

DUCTED CENTRAL SPLIT SYSTEM AIR CONDITIONER / HEAT PUMP

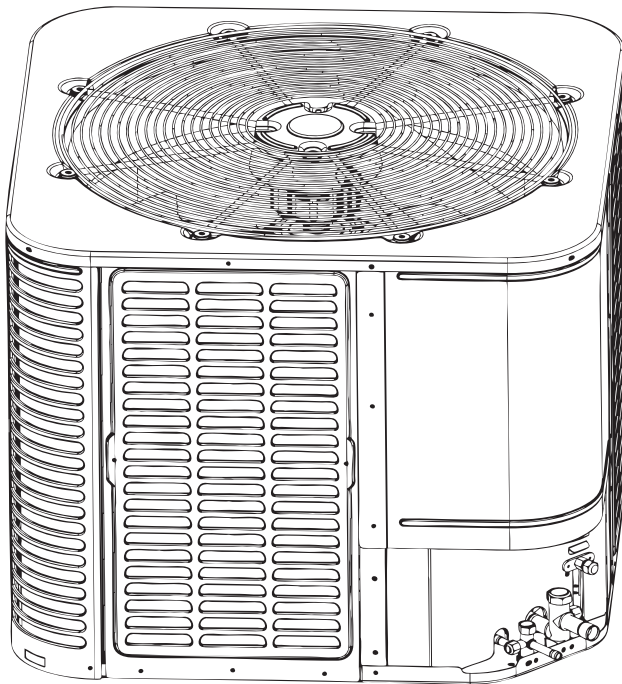
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# PIONEER®

## DYC-18 Inverter Series

For 24,000-60,000 BTU/hr Systems

*Condensing Unit (R-454B) - YD Outdoor (2/3 Ton & 4/5 Ton)*



### Models:

-YD2436GCSI18RD

-YD4860GCSI18RD

## Installation and Owner's Manual

### IMPORTANT NOTICE:

Please read this manual carefully before installing or operating your new air conditioning system. Be sure to save this manual for future reference.



REV250529

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# 1. Symbol and Key to Safety Instructions

## 1.1 Symbol Keywords



### WARNING

The warnings in this document are identified by warning triangles printed on a black background. The key words at the beginning of the warning indicate the type and severity of the next risk if no measures are taken to prevent it.

The following keywords are defined and used in this document:



### Danger

Indicates a hazardous situation, which, if not avoided, will lead to death or serious injury.



### Warning

Indicates a hazardous situation, which, if not avoided, may lead to death or serious injury.



### Caution

Indicates a hazardous situation, which, if not avoided, may cause mild to moderate injury.



### Note

Used to deal with behaviors unrelated to personal injury.

## Important information



This symbol represents important information that is not dangerous to people or property.

## 1.2 Safety

Please Read Before Continuing.



### WARNING



Failure to observe this warning may result in property damage, serious personal injury or death.



Before touching the electrical components, wait for 3 minutes after disconnecting the power supply.



### NOTICE



This document is the property of the customer and is kept by this unit. When you are finished, please return to the service information package.



These instructions do not cover all changes in the system, nor do they provide all unexpected situations that may be encountered during installation.



If you need more information, or there are special problems that are not sufficient for the buyer, you should consult your installation dealer or local dealer.



Some benefits of installing an approved indoor and outdoor split system are maximum efficiency, best performance and best overall system reliability.



This document contains wiring diagram and maintenance information. This is the customer's property and belongs to this unit. When you are finished, please return to the service information package.

---

### Warning:

- The unit must be installed by qualified personnel with a capability certificated for handling refrigerant fluids. Refer to regulation and laws in use on installation location.
- Installation, service, maintenance and repair of this unit must be performed by a certified technician.
- Servicing shall be performed only as recommended by the manufacturer.
- Product uninstallation and recycling must be performed by a certified technician.
- The appliances is designed to be operated in outdoor area. If have to be installed indoor, the appliance shall be stored in a room without continuously operating open flames (for example an operating gas appliance) and ignition sources (for example an operating electric heater).
- This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety.
- The appliance shall be installed in accordance with national wiring regulations.
- Children should be supervised to ensure that they do not play with the appliance.
- Before accessing the connection terminals, all power circuits must be disconnected.
- This information is intended for use by individuals with sufficient electrical and mechanical experience background. Attempting to repair central air conditioning products may result in personal injury and/or property damage.



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### Warning: Dangerous voltage

- Failure to observe this warning may result in property damage, serious personal injury or death.
- Can cause injury or death. disconnect all remote electric power supplies before servicing. Follow proper locking/tagging procedures to ensure that the power supply will not be energized accidentally.



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### Warning: Refrigerant oil



- Attempting to repair central air-conditioning products may result in property damage, serious personal injury or death. These units use R-454B refrigerant, and its working pressure is 50-70% higher than R-22. Use only the service equipment approved by R-454B. The refrigerant cylinder is painted "rose" to indicate the type of refrigerant, and may contain a "dip" tube to allow liquid refrigerant to be filled into the system. This systems use POE oil (VG74、VG75 or equivalent), which can easily absorb moisture from the atmosphere. In order to limit this "moisture absorption" effect, the system should be sealed as much as possible. If the system is exposed to the atmosphere for more than 4 hours, the compressor oil must be changed. Do not destroy the vacuum with air, and always replace the filter dryer when you open the system for component replacement.
- 

### Warning: Hot surface



- May cause mild to severe burns. Failure to observe this caution may result in property damage or personal injury. Do not touch the top of the compressor.
- 

### Caution: Contains refrigerant



- Failure to follow the correct procedures will lead to personal illness or injury or serious equipment damage. The system contains high-pressure oil and refrigerant. Before opening the system, recover the refrigerant to release the pressure.
- 

### Note: Indoor unit required



- The indoor unit must be matched with the thermal expansion valve. The model of TXV can be changed according to the system capacity.
- 

### Note:



- The manufacturer recommends installing only approved matched indoor and outdoor systems. All of the manufacturer's split systems are AHRI rated only with TXV indoor systems. Some of the benefits of installing approved matched indoor and outdoor split systems are maximum efficiency, optimum performance and the best overall system reliability.
- 

### Note: Grounding required



- Failure to check or use the correct maintenance tools may result in equipment damage or personal injury. Reconnect all grounding devices. All parts of this product that can conduct current are grounded. If the grounding wire, screw, strap, clip, nut or washer used to complete the grounding path is removed during maintenance, it must be put back in place and properly fixed.
- 

### Warning: service valve



- Failure to observe this warning will result in release of system pressure, which may result in personal injury and/or property damage. When opening the liquid pipeline service valve, be extra careful. Turn the valve stem counterclockwise until the valve stem touches the bead.
-



### Warning: Brazing required

- Failure to check the wiring or use the correct maintenance tools may result in equipment damage or personal injury. If using existing refrigerant lines, make sure that all joints are brazed, not soldered.



### Warning: High current leakage

- Failure to observe this warning may result in property damage, serious personal injury or death. Before connecting the power supply, grounding is essential.



### Warning:

- This product may expose you to chemicals including lead and lead components, which are known to cause cancer, birth defects or other reproductive harm in California. For more information, please visit [www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov).



### Warning:

- Do not use means to accelerate the defrosting process or to clean, other than those recommended by the manufacturer.
- The appliances is designed to be operated in outdoor area. If have to be installed indoor, 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.)
- Do not pierce or burn.
- Be aware that refrigerants may not contain an odour.

	<b>WARNING</b>	This symbol that this appliance used a flammable refrigerant . If the refrigerant is leaked and exposed to an external ignition source, there is a risk of fire.
	<b>CAUTION</b>	This symbol that the operation manual should be read carefully.
	<b>CAUTION</b>	This symbol that a service personnel should be handling this equipment with reference to the installation manual.
	<b>CAUTION</b>	This symbol that information is available such as the operating manual or installation manual.

## 1.3 Safety precautions for R454B refrigerant

### WARNING

- Do not use means to accelerate the defrosting process or to clean, other than those recommended by the manufacturer.
- The appliance shall be stored in a room without continuously operating ignition sources (for example: open flames, an operating gas appliance or an operating electric heater.
- Do not pierce or burn.
- Be aware that refrigerants may not contain an odour.

## **Qualification of workers**

Every working procedure like maintenance, service and repair operations that affects safety means shall only be carried out by competent persons.

Examples for such working procedures are:

- Breaking into the refrigerating circuit;
- Opening of sealed components;
- Opening of ventilated enclosures.

## **Checks to the area**

Prior to beginning work on systems containing FLAMMABLE REFRIGERANTS, safety checks are necessary to ensure that the risk of ignition is minimised.

## **Work procedure**

Work shall be undertaken under a controlled procedure so as to minimise the risk of a flammable gas or vapour being present while the work is being performed.

## **General work area**

All maintenance staff and others working in the local area shall be instructed on the nature of work being carried out. Work in confined spaces shall be avoided.

## **Checking for presence of refrigerant**

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

## **Presence of fire extinguisher**

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

## **No ignition sources**

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

## **Ventilated area**

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

## **Checks to the refrigerating equipment**

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

The following checks shall be applied to installations using FLAMMABLE REFRIGERANTS:

- the actual REFRIGERANT CHARGE is in accordance with the room size within which the refrigerant containing parts are installed;
- the ventilation machinery and outlets are operating adequately and are not obstructed;
- if an indirect refrigerating circuit is being used, the secondary circuit shall be checked for the presence of refrigerant
- marking to the equipment continues to be visible and legible. Markings and signs that are illegible shall be corrected;
- refrigerating pipe or components are installed in a position where they are unlikely to be exposed to any substance which may corrode refrigerant containing components, unless the components are constructed of materials which are inherently resistant to being corroded or are suitably protected against being so corroded.

### **Checks to electrical devices**

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

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

### **Repairs to sealed components**

Sealed electrical components shall be replaced.

### **Repair to intrinsically safe components**

Intrinsically safe components must be replaced.

### **Cabling**

Check that cabling 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.

### **Detection of flammable refrigerants**

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

The following leak detection methods are deemed acceptable for all 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 shall be calibrated to the refrigerant employed, and the appropriate percentage of gas (25 % maximum) is confirmed.

Leak detection fluids are also suitable for use with most refrigerants but the use of detergents containing chlorine shall be avoided as the chlorine may react with the refrigerant and corrode the copper pipe-work.

If a leak is suspected, all naked flames shall be removed/extinguished.

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

### **Removal and evacuation**

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

- safely remove refrigerant following local and national regulations;
- evacuate;
- purge the circuit with inert gas (optional for A2L);
- evacuate (optional for A2L);
- continuously flush or purge with inert gas when using flame to open circuit; and
- open the circuit.

