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

# DIY® Series Outtasight® Ceiling Cassette

## SERVICE MANUAL

## MODELS:

**DIYCASSETTE*HP-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: May 20, 2025
Please visit www.mrcool.com/documentation
to ensure you have the latest version of this manual.

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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:

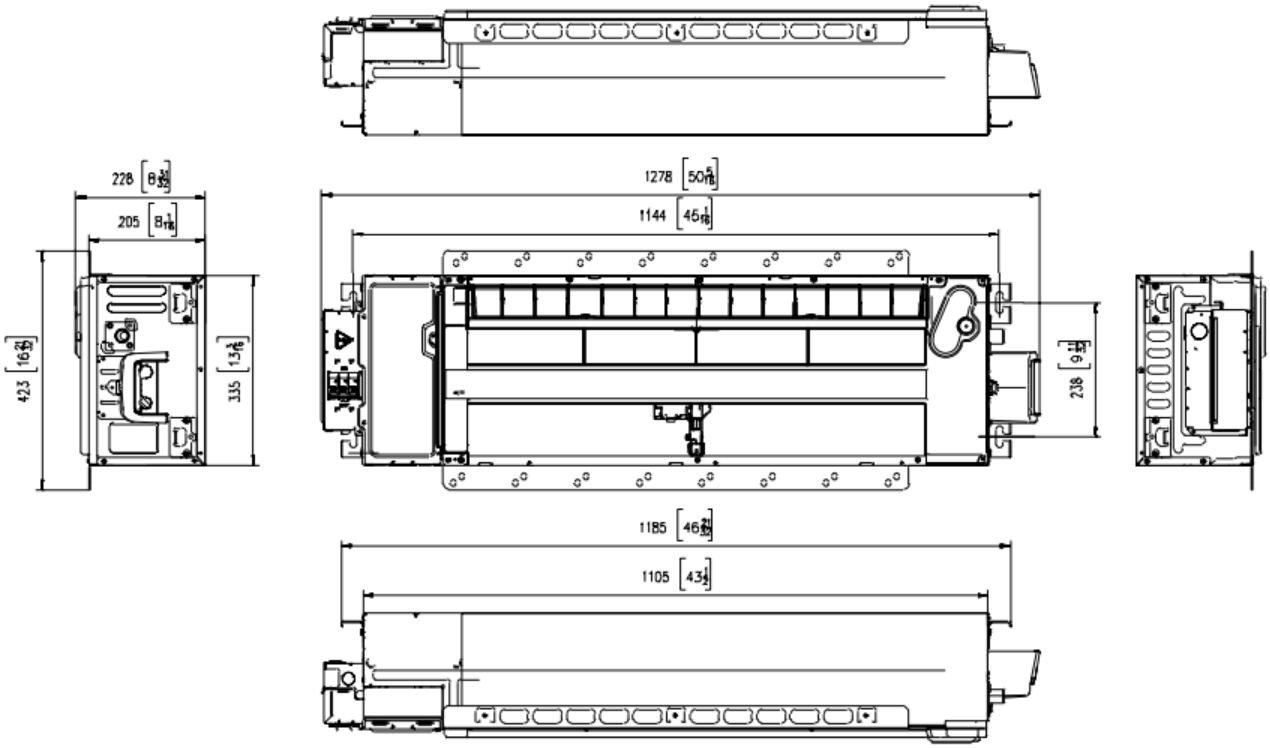
| Height of Outlet/m | A/m² | Mc/kg | Mmax/kg | Anvmin/m² |
|---|---|---|---|---|
| 2.2 | 5 | 5.0 | 2.685 | 0.045 |
| 2.2 | 6 | 5.0 | 2.941 | 0.042 |
| 2.2 | 7 | 5.0 | 3.177 | 0.038 |
| 2.2 | 8 | 5.0 | 3.396 | 0.035 |
| 2.2 | 9 | 5.0 | 3.602 | 0.031 |
| 2.2 | 10 | 5.0 | 3.797 | 0.028 |
| 2.2 | 11 | 5.0 | 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 |

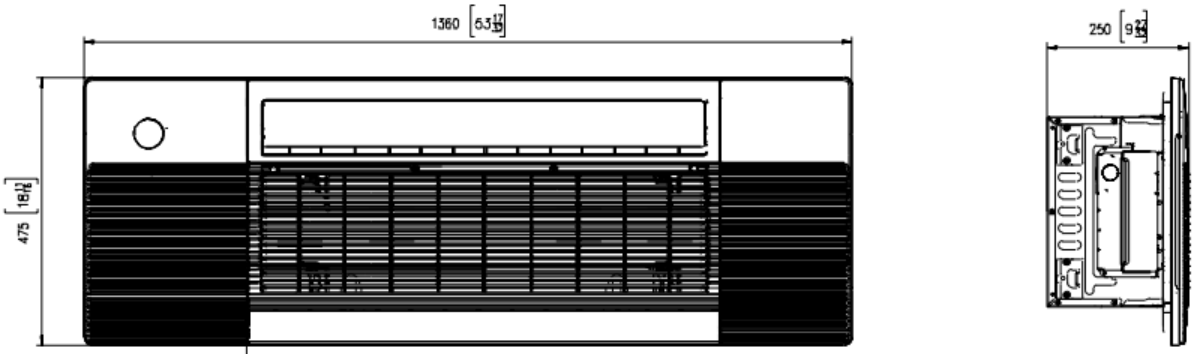
## 2.1 Model Reference

| Indoor Unit Model | Capacity (Btu/h) | Power Supply |
|---|---|---|
| DIYCASSETTE06HP-230D25-O | 6K | 208/230V~, 60Hz, 1 Phase |
| DIYCASSETTE09HP-230D25-O | 9K | |
| DIYCASSETTE12HP-230D25-O | 12K | |
| DIYCASSETTE18HP-230D25-O | 18K | |

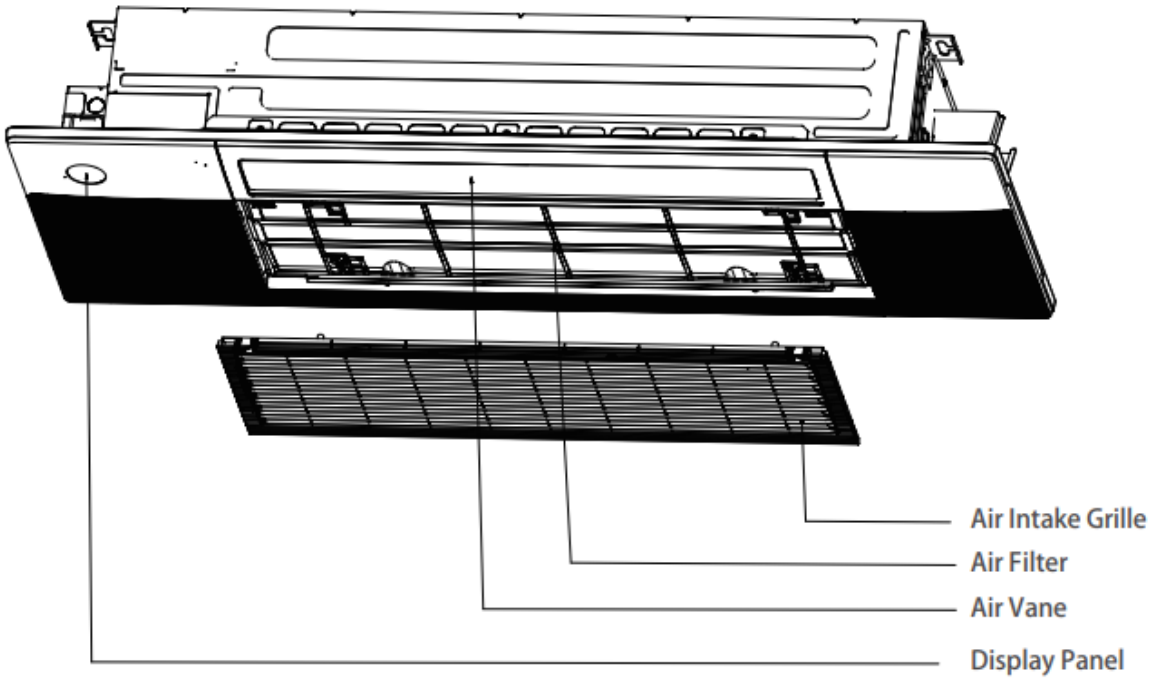
### Cassette Apperance

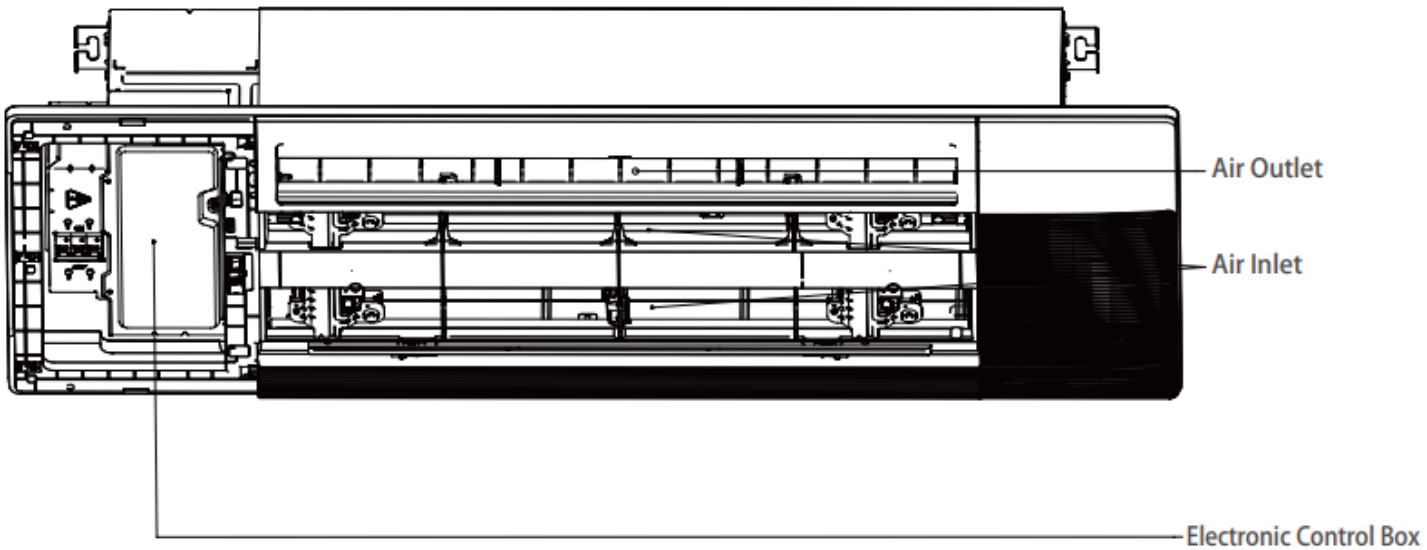
## 2.2 Dimensional Drawing



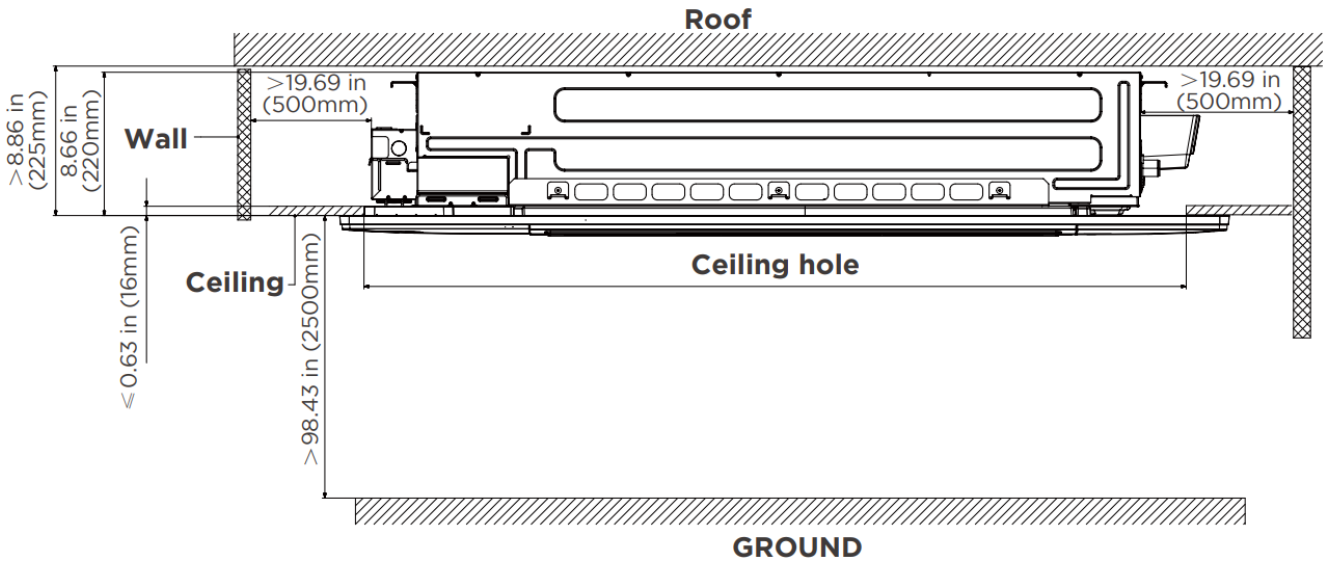
## 2.3 Part Names



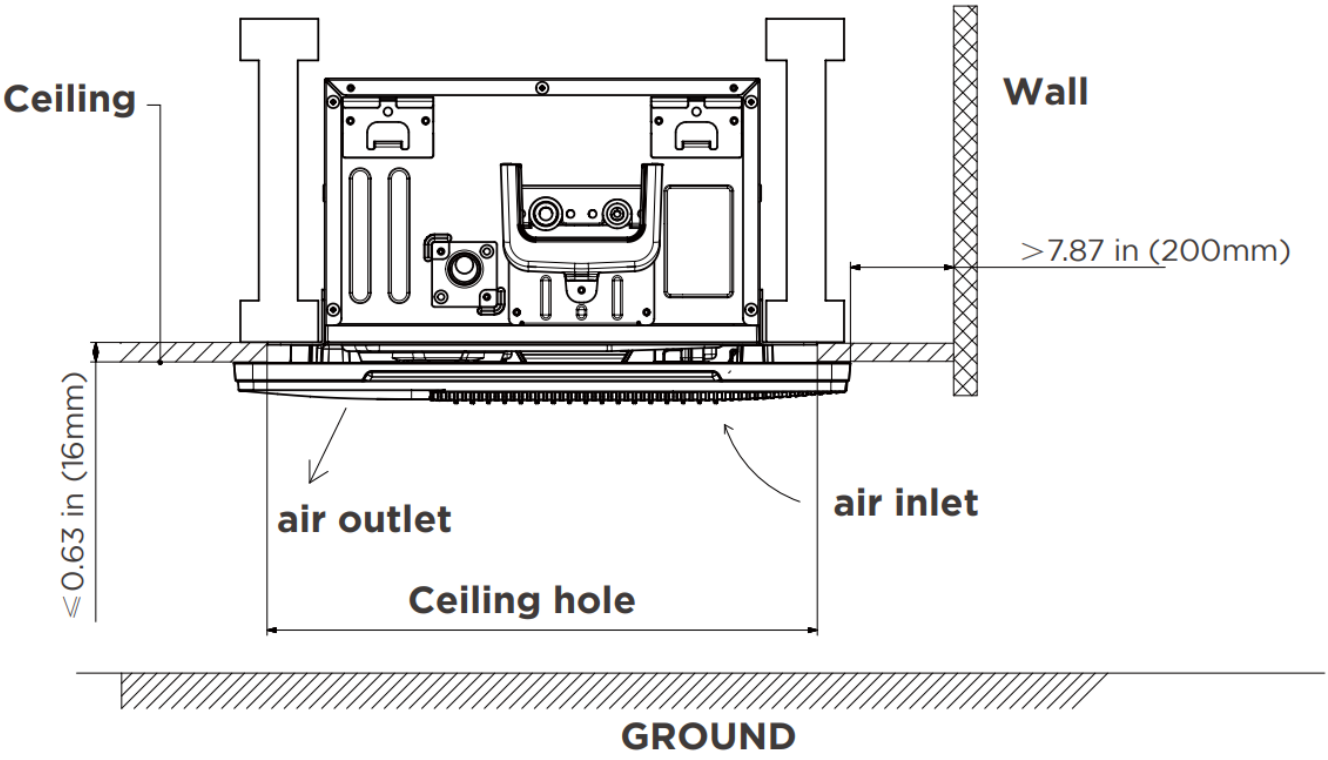



## 2.4 Placement Diagram

### Perspective A

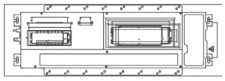
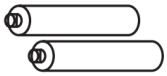
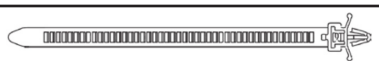
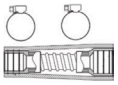
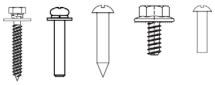
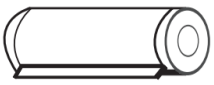
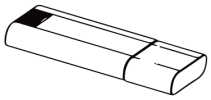
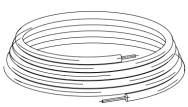



### Perspective B



## 2.5 Accessories

The air conditioning system comes with the following accessories. Use all of the installation parts and accessories to install the air conditioner. Improper installation may result in water leakage, electrical shock, fire, or equipment failure.

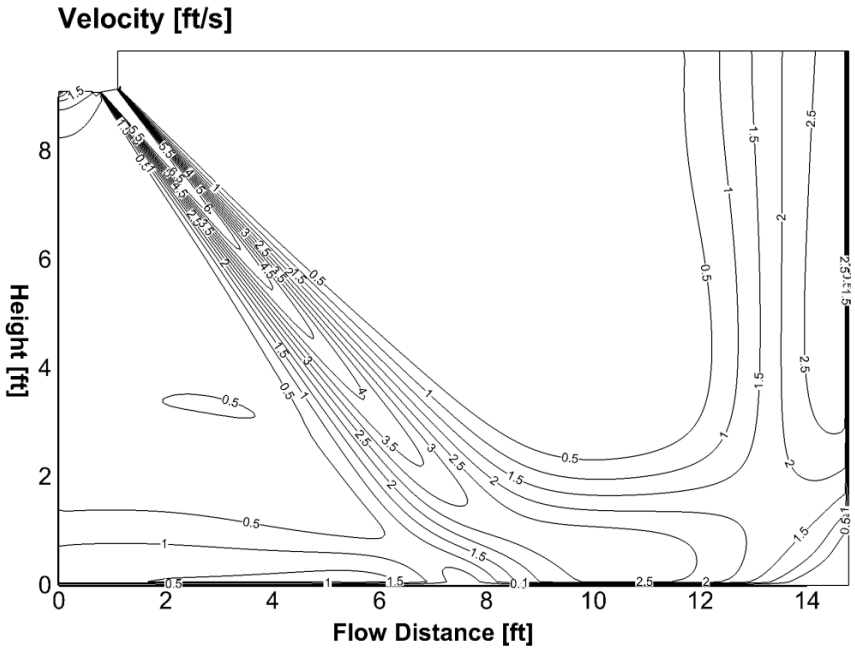
| PART | LOOKS LIKE | QUANTITY |
|---|---|---|
| Installation Cardboard Template |  | 1 |
| Manual |  | 1 |
| Remote |  | 1 |
| Battery |  | 2 |
| Remote Control Holder |  | 1 |
| Cable Ties |  | 6 |
| Drainpipe Adapter |  | 1 |
| Screw Kits (ST8*550, M4*22, ST2.9*16, ST4.8*12, ST3.9*10) |  | 1 (8,8,2,2,3) |
| Water Receiver |  | 1 |
| Rubber Ring |  | 1 |
| Insulation Sleeve |  | 2 |
| Smart Kit |  | 1 |
| Panel |  | 1 |
| MC Cable |  | 1 |
| Sound Deadening Pad |  | 2 |

***Note: The panel installation should be performed after wiring and piping have been completed.***

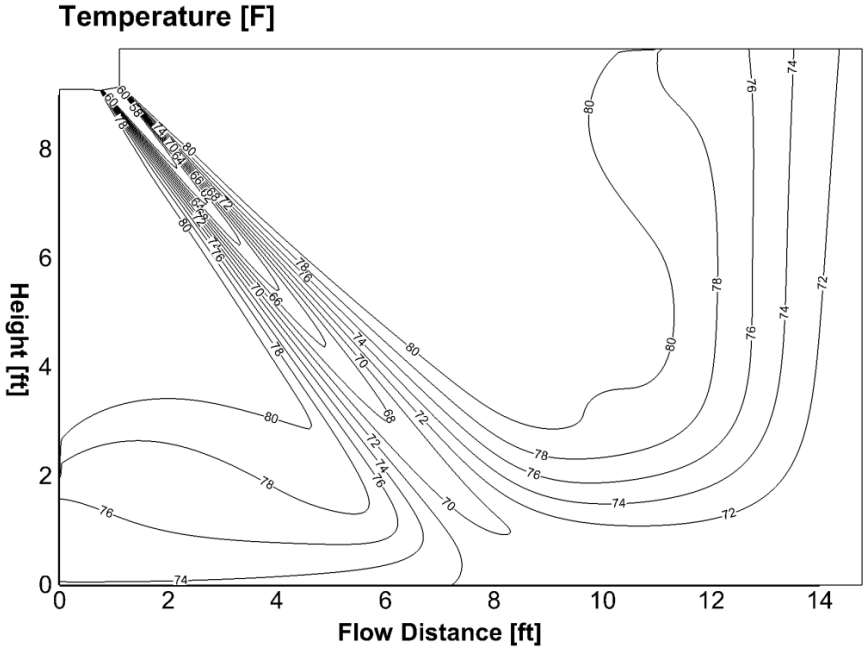
## 2.6 Air Velocity and Temperature Distributions

