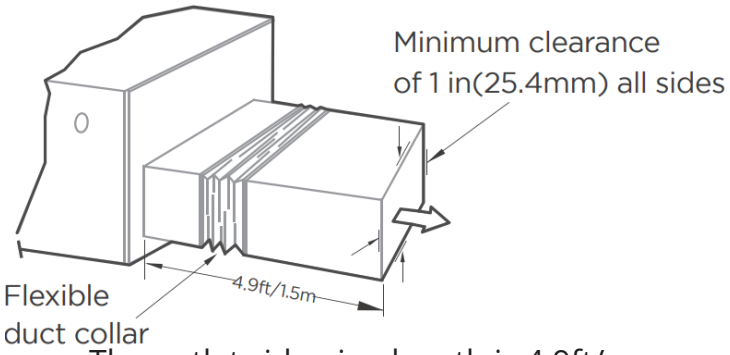
Dimensions	Model	24K		36K	
		inch	mm	inch	mm
A	Model Height	45	1143	49	1245
B	Model Width	17-1/2	445	21	534
C	Supply Air Opening Width	15-5/8	397	19-1/8	486
D	Return Air Opening Width	15-1/8	384	18-5/8	473
E	Model Depth	21	534	21	534
F	Supply Air Opening Depth	10-1/4	260	10-1/4	260
G	Return Air Opening Depth	18-3/4	476	18-3/4	476
H	Supply Air Opening Clearance	15/16	24	15/16	24
I	Return Air Opening Side Clearance	1-1/4	32	1-1/4	32
J	Return Air Opening Front Clearance	1-1/2	38	1-5/8	41
K	Return Air Opening Back Clearance	5/8	16	5/8	16

Part Names



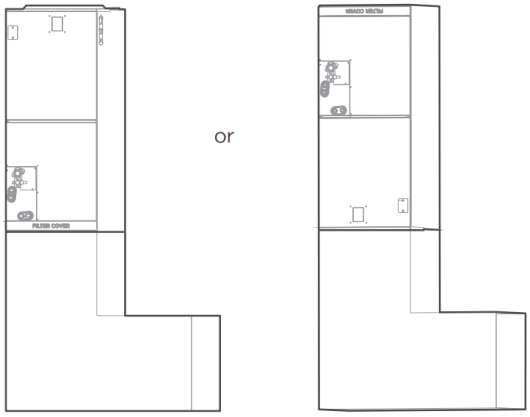
Service Place:

Horizontal Installation



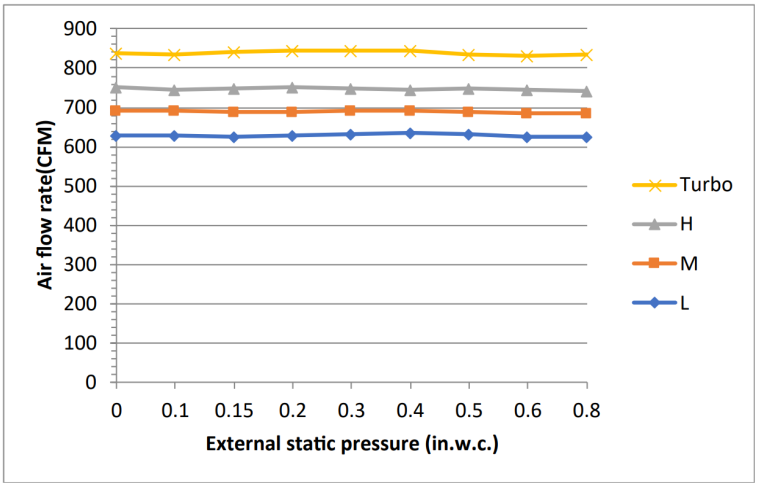
The outlet side pipe length is 4.9ft/m.

Vertical Installation



3.2 Fan Performance

24K Vertical, Horizontal Right, Horizontal Left:



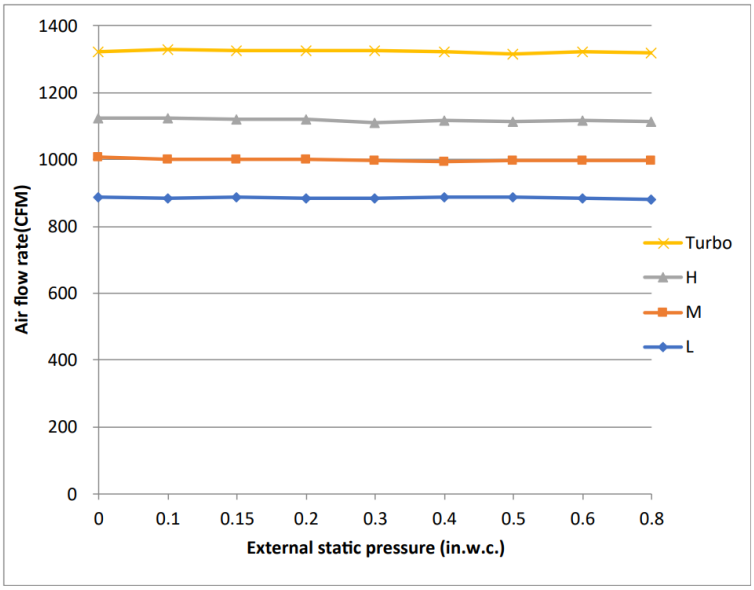
Use the Remote Controller:

1. The indoor unit needs to be turned off for 5 minutes then powered on (all settings need to be finished within 10 minutes).
2. Push ON/OFF and FAN SPEED together for 7 seconds to enter engineering mode.
3. Choose channel 23 (for cooling) and 25 (for heating) with UP and Down buttons.
4. After choosing channel 23 or 25 push ON/OFF for 2 seconds to select -41,-40,.....,-1,0,1,2,3,....,19,20 (reference the matrix list to identify the relative CFM)
5. Push the OK button to confirm the adjustment value, the display board will display CS (means success for the setting) then disconnect power after 5 seconds.

Cooling	Default	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10
Turbo	988	804	784	764	744	724	704	684	664	644	624
High	894	739	719	699	679	659	639	619	599	579	559
Medium	806	674	654	634	614	594	574	554	534	514	494
Low	712	609	589	569	549	529	509	489	469	449	429
Cooling	**Default**	**-11**	**-12**	**-13**	**-14**	**-15**	**-16**	**-17**	**-18**	**-19 ~ -40**	**+1**
Turbo	988	604	584	564	544	524	504	484	464	453	844
High	894	539	519	499	479	459	439	435	435	435	799
Medium	806	474	454	434	418	418	418	418	418	418	714
Low	712	409	400	400	400	400	400	400	400	400	649
Cooling	**Default**	**+2**	**+3**	**+4**	**+5**	**+6**	**+7**	**+8**	**+9 ~ +20**		
Turbo	988	853	853	853	853	853	853	853	853		
High	894	799	819	835	835	835	835	835	835		
Medium	806	734	754	774	794	814	818	818	818		
Low	712	669	689	709	729	749	769	789	800		

Heating	Default	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10	-11
Turbo	788	768	748	728	708	688	668	648	628	608	588	568
High	753	733	713	693	673	653	633	613	593	573	553	533
Medium	641	621	601	581	651	541	521	501	481	461	441	421
Low	524	504	484	646	444	424	404	400	400	400	400	400
Heating	**Default**	**-12**	**-13**	**-14**	**-15**	**-16**	**-17 ~ -40**	**+1**	**+2**	**+3**	**+4**	**+5**
Turbo	788	548	528	508	488	468	453	808	828	848	853	853
High	753	513	493	473	453	435	435	773	793	813	833	835
Medium	641	418	418	418	418	418	418	661	681	701	721	741
Low	524	400	400	400	400	400	400	544	564	584	604	624
Heating	**Default**	**+6**	**+7**	**+8**	**+9**	**+10**	**+11**	**+12**	**+13**	**+14 ~ +20**		
Turbo	788	853	853	853	853	853	853	853	853	853		
High	753	835	835	835	835	835	835	835	835	835		
Medium	641	761	781	801	818	818	818	818	818	818		
Low	524	644	664	684	704	724	744	764	784	800		

36K Vertical, Horizontal Right, Horizontal Left:



Use the Remote Controller:

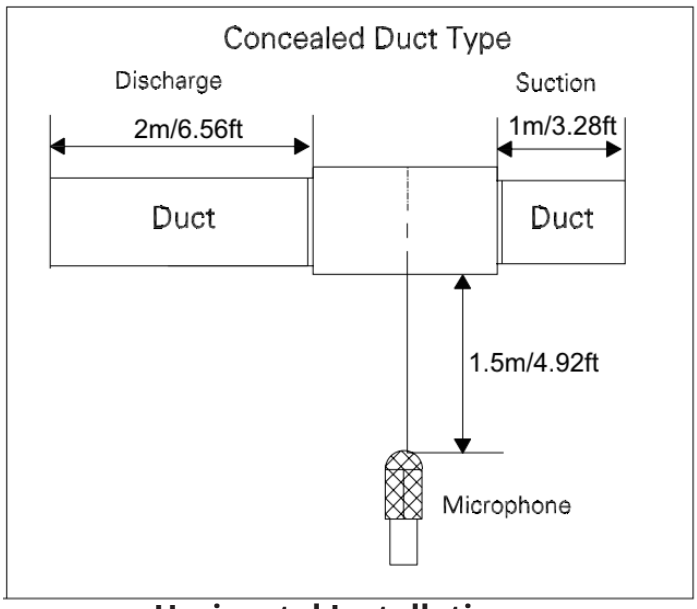
1. The indoor unit needs to be turned off for 5 minutes then powered on (all settings need to be finished within 10 minutes).
2. Push ON/OFF and FAN SPEED together for 7 seconds to enter engineering mode.
3. Choose channel 23 (for cooling) and 25 (for heating) with UP and Down buttons.
4. After choosing channel 23 or 25 push ON/OFF for 2 seconds to select -41,-40,.....,-1,0,1,2,3,....,19,20 (reference the matrix list to identify the relative CFM)
5. Push the OK button to confirm the adjustment value, the display board will display CS (means success for the setting) then disconnect power after 5 seconds.

Cooling	Default	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10	-11	-12
Turbo	1188	1168	1148	1128	1108	1088	1068	1048	1028	1008	988	968	948
High	1082	1062	1042	1022	1002	982	962	942	922	902	882	862	842
Medium	971	951	931	911	891	871	851	831	811	971	771	751	731
Low	865	845	825	805	785	765	745	725	705	685	665	645	625
Cooling	**Default**	**-13**	**-14**	**-15**	**-16**	**-17**	**-18**	**-19**	**-20**	**-21**	**-22**	**-23**	**-24**
Turbo	118	928	908	888	868	848	828	808	788	768	748	728	708
High	1082	822	802	782	762	742	722	702	682	662	642	622	602
Medium	971	711	691	671	651	631	611	591	571	551	531	511	491
Low	865	605	585	565	454	525	505	485	465	455	425	405	400
Cooling	**Default**	**-25**	**-26**	**-27**	**-28**	**-29**	**-30**	**-31**	**-32**	**-33**	**-34**	**-35**	**-36**
Turbo	1188	688	668	648	628	608	588	568	548	528	508	488	468
High	1082	582	562	542	522	502	482	462	442	435	435	435	435
Medium	971	471	451	431	418	418	418	418	418	418	418	418	418
Low	865	400	400	400	400	400	400	400	400	400	400	400	400

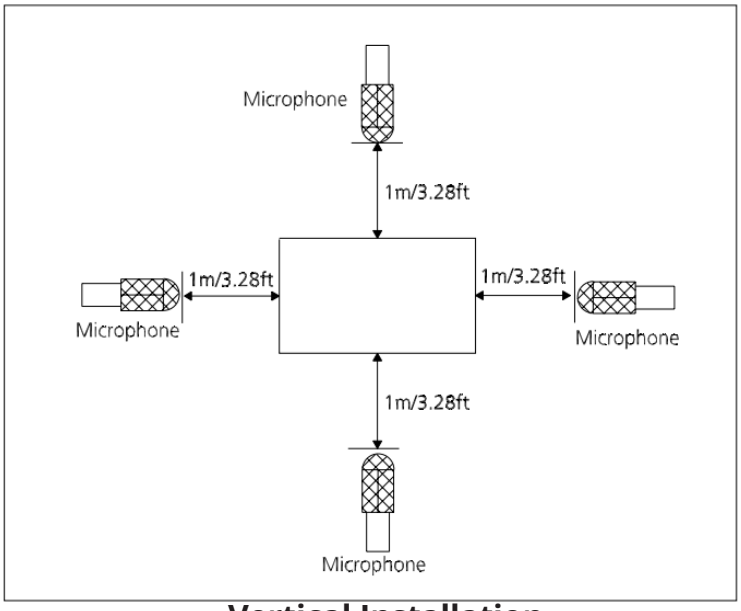
Cooling	Default	-37 ~ -40	+1	+2	+3	+4	+5	+6	+7	+8	+9	+10	+11
Turbo	1188	453	1208	1228	1248	1268	1288	1288	1288	1288	1288	1288	1288
High	1082	435	1102	1122	1142	1162	1182	1202	1222	1242	1262	1271	1271
Medium	971	418	991	1011	1031	1051	1071	1091	1111	1131	1151	1171	1191
Low	865	400	885	905	925	945	965	985	1005	1025	1045	1065	1085
Cooling	**Default**	**+12**	**+13**	**+14**	**+15**	**+16**	**+17**	**+18**	**+19 ~ +20**				
Turbo	1188	1288	1288	1288	1288	1288	1288	1288	1288				
High	1082	1271	1271	1271	1271	1271	1271	1271	1271				
Medium	971	1211	1231	1251	1253	1253	1253	1253	1253				
Low	865	1105	1125	1145	1165	1185	1205	1225	1235				

Heating	Default	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10	-11
Turbo	1112	1092	1072	1052	1032	1012	992	972	952	932	912	892
High	1059	1039	1019	999	979	959	939	919	899	879	859	839
Medium	794	774	754	734	714	694	674	654	634	614	594	574
Low	582	400	400	400	400	400	400	400	400	400	400	400
Heating	**Default**	**-12**	**-13**	**-14**	**-15**	**-16**	**-17**	**-18**	**-19**	**-20**	**-21**	**-22**
Turbo	1112	872	852	832	812	792	772	752	732	712	692	672
High	1059	819	799	779	759	739	719	699	679	659	639	619
Medium	794	554	534	514	494	474	454	434	418	418	418	418
Low	582	400	400	400	400	400	400	400	400	400	400	400
Heating	**Default**	**-23**	**-24**	**-25**	**-26**	**-27**	**-28**	**-29**	**-30**	**-31**	**-32**	**-33 ~ -40**
Turbo	1112	652	632	612	592	572	553	532	512	492	472	453
High	1059	599	579	559	539	519	499	479	459	439	435	435
Medium	794	418	418	418	418	418	418	418	418	418	418	418
Low	582	400	400	400	400	400	400	400	400	400	400	400
Heating	**Default**	**+1**	**+2**	**+3**	**+4**	**+5**	**+6**	**+7**	**+8**	**+9**	**+10**	**+11**
Turbo	1112	1132	1152	1172	1192	1212	1232	1252	1272	1288	1288	1288
High	1059	1079	1099	1119	1139	1159	1179	1199	1219	1239	1259	1271
Medium	794	814	834	854	874	894	914	934	954	974	994	1014
Low	582	602	622	642	662	682	702	722	742	762	782	802
Heating	**Default**	**+12**	**+13**	**+14**	**+15**	**+16**	**+17**	**+18**	**+19**	**+20**		
Turbo	1112	1288	1288	1288	1288	1288	1288	1288	1288	1288		
High	1059	1271	1271	1271	1271	1271	1271	1271	1271	1271		
Medium	794	1034	1054	1074	1094	1114	1134	1154	1174	1194		
Low	582	822	842	862	882	902	922	942	962	982		

3.3 Noise Curves



Horizontal Installation

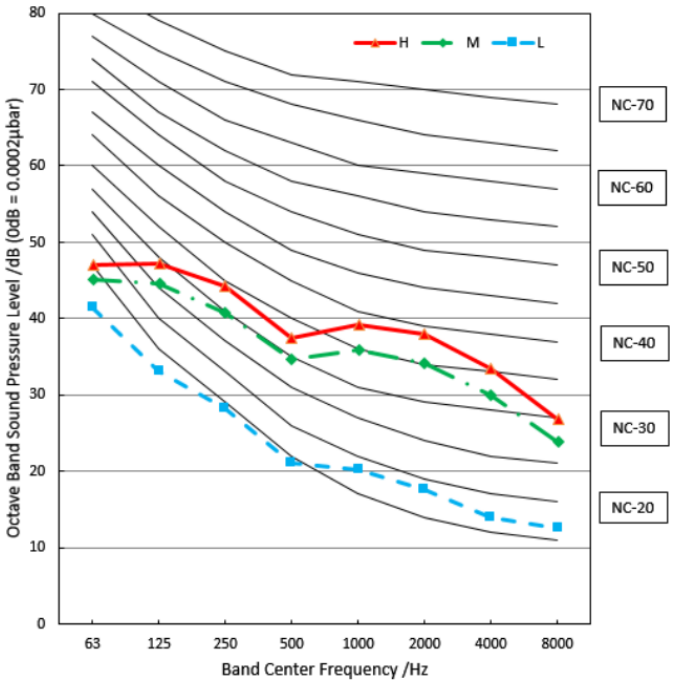


Vertical Installation (H=0.5x (height of unit+1))

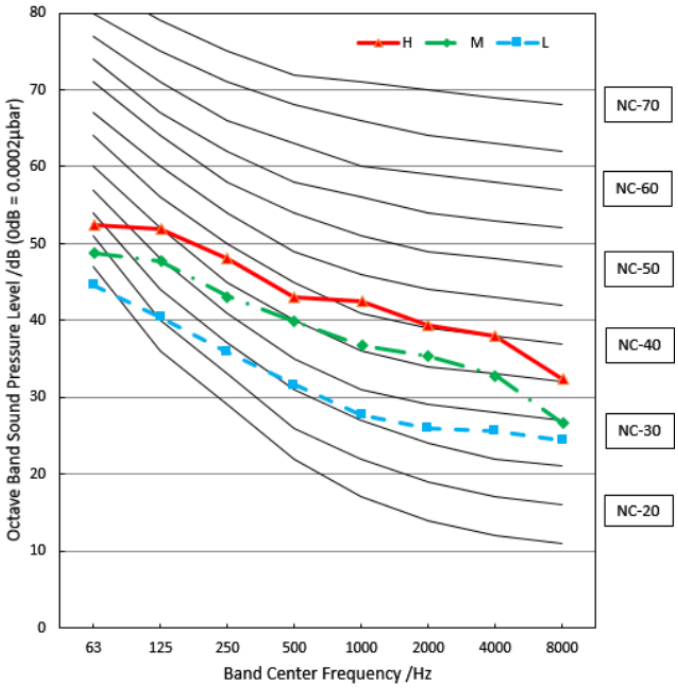
Notes:

- Sound is measures at 4.92ft/1.5m (horizontal installation) /3.28ft/1m (vertical installation) away from the center of the unit.
- Data is valid at free field condition.
- Reference acoustic pressure OdB=20μPa
- Sound level will vary depending on a range of factors such as the construction (acoustic absorption coefficient) of the room in which the equipment is installed.
- The operating conditions are assumed to be standard.

24K



36K



3.4 Electrical Wiring Diagrams

Electrical Characteristics:

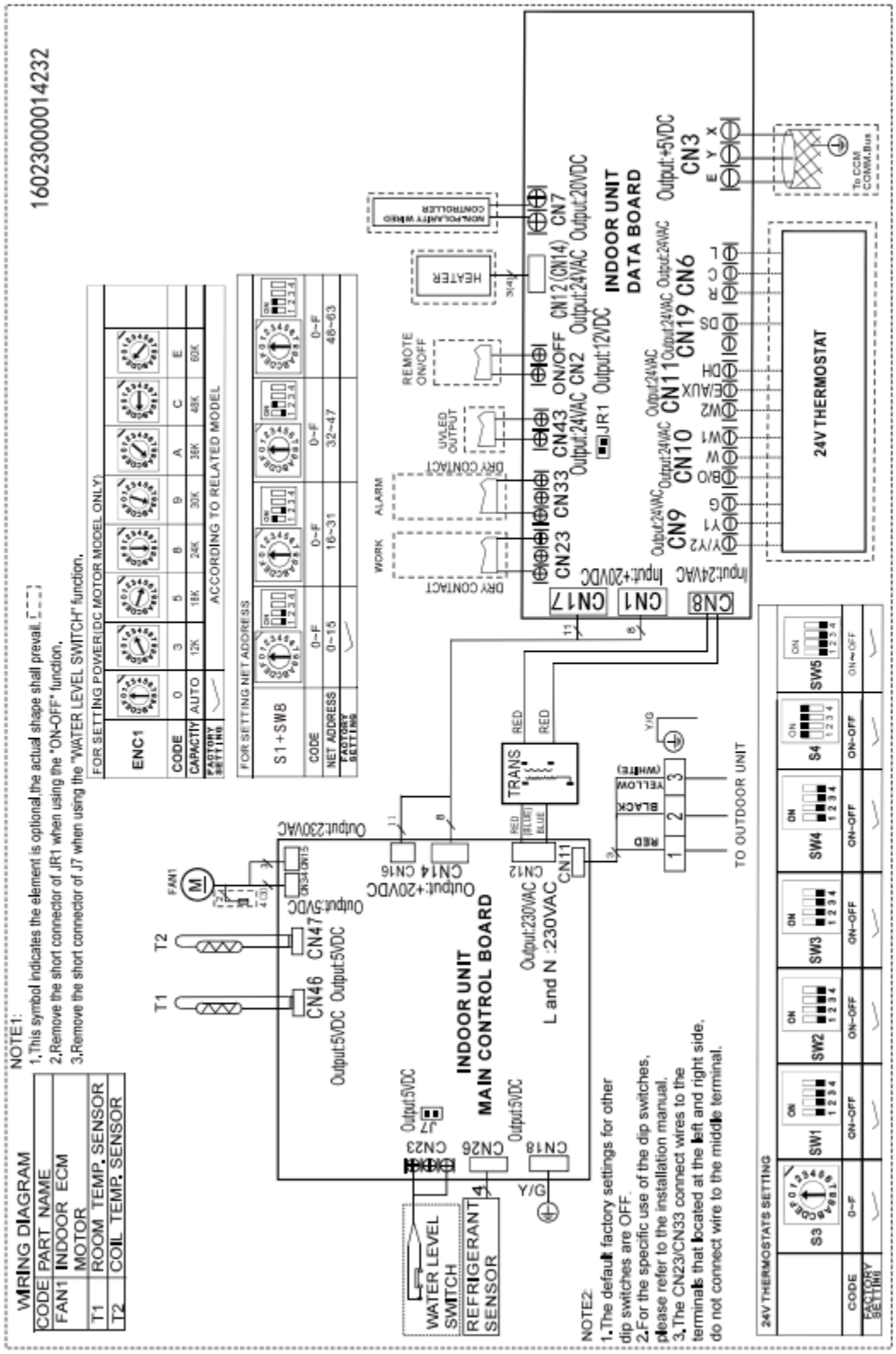
IDU Model		24K	36K
Power (Indoor)	Phase	1	
	Frequency and Volt	208/230V,60Hz	
Power (Outdoor)	Phase	1	
	Frequency and Volt	208/230V,60Hz	
Max. Fuse	Indoor Unit (A)	15	15
	Outdoor Unit (A)	25	35
Outdoor Unit Power Wire	Line Quantity	3	3
	Line Diameter (AWG)	12/4.0mm^2	10/6.0mm^2
Outdoor-Indoor Connect Wire 1	Line Quantity	4	4
	Line Diameter (AWG)	14/2.5mm^2	14/2.5mm^2
Outdoor-Indoor Connect Wire 2	Line Quantity	2	2
	Line Diameter (AWG)	20/0.5mm^2	20/0.5mm^2
Thermostat Signal Wire	Line Quantity		
	Line Diameter (AWG)	18/1.0mm^2	18/1.0mm^2

Electrical Wiring Diagrams:

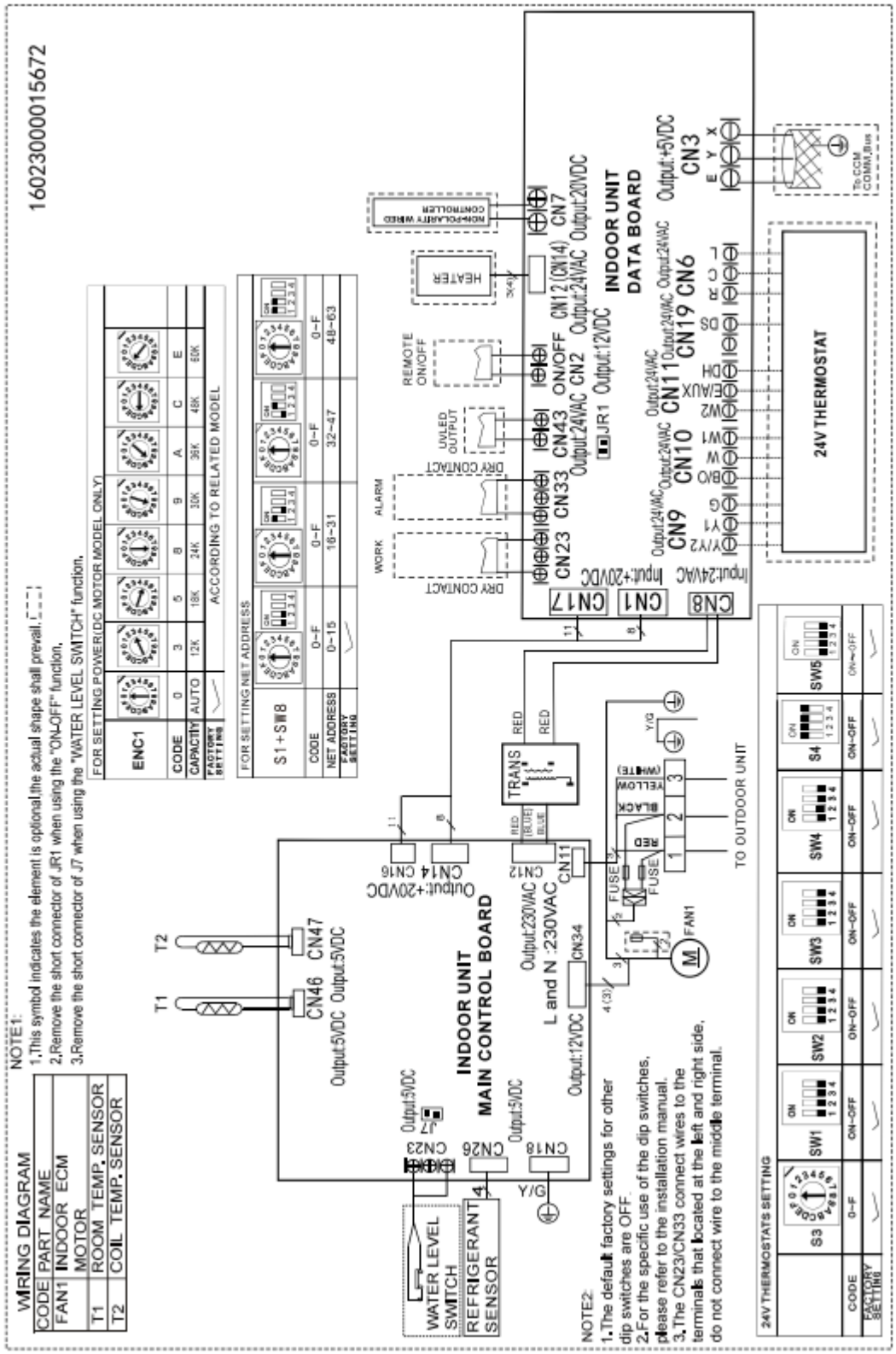
Capacity (Btu/h)	IDU Wiring Diagram
24K	16023000014232
36K	16023000015672

Abbreviation	Paraphrase
Y/G	Yellow-Green Conductor
FAN1	Indoor ECM Motor
To CCM Comm.Bus	Central Controller
T1	Indoor Room Temperature Sensor
T2	Indoor Coil Temperature Sensor

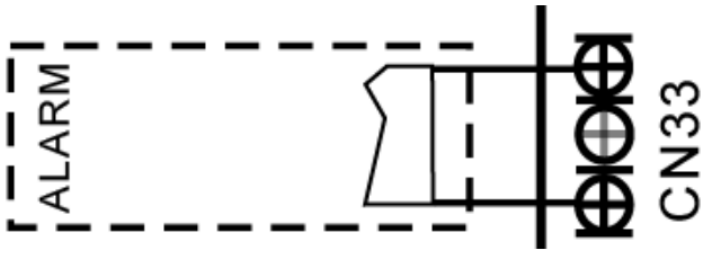
Indoor Unit Wiring Diagram: 16023000014232



Indoor Unit Wiring Diagram: 16023000015672

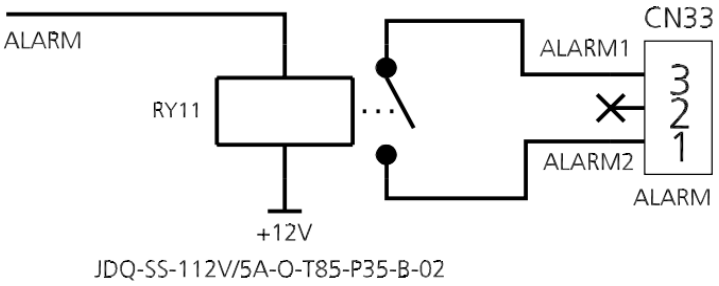


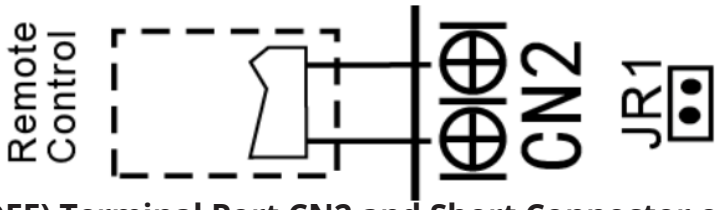
Micro-Switches:



For ALARM Terminal Port CN33:

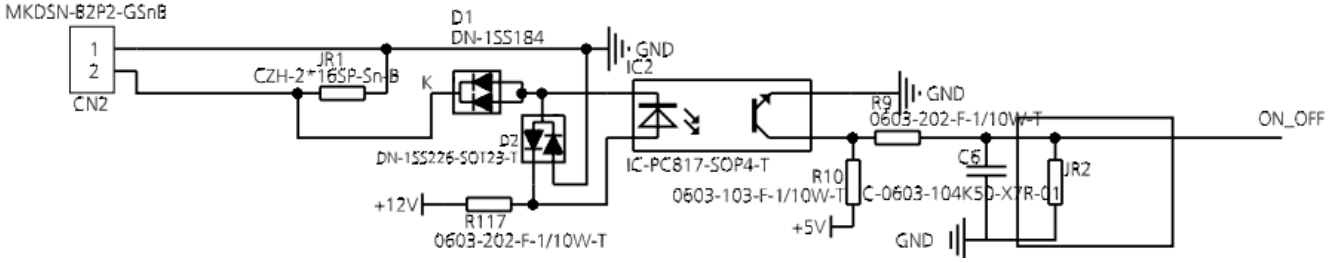
1. Use the terminal port to connect ALARM. (The terminal does not send power and must be supplied separately).
2. Design voltage can support higher voltage but it is highly recommended to use less than 24v with a current of less than 0.5A.
3. When a issue occurs the relay will close and the ALARM stops the system.

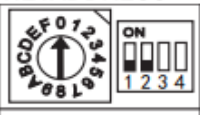
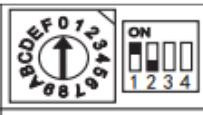
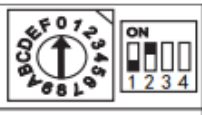
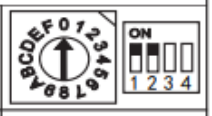




For Remote Control (ON-OFF) Terminal Port CN2 and Short Connector of JR1:

1. Remove the short connector of JR1 when you use ON-OFF function.
2. When the remote switch is off (OPEN); the unit will be off.
3. When the remote switch in on (CLOSE); the unit will be on.
4. When the switch is triggered the unit will respond to the demand within 2 seconds.
5. When the remote switch is on, you can use the remote controller/wired controller to select the mode desired, when the remote switch is off the unit will not respond to a demand from the remote/wire controller.
6. The voltage of the power is 12VDC with a design max. current of 5mA.



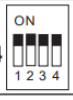
FOR SETTING NETADDRESS				
S1+SW8				
CODE	0~F	0~F	0~F	0~F
NETADDRESS	0~15	16~31	32~47	48~63
FACTORY SETTING	✓			

Micro-switch S1 and dial-switch SW8 are for address settings when you want to control this unit by a central controller.
Range: 00-63
Network address: the address silkscreen is NET address, which is composed of a 16-bit address rotary code S1 plus a two-digit DIP switch SW8 {Set during engineering installation, no network function needs to be set].
When SW8 is 00 (The dialing code is not connected), the network address value is the value of S1.
When SW8 is 10 (Corresponding to the switch of the hardware connected to the 10K resistor), the network address value is S1 plus 16.
Determined by dial code SW8 1-10K, 2-5.1K.
When SW8 is 01 (Corresponding to the dial code of the 5.1K resistor connected to the hardware is turned on), the network address value is the value of S1 plus 32.
When SW8 is 11 (All dialing codes are on), the network address value is the value of S1 plus 48.

Dial Code Selection	Net Address
	S1+48
	S1+32
	S1+16
	S1

FOR SETTING POWER(DC MOTOR MODEL ONLY)									
ENC1									
CODE	0	3	5	8	9	A	C	E	
CAPACTIY	AUTO	12K	18K	24K	30K	36K	48K	60K	
FACTORY SETTING	✓	ACCORDING TO RELATED MODEL							

Dial-Switch ENC1: The indoor PCB is universally designed for whole series units from 12K to 60K. This ENC1 setting will tell the main program what size the unit is.
Range: AUTO, 12K, 18K, ...60K.
Note: AUTO means the indoor unit is equipped with different outdoor units, which can automatically identify the capacity of the outdoor unit either single or multi zone and match the indoor units parameters.

24V THERMOSTATS SETTING								
	S3 	SW1 	SW2 	SW3 	SW4 	S4 	SW5 	
CODE	0~F	ON~OFF	ON~OFF	ON~OFF	ON~OFF	ON~OFF	ON~OFF	
FACTORY SETTING	✓	✓	✓	✓	✓	✓	✓	

Function DIP Switch Settings:
The 24V Thermostat Mode Needs to Refer to the Following Steps:

No.	Dial Code	Function	ON	OFF(Default)	Note
Control Scenario		24V Tstat, S1+S2			
1	SW1-2	Anti-cold blow protection option	No	[Default] Yes	
2	SW1-3	Single cooling/ heating and cooling options	Cooling	[Default] Cooling & Heating	
3	SW2-1	Compressor Running (demand working with heat pump+electric heat)	Compressor slower speed	[Default] Faster Compressor	Only affects compressor and W1
4	SW2-4	Compressor	The operation of heat pump is limited by the outdoor temperature, and the operation of auxiliary heat is not limited. The system makes judgments according to the following rules: 1. The compressor can be operated when the outdoor temperature is ≥S3 DIP switch temperature =2°C. 2. The compressor cannot be operated when the outdoor temperature is lower than S3 DIP switch temperature.	[Default] The operation of the heat pump is limited by the outdoor temperature and the operation of auxiliary heat is not limited. The system makes judgments based on the following rules: 1. The compressor cannot be operated when the outdoor temperature is lower than the S3 DIP switch. 2. The compressor can be operated when the outdoor temperature is ≥S3 DIP switch temperature +2°C.	SW2-4 and S3 need to be working together
5	Rotary Switch S3	Sets the outdoor temperature limitation (for auxiliary heating or compressor)	Table A		
6	SW3-1	Maximum continuous runtime allowed before the system automatically stages up capacity to satisfy set point. This adds 1-5°F to the user set point in the calculated control point to increase capacity and satisfy user set point.	30 Minutes	[Default] 90 minutes	
7	SW3-2	Cooling and heating Y/Y2 temperature differential adjustment.	Compressor slower speed	[Default] Faster Compressor	Only affects compressor

No.	Dial Code	Function	ON	OFF(Default)	Note
Control Scenario		24V Tstat, S1+S2			
8	SW3-3	Compressor running (demand working with heat pump+electric heat)	Compressor slower speed	[Default] Faster Compressor	Only affects compressor and W2
9	SW3-4	Fan speed of cooling mode when 24V thermostat is applied for	Turbo	High	
10	SW4-1 SW4-2 SW4-3	Electric heat nominal CFM adjustment	Available settings are 000/001/010/011. Each digit corresponds to an individual switch position. For example [SW4-1 OFF, SW4-2 ON, SW4-3 OFF]=010		
11	S4-4	Default ON	[Default] For single stage supplemental heat, W1 and W2 are connected	For dual stage supplemental heat, W1 and W2 are controlled independently	
12	S4-2	DH function selection	[Default] Dehumidification control not available	Dehumidification feature is enabled through thermostat	
13	SW5-3	L or Alarm relay selection	L output 24V or alarm relay close only when refrigerant sensor fault or R454B refrigerant leakage is detected	[Default] L output 24V or alarm relay close when any fault is detected	
14	SW5-4	R output selection	R stop output 24v When refrigerant sensor fault or R454B refrigerant leakage is detected	[Default] R keep output 24V even when refrigerant sensor fault or R454B refrigerant leakage is detected	

No.	Dial Code	Function	ON	OFF(Default)	Note
Control Scenario		Wired Controller			
1	SW1-2	Anti-cold blow protection option	No	[Default] Yes	
2	SW1-3	Single cooling/ heating and cooling options	Cooling	[Default] Cooling & Heating	
3	SW2-1	Temperature differential to activate first stage auxiliary heat (the GAP of T1 and Ts), Wire controller demand with heat pump+electric heat working together	26°F (1°C)	[Default] 4°F (2°C)	
4	SW2-2	Electric heat on delay	Yes	[Default] No	
5	SW2-3	Electric auxiliary heating delay to start time	30 minutes	[Default] No	
6	SW2-4	Compressor	The operation of heat pump is limited by the outdoor temperature, and the operation of auxiliary heat is not limited. The system makes judgments according to the following rules: 1. The compressor can be operated when the outdoor temperature is ≥S3 DIP switch temperature +2°C. 2. The compressor cannot be operated when the outdoor temperature is lower than S3 DIP switch temperature.	[Default] Only one heat pump or auxiliary heat can be operated. The system makes judgments according to the following rules: 1. When the outdoor temperature is lower than the S3 DIP switch temperature, the compressor is not allowed to be operated but auxiliary heat is allowed. 2. When the outdoor temperature is ≥S3 DIP switch temperature +2°C the compressor can be operated but auxiliary heat cannot be operated.	SW2-4 and S3 need to be working together
7	Rotary Switch S3	Sets the outdoor temperature limitation (for auxiliary heating or compressor)	Table A		
8	SW3-3	Temperature differential to activate second stage auxiliary heating (the GAP of T1 and Ts) Wire controller demand with heat pump+electric heat working together	4°F (2°C)	[Default] 6°F (3°C)	

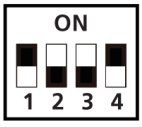
No.	Dial Code	Function	ON	OFF(Default)	Note
Control Scenario		**Wired Controller**			
9	SW4-1 SW4-2 SW4-3	Electric heat nominal CFM adjustment	Available settings are 000/001/010/011. Each digit corresponds to an individual switch position. For example [SW4-1 OFF, SW4-2 ON, SW4-3 OFF]=010		
10	SW4-4	Temperature differential to activate third stage auxiliary heating (the GAP of T1 and Ts) Wire controller demand with heat pump+electric heat working together	6°F (3°C)	[Default] 8°F (4°C)	Only valid for product which has three stage auxiliary heating
11	SW5-3	L or Alarm relay selection	L output 24V or alarm relay close only when refrigerant sensor fault or R454B refrigerant leakage is detected	[Default] R keep output 24v even when refrigerant sensor fault or R454B refrigerant leakage is detected	
12	SW5-4	R output selection	R stop output when refrigerant sensor fault or R454B refrigerant leakage is detected	[Default] R keep output 24v even when refrigerant sensor fault or R454B refrigerant leakage is detected	
Control Scenario		**Full 24V**			
1	SW1-2	Anti-cold blow protection option	No	[Default] Yes	
2	SW1-3	Single cooling/ heating and cooling options	Cooling	[Default] Cooling & Heating	
3	SW3-4	Fan speed of cooling mode when 24V thermostat is applied for	Turbo	High	
4	SW4-1 SW4-2 SW4-3	Electric heat nominal CFM adjustment	Available settings are 000/001/010/011. Each digit corresponds to an individual switch position. For example [SW4-1 OFF, SW4-2 ON, SW4-3 OFF]=010		
5	S4-4	Default ON	[Default] For single stage supplemental heat, W1 and W2 are connected	For dual stage supplemental heat, W1 and W2 are controlled independently.	
6	S4-2	DH function selection	[Default] Dehumidification control not available	Dehumidification feature is enabled through thermostat	
7	SW5-3	L or Alarm relay selection	L output 24V or alarm relay close only when refrigerant sensor fault or R454B refrigerant leakage is detected	[Default] L output 24V or alarm relay close when any fault is detected	
8	SW5-4	R output selection	R stop output 24V when refrigerant sensor fault or R454B refrigerant leakage is detected	[Default] R keep output 24V even when refrigerant sensor fault or R454B refrigerant leakage is detected	

Table A:

S3	S3 (°F)	S3 (°C)	S3	S3 (°F)	S3 (°C)
0	OFF	OFF	8	10	-12
1	-22	-30	9	18	-8
2	-18	-28	A	25	-4
3	-15	-26	B	32	0
4	-11	-24	C	36	2
5	-8	-22	D	39	4
6	-4	-20	E	43	6
7	3	-16	F	46	8

SW4-1	000 is default
SW4-2	000/001/010/011/100/101/110/111 , Internal machines with different abilities, electric heating and PSC classification for use
SW4-3	

Function Combination Table of SW1-1 and SW1-4:

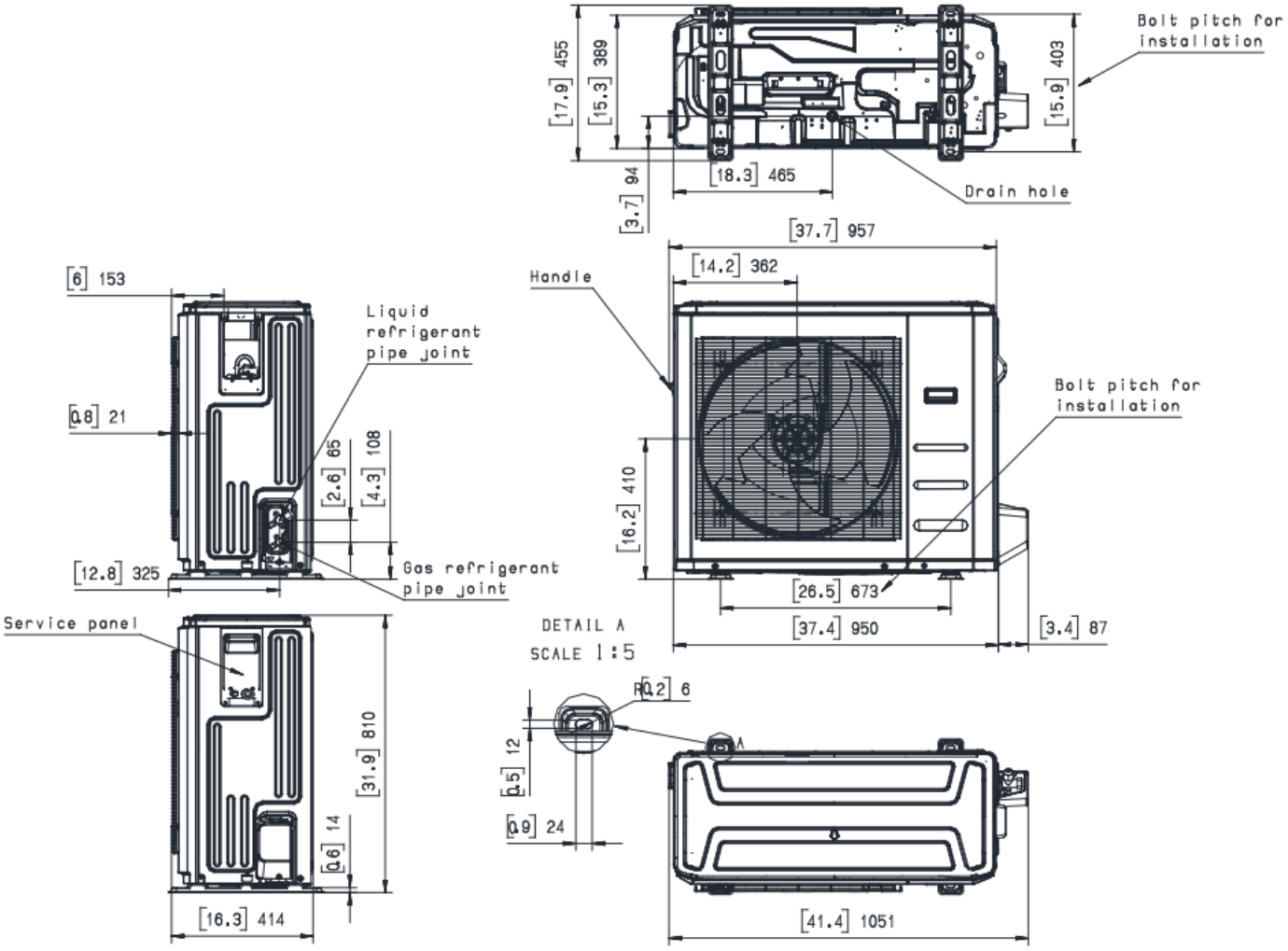
SW1	Control Type	IDU and ODU Connection	Note
	Wired Controller / 24V Thermostat	(S1+S2) / 24V Connection	Auto Discovery
	Wired Controller	S1+S2	Scenario 2
	24V Thermostat	S1+S2	Scenario 1
	24V Thermostat	24V Thermostat	Scenario 3

4.1 Dimensional Drawing

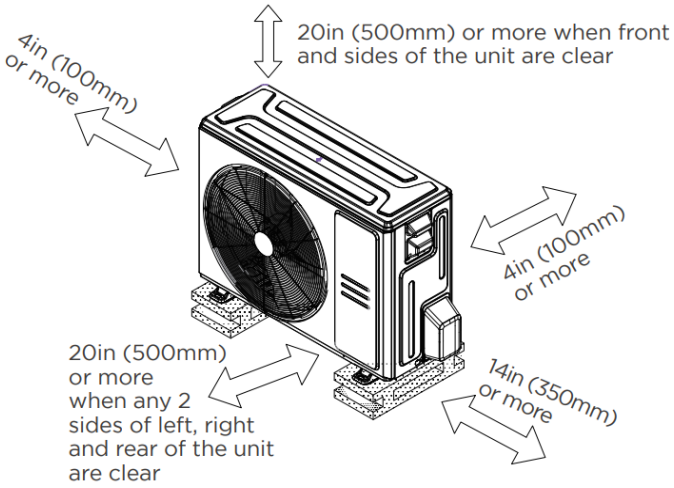
Outdoor Unit Model	Panel Plate
DIY-24-HP-C-230D25-O	D30
DIY-36-HP-C-230D25-O	

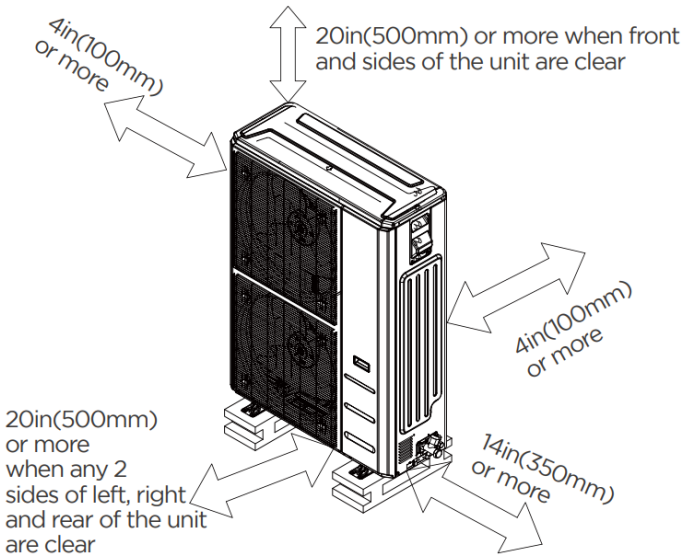
Note: Check the corresponding dimensional drawings according to the panel plate.