The refrigerant charge shall be recovered into the correct recovery cylinders if venting is not allowed by local and national codes. For appliances containing flammable refrigerants, the system shall be purged with oxygen-free nitrogen to render the appliance safe for flammable refrigerants. This process might need to be repeated several times. Compressed air or oxygen shall not be used for purging refrigerant systems.

For appliances containing flammable refrigerants, refrigerants purging shall be achieved by breaking the vacuum in the system with oxygen-free nitrogen and continuing to fill until the working pressure is achieved, then venting to atmosphere, and finally pulling down to a vacuum (optional for A2L). This process shall be repeated until no refrigerant is within the system (optional for A2L). When the final oxygen-free nitrogen charge is used, the system shall be vented down to atmospheric pressure to enable work to take place.

The outlet for the vacuum pump shall not be close to any potential ignition sources, and ventilation shall be available.

### **Charging procedures**

In addition to conventional charging procedures, the following requirements shall be followed.

- Ensure that contamination of different refrigerants does not occur when using charging equipment.  
Hoses or lines shall be as short as possible to minimise the amount of refrigerant contained in them.
- Cylinders shall be kept in an appropriate position according to the instructions.
- Ensure that the REFRIGERATING SYSTEM is earthed prior to charging the system with refrigerant
- Label the system when charging is complete (if not already).
- Extreme care shall be taken not to overfill the REFRIGERATING SYSTEM.

Prior to recharging the system, it shall be pressure-tested with the appropriate purging gas. The system shall be leak-tested on completion of charging but prior to commissioning. A follow up leak test shall be carried out prior to leaving the site.

### **Decommissioning**

Before carrying out this procedure, it is essential that the technician is completely familiar with the equipment and all its detail. It is recommended good practice that all refrigerants are recovered safely. Prior to the task being carried out, an oil and refrigerant sample shall be taken in case analysis is required prior to re-use of 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 system electrically.
- c) Before attempting the procedure, ensure that:
  - mechanical handling equipment is available, if required, for handling refrigerant cylinders;
  - all personal protective equipment is available and being used correctly;
  - the recovery process is supervised at all times by a competent person;
  - recovery equipment and cylinders conform to the appropriate standards.
- d) Pump down refrigerant system, if possible.
- e) If a vacuum is not possible, make a manifold so that refrigerant can be removed from various parts of the system.
- f) Make sure that cylinder is situated on the scales before recovery takes place.
- g) Start the recovery machine and operate in accordance with instructions.
- h) Do not overfill cylinders (no more than 80 % volume liquid charge).
- i) Do not exceed the maximum working pressure of the cylinder, even temporarily.
- j) When the cylinders have been filled correctly and the process completed, make sure that the cylinders and the equipment are removed from site promptly and all isolation valves on the equipment are closed off.
- k) Recovered refrigerant shall not be charged into another REFRIGERATING SYSTEM unless it has been cleaned and checked

### **Labelling**

Equipment shall be labelled stating that it has been de-commissioned and emptied of refrigerant. The label shall be dated and signed. For appliances containing FLAMMABLE REFRIGERANTS, ensure that there are labels on the equipment stating the equipment contains FLAMMABLE REFRIGERANT.

### **Recovery**

When removing refrigerant from a system, either for servicing or decommissioning, it is recommended good practice that all refrigerants are removed safely.

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

The recovery equipment shall be in good working order with a set of instructions concerning the equipment that is at hand and shall be suitable for the recovery of the flammable refrigerant. If in doubt, the manufacturer should be consulted. In addition, a set of calibrated weighing scales shall be available and in good working order. Hoses shall be complete with leak-free disconnect couplings and in good condition.

The recovered refrigerant shall 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 shall not be heated by an open flame or other ignition sources to accelerate this process. When oil is drained from a system, it shall be carried out safely.



## 2. Considerations of Unit Location

### 2.1 Unit Size

**Table 2.1 Outdoor Operating Temperature**

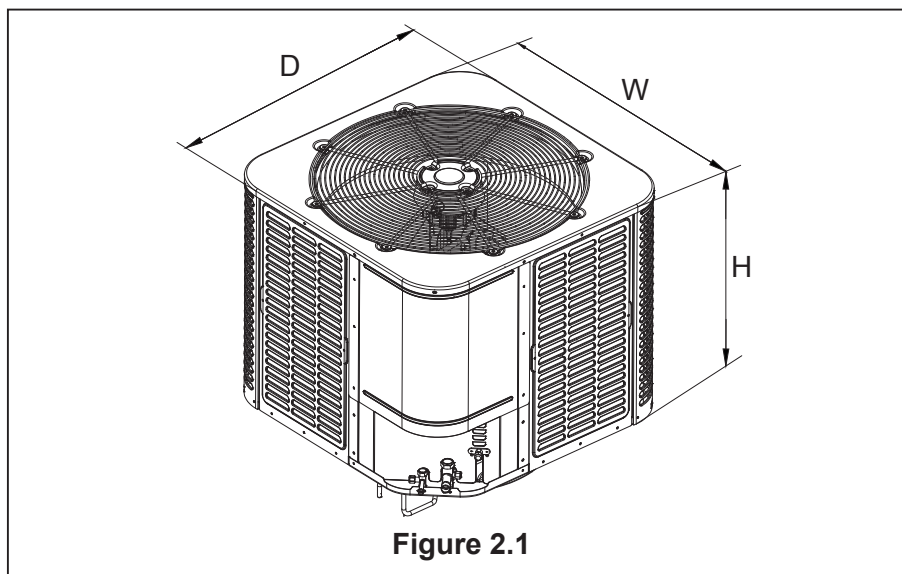
Model	Temperature
Cooling mode	5-125°F
Heating	-4-86°F

**Table 2.2**

Unit size	
Model	W x D x H (inches)
24/36K	29-1/2 x 29-1/2 x 25
48/60K	29-1/2 x 29-1/2 x 32-7/8

The weight of the unit is also printed on the carton.

When installing the outdoor unit on the roof, make sure that the roof can support the weight of the outdoor unit. It is recommended to choose appropriate isolation to prevent sound or vibration from being transmitted to the building structure.



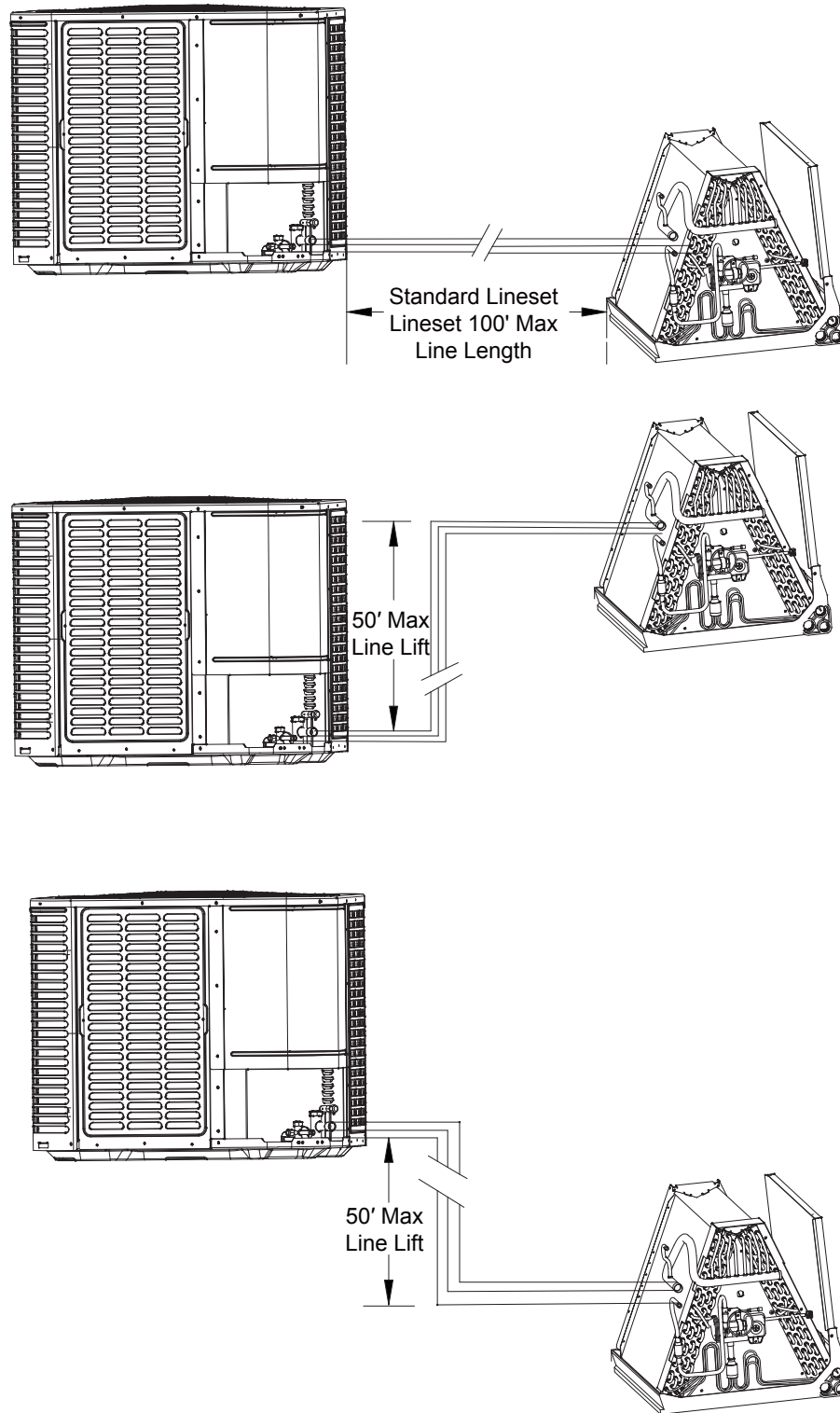
### 2.2 Refrigerant Pipeline Restriction

**Table 2.3**

Refrigerant line		Capacity (Kbtu/h)			
		24K	36K	48K	60K
Liquid suction	In.	3/8-3/4	3/8-3/4	3/8-7/8	3/8-7/8
Max.Refrigerant	Ft.	100			
Line Length*					
Max.Elevation*	Ft.	50			
Vertical Lift**					

\* It is recommended to adopt standard pipeline size; Refrigerant charge: see Section 14.

- ▶ Maximum equivalent length of pipeline = 100 feet.
- ▶ Maximum vertical equivalent length = 50 feet.
- ▶ Use only the pipe diameters shown in Table 2.3.
- ▶ If the suction line exceeds 65 feet, do not use a larger suction line than recommended.