**DIYCASSETTE06HP-230D-O:** Cooling (Indoor: 80.6°F /27°C Outdoor: 95°F /35°C)
Discharge angle 50°

### Airflow Velocity Distributions

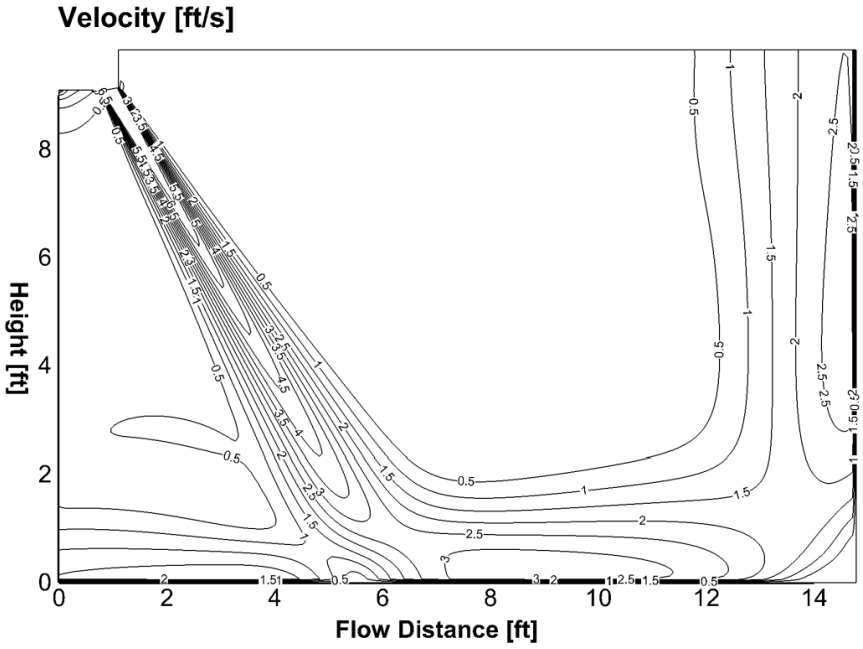



### Temperature Distributions

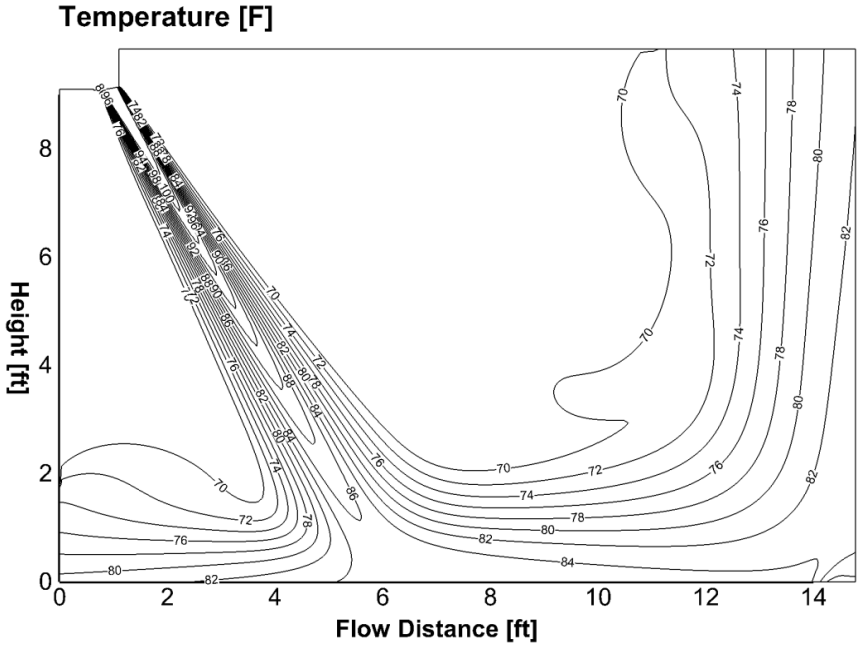


**DIYCASSETTE06HP-230D-O:** Heating (Indoor: 68°F /20°C Outdoor: 44.6°F /7°C)
Discharge angle 77°

### Airflow Velocity Distributions

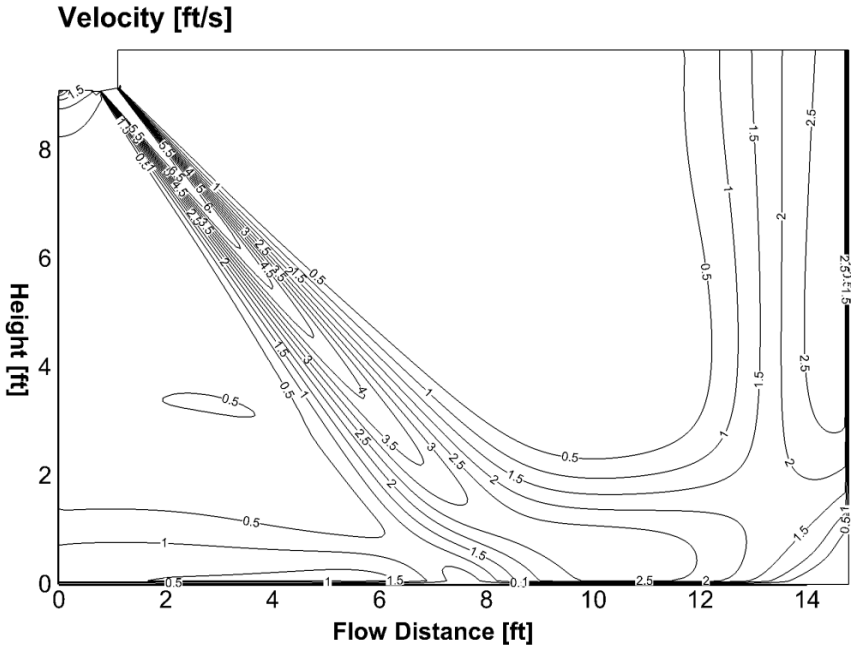



### Temperature Distributions

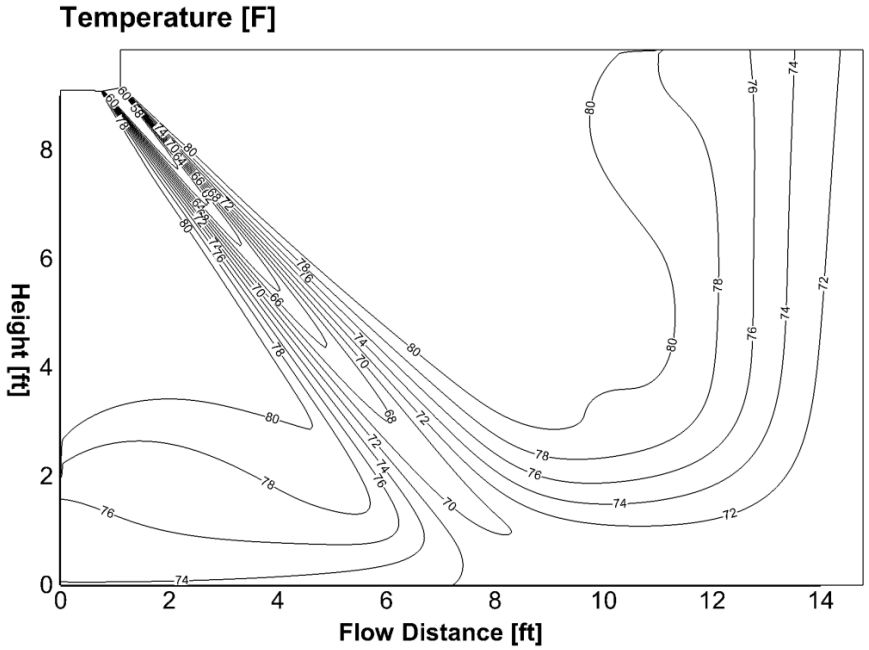


**DIYCASSETTE09HP-230D-O:** Cooling (Indoor: 80.6°F /27°C Outdoor: 95°F /35°C)
Discharge angle 50°

### Airflow Velocity Distributions

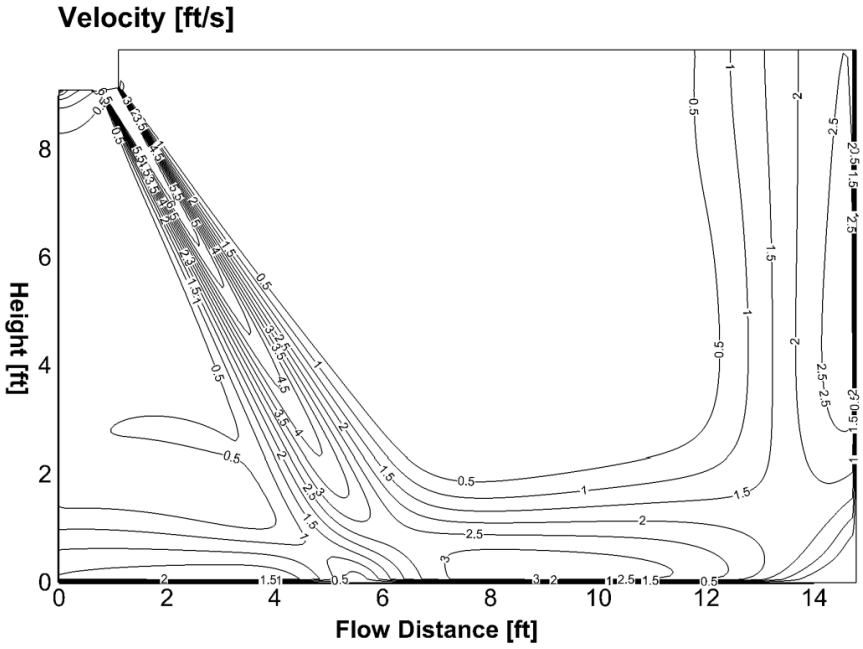



### Temperature Distributions

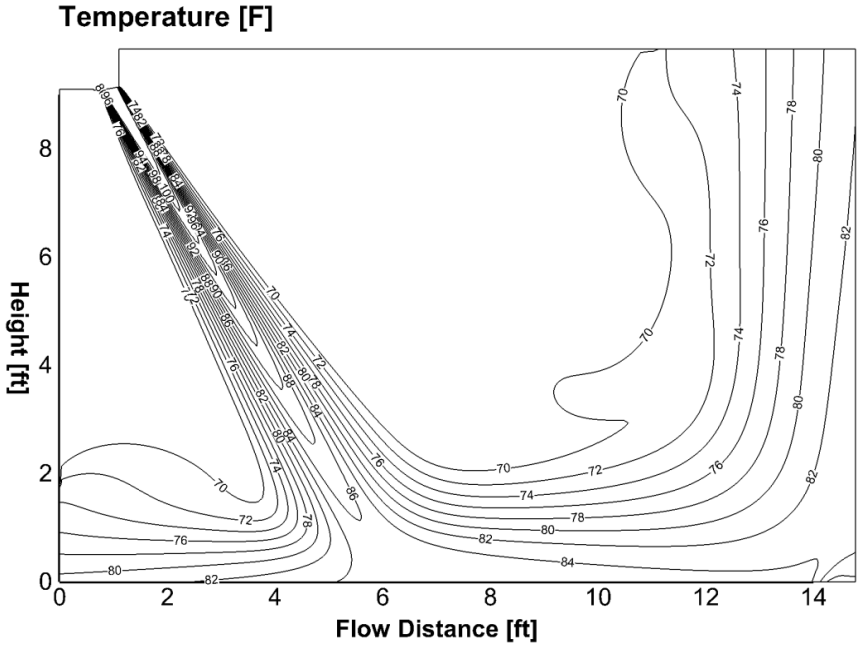


**DIYCASSETTE09HP-230D-O:** Heating (Indoor: 68°F /20°C Outdoor: 44.6°F /7°C)
Discharge angle 77°

### Airflow Velocity Distributions

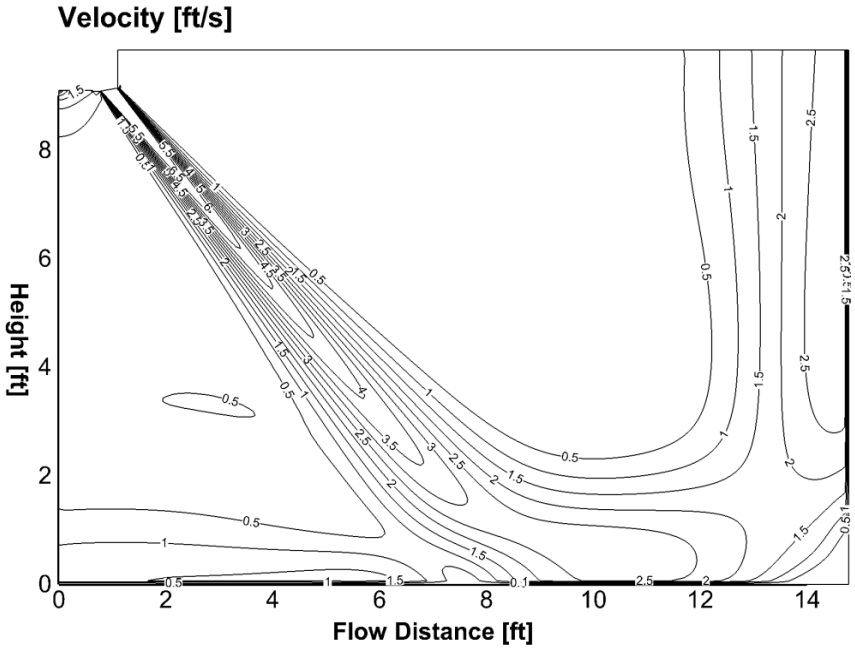



### Temperature Distributions

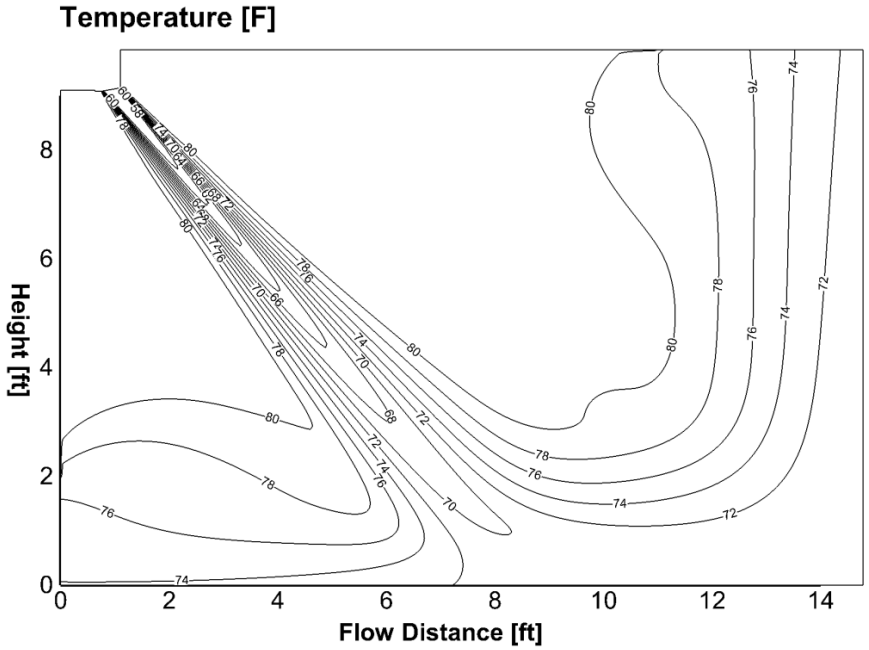


**DIYCASSETTE12HP-230D-O:** Cooling (Discharge angle 45°)

### Airflow Velocity Distributions

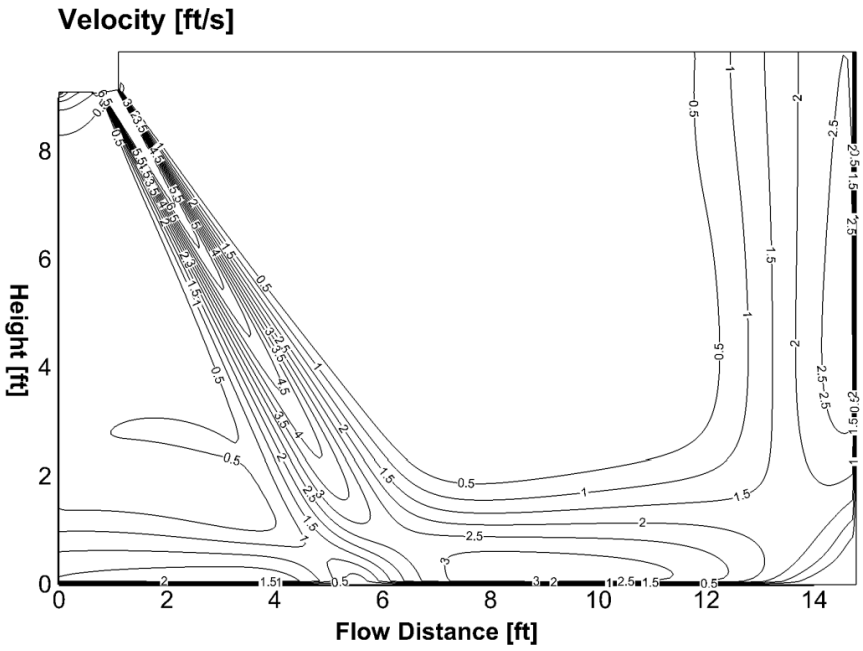



### Temperature Distributions

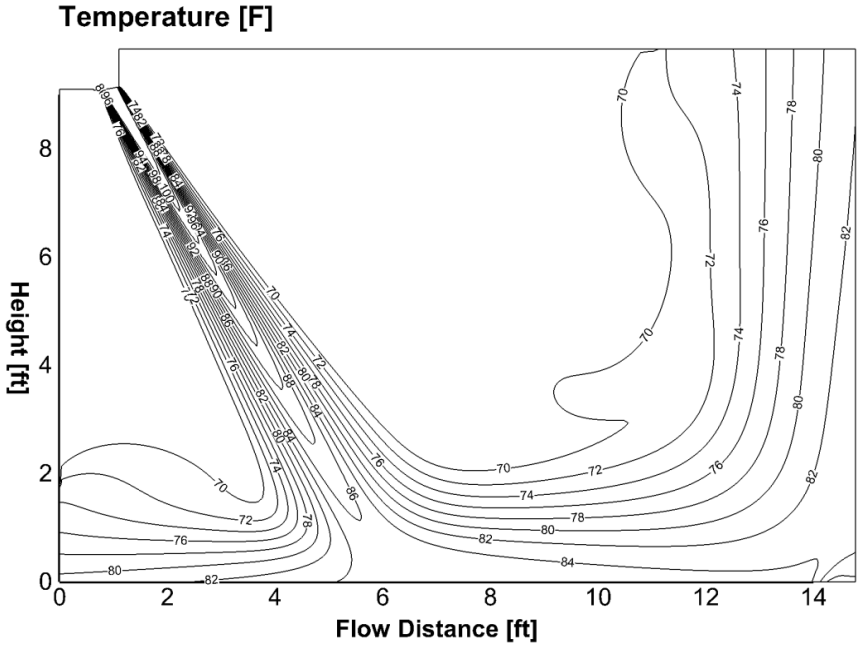


**DIYCASSETTE12HP-230D-O:** Heating (Discharge angle 65°)

### Airflow Velocity Distributions



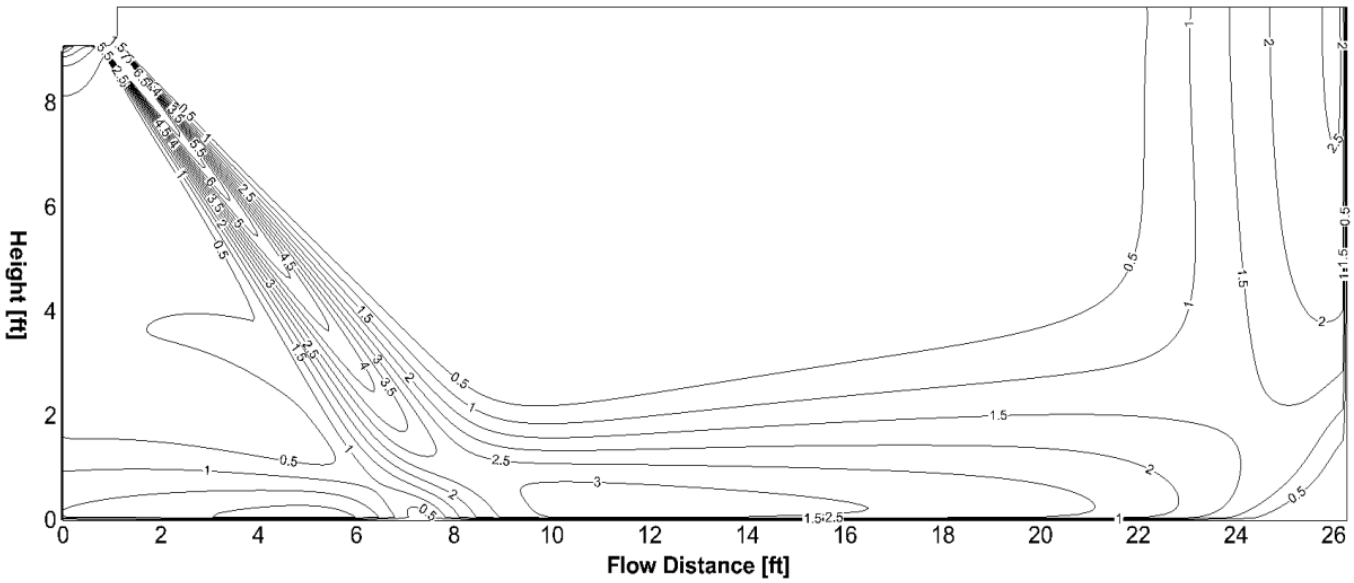

### Temperature Distributions



**DIYCASSETTE18HP-230D-O:** Cooling (Discharge angle 45°)

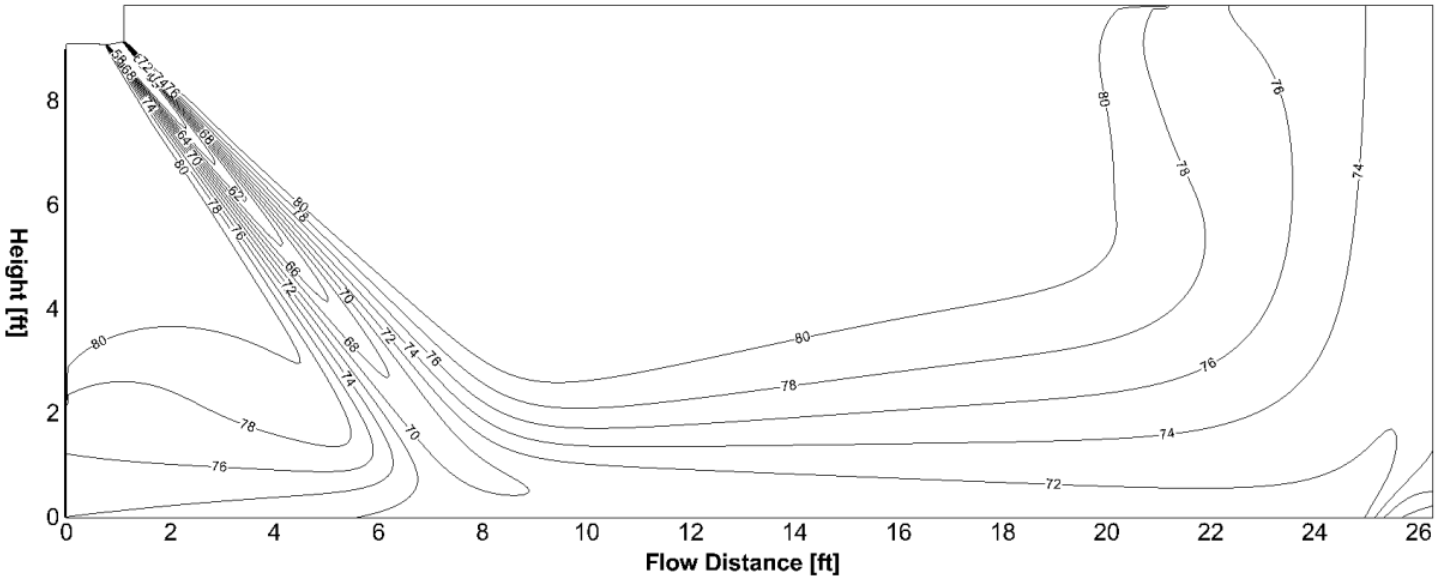
### Airflow Velocity Distributions

**Velocity [ft/s]**




### Temperature Distributions

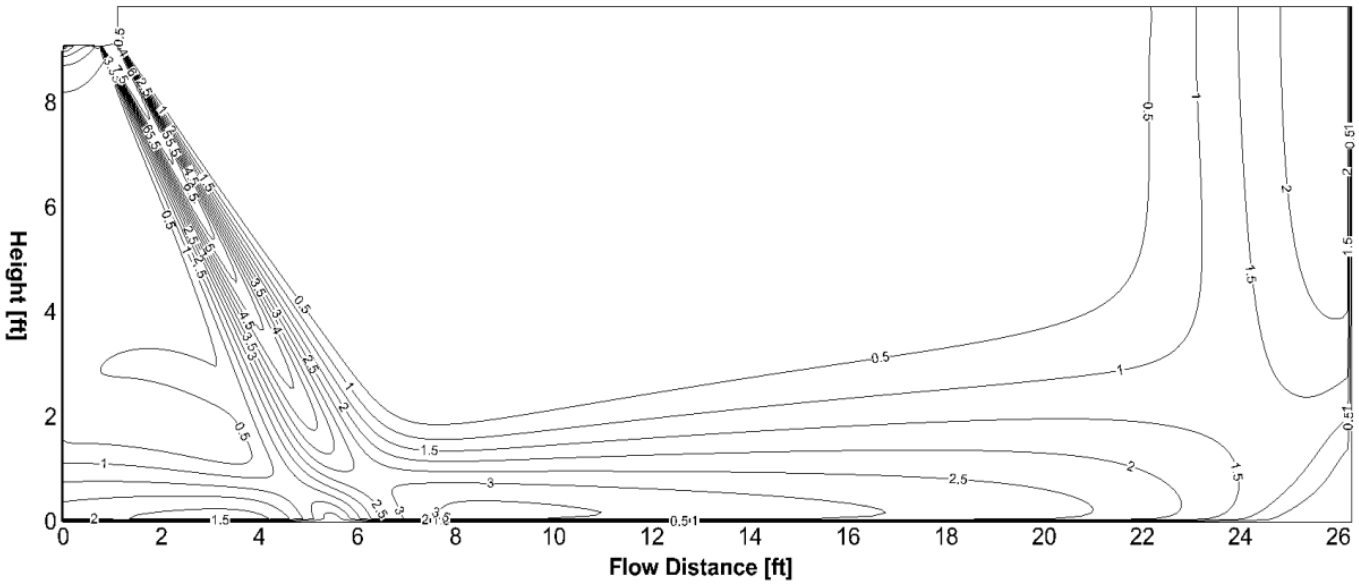
**Temperature [F]**



**DIYCASSETTE18HP-230D-O:** Heating (Discharge angle 65°)

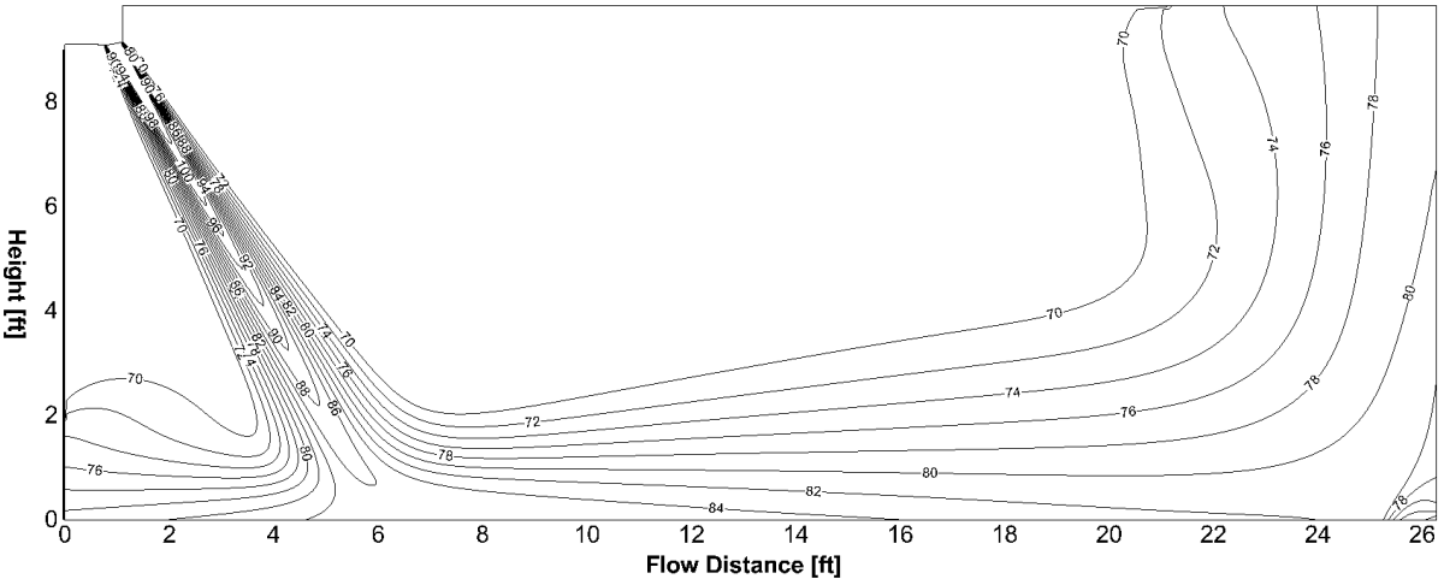
## Airflow Velocity Distributions

**Velocity [ft/s]**



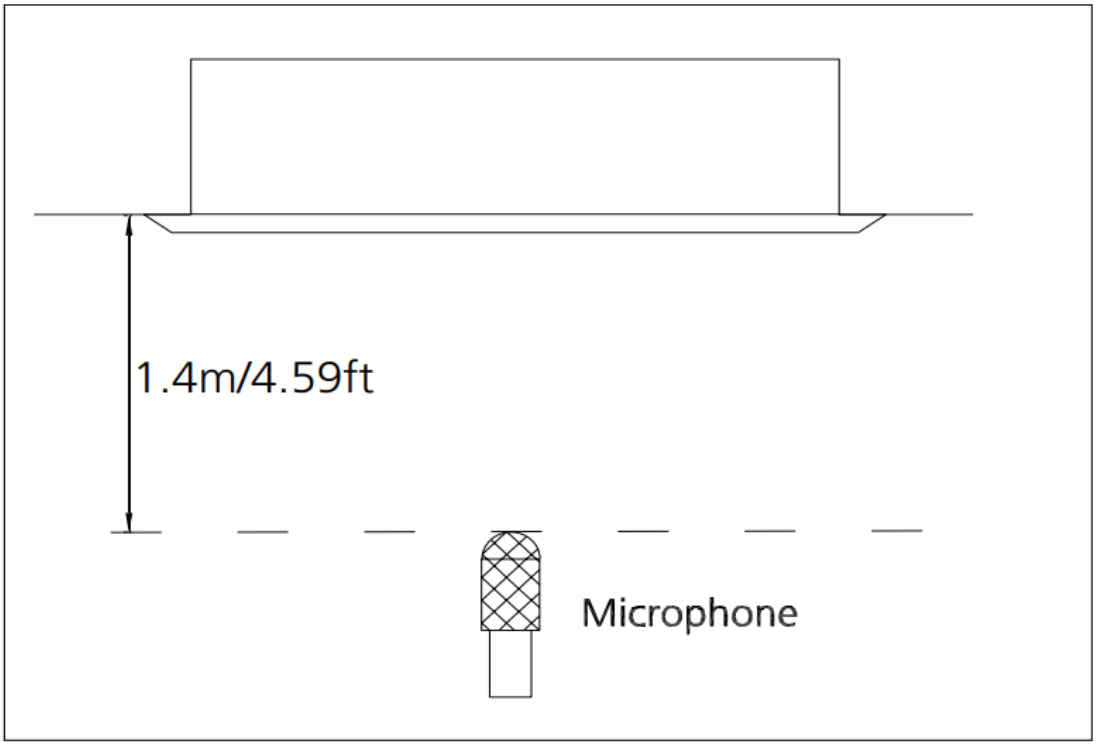

## Temperature Distributions

**Temperature [F]**



## 2.7 Noise Criterion Curves

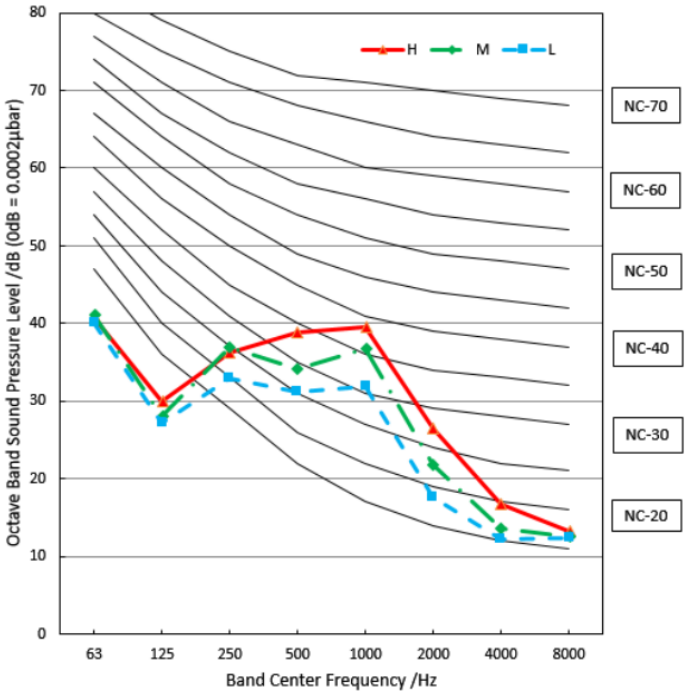
### Sound Pressure Level



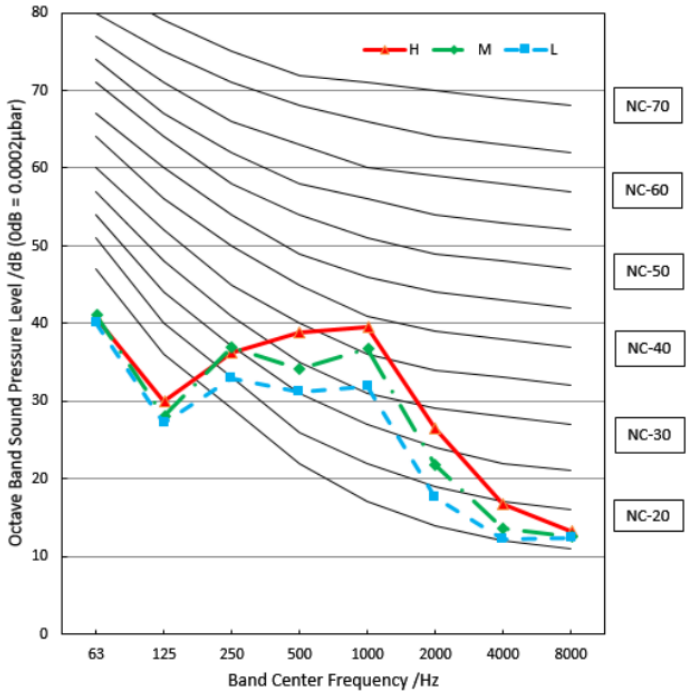

**Notes:**

- Sound is measures at 4.92ft/1.5m away from the loudest location of the unit.
- Data is valid at nominal operation 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.