D30 Platform
DIY-24-HP-C-230D25-O
DIY-36-HP-C-230D25-O



4.2 Install Location



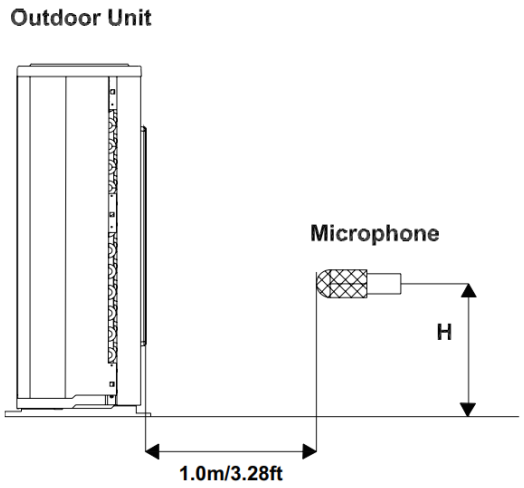


4.3 Capacity Correction for Height Difference

Capacity (Btu/h)	24K		Pipe Length (Ft/m)					
Cooling			24.6/7.5	32.8/10	65.6/20	98.4/30	131.2/40	164/50
Height difference H (ft/m)	Indoor Higher than Outdoor	82/25				0.917	0.898	0.879
		65.6/20			0.946	0.926	0.907	0.887
		32.8/10		0.975	0.955	0.936	0.916	0.896
		0	1.000	0.990	0.970	0.950	0.930	0.910
	Outdoor Higher than Indoor	-16.4/-5	1.000	0.990	0.970	0.950	0.930	0.910
		-32.8/-10		0.990	0.970	0.950	0.930	0.910
		-65.6/-20			0.970	0.950	0.930	0.910
		-82/-25				0.950	0.930	0.910
Heating			24.6/7.5	32.8/10	65.6/20	9834/30	131.2/40	164/50
Height difference H (ft/m)	Indoor Higher than Outdoor	82/25				0.984	0.978	0.972
		65.6/20			0.991	0.984	0.978	0.972
		32.8/10		0.997	0.991	0.984	0.978	0.972
		16.4/5	1.000	0.997	0.991	0.984	0.978	0.972
		0	1.000	0.997	0.991	0.984	0.978	0.972
	Outdoor Higher than Indoor	-16.4/-5	0.992	0.989	0.983	0.977	0.970	0.964
		-32.8/-10		0.981	0.975	0.969	0.963	0.957
		-65.6/-20			0.967	0.961	0.955	0.949
		-82/-25				0.953	0.947	0.941

Capacity (Btu/h)	36K		Pipe Length (Ft/m)					
Cooling			24.6/7.5	15/49.2	82/25	34/114.8	164/50	246/75
Height difference H (ft/m)	Indoor Higher than Outdoor	98.4/30				0.889	0.851	0.787
		65.6/20			0.924	0.898	0.859	0.795
		32.8/10		0.959	0.933	0.907	0.868	0.803
		16.4/5	0.995	0.969	0.942	0.916	0.876	0.811
		0	1.000	0.974	0.947	0.921	0.881	0.815
	Outdoor Higher than Indoor	-16.4/-5	1.000	0.974	0.947	0.921	0.881	0.815
		-32.8/-10		0.974	0.947	0.921	0.881	0.815
		-65.6/-20			0.947	0.921	0.881	0.815
		-30/-98.4				0.921	0.881	0.815
Heating			24.6/7.5	15/49.2	82/25	35/114.8	164/50	246/75
Height difference H (ft/m)	Indoor Higher than Outdoor	98.4/30				0.964	0.945	0.915
		65.6/20			0.976	0.964	0.945	0.915
		32.8/10		0.988	0.976	0.964	0.945	0.915
		16.4/5	1.000	0.988	0.976	0.964	0.945	0.915
		0	1.000	0.988	0.976	0.964	0.945	0.915
	Outdoor Higher than Indoor	-16.4/-5	0.992	0.980	0.968	0.956	0.938	0.908
		-35.8/-10		0.972	0.960	0.948	0.930	0.900
		-65.6/-20			0.952	0.941	0.923	0.893
		-30/-98.4				0.933	0.915	0.886

4.4 Noise Curves

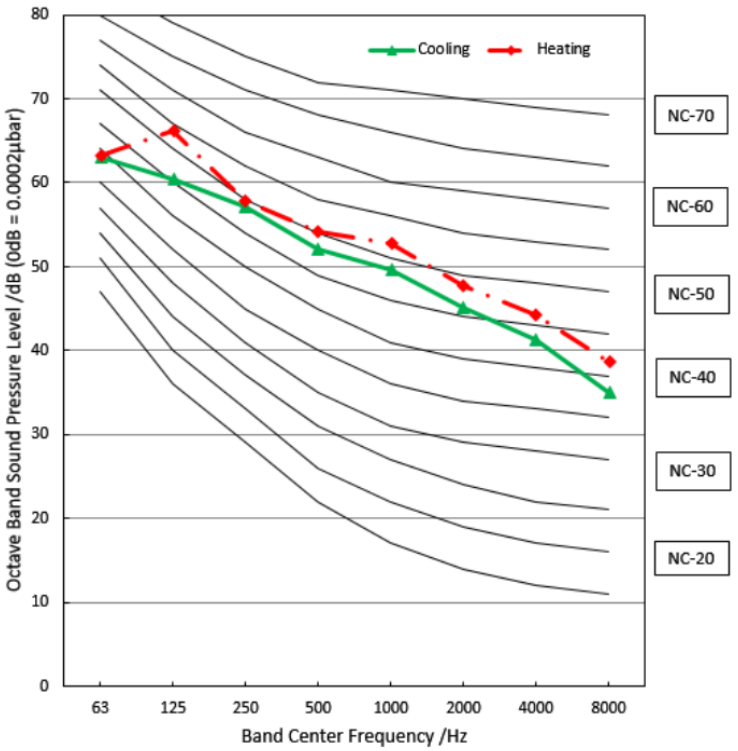


Note:H= 0.5 height of the outdoor unit.*

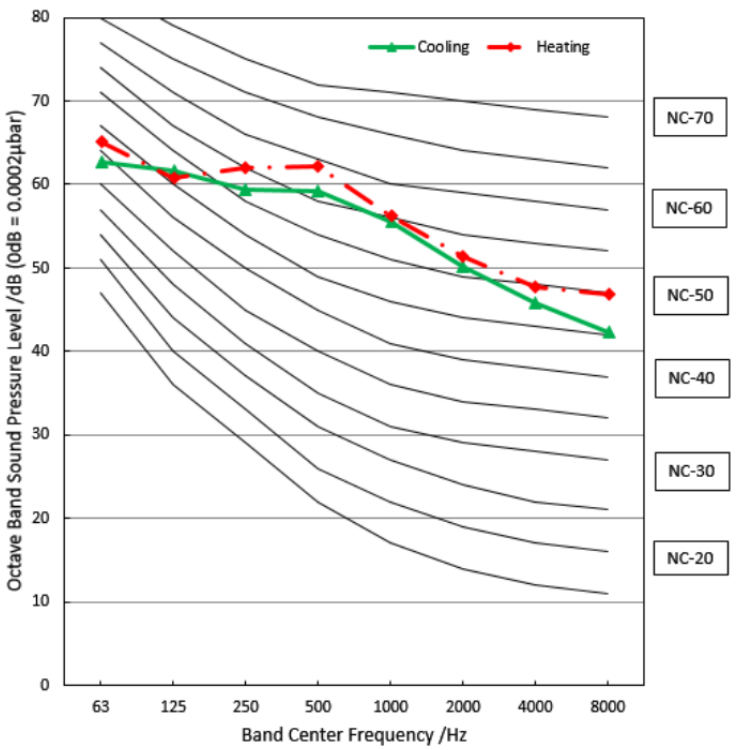
Notes:

- Sound is measured at 3.25ft (1.0m) Away from center of the unit.
- Data is valid at free field condition.
- Data is valid at nominal operation condition.
- Reference acoustic pressure OdB=20μPa.
- Sound level will vary depending on arrange off factors such as the construction (acoustic absorption coefficient) of particular rooms in which the equipment is installed.
- The operating conditions are assumed to be standard.

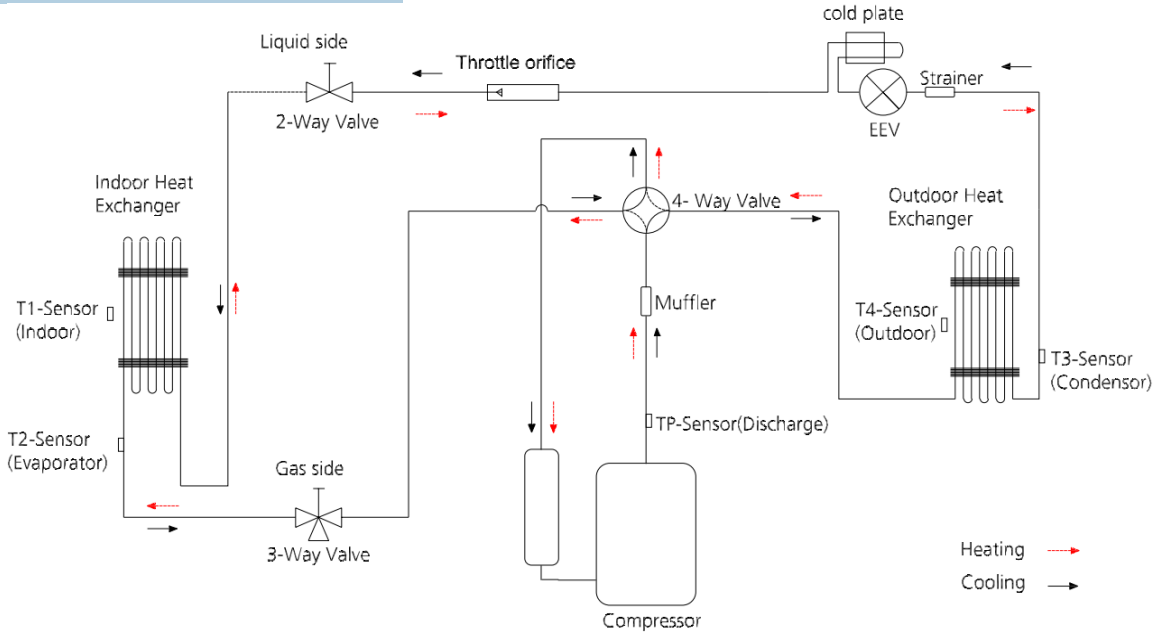
24K



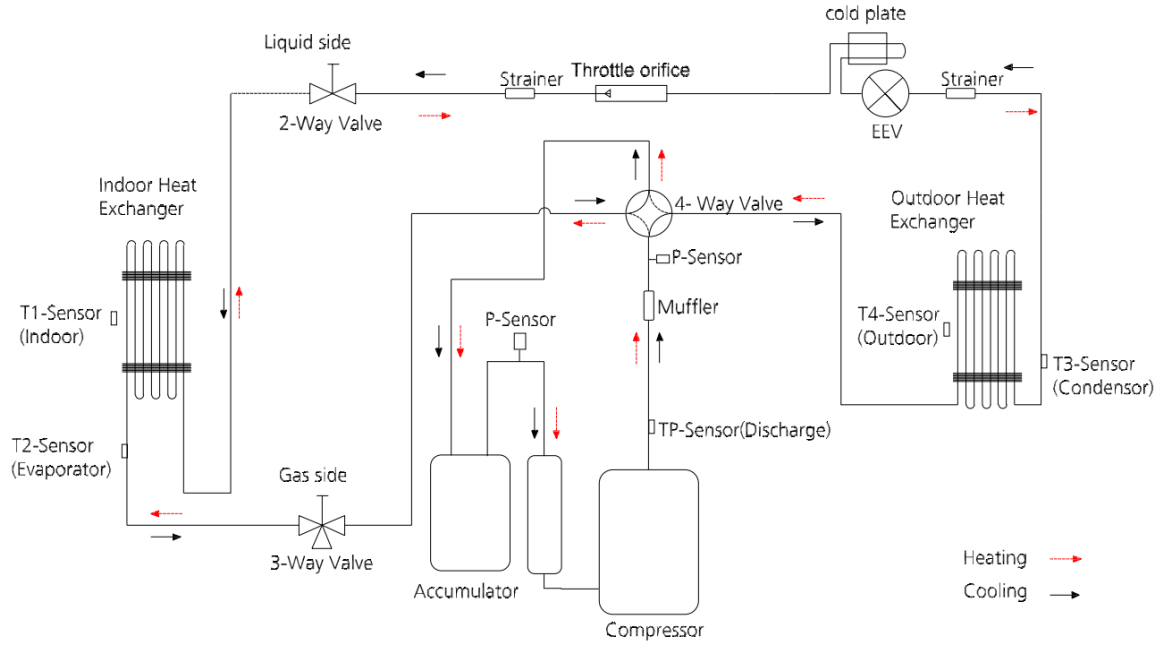
36K



4.5 Refrigerant Cycle Diagrams



Capacity (Btu/h)	Pipe Size (Diameter: Ø) inch(mm)		Piping Length (ft/m)		Elevation (ft/m)		Additional Refrigerant
	Gas	Liquid	Rated	Max.	Rated	Max.	
24K	5/8 (16)	3/8 (9.52)	24.6/7.5	164/50	0	82/25	0.32oz/ft (30g/m)

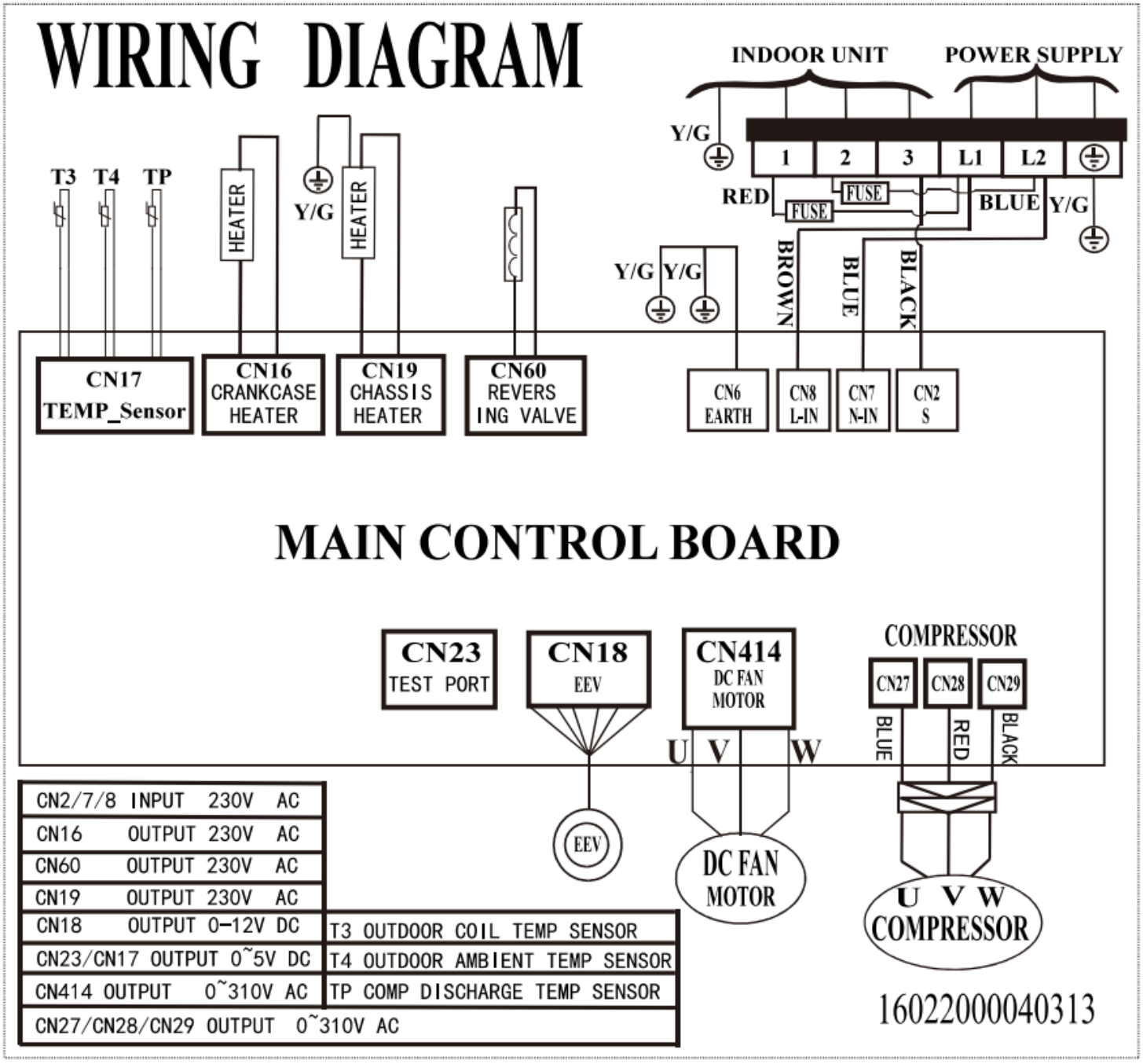


Capacity (Btu/h)	Pipe Size (Diameter: Ø) inch(mm)		Piping Length (ft/m)		Elevation (ft/m)		Additional Refrigerant
	Gas	Liquid	Rated	Max.	Rated	Max.	
36K	5/8 (16)	3/8 (9.52)	24.6/7.5	546/75	0	98.4/30	0.32oz/ft (30g/m)

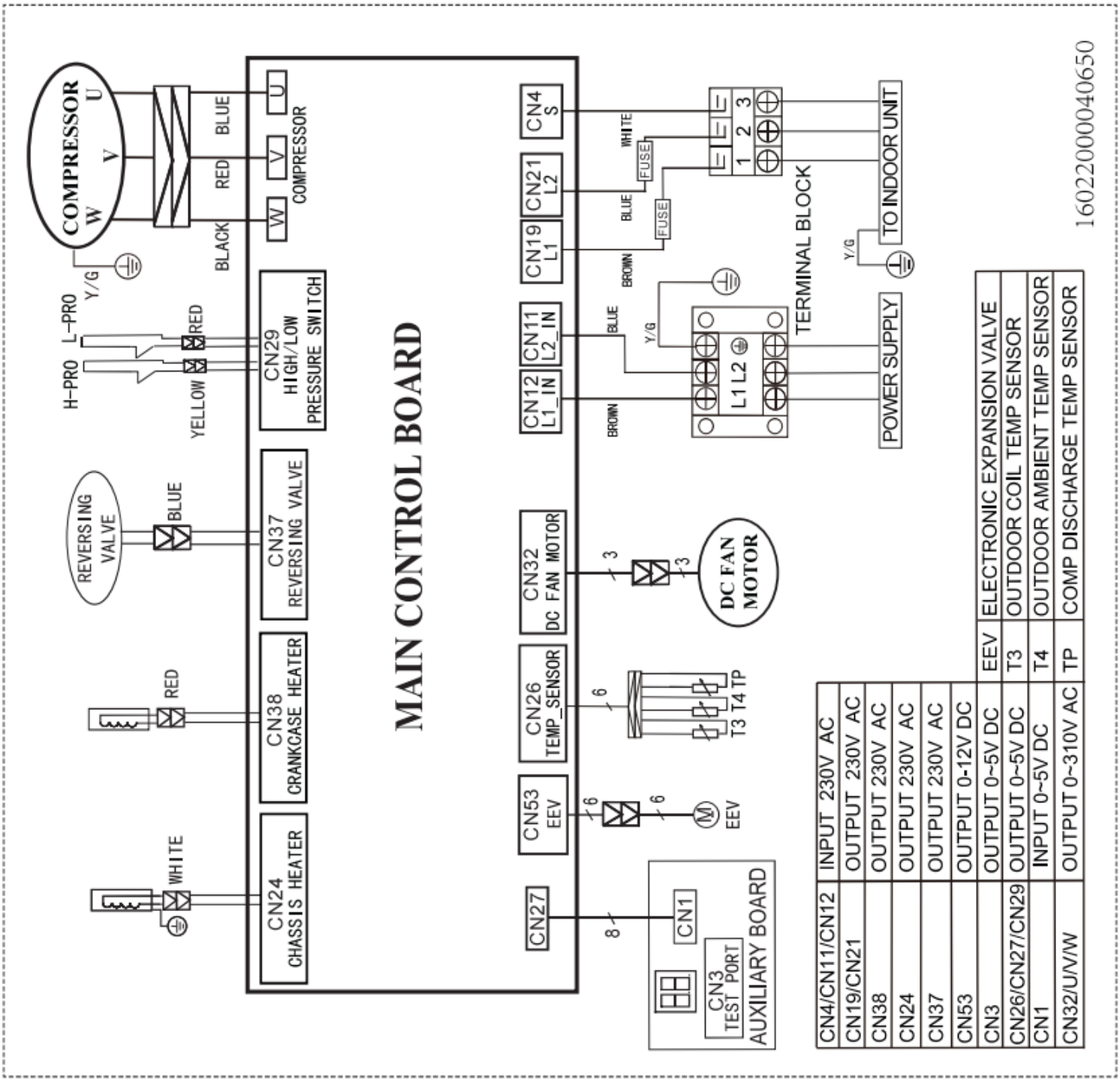
4.6 Electrical Wiring Diagrams

ODU Model	ODU Wiring Diagram	ODU Main Printed Circuit Board
DIY-24-HP-C-230D25-O	16022000040313	17122000048064
DIY-36-HP-C-230D25-O	16022000040650	17122300007152

Outdoor unit wiring diagram: 16022000040313

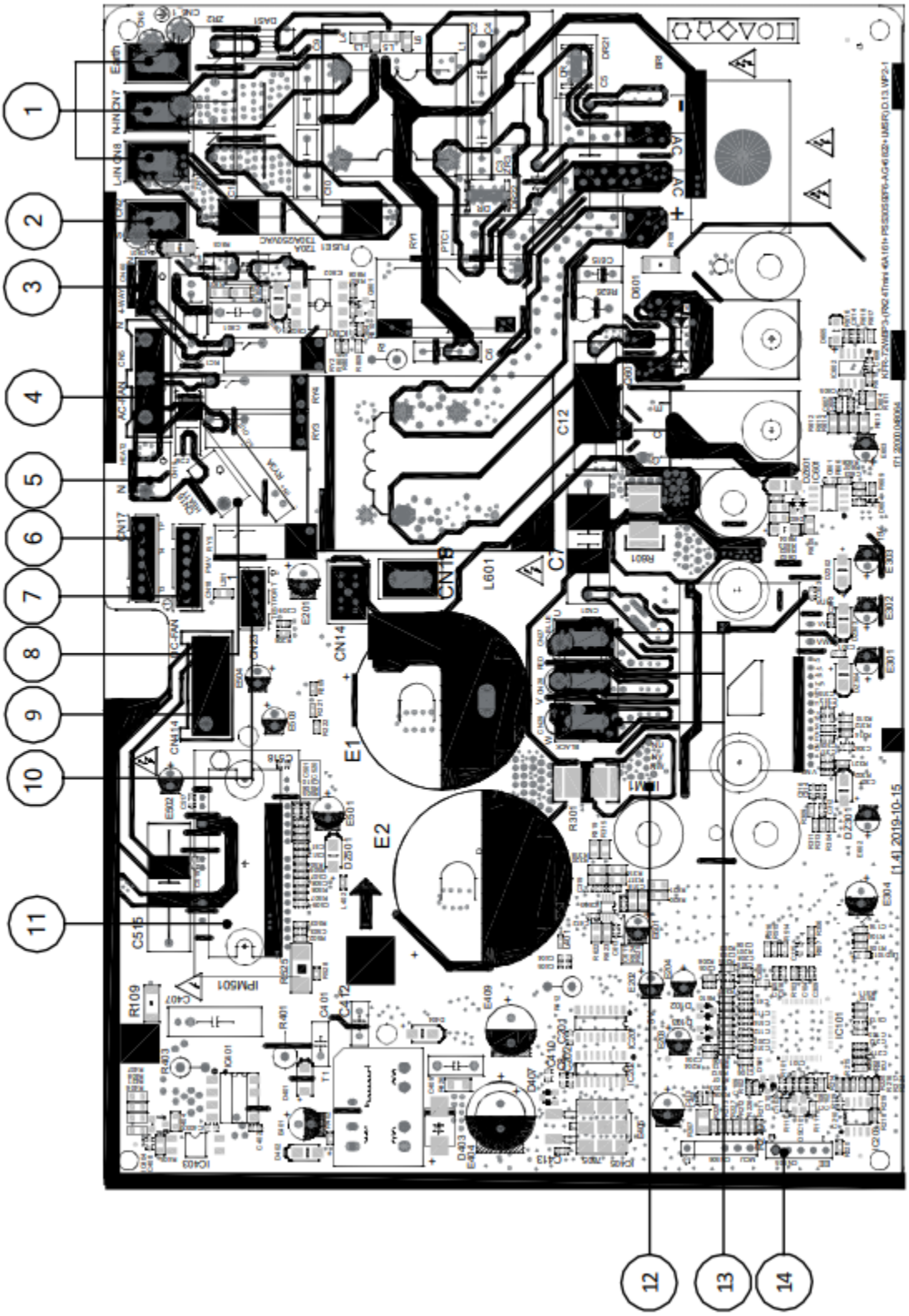


Outdoor unit wiring diagram: 16022000040650



CN4/CN11/CN12	INPUT 230V AC	EEV	ELECTRONIC EXPANSION VALVE
CN19/CN21	OUTPUT 230V AC	T3	OUTDOOR COIL TEMP SENSOR
CN38	OUTPUT 230V AC	T4	OUTDOOR AMBIENT TEMP SENSOR
CN24	OUTPUT 230V AC	TP	COMP DISCHARGE TEMP SENSOR
CN37	OUTPUT 230V AC		
CN53	OUTPUT 0-12V DC		
CN3	OUTPUT 0~5V DC		
CN26/CN27/CN29	OUTPUT 0~5V DC		
CN1	INPUT 0~5V DC		
CN32/U/V/W	OUTPUT 0~310V AC		

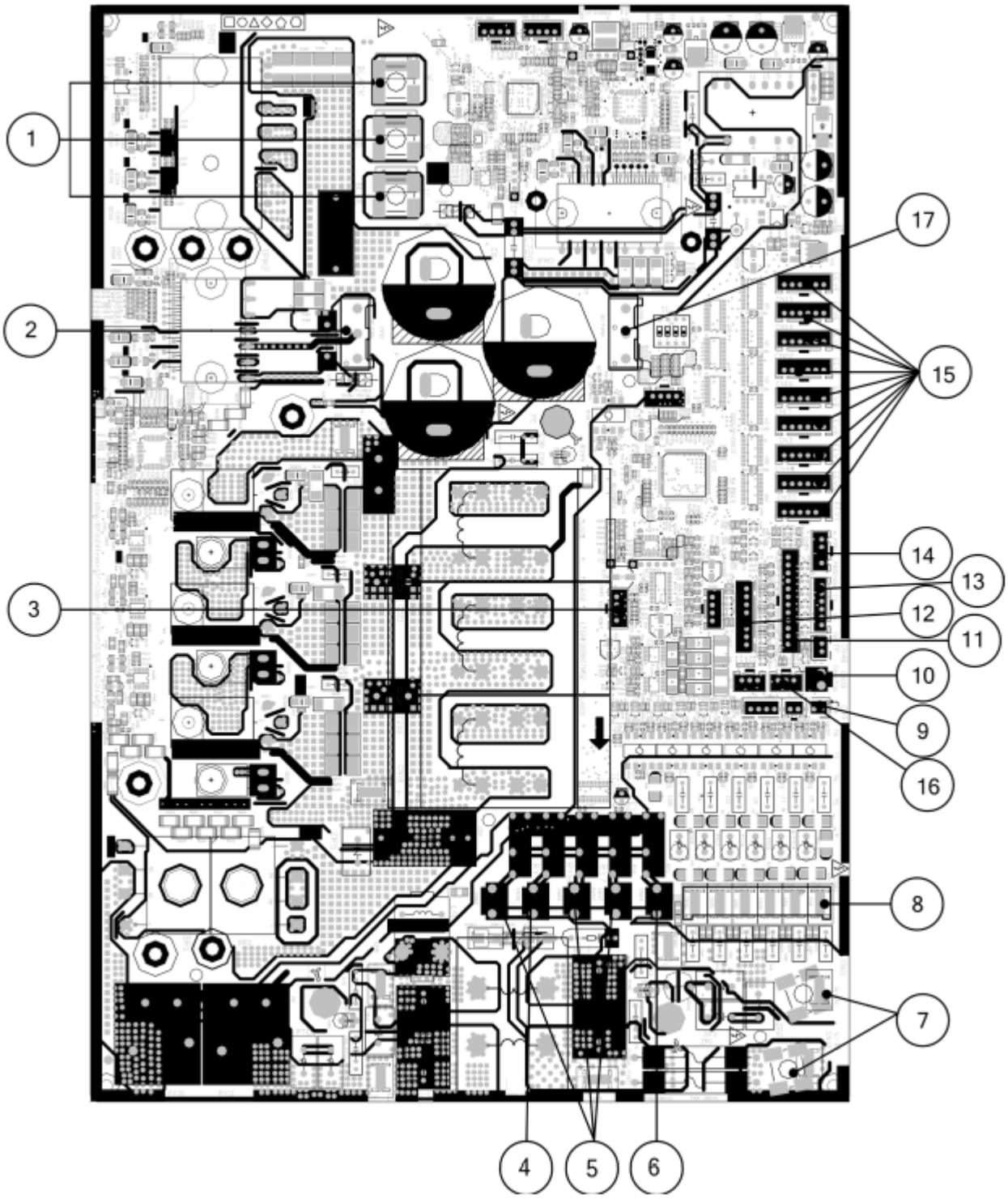
Outdoor unit printed circuit board diagram: 17122000048064 & 17122000048066



No.	Name	NC#	Meaning
1	Power Supply	CN6	Earth: Connect to Ground
		CN7	N_in: Connect to N-line (230VAC Input)
		CN8	L_in: Connect to L-line (230VAC input)
2	S	CN2	S: Connect to indoor unit communication (230VAC input)
3	4-WAY	CN60	Connect to 4 way valve (Output: 230VAC)
4	AC-FAN	CN5	Connect to AC fan
5	HEAT2	CN19	Connect to chassis heater (Output: 230VAC)
6	TP T4 T3	CN17	Connect to pipe temp. sensor T3, ambient temp. sensor T4, exhaust temp. sensor TP (Output: 0~5VDC)
7	PMV	CN18	Connect to Electric Expansion Valve
8	HEAT1	CN16	Connect to compressor heater (Output: 230VAC)
9	DC-FAN	CN414	Connect to DC fan (Output: 0~310VAC)
10	TESTPORT	CN23	Used for testing
11	FAN_IPM	IPM501	IPM for DC fan
12	COMP_IPM	IPM1	IPM for compressor
13	U	CN27	Connect to compressor (Output: 0~310VAC)
	V	CN28	
	W	CN29	
14	EE_PORT	CN505	EEPROM programmer port

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

Outdoor unit printed circuit board diagram: 17122300007152

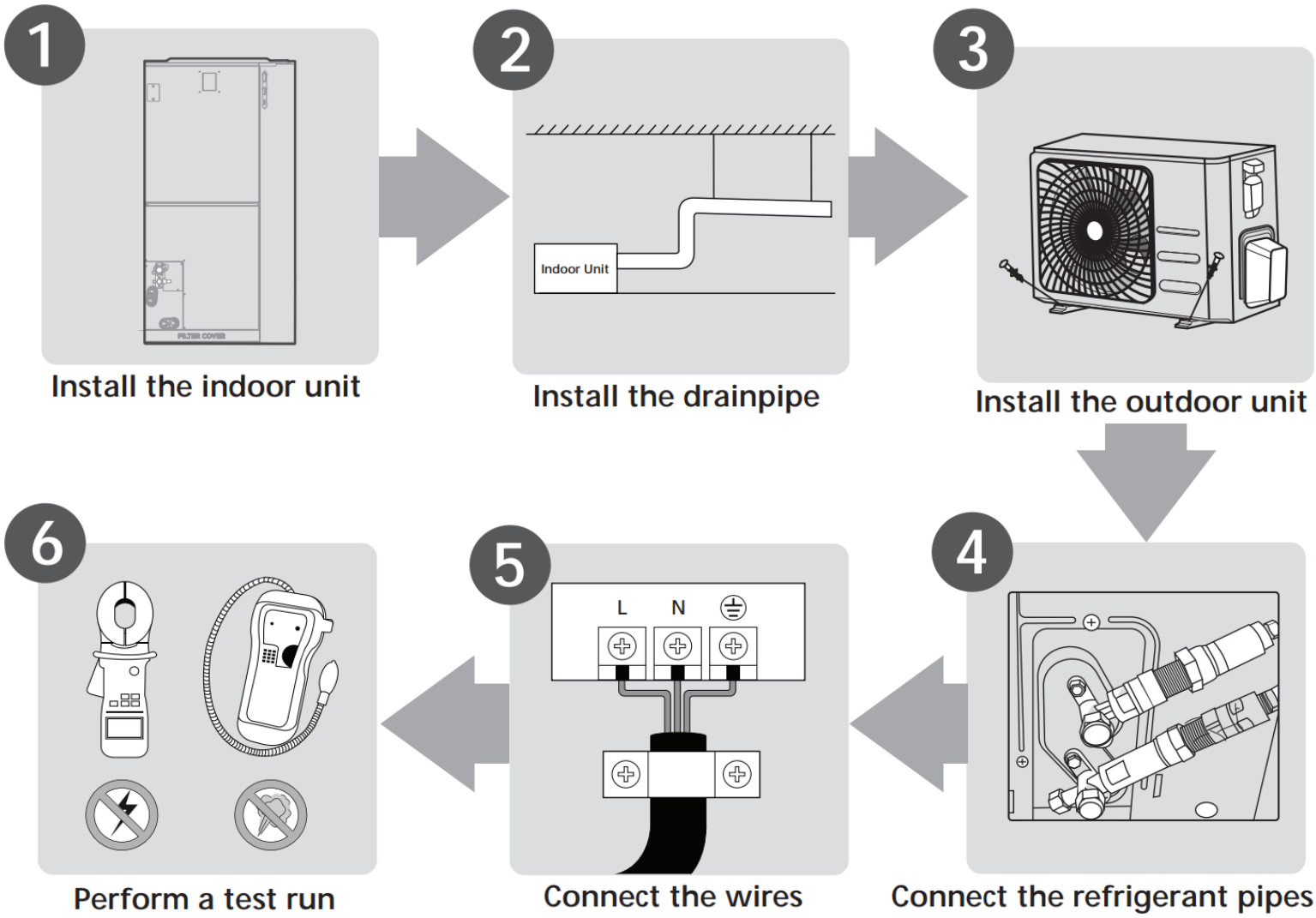


No.	Name	NC#	Meaning
1	COMPRESSOR	W	Connect to compressor (Output: 0~310VAC)
		V	
		U	
2	DC-FAN1	CN32	Connect to DC fan (Output: 0~310VAC)
3	TESTPORT	CN45	Used for testing
4	HEAT_Y	CN38	Connect to compressor heater (Output: 230VAC)
5	4-WAY	CN37	Connect to 4 way valve 1 (Output: 230VAC)
		CN25	Connect to 4 way valve 2 (Output: 230VAC)
		CN42	Connect to 4 way valve 3 (Output: 230VAC)
6	HEAT_D	CN24	Connect to chassis heater (Output: 230VAC)
7	POWER SUPPLY	CN11	N_in: connect to N-line (230 VAC input)
		CN12	L-in: connect to L-line (230VAC input)
8	S-A	CN43	S: connect to indoor unit communication (230VAC input)
	S-B		
	S-C		
	S-D		
	S-E		
	S-F		
9	TBH-IN TBH-OUT T3B TF	CN9	Connect to cold plate inlet temp. sensor TBH-IN, cold plate outlet temp. sensor TBH-OUT, condenser coil middle temp. sensor T3B, Refrigerant tube inlet temp. sensor TF
10	OLP TEMP. SENSOR	CN30	Connect to compressor top temp. sensor (Output 0~5VDC)
11	T2B	CN28	Connect to evaporator coil outlet temperature sensor T2B
12	/	CN27	Connect to key board CN1
13	T3 T4 TP	CN26	Connect to condenser coil temp. sensor T3, ambient temp. sensor T4, exhaust temp. sensor TP (Output: 0~5VDC)
14	H-PRO, L-PRO	CN29	Connect to high and low pressure switch (pin1-pin2 & pin3-pin4: 5VDC pulse wave)

No.	Name	NC#	Meaning
15	EEVA	CN17	Connect to electric expansion valve (Output: 0~12VDC)
	EEVB	CN16	
	EEVC	CN22	
	EEVD	CN14	
	EEVE	CN13	
	EEVF	CN1	
	EEV1	CN1	
	EEV2	CN44	
	EEV3	CN3	
16	H_YL	CN49	Connect to high pressure sensor
17	DC-FAN2	CN10	Connect to DC fan (Output: 0~310VAC)

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

5.1 Installation Overview



5.2 Location Selection

*** Unit Location Selection can Refer to the Installation Manual.**
***DO NOT Install the Unit in the Following Locations:**

Indoor Unit:

- DO NOT install the indoor unit in a moist environment. Excessive moisture can corrode the equipment, electrical components, and cause electrical shorts.
- Areas with strong electromagnetic waves.
- Coastal areas with high salt content in the air.
- Areas with oil drilling or fracking.
- Areas that store flammable materials or gas.
- Areas where there may be detergent or other corrosive gases in the air such as bathroom or laundry rooms.
- Areas where the air inlet and outlet may be obstructed.
- Danger of explosion. Keep flammable materials and vapors, such as gasoline, away from the air handler.

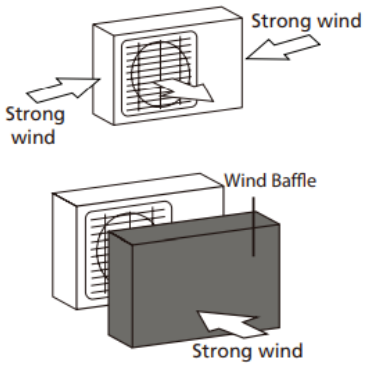
Outdoor Unit:

- Near an obstacle that will block air inlets and outlets.
- Near animals or plants that will be harmed by hot air discharge.
- In a location that is exposed to large amounts of dust.
- Near any source of combustible gas.
- Near a public street, crowded areas, or where noise from the unit will disturb others.

Special Considerations for Extreme Weather:

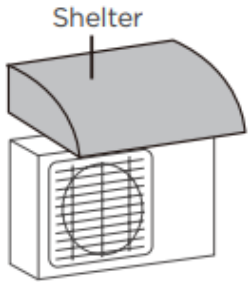
If the Unit is Exposed to Heavy Wind:

- Install the unit so that the air outlet fan is at a 90° angle to the direction of the wind. If needed, build a barrier in front of the unit to protect it from extremely heavy winds.