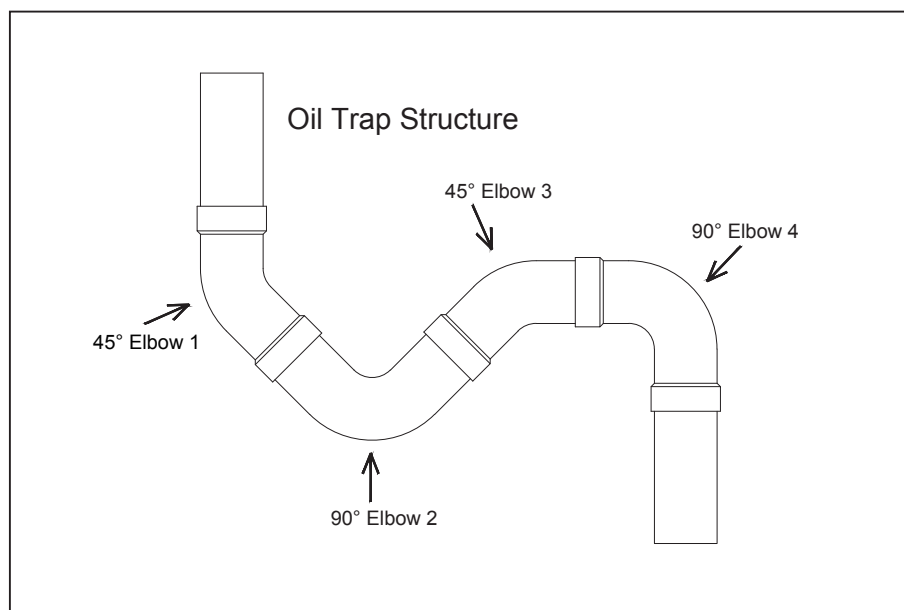


**Figure 2.2**

## 2.3 Long Line Installation Precautions

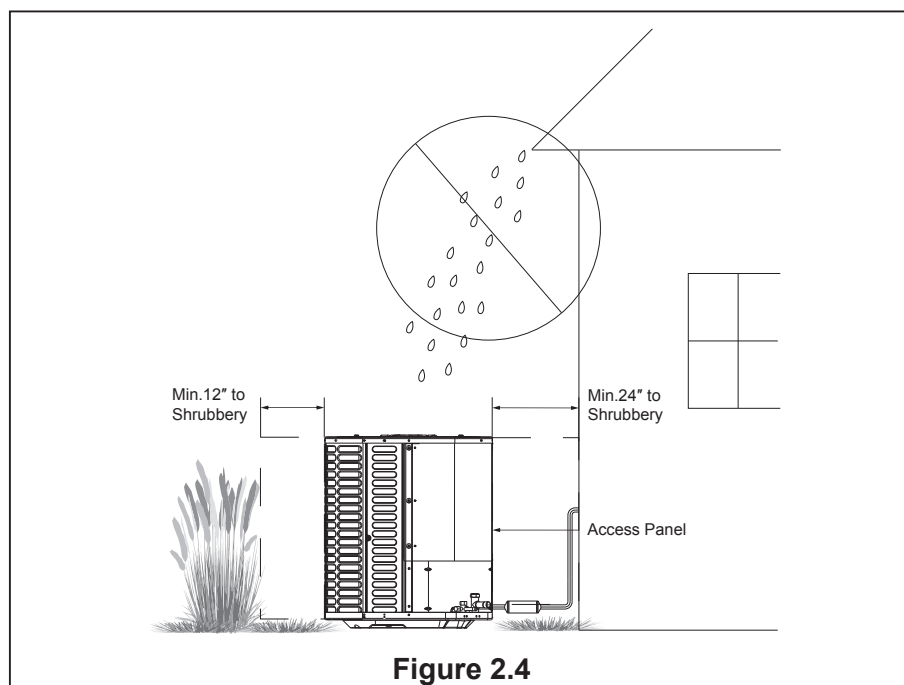
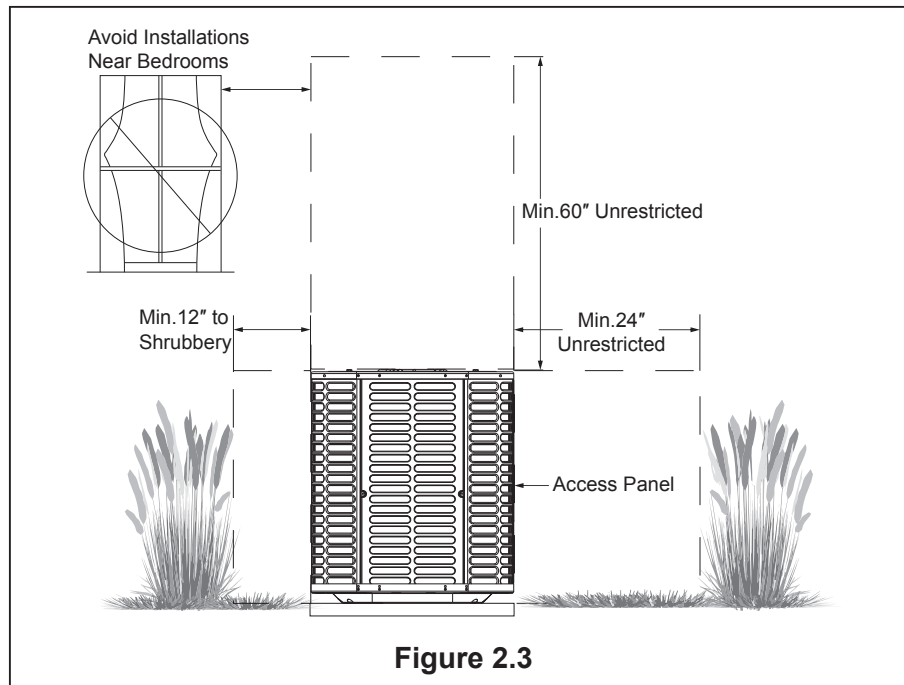
- Note that the length of the connecting line from the outdoor unit to the indoor unit cannot exceed 100 feet.
- If all long lines are in a horizontal state, no additional measures are required;
- If there is a vertical height difference in the long line, it needs to be installed according to the following requirements:
  - When the vertical height difference is  $0 < h \leq 16.5$  feet, no additional measures are required;
  - When the vertical height difference is  $16.5 \text{ ft.} < h \leq 33 \text{ ft.}$ , an oil return trap needs to be added in the middle of the height difference.
  - When the vertical height difference is  $33 \text{ ft.} < h \leq 50 \text{ ft.}$ , two oil return traps need to be added at an equal distance in the height difference.

**NOTE:** The **vertical** height difference between the outdoor unit and the indoor unit cannot exceed **50 feet**. The following is the connection method of the oil return trap:



## 2.4 Position Restriction

- Make sure that the discharge area (at least 60 inches above the top of the unit) is unrestricted.
- Don't put the outdoor unit near the bedroom, because the normal operating sound may be audible.
- Position the equipment, leaving enough space for smooth airflow, wiring, refrigerant lines and maintainability.
- Allow a minimum of 12 in. clearance on one side of control board access panel to a wall and a minimum of 24 in. on the adjacent side of control board access panel.
- Keep a distance of 24 inches between adjacent units.
- Place the unit in a place where water, snow or ice cannot fall directly on the device from the roof or overhangs.
- See figures 2.3 and 2.4.

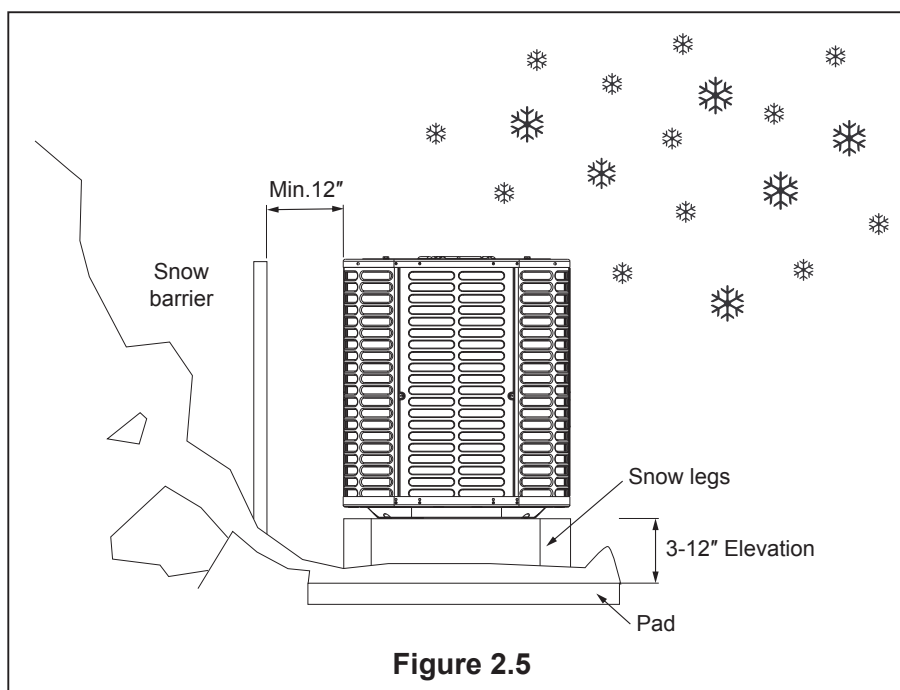


#### Precautions in cold climate (heat pump only)



Precautions must be taken for units installed in areas with snow and long-term temperatures below freezing point.

- Depending on the local weather conditions, the unit should be raised by 3-12 inches. This extra height will allow the snow and ice melted during the defrosting cycle to be discharged before re-freezing. Make sure that the drain hole on the unit chassis is not blocked, otherwise it will hinder the defrosting water discharge (Figure 2.5).
- If possible, avoid places that are prone to snow. If this is not feasible, a snow barrier should be installed around the unit to prevent snow accumulation on the side of the unit.