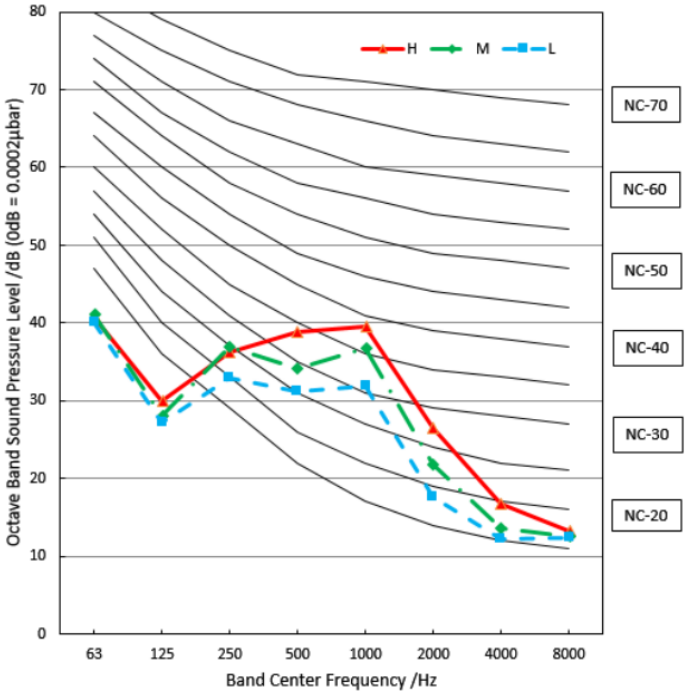
6K


H
M
L
NC-70
NC-60
NC-50
NC-40
NC-30
NC-20
Octave Band Sound Pressure Level /dB (0dB = 0.0002μbar)
Band Center Frequency /Hz
0
10
20
30
40
50
60
70
80
63
125
250
500
1000
2000
4000
8000

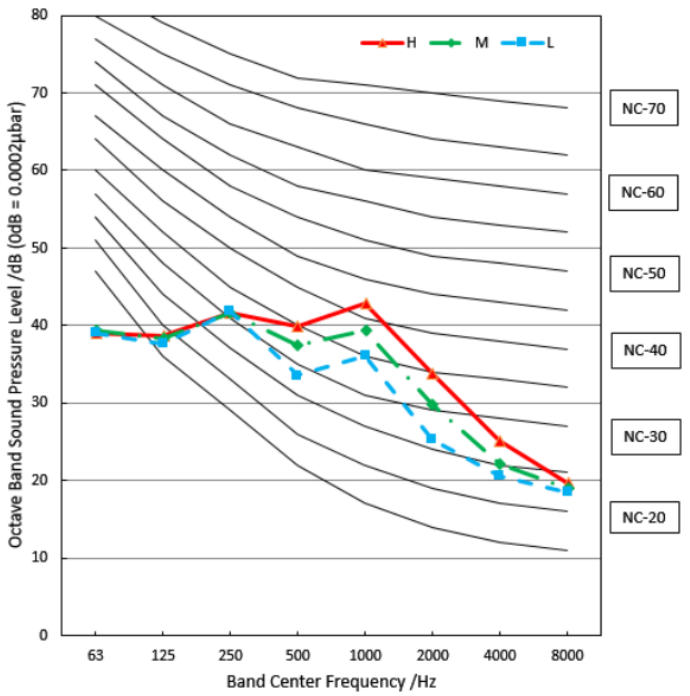
9K


H
M
L
NC-70
NC-60
NC-50
NC-40
NC-30
NC-20
Octave Band Sound Pressure Level /dB (0dB = 0.0002μbar)
Band Center Frequency /Hz
0
10
20
30
40
50
60
70
80
63
125
250
500
1000
2000
4000
8000

12K


H
M
L
NC-70
NC-60
NC-50
NC-40
NC-30
NC-20
Octave Band Sound Pressure Level /dB (0dB = 0.0002μbar)
Band Center Frequency /Hz
0
10
20
30
40
50
60
70
80
63
125
250
500
1000
2000
4000
8000

18K


H
M
L
NC-70
NC-60
NC-50
NC-40
NC-30
NC-20
Octave Band Sound Pressure Level /dB (0dB = 0.0002μbar)
Band Center Frequency /Hz
0
10
20
30
40
50
60
70
80
63
125
250
500
1000
2000
4000
8000

## 2.8 Electrical Wiring Diagrams

### Electrical Characteristics:

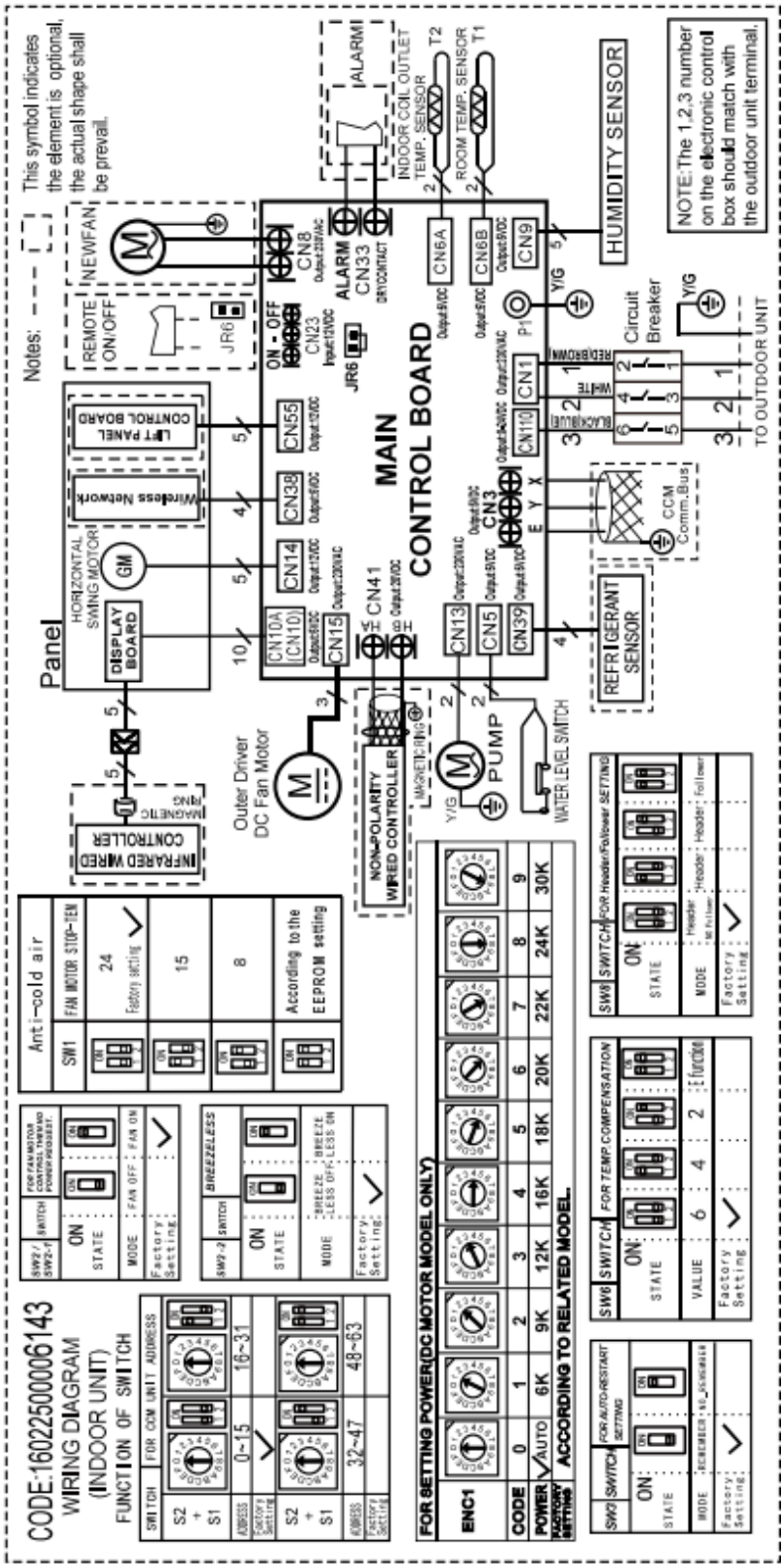
| IDU Model | | 6K | 9K | 12K | 18K |
|---|---|---|---|---|---|
| Power | Phase | 1 | | | |
| | Frequency and Volt | 208/230V,60Hz | | | |
| MOP (Rating of overcurrent protective device) | A | 15 | 15 | 15 | 15 |

### Electrical Wiring Diagrams:

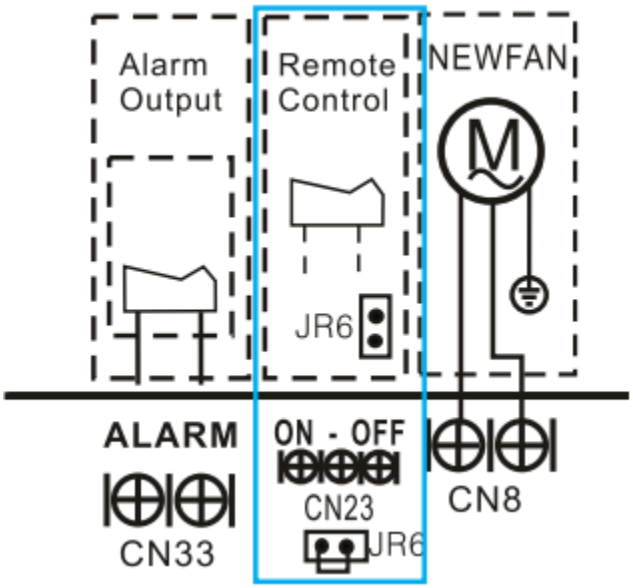
| Capacity (Btu/h) | IDU Wiring Diagram |
|---|---|
| 6K | 16022500006143 |
| 9K | |
| 12K | |
| 18K | |

| Abbreviation | Paraphrase |
|---|---|
| Y/G | Yellow-Green Conductor |
| CAP1 | Indoor Fan Capacitor |
| FAN1 | Indoor Fan |
| PUMP | PUMP |
| To CCM Comm.Bus | Central Controller |
| T1 | Indoor Room Temperature |
| T2 | Coil Temperature of Indoor Heat Exchanger |
| P3 | Super High Speed |
| P2 | High Speed |

## Indoor Unit Wiring Diagram: 16022500006143

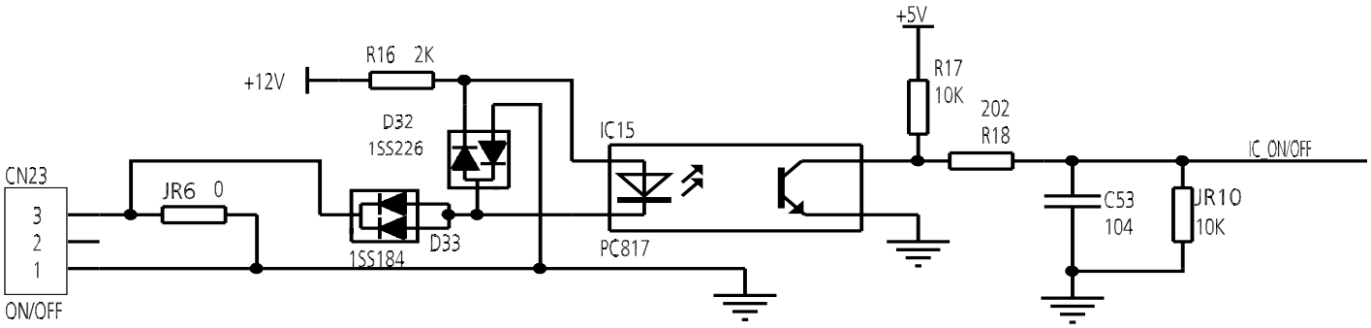


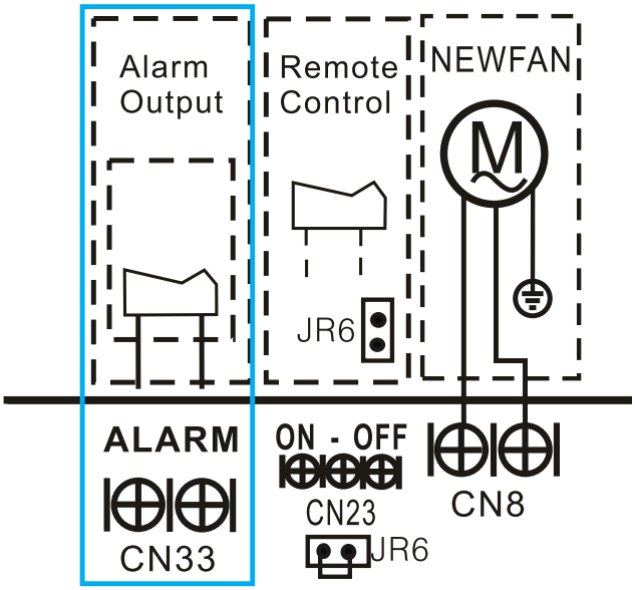
## Connectors:




**For Remote Control (ON-OFF) Terminal Port CN23 and Short Connector of JR6.**

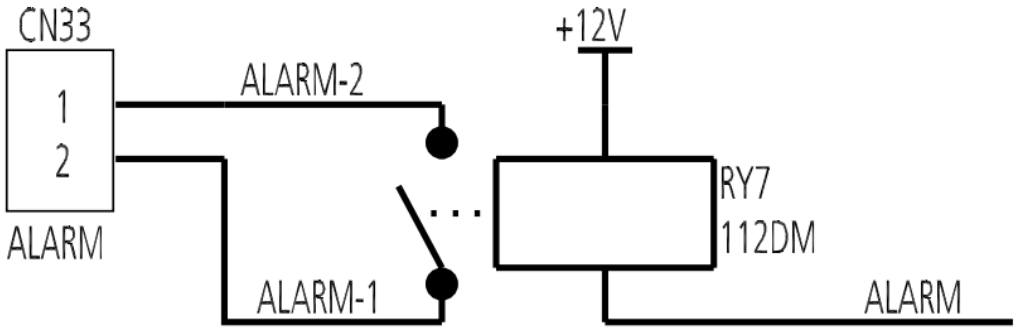
1. Remove the short connector of JR6 when you use ON-OFF function.
2. When the remote switch is off (OPEN); the unit will be off.
3. When the remote switch is on (CLOSED); the unit will be on.
4. When the switch is closed/open the unit will respond to the demand within 2 seconds.
5. When the remote switch is on you can use the remote controller to select the mode desired; when the remote switch is off the unit will not respond to any demand from the remote.
6. The voltage of the port is 12VDC with a design max current of 5mA.

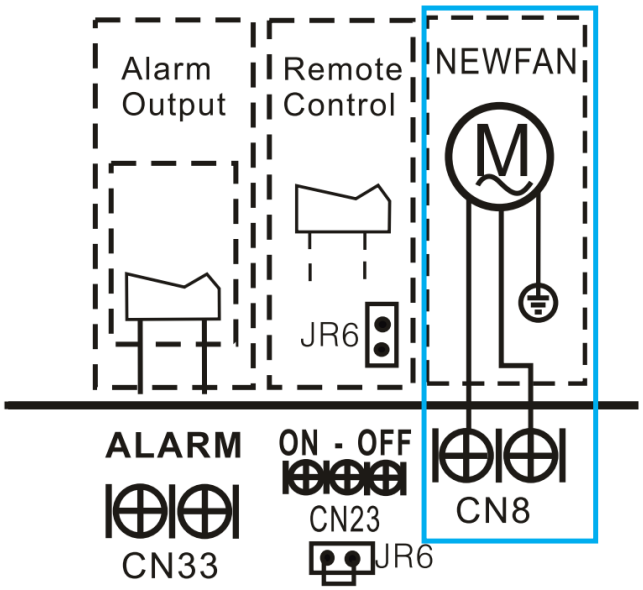





**For ALARM Terminal Port CN33.**

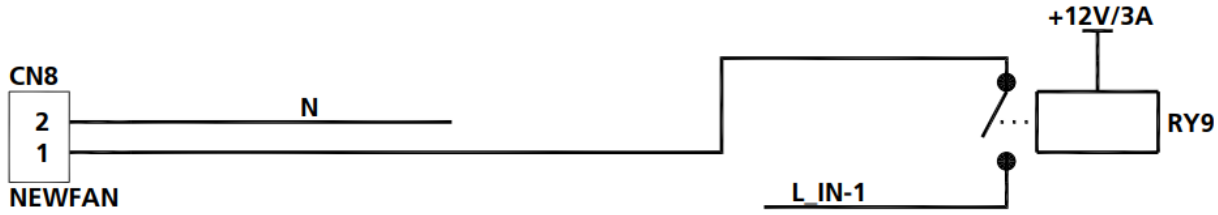
1. Provide the terminal port to connect ALARM as the port will not supply power from the unit.
2. Although the design voltage can support higher voltage it is highly advised to have the incoming power less than 24V with a current draw of less than 0.5A.
3. When the unit occurs a problem the relay will close then the ALARM will activate.



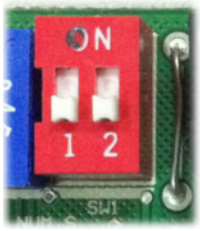



**For New Motor Terminal Port CN8.**

1. Connect the new fan motor to the port ignoring L/N of the fan motor.
2. The output voltage will be the power supply voltage.
3. The new motor cannot exceed 200W or 1A.
4. The new motor will work when a call is made for the indoor fan to operate.
5. When the unit goes into forced cooling mode or capacity testing mode the new motor will not work.

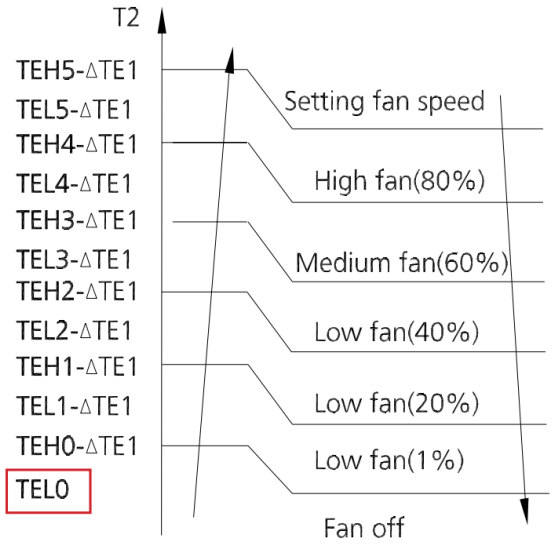


## Micro-Switch:




| Anti-Cold Air | |
|---|---|
| SW1 | Fan Motor Stop |
|  | 24 (Factory Setting) |
|  | 15 |
|  | 8 |
|  | According to the EEPROM Setting |






**Micro-switch SW1 is for selection of the indoor fan stop temperature (TEL0) when it is in anti-cold wind action in heating mode.**
**Range: 24°C, 15°C, 8°C, According to the EEPROM setting (reserved).**


| Fan Motor Control Then No Power Request | |
|---|---|
| SW2/ SW2-1 | Mode |
|  | Fan Off |
|  | Fan On (Factory Setting) |



**Micro-switch SW2/SW2-1 is for selection of indoor FAN ACTION if room temperature reaches the set point and the compressor stops.**
**Range: OFF: Anti-cold wind is available in heating mode. ON: No anti-cold wind function.**
***Note: SW2 dip switch is only reserved as a physical part but without mode modification function, if changes are needed to the factory setting use the remote control.***

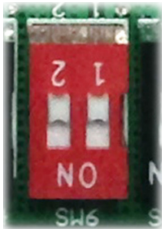

| Breezeless | |
|---|---|
| SW2-2 | Mode |
|  | Off (Factory Setting) |
|  | On |



**Micro-switch SW2-2 is for selection of breezeless function.**
**Range: OFF, ON.**

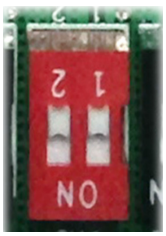

| For Auto-Restart Setting | |
|---|---|
| SW3 | Mode |
|  | Remember (Factory Setting) |
|  | No Remember |

**Micro-switch SW3 is for selection of the Auto-Restart Function.**
**Range: Active, Inactive.**



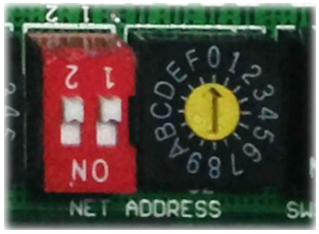

| For Temp. Compensation | |
|---|---|
| SW6 | Mode |
|  | 6 (Factory Setting) |
|  | 4 |
|  | 2 |
|  | E Function |

**Micro-switch SW6 is or the selection of temperature compensation in heating mode. This helps to reduce the temperature difference between the ceiling and floor so that the unit can run properly. If the height of installation is lower, a smaller value can be chosen.**
**Range: 6°C, 4°C, 2°C, E Function (reserved for special customizing).**



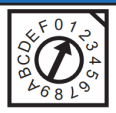
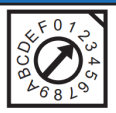
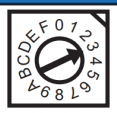
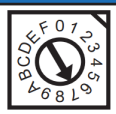

| For Header/Follower Setting | |
|---|---|
| SW6 | Mode |
|  | Header No Follower (Factory Setting) |
|  | Header |
|  | Header |
|  | Follower |

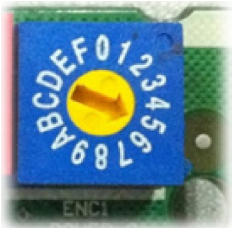
**Micro-switch SW8 is for setting Main or Slave (for some models).**
**Range: No Slave, Main & Slave.**




| For CCM Unit Address | | |
|---|---|---|
| S2 + S1 | Address Dial | Address |
|  |  | 0~15 (Factory Setting) |
|  |  | 16~31 |
|  |  | 32~47 |
|  |  | 48~63 |

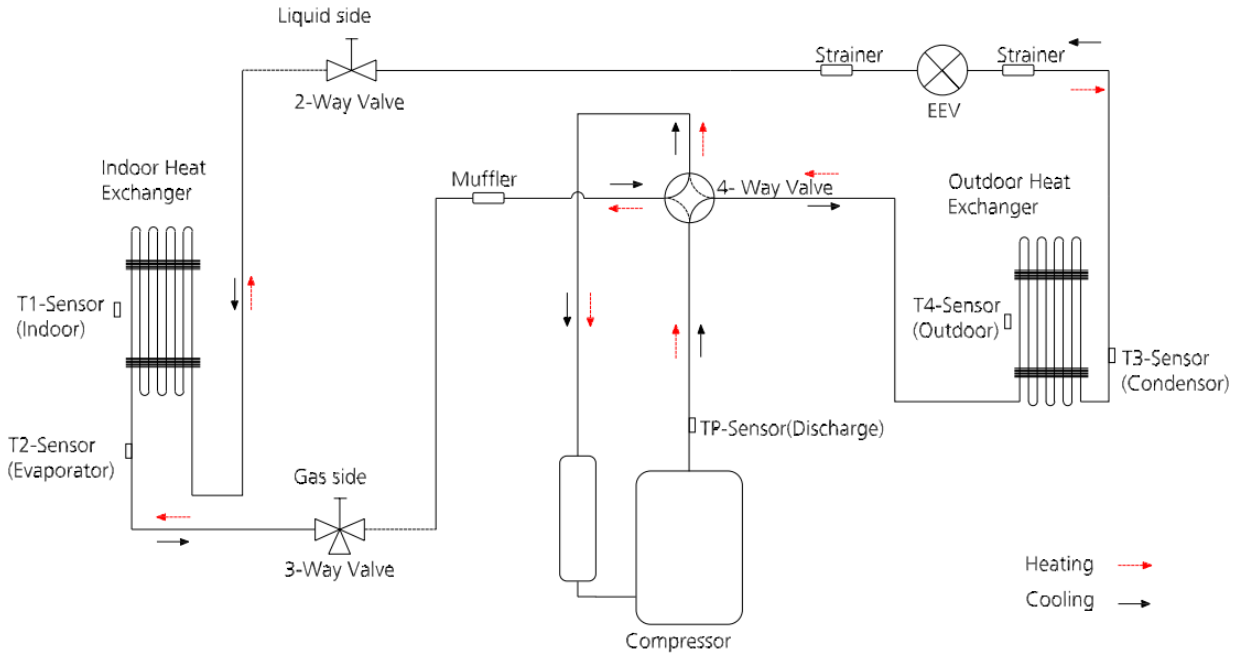
**Micro-switch S1 and Dial switch S2 are for address settings when controlling the unit by a central controller.**
**Range: 00-63**

| For Setting Power (DC Motor Model Only | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| ENC1 |  |  |  |  |  |  |  |  |  |  |
| Code | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| Power | √ Auto | 6K | 9K | 12K | 16K | 18K | 20K | 22K | 24K | 30K |
| Factory Setting | According To Related Model | | | | | | | | | |