If the Unit is Frequently Exposed to Heavy Rain or Snow:

- Build a shelter above the unit to protect it from the rain or snow. Be careful to not obstruct airflow around the unit.



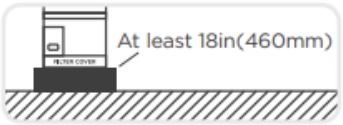
The Unit Must be Installed in a Location that Meets the Following Requirements:

Indoor Unit:

☑ Securely install the indoor unit on a structure that can support its weight. If the structure is too weak, the unit may fall and cause personal injury, unit and property damage, or death.

☑ Enough room for installation and maintenance.

☑ Enough room for the connecting pipe and drainpipe.



☑ Place air handler so that heating elements are at least 18in(460mm) above the floor for a garage installation. Failure to follow these instructions can result in death, explosion, or fire.

☑ The structure that the equipment is suspended from must support the weight of the indoor unit.

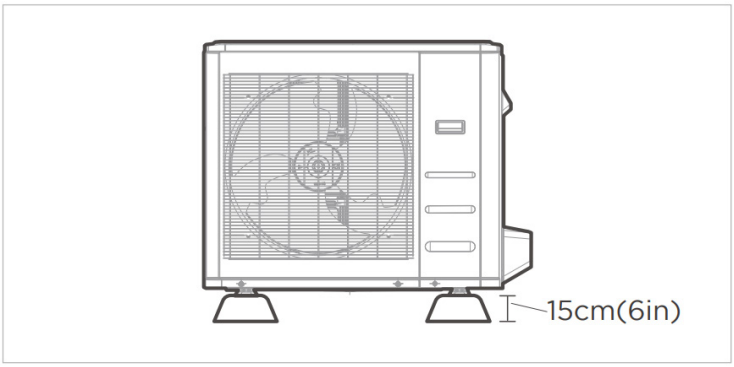
Outdoor Unit:

Firm and solid - the location can support the unit and will not vibrate.

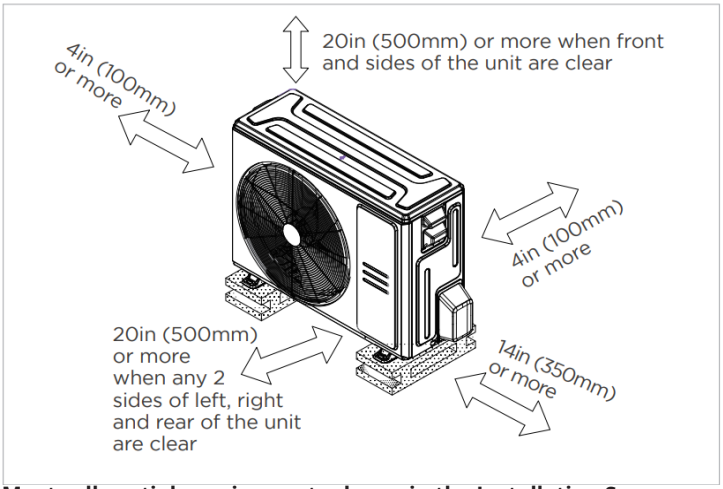
Noise from the unit will not disturb other people.

Good air circulation and ventilation.

Where snowfall is anticipated, take appropriate measures to prevent ice buildup and coil damage.



The outdoor unit must be installed on risers of at least 15cm (6in) in height or per local code to get the unit above the local mean snowfall line.

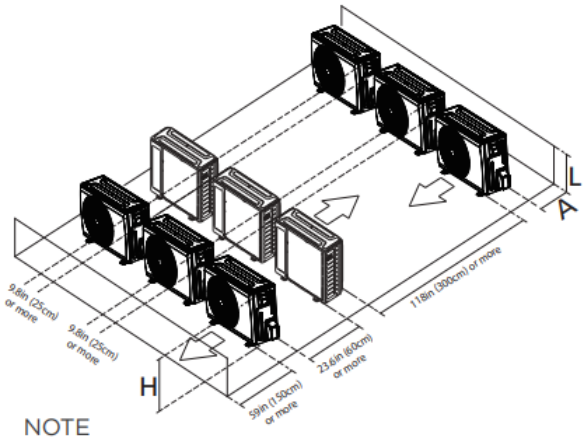


Meets all spatial requirements shown in the Installation Space Requirements above.

Rows of Series Installation:

The Relations Between H, A and L are as Follows:

	L	A
L ≤ H	L ≤ 1/2H	9.8in (25cm) or more
	1/2H < L ≤ H	11.8in (30cm) or more
L>H	Cannot be installed	



NOTE
H: Unit height
L: Height of the wall behind the unit
A: Distance between unit and wall

If You Install the Unit on the Ground or on a Concrete Mounting Platform Do the Following:

- Mark the positions for four expansion bolts based on the dimensions chart.
- Pre-drill holes for expansion bolts.
- Hammer expansion bolts into the pre-drilled holes.
- Remove the nuts from the expansion bolts and place the outdoor unit on the bolts.
- Put a washer on each expansion bolt then replace the nuts.
- Using a wrench, tighten each nut until snug.

⚠ Warning

When drilling into concrete eye protection is recommended at all times.

If You Install the Unit on a Wall-Mounted Bracket Do the Following:

- Pre-drill the holes for the expansion bolts.
- Place a washer and nut on the end of each expansion bolt.
- Thread the expansion bolt through the holes in the mounting brackets, put the brackets into position, then hammer the expansion bolts into the wall.
- Check that the mounting brackets are level.

- Carefully lift the unit and place its mounting feet onto the brackets.
- Install the rubber isolator pads to reduce vibration and noise.
- Bolt the unit firmly to the brackets.

! CAUTION

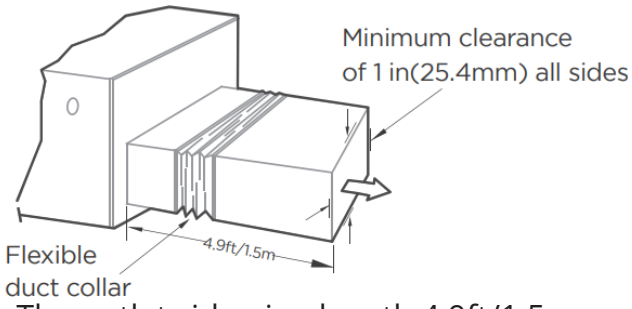
Make sure that the wall is made of solid brick, concrete, or similarly strong material. The wall must be able to support at least four times the weight of the unit.

5.3 Indoor Unit Installation

Service Space for the Indoor Unit:

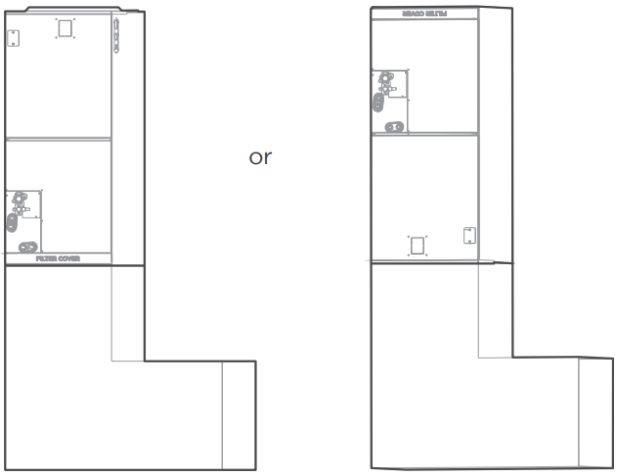
Horizontal Installation:

Plenum Clearances:



The outlet side pipe length 4.9ft/1.5m.

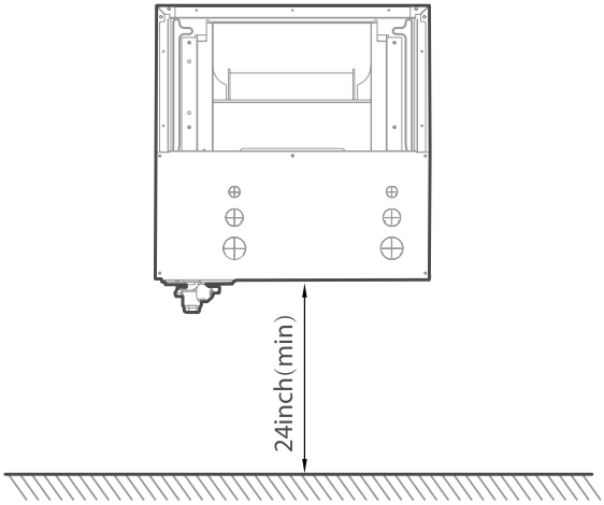
Vertical Installation:



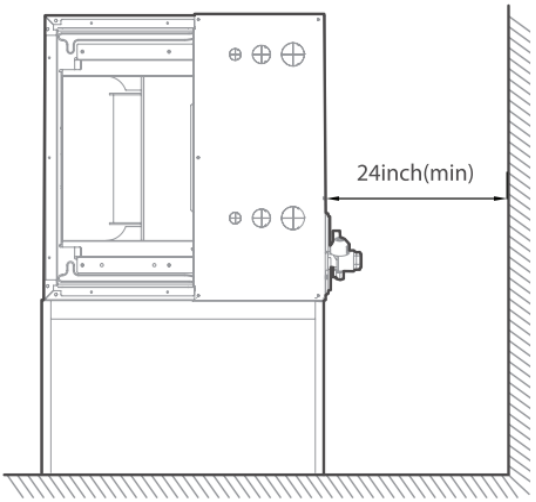
When installed vertical (up flow or down flow) the lower end of the air outlet needs to be connected to the L-Shaped air duct and fastened by screws.

Spacing:

Vertical Installation:



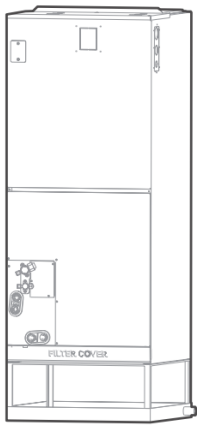
Horizontal Installation:



Installation of the Main Body:

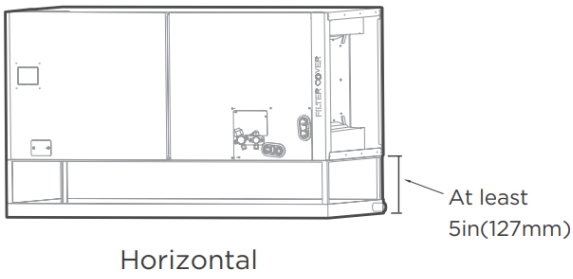
The units can be installed in a vertical (down flow and up flow) and horizontal (right or left) configuration.

Vertical Installation:



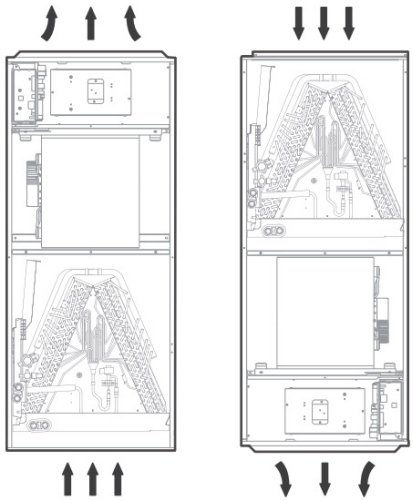
Vertical up

Horizontal Installation:

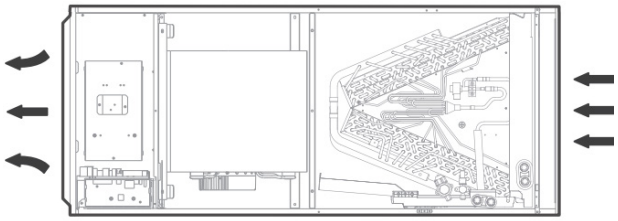


Horizontal

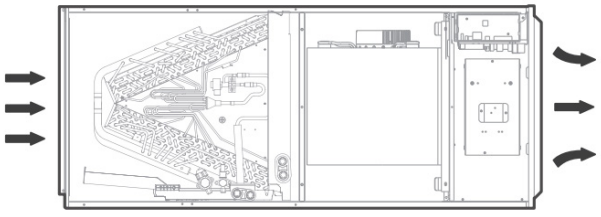
Note: For horizontal installation, a secondary drain pan (not supplied) must be installed.



Upflow Downflow



Horizontal left



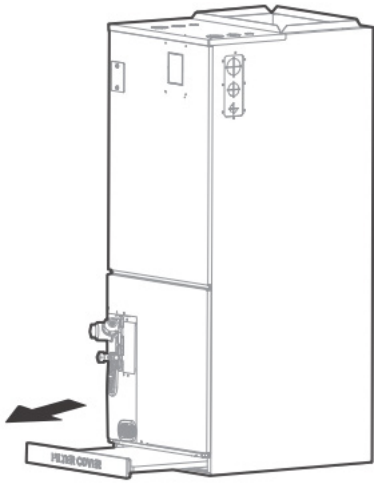
Horizontal right

Note: Vertical up and horizontal left installations do not need the evaporator coil positioned changed.

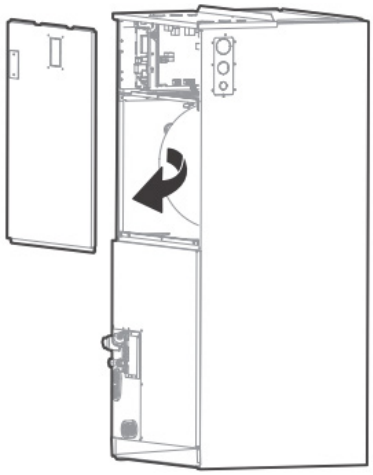
Follow the Following Steps to Perform Down Flow and Horizontal Right Installations:

1. Open the upper cover.
2. Open the cover of the electronic control box.
3. Connect the wire according to the wiring diagram.
4. Connect the piping and install the drainage pipes.

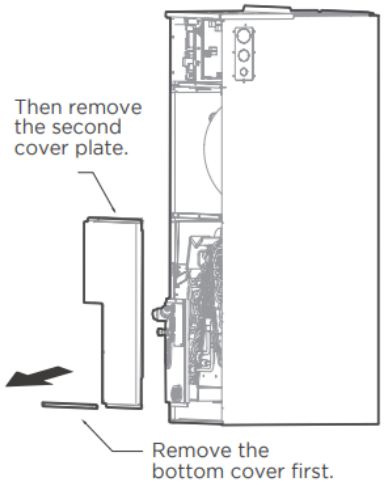
1. Remove the filter door and take the filter out.



2. Remove the upper cover assembly.

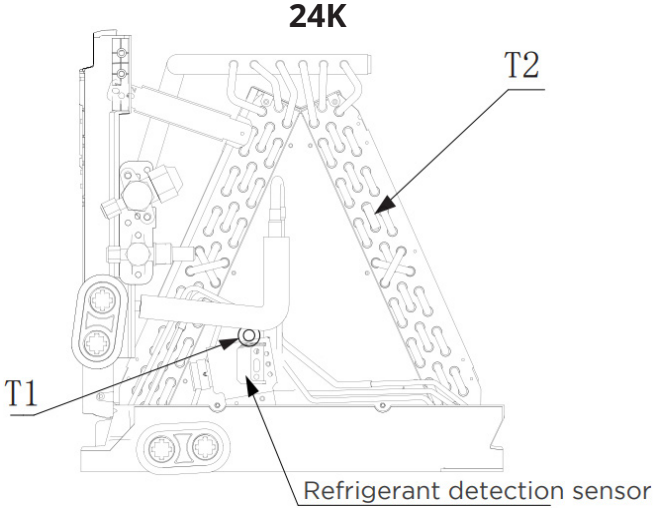


3. Remove the evaporator cover plate.

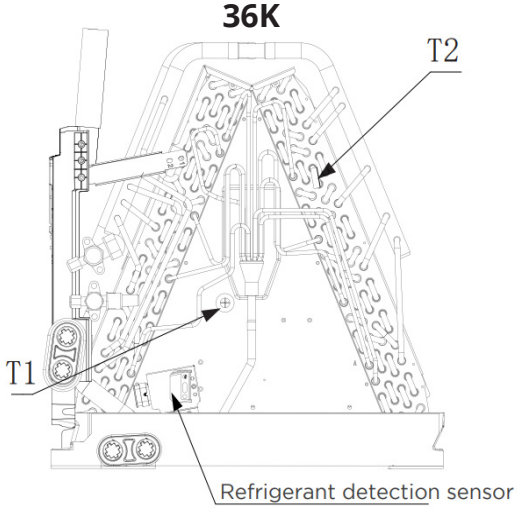


4. Indication of the position of each temperature sensor sensors of the evaporator. Confirm your model below.

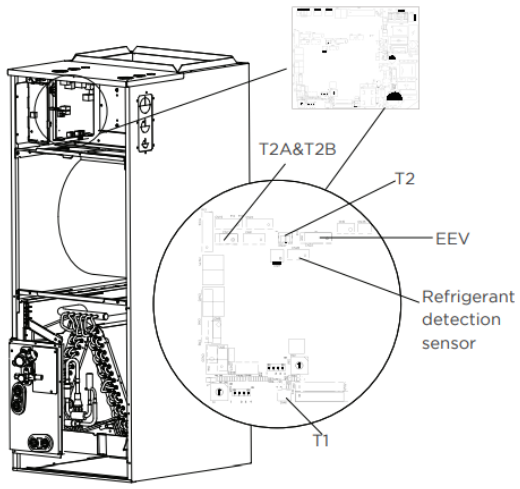
24K



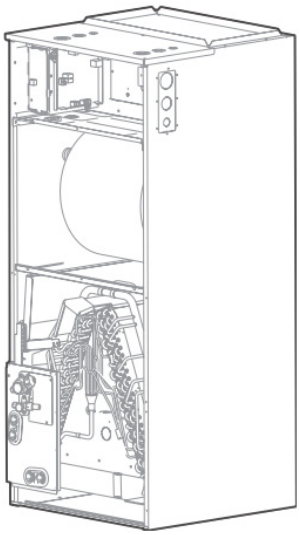
36K



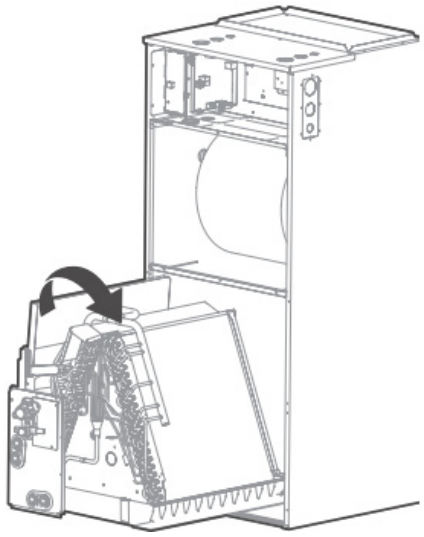
5. Unplug temperature sensors T1,T2, refrigerant detection sensor from the control board.
Sensors:
T1: Room temperature
T2: Evaporator central plug



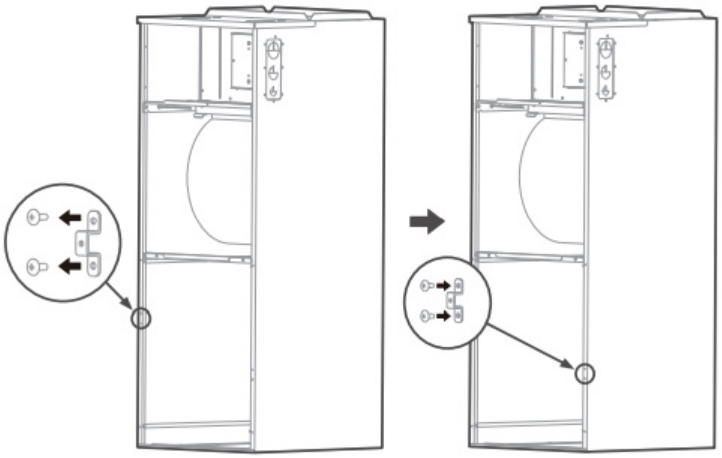
6. Remove T1,T2, refrigerant detection sensor wire ties.



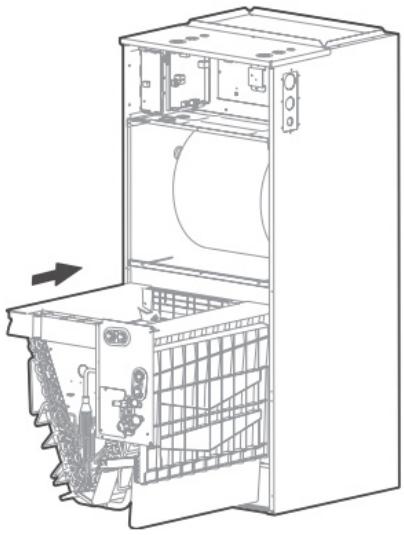
7. Take the evaporator and drain pan and rotate 180°.



8. Adjust the mounting parts position according to the direction of the equipment.

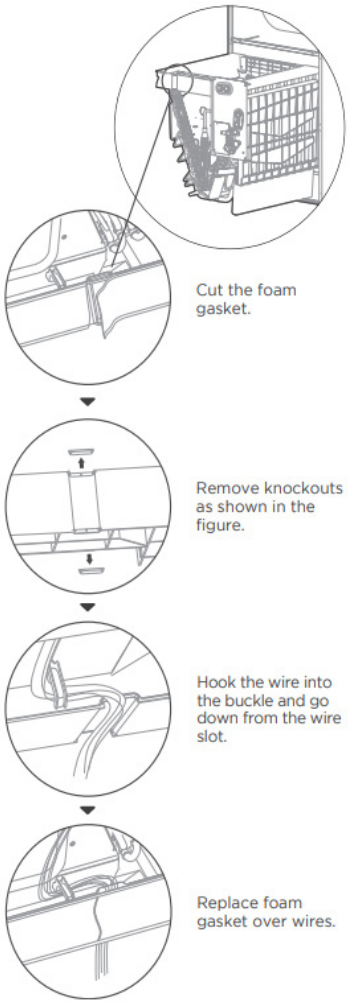


9. Reinstall the evaporator and drain pan.

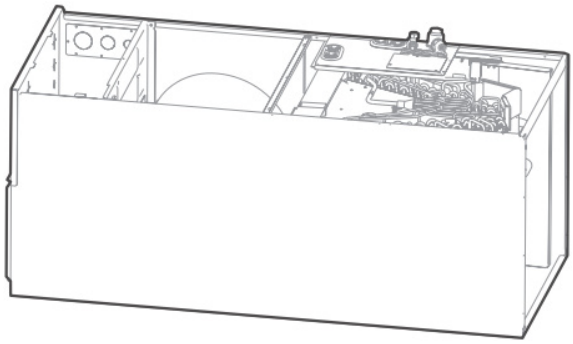


10. Reinstall T1 and T2 sensor plugs and tie up the sensor wires.

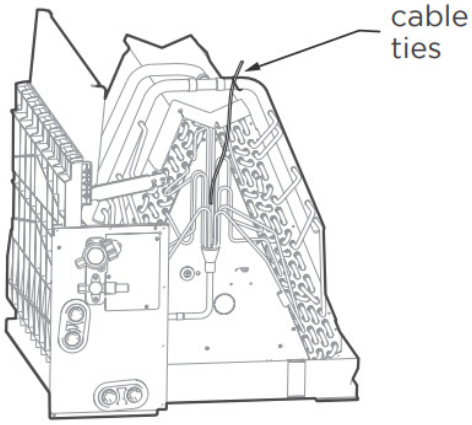
Note: The wire body needs to pass through the wire groove from the drain pan and be stuck on the hook of the drain pan.



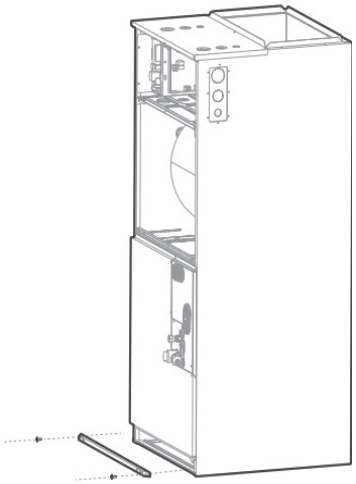
11. The evaporator is assembled in place.



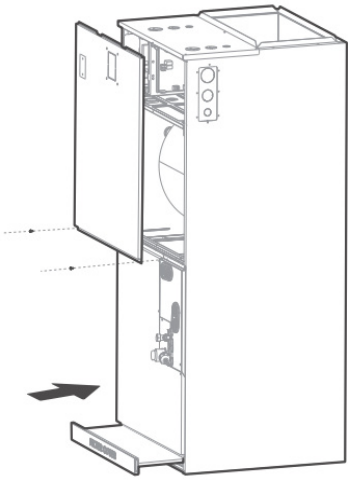
12. Use cable ties to fix the room temperature sensor as shown in the figure.



13. Reinstall evaporator cover plate



14. Connect the wire according to the wiring diagram
15. Reassemble the upper cover and reinstall the filter cover plate.



16. Connect the pipes and install the drainage pipes.

Pipe Installation:

! CAUTION

- Insulate all piping to prevent condensation. (If not insulated it can lead to water damage).
- The drain pipe is used to drain water away from the unit. If the drainpipe is bent or installed incorrectly water may leak and cause a water-level switch malfunction.
- In HEAT mode, the outdoor unit will discharge water. Ensure that the drain hose is placed in an appropriate area to avoid water damage and icy conditions on walkways.
- **DO NOT** pull the drain pipe forcefully. This can disconnect it.

Note: If installed above a finished living space, a secondary drain pan (as required by may building codes) must be installed under the unit and its condensate drain line must be routed to a location such that the user will see the condensate discharge.

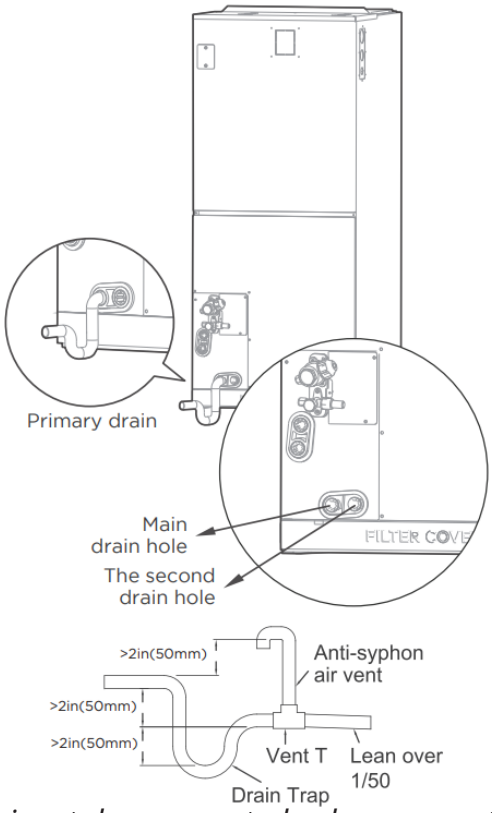
Notice on Purchasing Pipes:
Installation requires pvc pipe or other suitable material per local and national codes. Piping can be purchased at your local hardware store or dealer.

⚠ Warning

- After removal of drain pan plug(s), check drain hole(s), to verify that the drain opening is fully open and free of any debris. Also check to make sure that no debris have fallen into the drain pan during installation that may plug up the drain opening. Seal around the exiting drain pipe, liquid, and suction lines to prevent infiltration of humid air.
- On units of this style where the blower "draws" rather than "blows' air through the coil, traps must be installed in the condensate drain lines (primary and auxiliary, if used). Traps prevent the blower from drawing air through the drain lines into the air supply.

Vertical Installations:

- These unit operate with a negative pressure so a drain trap (p-trap) is required. The trap needs to be installed as close to the unit as possible. Make sure the top of the trap is below the connection pan to allow complete drainage of the pan.



Note: Horizontal runs must also have an anti-siphon air vent (standpipe) installed ahead of the horizontal run to eliminate air trapping.

Notes on Drainpipe Installation:

- The figure shows how to trap or plug all drains during vertical discharge.
- The figure shows how to trap or plug all drains during right-hand discharge.
- The seal plugs are supplied as accessories and should be screwed tightly only by hand.
- Incorrect installation could cause water to flow back into the unit and flood.

! CAUTION

The drainpipe outlet should be at least 1.9in (5cm) above the ground. If it touches the ground the unit may become blocked and malfunction.

5.4 Outdoor Unit Installation

Installing Drain Joint:

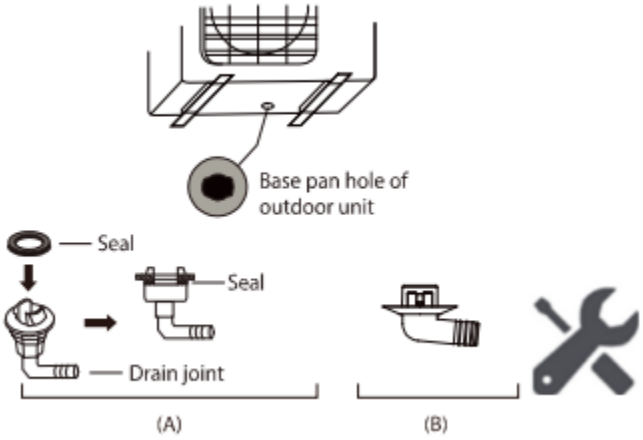
Before bolting the outdoor unit in place, you must install the drain joint at the bottom of the unit.
Note: There are two different types of drain joints depending on the type of outdoor unit.

If the Drain Joint Comes with a Rubber Seal (See Fig. A), Do the Following:

1. Fit the rubber seal on the end of the drain joint that will connect to the outdoor unit.
2. Insert the drain joint into the hole in the base pan of the unit.
3. Rotate the drain joint 90° until it clicks in place facing the front of the unit. **For some panel plates you will need to use a tool.**
4. Connect a drain hose extension (not included) to the drain joint to redirect water from the unit during heating mode.

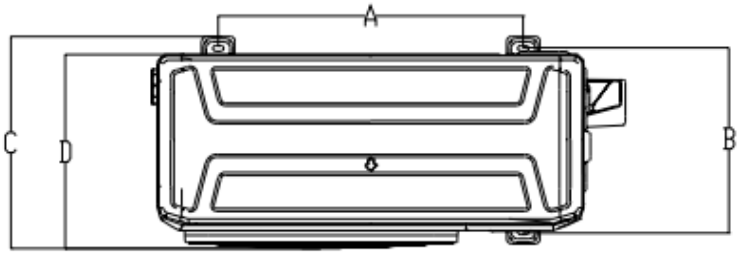
If the Drain Joint Doesn't Come with a Rubber Seal (See Fig. B) Do the Following:

1. Insert the drain joint into the hole in the base pan of the unit. The drain joint will click in place.
2. Connect a drain hose extension (not included) to the drain joint to redirect water from the unit during heating mode.



Anchor Outdoor Unit:

The outdoor unit can be anchored to the ground or to a wall-mounted bracket with bolt (M10). Prepare the installation base of the unit according to the dimensions below.
The following is a list of different outdoor unit sizes and the distance between their mounting feet.



Platform	Unit	D	A	B	C
D30	inch	16.14	26.50	15.87	17.9
	mm	410	673	403	455

5.5 Refrigerant Pipe Installation

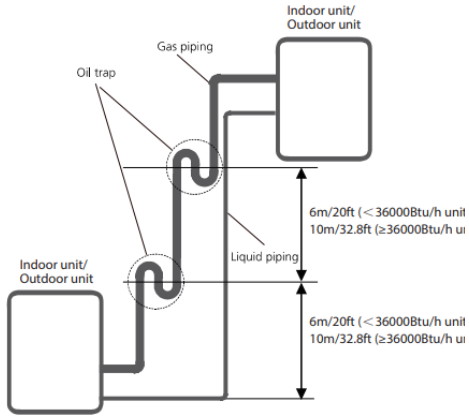
Maximum Length and Drop Height:

Ensure that the length of the refrigerant pipe, the number of bends, and the drop height between the indoor and outdoor units meets the requirements shown in the following table.

Capacity	Max. Length (ft/m)	Max. Elevation (ft/m)
24k	164/50	82/25
36k	246/75	98.4/30

! CAUTION

1. The capacity test is based on the standard length and maximum permissive length is based on the system reliability.
2. Oil traps.
   - If oil flows back into the outdoor unit's compressor, this might cause liquid compression or deterioration of oil return. Oil traps in the rising gas piping can prevent this.
   - An oil trap should be installed every 20ft (6m) of vertical suction line riser (<36kBtu/h unit).
   - An oil trap should be installed every 32.8ft (10m) of vertical suction line riser (≥36kBtu/h unit).



Connection of Quick Connect Refrigerant Lines (Indoor Unit):

Important Information

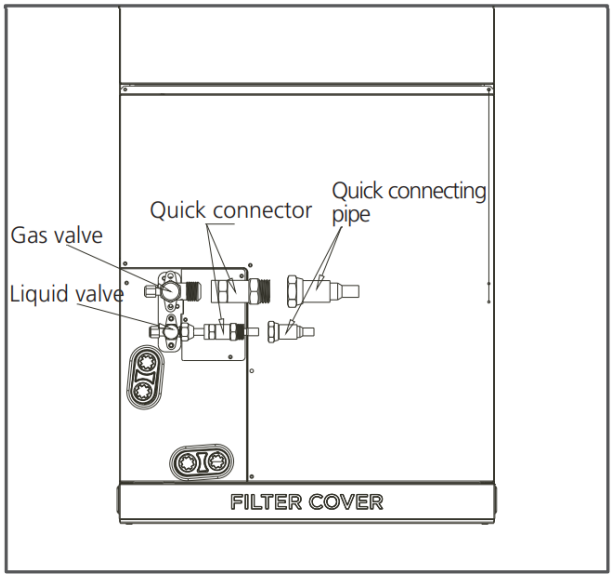
- Closely follow the detailed instructions for connecting the refrigerant lines to the indoor and outdoor unit. Failure to install in accordance with these installation instructions may void the warranty.
- Do not remove the sealing caps and stoppers until you are ready to install the line sets.
- To prevent leaks, ensure that the quick-connector threading and valve body is free of dirt and contaminates prior to assembly. Moisture or foreign material may impact function leading to refrigerant loss or premature failure.
- Only install refrigerant lines during dry weather.
- The refrigerant lines cannot be plastered over.
- Care should be taken to prevent the release of refrigerant to the environment while installing or servicing the equipment.
- Wear proper PPE when handling refrigerant (gloves, safety glasses, etc.)
- Do not smoke during installation.
- The equipment must never be operated without fully completing the refrigerant line connections.
- Follow the required tightening torques defined in the table based on the connector size. Under-tightening may result in a refrigerant leak while over-tightening could damage components.

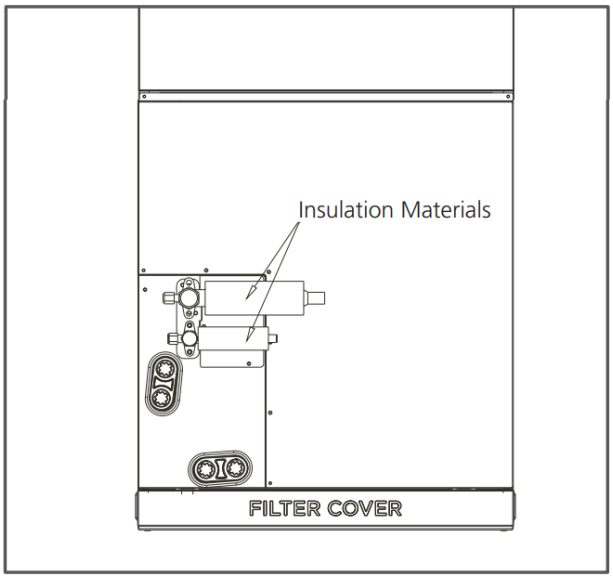
Note:

- The quick-connect installation method is only used for models that have been pre-charged with refrigerant and equipped with quick-connects.
- Before you continue read the following instructions carefully.

Step 1:

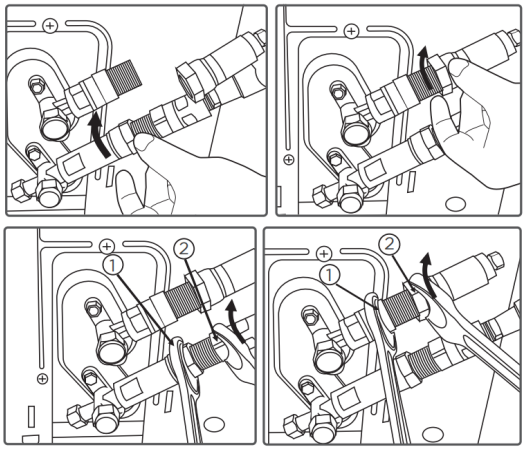
- When you are ready to install the refrigerant line remove the plastic seals/caps from the indoor unit and the refrigerant line.
- Align the quick connector with the valve of the indoor unit ensuring that they are the same size.
- Tighten them with two wrenches (one to fix the valve and another to tighten the quick connect) according to the torque table.
- Screw the quick connect line onto the quick connector and hand tighten. Be careful not to cross thread.





Step 2:

Using two open-ended wrenches, tighten the quick-connect nut "2" on the line according to the torque specification in the table below, be careful to not loosen the connection "1" to the valve body.



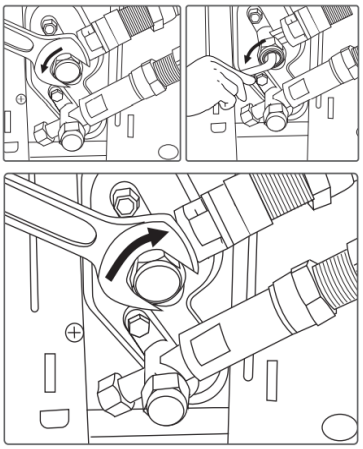
Step 3:

Ensure that the screw connectors do not cross thread as you tighten them and work quickly. After completing steps 1-3, check that all the connections are sealed correctly by using a leak detection spray or soapy water. If any bubbles form, the system has a leak and the screw connectors must be re tightened using an open-ended wrench.

Note: Since the coupling works with tapping rings, it may leak if you undo and reconnect the pipes.

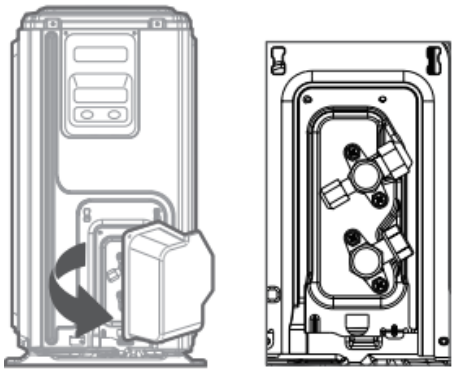
Step 4:

Remove the cover on the top valve using a 19mm open-ended wrench. Open the valve by turning it counter clockwise as far as it will go using a 5mm Allen key. The valve will now be opened. If the valve is not fully opened the system can malfunction and suffer damage. Screw the cover back on to the top valve and tighten it well to ensure that it is properly sealed.



Connection of Quick Connect Refrigerant Lines (Outdoor Unit):

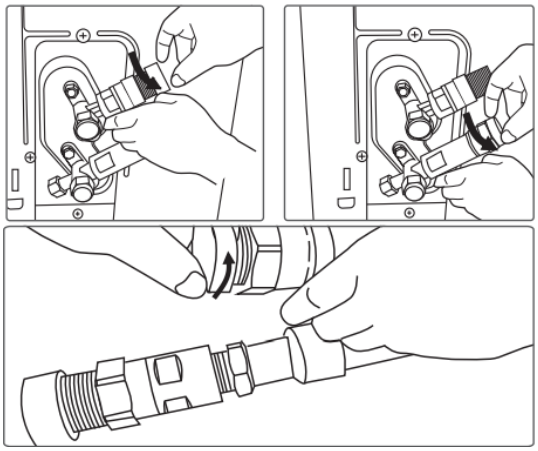
Step 1:
First remove the service valve cover on the outdoor unit as shown below.



remove the cover

Note: Before connecting the quick joint connecting pipe, use a wrench to confirm the fast joint and the shut-off valves are securely fastened in the direction indicated in the diagram. If it is loose at all it needs to be tightened to prevent leakage. During the assembly process, if there is reverse disassembly operation, the above operation needs to be performed to tighten it.

Step 2:
When you are ready to install the refrigerant line, remove the plastic seals/caps from the outdoor unit and refrigerant line.

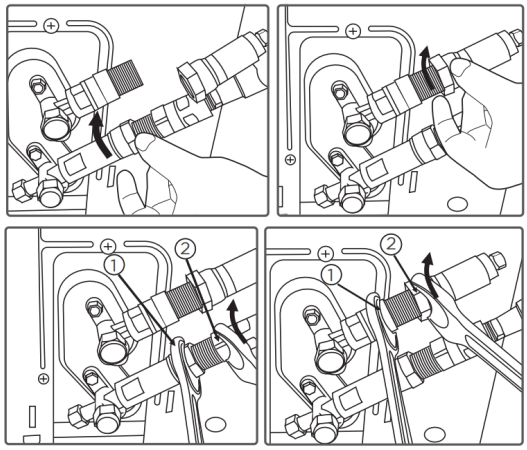


Step 3:
Align the refrigerant quick-connect line with the threaded connector on the outdoor unit ensuring they are the same size. Be careful not to cross thread, screw the line connector onto the quick-connect and hand-tighten.

⚠ Warning

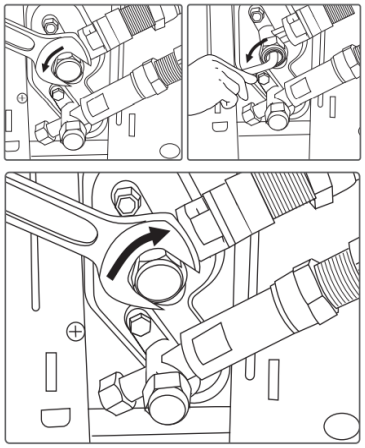
Before connecting the pipes, ensure that the quick connectors are tightened.
Note: The refrigerant pipes must be connected with the valves with as little stress as possible.

Step 4:
Using two open-ended wrenches, tighten the quick-connect nut "2" on the line according to the torque specification in the table below, be careful to not loosen the connection "1" to the valve body.

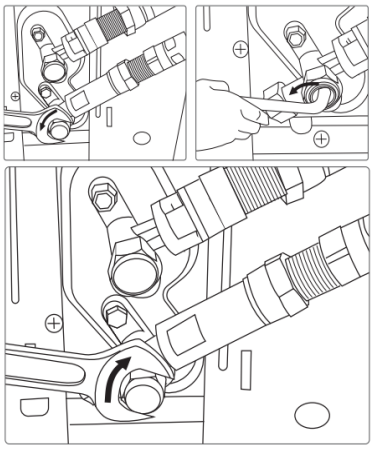


Step 5:
Important: The conical ring on the valve has an important sealing function together with the sealing seat in the caps. Ensure that you do not damage the cone and that you keep the cap free of dirt and dust. After completing steps 1-4, check that all the connections are sealed correctly using leak detection spray or soapy water. If any bubbles form, the system has a leak and the screw connectors must be re-tightened using an open-ended wrench.

Step 6:
Remove the cover on the top valve using a 19mm open-ended wrench. Open the valve by turning it counter clockwise as far as it will go using a 5mm Allen key. The valve will now be opened. If the valve is not fully opened the system can malfunction and suffer damage. Screw the cover back on to the top valve and tighten it well to ensure that it is properly sealed.



Step 7:
Remove the cover on the bottom valve using a 19mm open-ended wrench. Open the valve by turning it counter clockwise as far as it will go using a 5mm Allen key. The valve will now be opened. If the valve is not fully opened the system can malfunction and suffer damage. Screw the cover back on to the top valve and tighten it well to ensure that it is properly sealed.