#### Corrosive Environment

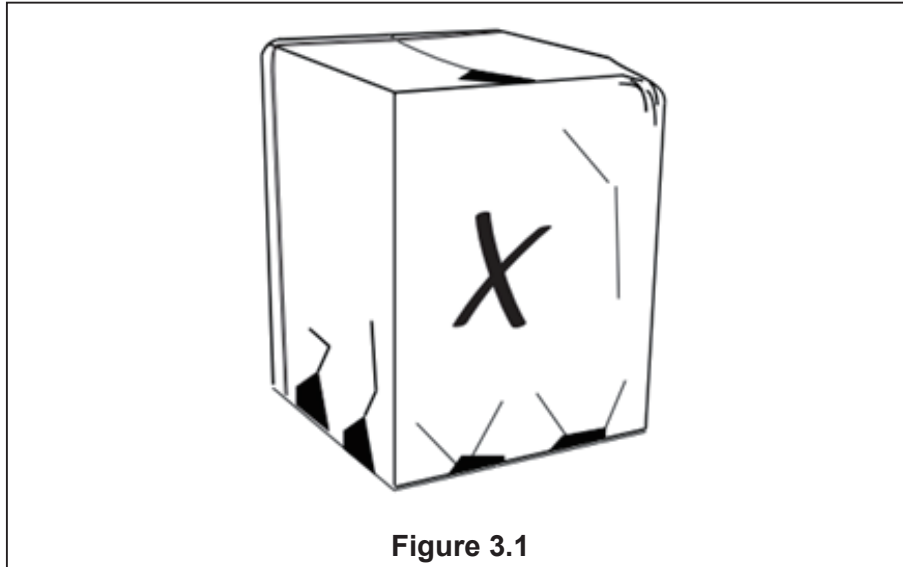
Exposure to corrosive environment may shorten the service life of unit, corrode metal parts and/or negatively affect the performance of unit. Corrosive elements include but are not limited to: sodium chloride, sodium hydroxide, sodium sulfate and other compounds commonly found in seawater, sulfur, chlorine, fluorine, fertilizers and various chemical pollutants from industrial/manufacturing plants. If it is installed in an area that may be exposed to corrosive environment, special attention should be paid to the placement and maintenance of the unit.

- Lawn sprinklers/hoses/waste water should not be sprayed directly on the outer panel of the unit for a long time.
- In coastal areas: install the unit on the side away from the waterfront.
- Fences or shrubs can provide some shielding protection for the unit, but the minimum device clearance must still be kept.
- Clean the outdoor coil and any exposed external surfaces about every three months.

## 3. Unit Installation Preparation

### 3.1 Prepare the Unit for Installation

- Check whether there is any damage and report any damage to the unit to the courier (Figure 3.1).
- The service port can be used to ensure that the refrigerant charge is uncompromised during shipment.



## 4. Unit Settings

### 4.1 Pad Installation

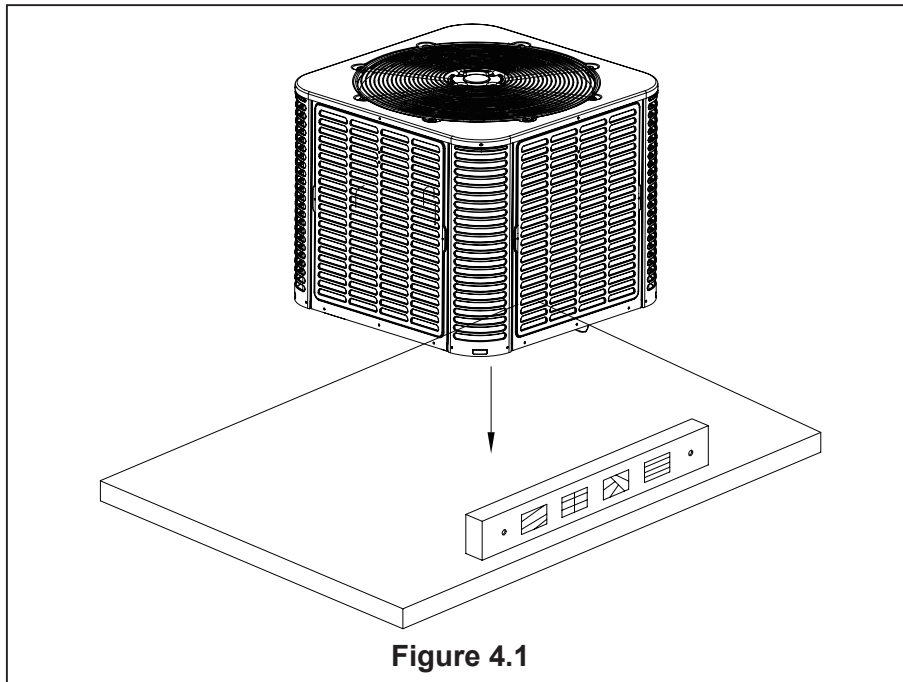
When installing the unit on a support pad (such as a concrete slab), please consider the following:

- All sides of the pad must be at least 1-2 inches larger than the unit.
- The pad must be separated from any structure.
- The pad must be level.
- The pad must be high enough above the ground for drainage.
- The location of the pad must comply with national, state and local regulations.



These instructions are intended to provide a method of fixing the system to the cement slab as a fixing procedure in windy areas. Check the local regulations of tie-down methods and protocols.

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## 5. Precautions for Refrigerant Pipeline

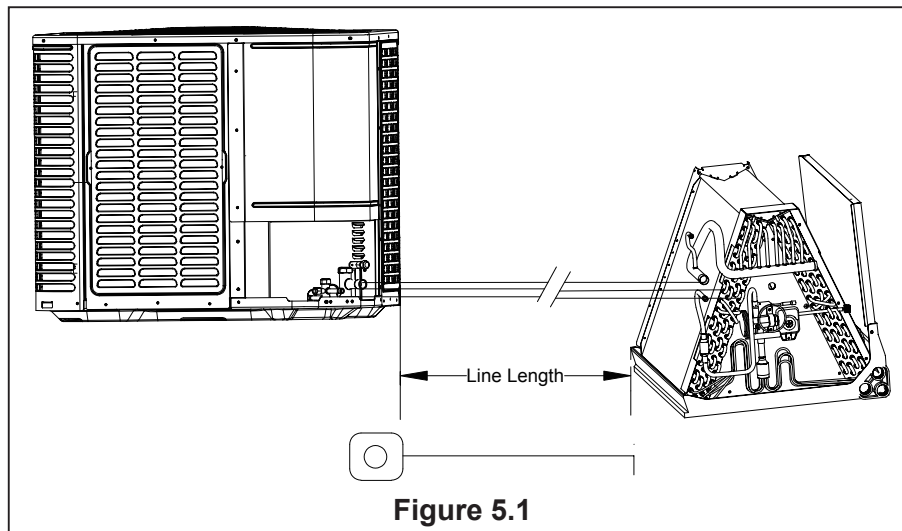
### 5.1 Connecting Dimensions of Refrigerant Lines and Service Valves

Table 5.1

Model	Suction line	Liquid line	Suction line connection	Liquid line connection
	The dimensions are in inches.			
24K/36K	3/4	3/8	3/4	3/8
48K/60K	7/8	3/8	7/8	3/8

### 5.2 Required Refrigerant Line Length

Determine the required pipeline length (Figure 5.1). Please refer to Section 2.2.

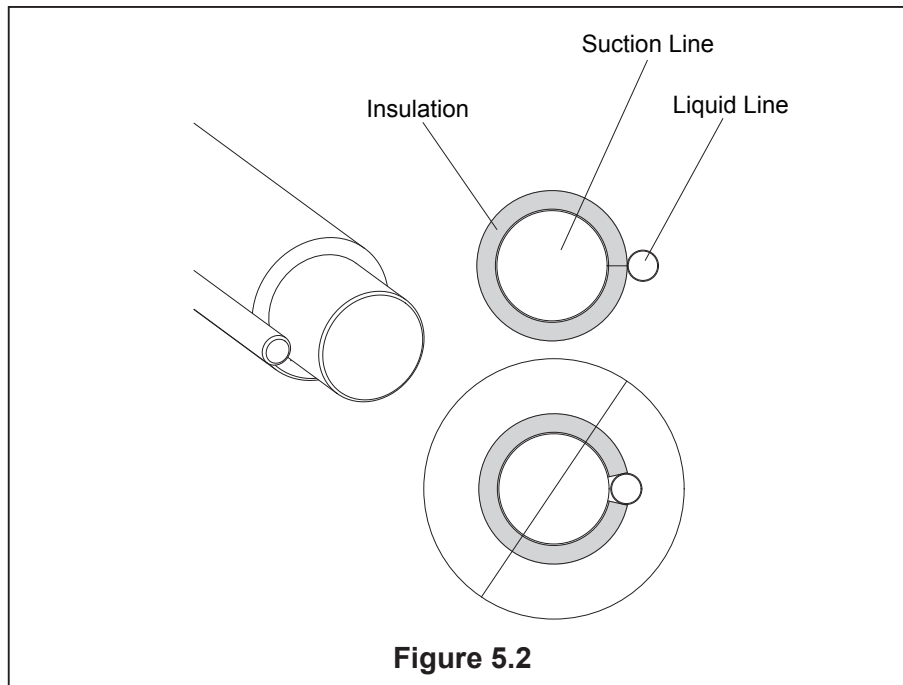


### 5.3 Refrigerant Pipe Insulation



The refrigerant pipe must always be insulated. Do not let the liquid line and suction line come into direct contact (metal to metal).





## 5.4 Reuse the Existing Refrigerant Lines



### Note: Mild to moderate burns

- If using existing refrigerant lines, make sure that all joints are brazed, not soldered.

The following precautions should be taken for the retrofit application that will use the existing refrigerant pipeline:

- Make sure the refrigerant line size is correct. Refer to Section 2.2 and Table 2.2.
- Make sure the refrigerant line is free of leakage, acid and oil.



The manufacturer recommends that only approved matching indoor and outdoor systems be installed. All split systems of the manufacturer are AHRI-rated, only applicable to indoor units with TXV. The benefits of installing an approved indoor and outdoor split system are maximum efficiency, best performance and best overall system reliability.