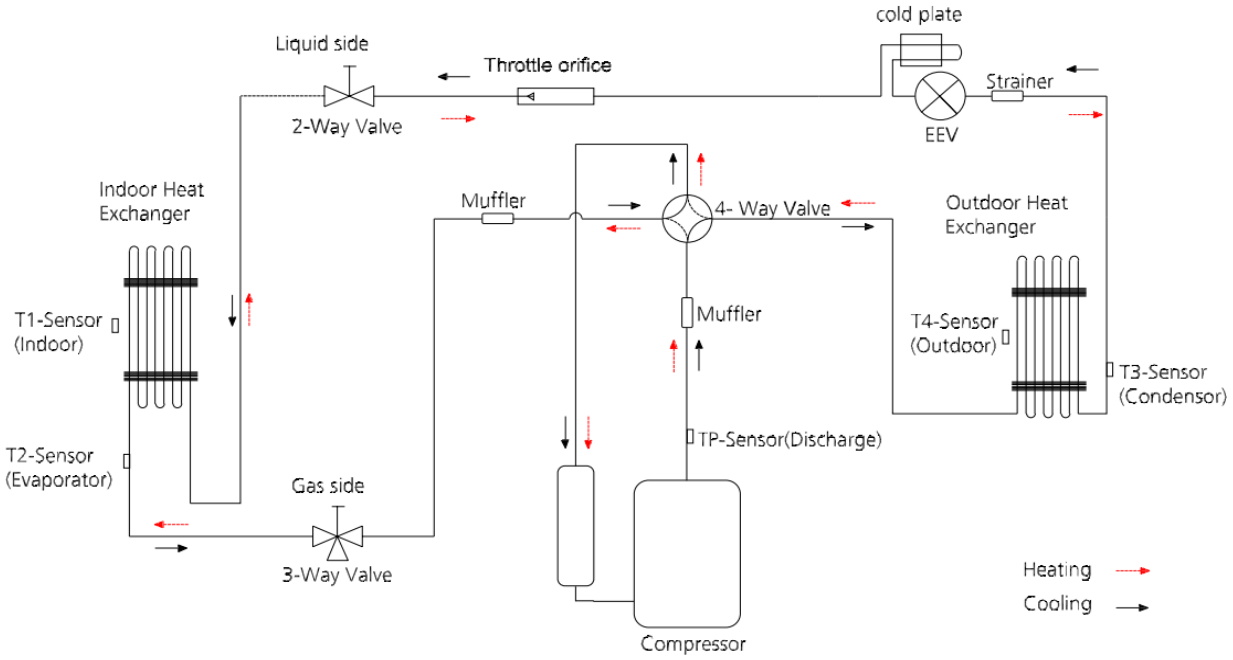



**Dial switch ENC1: The indoor PCB is universally designed for whole series units from 6K to 30K. The ECN1 setting will tell the main program what size the unit is.**
**Range: AUTO, 6K, 9K,…., 30K.**
*Note: AUTO means the indoor unit is equipped with different outdoor units which can automatically identify the capacity of the outdoor unit, model, single, or multi-zone match up and set the indoor units parameters.*
**Usually there is glue on the switch as the switch position cannot be changed at random unless you use the PCB as a spare part on another unit. If using on a different unit you will have to select the proper position to match the size of the system.**

## 1.9 Refrigerant Cycle Diagrams

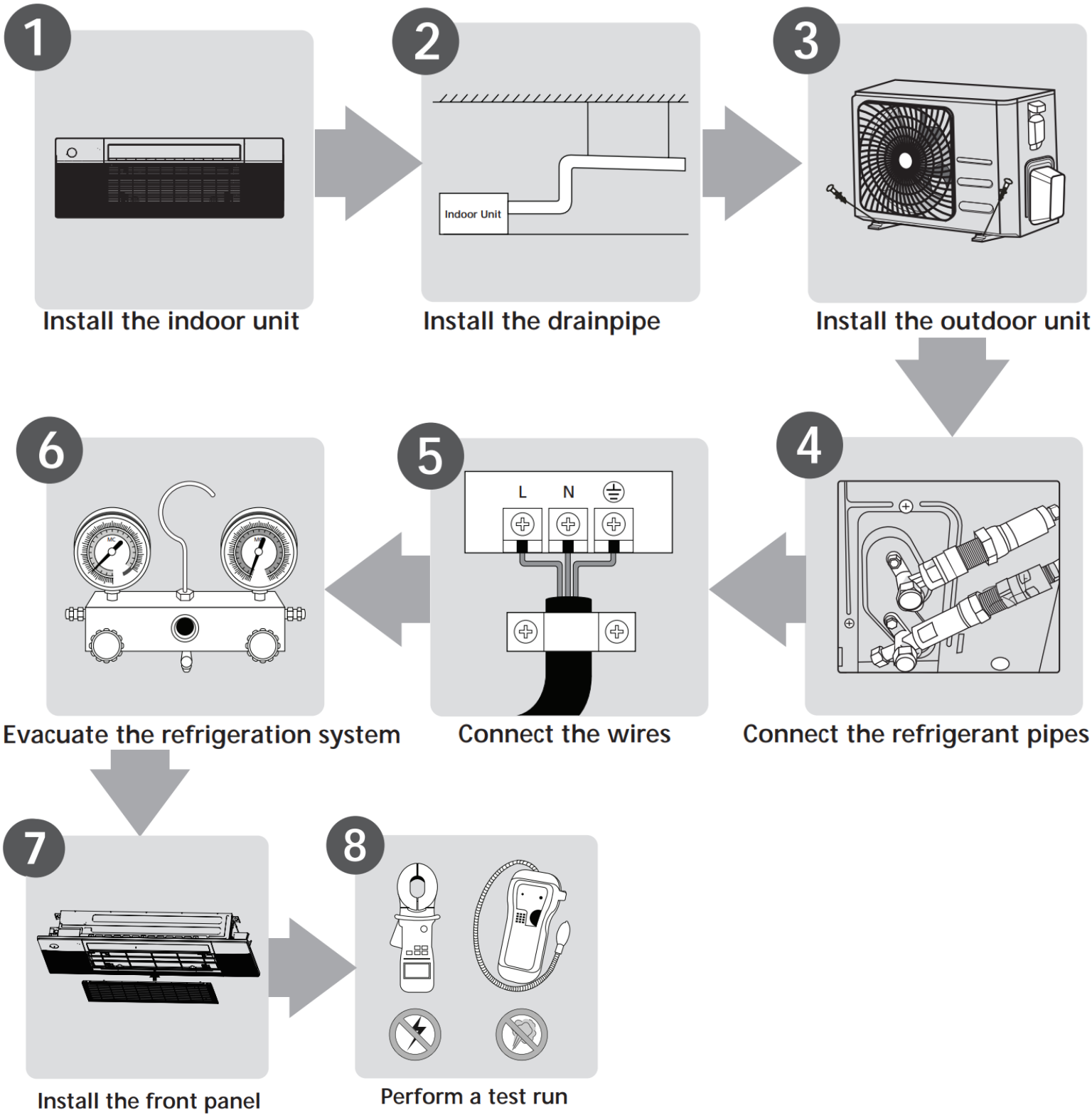



| Capacity (Btu/h) | Pipe Size (Diameter: ø) inch (mm) | | Piping Length (ft/m) | | Elevation (ft/m) | | Additional Refrigerant |
|---|---|---|---|---|---|---|---|
| | Gas | Liquid | Rated | Max. | Rated | Max. | |
| 6K | 3/8 (9.52) | 1/4 ( 6.35) | 24.6/7.5 | 82/25 | 0 | 49.2/15 | 0.16oz/ft (15g/m) |
| 9K | | | | | | | |
| 12K | | | | | | | |




| Capacity (Btu/h) | Pipe Size (Diameter: ø) inch (mm) | | Piping Length (ft/m) | | Elevation (ft/m) | | Additional Refrigerant |
|---|---|---|---|---|---|---|---|
| | Gas | Liquid | Rated | Max. | Rated | Max. | |
| 18K | 1/2 (12.7) | 1/4 (6.35) | 24.6/7.5 | 98.4/30 | 0 | 65.6/20 | 0.16oz/ft (15g/m) |

## 3.1 Installation Overview



## 3.2 Location

**DO NOT install the unit in the following locations:**

- Coastal areas with high salt content in the air.
- Areas with oil drilling or fracking.
- Areas with caustic gases in the air, such as hot springs.
- Areas that experience power fluctuations, such as factories.
- Enclosed spaces, such as cabinets.
- Kitchens that use natural gas.
- Areas with strong electromagnetic waves.
- Areas that store flammable materials or gas.
- Rooms with high humidity, such as bathrooms or laundry rooms.

### Warning

**The system must be installed in a location that meets the following requirements:**

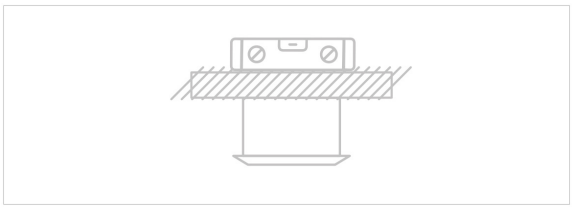
☑ Enough room exists for installation and maintenance.

☑ Enough room exists for the connecting the pipe and drainpipe.

☑ There is no direct radiation from heaters.

☑ The air inlet and outlet are not blocked.

☑ The airflow can fill the entire room.



☑ The ceiling is horizontal and its structure can sustain the weight of the indoor unit.

## 3.3 Refrigerant Pipe Installation

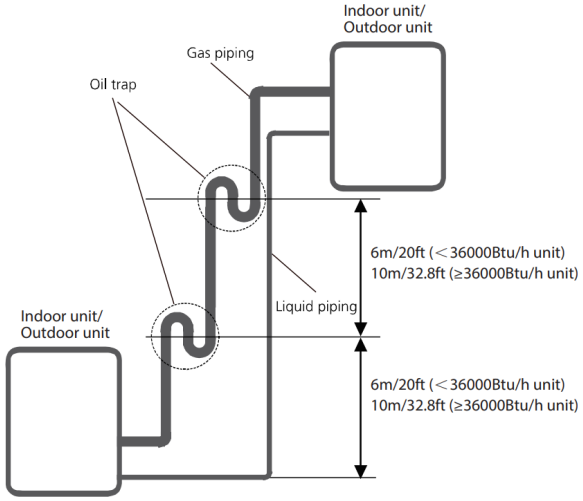
**Maximum Length and Drop Height:**

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

| Capacity (Btu/h) | Max. Length (ft/m) | Max. Elevation (ft/m) |
|---|---|---|
| 6K | 82/25 | 49.2/15 |
| 9K | | |
| 12K | | |
| 18K | 98.4/30 | 65.6/20 |

### CAUTION

1. The capacity test is based on the standard length and the maximum permissive length is based on the system reliability.
2. Oil traps:
   - If oil flows back into the outdoor units compressor it may 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 (<36000 btu/h).
   - An oil trap should be installed every 32.8ft (10m) of vertical suction line riser (≥36000 Btu/h).



## 3.4 Vacuuming & Leak Check

### 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.

### Selection of a Vacuum Pump:

- The ultimate vacuum degree of a vacuum pump shall be -756mmHg or above.
- Precision of the vacuum pump shall reach 0.02mmHg or above

### 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:**

5. Finding moisture during flushing refrigerant pipe.
6. Conducting construction on a rainy day (Rain water might get into pipeline).
7. 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.

## 3.5 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.
- Always use gloves and glasses to protect your hands and eyes during the charge work.
- 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.
- Use gauge hoses to connect to the refrigerant cylinder, pressure gauge, and outdoor unit (The refrigerant should be charged in a liquid state). Before recharging the air in the gauges and hoses needs to be vented.
- After finishing the refrigerant recharge process, check whether there is refrigerant leakage at the connection joints(Using a leak detector or soapy water).

## 3.6 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:**

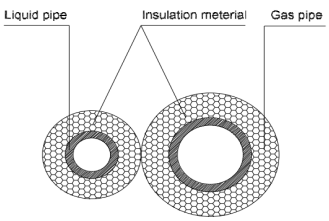
- During operation the temperature of the gas pipe and liquid pipe will be very hot/cold. Therefore insulation is necessary as without it will decrease performance and can cause the compressor to burnout.
- The gas pipe temperature is low during cooling operation, if lacking insulation it will condensate.
- 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.

## 3.7 Electrical Wiring

### Highlights of Electrical Wiring:

- All wiring must comply with local and national electrical codes, regulations, and must be installed by a licensed electrician.
- All electrical connections must be made according to the Electrical Connection Diagram located on the panels of the indoor and outdoor units.
- If there is a serious safety issue with the power supply stop work immediately and explain your reasoning to the client. If required refuse to install the unit until the issue is remedied.
- Power voltage should be within 90-110% of the rated voltage. Insufficient power can cause a malfunction, electrical shock, or fire.
- Installation of a external surge protector at the outdoor disconnect is recommended.
- Install a disconnect making sure all poles have a contact separation of at least 1/8in (3mm) incorporated into the wiring. You must use an approved circuit breaker and disconnect.
- Only connect the unit to an individual branch circuit and do not connect another appliance to that circuit.
- Make sure the unit is properly grounded.
- Every wire must be firmly connected. Loose wiring can cause the terminal to overheat resulting in a malfunction or a fire.
- Do not let wires touch or rest against the refrigerant tubing, the compressor, or any moving parts.

- If installing aux. heat it must be installed at least 40in (1m) away from any combustible material.
- To avoid shock never touch electrical components after turning power off, wait 10 minutes or more before touching electrical components.
- Make sure to not cross electrical wiring with signal wiring as it can cause distortion, interference, or damage to control boards.
- Connect wiring to the outdoor unit before the indoor unit.

## 3.8 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.**

A. Open both the liquid and gas valves.
B. Turn ON the main power and allow the unit to warm up.
C. 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.

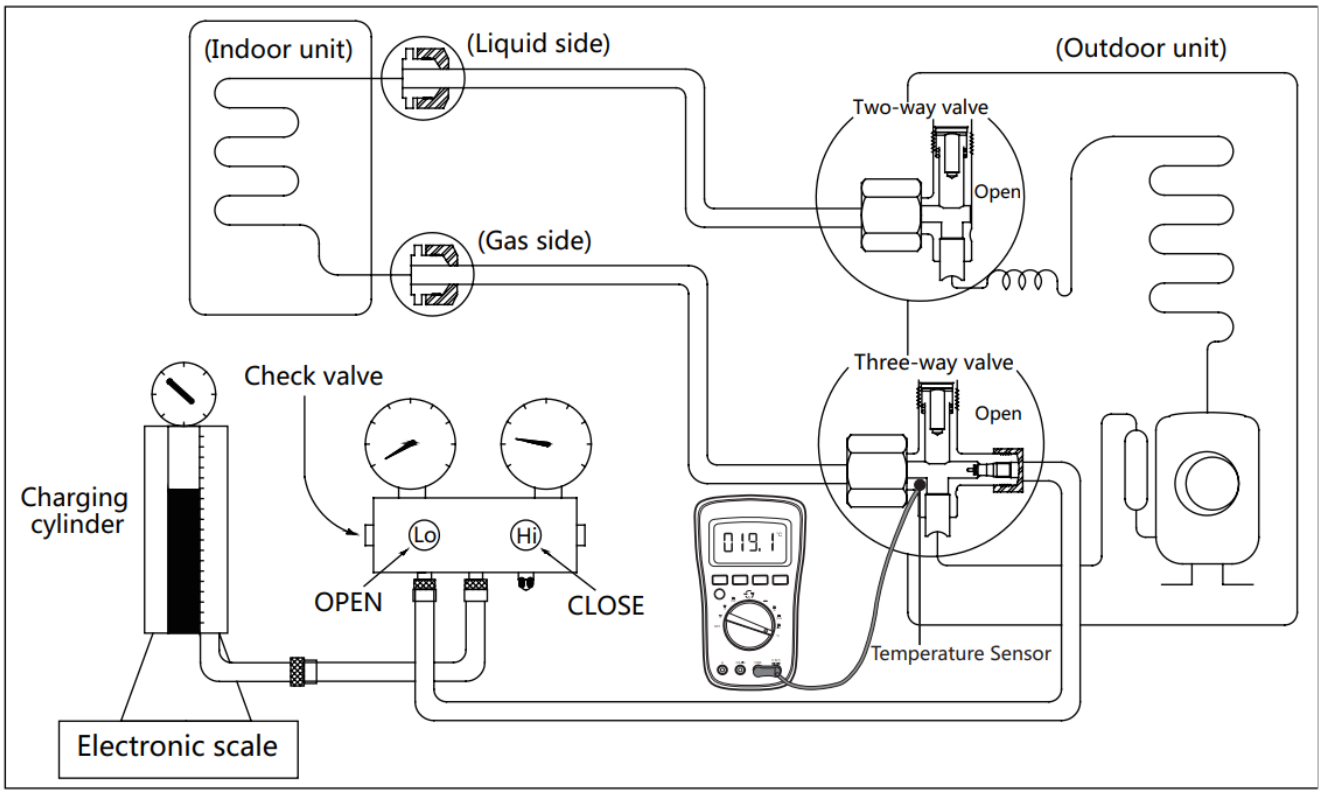
4. **Drainage test**

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).

**! CAUTION**

**The drainage plug at the bottom of the units body is used to discharge accumulated water from the drain pan when the air conditioner malfunctions. When the air conditioner is operating normally, make sure the drainage plug is properly plugged to prevent water from leaking.**

## 3.9 Maintenance

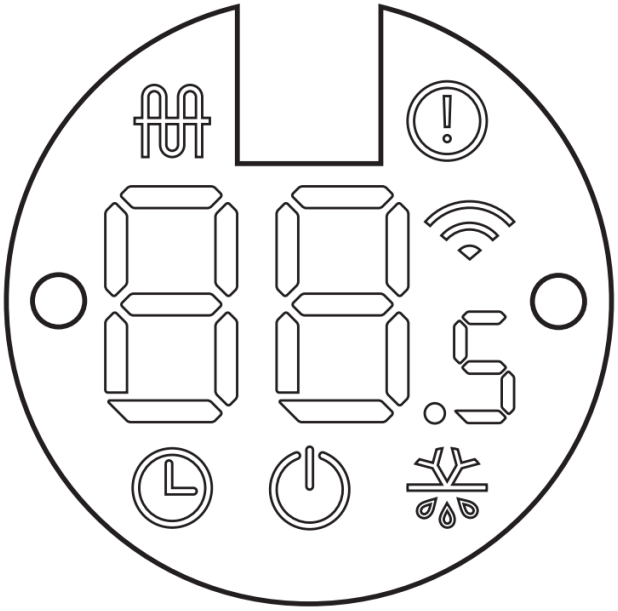



### Procedure:

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.

# 4 PRODUCT FEATURES

## 4.1 Display Function



When TIMER is set.

When the unit is on.

Alarm Indicator.

When Wireless Control feature is active.

When pre-heating/defrost feature is active.

Displays temperature, operation feature and error codes.

When 8°C heating feature is on (freeze protection).

When Active Clean feature is turned on.

When WiFi module enters AP mode.

When Forced Cooling feature is turned on.

Filter cleaning reminder.

## 4.2 Safety Features

**Compressor three minute delay at restart:**
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 a period of time, the compressor ceases operation.
**Automatic shutoff based on fan speed:**
If the indoor fan speed registers below 200RPM or over 2100RPM for an extended period of time, the unit ceases operation and the corresponding error code is displayed on the indoor unit.
**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:**
- When the unit starts, the louver is automatically activated and the indoor fan will operate after a period of setting time or the louver is in place.
- 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 T4 sensor is lower than 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 air conditioner ceases operation.

## 4.3 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 |
| Tsc | Adjusted setting of temperature |
| TP | Compressor discharge temperature sensor |
| CDIFTEMP | Cooling shutdown temperature |
| HDIFTEMP2 | Heating shutdown temperature |
| TCDE1 | Exit defrost temperature 1 |
| 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, TIMING_DEFROST_TIME...etc, they are well-setting parameter of EEPROM.

# Fan Mode:

**When fan mode is activated:**

- The outdoor fan and compressor cease operation.
- Temperature control is disabled and indoor room temperature is displayed.
- The indoor fan speed can be set to 1%-100%, or auto.
- The louver operations are identical to those in cooling mode.
- Auto fan: In fan-only mode, AC operates the same as auto fan in cooling mode with the temperature set at 75°F (24°C). (Tsc=75°F (24°C)).

# Cooling Mode:

## Compressor Control:

**When fan mode is activated:**

Reach the configured temperature

1. When the compressor runs continuously for within 120 minutes.
   - If the following conditions are satisfied, the compressor ceases operation.
   - Calculated frequency(fb) is less than minimum limit frequency(FminC).
   - Compressor runs at FminC more than 10 minutes.
   - T1 is lower than or equal to (Tsc-CDIFTEMP-32.9°F (0.5°C)).

*Note: CDIFTEMP is EEPROM setting parameter. It is 35.6°F (2°C)).*

2. When the compressor runs continuously for more than 120 minutes.
   - If the following conditions are satisfied, the compressor ceases operation.
   - Calculated frequency(FB) is less than minimum limited frequency(FminC).
   - Compressor runs at FminC more than 10 minutes.
   - T1 is lower than or equal to (Tsc-CDIFTEMP).

*Note: CDIFTEMP is EEPROM setting parameter. It is 35.6°F (2°C) usually.*

3. If one of the following conditions is satisfied, not judge protective time.
   - Compressor running frequency(fr) is more than test frequency (TestFre).
   - Compressor running frequency is equal to test frequency, T4 is more than 59°F (15°C) or T4 fault.
   - Change setting temperature.
   - Turn 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 1%-100%, or auto.
2. Auto fan.

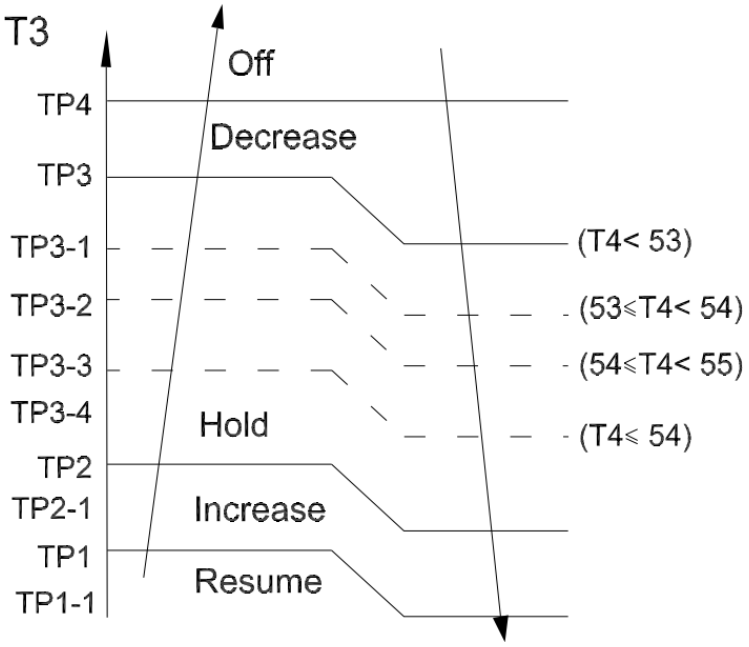
**For DC Fan Motor Units:**

- **Descent Curve**
  - When T1-Tsc is lower than 6.3°F (3.5°C), fan speed reduces to 80%.
  - When T1-Tsc is lower than 1.8°F (1°C), fan speed reduces to 60%.
  - When T1-Tsc is lower than 0.9°F (0.5°C), fan speed reduces to 40%.
  - When T1-Tsc is lower than 0°F (0°C), fan speed reduces to 20%.
  - When T1-Tsc is lower than -0.9°F (-0.5°C), fan speed reduces to 1%.
- **Rise Curve**
  - When T1-Tsc is higher than or equal to 0°F (0°C), fan speed increases to 20%.
  - When T1-Tsc is higher than or equal to 0.9°F (0.5°C), fan speed increases to 40%.
  - When T1-Tsc is higher than or equal to 1.8°F (1°C), fan speed increases to 60%.
  - When T1-Tsc is higher than or equal to 2.7°F (1.5°C), fan speed increases to 80%.
  - When T1-Tsc is higher than or equal to 7.2°F (4°C), fan speed increases to 100%.

## Outdoor Fan Control:

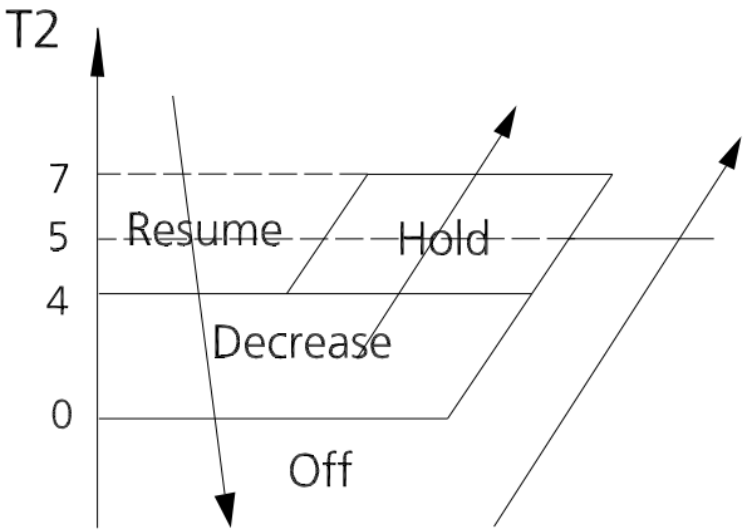
- The outdoor unit will be run at different fan speeds according to T4 and compressor running frequency.
- For different outdoor units, the fan speeds are different.

## Condenser Temperature Protection:




When the condenser temperature exceeds a configured value, the compressor ceases operation.

## Evaporator Temperature Protection:




- Off: Compressor stops.
- Decrease: Decreases the running frequency to 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 minimum limit frequency(FminH).
  - Compressor runs at FminH more than 10 minutes.
  - T1 is higher than or equal to Tsc+ HDIFTEMP2.

Note: HDIFTEMP2 is EEPROM setting parameter. It is 35.6°F (2°C) usually.