Step 8:
After completing steps 1-7, check that all connections are sealed correctly using leak detection spray or soapy water. If any bubbles form, the system has a leak and the screw connectors must be re-tightened using an open-ended wrench.

Step 9:
With the system now functional, check the system again for signs of leaks (as in step 7) except while operating in both cooling and heating modes to allow proper operating pressures to be generated. If any bubbles form, the system has a leak and the screw connectors must be re-tightened until no leaks exists.

Quick Connect Torque Specs:

Coupling Size (Last 2 Part Numbers)	Pound Force Foot (Lbs Ft)	Newton Meter (Nm)
-06	18-20	24.4-27.1
-09	30-35	40.6-47.4
-12	45-50	61.0-67.7
-16	60-65	81.3-88.1

5.6 Vacuum Drying & Leakage Testing

Purpose of Vacuum Drying:

- Eliminates moisture in the system to prevent the phenomena of ice-blockage and copper oxidation.
  -Ice-blockages will cause abnormal operation of system while copper oxidation will damage the compressor.
- Eliminating non-condensible gas(air) in the system will prevent the components from oxidizing, pressure fluctuation, and poor heat exchange during operation of the system.

Operation Procedure for Vacuum Drying:

Due to different construction environments, two kinds of vacuum drying ways could be chosen, namely ordinary vacuum drying and special vacuum drying.

Ordinary vacuum drying:

1. When conducting first vacuum drying, connect a pressure gauge to the infusing mouth of gas pipe and liquid pipe and keep the vacuum pump running for 1 hour (vacuum degree of vacuum pump shall be reached at -755mmHg).
2. If the vacuum degree of the vacuum pump could not reach -755mmHg after 1 hour of drying it indicates that there is moisture or leakage in the pipeline of the system and needs to go on with drying for half an hour.
3. If the vacuum degree of the vacuum pump still cannot reach -755mmHg after 1.5 hours of drying check to see if there is a leak.
4. Leakage test: After the vacuum degree reaches -755mmHg stop vacuum drying and keep the pressure for 1 hour. If the indicator of the vacuum gauge does not go up it is good. If it does go up it indicates that there is moisture or a leak.

Special Vacuum Drying:
The special vacuum drying method shall be adopted when:
1. Finding moisture during flushing refrigerant pipe.
2. Conducting construction on a rainy day (Rain water might get into pipeline).
3. Construction period is long (Rain water might get into pipeline).

Procedures of special vacuum drying are as follows:
1. Vacuum drying for 1 hour.
2. Vacuum damage, filling nitrogen to reach 0.5Kgf/cm².

-Because nitrogen is a dry gas, vacuum damage could achieve the of vacuum drying, but this method cannot achieve drying thoroughly when there is too much moisture. Therefore special attention shall be drawn to prevent the entering of water and the formation of condensate water.

3. Vacuum drying again for half an hour.

-If the pressure reached -755mmHg, start pressure leakage test. If it cannot reach the value, repeat vacuum damage and vacuum drying again for 1 hour.

4. Leakage test: After the vacuum degree reaches -755mmHg, stop vacuum drying and keep the pressure for 1 hour. If the indicator of the vacuum gauge does not go up it is good. If it keeps going up it indicates that there is moisture or a leak.

5.7 Additional Refrigerant Charge

- After the vacuum drying process is carried out, the additional refrigerant charge process needs to be performed.
- The outdoor unit is factory charged with refrigerant. The additional refrigerant charge volume is decided by the diameter and length of the liquid pipe between the indoor and outdoor unit. Refer to the following formula to calculate the charge volume.

	Diameter of liquid pipe (inch(mm))	Formula
R545B	Ø1/4 (Ø6.35)	V=0.32(30)oz/ft(g/m)x(L-standard pipe length)
	Ø3/8 (Ø9.52)	V=0.7(65)oz/ft(g/m)x(L-standard pipe length)

V: Additional Refrigerant charge volume.
L: The length of the liquid pipe.

Note:
- Refrigerant may only be charged after the performed vacuum drying process.
- Use electronic scale or fluid infusion apparatus to weigh the refrigerant to be charged. Be sure to avoid excess refrigerant charge, it may cause liquid hammering of the compressor.
- The refrigerant should be charged in a liquid state.
- After finishing the refrigerant recharge process, check whether there is refrigerant leakage at the connection joints(Using a leak detector or soapy water).

5.8 Piping Insulation

Insulation of Refrigerant Pipe:

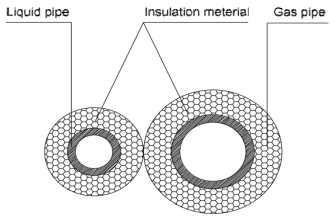
1. Operational Procedure of Refrigerant Pipe Insulation:

Cut the suitable pipe > insulation (except joint section) > flare the piping > piping layout and connection > vacuum drying > insulate joints.

2. Purpose of Refrigerant Pipe Insulation:
- During operation the temperature of the gas pipe and liquid pipe will be very hot/cold. Therefore insulation is necessary as without it will decrease performance and can cause the compressor to burnout.
- The gas pipe temperature is low during cooling operation, if lacking insulation it will condensate.
- The gas pipe temperature is high (generally 122°F -212°F (50°C-100°C)) in heating operating. If lacking insulation it can result in burns.

3. Insulation Material Selection for Refrigerant Pipes:
- Insulation should withstand 248°F (120°C)
- Choose insulation materials according to local codes.
- The thickness of the insulation layers needs to be above 10mm. If in a hot or wet environment the layer on insulation will need to be thicker.

4. Highlights of insulation construction:
- The gas pipe and liquid pipe needs to be insulated separately. (If the gas and liquid pipe were insulated together it will decrease the performance of the system).



- The insulation material at jointing pipes shall be 1.96in (5cm)~3.93in (10cm) longer than the gap of the insulation material.
- Insulation material at the joint needs to be inserted into the gap of the insulation material.
- Insulation material at the joint needs to be banded to the gap and liquid pipe tightly.
- The linking part should by glued together.
- Make sure not to bind the insulation material tightly, it can extrude air out of the material causing it to age faster.

Insulation of Drain Line:

1. Operational Procedure of Refrigerant Pipe Insulation:

Cut the suitable pipe > insulation (except joint section) > Piping layout and connection > drainage test > insulate joints.

2. Purpose of Drainage Pipe Insulation:

The temperature of the condensate drainage water is low. If there is insufficient insulation it will sweat and leak causing damage to structures.

3. Insulation Material Selection for Drainage Pipe:

- The insulation material should be flame retardant material and the flame retardant of the material should be selected according to the local codes.
- Thickness of the insulation is usually above 0.39in (10mm).
- Use specific glue to paste the seam of insulation material and then bind with adhesive tape. The width of the tape shall be no less than 1.97in (5cm). Make sure it is firm to avoid sweating.

4. Installation and Highlight of Insulation Construction:

- A single piece of pipe should be insulated before connecting to another pipe, the joint should be insulated after the drainage test.
- There should be no insulation gap between the insulation material.

5.9 Auxiliary Heat

Note:

Installation must be performed by a licensed contractor. Please make necessary precaution when performing the installation operation.

Preparations for Installation:

Before installation, please confirm the electric auxiliary heat module and supplied accessories are complete and free of any damage. Do not attempt to install if there is damage present.

Accessories:

Name	Quantity
Manual	2
Foam Gasket	1
Screws	7
Silicone Breaker Cover	1
Electric Auxiliary Heating Diagram	1
Circuit Breaker Label	1

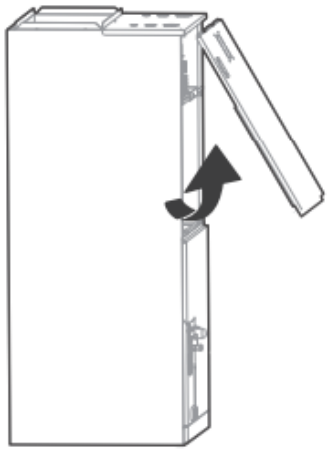
Model size selection:

For installations requiring supplemental heating, the optional electric heat module is available in sizes from 5kW to 20kW to accommodate appropriate sizing given to the specific heat load and electrical requirements of each installation. Please refer to the following table below for selections of available sizes of each model to avoid improper matching.

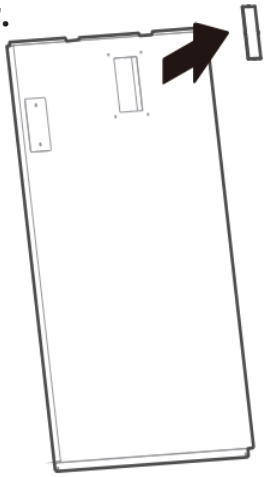
Indoor Unit Model (Btu/h)	5kW	8kW	10kW	15kW	20kW
24K	√	√	√	√	x
36K	√	√	√	√	√

Auxiliary heat installation and wiring:

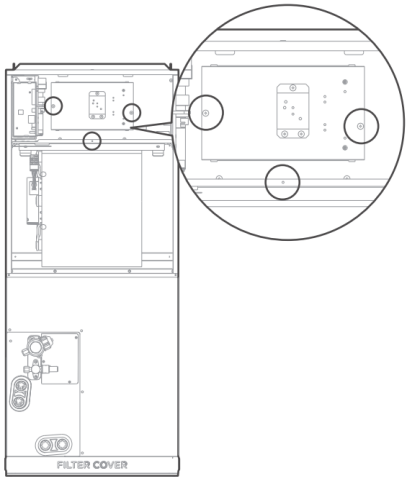
1. Open the upper cover.



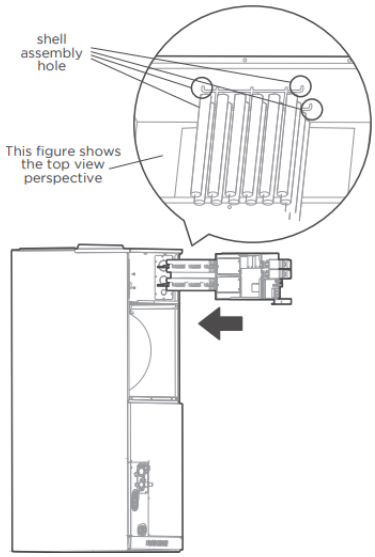
2. Use tools to remove the knock-out holes of the upper cover.



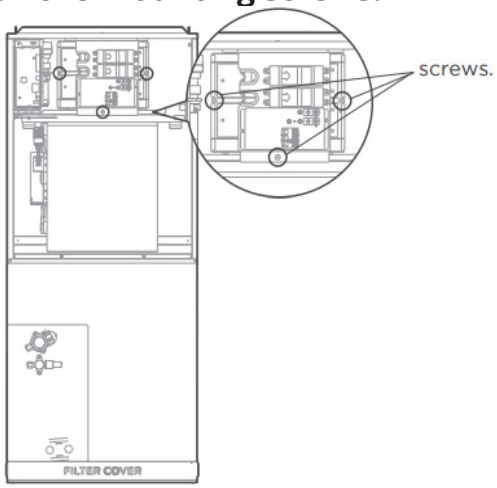
3. Remove the terminal block and power wires, loosen the screws, and remove the electric auxiliary heating cover.



4. Install the electric auxiliary heating assembly and make sure the support rails lock into the support holes in the back of the cabinet.



5. Tighten the mounting screws.

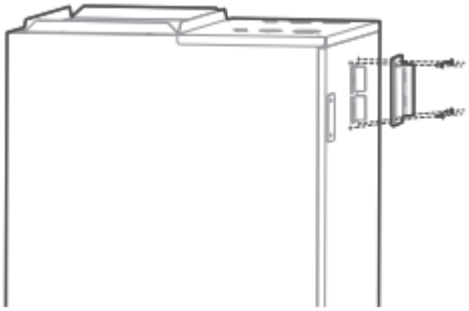


6. Wire according to the wiring nameplate.

Note: Apply the wiring diagram to the inside cover after wiring is completed for future reference and maintenance.

- Plug the electric heating plugs into CN11 and CN12 into the main board.

7. Install the upper cover and the silicone breaker cover.



8. After installing the electric auxiliary heat module, apply the circuit breaker label near the silicone breaker cover that was just applied.

Confirmation of Indoor Unit:

After the electric heating wiring is connected, please confirm before powering on:

- Check all wiring and ensure secure connection of all wiring.
- Ensure that the wire size is properly selected per NEC or local codes.

Specifications	Number of circuit breakers	Number of relays	Number of power cord groups	Number of power cord grounding screws
5kW	1	1	2	2
8kW	1	1	2	2
10kW	1	2	2	2
15kW	2	3	3	3
20kW	2	4	3	3

Note:

- Electric auxiliary heating wiring diagrams are packed with the accessory.
- If the branch circuit wire length exceeds 100ft, consult NEC 210-19a to determine the maximum wire length. Use 2% voltage drop.

5.10 Electrical Wiring

Highlights of Electrical Wiring:

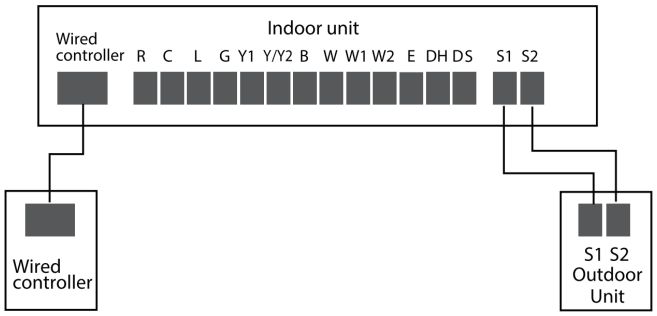
- All field wiring construction should be finished by a qualified electrician.
- Air conditioning equipment should be grounded according to the local electrical regulations.
- A current leakage protection switch should be installed.
- Do not connect the power wire to the terminal of the signal wire.
- When the power wire is parallel with the signal wire put the wires in their own conduit and gap them by 11.8in (300mm).
- According to the table in the indoor wiring make sure the selected wiring is not smaller than shown in the table.
- Select different colors for different wire according to relevant regulations.
- DO NOT use metal conduit in a place with acid or alkali corrosion. Switch to a plastic wire tube to replace it.
- DO NOT have a joint in the conduit, if one is required place into a connection box.
- The wiring with different voltage should not be in the same conduit.
- Ensure that the color of the wires of the outdoor terminal number and indoor correspond.

Specific wiring method:

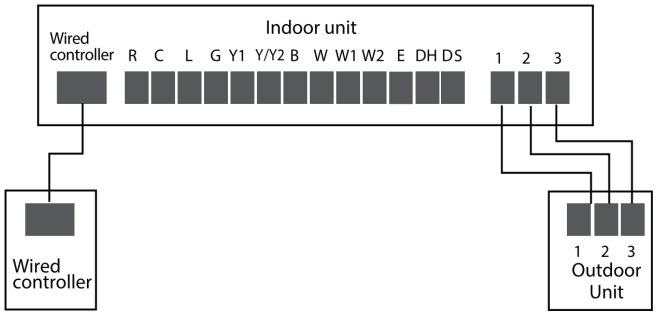
Connection Method A:

Refer to the wiring method of internal and external machine communication:

A.



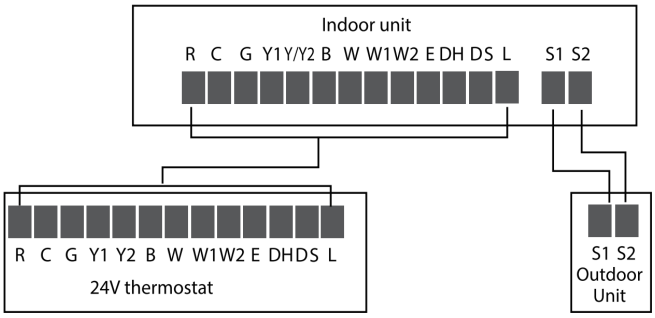
B.



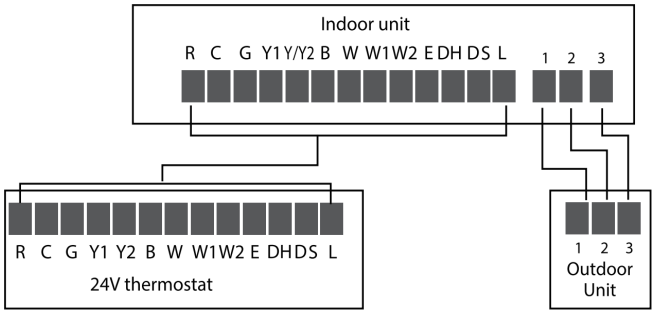
Connection Method B:

To use a 24V thermostat you need to refer to the following wiring:

A.



B.

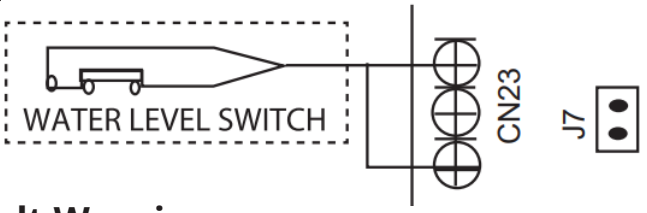


Note: The wiring method of the thermostat and the internal machine refers to the wiring of the non-communication scheme.

Optional Function Wiring:

Condensate Overflow Switch:

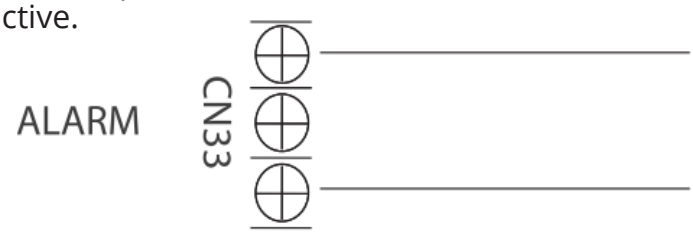
The unit will accommodate a remote condensate overflow switch. To enable, remove jumper J7 and connect he installer provided condensate overflow device to CN23 per below. When an overflow condition is present the device should open connection signaling the unit to turn off the system.



Fault Warning:

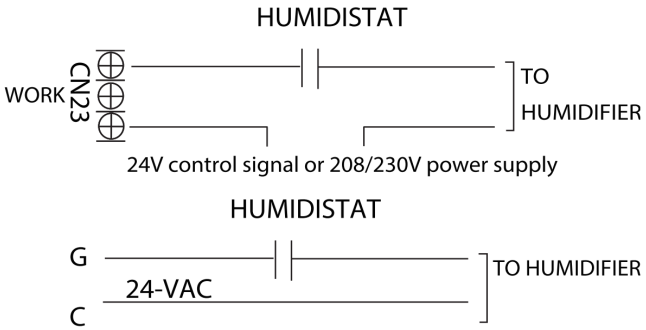
Alarm output:

An alarm output (CN33) can be utilized if actions are required when a fault is present. This is a passive outlet port so you will need to input a voltage signal. The relay is normally-open for normal operation and closed when a fault is active.



Humidifier Control:

To connect a humidifier, utilize the passive signal "WORK" output (CN23) port as well as the G and C wires on the controller and wire the humidistat and humidifier per the wiring diagram below. When the fan is running the CN23 relay will be closed which will allow power to the humidifier when the humidistat is below humidity set point. If the thermostat or zone controller has a HUM interface, connect the humidifier directly to the HUM and C ports.



UV, Fresh air, or Negative Ion Wiring:

The WORK port is linked with the fan. When the fan is running the relay is closed; if an active 24V signal is required it can be directly connected to the G and C ports.

24V control signal or 208/230V power supply

Control Logic:

Indoor Unit Connector:

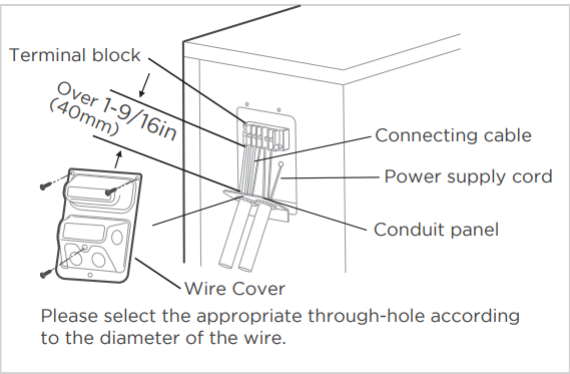
Connector	Purpose
R	24V Power Connection
C	Common
G	Fan Control
Y1	Low Cooling
Y/Y2	High Cooling
B	Heating Reversing Valve
W	Heating Control
W1	Stage 1 Electric Heating
W2	Stage 2 Electric Heating
E/AUX	Emergency Heating
DH/BK	Dehumidification/Zoning Control
DS	Reserved Signal
L	System Fault Signal

KEY1 Instructions (Wired Controller Only):

- Press KEY1 to enter the forced automatic mode, press KEY1 again to enter the forced cooling mode (LED displays FC), and press KEY1 again to shut down.
- Long press KEY1 under forced cooling mode (LED displays FC) for 5 seconds to enter forced cooling mode.

Outdoor Unit Wiring:

1. Remove the wire cover from the unit by loosening the 3 screws.
2. Remove the caps on the conduit panel.
3. Mount the conduit tubes (not included) on the conduit panel.
4. Properly connect both the power supply and low voltage lines to the corresponding terminals on the terminal block.
5. Ground the unit in accordance with local codes.
6. Be sure to leave some slack in the wiring for connections.



Warning

Isolate the power supply leads and communication leads from touching each other or crossing.

5.11 Test Operation

1. **The test operation must be carried out after the installation has been completed.**
2. **Please confirm the following points before the test operation.**

- The indoor and outdoor unit are installed properly.
- Piping and wiring are properly connected.
- Make sure that there are no obstacles near the inlet and outlet of the unit that might cause poor performance or malfunction.
- The refrigerant system has no leaks.
- The drainage system is clear and draining to a safe location.
- The heating insulation is properly installed.
- The grounding wires are properly connected
- The length of the piping and the added refrigerant capacity has been recorded.
- Power voltage is correct for the system.

CAUTION

Failure to perform the test run may result in system damage, property damage, or personal injury.

3. **Test run instructions.**

D. Open both the liquid and gas valves.
E. Turn ON the main power and allow the unit to warm up.
F. Set the air conditioner to COOL mode and check the following points:

Indoor unit

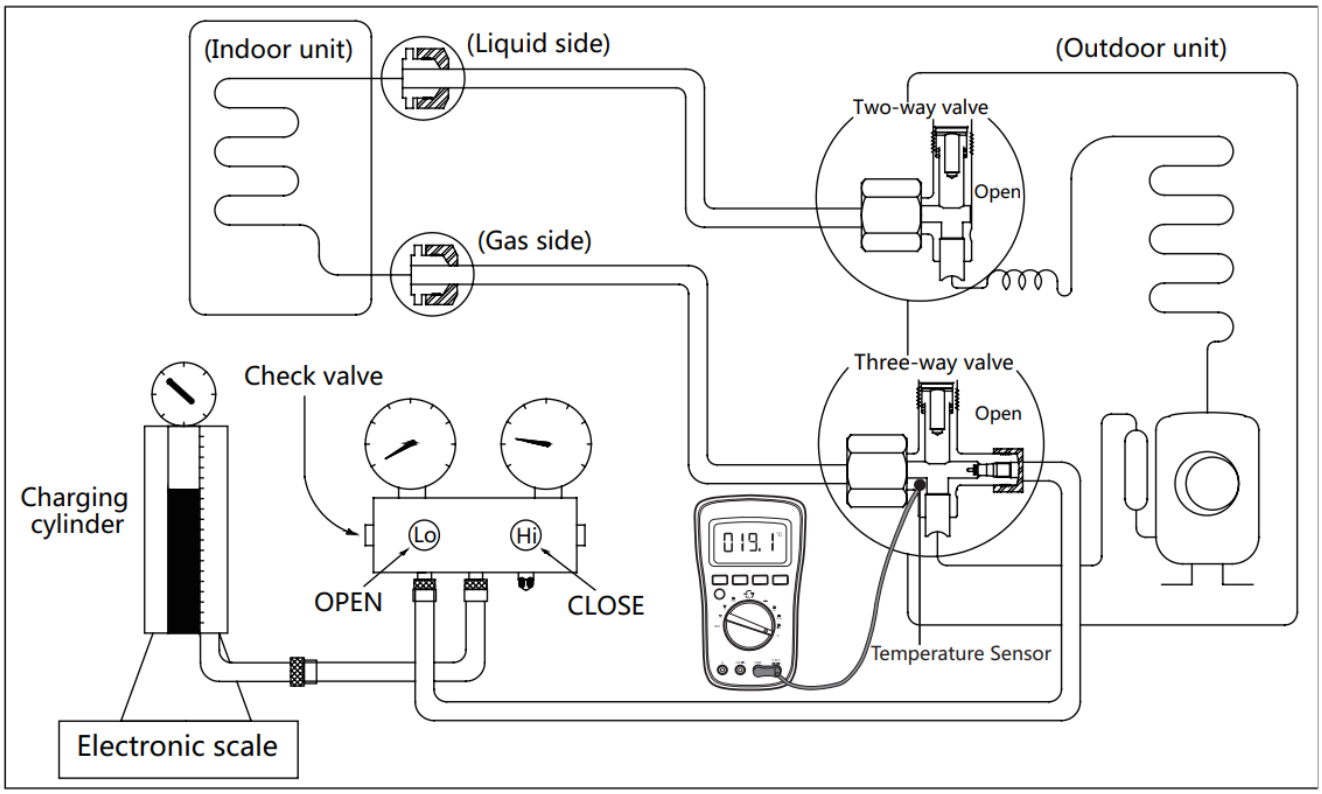
- Double check to see if the room temperature is being registered correctly.
- Ensure the manual buttons on the indoor unit work properly.
- Check to see that the drainage system is clear and draining smoothly.
- Ensure there is no vibration or abnormal noise during operation.

Outdoor Unit

- Check to see if the refrigeration system is leaking.,
- Make sure there is no vibration or abnormal noise during operation.
- Ensure the wind, noise, and water generated by the unit do not disturb your neighbors or pose a safety hazard.

4. **Drainage test**

A. Ensure the drain pipe flows smoothly. New buildings should perform this test before finishing the ceiling.
B. Turn on the main power and run the unit in COOL mode.
C. Check to see that the water is discharged. It may take up to one minute before the unit begins to drain depending on the drain pipe.
D. Stop the unit (turn off power and reinstall the test cover).



Procedure:

1. Close both 2 and 3 way valves.
2. Slightly connect the handle Lo charge hose to the 3 way service port.
3. Connect the charge hose to the valve at the bottom of the refrigerant cylinder.
4. If the refrigerant is R410A/R32, invert the cylinder to ensure a complete liquid charge.
5. Open the valve at the bottom of the cylinder for 5 seconds to purge the air in the charge hose, then fully tighten the charge hose with a push pin Handle Lo to the service port of the 3-way valve.
6. Place the charging cylinder onto an electronic scale and record the starting weight.
7. Fully open the Handle Lo manifold valve, 2-way and 3-way valves.
8. Operate the air conditioner in cooling mode to charge the system.
9. When the electronic scale displays the correct weight (refer to the gauge and the pressure of the low side to confirm, the value of pressure refers to chapter System Pressure Table) turn off the air conditioner then close Lo manifold valve and cylinder valve and disconnect the charge hose from the 3-way service port immediately.
10. Mount the caps back to the 2-way and 3-way valves.
11. Use a torque wrench to tighten the caps to a torque spec of 13.28ft. lbs (18Nm).
12. Check for any leaks.

7.1 24V Signal Chart

Mode	Priority	G	Y1	Y/Y2	B	W	W1	W2	E/AUX	DH	Fan Speed	Display
OFF	/	0	0	0	0	0	0	0	0	*	OFF	00
FAN	7	1	0	0	*	0	0	0	0	*	Low	01
Cooling Stage 1	6	*	1	0	0	0	0	0	0	1	Mid	02
Cooling Stage 2		*	*	1	0	0	0	0	0	1	High	03
Dehumidification 1		*	1	0	0	0	0	0	0	0	Low	04
Dehumidification 2		*	*	1	0	0	0	0	0	0	Low	05
Heat Pump Stage 1	5	*	1	0	1	0	0	A	0	1	Mid	06
Heat Pump Stage 2		*	*	1	1	0	0	A	0	1	High	07
Heat Pump Stage 2		*	*	*	*	1	0	A	0	1	High	
Electric Auxiliary Heat Module 1	3	*	0	0	*	0	1	A	0	*	Turbo	08
Electric Auxiliary Heat Module 2		*	0	0	*	0	0	1	0	*	Turbo	
Electric Auxiliary Heat Module 1 & 2		*	0	0	*	0	1	1	0	*	Turbo	09
Heat Pump Stage 1 + Electric Auxiliary Heat Module 1	1	*	1	0	1	0	1	0	0	1	Turbo	10
Heat Pump Stage 1 + Electric Auxiliary Heat Module 2		*	*	0	1	0	0	1	0	1	Turbo	
Heat Pump Stage 2 + Electric Auxiliary Heat Module 1		*	*	1	1	0	1	0	0	1	Turbo	
Heat Pump Stage 2 + Electric Auxiliary Heat Module 1		*	*	*	*	1	1	0	0	1	Turbo	
Heat Pump Stage 2 + Electric Auxiliary Heat Module 2		*	*	1	1	0	0	1	0	1	Turbo	
Heat Pump Stage 2 + Electric Auxiliary Heat Module 2		*	*	*	*	1	0	1	0	1	Turbo	
Heat Pump Stage 1 + Electric Auxiliary Heat Module 1 & 2		*	1	0	1	0	1	1	0	1	Turbo	11
Heat Pump Stage 2 + Electric Auxiliary Heat Module 1 & 2		*	*	1	1	0	1	1	0	1	Turbo	
Heat Pump Stage 2 + Electric Auxiliary Heat Module 1 & 2		*	*	*	*	1	1	1	0	1	Turbo	
Emergency Heat	1	*	*	*	*	*	*	*	1	*	Turbo	12
Heating Zone Control	2	*	1	0	1	0	*	*	0	0	Low	13
Heating Zone Control		*	*	1	1	0	*	*	0	0	Low	
Heating Zone Control		*	*	*	*	1	*	*	0	0	Low	

Note:
1: 24V signal
0: No 24V signal
*: 1 or 0
The AHU will turn off if the 24V input cannot meet the table.

7.2 Safety Features

Compressor Three-Minute Delay at Start:

Compressor functions are delayed for up to ten seconds upon the first startup of the unit, and are delayed for up to three minutes upon subsequent unit restarts.

Automatic Shutoff Based on Discharge Temperature:

If the compressor discharge temperature exceeds a certain level for nine seconds, the compressor ceases operation.

Inverter Module Protection:

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

Indoor Fan Delayed Operation:

If the unit is in heating mode the indoor fan is regulated by the anti-cold wind function.

Compressor Preheating:

Preheating is automatically activated when the T4 sensor is lower than the setting temperature.

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 system will cease operation.

7.3 Basic Functions

Unit Element Abbreviations:

Abbreviation	Element
T1	Indoor room temperature sensor
T2	Evaporator coil temperature sensor
T3	Condenser coil temperature sensor
T4	Outdoor ambient temperature sensor
TP	Compressor discharge temperature
Tsc	Adjusted setting temperature
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 CDIFTEMP, HDIFTEMP2, TCDE1, TCDE2,...etc, they are well-setting parameter of EEPROM.

Fan Mode:

When Fan Mode is Activated:

- Temperature control is disabled and no temperature setting is displayed.
- The indoor fan speed can be set to low, medium, high, turbo, and auto.
- The outdoor fan and compressor stop.
- Auto fan: In fan-only mode the system operates the same as auto fan in cooling mode with the temperature set at 75°F (24°C).
- Under 24V control, when only G signal is available when switching from heating mode or emergency heating mode to fan mode, T4<50°F (10°C), the heating mode is sent to the outdoor; when T4>53.6°F (12°C), the normal outdoor control if resumed, the fan mode is sent to the outdoor

Cooling Mode:

Compressor Control:

1. Reach the configured temperature
   - If the following conditions are satisfied the compressor ceases operation.
   - Calculated frequency (fb) is less than 0Hz.
   - Reach temperate stop protective time is more than 10 minutes.
   - Indoor room temperature (T1) is lower than or equal to (Tsc-1°F (-0.5°C)).
2. If one of the following conditions is satisfied, not judge protective time.
   - Compressor running frequency is more than test frequency.
   - When compressor running frequency is equal to test frequency, outdoor ambient temperature (T4) is more than 59°F (15°C), or outdoor ambient sensor (T4) fault.
   - Change in the setting temperature.
   - Turning on/off turbo or sleep function.
   - Various frequency limit shutdown occurs.

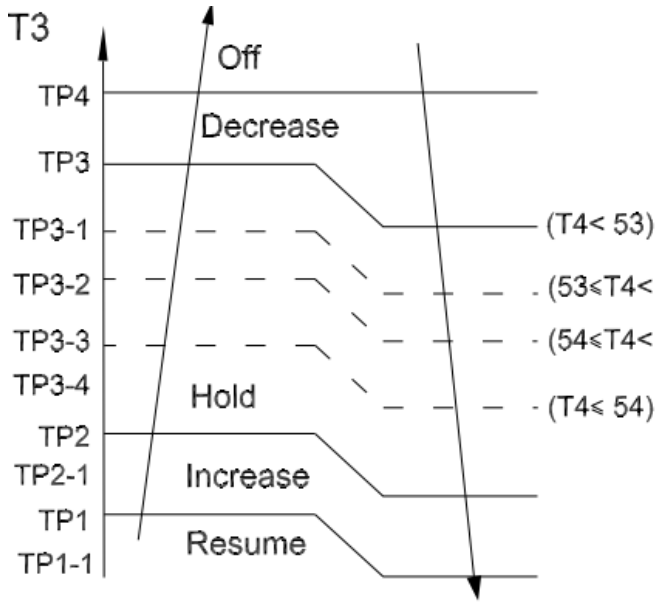
Indoor Fan Control:

1. In cooling mode, the indoor fan operates continuously. The fan speed can be set to low, medium, high, turbo, and auto.
2. Auto fan action in cooling mode:
   - Descent curve
   - When T1-Tsc is lower than 6.3°F (3.5°C), the fan speed reduces to high.
   - When T1-Tsc is lower than 1.8°F (1°C), the fan speed reduces to medium.
   - When T1-Tsc is lower than 0.9°F (0.5°C), the fan speed reduces to low.
   - Rise curve
   - When T1-Tsc is higher than or equal to 1.8°F (1°C), the fan speed increases to medium.
   - When T1-Tsc is higher than or equal to 2.7°F (1.5°C), the fan speed increases to high.
   - When T1-Tsc is higher than or equal to 7.2°F (4°C) the fan speed increases to turbo.

Outdoor Fan Control:

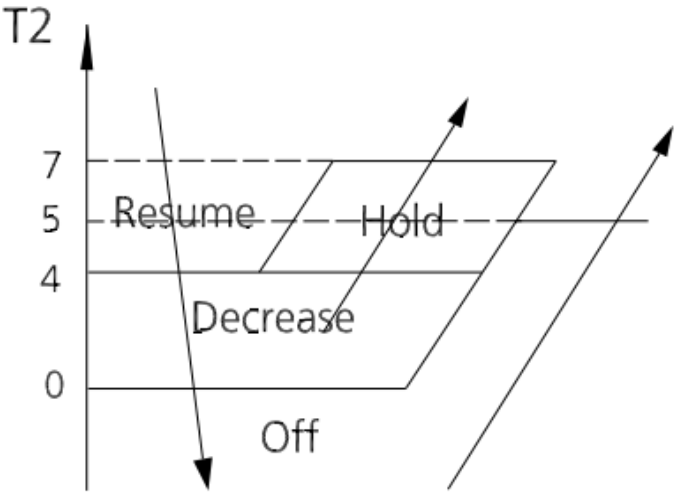
- The outdoor unit will be run at different fan speeds according to T4 and compressor running frequency.
- For different outdoor units, the fan speeds are different.

Condenser Temperature Protection:



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

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.

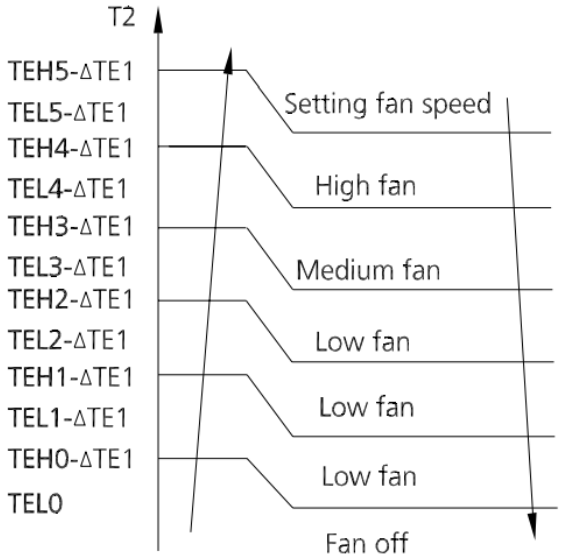
Heating Mode:

Compressor Control:

1. Reach the configured temperature.
   - If the following conditions are satisfied, the compressor ceases operation.
     - Calculated frequency(fb) is less than 0Hz.
     - Reach temperature stop protective time is more than 10 minutes.
     - T1 is higher than or equal to Tsc + 1°F (0.5°C).
2. If one of the following conditions is satisfied, not judge protective time.
   - Compressor running frequency is more than test frequency.
   - Compressor running frequency is equal to test frequency, outdoor ambient temperature (T4) is more than 59°F (15°C), or outdoor ambient sensor (T4) fault.
   - Change setting temperature.
   - Turning on/off turbo or sleep function.
3. When the current is higher than the predefined safe value, surge protection is activated causing the compressor to cease operation.

Indoor Fan Control:

1. In heating mode, the indoor fan operates continuously. The fan speed can be set to low, medium, high, turbo, and auto.
   - Anti-cold air function
   - The indoor fan is controlled by the indoor temperature T1 and the indoor unit coil temperature T2.



T1≥66°F (19°C)	ΔTE1=0
59°F (15°C)≤T1,66°F (19°C)	ΔTE1=66°F (19°C)-T1
T1<59°F (15°C)	ΔTE1=7.2°F (4°C)

2. Auto fan action in heating mode:
   - Rise Curve
     - When T1-Tsc is higher than -3°F (-1.5°C), fan speed reduces to high.
     - When T1-Tsc is higher than 0°F (0°C), fan speed reduces to medium.
     - When T1-Tsc is higher than 1°F (0.5°C), fan speed reduces to low.
   - Descent Curve
     - When T1-Tsc is lower than or equal to 0°F (0°C), fan speed increases to medium.
     - When T1-Tsc is lower than or equal to -3°F (-1.5°C), fan speed increases to high.
     - When T1-Tsc is lower than or equal to -5°F (-3°C), fan speed increases to turbo.

Outdoor Fan Control:

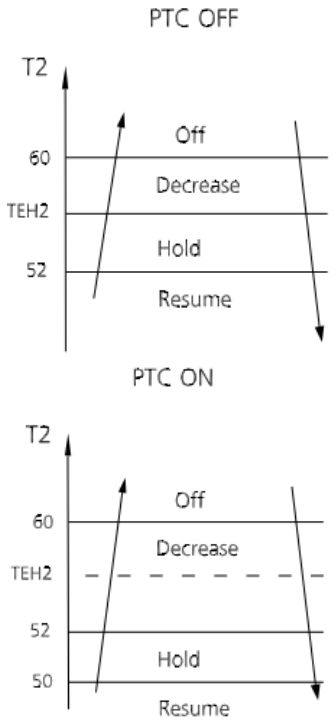
- The outdoor unit will be run at different fan speeds according to T4 and compressor running frequency.
- For different outdoor units, the fan speeds are different.

Defrosting Mode:

- The unit enters defrosting mode according to the temperature value of condenser temperature (T3) and outdoor ambient temperature (T4) as well as the compressor running time.
- In defrosting mode the compressor continues to run, the indoor and outdoor motor will cease operation and the defrost light of the indoor unit will turn on then the "dF" symbol is displayed.
- If any one of the following conditions is satisfied defrosting ends and the machine switches to normal heating mode:
  - Condenser temperature (T3) rises above TCDE1.
  - Condenser temperature (T3) maintained above TCDE2 for 80 seconds.
  - Unit runs for 15 minutes consecutively in defrosting mode.
- If the outdoor ambient temperature (T4) is lower than or equal to -8°F (-22°C) and the 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.
  - Condenser temperature (T3) rises above 50°F (10°C).

- If any one of the following conditions is satisfied, the unit enters defrosting mode:
  - If the condenser temperature (T3) or outdoor ambient temperature (T4) is lower than 27°F (-3°C) for 30 seconds, Ts-T1 is lower than 41°F (5°C) and the compressor running time is more than EE_TIME_DEFROST7.
  - If condenser temperature (T3) or outdoor ambient temperature (T4) is lower than 27°F (-3°C) for 30 seconds and the compressor running time is more than EE_TIME_DEFROST7 + 30 minutes.
- If any one of the following conditions is satisfied, defrosting ends and the machine switches to normal heating mode:
  - Condenser temperature (T3) rises above TCDE1+7°F (4°C).
  - Condenser temperature (T3) maintained above TCDE2+7°F (4°C) for 80 seconds.
  - Unit runs for 15 minutes consecutively in defrosting mode.

Evaporator Coil 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.

Auto Mode:

- This mode can be selected with the remote controller and the temperature setting can be adjusted between 61°F-86°F (16°C-30°C).
- In auto mode, the machine selects cooling, heating, or fan-only mode on the basis of ΔT (Δ=T1-Ts).

ΔT	Running mode
ΔT>3.6°F (2°C)	Cooling
-5.4°F (-3°C)<ΔT≤3.6°F (2°C)	Fan-only
ΔT≤-5.4°F (-3°C)	Heating*

Heating*: in auto mode, cooling only models run the fan.

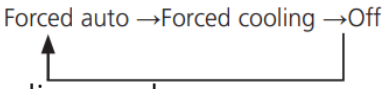
- Indoor fan will run at auto fan speed.
- If the machine switches modes between heating and cooling, the compressor will keep stopping for a certain time and then choose a mode according to the ΔT.

Drying Mode:

- In drying mode, the system operates the same as auto fan in cooling mode.
- All protections are activated and operate the same as they do in cooling mode.
- Low room temperature protection:
  If the room temperature is lower than 50°F (10°C), the compressor ceases operation and does not resume until the room temperature exceeds 53.6°F (12°C).

Forced Operation Function:

Press the AUTO/COOL button, the system will run as below sequence:



- Forced cooling mode:
  The compressor and outdoor fan continue to run and the indoor fan will run at breeze speed. After running for 30 minutes, the system will switch to auto mode with a preset temperature of 76°F (24°C).
- Forced auto mode:
  Forced auto mode operates the same as normal auto mode with a preset temperature of 76°F (24°C).
- The unit will exit forced operation when it receives the following signals:
  - Switch off
  - Receives the remote signal to change the running mode.

Timer Function:

- The timing range is 24 hours.
- Time On: The machine turns on automatically at the preset time.
- Timer Off: The machine turns off automatically at the preset time.
- Timer On/Off: The machine turns on automatically at the preset On time and turns off automatically at the preset Off time.
- Timer Off/ON: The machine turns off automatically at the preset Off time and then turns on automatically at the preset ON time.
- The timer does not change the units operation mode. If the unit is off it will not start immediately after the "timer off" function is set. When the setting time is reached, the timer LED switches off and the units running mode remains unchanged.
- The timer uses relative time, not clock time.