## 6. Refrigerant Pipeline Routing

### 6.1 Preventive Measure

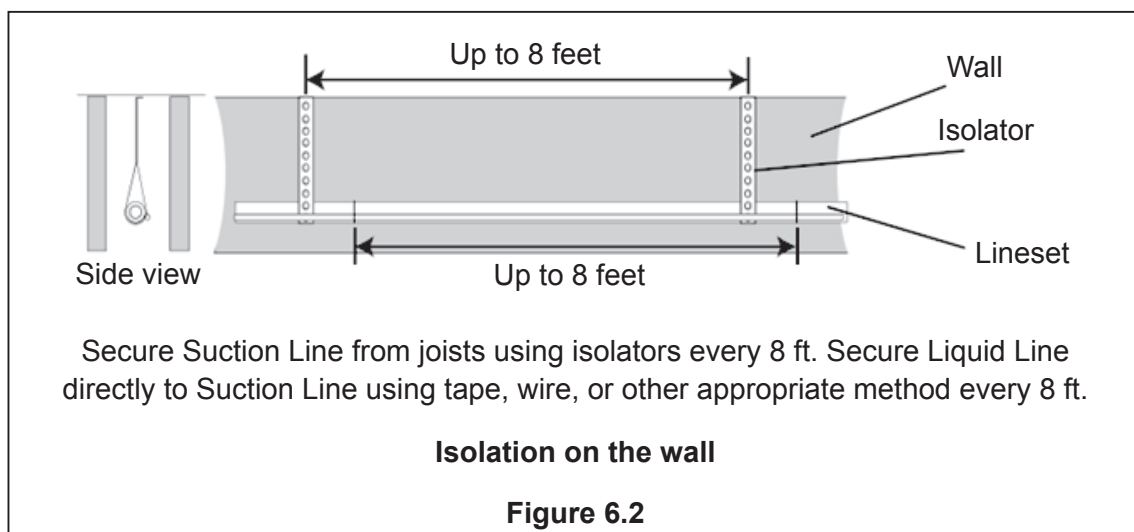
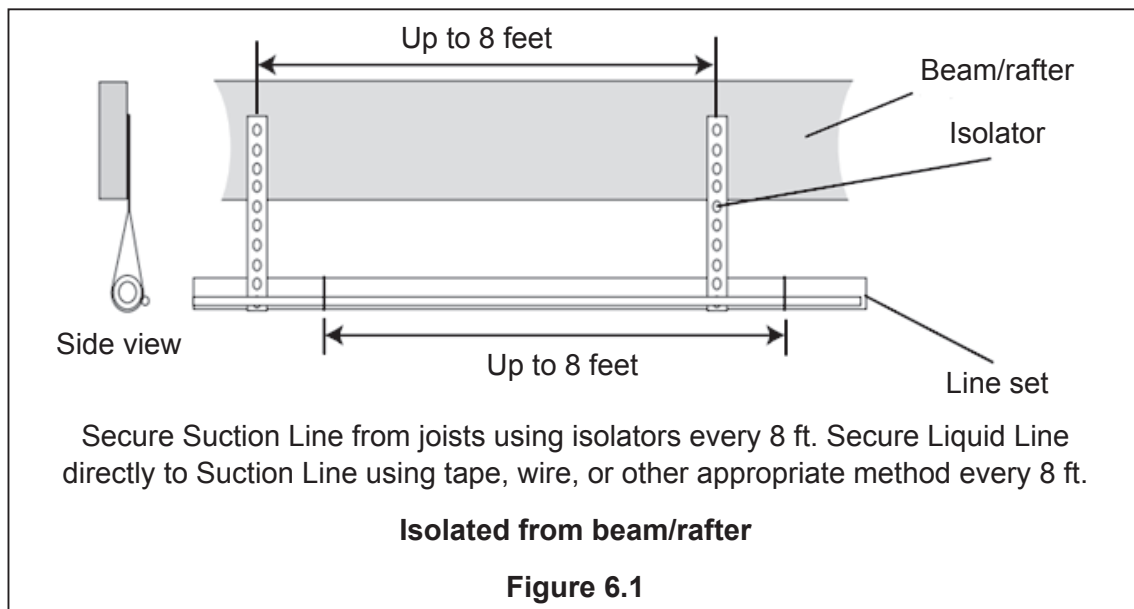


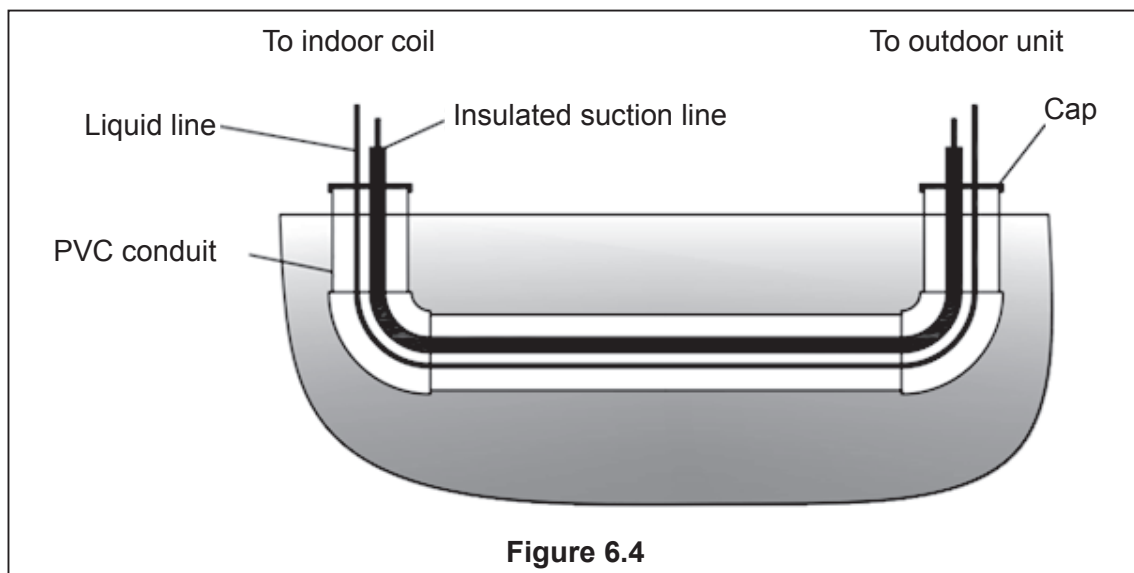
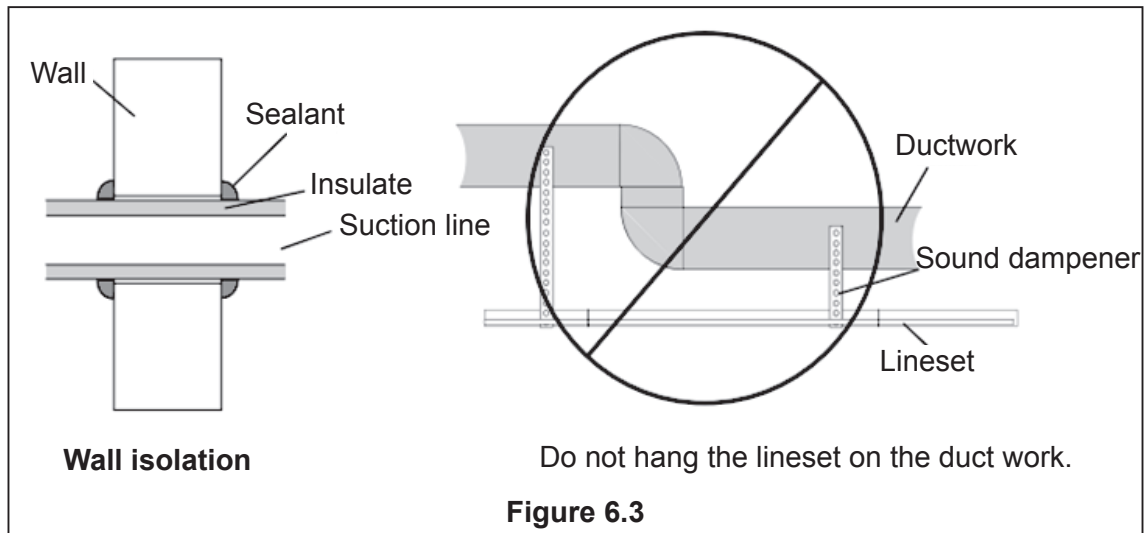
Take preventive measures to prevent noise generated by vibration transmission of refrigerant line in building structure. For example:

- When the refrigerant line must be fixed on floor joists or other frames in the structure, use isolated hangers.
- When the refrigerant line runs in the column space or closed ceiling, the isolation hanger should also be used.
- When refrigerant lines pass through walls or windowsills, they should be insulated and isolated.
- Isolate the line from all ductwork systems.
- Try to reduce the number of 90° turn.



Comply with national, state and local regulations when isolating the wire group from joists, rafters, walls or other structural elements.

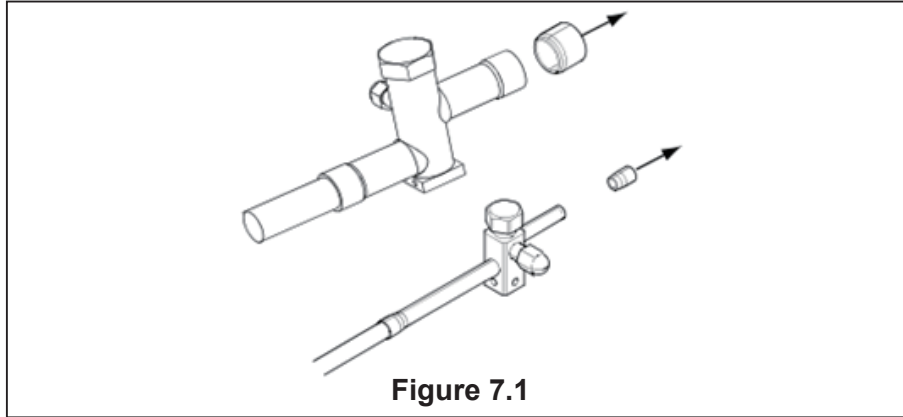




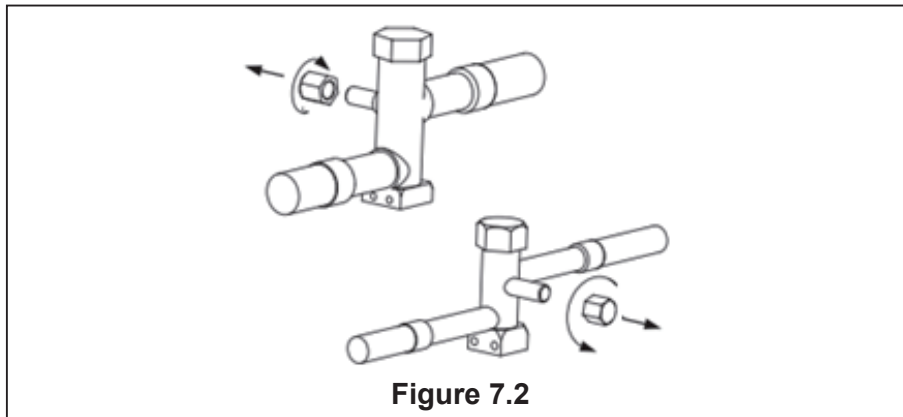
## 7. Refrigerant Line Brazing

### 7.1 Brazed Refrigerant Pipeline

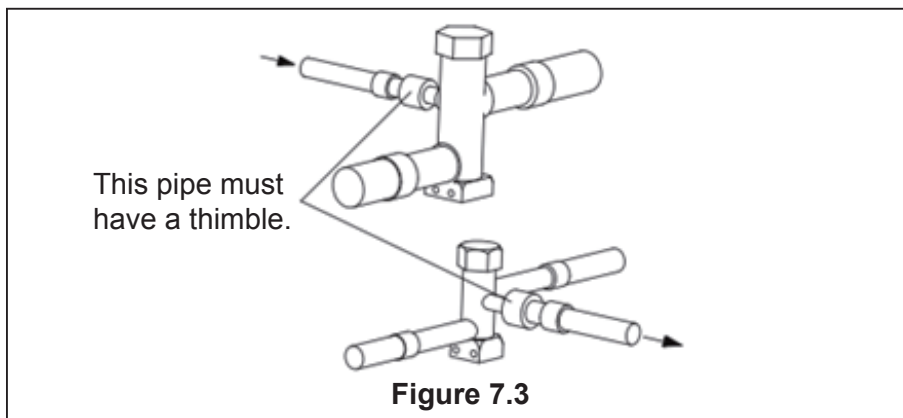
1. Remove the cover or plug. Use the deburring tool to deburr the line end. Clean the inner and outer surfaces of the pipeline with emery cloth.