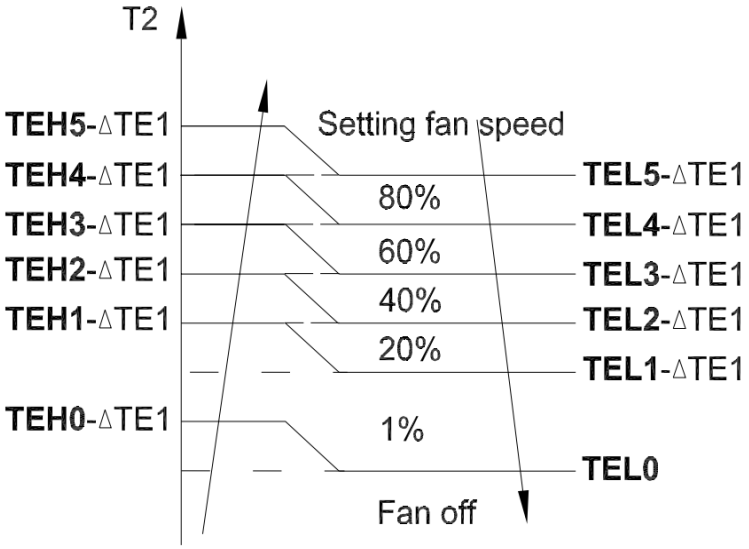
- If one of the following conditions is satisfied, do not judge protective time.
  - Compressor running frequency(fr) is more than test frequency(TestFre).
  - When compressor running frequency is equal to test frequency, T4 is more than 59°F (15°C) or T4 fault.
  - Change setting temperature.
  - Turn on/off turbo or sleep function.

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

## Indoor Fan Control:

1. In heating mode, the indoor fan operates continuously. The fan speed can be set to 1%-100%, or mute. And the anti-cold wind function has priority.

- Anti-cold air function
  - The indoor fan is controlled by the indoor temperature T1 and indoor unit coil temperature T2.




ΔTE1=0

**2. Auto fan**

For DC fan motor units:

- **Rise curve**
  - When T-Tsc is higher than -2.7°F (-1.5°C), fan speed reduces to 80%.
  - When T1-Tsc is higher than 0°F (0°C), fan speed reduces to 60%.
  - When T1-Tsc is higher than 0.9°F (0.5°C), fan speed reduces to 40%.
  - When T1-Tsc is higher than 1.8°F (1°C), fan speed reduces to 20%.
- **Descent curve**
  - When T1-Tsc is lower than or equal to 0.9°F (0.5°C), fan speed increases to 40%.
  - When T1-Tsc is lower than or equal to 0°F (0°C), fan speed increases to 60%.
  - When T1-Tsc is lower than or equal to -2.7°F (-1.5°C), fan speed increases to 80%.
  - When T1-Tsc Is lower than or equal to 5.4°F (-3°C), fan speed increases to 100%.

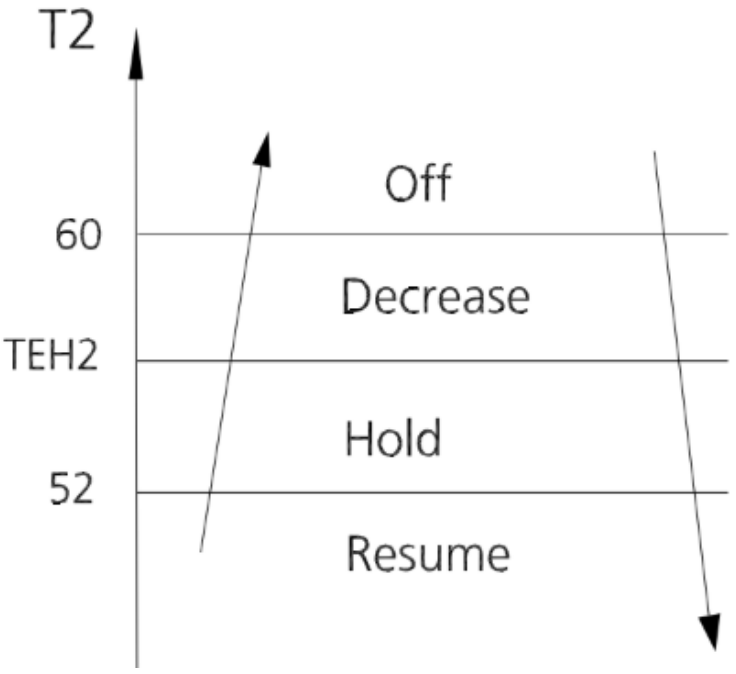
## Outdoor Fan Control:

- 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 the 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, and the "❄" 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 condenser temperature (T3) or outdoor ambient temperature (T4) is lower than 26.6°F (-3°C) for 30 seconds, Ts-T1 is lower than 41°F (5°C) and compressor running time is more than EE_TIME_DEFROST7.
  - If condenser temperature (T3) or outdoor ambient temperature (T4) is lower than 26.6°F (-3°C) for 30 seconds and 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 TCDE2+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.

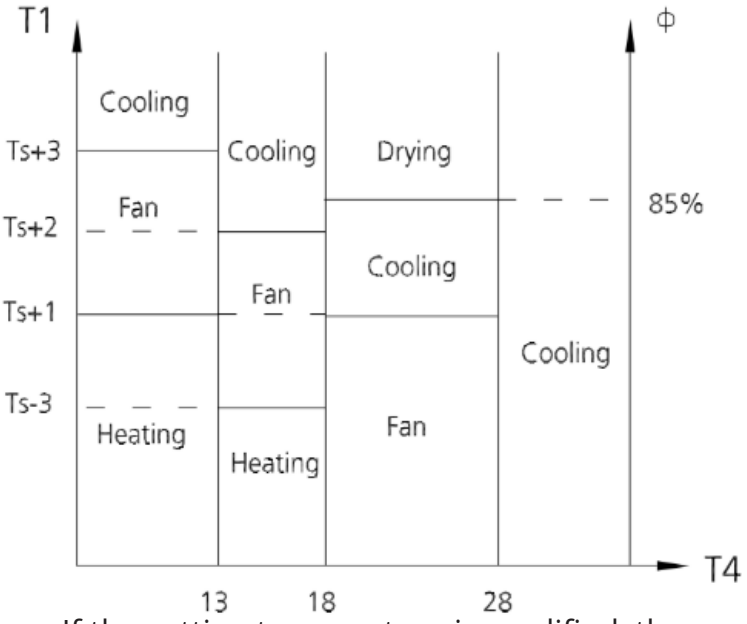
## Evaporator Coil Temperature Protection:




- Off: Compressor stops.
- Decrease: Decreases 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 setting temperature can be changed between 60°F-86°F (16°C-30°C).
- In auto mode, the machine selects cooling, heating, auto-drying, or fan-only mode on the basis of T1, Ts, T4 and relative humidity.




- If the setting temperature is modified, the machine selects a new running function.

## Drying Mode:

- In drying mode, the unit 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 AC will run as the sequence below.

Forced auto →Forced cooling →Off

**Forced Cooling Mode:**
The compressor and outdoor fan continue to run (fixed at rated frequency), and the indoor fan runs at rated speed. After running for 30 minutes, the unit 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 exits forced operation when it receives the following signals:
  - Switch off
  - Changes in:
    - Mode
    - Fan Speed
    - Sleep Mode
    - Follow Me

## Timer Function:

- Timing range is 24 hours
- Timer on: The machine will turn on automatically when reaching the setting time.
- Timer off: The machine will turn off automatically when reaching the setting time.
- Timer on/off: The machine will turn on automatically when reaching the setting "on" time, and then turn off automatically when reaching the setting "off" time.
- The timer function will not change the units operation mode. Suppose the unit is off now, it will not start up on start after setting the "timer off" function and when reaching the setting time, the timer LED will be off and the units running mode will not be changed.
- The setting time is relative time.
- The unit will quit the timer function when it has malfunctioned.
- The timer use relative time, not clock time.

## Sleep Function

The sleep function is available in cooling, heating, or auto mode.

**The operational process for sleep mode is as follows:**

- When cooling, the temperature rises 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 a low speed.
- When heating the temperature decreases 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 a low speed. The anti-cold wind function will take priority.
- The operating time for sleep mode is 8 hours, after which the unit will exit this mode.
- 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, will restore those settings automatically within 3 minutes of power returning.

## FP Mode 46.4°F (8°) Heating:

In heating mode, the temperature can be set to as low as 46.4°F (8°C) preventing the indoor area from freezing if in a unoccupied space during cold weather.

## Follow Me:

- Once the follow me function is active the remote control will send a signal every 3 minutes with no beeps. The unit automatically sets the temperature according to the measurements from the remote control.
- The unit will only change modes if the information from the remote control makes it necessary, not from the units temperature setting.
- If the unit does not receive a signal for 7 minutes or you press "Follow Me" the function turns off. The unit regulates temperature based on its own sensor and settings.

## Silence

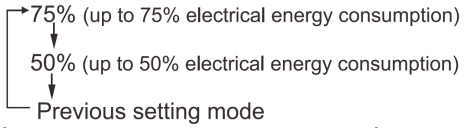
- Press "Silence" or keep pressing the Fan button for more than 2 seconds on the remote control to enable the SILENCE function. While this function is active, the compressor frequency is maintained at a lower level than F3. The indoor unit will run at a faint breeze (1%) which reduces noise to the lowest possible level.
- When matching with a multi outdoor unit, this function is disabled.

## ECO Function:

- Used to enter energy efficient mode.
- Under cooling mode, press ECO button and the remote control will adjust the temperature automatically to 75.2°F (24°C) and the fan speed to Auto to save energy (but only if the set temperature is less than 75.2°F (24°C).
- If the set temperature is more than 75.2°F (24°C) and 86°F (30°C) press the ECO button and the fan speed will change to auto and the set temperature will remain unchanged.
- When the unit receives signals such as switch off, turbo, silence, self clean, forced cooling, mode change, sleep mode, or adjusting the set temperature to less than 76°F (24°C), it will cease ECO operation.
- When there is any temperature sensor malfunction the unit will cease ECO mode.
- The indoor fan will run in auto fan mode when put into ECO mode. The set temperature and fan speed can be changed by the remote.

## Electrical Energy Consumption Control:

**Press the " Gear" Button on the remote control to enter energy efficient mode in a sequence of the following:**




Turn off the unit or activate ECO, sleep, turbo, FP, silence, or self clean to quit this function.

## Breeze Away:

This feature avoids direct airflow from blowing on the body.

*Note: this feature is only available under cool,fan-only, or dry mode.*

## Active Clean Function:

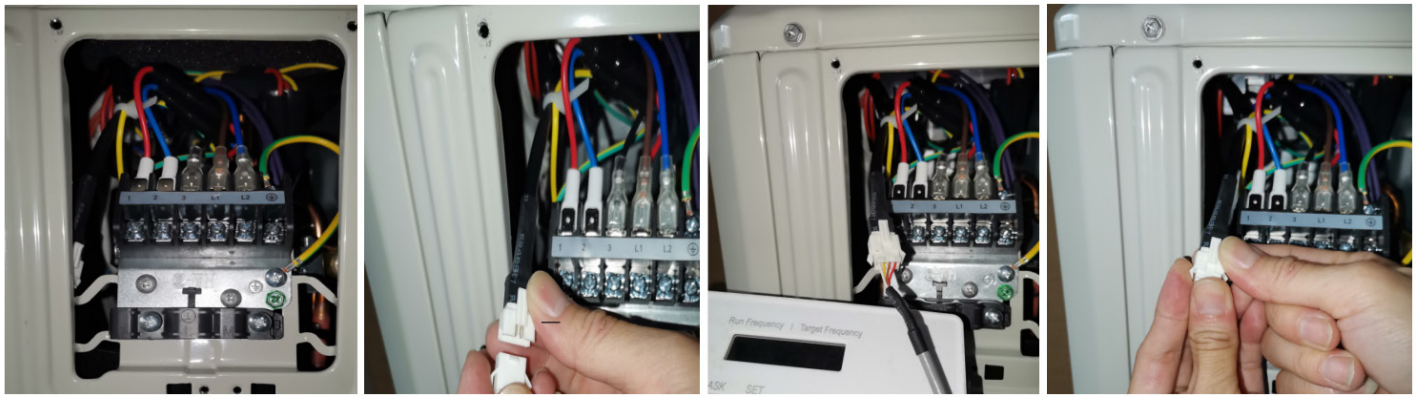
- The active clean technology washes away dust, mold, and grease that may cause odors when it adheres to the heat exchanger by automatically freezing and then rapidly thawing the frost. The internal wind wheel then keeps operating to blow-dry the evaporator, thus preventing the growth of mold and keeping the inside clean.
- When this function is turned on, the indoor unit displays "CL", after 20 to 130 minutes, the unit will turn off automatically and cancel the active clean function.

## 5.1 Safety Caution

**⚠ WARNING**

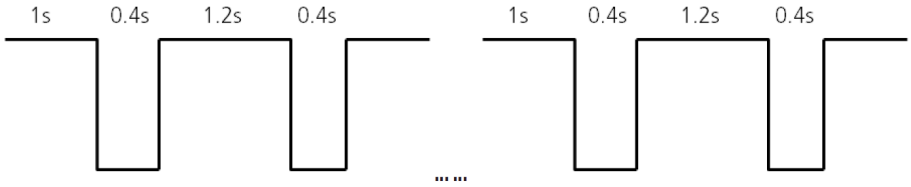
**Be sure to turn off all power supplies or disconnect all wires to avoid electric shock. While checking the indoor/outdoor PCB, please equip yourself with anti-static gloves or a wrist strap to avoid damaging the board.**
**Electricity will remain in capacitors even when the power supply is off. Ensure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

**Note:** If using the inverter test tool for maintenance, remove the big handle from the unit, take out the detection cable, take out the female end of the cable, and connect the inverter testing tool. After maintenance is completed, insert the female end back into the port.



***Note: This picture is for reference only. Actual appearance may vary.***

**LED Flash Frequency:**



## 5.2 Error Display (Indoor Unit)

| Display | Error Information | Solution |
|---|---|---|
| FC | Forced cooling (not an error code) | -- |
| EC 07 | ODU fan speed out of control | TS22 |
| EC 51 | ODU EEPROM parameter error | TS19 |
| EC 52 | ODU coil temp. sensor (T3) error | TS24 |
| EC 53 | ODU ambient temp. sensor (T4) error | TS24 |
| EC 54 | COMP. discharge temp. sensor (TP) error | TS24 |
| EC 56 | IDU coil outlet temp. sensor (T2B) error (multi-zone) | TS24 |
| EC C1 | Other IDU refrigerant sensor detects leakage (multi-zone) | TS24 |
| EH 00 | IDU EEPROM Malfunction | TS19 |
| EH 03 | IDU fan speed out of control | TS22 |
| EH 0A | IDU EEPROM parameter error | TS19 |
| EH 0E | Water-level alarm malfunction | TS26 |
| EH 12 | Main unit or secondary units malfunction | TS40 |
| EH 3A | External fan DC bus voltage is too low protection | TS36 |
| EH 3b | External fan DC bus voltage is too high fault | TS36 |
| EH 60 | IDU room temp. sensor (T1) error | TS24 |
| EH 61 | IDU evaporator coil temp. sensor (T2) error | TS24 |
| EH bA | Communication error between the indoor unit and external fan module | TS36 |
| EH C1 | Refrigerant sensor detects leakage | TS39 |
| EH C2 | Refrigerant sensor is out of range and leakage is detected | TS39 |
| EH C3 | Refrigerant sensor is out of range | TS38 |
| EL 01 | IDU & ODU communication error | TS20 |
| EL 0C | System lacks refrigerant | TS25 |
| EL 11 | Communication malfunction between main unit and secondary units | TS40 |
| FH 07 | Communication malfunction between indoor unit and auto-lifting panel | TS37 |
| FH CC | Refrigerant sensor error | TS38 |
| PC 00 | ODU IPM module protection | TS27 |
| PC 01 | ODU voltage protection | TS28 |
| PC 02 | Compressor top (or IPM) temp. protection | TS33 |
| PC 03 | Pressure protection (low or high pressure) (for some models) | TS30 |
| PC 04 | Inverter compressor drive error | TS29 |
| PC 0L | Low ambient temperature protection (for some models) | TS34 |

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

**Troubleshooting:**
Test the unit using the remote control. If the unit does not respond to the remote, the indoor PCB requires replacement. If the unit responds, the display board requires replacement.

## 5.3 Information Inquiry & Setting

In order to enter to engineering mode and check the data of the system (data checking mode), please follow these steps:

- Make sure that the system is in standby status or working in non-locked conditions.
- Press the "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.
- Press the "UP" or "Down" buttons to choose different channel numbers that want to check (from 0-30) on the remote controller, and then the display will show the parameter value.

| Channel | Code | Meaning | Remark |
|---|---|---|---|
| 0 | | Error Code | Refer to the next list of error codes<br>Empty means no error code |
| 1 | T1 | Room temperature | Actual data, °C |
| 2 | T2 | Indoor coil temperature | Actual data, °C |
| 3 | T3 | Outdoor coil temperature | Actual data, °C |
| 4 | T4 | Ambient temperature | Actual data, °C |
| 5 | TP | Discharge temperature | Actual data, °C |
| 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 | -- | Indoor operating mode | 0-Off; 1-Cooling; 2-Heating;<br>3-Fan Only; 4-Drying; 5-Auto;<br>7-Defrosting; 12-Active Clean |
| 12 | Pr | Outdoor fan speed | Actual data/8 |
| 13 | Lr | EXV opening steps | Actual data/8 |
| 14 | Ir | Indoor fan speed | Actual data/8 |
| 15 | Hu | Humidity (if a sensor is there) | 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 | nA | Reserve | |
| 22~30 | nA | | |

***Note:***

1. The channel number indicates a certain parameter value (Check next table).
2. The indoor unit display will show the code for 2s and then the parameter value.
3. In the engineering mode, the other keys or operations are invalid except for the following buttons "Power", "Up", "Down", and "Ok".
4. In order to exit from the engineering mode, press the "Power" + "Fan" buttons together for 2s to quit checking and return back to the home screen
5. The engineering mode will be exited if there is no valid input data for 60s.

## Error Code of Engineer Mode:

| Display | Error Information |
|---|---|
| EH 00 | IDU EEPROM malfunction |
| EH 0A | Indoor EEPROM parameter error |
| EL 01 | IDU & ODU communication error |
| EH bA | Communication error between indoor unit and indoor external fan module |
| EH 30 | Parameters error of indoor external fan |
| EH 35 | Phase failure of indoor external fan |
| EH 36 | Indoor external fan current sampling bias fault |
| 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 fault |
| EH 3E | Indoor external fan overcurrent fault |
| EH 3F | Indoor external fan module protection/hardware overcurrent protection |
| EH 03 | IDU fan speed out of control |
| EC 51 | ODU EEPROM parameter error |
| EC 52 | ODU coil temp. sensor (T3) error |
| EC 53 | ODU ambient temp. sensor (T4) error |
| EC 54 | COMP. Discharge temp. sensor (TP) error |
| EC 55 | ODU IPM module temp. sensor (TH) error |
| EC 0d | Outdoor unit malfunction |
| EH 60 | IDU room temp. sensor (T1) error |
| EH 61 | Evaporator coil temperature sensor T2 is in open circuit or short circuit |
| EC 71 | Outdoor external fan overcurrent fault |
| EC 75 | Outdoor external fan module protection/hardware overcurrent 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 | System lacks refrigerant |
| 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 |

## Error Code of Engineer Mode Cont.:

| Display | Error Information |
|---|---|
| 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 |
| PC 43 | Lack of phase (3 phase) protection |
| PC 44 | Outdoor unit zero speed protection |
| PC 45 | 341PWM error |
| PC 46 | Compressor speed malfunction |
| PC 49 | Compressor overcurrent 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 protection |
| PC 03 | Pressure protection |
| PC 0L | Outdoor low ambient temperature protection |
| PH 90 | Evaporator coil temperature over high protection |
| PH 91 | Evaporator coil temperature over low protection |
| 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 30 | Frequency limit caused by high pressure |
| LH 07 | Frequency limit caused by remote controller |
| -- | IDUs mode conflict (match with multi outdoor unit) |
| NA | No malfunction and protection |

## Advanced Function Setting:

In order to enter to the engineering mode and check the advanced function settings please follow these steps.

**If you want to check the current functions set value (Presetting Page):**

1. First, you will need to disconnect the power supply from the unit and wait 1 minute.
2. Then re-connect the power supply to the unit and it should enter standby mode.
3. Press the "Power" + "Fan" buttons together for 7s until the remote controller screen shows "0", then the "Auto, Cool, Dry, Heat, Battery" icons will be displayed at the same time.
4. Press "UP" or "Down" buttons to choose different channel numbers that you want to check (from 0-30) on the remote controller.
5. The 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 vale will be shows on the indoor units display.

**If you want to change the current functions set value:**

1. First, you will need to disconnect the power supply form the unit and wait 1 minute.
2. Then connect the power supply again to the unit and it should enter standby mode.
3. Press the "Power" + "Fan" buttons together for 7s until the remote controller screen shows "0" then the "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 change (from 0~30) on the remote controller.
5. The press the "Power" button for 2s until the remote controller screen shows "Ch".
6. 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, the indoor 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 re-connect.

***Note:***

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

- Press the "Power" button for 2s until the remote controller screen shows "0".
- The press the "Power" + "Fan" buttons together for 2s to quit the engineering mode and back to the home screen.

| Channel | Function | Parameter Value Meaning | Remark |
|---|---|---|---|
| 0 | Capacity setting (Btu/h) | 1-100K | |
| 1 | Auto-restart function | 0- Inactive<br>1- Active | |
| 2 | Fan control when Ts reached | 1- Fan stop<br>2- Fan runs at lowest RPM<br>3- Fan runs at setting RPM<br>4~11- Fan stops for 4 mins and runs for 1 min | |
| 3 | Mode lock | CH- Cooling and heating (all modes)<br>HH- Heating only (Heating + Fan only)<br>CC- Cooling only (Cooling + Drying + Fan only)<br>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 | | |
| 7 | Twins selection | 0- No twins; 1- Master unit; 2- Secondary unit | |
| 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. frequency limitation in heating mode | 20,21,22,...,149,250,-- (cancel) | |
| 13 | Max. frequency selection in T4 limitation of Zone 6 | 20,21,22,...,149,250,-- (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) | |
| 19 | Max. frequency selection in cooling mode | 40,41,42,..,83,83,-- (cancel) | |
| 20 | Max. frequency selection in heating mode | 40,41,42,...,83,84,-- (cancel) | |
| 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 | Max. fan speed selection in cooling | -41,-40,-39,...,19,20,-- (cancel) | |

| Channel | Function | Parameter Value Meaning | Remark |
|---|---|---|---|
| 24 | Min. fan speed selection in cooling | -41,-40,-39,...,19,20,-- (cancel) | |
| 25 | Max. fan selection in heating | -41,-40,-39,...,19,20,-- (cancel) | |
| 26 | Min. fan speed selection in heating | -41,-40,-39,...,19,20,-- (cancel) | |
| 27 | Reserved | Nothing to set | |
| 28 | Anti-cold air stop fan temperature | 16~28 | |
| 29 | Reserved | Nothing to set | |
| 30 | Reserved | Nothing to set | |

## 5.4 Error Diagnosis Without Error Code

### 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 | TS14-TS15 |
| 2 | The power switch is on but fans will not start | TS14-TS-15 |
| 3 | The temperature on the display board cannot be set | TS14-TS-15 |
| 4 | Unit is on but the air is not cold/hot | TS14-TS-15 |
| 5 | Unit runs but shortly stops | TS14-TS-15 |
| 6 | The unit starts up and stops frequently | TS14-TS-15 |
| 7 | Unit runs continuously but insufficient cooling/heating | TS14-TS-15 |
| 8 | Cool cannot change to heat | TS14-TS-15 |
| 9 | Unit is noisy | TS14-TS-15 |

### 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 |

| 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 |

## 5.5 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 | EL 0C | EH C1/ EH C2 | EH 0E | EC 53 | EH 0b/ FH 07 |
| Indoor PCB | √ | √ | √ | √ | √ | √ | x | √ | x | √ |
| Outdoor PCB | x | √ | x | x | x | x | x | x | √ | x |
| Indoor Fan Motor | x | x | √ | x | x | x | x | x | x | x |
| T1 Sensor | x | x | x | √ | x | x | x | x | x | x |
| T2 Sensor | x | x | x | x | √ | √ | x | √ | x | x |
| T3 Sensor | x | x | x | x | x | x | x | x | x | x |
| T4 sensor | x | x | x | x | x | x | x | x | √ | x |
| Reactor | x | √ | x | x | x | x | x | x | x | x |
| Compressor | x | x | x | x | x | x | x | x | x | x |
| Additional Refrigerant | x | x | x | x | x | √ | √ | √ | x | x |
| Water-Level Switch | x | x | x | x | x | x | x | √ | x | x |
| Water Pump | x | x | x | x | x | x | x | √ | x | x |
| Display Board | x | x | x | x | x | x | x | x | x | √ |

| Part Requiring Replacement | Error Code | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | EC 54 | EC 51 | EC 52 | 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 | √ |
| Outdoor PCB | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | X |
| Outdoor Fan Motor | X | X | X | X | √ | √ | X | √ | √ | X | X |
| T3 Sensor | X | X | √ | X | X | X | X | X | X | X | X |
| TP Sensor | √ | X | X | X | X | X | X | X | X | X | X |
| T2B Sensor | X | X | X | √ | X | X | X | X | X | X | X |
| Refrigerant Sensor | X | X | X | X | X | X | X | X | X | X | √ |
| Reactor Sensor | X | X | X | X | X | X | √ | X | X | X | X |
| Compressor | X | X | X | X | X | √ | X | X | √ | X | X |
| IPM Module Board | X | X | X | X | X | √ | √ | √ | √ | X | X |
| Pressure Protector | X | X | X | X | X | X | X | X | X | √ | X |
| Additional Refrigerant | X | X | X | X | X | X | X | X | X | √ | X |

## 5.6 Troubleshooting by Error Code

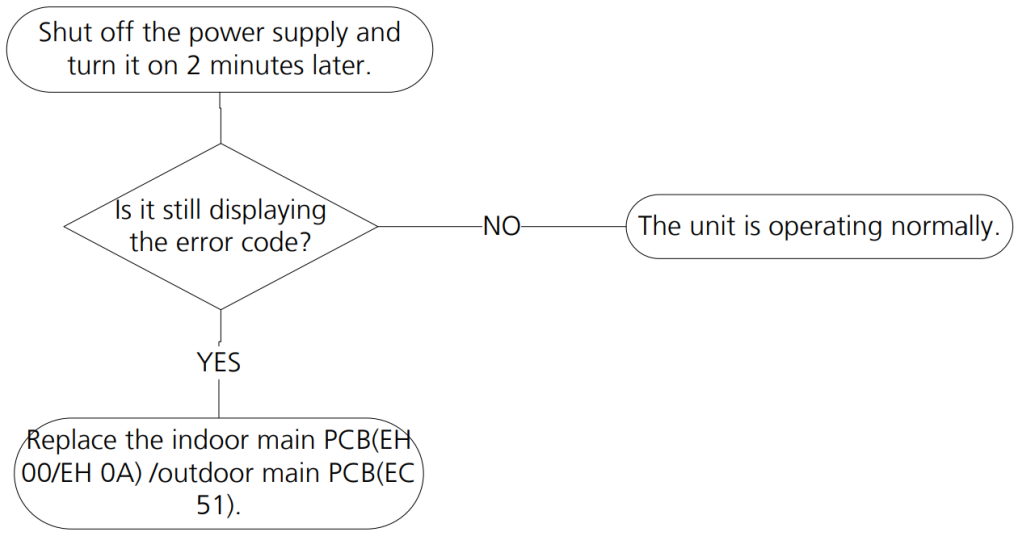
### EH 00/ EH 0A/ EC 51: EEPROM Malfunction Error Diagnosis and Solution.