Sleep Function:

- The sleep function is available in cooling, heating, auto mode, or heat pump+electric heat.
- The operational process for sleep mode is as follows:
  - When cooling, the set temperature rises by 1.8°F (1°C) (no higher than 86°F (30°C)) every hour. After 2 hours the temperature stops rising and the indoor fan is fixed at low speed.
  - When heating, the set temperature decreases by 1.8°F (1°C) (no lower than 60.8°F (16°C)) every hour. After 2 hours the temperature stops decreasing and the indoor fan is fixed at low speed. The anti-cold wind function takes priority.
  - When in auto mode, the fan speed is also fixed at low speed. After 1 hour if the actual operation mode is cooling mode, the set temperature will rise by 1.8°F (1°C), if it is in heating mode the set temperature will decrease by 1.8°F (1°C), if it is in fan mode the set temperature will not change and the set temperature will not change after two hours of operation.
- The timer setting is available in this mode.

Auto-Restart Function:

- The indoor unit has an auto-restart module that allows the unit to restart automatically. The module automatically stores the current settings and in case of sudden power failure it will restore those settings automatically within 3 minutes after power returns.

8.1 Error Display (Indoor Unit)

When the indoor unit encounters a recognized error, the operation lamp will flash in a corresponding series, the timer lamp may turn on or begin flashing, and an error code will be displayed. These error codes are described in the following table:

Display	Error Information	Solution
EC 07	ODU fan speed out of control	TS27
EC 0D	ODU malfunction	TS44
EC 51	ODU EEPROM parameter error	TS23
EC 52	ODU coil temp. sensor (T3) error	TS29
EC 53	ODU ambient temp. sensor (T4) error	TS29
EC 54	COMP. discharge temp. sensor (TP) error	TS29
EC 56	IDU coil outlet temp. sensor (T2B) error (Multi-Zone)	TS29
EC C1	Other IDU refrigerant sensor detects leakage (Multi-Zone)	TS43
EH 00	IDU EEPROM malfunction	TS23
EH 03	IDU fan speed out of control	TS27
EH 0A	IDU EEPROM parameter error	TS23
EH 0B	IDU main control board & display board communication error	TS45
EH 0E	Water-level alarm malfunction	TS31
EH 3A	External fan DC bus voltage is too low	TS41
EH 3B	External fan DC bus voltage is too high	TS41
EH 60	IDU room temp. sensor (T1) error	TS29
EH 61	IDU coil temp. sensor (T2) error	TS29
EH 62 / EH 66	Evaporator coil inlet temperature sensor T2B is in open circuit or short circuit	TS29
EH 65	Evaporator coil temperature sensor T2A is in open circuit or short circuit	TS29
EH BA	Communication malfunction between indoor unit and external fan module	TS31
EH C1	Refrigerant sensor detects leakage	TS43
EH C2	Refrigerant sensor is out of range and leakage is detected	TS43
EH C3	Refrigerant sensor is out of range	TS42
EL 01	IDU & ODU communication error	TS24
EL 0C	System lacks refrigerant	TS24
EL 16	Communication malfunction between adapter board and outdoor main board	TS46
FH CC	Refrigerant sensor error	TS42
FL 09	Mismatch between the new and old platforms	TS49
PC 00	ODU IPM module protection	TS32
PC 01	ODU voltage protection	TS33
PC 02	Compressor top (or IPM) temp. protection	TS38
PC 03	Pressure protection (low or high pressure)	TS35
PC 04	Inverter compressor drive error	TS34
PC 0l	Low ambient temperature protection	TS39
----	IDUs mode conflict (Multi-Zone)	--
EH B3	Communication malfunction between wire & master control (for wired controller)	TS40

⚠ WARNING

Be sure to turn off all power supplies or disconnect all wires to avoid electric shock. While checking the indoor/outdoor PCB, please equip yourself with anti-static gloves or a wrist strap to avoid damaging the board.
Electricity will remain in capacitors even when the power supply is off. Ensure the capacitors are fully discharged before troubleshooting.

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.

LED Flash Frequency:

8.2 Error Display (Outdoor Unit with Auxiliary Board)

Display	Error Information	Solution
DF	Defrost	Normal display, not error code
FC	Forced cooling	
EC 07	ODU Fan Speed Out of Control	TS27
EC 51	ODU EEPROM Parameter Error	TS23
EC 52	ODU coil temp. sensor (T3) Error	TS29
EC 53	ODU ambient temp. sensor (T4) Error	TS29
EC 54	COMP. Discharge Temp. Sensor (TP) Error	TS29
EC 55	ODU IPM Module Temperature Sensor Malfunction	TS33
EC 56	IDU Coil Outlet Temp. Sensor (T2B) Error Multi-Zone	TS29
EC 57	Refrigerant Pipe Temperature Sensor Error	TS29
EC 71	Over Current Failure of ODU DC Fan Motor	TS27
EC 72	Lack Phase Failure of ODU DC Fan Motor	TS63
EL 01	IDU & ODU Communication Error	TS24
EL 16	Communication Malfunction between Adapter Board and ODU Main Board	TS46
PC 00	IPM Module Protection	TS32
PC 02	Compressor Top(or IPM) Temp. Protection/ Refrigerant Sensor Error	TS38
PC 06	Discharge Temperature protection of compressor	TS53
PC 08	Outdoor Over current Protection	TS47
PC 0A	High Temperature Protection of Condenser	TS54
PC 0F	PFC Module Protection	TS52
PC 10	ODU Low AC Voltage Protection	TS49
PC11	ODU Main Control Board DC Bus High Voltage Protection	TS49
PC 12	ODU Main Control Board DC Bus Low Voltage Protection /341 MCE Error	TS49
PC 30	System High Pressure Protection	TS55
PC31	System Low Pressure Protection	TS57
PC40	Communication Error Between ODU Main Chip and Compressor Driven Chip	TS51
PC 41	Compressor Current Sampling Failure	TS60
PC 42	Compressor Start Failure of Outdoor Unit	TS47
PC 43	ODU Compressor Lack Phase Protection	TS59
PC 44	ODU Zero Speed Protection	TS47
PC 45	ODU IR Chip Drive Failure	TS60
PC 46	Compressor Speed has Been Out of Control	TS47
PC 49	Compressor Over current Failure	TS47
LC 06	High Temperature Protection of Evaporator	TS38
PH 90	High Temperature Protection of Evaporator	TS61
PH 91	Low Temperature Protection of Evaporator	TS62

8.3 Outdoor Unit Point Check Function

- A check switch is included on the auxiliary board.
- Push SW4 to check the unit's status while running. The digital display shows the following codes each time the SW4 is pushed.

Number of Presses	Display	Remark
00	Normal display	Displays running frequency, running state, or malfunction code. Defrosting mode: " dF" or alternative displays between running frequency and "dF" (ach appears for 0.5s.)
01	Indoor unit capacity demand code	Actual data*HP*10 If capacity demand code is higher than 99, light the decimal point of the high digit tube. (For example, the digital display tube show "5.0", so 5.0 multiplied by 10 to become 50, then added to 100 to become 150, so actual capacity demand=150/10=15. The digital display tube show "60", so actual capacity demand=60/10=6.0) GA algorithm models display "--"
02	The frequency after the capacity requirement transfer	If the value is higher than 99, light the decimal point of the high digit tube.
03	Room temperature (T1)	If the temp. is lower than 0°C, the digital display tube will show "0". If the temp. is higher than 70°C, the digital display tube will show "70".
04	Indoor unit evaporator temperature (T2)	If the temp. is lower than -9°C, the digital display tube will show "-9°C". If the temp. is higher than 70°C, the digital display tube will show "70". If the indoor unit is not connected, the digital display tube will show: "--".
05	Condenser pipe temp. (T3)	
06	Outdoor ambient temp. (T4)	
07	Compressor discharge temp. (TP)	The display value is between 0~199°C. if the temp. is lower than 0°C, the digital display tube will show "0". If the temp. is higher than 99°C, light the decimal point of the high digit tube. (For example, the digital display tube show "0.5", so 0.5 multiplied by 10 to become 5 then added to 100 to become 105°C).
08	AD value of current	The display value is a hex number. For example, the digital display tube shows "Cd", so $C*16^1+d*16^0=12*16+13=205$, it meads AD value is 205.
09	AD value of voltage	
10	Indoor unit running mode code	Standby:0, Cooling:1, Heating:2, Fan only:3, Drying:4, Forced cooling:6, Defrost:7, ECO:9, Forced defrosting:A, Self clean:B
11	Outdoor unit running mode code	
12	EXV open angle	Actual data/4 If the value is higher than 99, light the decimal point of the high digit tube. For example, the digital display tube show "2.0", so 2.0 multiplied by 10 to become 20, then added to 100 to become 120, it means the EXV open angle is 120x4=480p.

<table>
<tr><th>Number of Presses</th><th>Display</th><th colspan="3">Remark</th></tr>
<tr><td rowspan="8">13</td><td rowspan="8">Frequency limit symbol</td><td>Bit7</td><td>Frequency limit caused by IGBT radiator</td><td rowspan="8">The display value is hex number. For example, the digital display tube show 2A, the corresponding binary is 101010, so Bit5=1, Bit3=1, and Bit1=1.
It means frequency limit caused by T3, or the current.</td></tr>
<tr><td>Bit6</td><td>Reserved</td></tr>
<tr><td>Bit5</td><td>Reserved</td></tr>
<tr><td>Bit4</td><td>Frequency limit caused by low temperature of T2. (LH00)</td></tr>
<tr><td>Bit3</td><td>Frequency limit caused by T3.(LC01)</td></tr>
<tr><td>Bit2</td><td>Frequency limit caused by TP.(LC02)</td></tr>
<tr><td>Bit1</td><td>Frequency limit caused by current.(LC03)</td></tr>
<tr><td>Bit0</td><td>Frequency limit caused by voltage.(LC05)</td></tr>
<tr><td>14</td><td>Outdoor unit fan speed</td><td colspan="3">If it is higher than 99, light the decimal point of the high digit tube. (For example, the digital display tube show "2.0", so 2.0 multiplied by 10 to become 20, then added to 100 to become 120. This value is multiplied by 8, and is the current fan speed: 120*8=960.</td></tr>
<tr><td>15</td><td>The average value of the temperature values detected by the high and low pressure sensors in the last 10 seconds of the compressor frequency calculation period</td><td colspan="3" rowspan="2">The displayed value is the actual value plus 60 (that is, when the displayed value is 10, the actual value is -50). When the displayed value is higher than 99, light the decimal point of the high digit tube. (If it displays 2.0, so 2.0 multiplied by 10 to become 20, then added to 100 to become 120, the actual value is 60).
When there is no pressure sensor, it is displayed as --.</td></tr>
<tr><td>16</td><td>The temperature value detected by the high and low pressure sensor</td></tr>
<tr><td>17</td><td>AD value detected by the high and low pressure sensor</td><td colspan="3">The display value is a hex number.
For example, the digital display tube shows "Cd", so C*16¹+d*16⁰=12*16+13=205, it meads AD value is 205. When there is no pressure sensor, it is displayed as --.</td></tr>
<tr><td>18</td><td>The currently running communication protocol version</td><td colspan="3">00-99</td></tr>
</table>

8.4 Information Inquiry

In order to enter engineering mode and check the data of the system, use the following steps:

- Ensure the unit is in standby status, or working normally in non-locked conditions.
- Press both "Power" and "Fan" buttons together simultaneously for 7 seconds until the remote screen shows "0". The "Auto", "Cool", "Dry", "Heat", and "Battery" icons will be displayed at the same time.
- Press the "Up" or "Down" button to choose the different channel number that you want to check. (from 0-30) on the remote control, and the display will show the parameter value.

Channel	Code	Meaning	Remark
0		Error Code	Refer to the next list of error codes: Empty means no error
1	T1	Room Temperature	Actual data, °C/°F
2	T2	Indoor Coil Temperature	Actual data, °C/°F
3	T3	Outdoor Coil Temperature	Actual data, °C/°F
4	T4	Ambient Temperature	Actual data, °C/°F
5	TP	Discharge Temperature	Actual data, °C/°F
6	FT	Targeted Frequency	Actual data
7	Fr	Actual Frequency	Actual data
8	dL	Running Current	3.2A = 3
9	Ac	AC Voltage	
10	Sn	Reserved	
11	nA	Reserved	
12	Pr	Indoor Air Flow	Actual Data / 10
13	Lr	EXV opening steps	Actual Data / 8
14	Ir	Indoor fan speed	Actual Data / 8
15	Hu	Humidity (if sensor is present)	Actual Data, %
16	TT	Set temperature including compensation	Actual Data, °C
17	nA	Reserved	
18	nA	Reserved	
19	Uo	Outdoor DC bus voltage	
20	oT	Target Frequency calculated by indoor	Without limitation
21~30	nA	Reserved	

Note:

1. The channel number indicates a certain parameter value (check the table below).
2. The indoor unit display will show the code for 2 seconds, then the parameter value.
3. In engineering mode, the other keys or operations are invalid except for the "Power", "Up", "Down", and "OK" buttons.
4. To exit from engineering mode, press the "Power" and "Fan" buttons together for 2 seconds to quit and return to the home screen.
5. The engineering mode will automatically end and return to the home screen if there is no activity for 60 seconds.

Error Codes of Engineer Mode:

Display	Error Information
EH 00	IDU EEPROM malfunction
EH 0A	IDU EEPROM parameter error
EL 01	IDU & ODU communication error
EH BA	Communication error between the indoor unit and external fan module
EH 30	Parameters error of indoor external fan
EH 35	Phase failure of indoor external fan
EH 37	Indoor external fan zero speed failure
EH 38	Indoor external fan stall failure
EH 39	Out of step failure of indoor external fan
EH 3A	Low voltage protection of indoor external fan DC bus
EH 3B	Indoor external fan DC bus voltage is too high
EH 3E	Indoor external fan over current fault
EH 3F	Indoor external fan module protection/hardware over current protection
EH 03	IDU fan speed out of control
EC 51	ODU EEPROM parameter error
EC 52	ODU coil temperature sensor (T3) error
EC 53	ODU ambient temperature sensor (T4) error
EC 54	COMP. discharge temperature sensor (TP) error
EC 55	IGBT temperature sensor TH is in open circuit or short circuit
EC 0d	Outdoor unit malfunction
EH 60	IDU room temperature sensor (T1) error
EH 61	IDU coil temperature sensor (T2) error
EC 71	Outdoor external fan over current fault
EC 75	Outdoor external fan module protection/hardware over current protection
EC 72	Outdoor external fan phase failure
EC 74	Outdoor external fan current sampling bias fault
EC 73	Zero speed failure of outdoor unit DC fan
EC 07	ODU fan speed out of control
EH B5	Intelligent eye communication failure
EL 0C	Refrigerant leak detected
EH 0E	Water-level alarm malfunction
EH 0F	Intelligent eye malfunction
FH 07	Communication malfunction between indoor unit and auto-lifting panel
PC 00	ODU IPM module protection
PC 10	Over low voltage protection
PC 11	Over voltage protection
PC 12	DC voltage protection
PC 02	Top temperature protection of compressor or High temperature protection of IPM module
PC 40	Communication error between outdoor main chip and compressor driven chip
PC 41	Current Input detection protection
PC 42	Compressor start error

Display	Error Information
PC 43	Lack of phase (3 phase) protection
PC 44	Outdoor unit zero speed protection
PC 45	341 PWM error
PC 46	Compressor speed malfunction
PC 49	Compressor over current protection
PC 06	Compressor discharge temperature protection
PC 08	Outdoor current protection
PH 09	Anti-cold air in heating mode
PC 0f	PFC module malfunction
PC 30	System overpressure protection
PC 31	System pressure is too low
PC 03	Pressure protection
PC 0l	Outdoor low ambient temperature protection
PH 90	Evaporator coil temperature too high
PH 91	Evaporator coil temperature too low
PC 0A	Condenser high temperature protection
PH 0C	Indoor unit humidity sensor failure
LH 00	Frequency limit caused by T2
LH 30	Indoor external fan current limit
LH 31	Indoor external fan voltage limit
LC 01	Frequency limit caused by T3
LC 02	Frequency limit caused by TP
LC 05	Frequency limit caused by voltage
LC 03	Frequency limit caused by current
LC 06	Frequency limit caused by PFC
LC 30	Frequency limit caused by high pressure
LC 31	Frequency limit caused by low pressure
LH 07	Frequency limit caused by a remote control
--	IDUs mode conflict (match with multi-outdoor unit)
NA	No malfunction and protection

Advanced Function Setting:

In order to enter to Check the Advanced Function Settings and Enter Engineering Mode please follow these steps:

1. First you will need to disconnect power from the unit and wait for 1 minute.
2. Then connect the power supply again to the unit (the system should enter standby).
3. Press "Power" + "Fan" buttons together for 7s until the remote controller screen shows "0", and also "Auto, Cool, Dry, Heat, battery" icons will be displayed at the same time.
4. Press the "Up" or "Down" buttons to choose different channel numbers that you want to check (from 0-30) on the remote controller.
5. Then press the "Power" button for 2s until the remote controller screen shows "Ch".
6. Press the "Ok" button to query the current function set value while the remote controller shows "Ch" and the function set value will be shown on the indoor units display.

If you want to change the Current Functions Set Value:

1. First you will need to disconnect power from the unit and wait for 1 minute.
2. Then connect the power supply again to the unit (the system should enter standby).
3. Press "Power" + "Fan" buttons together for 7s until the remote controller screen shows "0", and also "Auto, Cool, Dry, Heat, battery" icons will be displayed at the same time.
4. Press the "Up" or "Down" buttons to choose different channel numbers that you want to check (from 0-30) on the remote controller.
5. Then press the "Power" button for 2s until the remote controller screen shows "Ch".
6. Then press the "Up" or "Down" button to choose the desired set value from the screen of the remote control.
7. The press "Ok" to send the new set value to the indoor unit and the indoor unit will display "CS" which means that the new set value is uploaded successfully.
8. Finally disconnect the power supply again from the unit and wait for 10 minutes, then connect it again.

Please Note:

1. The channel number indicates a certain function and each number shown on the indoor units screen indicates the current function set value (Reference table below).
2. In the engineering mode, the other keys or operations are invalid except for the following buttons "Power", "Up", "Down", and "Ok".
3. In order to set a new set value successfully you need to finish the steps (from 2-7) within 1 minute.
4. The engineering mode will be exited if there is no valid input data for 60s.
5. In order to exit engineering mode, please follow these steps:

- Press "Power" button for 2s until the remote controls screen shows "0".
- Then press "Power" + "Fan" buttons together for 2s to quite the engineering mode and return back to the home screen.

Channel	Function	Parameter Value Meaning	Remark
0	Capacity setting (Btu/h)	1-100K	
1	Auto-restart function	0-Inactive 1-Active	
2	Fan control when Ts reached	1-Fan stop 2-Fan runs at lowest RPM 3-Fan runs at setting RPM 4-Fan stops for 4 mins. and runs for 1 min. 5-Fan stops for 8 mins. and runs for 1 min. 6-Fan stops for 16 mins. and runs for 1 min. 7-Fan stops for 24 mins. and runs for 1 min. 8-Fan stops for 48 mins. and runs for 1 min. 9-Fan stops for 15 mins. and runs for 2.5 min. 10-Fan stops for 30 mins. and runs for 2.5 min. 11-Fan stops for 60 mins. and runs for 2.5 min. 12-Fan runs at setting RPM, but stops if you choose automatic speed 13-Fan runs at lowest speed, but will stop if you choose automatic speed	
3	Mode lock	CH-Cooling and heating (all modes) HH-Heating only (heating + fan only) CC-Cooling only (cooling + drying + fan only) nU-Cooling and heating without auto	Remote controller will change as well
4	Lowest setting temperature	16-24	Remote controller will change as well
5	Highest setting temperature	25-30	Remote controller will change as well
6	Reserved	Nothing to set	
7	/	Nothing to set	
8	/	Nothing to set	
9	/	Nothing to set	
10	/	Nothing to set	
11	Min. frequency limitation in cooling mode	10,11,12,...,49,50,--(Cancel)	
12	Min. fequency limitation in heating mode	10,11,12,...,49,50,--(Cancel)	
13	Max. frequency selection in T4 limitation of Zone6	20,21,22,...,149,150,--(Cancel)	
14	/	Nothing to set	
15	Frequency selection of outdoor forced-operation	10,11,12,...,249,250,--(Cancel)	
16	One button reset	rS - Reset	
17	nA	Nothing to set	
18	Capacity setting(kW)	23,26,32,35,51,72,120,--,(Cancel)	

Channel	Function	Parameter Value Meaning	Remark
19	Max. frequency selection in cooling mode	40,41,42,...,83,84,--(Cancel)	
20	Max. frequency selection in heating mode	40,41,42,...,83,84,--(Cancel)	Without limitation
21	Cooling temperature compensation	-3.0,-2.5,-2.0,...,3.0,3.5,--(Cancel)	
22	Heating temperature compensation	-6.5,-6.0,-5.5,...,0.5,1.0,1.5,...,7.0,7.5,--(Cancel	
23	Fan volume selection in cooling	Fan volume will add set data*20cfm	
24	Reserved	Nothing to set	
25	Fan volume selection in heating	Fan volume will add set data*20cfm	
26	Reserved	Nothing to set	
27	Defrosting type	A0-Normal defrosting A1-Enhanced defrosting	
28	Anti-cold air Stop Fan Temperature	16~28	
29	Reserved	Nothing to set	
30	Reserved	Nothing to set	

8.5 Error Diagnosis Without Error Code

WARNING

Be sure to turn off unit before any maintenance to prevent damage or injury.

Remote Maintenance:

Suggestion: When troubles occur, please check the following points with the customer before field maintenance.

No.	Problem	Solution
1	Unit will not start	TS29-TS15
2	The power switch is on but fans will not start	TS29-TS15
3	The temperature on the display board cannot be set	TS29-TS15
4	Unit is on but the air is not cold/hot	TS29-TS15
5	Unit runs but shortly stops	TS29-TS15
6	The unit starts up and stops frequently	TS29-TS15
7	Unit runs continuously but insufficient cooling/heating	TS29-TS15
8	Cool cannot change to heat	TS29-TS15
9	Unit is noisy	TS29-TS15

Field Maintenance:

No.	Problem	Solution
1	Unit will not start	TS16-TS17
2	Compressor will not start but fans run	TS16-TS17
3	Compressor and condenser fan will not start	TS16-TS17
4	Air handler fan will not start	TS16-TS17
5	Condenser fan will not start	TS16-TS17
6	Unit runs but shortly stops	TS16-TS17
7	Compressor short-cycles due to overload	TS16-TS17
8	High suction pressure	TS16-TS17
9	Low discharge pressure	TS16-TS17
10	High suction pressure	TS16-TS17
11	Low suction pressure	TS16-TS17
12	Unit runs continuously but insufficient cooling	TS16-TS17
13	Too cool	TS16-TS17
14	Compressor is noisy	TS16-TS17
15	Horizontal louver cannot revolve	TS16-TS17

8 TROUBLESHOOTING

1. Remote Maintenance	Electrical Circuit								Refrigerant Circuit					
Possible causes of trouble	**Power failure**	**The main power tripped**	**Loose connections**	**Faulty transformer**	**The voltage too high or too low**	**The remote control is powered off**	**Broken the remote control**	**Dirty air filter**	**Dirty condenser fins**	**The setting temperature is higher/lower than the room's(cooling/heating)**	**The ambient temperature is too high/ low when the mode is cooling/heating**	**Fan mode**	**Silence function is activate**	**Frosting and defrosting frequency**
Unit will not start	√	√	√	√	X	X	X	X	X	X	X	X	X	X
The power switch is on but fans will not start	X	X	√	√	√	X	X	X	X	X	X	X	X	X
The temperature on the playboard cannot be set	X	X	X	X	X	√	√	X	X	X	X	X	X	X
Unit is on but the air is not cold/hot	X	X	X	X	X	X	X	X	X	√	√	√	X	X
Unit runs but shortly stops	X	X	X	X	√	X	X		X	√	√	X	X	X
The unit startup and stops frequently	X	X	X	X	√	X	X	X	X	X	√	X	X	√
Unit runs continuously but insufficient cooling/ heating	X	X	X	X	X	X	X	√	√	√	√	X	√	X
Cool cannot change to heat	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Unit is noisy	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Test method/ remedy	**Test voltage**	**Close the power switch**	**Inspect connections - tighten**	**Change the transformer**	**Test voltage**	**Replace the battery of the remote control**	**Replace the remote control**	**Clean or replace**	**Clean**	**Adjust the setting temperature**	**Turn on the unit later**	**Adjust to cool mode**	**Turn off the silence function**	**Turn on the unit later**

1. Remote Maintenance	Others					
Possible causes of trouble	Heavy load condition	Loosen hold down bolts or screws	Bad airproof	The air inlet or outlet of either unit is blocked	Interference from cell phone towers and remote boosters	Shipping plates remain attached
Unit will not start	X	X	X	X	X	X
The power switch is on but fans will not start	X	X	X	X	√	X
The temperature on the playboard cannot be set	X	X	X	X	X	X
Unit is on but the air is not cold/hot	X	X	X	X	X	X
Unit runs but shortly stops	X	X	X	X	X	X
The unit startup and stops frequently	X	X	X	√	X	X
Unit runs continuously but insufficient cooling/ heating	√	X	√	√	X	X
Cool cannot change to heat	X	X	X	X	X	X
Unit is noisy	X	√	X	X	X	√
Test method/ remedy	Check heat load	Tighten bolts and screws	Close all windows and doors	Remove the obstacles	Reconnect the power or press ON/OFF button on the remote to restart operation	Remove item

2. Field Maintenance	Refrigerant Circuit								Others													
Possible causes of trouble	Compressor stuck	Shortage of refrigerant	Restricted liquid line	Dirty air filter	Dirty evaporator coil	Insufficient air through evaporator coil	Overcharge of refrigerant	Dirty or partially blocked condenser	Air or incompressible gas in refrigerant cycle	Short cycling of condensing air	High temperature condensing medium	Insufficient condensing medium	Broken compressor internal parts	Inefficient compressor	Expansion valve obstructed	Expansion valve or capillary tube close completely	Leaking power element on expansion valve	Poor installation of feeler bulb	Heavy load condition	Loosen hold down bolts and/or screws	Shipping plates remain attached	Poor choices of capacity	Contact of piping with other piping or external plate
Unit will not start	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Compressor will not start but fans run	√	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Compressor and condenser fan will not start	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Air handler fan will not start	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Condenser fan will not start	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Unit runs but shortly stops	X	√	√	X	X	X	√	√	X	X	X	X	X	X	X	√	√	X	X	X	X	X	X
Compressor short-cycles due to overload	X	√	X	X	X	X	√	√	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
High discharge pressure	X	X	X	X	X	X	√	√	√	√	√	√	X	X	X	X	X	X	X	X	X	X	X
Low discharge pressure	X	√	X	X	X	X	X	X	X	X	X	X	X	√	X	X	X	X	X	X	X	X	X
Test method/ remedy	Replace the compressor	Leak test	Replace restricted part	Clean or replace	Clean coil	Check fan	Change charged refrigerant volume	Clean condenser or remove obstacle	Purge, evacuate and recharge	Remove obstruction to air flow	Remove obstruction in air or water flow	Remove obstruction in air or water flow	Replace compressor	Test compressor efficiency	Replace valve	Replace valve	Replace valve	Fix feeler bulb	Check heat load	Tighten bolts or screws	Remove them	Choose system of larger capacity or add another system	Rectify piping so as to not contact with each other or with external plate

2. Field Maintenance	Refrigerant Circuit								Others													
Possible causes of trouble	Compressor stuck	Shortage of refrigerant	Restricted liquid line	Dirty air filter	Dirty evaporator coil	Insufficient air through evaporator coil	Overcharge of refrigerant	Dirty or partially blocked condenser	Air or incompressible gas in refrigerant cycle	Short cycling of condensing air	High temperature condensing medium	Insufficient condensing medium	Broken compressor internal parts	Inefficient compressor	Expansion valve obstructed	Expansion valve or capillary tube close completely	Leaking power element on expansion valve	Poor installation of feeler bulb	Heavy load condition	Loosen hold down bolts and/or screws	Shipping plates remain attached	Poor choices of capacity	Contact of piping with other piping or external plate
High suction pressure	X	X	X	X	X	X	√	X	X	X	X	X	X	√	X	X	X	√	√	X	X	X	X
Low suction pressure	X	√	√	√	√	√	X	X	X	X	X	X	X	X	√	√	√	X	X	X	X	X	X
Unit runs continuously but insufficient cooling	X	√	√	√	√	√	X	√	√	√	X	X	X	√	X	X	X	X	√	X	X	√	X
Too Cool	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Compressor is noisy	X	X	X	X	X	X	√	X	X	X	X	X	√	X	X	X	X	X	X	√	√	X	√
Horizontal louver cannot revolve	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Test method/ remedy	Replace the compressor	Leak test	Replace restricted part	Clean or replace	Clean coil	Check fan	Change charged refrigerant volume	Clean condenser or remove obstacle	Purge, evacuate and recharge	Remove obstruction to air flow	Remove obstruction in air or water flow	Remove obstruction in air or water flow	Replace compressor	Test compressor efficiency	Replace valve	Replace valve	Replace valve	Fix feeler bulb	Check heat load	Tighten bolts or screws	Remove them	Choose system of larger capacity or add another system	Rectify piping so as to not contact with each other or with external plate

2. Field Maintenance	Electrical Circuit													
Possible causes of trouble	Power Failure	Blown fuse or varistor	Loose connections	Shorted or broken wires	Safety device opens	Faulty thermostat/room temperature sensor	Wrong setting place of temperature sensor	Faulty transformer	Shorted or open capacitor	Faulty magnetic contactor for compressor	Faulty magnetic contactor for fan	Low voltage	Faulty stepping motor	Shorted or grounded compressor	Shorted or grounded fan motor
Unit will not start	√	√	√	√	√	X	X	√	X	X	X	X	X	X	X
Compressor will not start but fans run	X	X	X	√	X	√	X	√	√	X	X	X	X	√	X
Compressor and condenser fan will not start	X	X	X	√	X	√	X	X	X	√	X	X	X	X	X
Air handler fan will not start	X	X	X	√	X	X	X	X	√	X	√	X	X	X	√
Condenser fan will not start	X	X	X	√	X	√	X	X	√	X	√	X	X	X	√
Unit runs but shortly stops	X	X	X	X	X	X	X	X	X	√	X	√	X	X	X
Compressor short-cycles due to overload	X	X	X	X	X	X	X	X	X	√	X	√	X	X	X
High discharge pressure	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Low discharge pressure	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Test method/ remedy	Test voltage	Inspect fuse type & size	Inspect connections - tighten	Test circuits with tester	Test continuity of safety device	Test continuity of thermostat/ sensor & wiring	Place the temperature sensor at the central of the air inlet grille	Check control circuit with tester	Check capacitor with tester	Test continuity of coil & contacts	Test continuity of coil & contacts	Test voltage	Replace the stepping motor	Check resistance with multimeter	Check resistance with multimeter

2. Field Maintenance	Electrical Circuit														
Possible causes of trouble	Power Failure	Blown fuse or varistor	Loose connections	Shorted or broken wires	Safety device opens	Faulty thermostat/room temperature sensor	Wrong setting place of temperature sensor	Faulty transformer	Shorted or open capacitor	Faulty magnetic contactor for compressor	Faulty magnetic contactor for fan	Low voltage	Faulty stepping motor	Shorted or grounded compressor	Shorted or grounded fan motor
High suction pressure	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Low suction pressure	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Unit runs continuously but insufficient cooling	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Too cool	X	X	X	X	X	X	√	√	X	X	X	X	X	X	X
Compressor is noisy	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Horizontal louver can not revolve	X	X	√	√	X	X	X	X	X	X	X	X	√	X	X
Test method/ remedy	Test voltage	Inspect fuse type & size	Inspect connections - tighten	Test circuits with tester	Test continuity of safety device	Test continuity of thermostat/ sensor & wiring	Place the temperature sensor at the central of the air inlet grille	Check control circuit with tester	Check capacitor with tester	Test continuity of coil & contacts	Test continuity of coil & contacts	Test voltage	Replace the stepping motor	Check resistance with multimeter	Check resistance with multimeter

8.6 Quick Maintenance by Error Code

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

Part Requiring Replacement	Error Code										
	EH 00/ EH 0A	EL 01	EH 03	EH 60	EH 61	EH 62/ EH 66	EH 65	EL 0C	EH C1/ EH C2	EH 0E	EH 0b
Indoor PCB	√	√	√	√	√	√	√	√	x	√	√
Outdoor PCB	x	√	x	x	x	x	x	x	x	x	x
Indoor fan motor	x	x	√	x	x	x	x	x	x	x	x
T1 sensor	x	x	x	√	x	x	x	x	x	x	x
T2 sensor	x	x	x	x	√	x	x	√	x	√	x
T2B sensor	x	x	x	x	x	√	x	x	x	x	x
T2A sensor	x	x	x	x	x	x	√	x	x	x	x
Reactor	x	√	x	x	x	x	x	x	x	x	x
Compressor	x	x	x	x	x	x	x	x	x	x	x
Additional refrigerant	x	x	x	x	x	x	x	√	√	√	x
Water-level switch	x	x	x	x	x	x	x	x	x	√	x
Water pump	x	x	x	x	x	x	x	x	x	√	x
Display board	x	x	x	x	x	x	x	x	x	x	√

Part Requiring Replacement	Error Code											
	EC 54	EC 51	EC 52	EC 53	EC 56	EC 07	PC 00	PC 01	PC 02	PC 04	PC 03	FH CC/EH C3
Indoor PCB	X	X	X	X	X	X	X	X	X	X	X	√
Outdoor PCB	√	√	√	√	√	√	√	√	√	√	√	X
Outdoor fan motor	X	X	X	X	X	√	√	X	√	√	X	X
T3 sensor	X	X	√	X	X	X	X	X	X	X	X	X
T4 sensor	X	X	X	√	X	X	X	X	X	X	X	X
TP sensor	√	X	X	X	X	X	X	X	X	X	X	X
T2B sensor	X	X	X	X	√	X	X	X	X	X	X	X
Refrigerant sensor	X	X	X	X	X	X	X	X	X	X	X	√
Reactor sensor	X	X	X	X	X	X	X	√	X	X	X	X
Compressor	X	X	X	X	X	X	√	X	X	√	X	X
IPM module board	X	X	X	X	X	X	√	√	√	√	X	X
Pressure protector	X	X	X	X	X	X	X	X	X	X	√	X
Additional refrigerant	X	X	X	X	X	X	X	X	X	X	√	X

Part Requiring Replacement	Error Code					
	PC 06	PC 08/42/44/46/49	PC 0A	PC 0F	PC 40	EC 71
Outdoor PCB	√	√	√	√	√	√
Outdoor fan motor	x	√	√	x	x	√
T3 sensor	x	x	√	x	x	x
TP sensor	√	x	x	x	x	x
Pressure Sensor	x	x	x	x	x	x
Reactor	x	√	x	√	x	x
Compressor	x	x	x	x	x	x
IPM module board	x	√	x	x	√	x
High pressure valve assy.	√	x	x	x	x	x
High pressure protector	x	x	x	x	x	x
Low pressure protector	x	x	x	x	x	x
Additional refrigerant	√	x	√	x	x	x
Electric control box	x	x	x	x	√	x

Part Requiring Replacement	Error Code					
	PC 41	PC 43	PC 10/11/12	PC 45	PH 90	PH 91
Outdoor PCB	√	√	√	X	X	X
Outdoor fan motor	X	X	X	X	X	X
T3 sensor	X	X	X	X	X	X
TP sensor	X	X	X	X	X	X
Pressure Sensor	X	X	X	X	X	X
Reactor	X	X	√	X	X	X
Compressor	X	√	X	X	X	X
IPM module board	X	X	√	√	X	X
High pressure valve assy.	X	X	X	X	X	X
High pressure protector	X	X	X	X	X	X
Low pressure protector	X	X	X	X	X	X
Additional refrigerant	X	X	X	X	X	X
Electric control box	X	X	X	X	X	X
T2 sensor	X	X	X	X	√	√
Indoor PCB	X	X	X	X	√	√
Indoor fan motor	X	X	X	X	√	X

8.7 Troubleshooting by Error Code

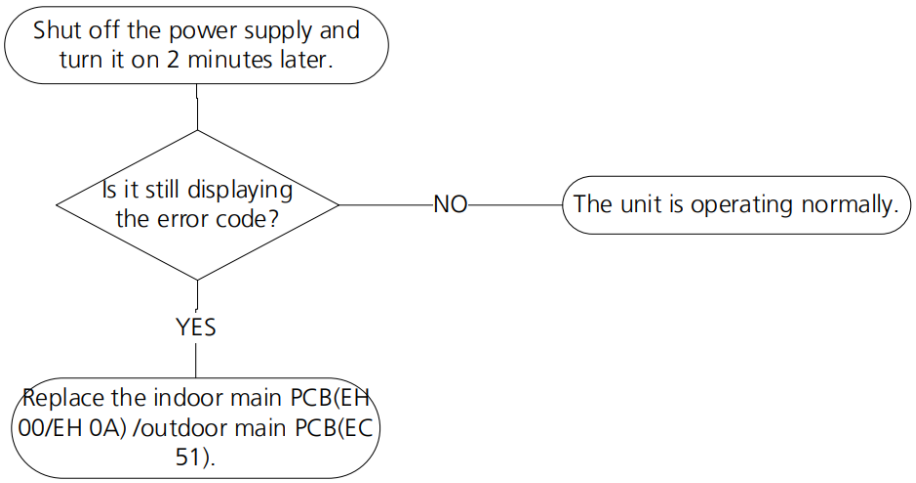
EH 00/ EH 0A/ EC 51: EEPROM Malfunction Error Diagnosis and Solution.

Description: Indoor or outdoor PCB main chip does not receive feedback from EEPROM chip.

Recommended parts to prepare:

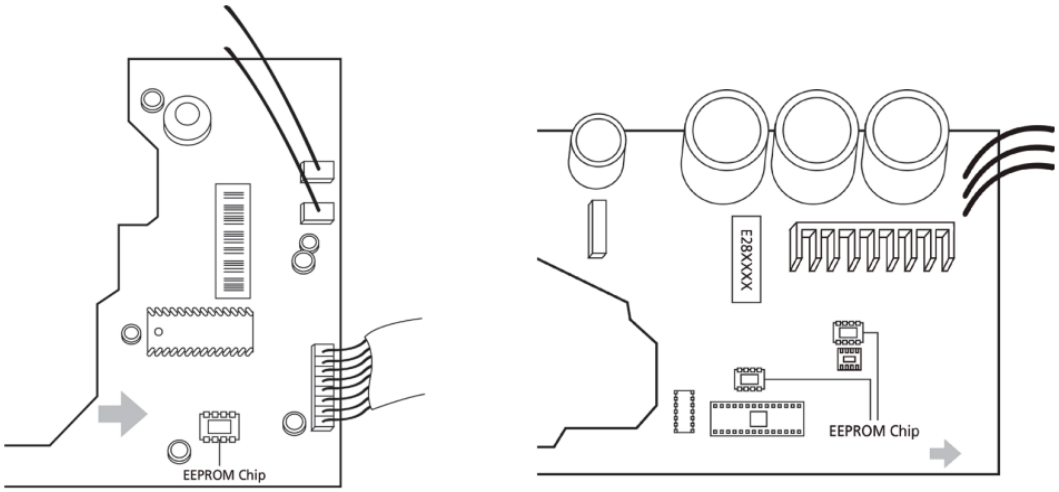
- Indoor PCB
- Outdoor PCB

Troubleshooting and repair:



Remarks:

EEPROM: A read-only memory whose contents can be erased and reprogrammed using a puled voltage. The location of the EEPROM chip on the indoor and outdoor PCB is shown in the following two images:



Note: These pictures are for reference, actual appearance may vary.

Troubleshooting and repair of the compressor driven chip EEPROM parameter error and communication error between the outdoor main chip and compressor driven chip are the same as EC 51.

EL 01: Indoor and Outdoor Unit Communication Error Diagnosis and Solution.

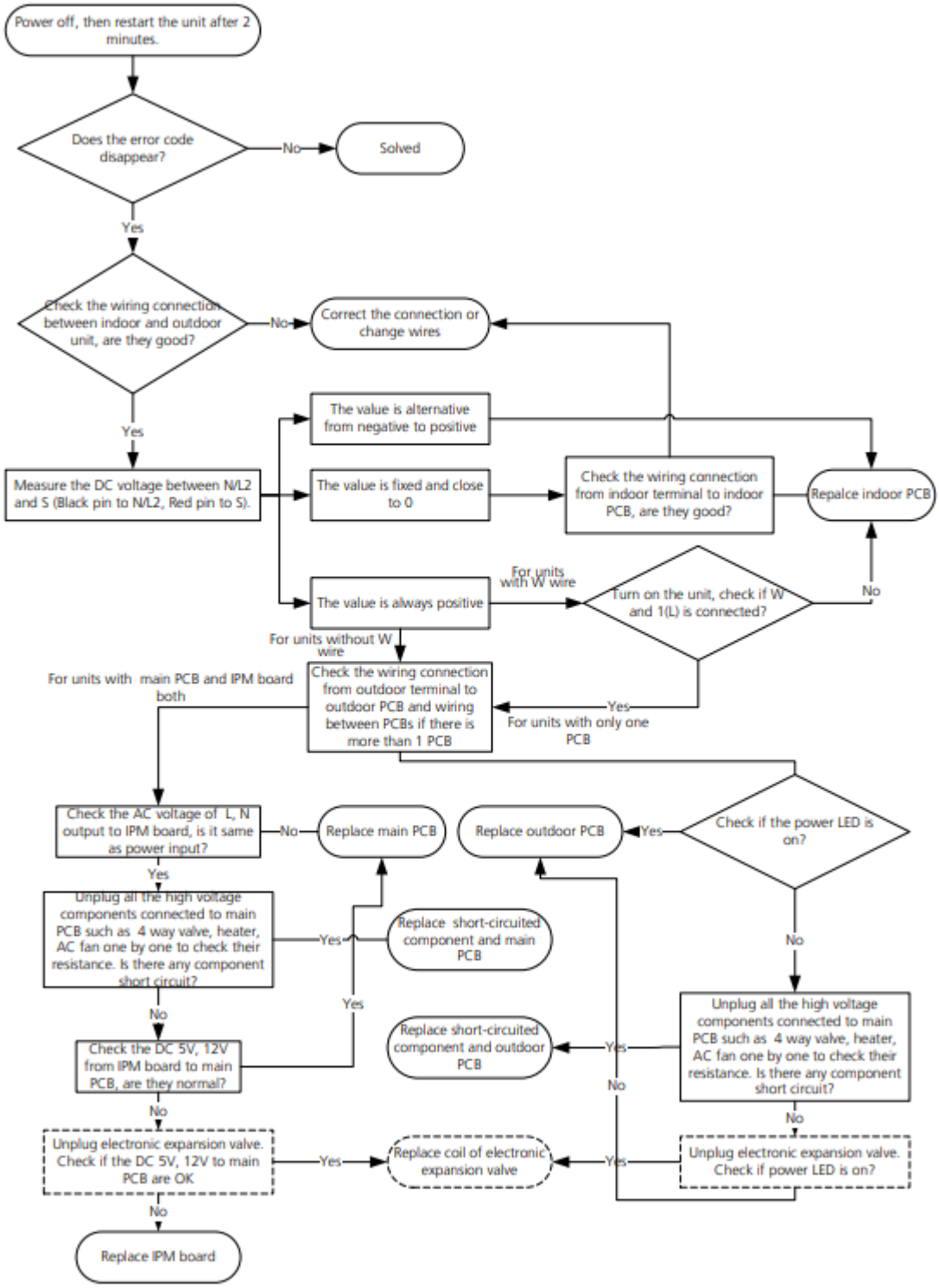
Description: Indoor unit cannot communicate with the outdoor unit.