2. Remove the pressure taps from the two service valves.



3. Purge refrigerant lines and indoor coils with dry nitrogen.



4. Wrap the valve body with a wet rag to avoid thermal damage, and continue the dry nitrogen purging (Figure 7.4).  
Braze the refrigerant line to the service valve.  
Braze the filter drier to the liquid line.

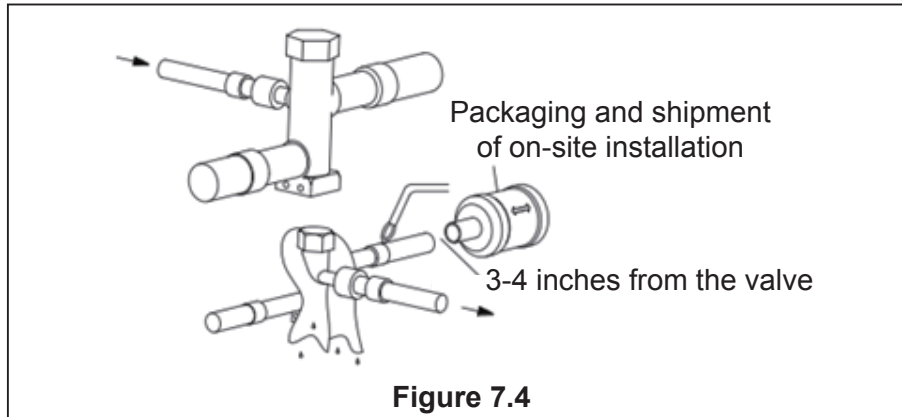


All units are recommended to have a bidirectional filter driver installed. Braze the filter drier to the liquid line, taking care not to push the refrigerant line too hard through the stopper in the filter drier (this may damage the filter).

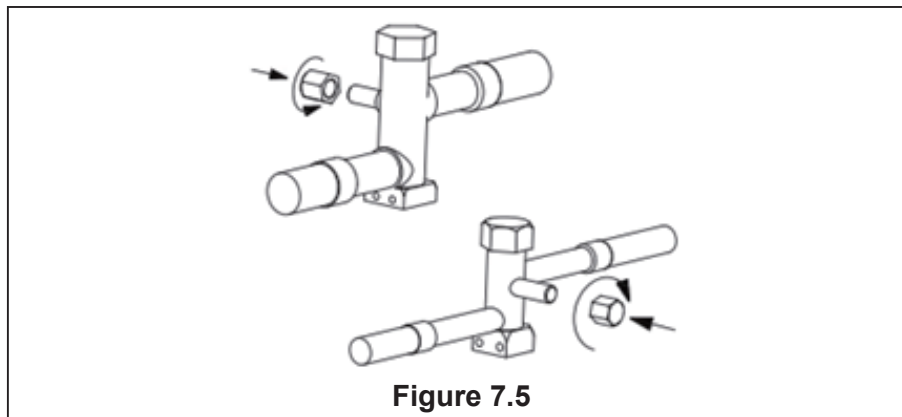
Continue the dry nitrogen purge. Don't take off the wet rag before all brazing is completed.



Before stopping the dry nitrogen purge, please remove the wet rag.



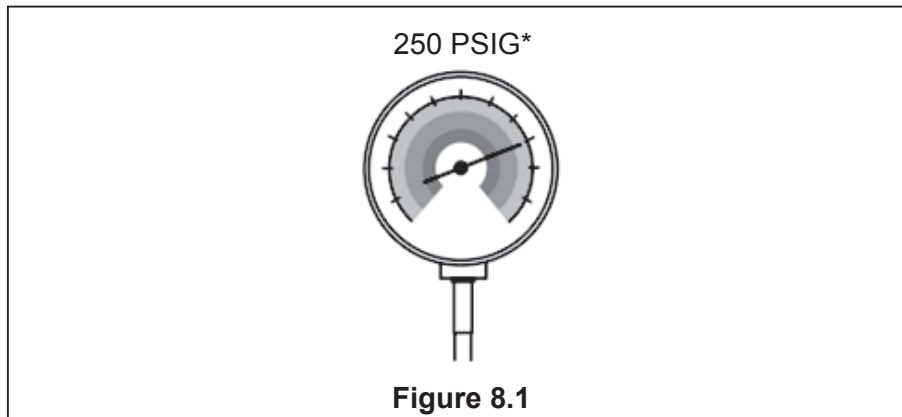
5. After the service valve cools down, put back the pressure tap.



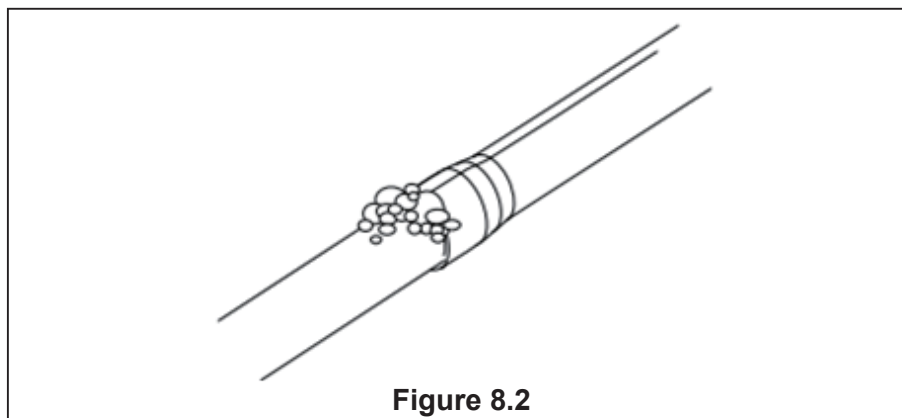
## 8. Refrigerant Line Leakage Inspection

### 8.1 Check for Leaks

1. Use dry nitrogen to pressurize the refrigerant line and evaporator coil to 250 PSIG\*.



2. Use soapy water or bubbles at each brazing position to check for leaks.



**\*Note:**

After completion of field piping for split systems, the field pipework shall be pressure tested with an inert gas and then vacuum tested prior to refrigerant charging. The minimum test pressure for the system shall be the low side design pressure (See nameplate for details).

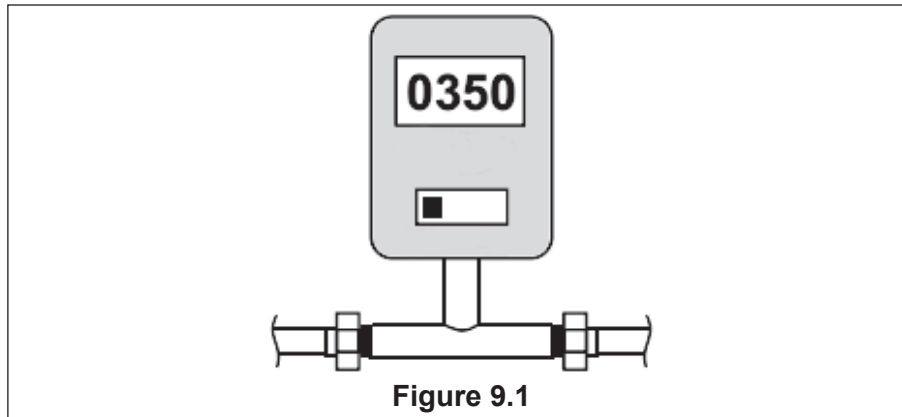
## 9. Vacuuming

### 9.1 Drain Refrigerant Lines and Indoor Coils



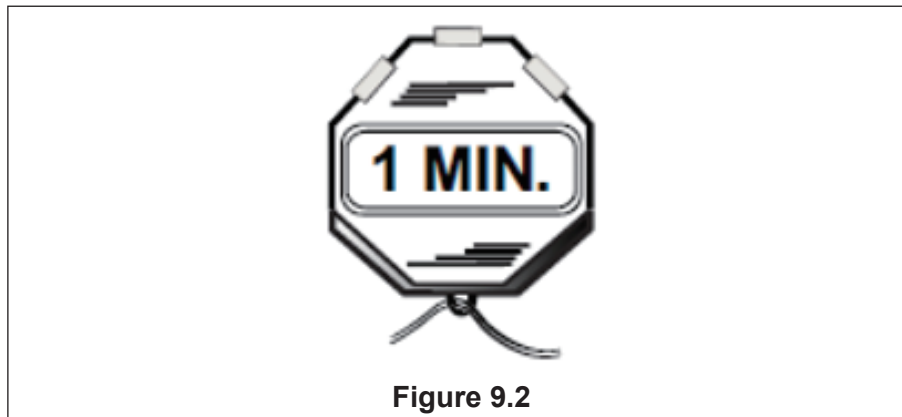
Do not open the service valve until the leakage inspection and vacuuming of refrigerant lines and indoor coils are completed.

1. Evacuate until the micron gauge reads no higher than 350 microns, then close the valve to the vacuum pump.



2. Observe micron gauge. If the micrometer meter does not rise above 500 microns within one (1) minute, the evacuation is completed.

After the evacuation, turn off the vacuum pump and micron gauge, and close the valve on the manifold instrument cluster.