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

**Recommended parts to prepare:**

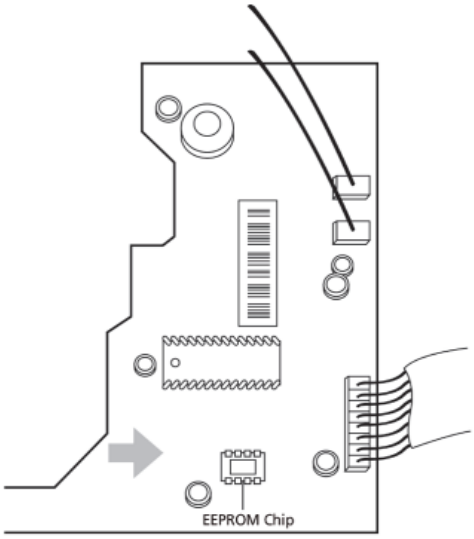
- Indoor PCB
- Outdoor PCB

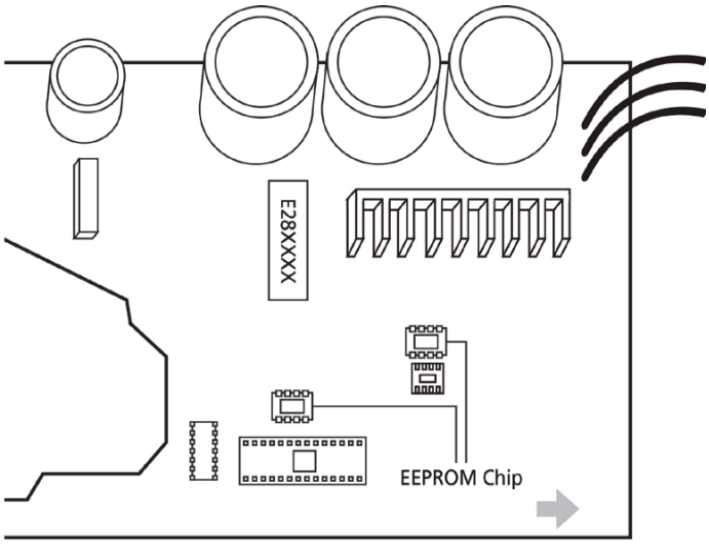
**Troubleshooting and repair:**




**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 PCB is shown in the following 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.**

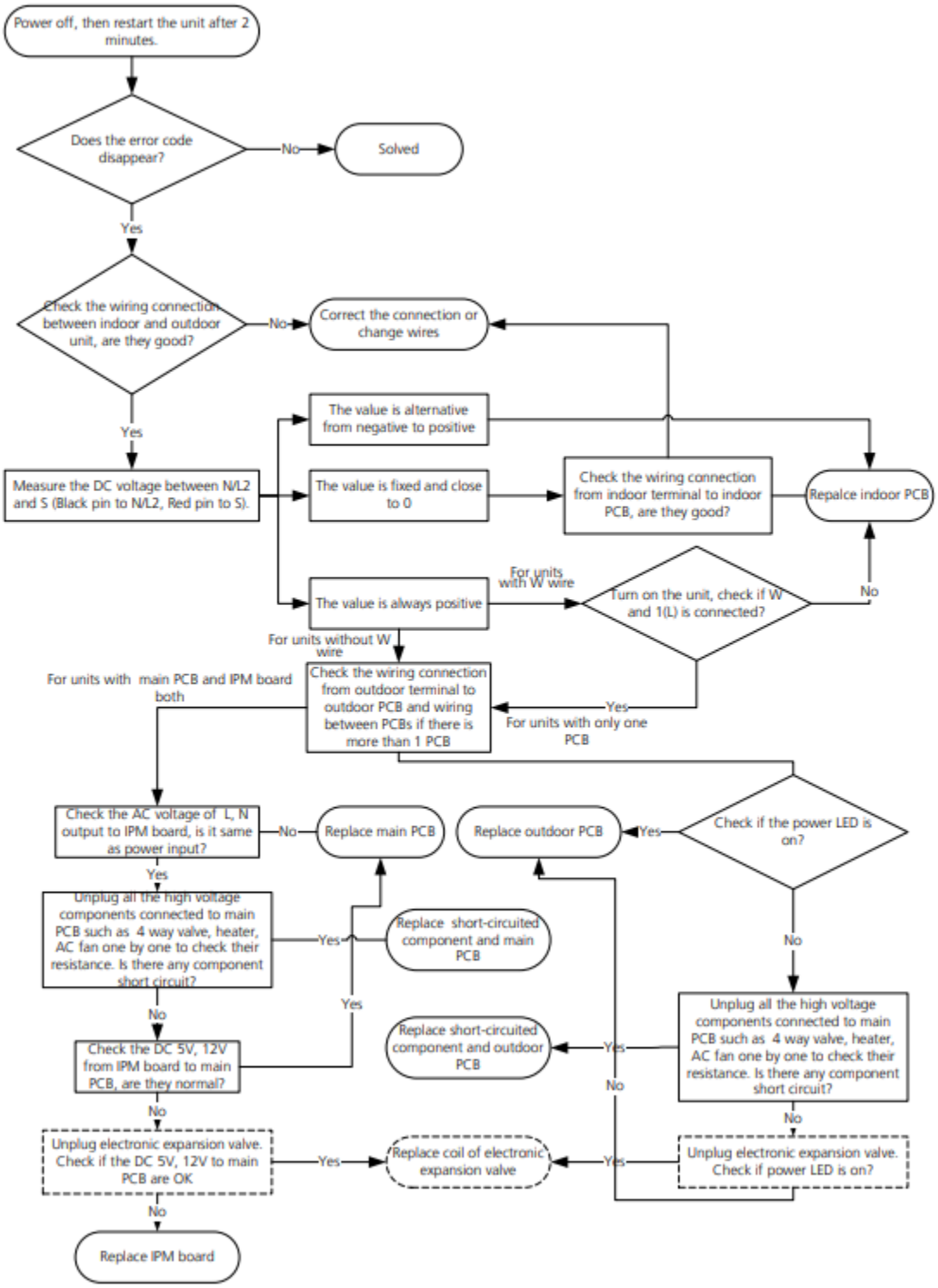
## EL 01: IDU & ODU Communication Error Diagnosis and Solution.

**Description:** Indoor unit cannot communicate with the outdoor unit.

**Recommended parts to prepare:**

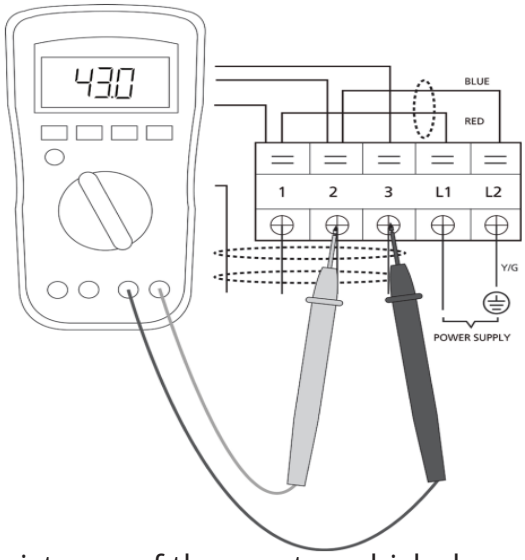
- Indoor PCB
- Outdoor PCB
- Reactor

**Troubleshooting and repair:**

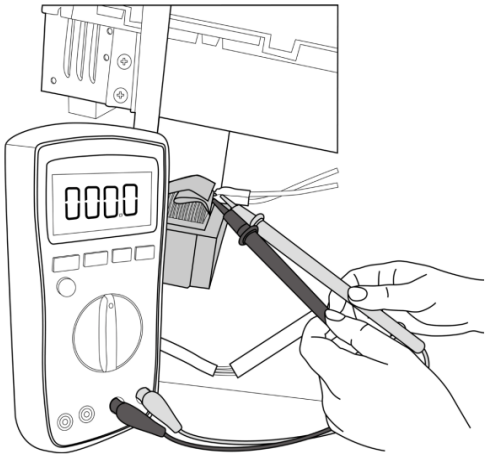


**Remarks:**

- 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.*

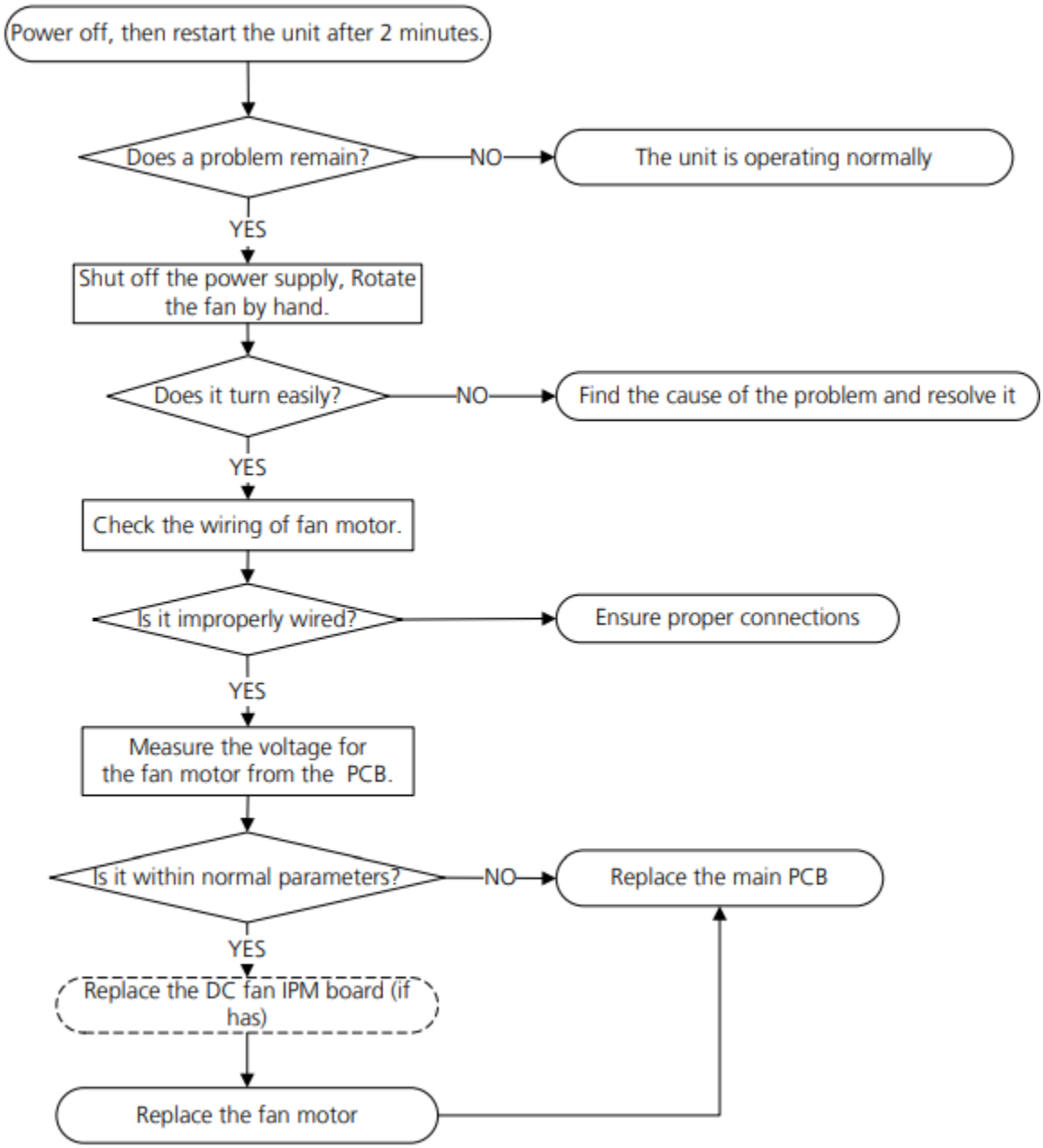
## EH 03/ EC 07: Fan Speed Out of Control Diagnosis and Solution.

**Description:** When the indoor/outdoor fan speed keeps too low or too high for a certain time, the unit ceases operation and the LED displays a fault.

**Recommended parts to prepare:**

- Connection wires
- Fan assembly
- Fan motor
- PCB

**Troubleshooting and repair:**

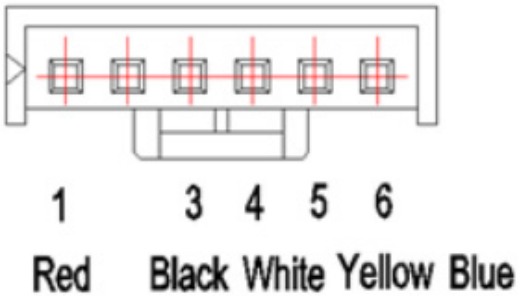


**Index:**

**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.

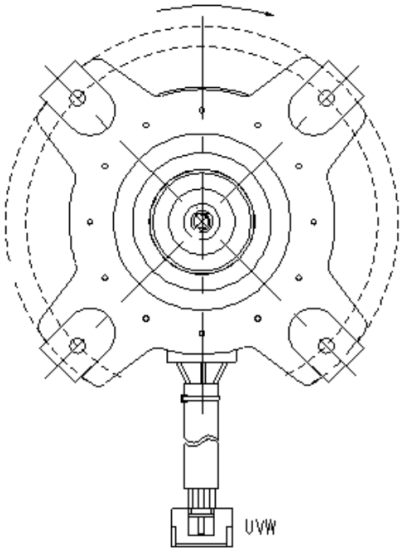
| NO. | Color | Signal | Voltage |
|---|---|---|---|
| 1 | Red | Vs/Vm | 192V~380V |
| 2 | --- | --- | --- |
| 3 | Black | GND | 0V |
| 4 | White | Vcc | 13.5-16.5V |
| 5 | Yellow | Vsp | 0~6.5V |
| 6 | Blue | FG | 13.5-16.5V |




**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.



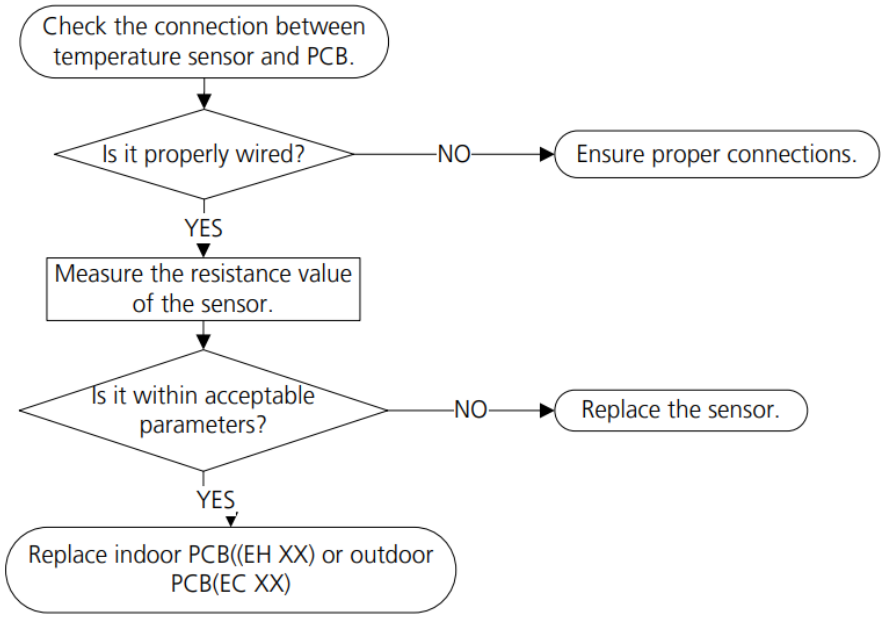
## EH 60/ EH 61/ EC 53/ EC 52/ EC 54/ EC 56: Open Circuit or Short Circuit of Temperature Sensor Diagnosis and Solution.

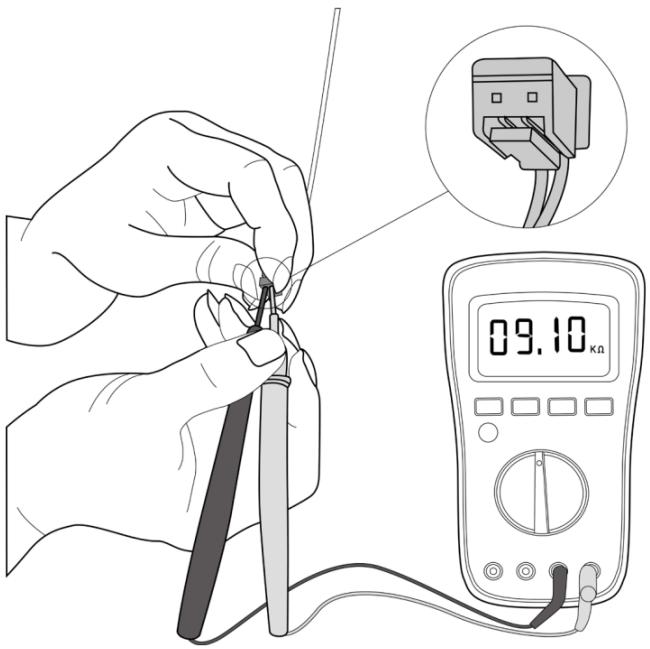
**Description:** If the sampling voltage is lower than 0.06V or higher than 4.94V, the LED displays a fault code.

**Recommended parts to prepare:**

- Connection wires
- Sensors
- PCB

**Troubleshooting and repair:**




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

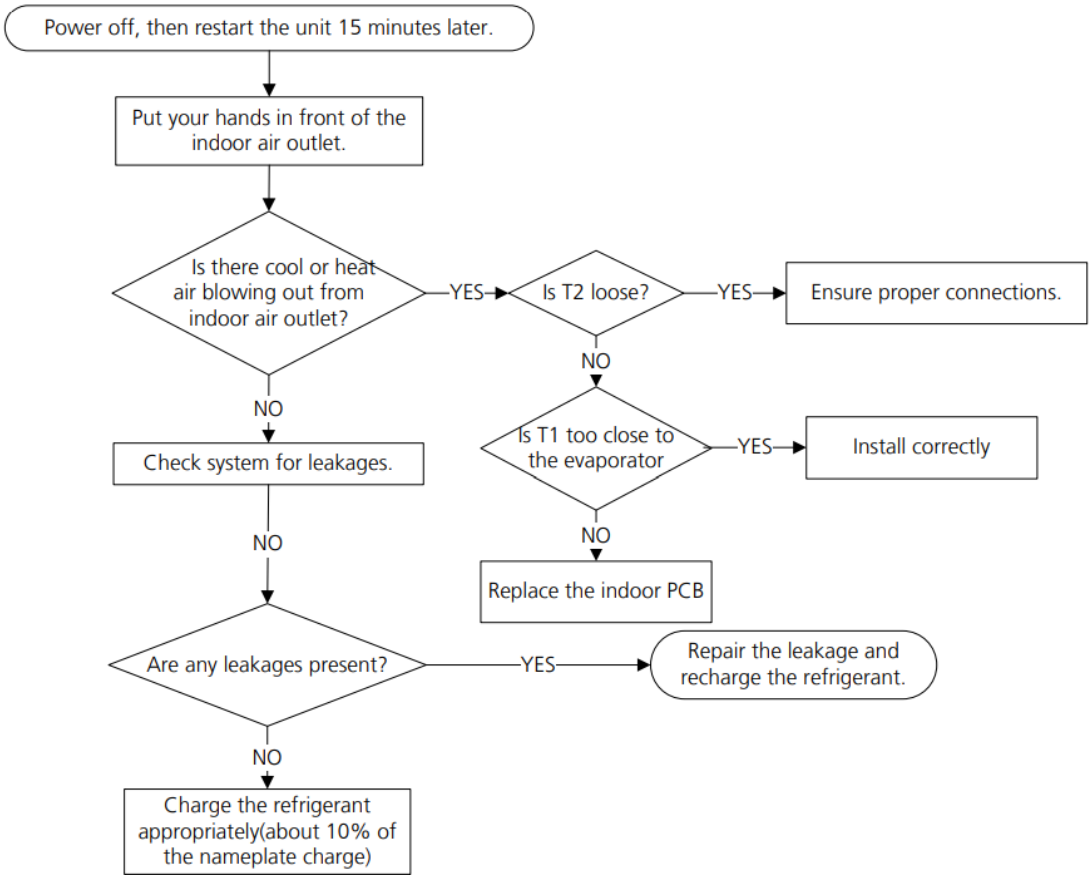
## EL 0C: System Lacks Refrigerant Diagnosis and Solution.

**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:**



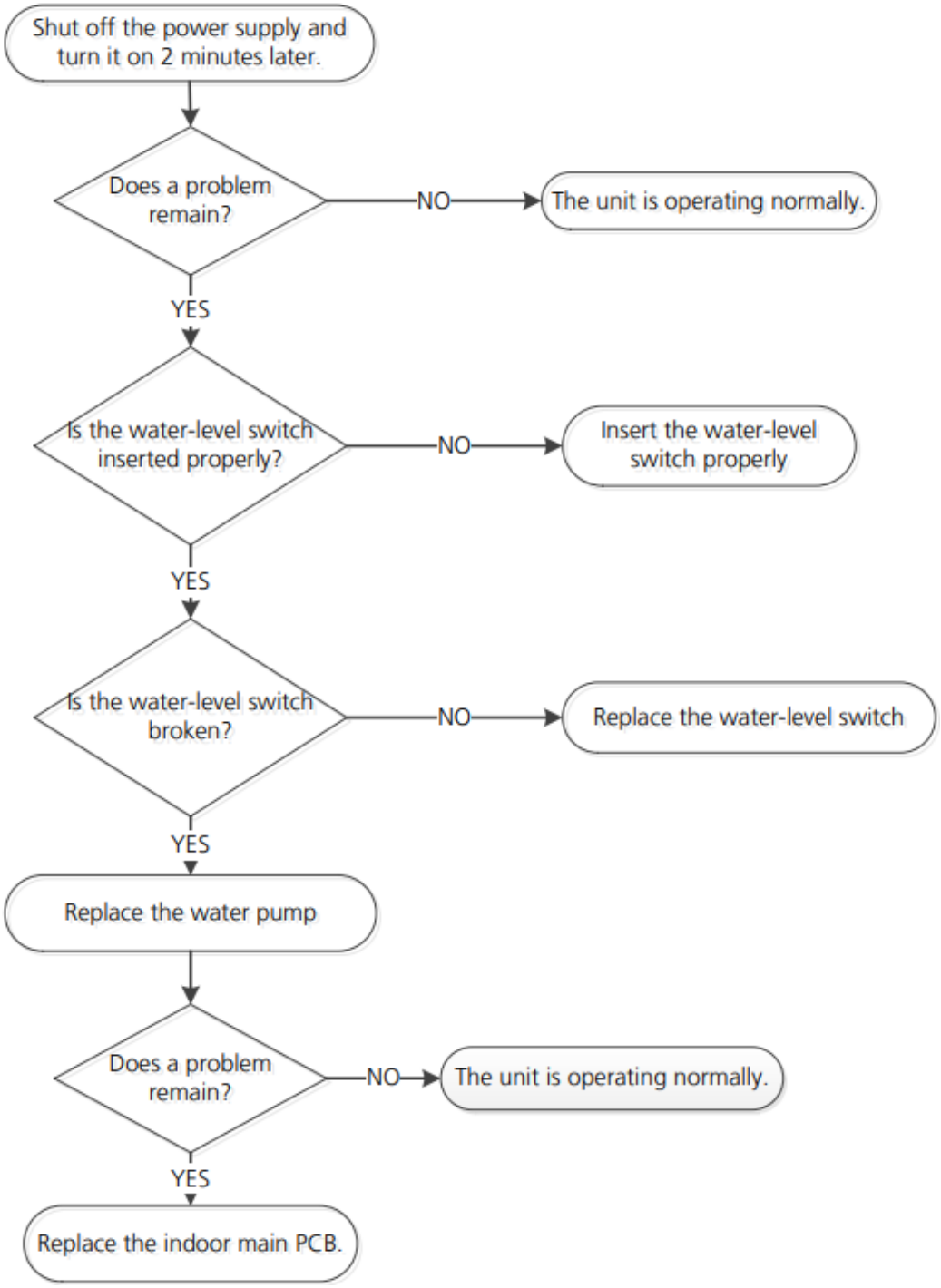
## EH 0E: Water-Level Alarm Malfunction Diagnosis and Solution.

**Description:** If the sampling voltage is not 5V, the LED displays a fault code.

**Recommended parts to prepare:**

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

**Troubleshooting and repair:**



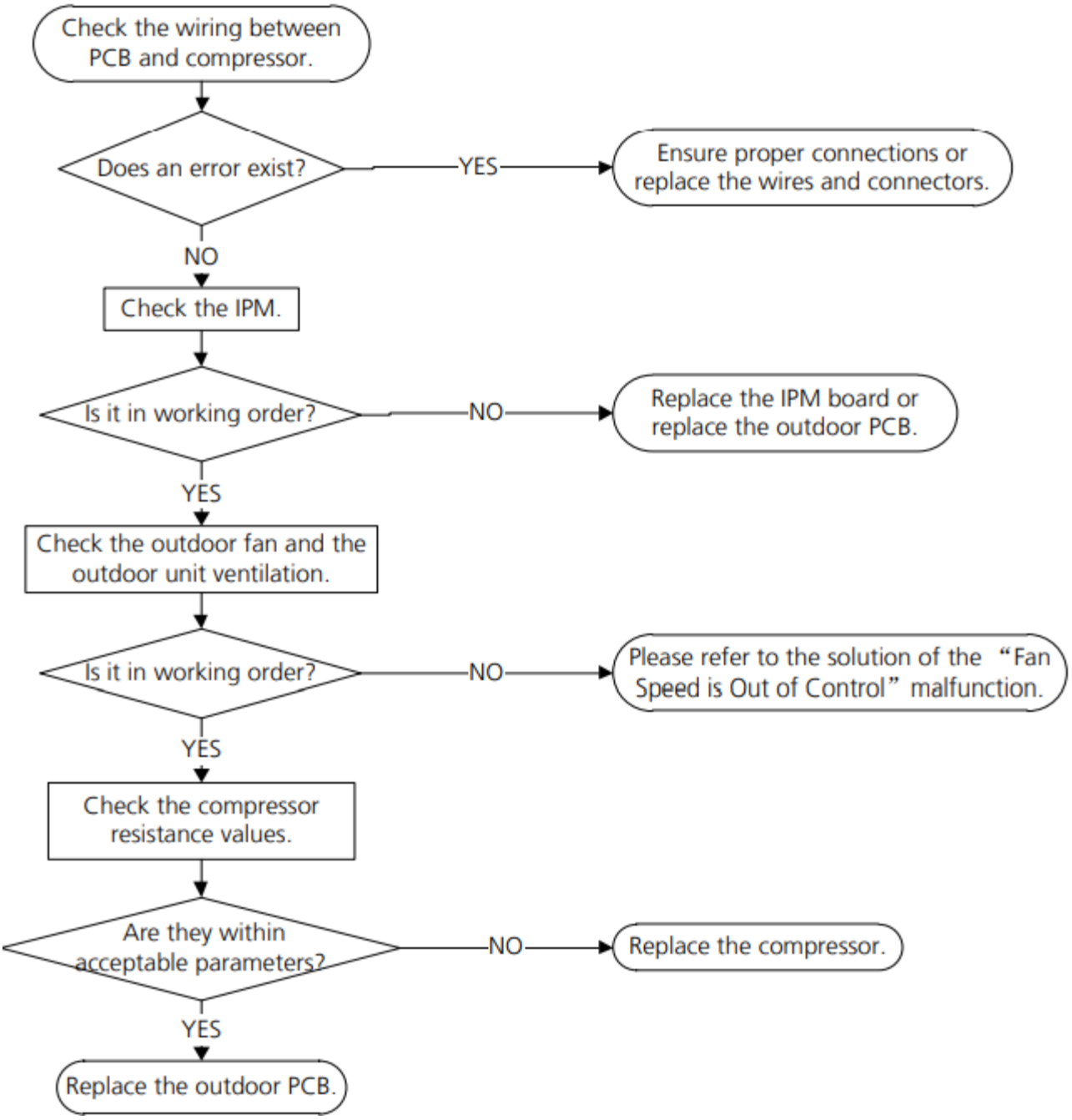
## PC 00: ODU IPM Module Protection Diagnosis and Solution.