Recommended parts to prepare:

- Indoor PCB
- Outdoor PCB
- Reactor

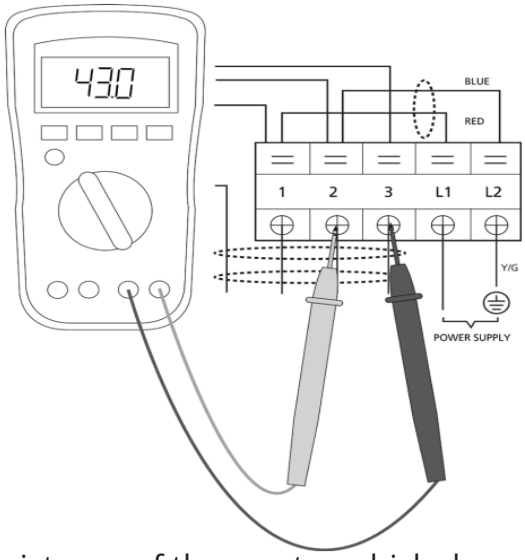
Troubleshooting and repair:

Current loop Communication (S Communication)

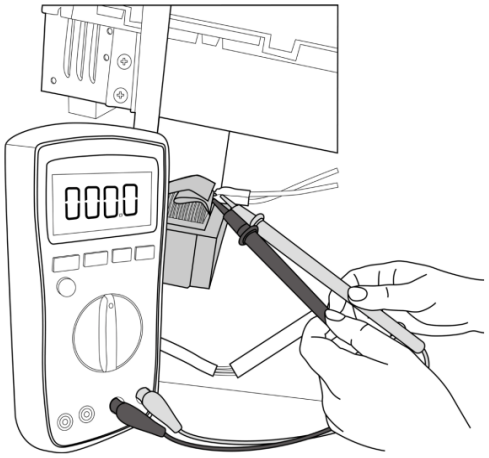


Remarks:

- Use a multimeter to test the DC voltage between 2 port (or S or L2 port) and 3 port (or N or S port) of outdoor unit. The red pin of the multimeter connects with 2 port (or S or L2 port) while the black pin is for 3 port (or N or S port).
- When AC is running normal the voltage will move alternately between -25V to 25V.
- If the outdoor unit has a malfunction, the voltage will alternate with a positive value.
- If the indoor unit has a malfunction the voltage will be a certain value.



- Use a multimeter to test the resistance of the reactor which does not connect with the capacitor.
- The normal value should be around zero ohms. Otherwise the reactor has a malfunction.



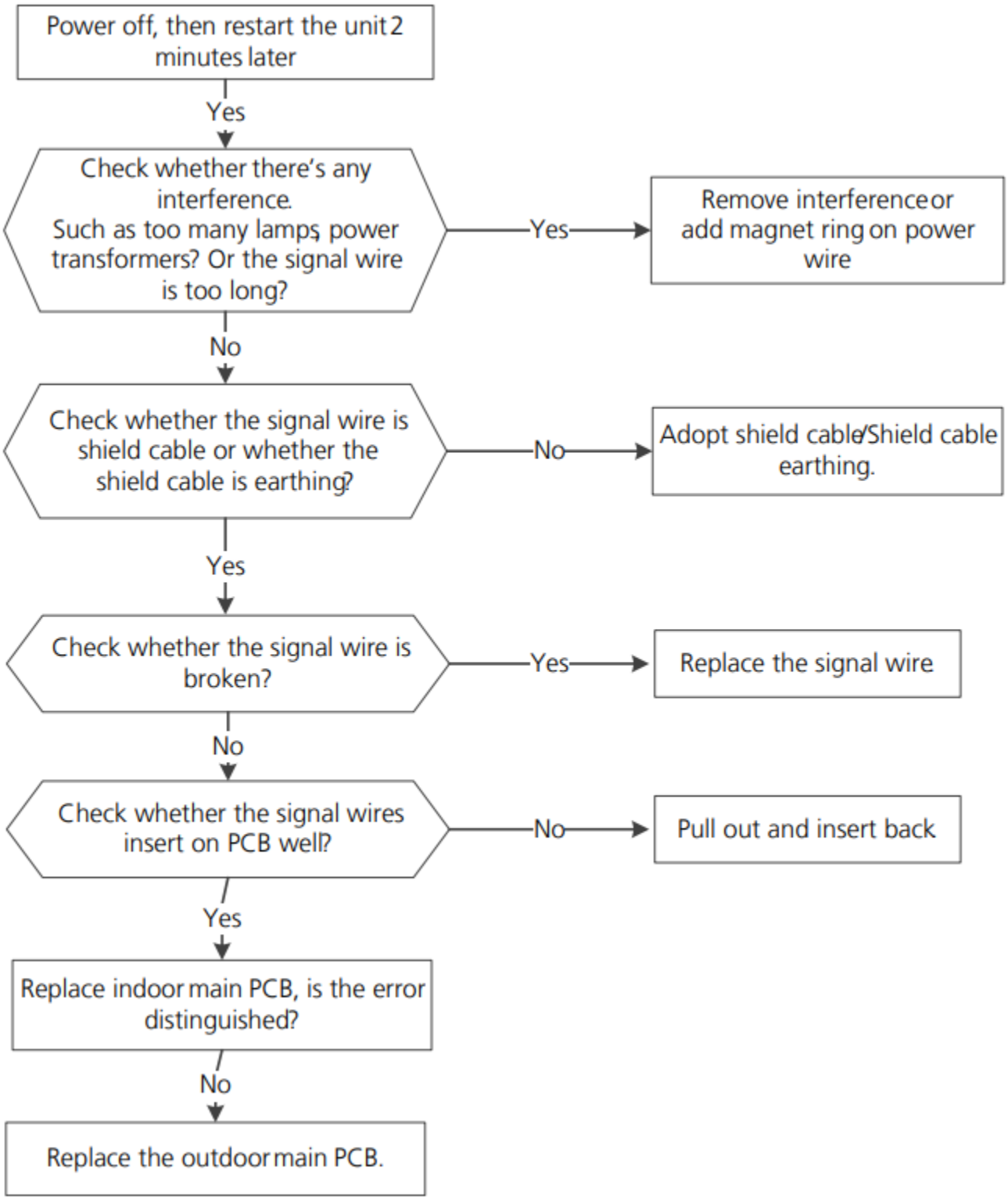
Note: The pictures and the values are for reference only, actual condition and specific values may vary.

485 Communication (S1,S2 Communication):

Recommended parts to prepare:

- Indoor PCB
- Outdoor PCB
- Magnet Ring
- Signal Wires

Troubleshooting and repair:



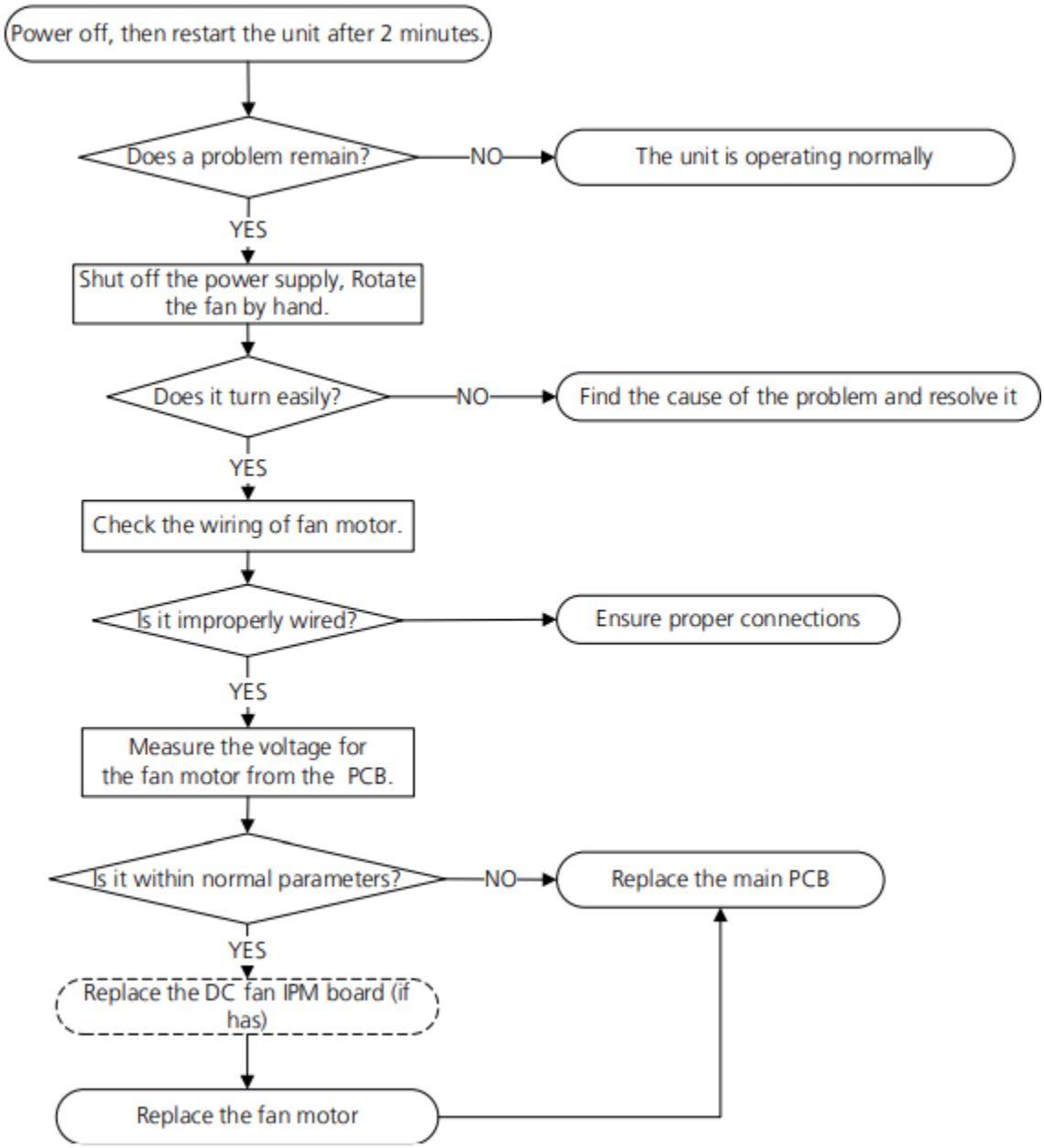
EH 03/ EC 07/ EC 71: Fan Speed is Operating Outside of Normal Range/ Over Current Failure of ODU DC Fan Motor Diagnosis and Solution.

Description: When the indoor/outdoor fan speed is too low or too high for a certain time, the unit ceases operation and the LED displays an error code.

Recommended parts to prepare:

- Connection wires
- Fan assembly
- Fan motor
- PCB

Troubleshooting and repair:



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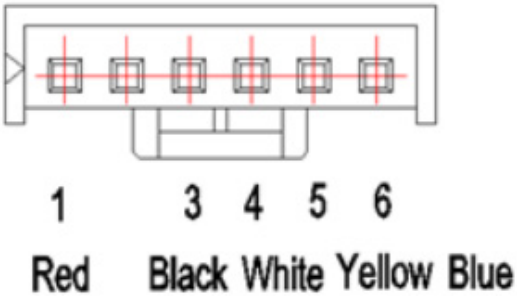
1. Indoor or Outdoor DC fan motor (control chip is in fan motor)

Power on and make sure the unit is in standby, measure the voltage of pin1-pin3, pin4-pin3 on the fan motor connector. If the value of the voltage is not in the range showing in the tables below the PCB will have problems and will need to be replaced.

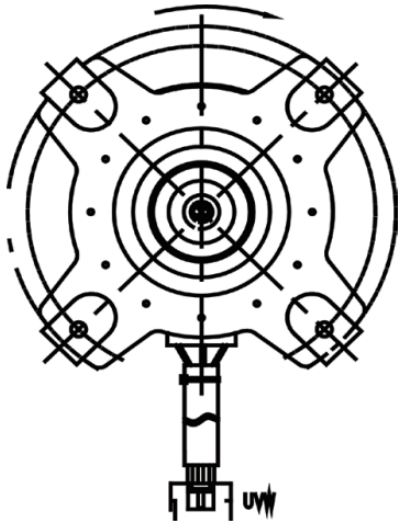
NO.	Color	Signal	Voltage
1	Red	Vs/Vm	192V~380V
2	---	---	---
3	Black	GND	0V
4	White	Vcc	13.5-16.5V
5	Yellow	Vsp	0~6.5V
6	Blue	FG	13.5-16.5V



Index:

1. Outdoor DC fan motor (control chip is in outdoor PCB)

Release the UVW connector and measure the resistance of U-V, U-W, V-W. If the resistance is not equal to each other the fan motor has a problem and needs to be replaced. Otherwise the PCB has a problem and needs to be replaced.



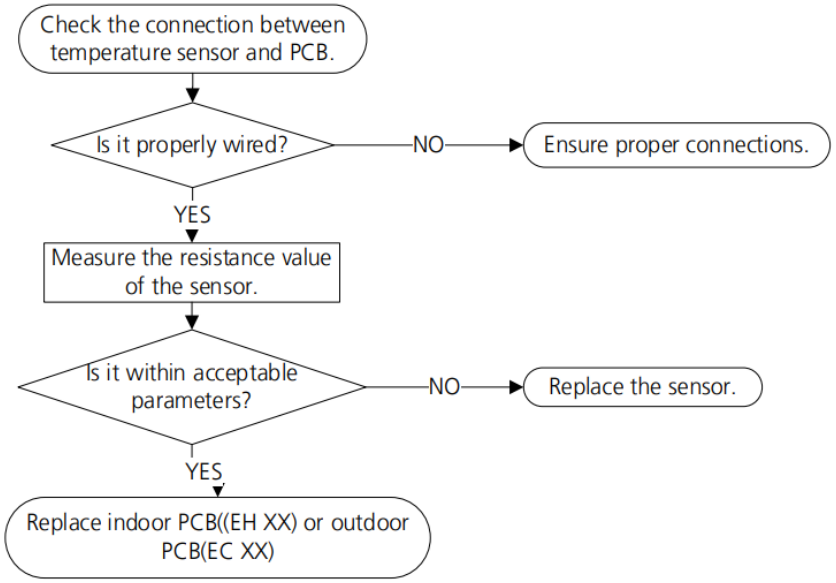
EH 60/ EH 61/ EH 62/ EH 66/ EH 65/ EC 53/ EC 52/ EC 54/ EC 56/ EC 57: Open Circuit or Short Circuit of Temperature Sensor Diagnosis and Solution.

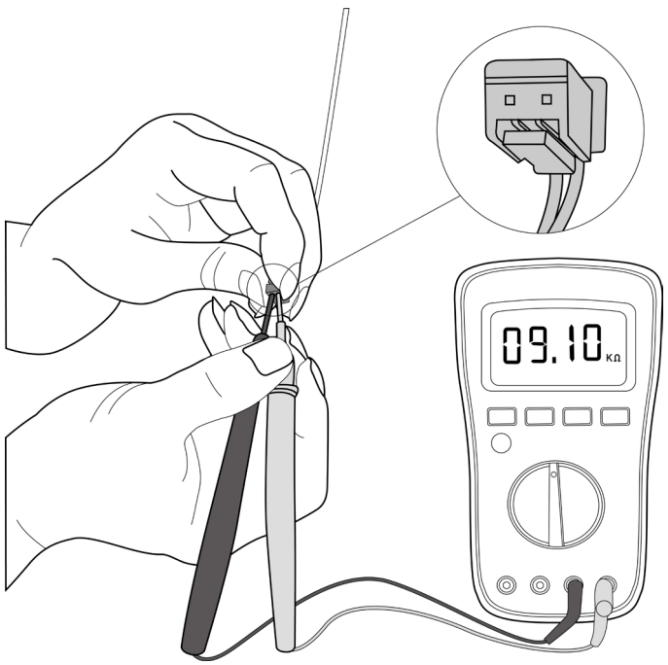
Description: If the sampling voltage is lower than 0.06V or higher than 4.94V the LED will display an error.

Recommended parts to prepare:

- Connection wires
- Sensors
- PCB

Troubleshooting and repair:





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

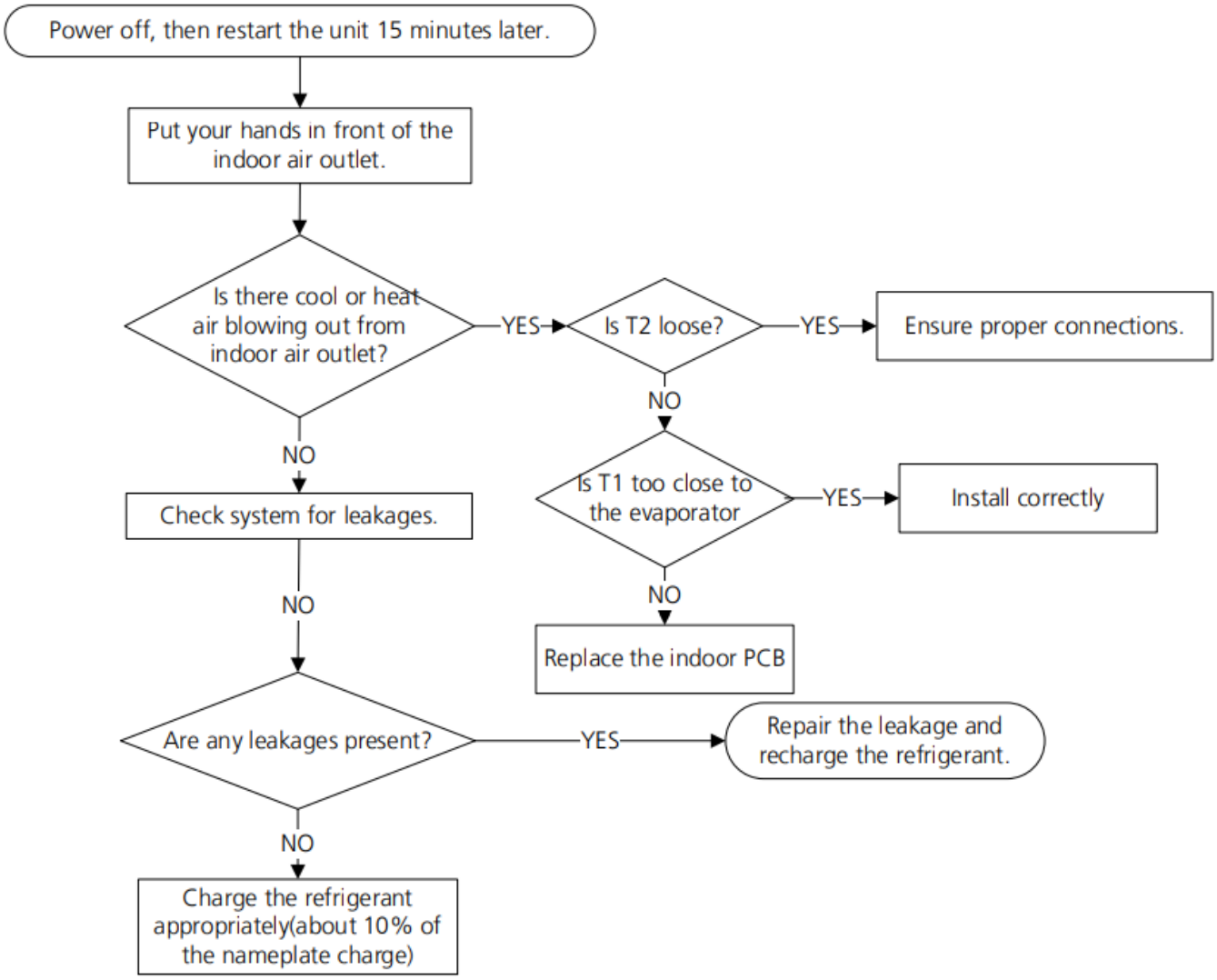
EL 0C: System Lacks Refrigerant Diagnosis and Solution.

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:

- Indoor PCB
- Additional refrigerant

Troubleshooting and repair:



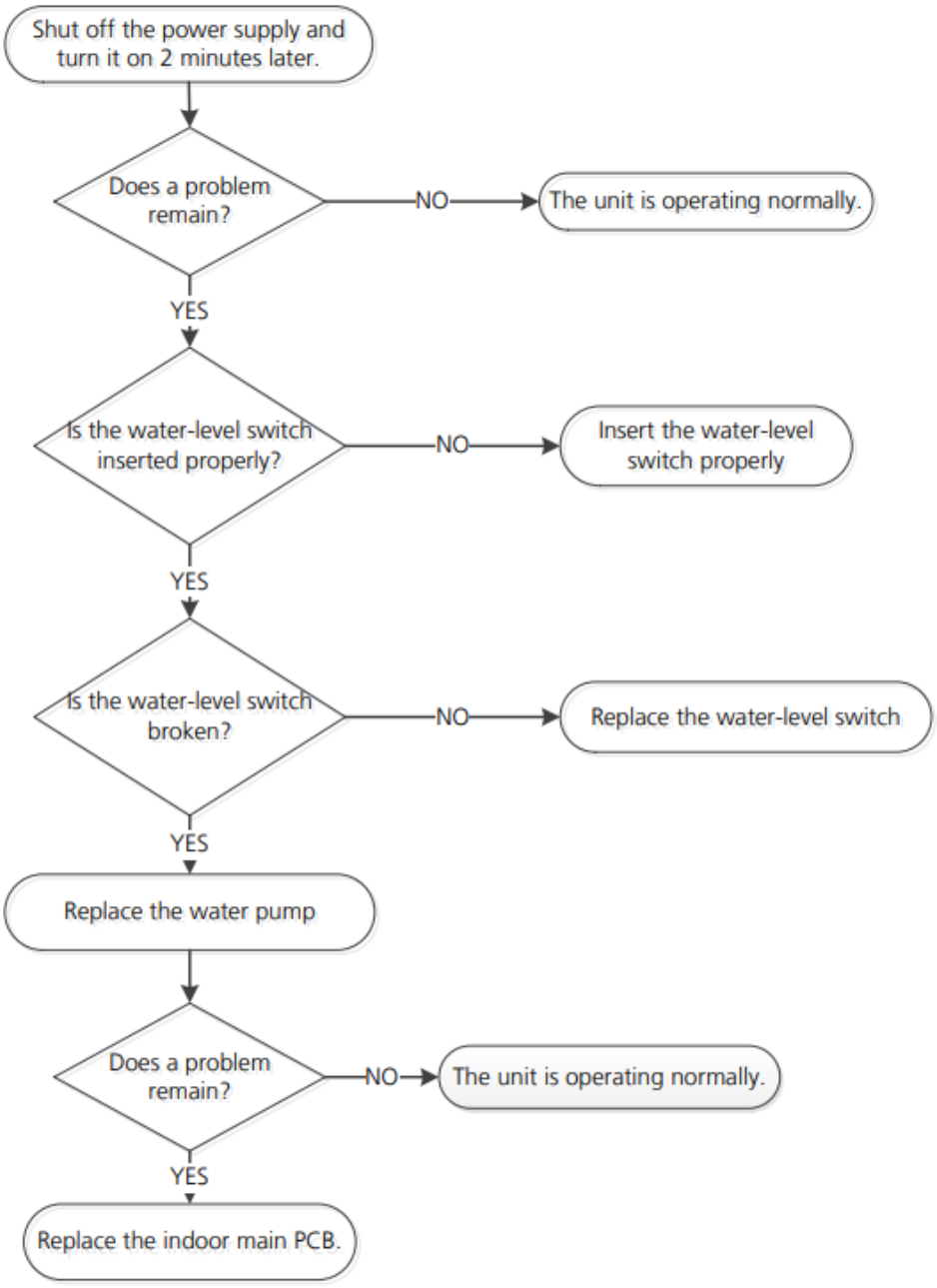
EH 0E: Water-Level Alarm Malfunction Diagnosis and Solution

Description: If the sampling voltage is not 5V the LED displays an error code.

Recommended parts to prepare:

- Connection wires
- Water-level switch
- Water pump
- Indoor PCB

Troubleshooting and repair:



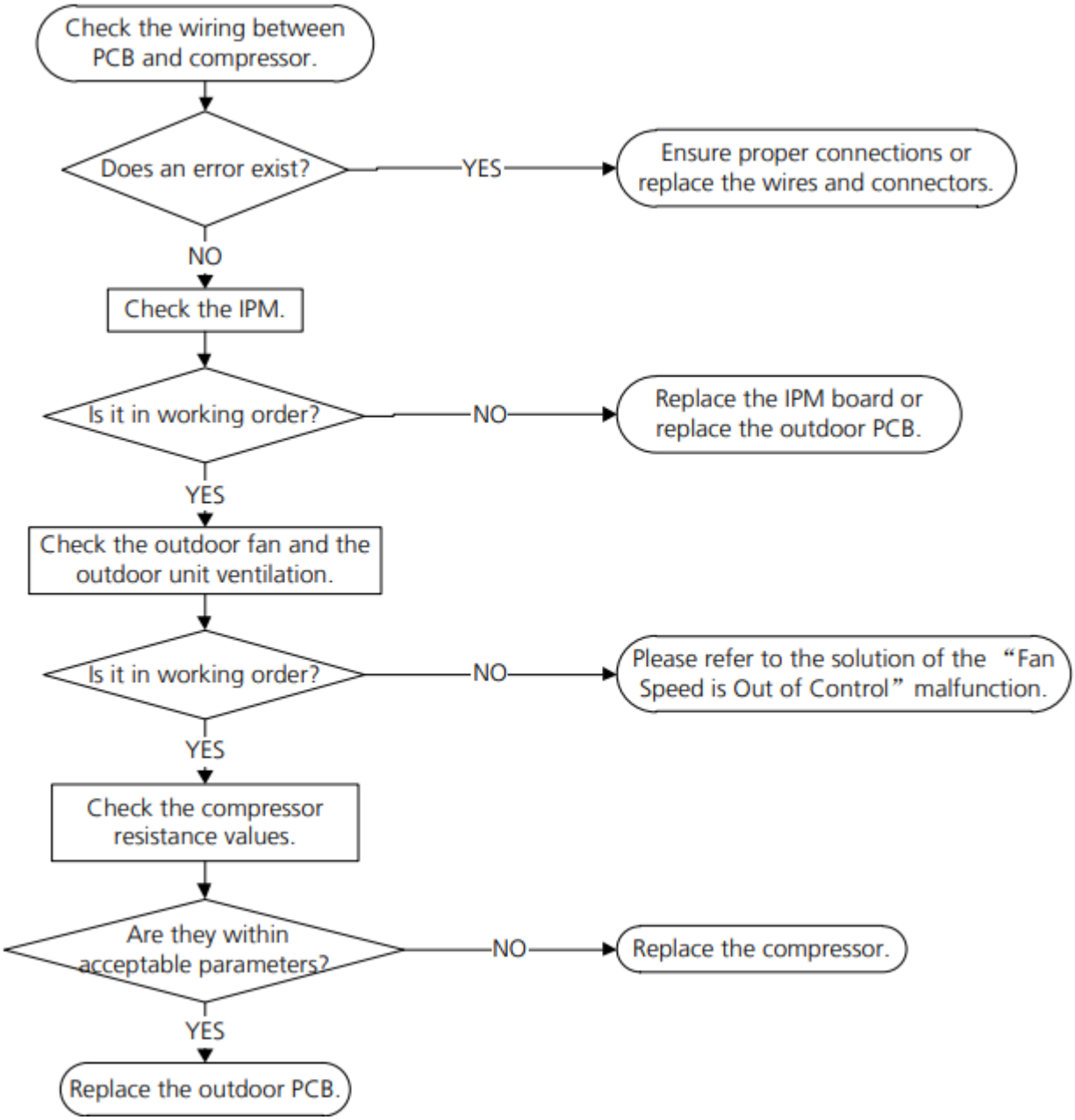
PC 00: ODU IPM Module Protection Diagnosis and Solution.

Description: When the voltage signal the IPM sends to the compressor drive chip is abnormal the LED display shows "PC 00" and the system shuts down.

Recommended parts to prepare:

- Connection wires
- IPM module board
- Outdoor fan assembly
- Compressor
- Outdoor PCB

Troubleshooting and repair:



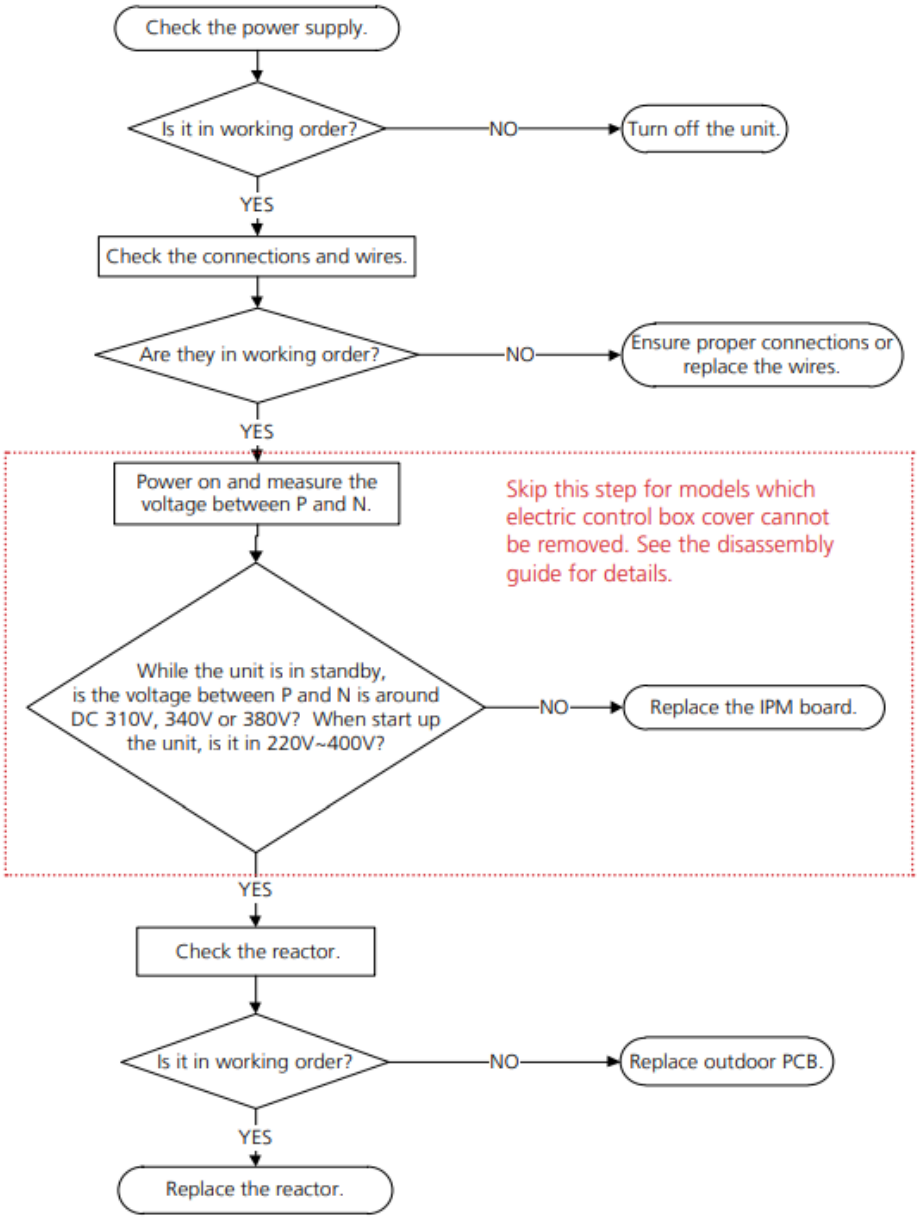
PC 01: ODU Voltage Protection Diagnosis and Solution.

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

Recommended parts to prepare:

- Power supply wires
- IPM module board
- PCB
- Reactor

Troubleshooting and repair:



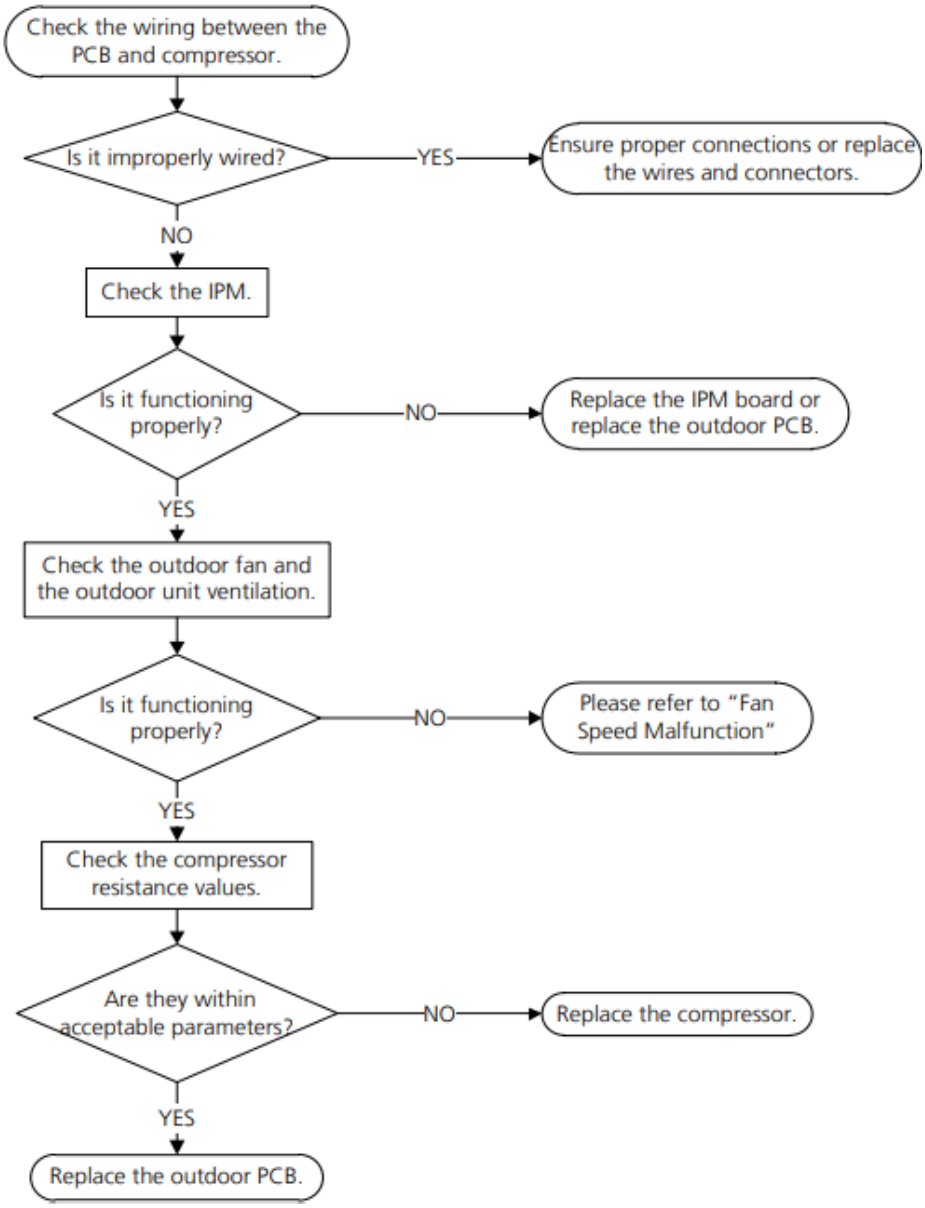
PC 04: Inverter Compressor Drive Error Diagnosis and Solution.

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:

- Connection wires
- IPM module board
- Outdoor fan assembly
- Compressor
- Outdoor PCB

Troubleshooting and repair:



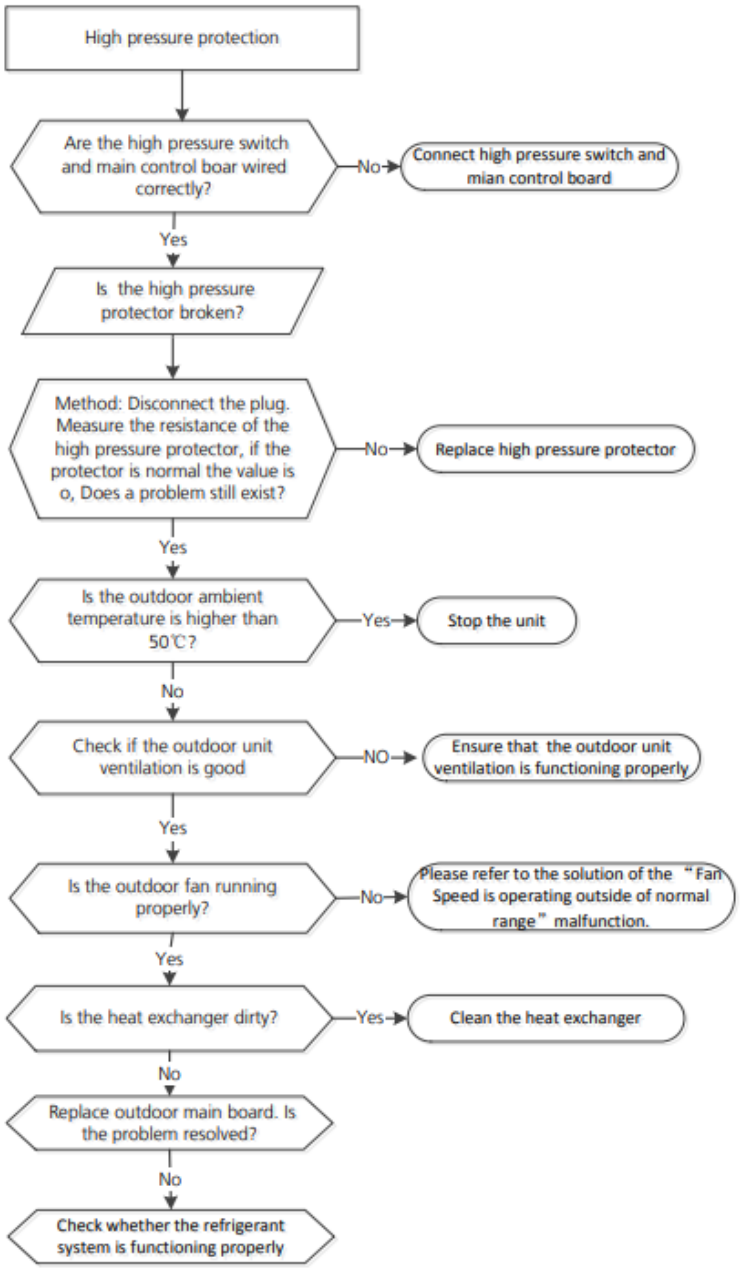
PC 03: Pressure Protection (Low or High Pressure) Diagnosis and Solution.

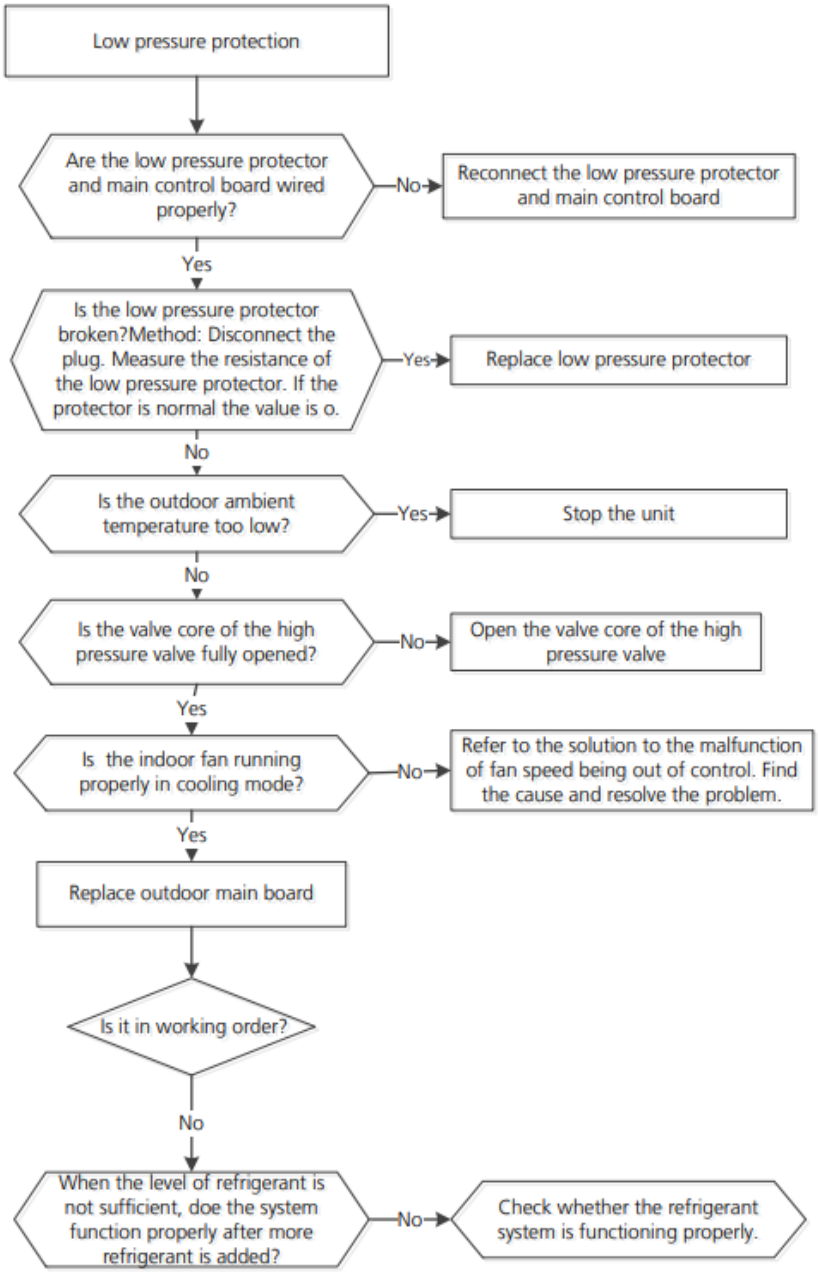
Description: Outdoor pressure switch cuts off the system because pressure is higher than 638PSI (4.4MPa) or the outdoor pressure switch cuts off because pressure is lower than 19PSI (0.13MPa) the LED displays an error code.

Recommended parts to prepare:

- Connection wires
- Pressure switch
- Outdoor fan
- Outdoor main PCB
- Refrigerant

Troubleshooting and repair:




Low pressure protection
Are the low pressure protector and main control board wired properly?
No
Reconnect the low pressure protector and main control board
Yes
Is the low pressure protector broken?Method: Disconnect the plug. Measure the resistance of the low pressure protector. If the protector is normal the value is o.
Yes
Replace low pressure protector
No
Is the outdoor ambient temperature too low?
Yes
Stop the unit
No
Is the valve core of the high pressure valve fully opened?
No
Open the valve core of the high pressure valve
Yes
Is the indoor fan running properly in cooling mode?
No
Refer to the solution to the malfunction of fan speed being out of control. Find the cause and resolve the problem.
Yes
Replace outdoor main board
Is it in working order?
No
When the level of refrigerant is not sufficient, doe the system function properly after more refrigerant is added?
No
Check whether the refrigerant system is functioning properly.