## 10. Service Valve

### 10.1 Open the Service Valve

#### Warning: Moderate to severe burns



- When opening the liquid line service valve, be extra careful. Turn counterclockwise until the valve stem just touches the hem. No torque is required. Failure to observe this warning will result in sudden release of system pressure, and may result in personal injury and/or property damage. Use an allen/hex wrench of minimum 50 Rc-Rockwell Hardness Scale.

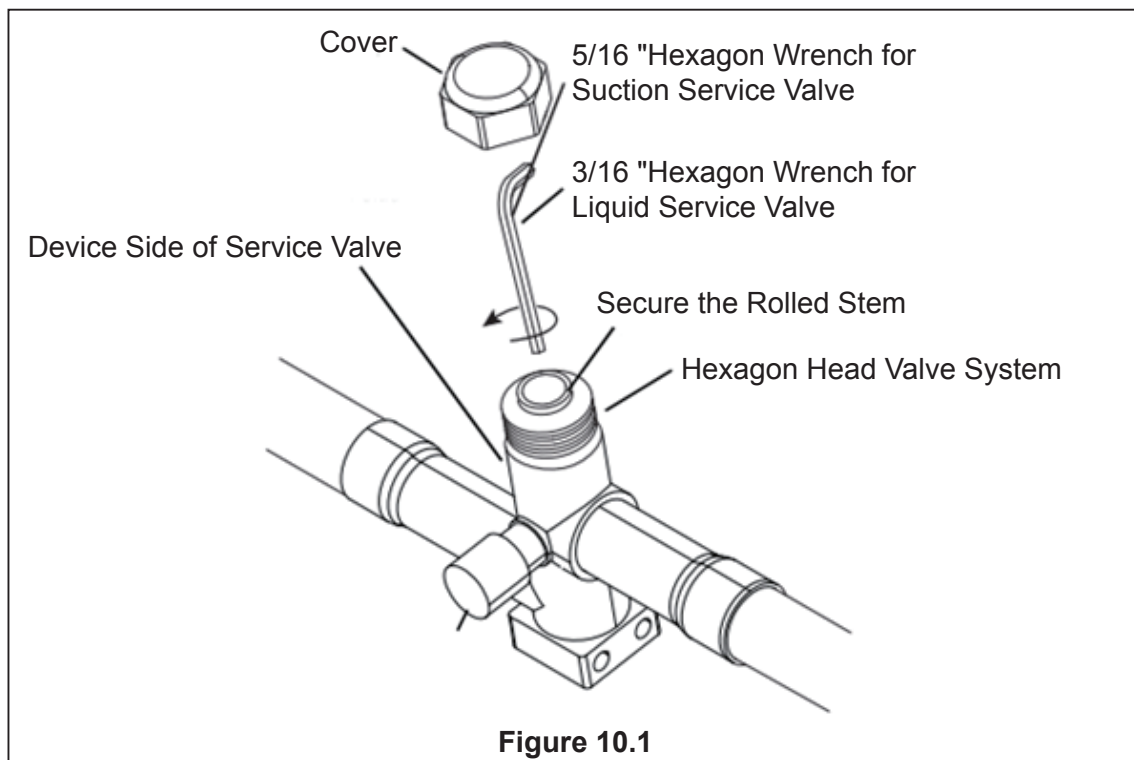


Before opening the service valve, the leakage inspection and evacuation must be completed. The valve of copper welded pipe installation should be used for leakage inspection and vacuum pumping. The use of a separate suction port in this process will lead to refrigerant loss.



Before opening the liquid service valve, the suction service valve must be opened first.

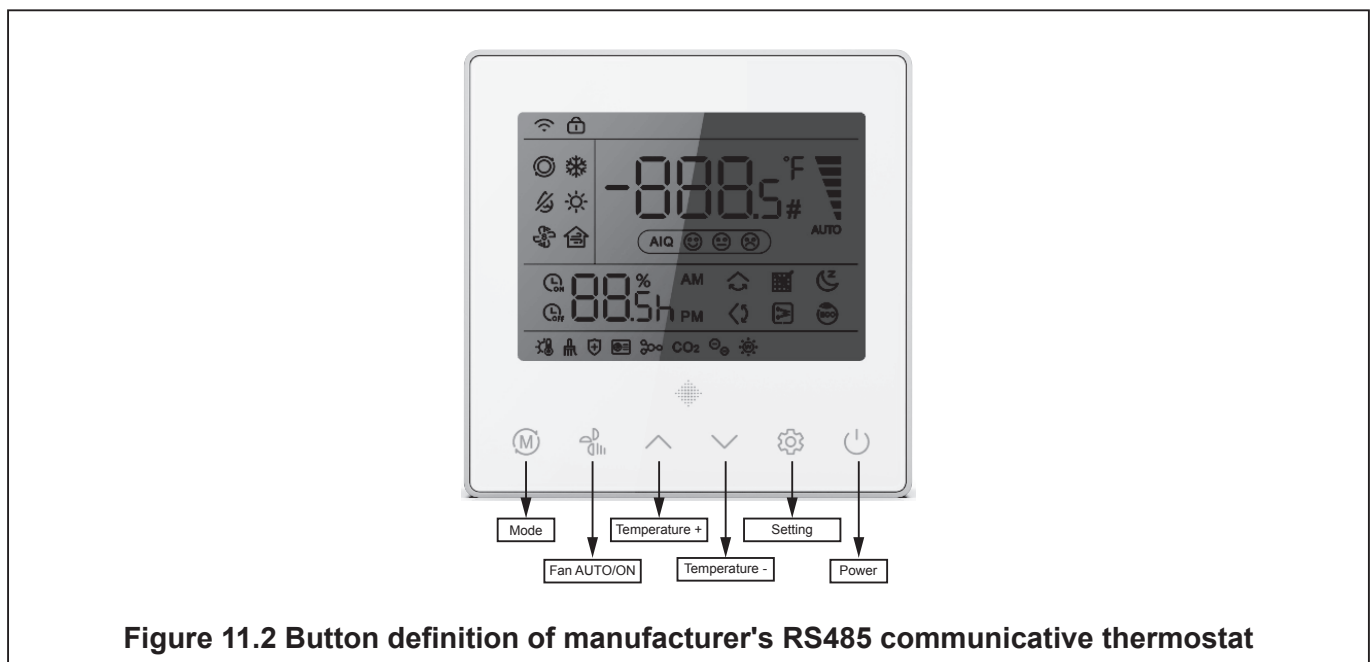
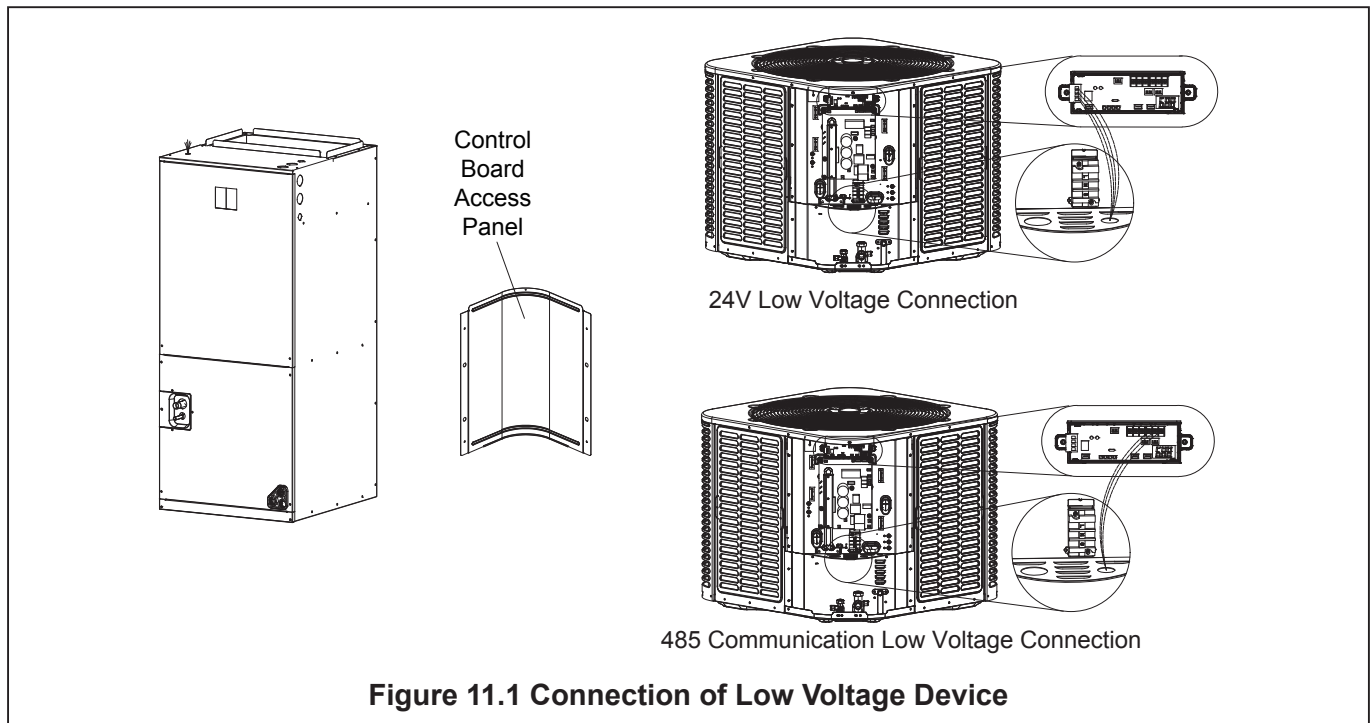
1. Remove the valve cover (Figure 10.1).
2. Insert the hex wrench into the valve stem completely and back out counterclockwise until the valve stem just touches the bead (about five (5) turns).)
3. Replace the valve stem cap to prevent leakage. Tighten it with your fingers and turn it for another 1/6 turn.
4. Repeat steps 1-3 for the liquid service valve.