**Description:** When the voltage signal the IPM sends to the compressor drive chip is abnormal, the LED displays a fault code.

**Recommended parts to prepare:**

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

**Troubleshooting and repair:**



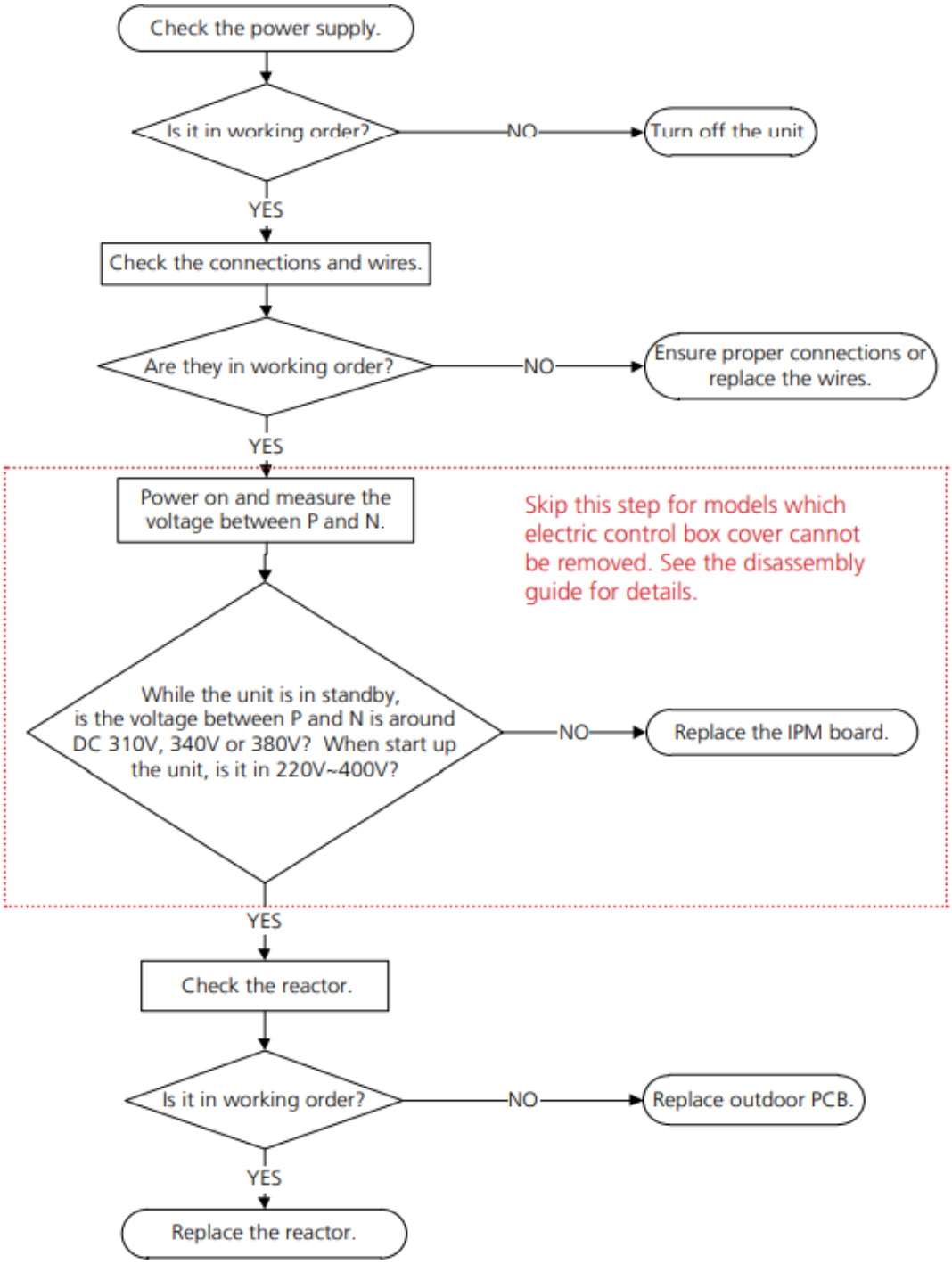
## PC 01: ODU Voltage Protection Diagnosis and Solution.

**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:**



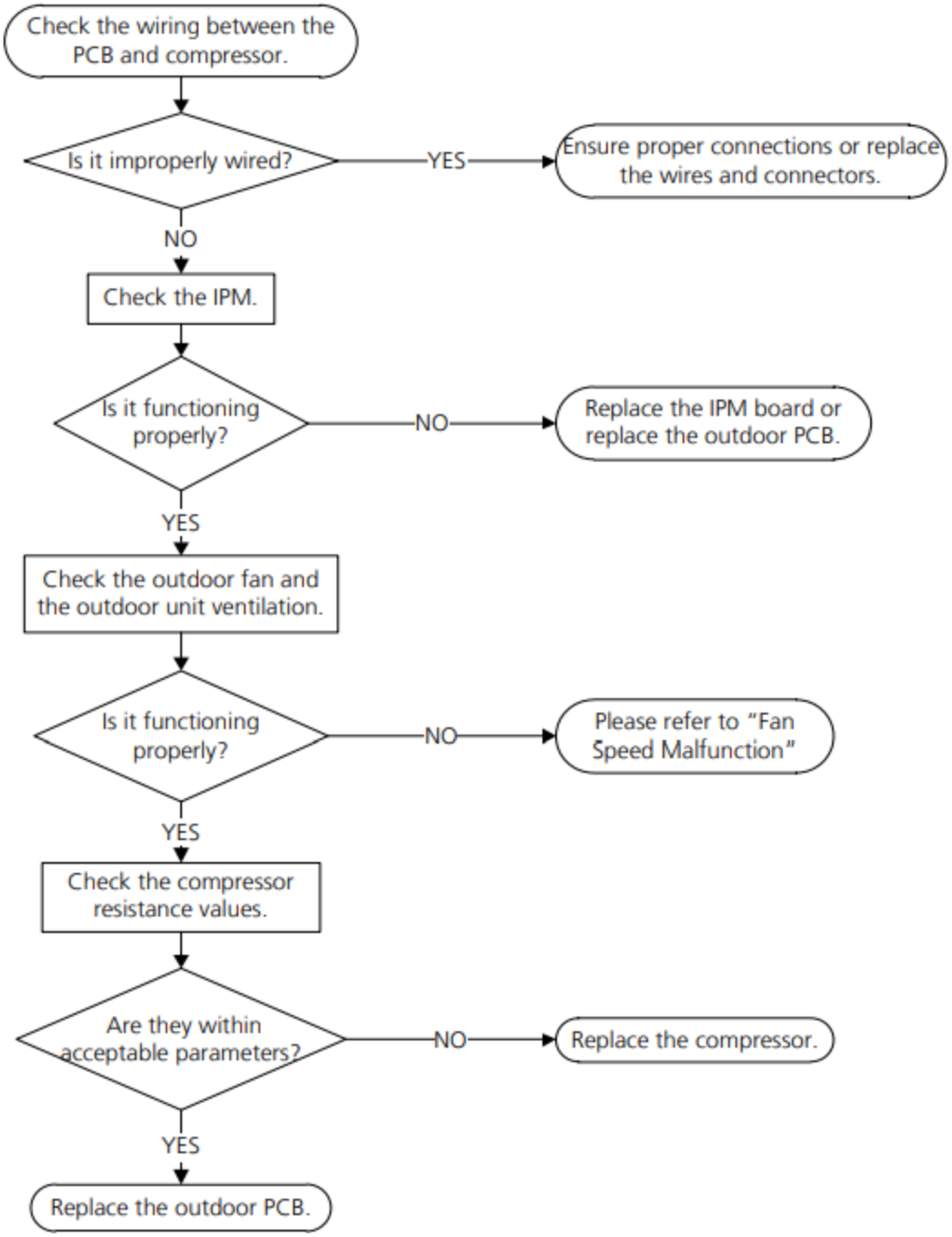
## PC 04: Inverter Compressor Drive Error Diagnosis and Solution.

**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:**



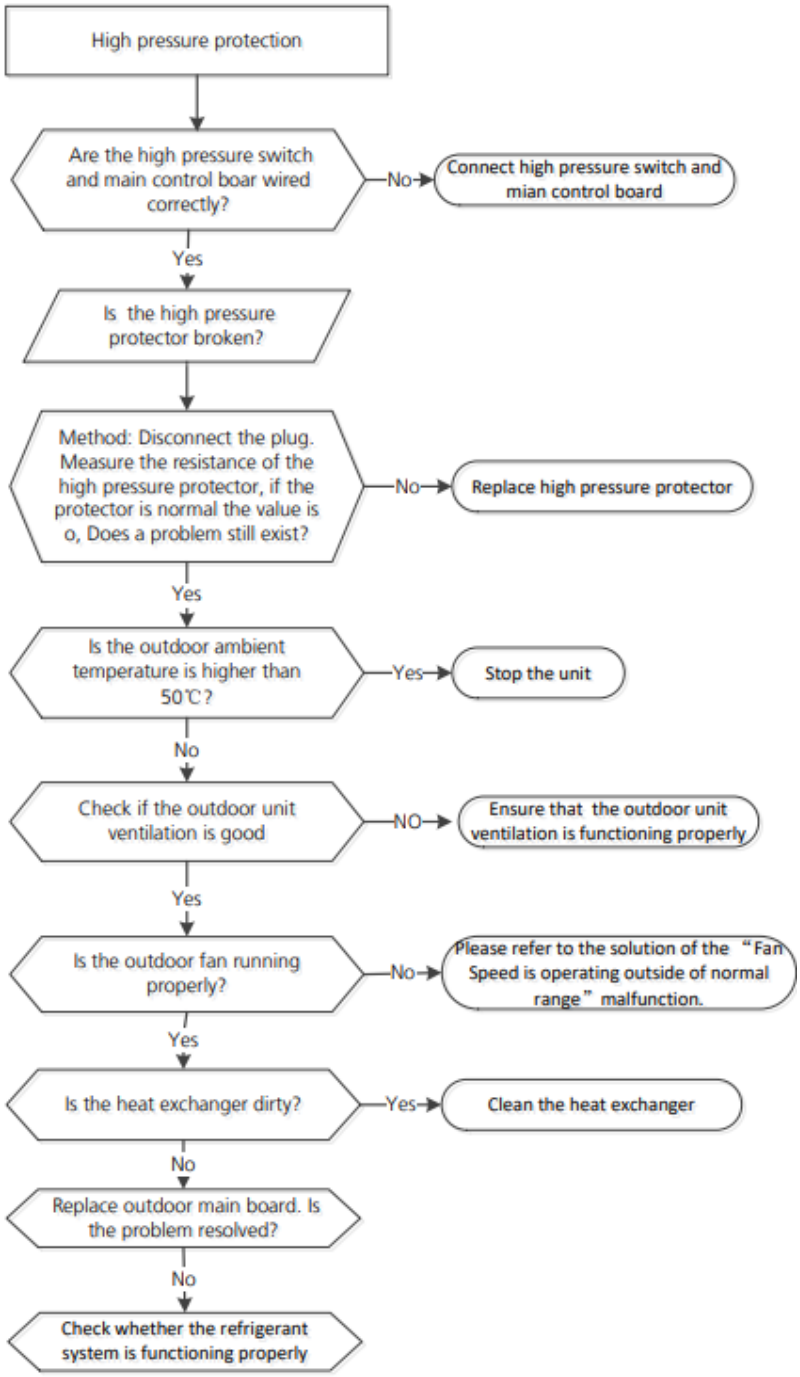
## PC 03: Pressure Protection (Low or High Pressure) Diagnosis and Solution.

**Description:** The outdoor pressure switch cut off the system due to high pressure (if pressure is higher than 638 PSI.(4.4MPa)). Or the outdoor pressure switch cut off the system due to low pressure (if the pressure is lower than 18.85 PSI.(0.13MPa) the LED will display a fault code.

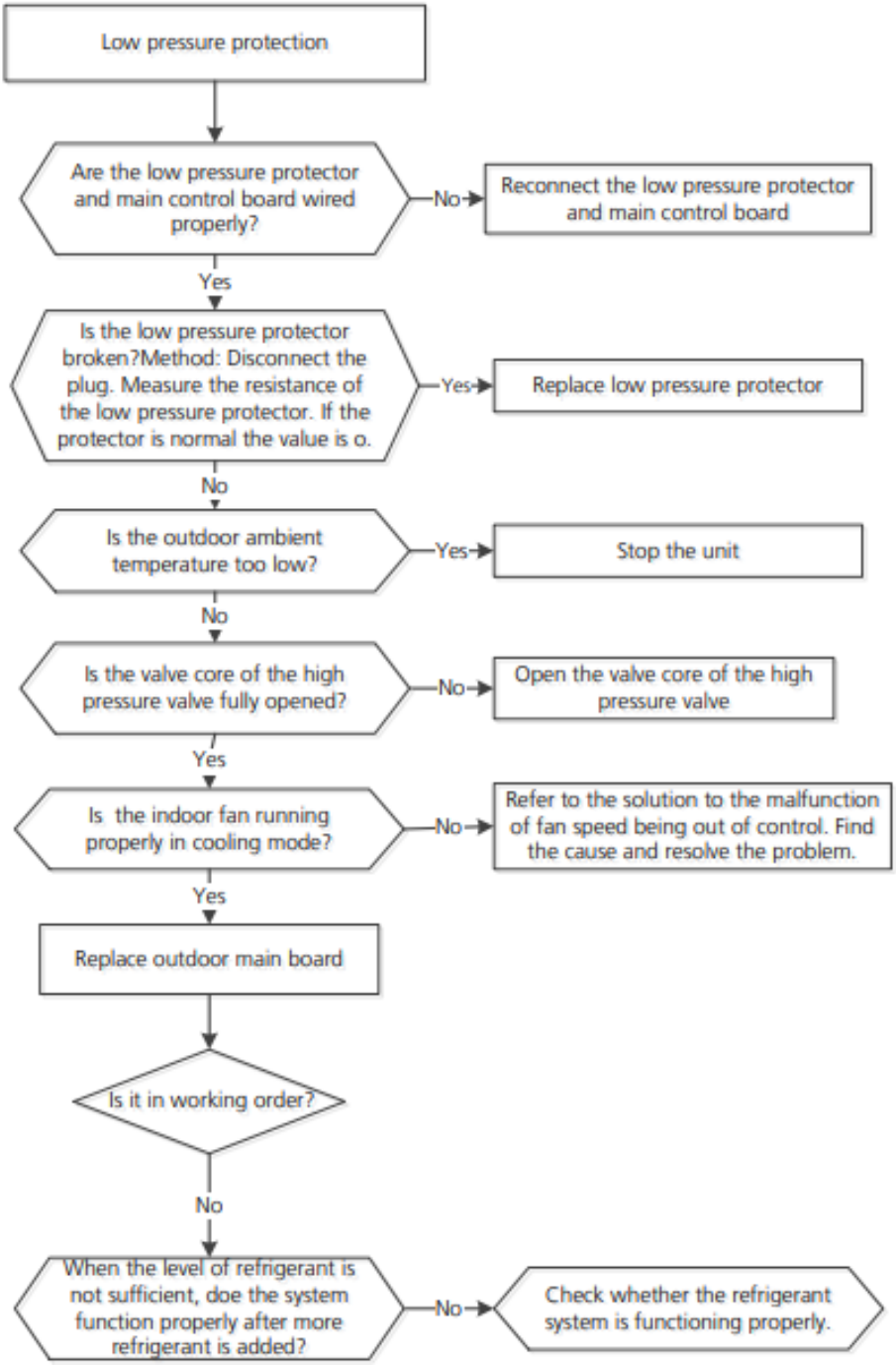
**Recommended parts to prepare:**

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

**Troubleshooting and repair:**



**PC 03: Cont.**


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.

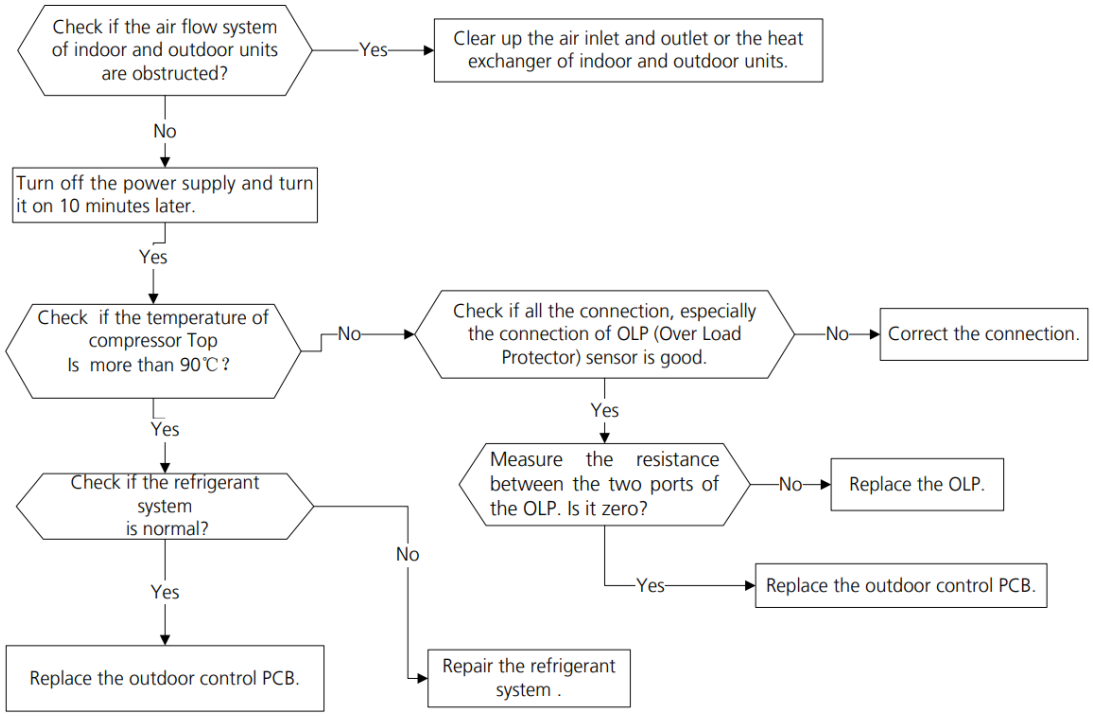
## PC 02: Compressor Top (or IPM) Temp. Protection Diagnosis and Solution.

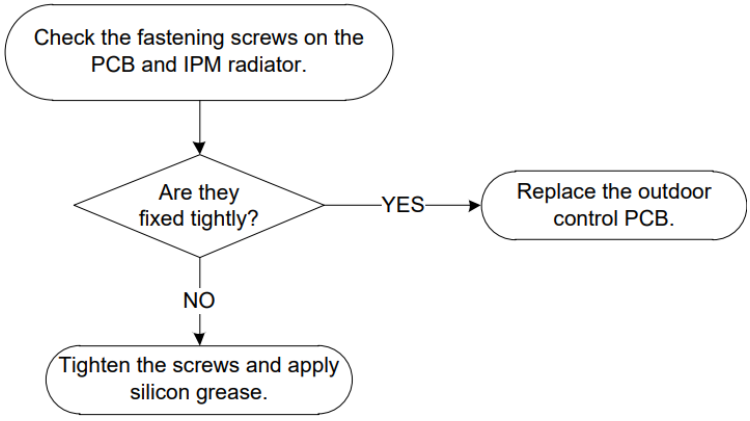
**Description: (**For some models with overload protection). If the sampling voltage is not 5V, the LED will display a fault code. If the temperature of the IPM module is higher than a certain value, the LED will display a fault code.

**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. When the compressor is off and the outdoor ambient temperature (T4) is lower than -35°C for 10s, the AC will stop and display the fault code.
When the compressor is on and the outdoor ambient temperature (T4) is lower than -40°C for 10s, the AC will stop and display the fault code.
When the outdoor ambient temperature (T4) is no lower than -32°C for 10s, the unit will exit the protection.

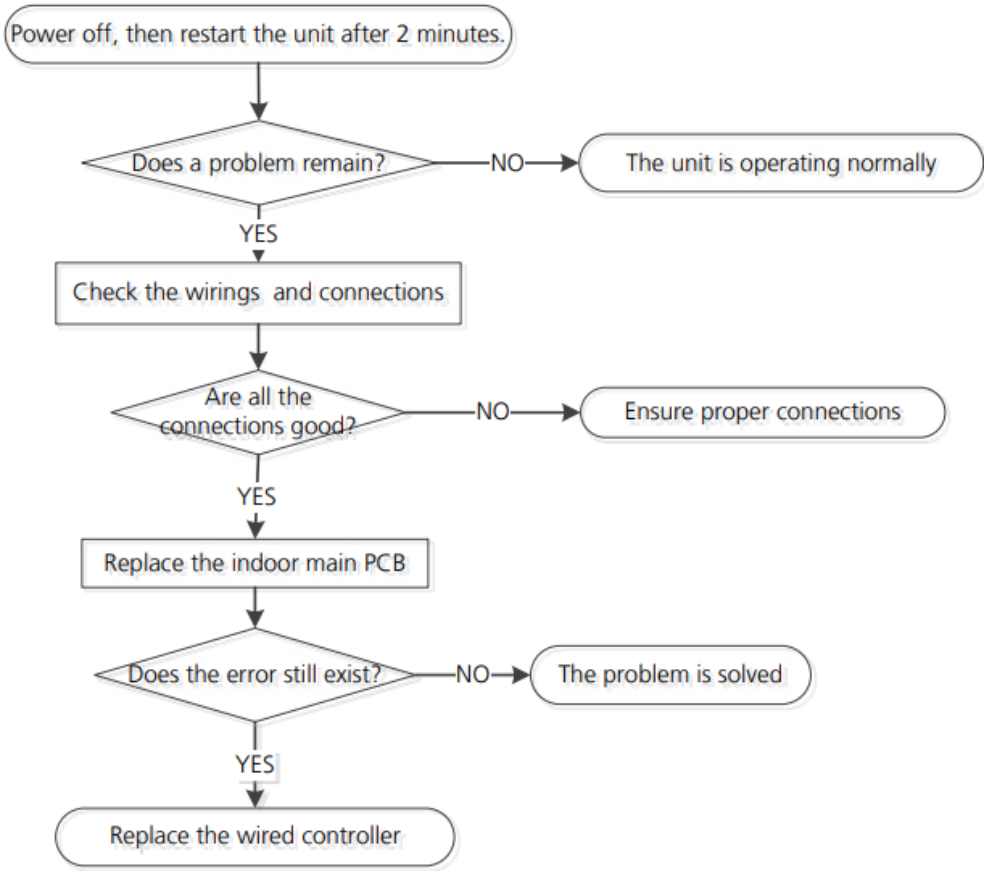
## EH b3: Communication malfunction Between Wire and Master Control Diagnosis and Solution.

**Description:** If the indoor PCB does not receive feedback from the wired controller, the error displays on the wired controller..

**Recommended parts to prepare:**

- Connection wires
- Indoor PCB
- Wired Controller

**Troubleshooting and repair:**



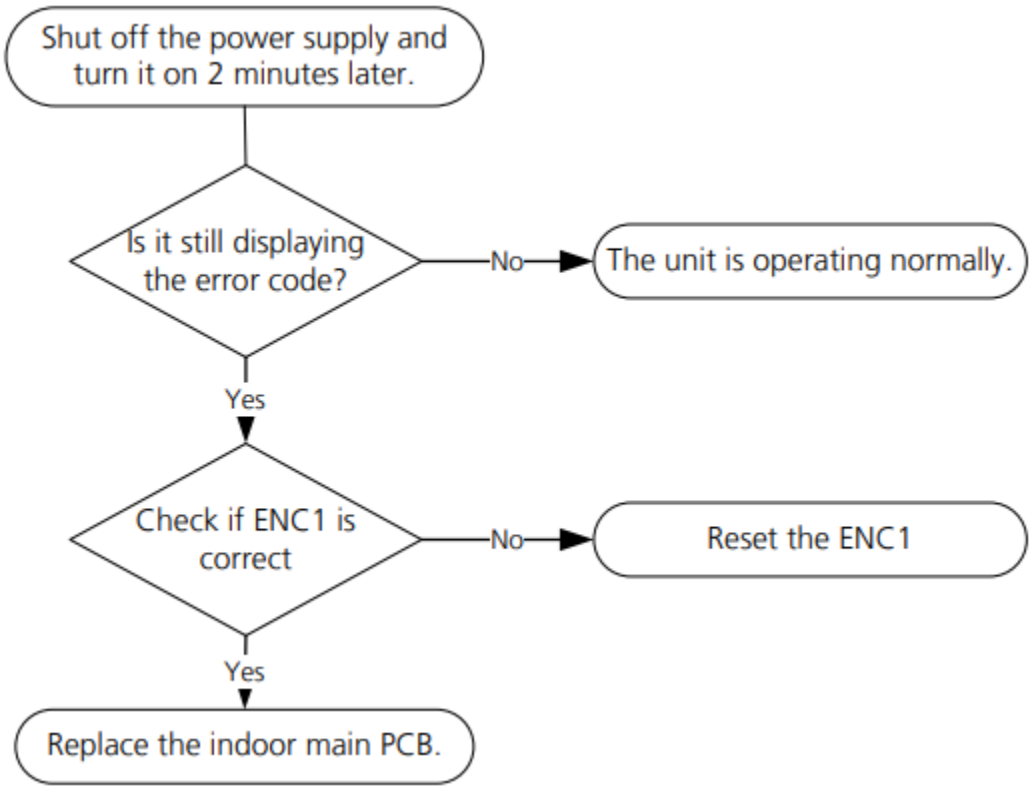
## EH bA: Communication Error Between the Indoor Unit and the External Fan module/ EH 3A: External Fan DC Bus Voltage is too Low Protection/ EH 3b: External fan DC bus voltage is too High Fault Diagnosis and Solution.