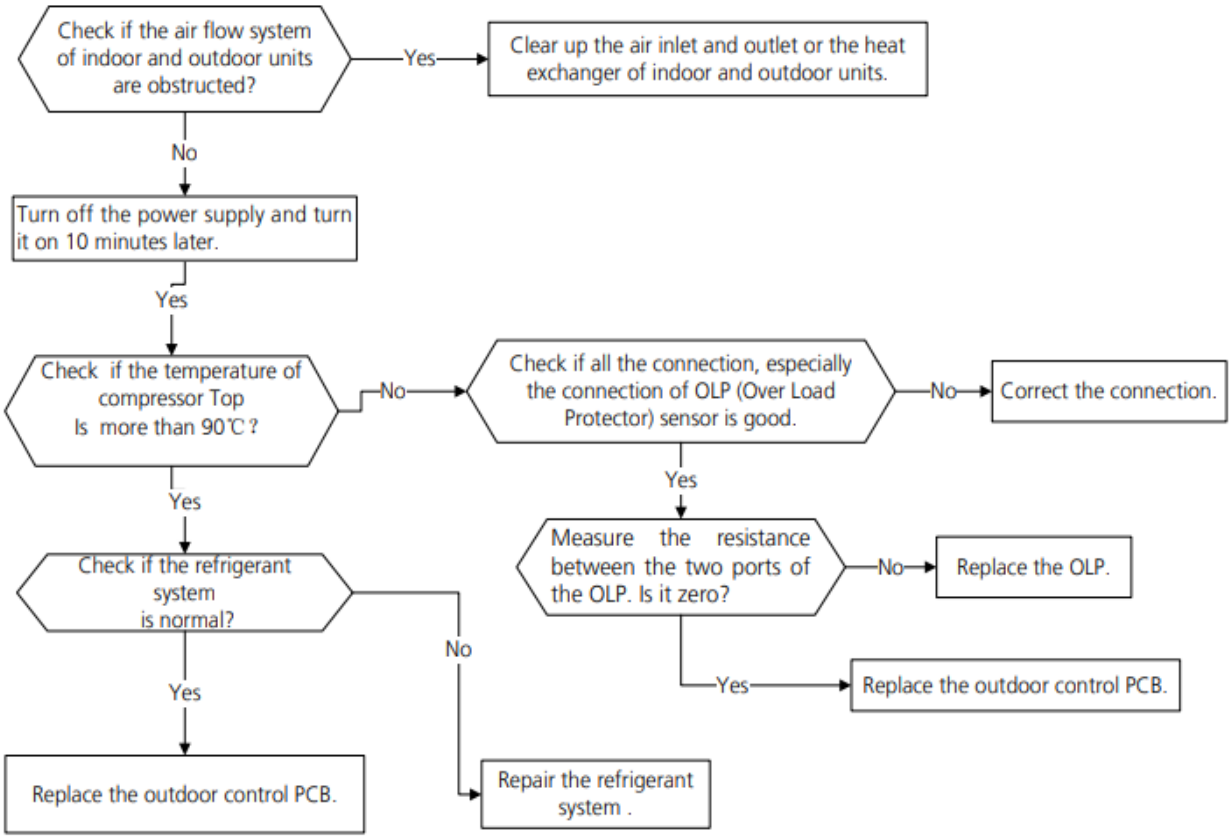
PC 02/ LC 06: Compressor Top (or IPM) Temp. Protection Diagnosis and Solution.

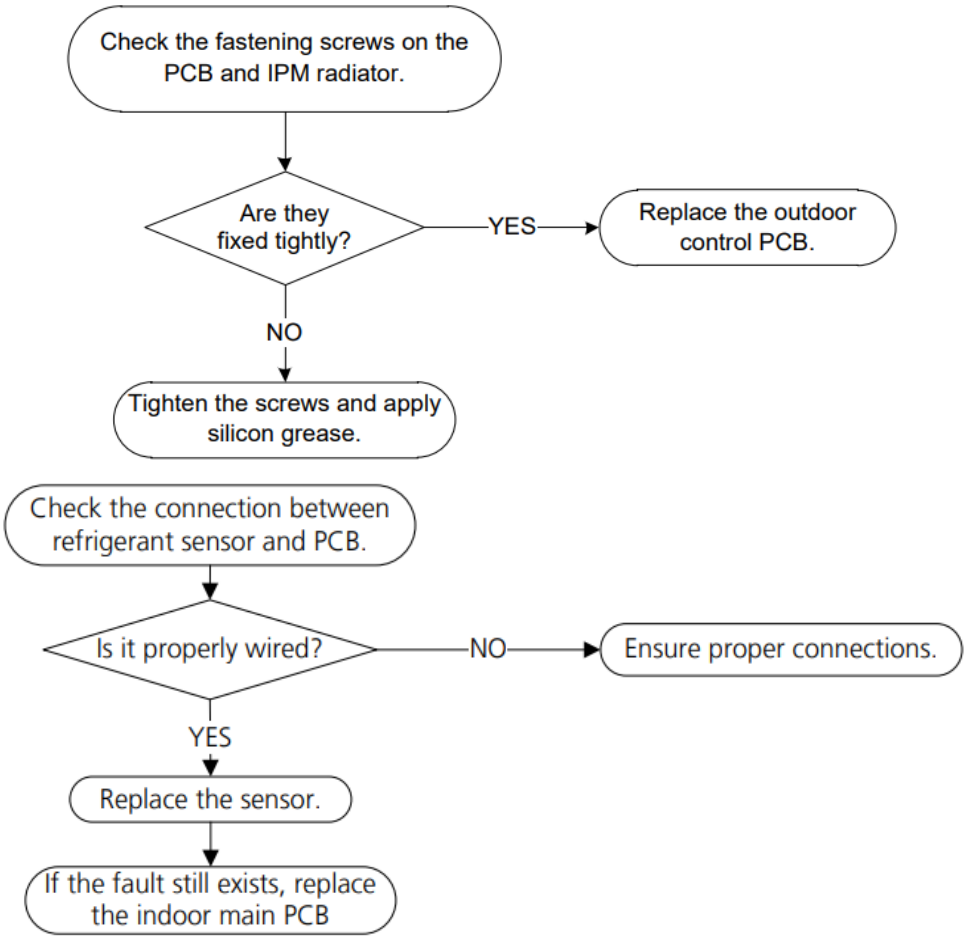
Description: For some models with an overload protection, if the sampling voltage is not 5V the LED will display an error. If the temperature of the IPM module is higher than a certain value the LED will display an error. Models without an overload protector should be diagnosed according to the second flowchart.

Recommended parts to prepare:

- Connection wires
- Outdoor PCB
- IPM module board
- High pressure protector
- System blockages

Troubleshooting and repair:





PC 0L: Low Ambient Temperature Protection.

Description: It is a protection function for the system (when off) that occurs when the outdoor ambient temperature (T4) is lower than -35°C for 10s which will cause the system to stop and display an error code.
When the compressor is on and the outdoor ambient temperature is lower than -40°C for 10s, the system will stop and display an error code.
When the outdoor ambient temperature (T4) is no lower than -32°C for 10s the unit will exit the protection.

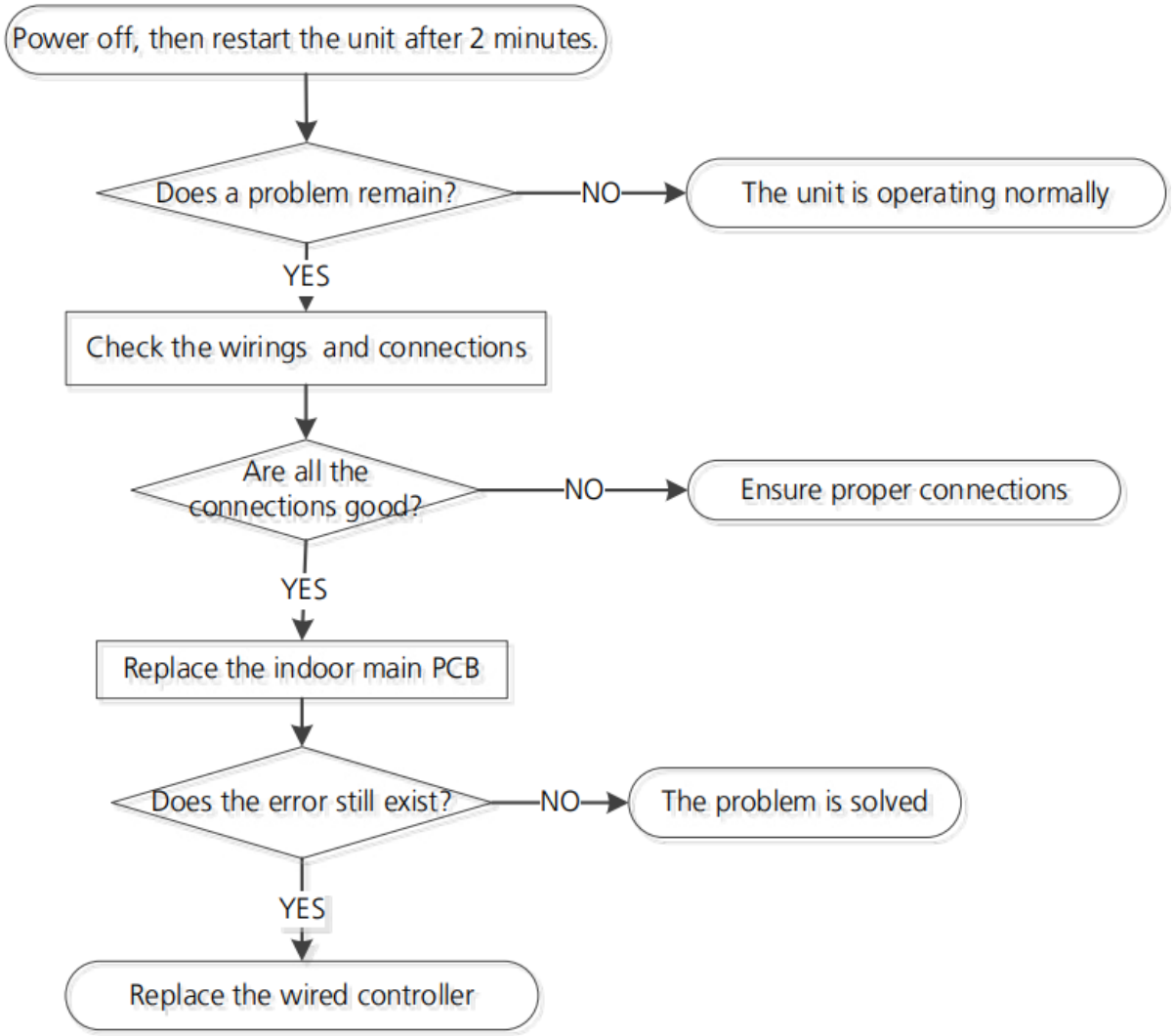
EH b3: Communication Malfunction Between Wire and Master Control Diagnosis and Solution.

Description: If the indoor PCB does not receive feedback from the wired controller the error will display on the wired controller.

Recommended parts to prepare:

- Connection wires
- Indoor PCB
- Wired controller

Troubleshooting and repair:



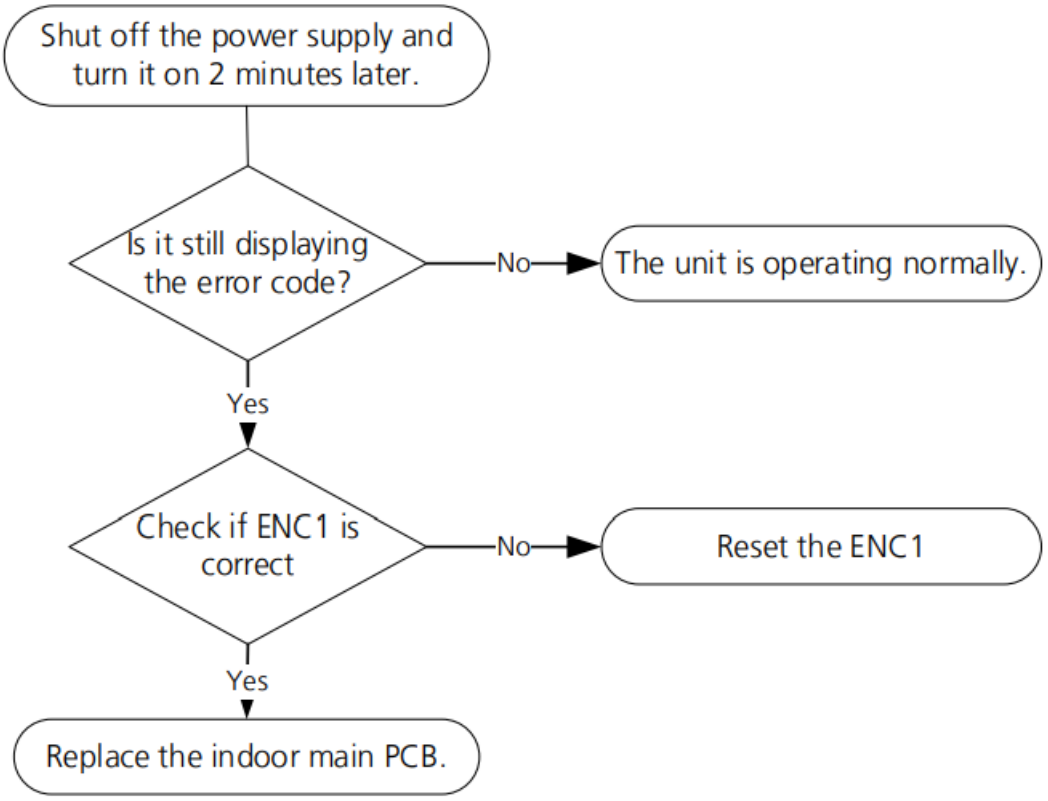
EH bA: Communication Malfunction Between Indoor Unit and External Fan Module. EH 3A: External Fan DC Bus Voltage is too Low Protection. EH 3b: External Fan DC Bus Voltage is too High Diagnosis and Solution.

Description: Indoor unit does not receive the feedback from external fan module during 150 seconds or the indoor unit receives abnormal increases or decreases in voltage from external fan module.

Recommended parts to prepare:

- Indoor PCB

Troubleshooting and repair:



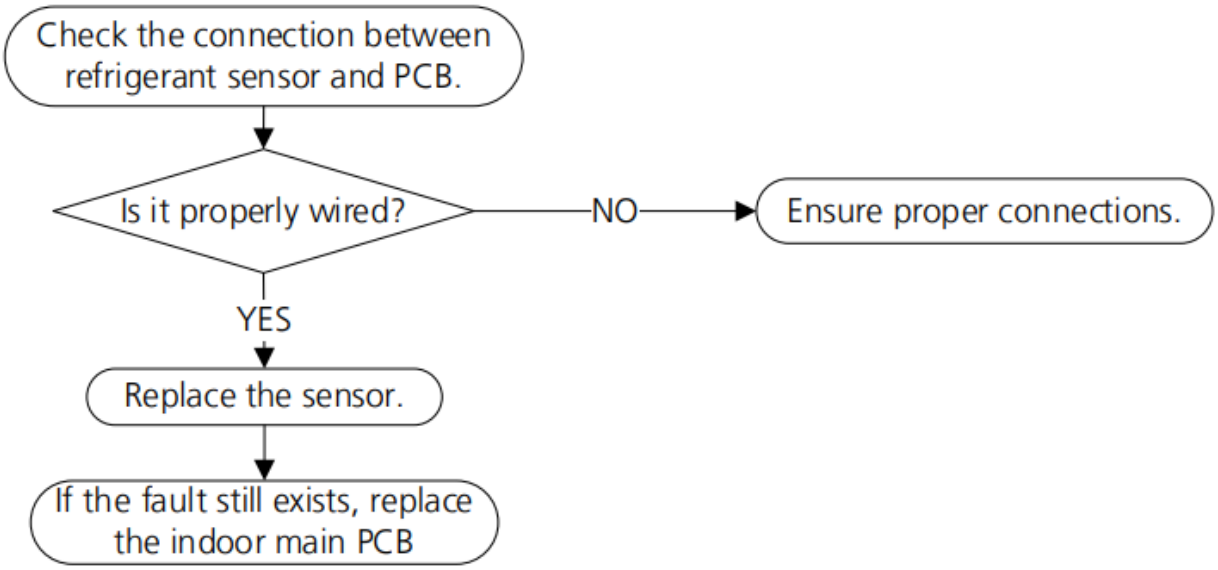
FH CC: Refrigerant Sensor Error or EH C3: Refrigerant Sensor is Out of Range Diagnosis and Solution.

Description: Indoor unit receives a fault signal for 10s or the indoor unit does not receive feedback from the refrigerant sensor for 150s.

Recommended parts to prepare:

- Connection wires
- Sensors
- Indoor main PCB

Troubleshooting and repair:



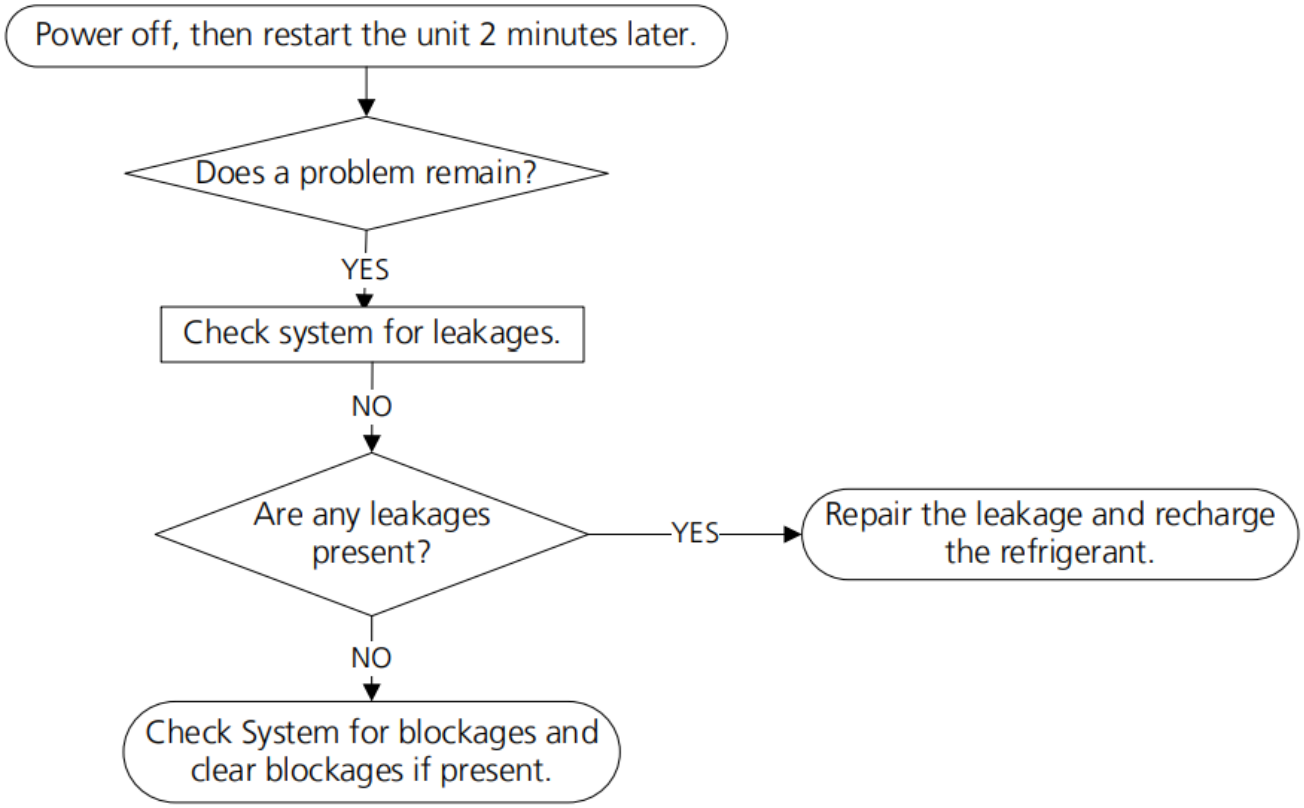
EH C1: Refrigerant Sensor Detects Leakage or EH C2: Refrigerant Sensor is Out of Range and Leakage is Detected Diagnosis and Solution.

Description: The refrigerant sensor detects a concentration higher than or equal to 10%*LFL for 10 seconds or the refrigerant sensor detects a concentration higher than or equal to 20%*LFL or the multi model receives the refrigerant leakage protection fault sent by the outdoor unit.
Multi-zone: Only the buzzer of the indoor unit that detects refrigerant leakage continues to sound the alarm, the shortest sound is 10 seconds, and the longest sound is 5 minutes (you can press any key such as remote control or wire control, app, and so on to eliminate the alarm), and the other non-refrigerant leakage fault the indoor unit only displays "ECC1" but the buzzer does not sound.

Recommended parts to prepare:

- Additional refrigerant

Troubleshooting and repair:



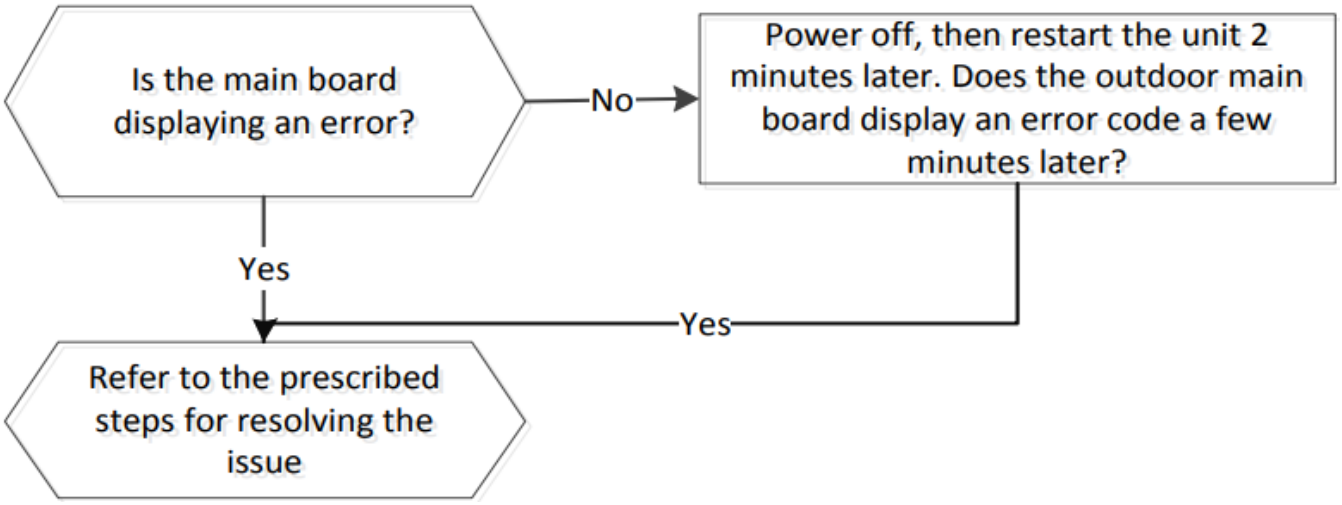
EC 0d: ODU Malfunction Diagnosis and Solution.

Description: The indoor unit detects the outdoor unit has an error.

Recommended parts to prepare:

- Outdoor unit

Troubleshooting and repair:



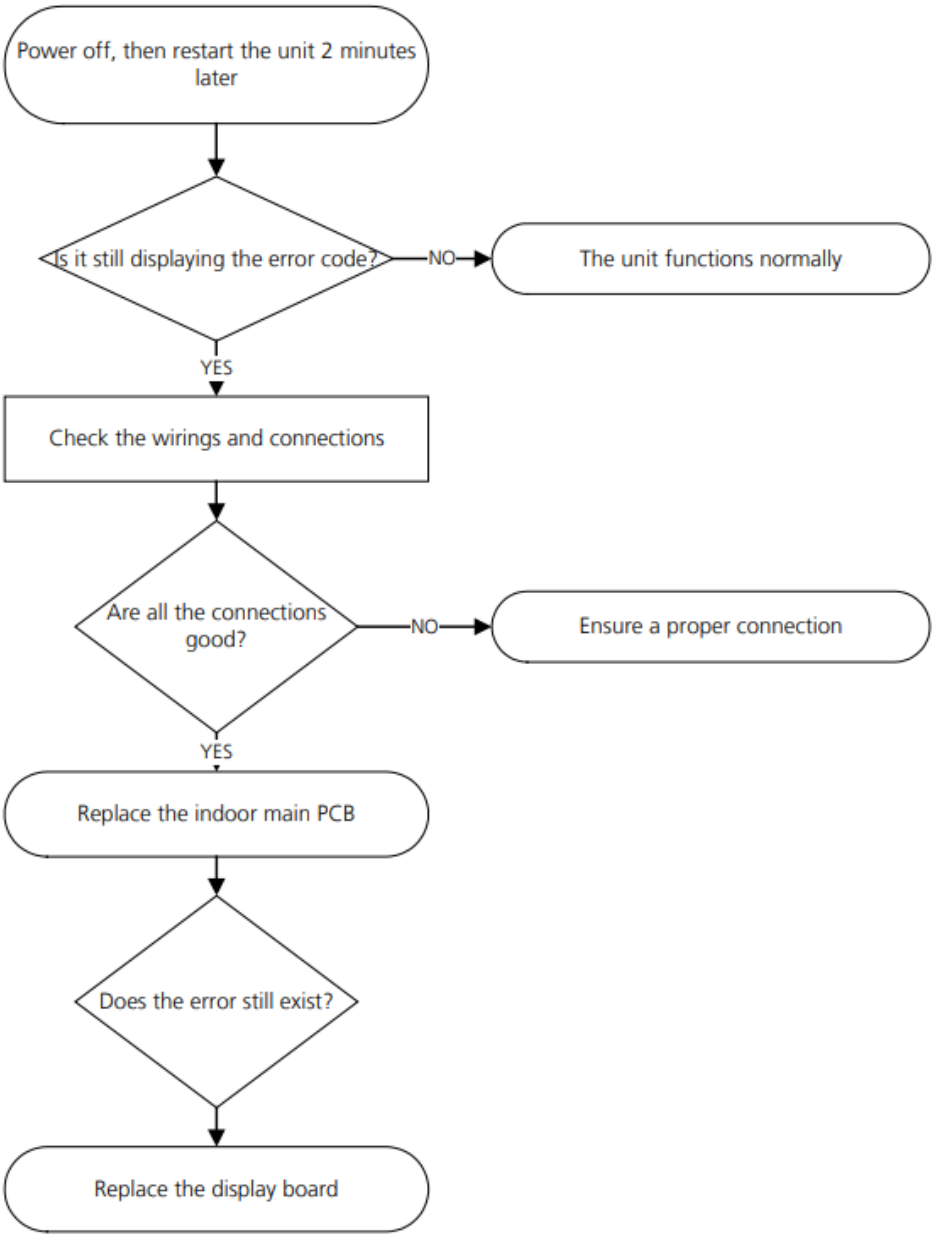
EH 0b: IDU Main Control Board and Display Board Communication Error Diagnosis and Solution.

Description: Indoor PCB does not receive feedback from the display board.

Recommended parts to prepare:

- Communication wire
- Indoor PCB
- Display board

Troubleshooting and repair:



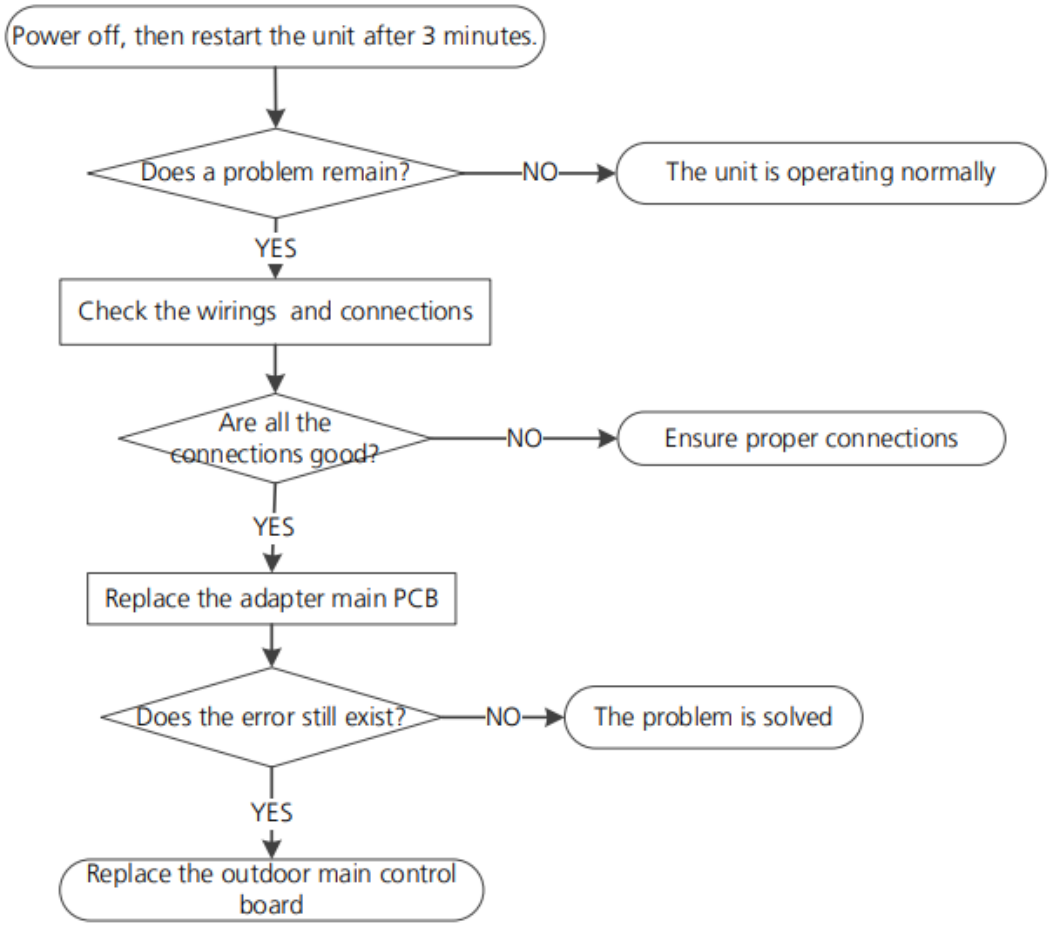
EL 16: Communication Malfunction Between Adapter Board and Outdoor Main Board Diagnosis and Solution.

Description: The adapter PCB cannot detect the main control board.

Recommended parts to prepare:

- Connection wires
- Adapter board
- Outdoor main PCB

Troubleshooting and repair:



FL 09: Mismatch Between the New and Old Platforms Diagnosis and Solution.

Description: When the indoor and outdoor units are mismatched the LED will display this code. Please replace the indoor or outdoor unit to match accordingly.

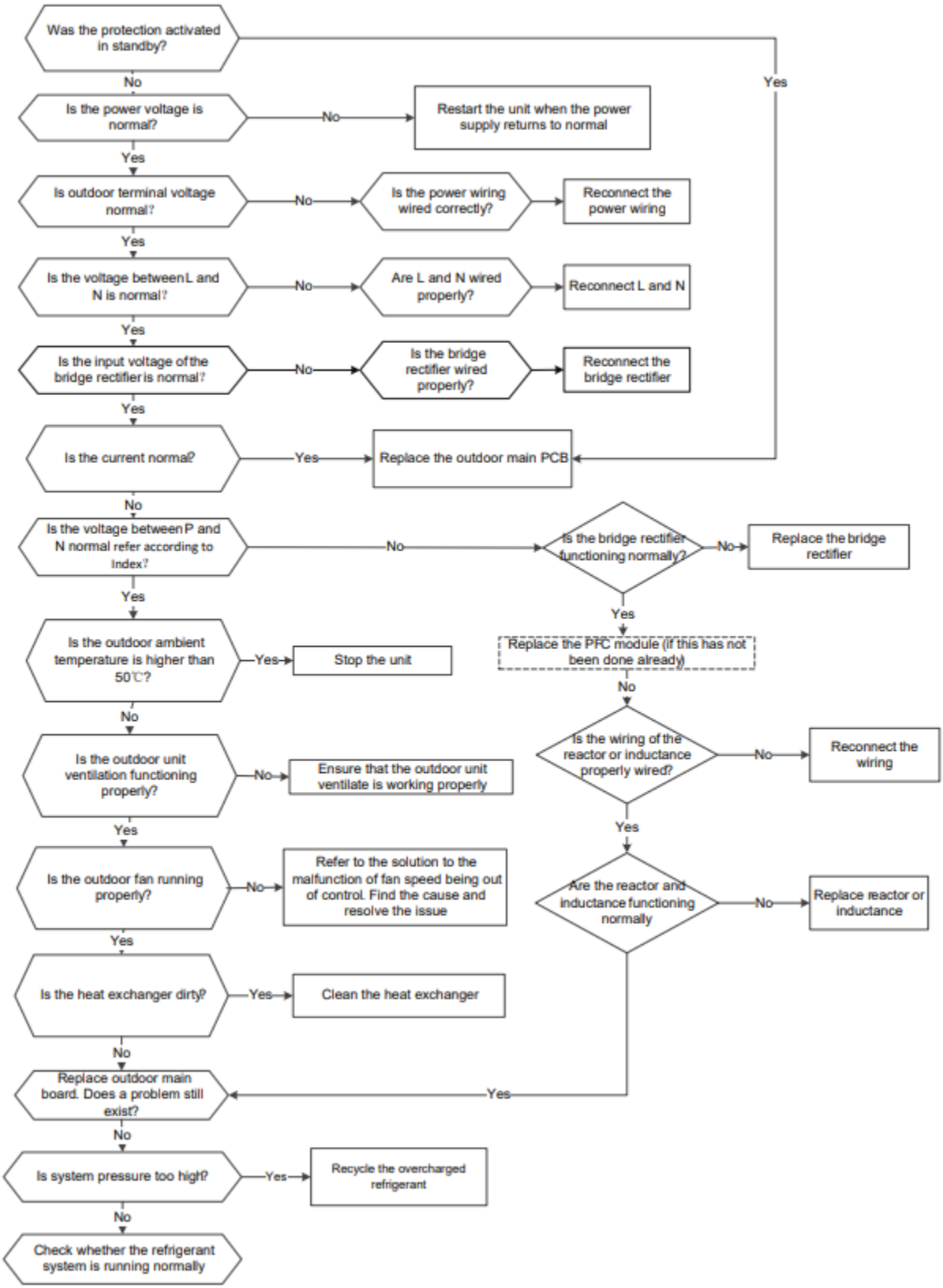
PC 08: Current Overload Protection/ PC 42: Compressor Start Failure of Outdoor Unit/ PC 44: ODU Zero Speed Protection/ PC 46: Compressor Speed has been Out of Control/ PC 49: Compressor Over Current Failure.

Description: An abnormal current rise is detected by checking the specified current detection circuit.

Recommended parts to prepare:

- Outdoor PCB
- Connection wires
- Bridge rectifier
- PFC circuit or reactor
- Refrigeration piping system
- Pressure switch
- Outdoor fan
- IPM module board

Troubleshooting and repair:


Was the protection activated in standby?
Yes
No
Is the power voltage is normal?
No
Restart the unit when the power supply returns to normal
Yes
Is outdoor terminal voltage normal?
No
Is the power wiring wired correctly?
Reconnect the power wiring
Yes
Is the voltage between L and N is normal?
No
Are L and N wired properly?
Reconnect L and N
Yes
Is the input voltage of the bridge rectifier is normal?
No
Is the bridge rectifier wired properly?
Reconnect the bridge rectifier
Yes
Is the current normal?
Yes
Replace the outdoor main PCB
No
Is the voltage between P and N normal refer according to Index?
No
Is the bridge rectifier functioning normally?
No
Replace the bridge rectifier
Yes
Replace the PFC module (if this has not been done already)
Yes
Is the outdoor ambient temperature is higher than 50℃?
Yes
Stop the unit
No
Is the outdoor unit ventilation functioning properly?
No
Ensure that the outdoor unit ventilate is working properly
Yes
No
Is the wiring of the reactor or inductance properly wired?
No
Reconnect the wiring
Yes
Is the outdoor fan running properly?
No
Refer to the solution to the malfunction of fan speed being out of control. Find the cause and resolve the issue
Yes
Are the reactor and inductance functioning normally
No
Replace reactor or inductance
Is the heat exchanger dirty?
Yes
Clean the heat exchanger
No
Replace outdoor main board. Does a problem still exist?
Yes
No
Is system pressure too high?
Yes
Recycle the overcharged refrigerant
No
Check whether the refrigerant system is running normally

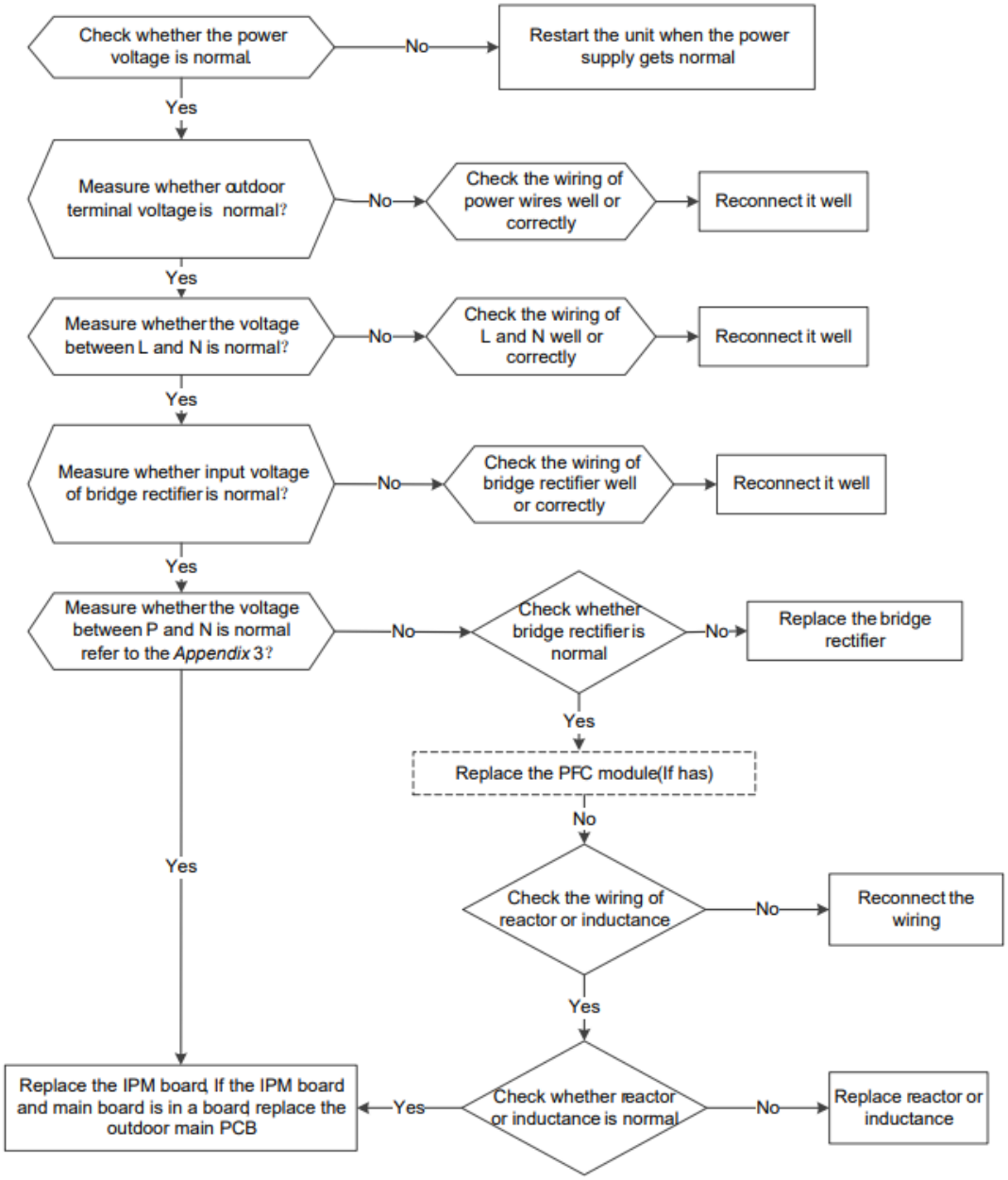
PC 10: ODU Low AC Voltage Protection/ PC 11: ODU Main Control Board DC Bus High Voltage Protection/ PC 12: ODU Main Control Board DC Bus Low Voltage Protection/341 MCE Error Diagnosis and Solution.

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

Recommended parts to prepare:

- Power supply wires
- IPM module board
- Outdoor PCB
- Bridge rectifier
- PFC circuit or reactor

Troubleshooting and repair:



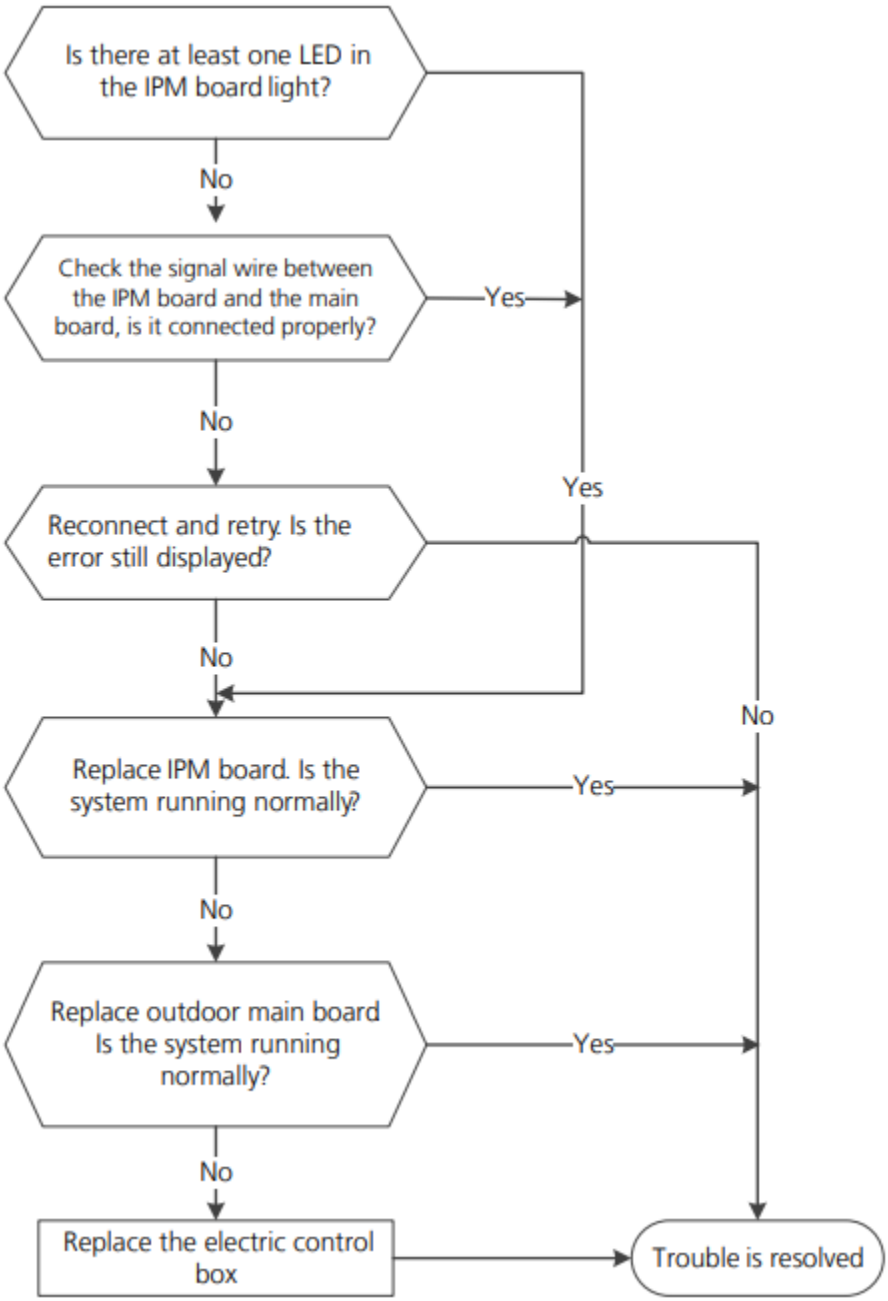
PC 40: Communication Error Between ODU Main Chip and Compressor Driven Chip Diagnosis and Solution.

Description: The main PCB cannot detect the IPM board.

Recommended parts to prepare:

- Connection wires
- Outdoor PCB
- IPM module board
- Electric control box

Troubleshooting and repair:



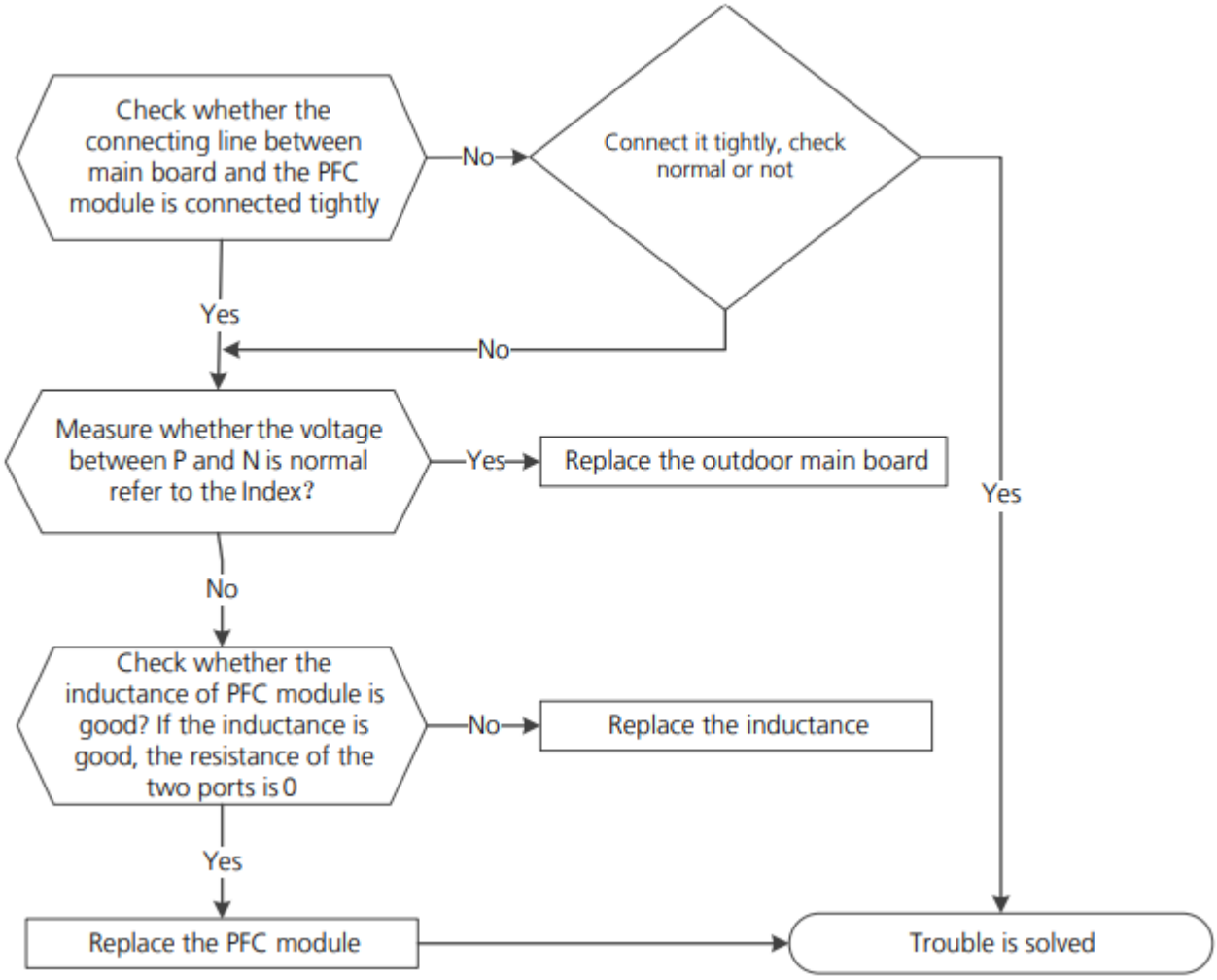
PC 0F: PFC Module Protection Diagnosis and Solution.

Description: Outdoor PCB detects PFC signal is low voltage or DC voltage is lower than 340V for 6s when quick check.

Recommended parts to prepare:

- Connection wires
- Outdoor PCB
- Inductance
- PFC circuit or IPM module board

Troubleshooting and repair:



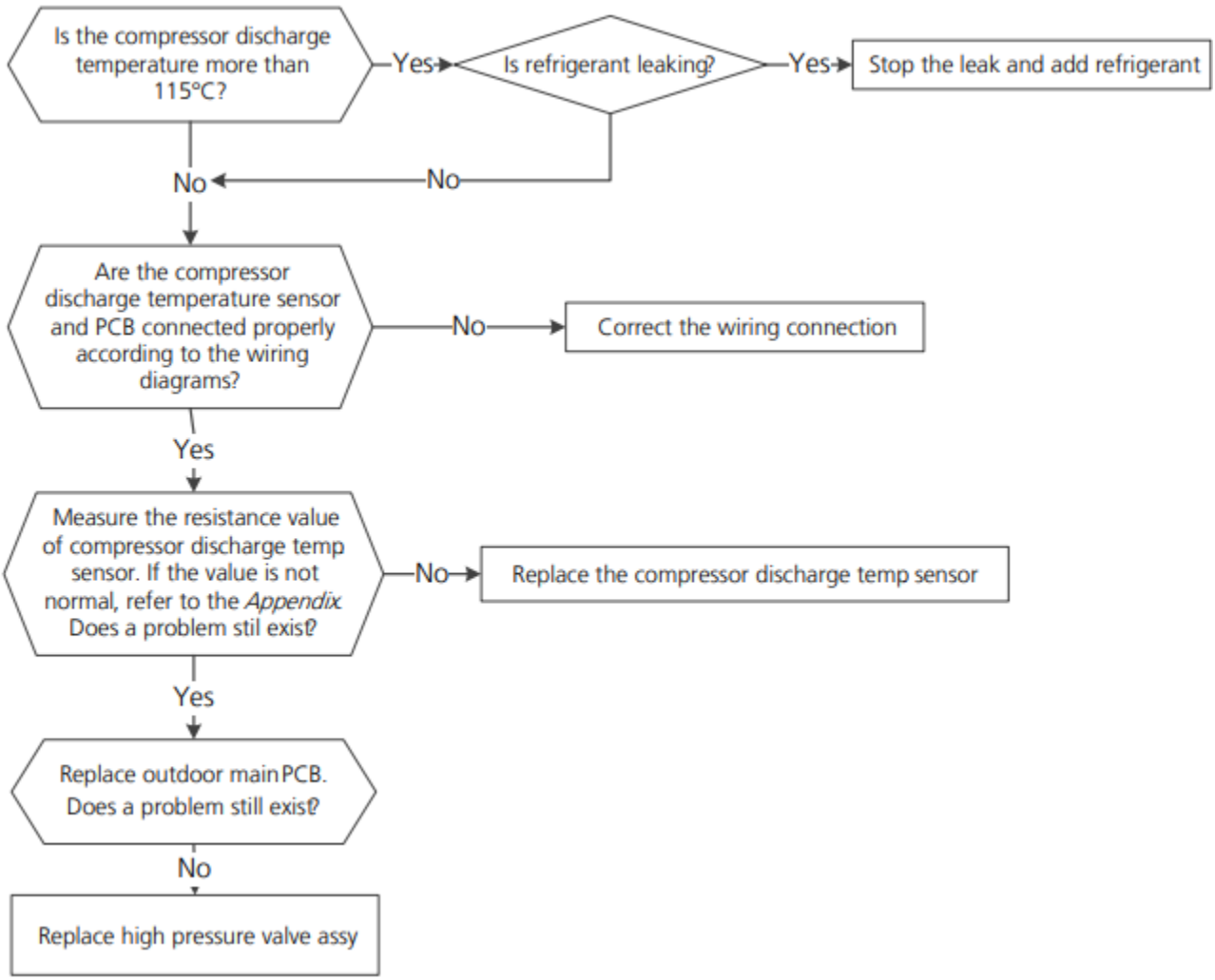
PC 06: Discharge Temperature Protection of Compressor Diagnosis and Solution.

Description: When the compressor discharge temperature (TP) is more than 115°C for 10 seconds, the compressor ceases operation and does not restart until TP is less than 90°C..

Recommended parts to prepare:

- Connection wires
- Outdoor PCB
- Discharge temperature sensor
- Refrigerant

Troubleshooting and repair:



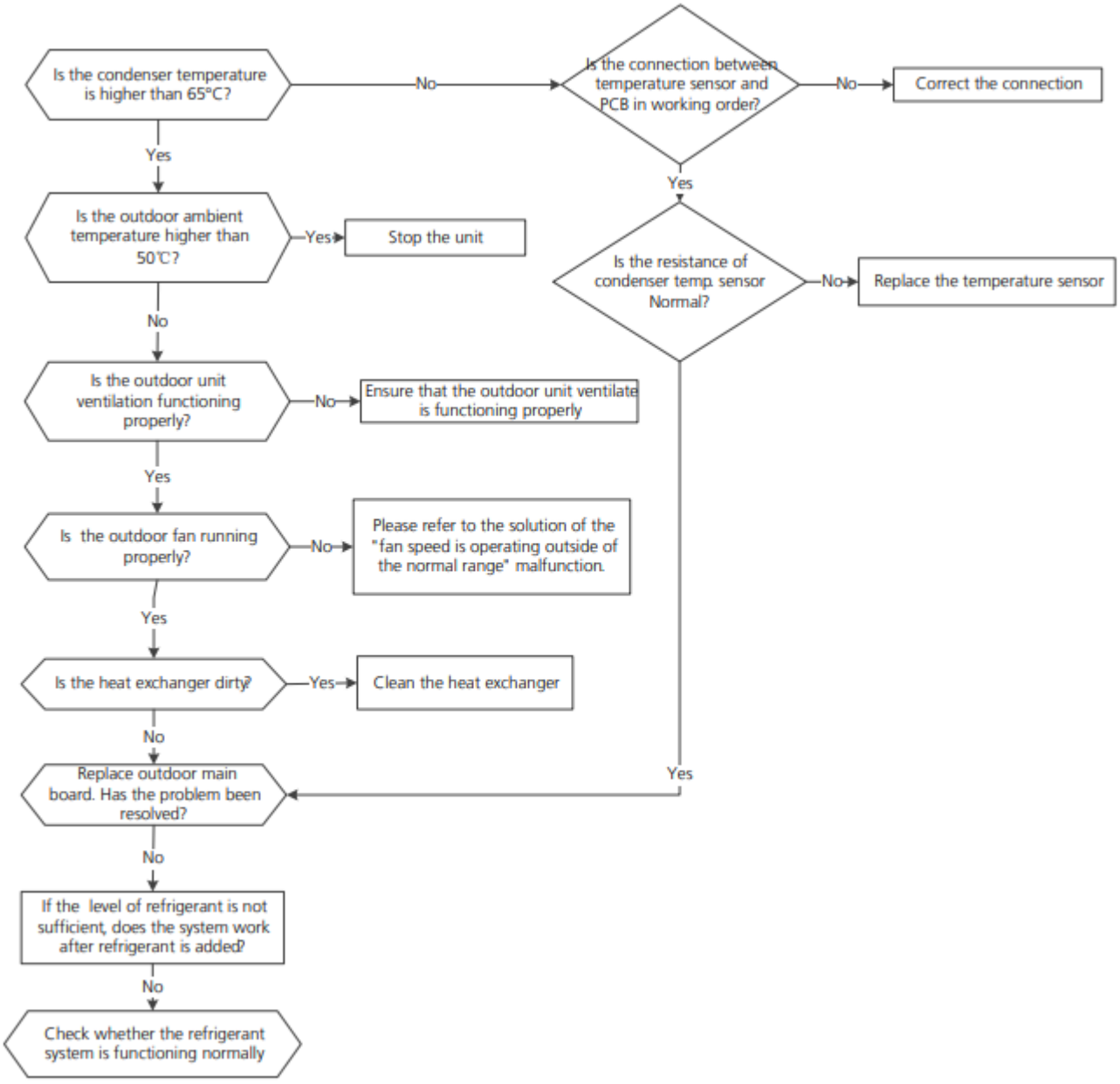
PC 0A: High Temperature Protection of Condenser Diagnosis and Solution.

Description: The unit will stop when condenser temperature is higher than 65°C, and runs again when it is less than 50°C.

Recommended parts to prepare:

- Connection wires
- Condenser temperature sensor
- Outdoor fan
- Outdoor main PCB
- Refrigerant

Troubleshooting and repair:



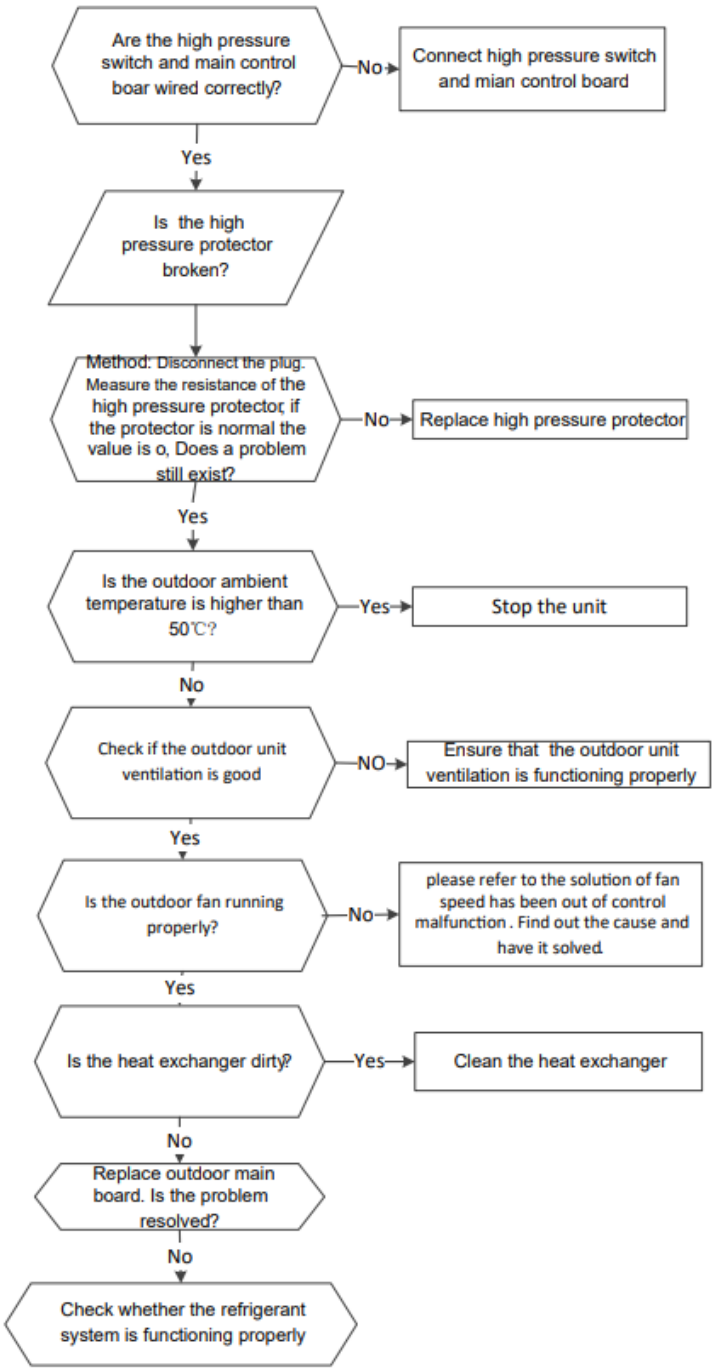
PC 30: System High Pressure Protection Diagnosis and Solution.

Description: Outdoor pressure switch cuts off the system because pressure is higher than 638PSI (4.4MPa).

Recommended parts to prepare:

- Connection wires
- Pressure switch
- Outdoor fan
- Outdoor main PCB

Troubleshooting and repair:



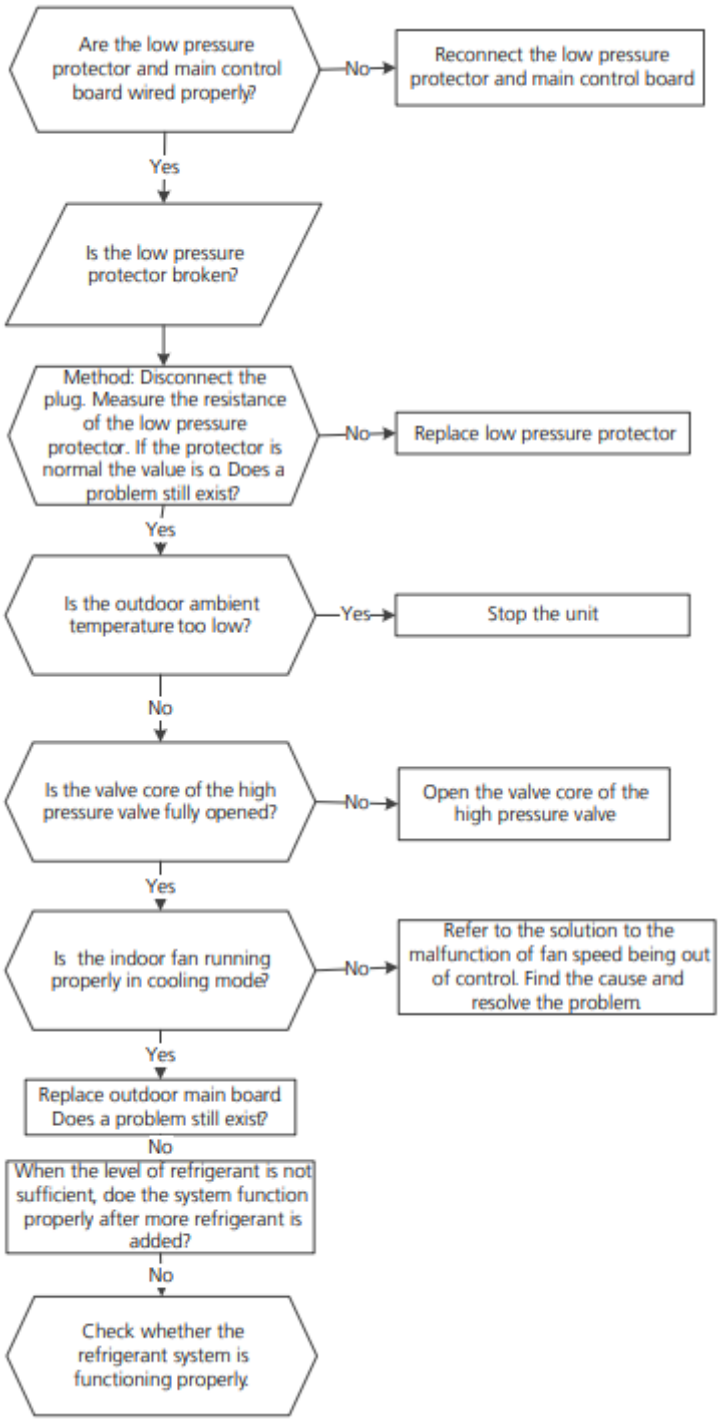
PC 31: System Low Pressure Protection Diagnosis and Solution.

Description: Outdoor pressure switch cut off the system because low pressure is lower than 18.85PSI (0.13MPa), the LED displays the failure code.

Recommended parts to prepare:

- Connection wires
- Outdoor PCB
- Low pressure protector
- Refrigerant

Troubleshooting and repair:



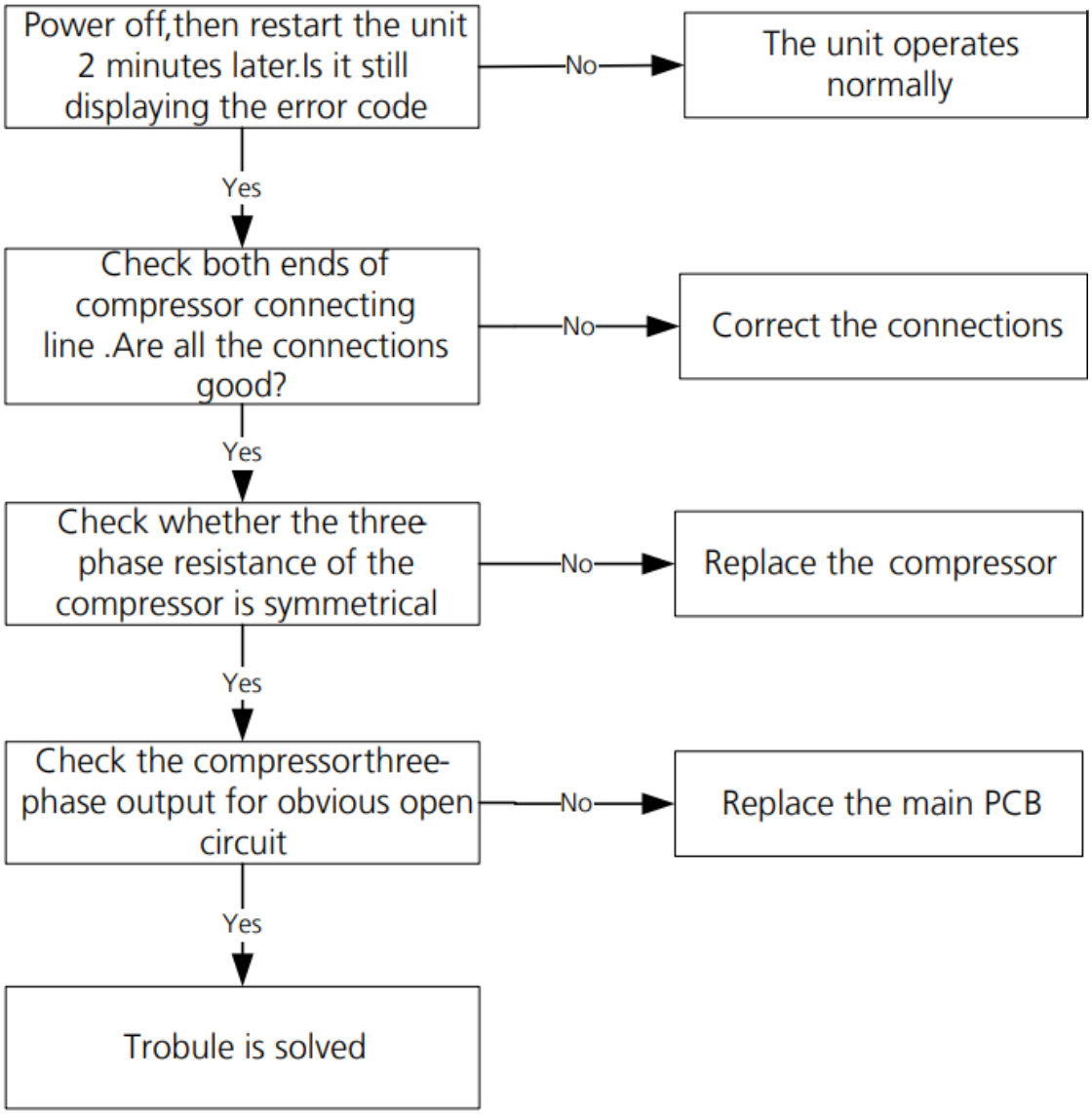
PC 43: ODU Compressor Lack Phase Protection Diagnosis and Solution.

Description: When the three-phase sampling current of the compressor is abnormal, especially when the current of one or more phases is always small and almost 0, the LED displays the failure code.

Recommended parts to prepare:

- Connection wires
- Compressor
- Outdoor PCB

Troubleshooting and repair:



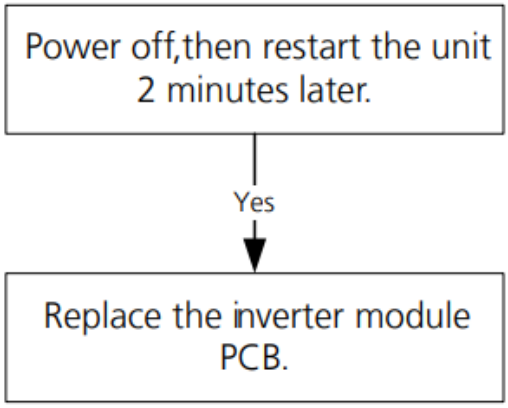
PC 45: ODU IR Chip Drive Failure Diagnosis and Solution.

Description: When the IR chip detects its own parameter error, the LED displays the failure code when power is on.

Recommended parts to prepare:

- Inverter module PCB

Troubleshooting and repair:



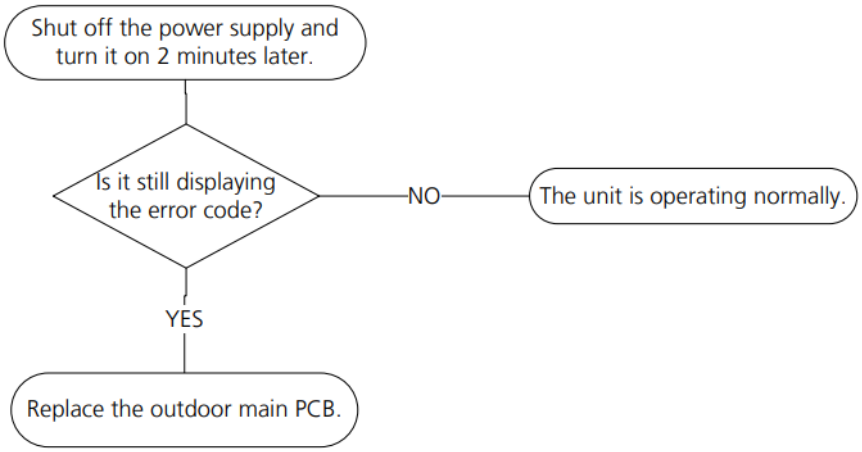
PC 41: Outdoor Compressor Current Sampling Circuit Failure Diagnosis and Solution.

Description: Three-phase sampling offset voltage error, the static bias voltage is normally 2.5V.

Recommended parts to prepare:

- Outdoor main PCB

Troubleshooting and repair:



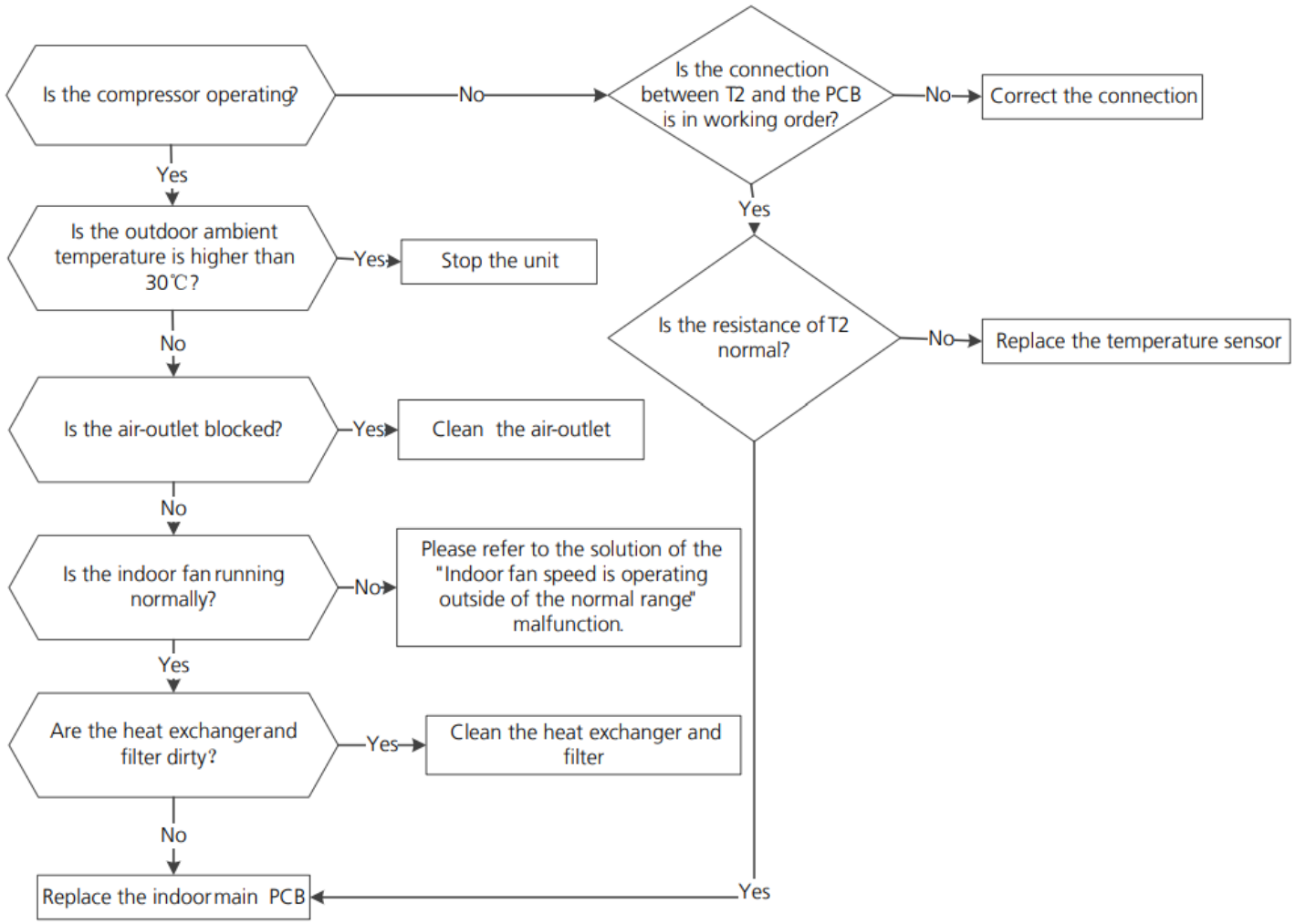
PH 90: High Temperature Protection of Evaporator Diagnosis and Solution.

Description: When evaporator coil temperature is more than 60°C in heating mode, the unit stops. It starts again only when the evaporator coil temperature is less than 52°C.

Recommended parts to prepare:

- Connection wires
- Evaporator coil temperature sensor (T2)
- Indoor fan
- Indoor main PCB

Troubleshooting and repair:

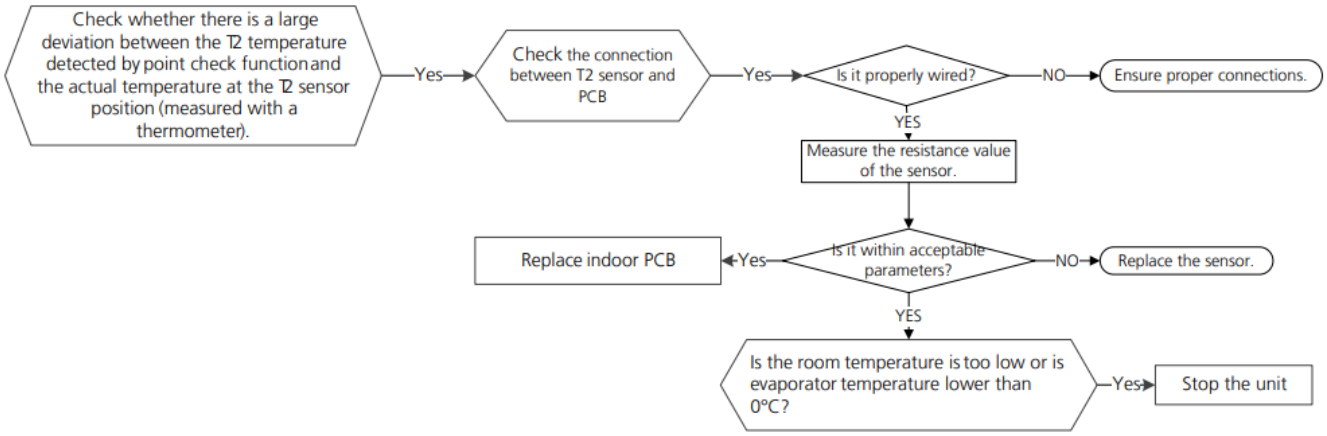


PH 91: Low Temperature Protection of Evaporator Diagnosis and Solution.

Description: When evaporator coil temperature is lower than 0°C in cooling mode or drying mode, the unit stops. It starts again only when the evaporator coil temperature is more than 5°C.

Recommended parts to prepare:

- Connection wires
- Evaporator coil temperature sensor (T2)
- Indoor main PCB



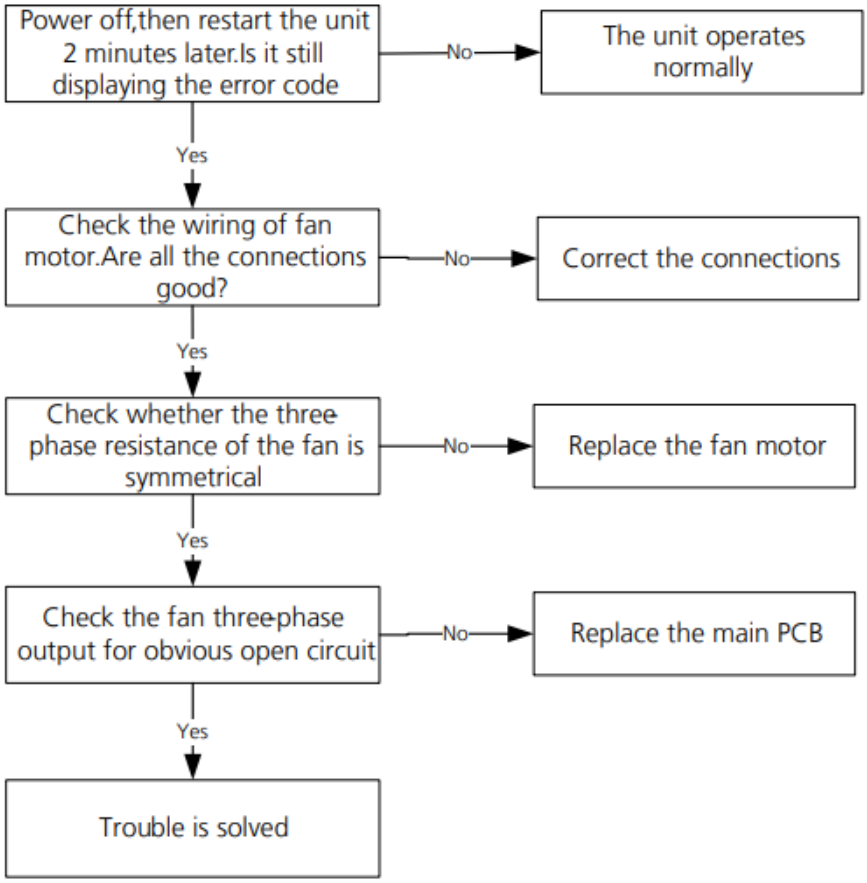
EC 71: Lack Phase Failure of ODU DC Fan Motor Diagnosis and Solution.

Description: When the three-phase sampling current of the DC motor is abnormal, especially when the current of one or more phases is always small and almost 0, the LED displays a fault code.

Recommended parts to prepare:

- Connection wires
- Fan motor
- Outdoor PCB

Troubleshooting and repair:



8.8 Check Procedures

WARNING

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

Temperature Sensor Check:

1. Disconnect the temperature sensor from the PCB.
2. Measure the resistance value of the sensor using a multi-meter.
3. Check corresponding temperature sensor resistance value table.

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

Temperature Sensor Resistance Value Table for TP (°C-K)

°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	1.171
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			

Other Temperature Sensor Resistance Value Table (°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	1.89627	107	225	0.51426
-12	10	70.1698	28	82	8.71983	68	154	1.83003	108	226	0.49989
-11	12	66.0898	29	84	8.3356	69	156	1.76647	109	228	0.486
-10	14	62.2756	30	86	7.97078	70	158	1.70547	110	230	0.47256
-9	16	58.7079	31	88	7.62411	71	160	1.64691	111	232	0.45957
-8	18	56.3694	32	90	7.29464	72	162	1.59068	112	234	0.44699
-7	19	52.2438	33	91	6.98142	73	163	1.53668	113	235	0.43482
-6	21	49.3161	34	93	6.68355	74	165	1.48481	114	237	0.42304
-5	23	46.5725	35	95	6.40021	75	167	1.43498	115	239	0.41164
-4	25	44	36	97	6.13059	76	169	1.38703	116	241	0.4006
-3	27	41.5878	37	99	5.87359	77	171	1.34105	117	243	0.38991
-2	28	39.8239	38	100	5.62961	78	172	1.29078	118	244	0.37956
-1	30	37.1988	39	102	5.3689	79	174	1.25423	119	246	0.36954
0	32	35.2024	40	104	5.17519	80	176	1.2133	120	248	0.35982
1	34	33.3269	41	106	4.96392	81	178	1.17393	121	250	0.35042
2	36	31.5635	42	108	4.76253	82	180	1.13604	122	252	0.3413
3	37	29.9058	43	109	4.5705	83	181	1.09958	123	253	0.33246
4	39	28.3459	44	111	4.38736	84	183	1.06448	124	255	0.3239
5	41	26.8778	45	113	4.21263	85	185	1.03069	125	257	0.31559
6	43	25.4954	46	115	4.04589	86	187	0.99815	126	259	0.30754
7	45	24.1932	47	117	3.88673	87	189	0.96681	127	261	0.29974
8	46	22.5662	48	118	3.73476	88	190	0.93662	128	262	0.29216
9	48	21.8094	49	120	3.58962	89	192	0.90753	129	264	0.28482
10	50	20.7184	50	122	3.45097	90	194	0.8795	130	266	0.2777
11	52	19.6891	51	124	3.31847	91	196	0.85248	131	268	0.27078
12	54	18.7177	52	126	3.19183	92	198	0.82643	132	270	0.26408
13	55	17.8005	53	127	3.07075	93	199	0.80132	133	271	0.25757
14	57	16.9341	54	129	2.95896	94	201	0.77709	134	273	0.25125
15	59	16.1156	55	131	2.84421	95	203	0.7537	135	275	0.24512
16	61	15.3418	56	133	2.73823	96	205	0.73119	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	2.4467	99	210	0.64862	139	282	0.22231

System Pressure Table-R454B

Pressure			Temperature		Pressure			Temperature	
Kpa	Bar	PSI	°C	°F	Kpa	Bar	PSI	°C	°F
58.196	0.58	8.44	-60	-76	935.23	9.35	135.64	8	46.4
61.517	0.62	8.92	-59	-74.2	963.75	9.64	139.78	9	48.2
64.988	0.65	9.43	-58	-72.4	992.93	9.93	14401	10	50
68.615	0.69	9.95	-57	-70.6	1022.8	10.23	148.34	11	51.8
72.402	.072	10.50	-56	-68.8	1053.3	10.53	152.76	12	53.6
76.354	0.76	11.07	-55	-67	1084.5	10.85	157.29	13	55.4
80.478	0.80	11.67	-54	-65.2	1116.4	11.16	161.91	14	57.2
84.776	0.85	12.30	-53	-63.4	1149	11.49	166.64	15	59
89.256	0.89	12.95	-52	-61.6	1182.3	11.82	171.47	16	60.8
93.923	0.94	13.62	-51	-59.8	1216.3	12.16	176.40	17	62.6
98.781	0.99	14.33	-50	-58	1251.1	12.51	181.45	18	64.4
103.84	1.04	15.06	-49	-56.2	1286.6	12.87	186.60	19	66.2
109.1	1.09	15.82	-48	-54.4	1322.8	13.23	191.85	20	68
114.56	1.15	16.61	-47	-52.6	1359.9	13.60	197.23	21	69.8
120.25	1.20	17.44	-46	-50.8	1397.7	13.98	202.71	22	71.6
126.15	1.26	18.30	-45	-49	1436.3	14.36	208.31	23	73.4
132.28	1.32	19.18	-44	-47.2	1475.7	14.76	214.02	24	75.2
138.64	1.39	20.11	-43	-45.4	1515.9	15.16	219.85	25	77
145.24	1.45	21.06	-42	-43.6	1557	15.57	225.82	26	78.8
152.09	1.52	22.06	-41	-41.8	1598.9	15.99	231.89	27	80.6
159.18	1.59	23.09	-40	-40	1641.6	16.42	238.09	28	82.4
166.54	1.67	24.15	-39	-38.2	1685.2	16.85	244.41	29	84.2
174.15	1.74	25.26	-38	-36.4	1729.7	17.30	250.86	30	86
182.04	1.82	26.40	-37	-34.6	1775	17.75	257.43	31	87.8
190.2	1.90	27.59	-36	-32.8	1821.3	18.21	264.15	32	89.6
198.65	1.99	28.81	-35	-31	1868.4	18.68	270.98	33	91.4
207.39	2.07	30.08	-34	-29.2	1916.5	19.17	277.95	34	93.2
216.42	2.16	31.39	-33	-27.4	1965.6	19.66	285.08	35	95
225.76	2.26	32.74	-32	-25.6	2015.5	20.16	292.31	36	96.8
235.41	2.35	34.14	-31	-23.8	2066.5	20.67	299.71	37	98.6
245.37	2.45	35.59	-30	-22	2118.4	21.18	307.24	38	100.4
255.67	2.56	37.08	-29	-20.2	2171.3	21.71	314.19	39	102.2
266.29	2.66	38.62	-28	-18.4	2225.2	22.25	322.73	40	104
277.25	2.77	40.21	-27	-16.6	2280.2	22.80	330.70	41	105.8
288.56	2.89	41.85	-26	-14.8	2336.1	23.36	38.81	42	107.6
300.22	3.00	43.54	-25	-13	2393.2	23.93	347.09	43	109.4
312.24	3.12	45.28	-24	-11.2	2451.3	24.51	355.52	44	111.2
324.63	3.25	47.08	-23	-9.4	2510.4	25.10	364.09	45	113
337.39	3.37	48.93	-22	-7.6	2570.7	25.71	372.84	46	114.8
350.54	3.51	50.84	-21	-5.8	2632.1	26.32	381.74	47	116.6
364.08	3.64	52.80	-20	-4	2694.7	26.95	390.82	48	118.4
378.02	3.78	54.83	-19	-2.2	2758.33	27.58	400.04	49	120.2
392.37	3.92	56.91	-18	-0.4	2823.2	28.23	409.46	50	122
407.13	4.07	59.05	-17	1.4	2889.3	28.89	419.04	51	123.8

System Pressure Table-R454B Cont.

Pressure			Temperature		Pressure			Temperature	
Kpa	Bar	PSI	°C	°F	Kpa	Bar	PSI	°C	°F
422.31	4.22	61.25	-16	3.2	2956.5	29.57	428.79	52	125.6
437.92	4.38	63.5	-15	5	3025	30.25	438.72	53	127.4
453.98	4.54	65.84	-14	6.8	3094.7	30.95	448.83	54	129.2
470.47	4.70	68.23	-13	8.6	3165.7	31.66	459.13	55	131
487.43	4.87	70.69	-12	10.4	3238.1	32.38	469.63	56	132.8
504.84	5.05	73.22	-11	12.2	3311.7	33.12	480.30	57	134.6
522.73	5.23	75.81	-10	14	3386.7	33.87	491.18	58	136.4
541.1	5.41	78.48	-9	15.8	3463	34.63	502.25	59	138.2
559.95	5.60	81.21	-8	17.6	3540.7	35.41	513.52	60	140
579.31	5.79	84.02	-7	19.4	3619.9	36.20	525.00	61	141.8
599.16	5.99	86.90	-6	21.2	3700.5	37.01	536.69	62	143.6
619.54	6.20	89.85	-5	23	3782.7	37.83	548.61	63	145.4
640.43	6.40	92.88	-4	24.8	3866.3	38.66	560.74	64	147.2
661.86	6.62	95.99	-3	26.6	3951.5	39.52	573.10	65	149
683.82	6.84	99.18	-2	28.4	4038.3	40.38	585.69	66	450.28
706.34	7.06	102.44	-1	30.2	4126.8	41.27	598.52	67	152.6
729.41	7.29	105.79	0	32	4217	42.17	611.60	68	154.4
753.06	7.53	109.22	1	33.8	4309	43.09	624.95	69	156.2
777.28	7.77	112.73	2	35.6	4402.9	44.03	638.56	70	158
802.08	8.02	116.33	3	37.4	4498.7	44.99	652.46	71	159.8
827.47	8.27	120.01	4	39.2	4596.5	45.97	666.64	72	161.6
853.49	8.53	123.78	5	41	4696.5	46.97	681.15	73	163.4
880.11	8.80	127.64	6	42.8	4798.9	47.99	696.00	74	165.5
907.35	9.07	131.60	7	44.6	4904.1	49.04	711.25	75	167

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