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

**Recommended parts to prepare:**

- Indoor main PCB

**Troubleshooting and repair:**



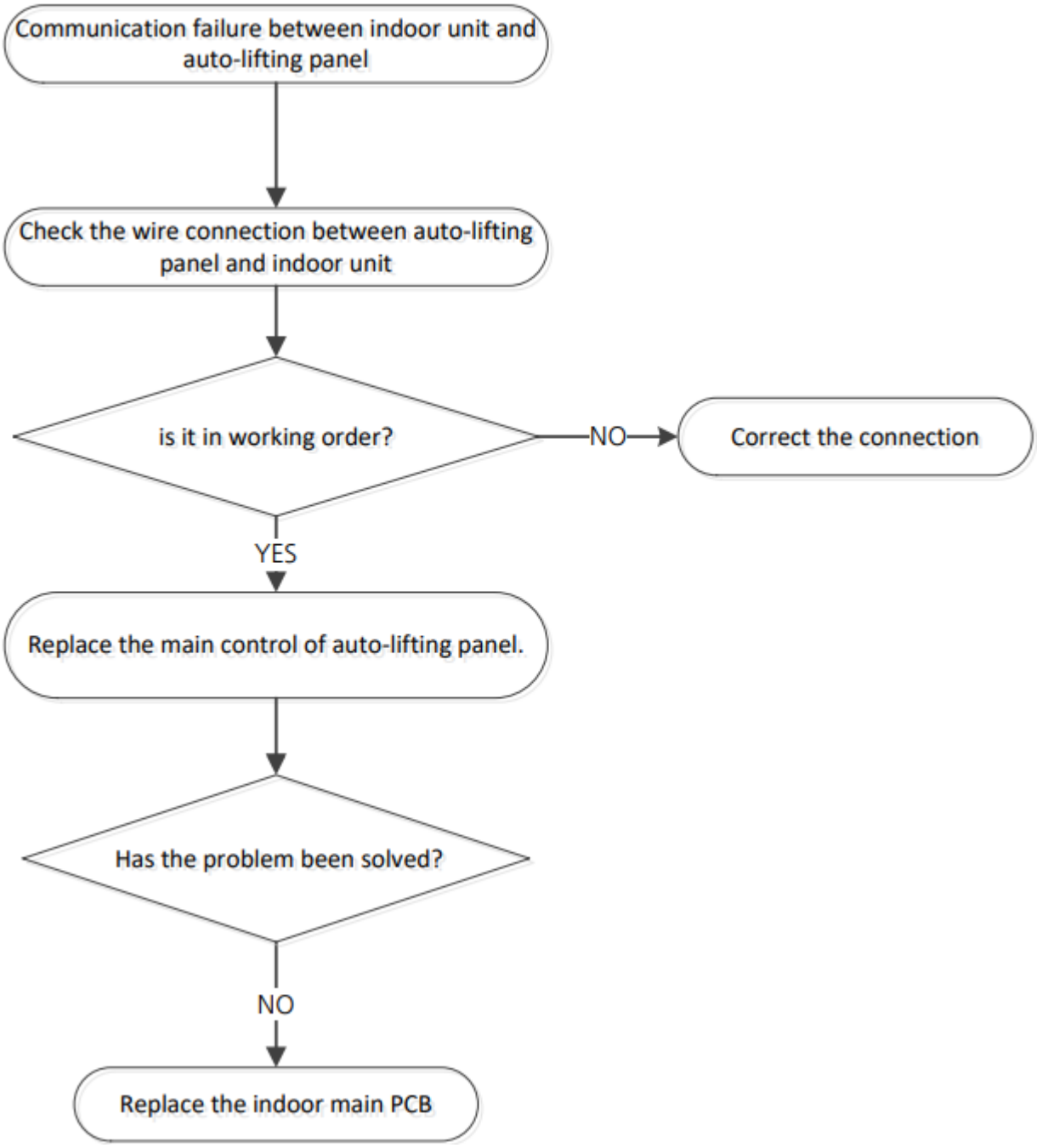
## FH 07: Communication Malfunction Between the Indoor Unit and Auto-Lifting Panel Diagnosis and Solution.

**Description:** Indoor PCB does not get the feedback from the PCB of the auto-lifting panel.

**Recommended parts to prepare:**

- Connection wires
- PCB of auto-lifting panel
- Indoor PCB

**Troubleshooting and repair:**



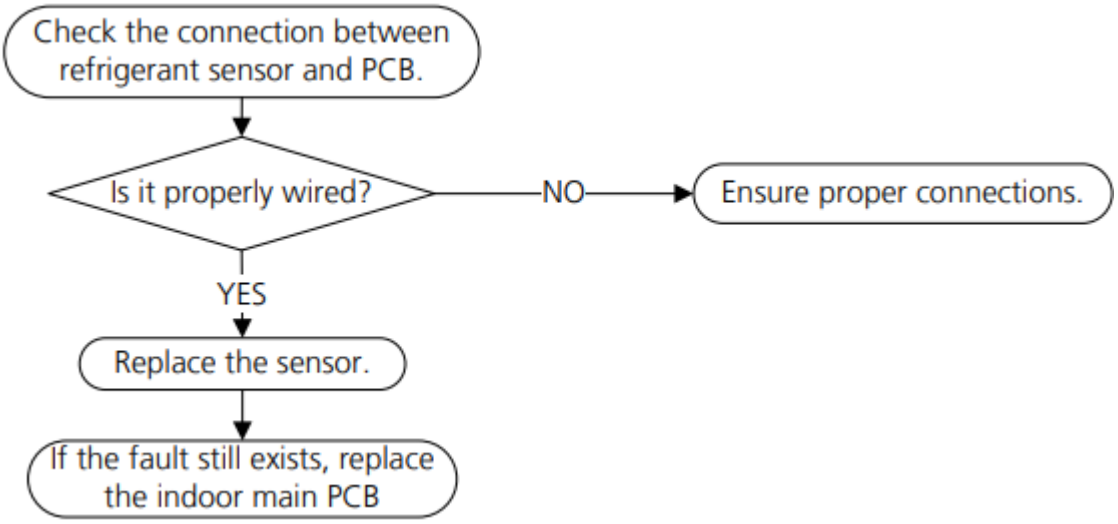
## FH CC: Refrigerant Sensor Error/ EH C3: Refrigerant Sensor is Out of Range Diagnosis and Solution.

**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 man PCB

**Troubleshooting and repair:**



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

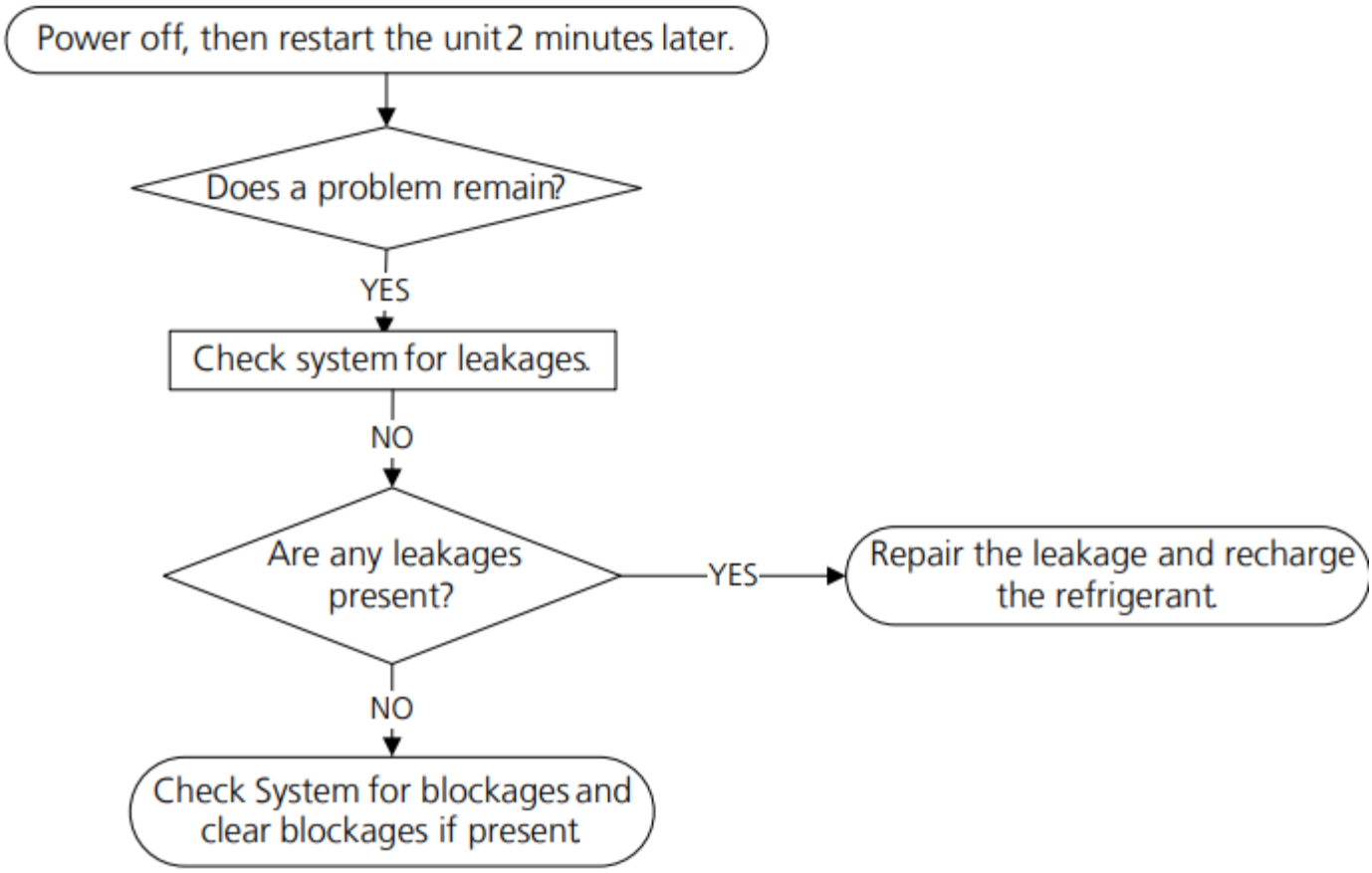
**Description:** The refrigerant sensor detects a concentration higher than or equal to 10%*LFL for 10 seconds or the refrigerant sensor detects a concentration higher than or equal to 20%*LFL or the multi model receives the refrigerant leakage protection fault sent by the outdoor unit.

**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 on the remote control, wired controller, APP, and so on to eliminate the alarm) and any other non-refrigerant leakage fault the indoor unit will only display ECC1 and the buzzer will not make a sound.

**Recommended parts to prepare:**

- Additional refrigerant

**Troubleshooting and repair:**



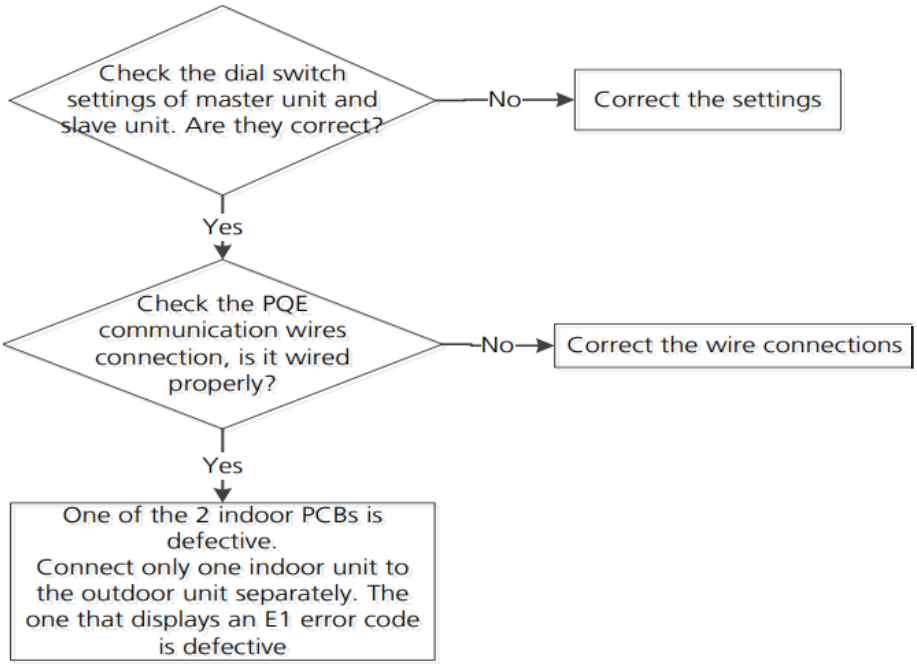
## EL 11: Communication Malfunction Between the Main unit and Secondary Units (for Twin Systems) Diagnosis and Solution.

**Description:** When set in twin systems the master unit and slave unit cannot be recognized normally.

**Recommended parts to prepare:**

- Connection wires
- Indoor man PCB

**Troubleshooting and repair:**




## EH 12: Main Unit or Secondary Unit Malfunction (for Twin System) Diagnosis and Solution.

**Description:** When set in twin systems, one indoor unit displays this error code which means another unit if faulty. Check another indoor unit's error code and then follow the prescribed solutions to resolve the malfunction.

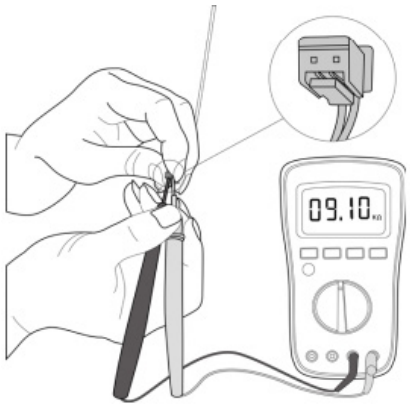
## 5.7 Check Procedures

**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:

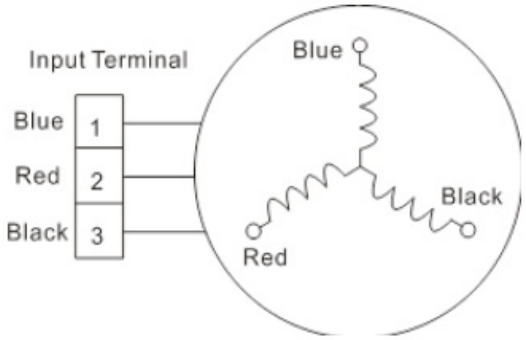
1. Disconnect the temperature sensor from the PCB.
2. Measure the resistance value of the sensor using a multi-meter.
3. Check corresponding temperature sensor resistance value table.




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

### Compressor Check:

1. Disconnect the compressor power cord from the outdoor PCB.
2. Measure the resistance value of each winding using a multi-meter.
3. Check the resistance value of each winding in the following table.



| Resistance Value | KSK89D53UEZ | KSK89D29UEZD | KSN98D22UFZ | KSK103D33UEZ3<br>KSK103D33UEZ3(MD)<br>KSK103D33UEZ3 |
|---|---|---|---|---|
| Blue-Red | 2.35±5%Ω<br>(at 68°F (20°C)) | 1.99±5%Ω<br>(at 68°F (20°C)) | 1.57±5%Ω<br>(at 68°F (20°C)) | 2.13±5%Ω<br>(at 68°F (20°C)) |
| Blue-Black | | | | |
| Red-Black | | | | |

| Resistance Value | KSK103D32UEZ31<br>KSK75D32UEZD31 | KTN150D30UFZA<br>KTN150D30SFZA |
|---|---|---|
| Blue-Red | 4.06±5%Ω<br>(at 68°F (20°C)) | 1.02±5%Ω<br>(at 68°F (20°C) |
| Blue-Black | | |
| Red-Black | | |

| Resistance Value | KSM135D23UFZ | KTN110D42UFZ | KSN140D21UFZ | KTM140D78UFZ3 |
|---|---|---|---|---|
| Blue-Red | 1.72±5%Ω<br>(at 68°F (20°C)) | 1.82±5%Ω<br>(at 68°F (20°C)) | 1.28±5%Ω<br>(at 68°F (20°C)) | 1.5±5%Ω<br>(at 68°F (20°C)) |
| Blue-Black | | | | |
| Red-Black | | | | |

| Resistance Value | KTF235D22UMT<br>ATF235D22TMT<br>KTF250D22UMT | KTM240D46UKT2 |
|---|---|---|
| Blue-Red | 0.75±5%Ω<br>(at 68°F (20°C)) | 1.04±5%Ω<br>(at 68°F (20°C) |
| Blue-Black | | |
| Red-Black | | |

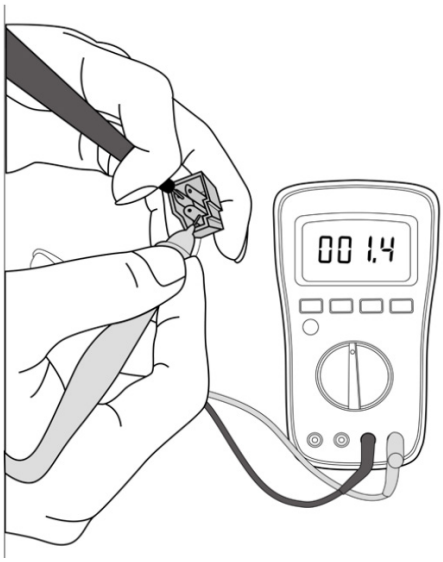
| Resistance Value | KSN140D58UFZ | KTM240D43UKT | KSN98D64UFZ23 | ASN140D35TFZ |
|---|---|---|---|---|
| Blue-Red | 1.86±5%Ω<br>(at 68°F (20°C)) | 1.03±5%Ω<br>(at 68°F (20°C)) | 2.7±5%Ω<br>(at 68°F (20°C)) | 0.83±5%Ω<br>(at 68°F (20°C)) |
| Blue-Black | | | | |
| Red-Black | | | | |

| Resistance Value | KTF420D62UNT | ASN108D22TEZ |
|---|---|---|
| Blue-Red | 0.86±5%Ω<br>(at 68°F (20°C)) | 1.76±5%Ω<br>(at 68°F (20°C) |
| Blue-Black | | |
| Red-Black | | |

| Resistance Value | KTM240D63SKT2 | KTM240D57UMT | DTN210D32UFZ | KSN140D33UFZB3 |
|---|---|---|---|---|
| Blue-Red | 1.19±5%Ω (at 68°F (20°C)) | 0.62±5%Ω (at 68°F (20°C)) | 1.7±5%Ω (at 68°F (20°C)) | 1.68±5%Ω (at 68°F (20°C)) |
| Blue-Black | | | | |
| Red-Black | | | | |

| Resistance Value | KTM110D79UFZA3 | GSD098XKUF7JV6B |
|---|---|---|
| Blue-Red | 1.88±5%Ω (at 68°F (20°C)) | 2.83±5%Ω (at 68°F (20°C) |
| Blue-Black | | |
| Red-Black | | |

| Resistance Value | KSK75D33UEZD3 | DTN210D54UEZ3 | DTN250D53UFZ3 | KSN103D42UEZ31 | KTM180D68UMT |
|---|---|---|---|---|---|
| Blue-Red | 2.14±%Ω (at 68°F (20°C)) | 2.56±%Ω (at 68°F (20°C)) | 1.97±%Ω (at 68°F (20°C)) | 2.35±%Ω (at 68°F (20°C)) | 1.91±%Ω (at 68°F (20°C)) |
| Blue-Black | | | | | |
| Red-Black | | | | | |




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

## IPM Continuity Check:

**⚠ WARNING**

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

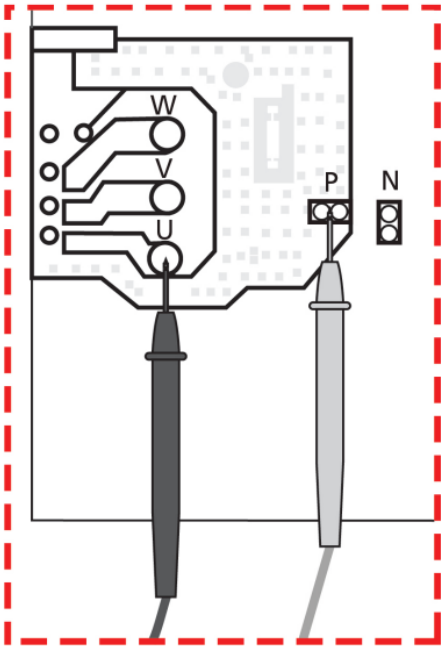
1. Turn off the outdoor unit and disconnect the power supply.
2. Discharge electronic capacitors and ensure all energy-storage units have been discharged.
3. Disassemble the outdoor PCB or disassemble the IPM board.
4. Measure the resistance value between P and U (U,W,N), U(V,W) and N.

| Digital tester | | Resistance Value | Digital Tester | | Resistance Value |
|---|---|---|---|---|---|
| (+)Red | (-)Black | | (+)Red | (-)Black | |
| P | N | ∞ (Several M±5%Ω) | U | N | ∞ (Several M±5%Ω) |
| | U | | V | | |
| | V | | W | | |
| | W | | - | | |

## Or test the conductivity of IPM with diode mode:

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

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

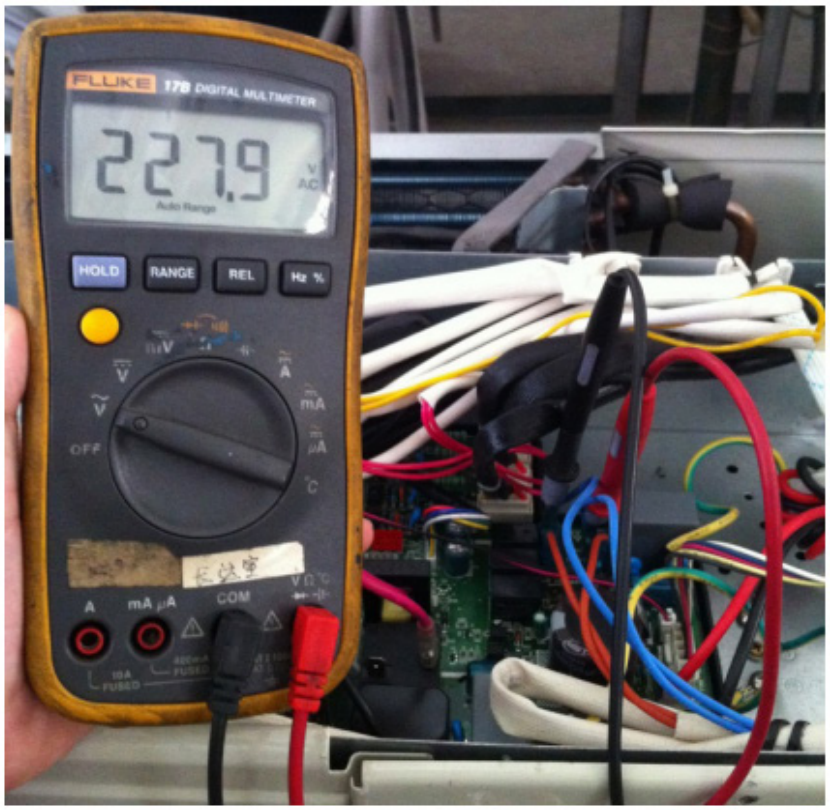



*Note: The picture and the value are for reference only, actual condition and specific values may vary.*

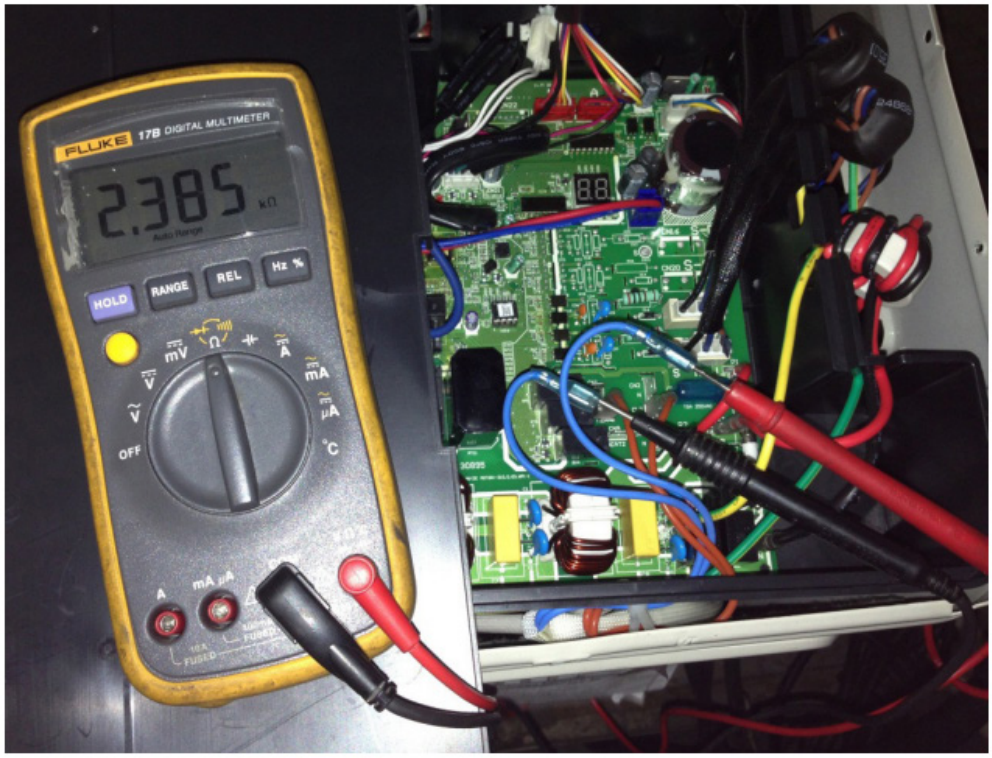
## 4-way Valve Check

1. Power on and use a digital tester to measure the voltage. When the unit operates in cooling it is 0V, when the unit operates in heating it is about 230VAC.

**If the value of the voltage is not in range the PCB has problems and needs to be replaced.**

2. Turn the power off and use a digital tester to measure the resistance. The value should be 1.8~2.5 K±5%Ω.

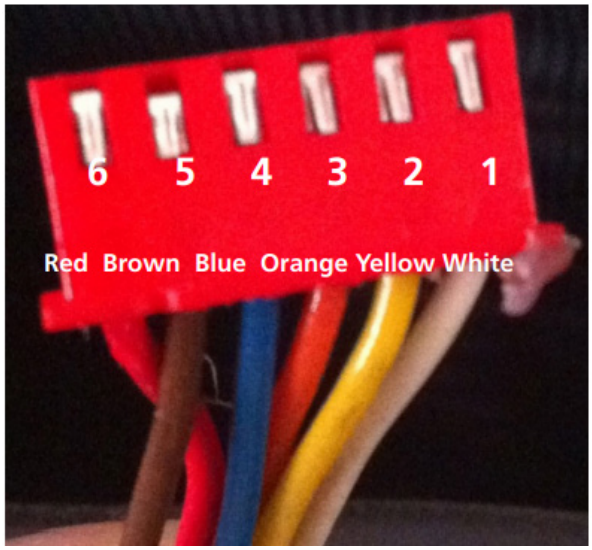


## EXV (EEV) Check:

**⚠ WARNING**

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

1. Disconnect the connector from the outdoor PCB.
2. Measure the resistance value of each winding using a multi-meter.
3. Check the resistance value of each winding in the following table.




| Color of Lead Winding | Normal Value |
|---|---|
| Red-Blue | About 50Ω |
| Red-Yellow | |
| Brown-Orange | |
| Brown-White | |

## 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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