# 11. Electrical-Low Voltage

## 11.1 Low Voltage Connection Diagram



## 11.2 Wiring Diagram of Thermostat

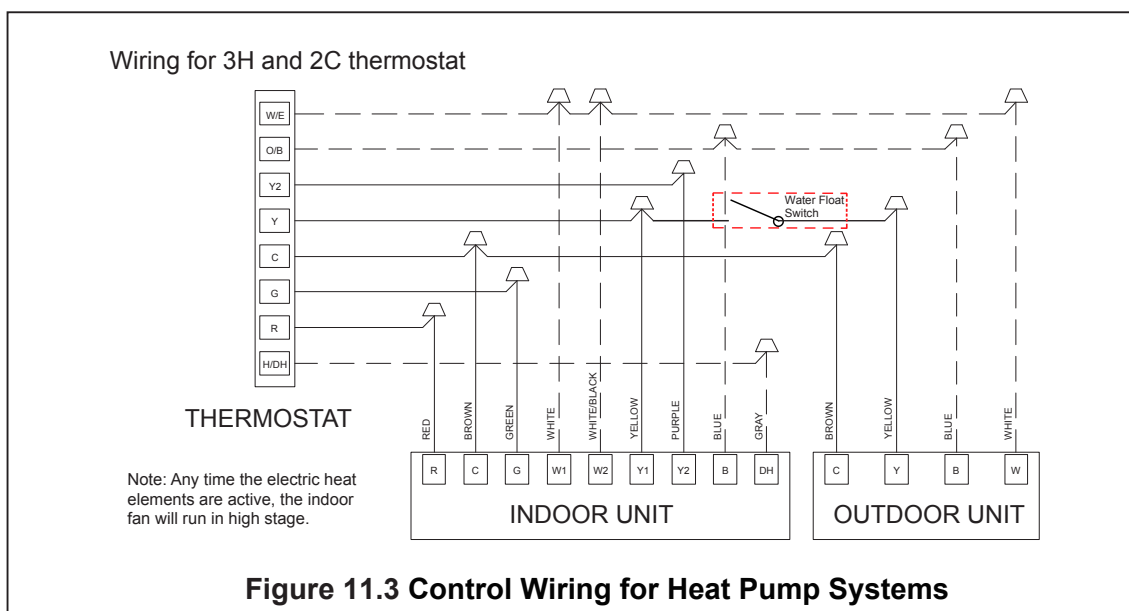
- Ensure that the power supply is consistent with the nameplate of the unit.
- The power connection and grounding of the unit must comply with local regulations.
- Low voltage wiring to be No. 22 AWG minimum conductor.
- "-----"On-site installation of electrical auxiliary heat connection
- Single-stage electric auxiliary heating supported by 2H thermostat
- Two-stage electric auxiliary heating supported by 3H thermostat
- W1: The first stage of electric auxiliary heating installed in the indoor unit.
- W2: The second stage of electric auxiliary heating installed in the indoor unit.
- The W signal of the outdoor unit is connected to the electric auxiliary heating or the first-stage electric auxiliary heat.



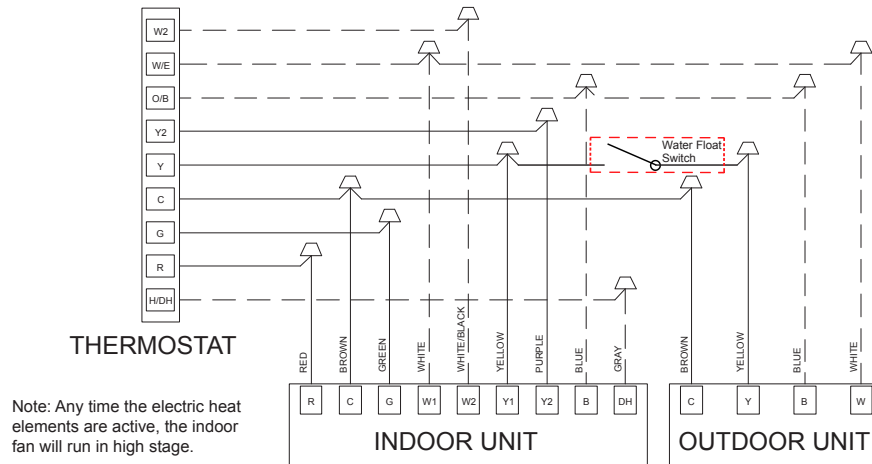
The dotted line in the following thermostat wiring diagram indicates optional wiring (wiring for passive dehumidification and/or electric heating). For the wiring of the thermostat, please refer to the user manual of the thermostat.



The reversing valve is energized in heating mode and de-energized in cooling mode. As factory default, O/B terminal and reversing valve are set to be energized at the same time. You can use dip switch SW2-4 to achieve the opposite.

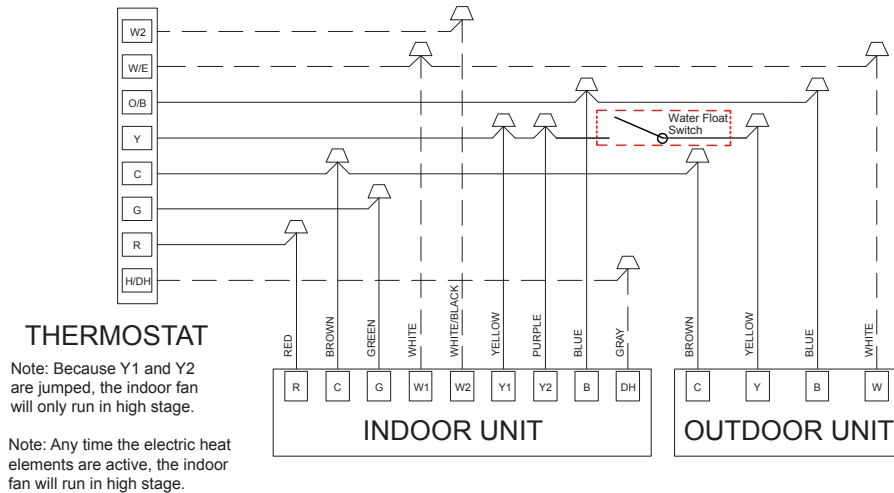


#### Wiring for 4H and 2C thermostat



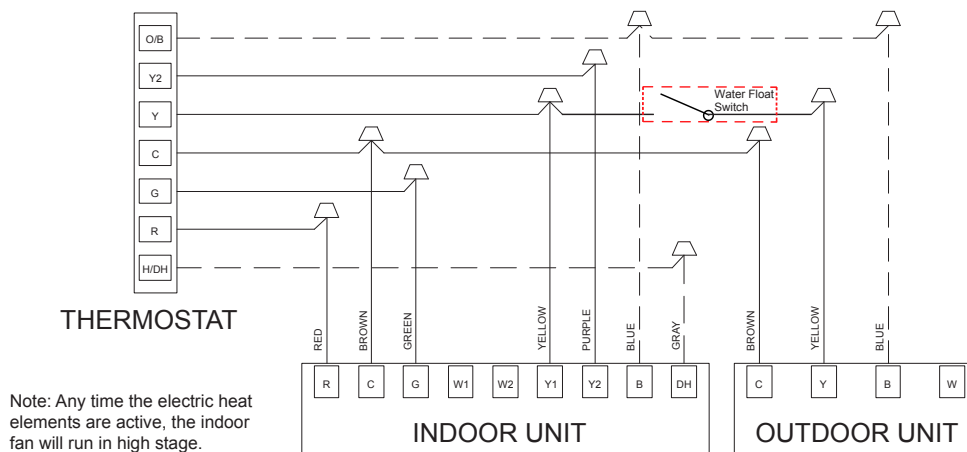
**Figure 11.4 Control Wiring for Heat Pump Systems**

#### Wiring for 3H and 1C thermostat



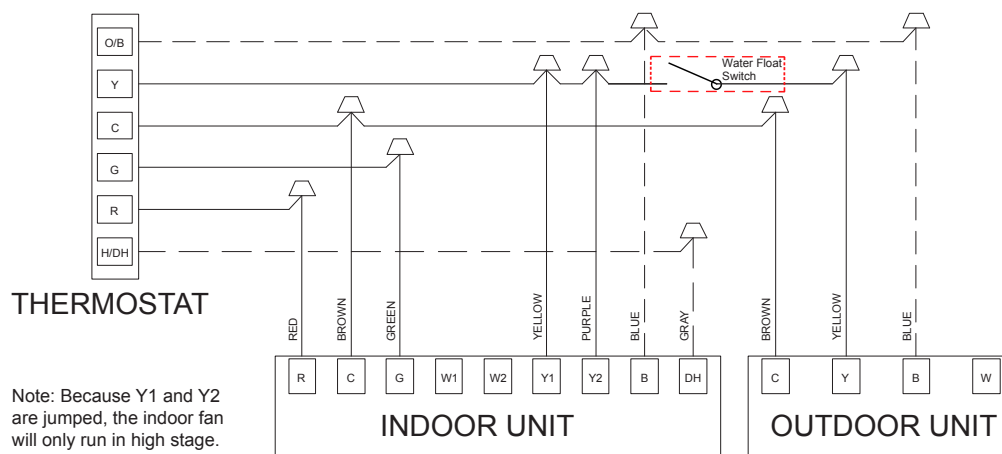
**Figure 11.5 Control Wiring for Heat Pump Systems**

#### Wiring for 2H and 2C thermostat



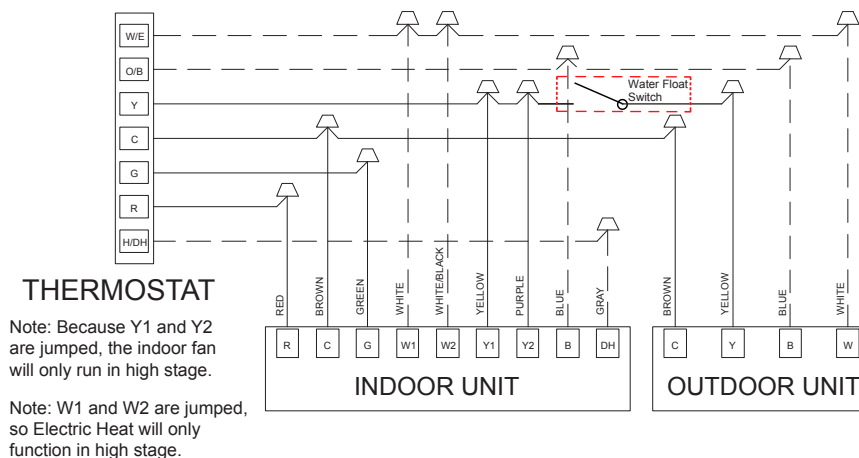
**Figure 11.6 Control Wiring for Heat Pump Systems**

### Wiring for 1H and 1C thermostat



**Figure 11.7 Control Wiring for Heat Pump Systems**

### Wiring for 2H and 1C thermostat



**Figure 11.8 Control Wiring for Heat Pump Systems**

## 12. Electrical-High Voltage

### 12.1 High Voltage Power Supply



#### Warning: Live electrical parts!

- During the installation, testing, maintenance and troubleshooting of this product, it may be necessary to use live electrical parts. Failure to observe all electrical safety precautions when exposed to live electrical parts may result in death or serious injury.

The high-voltage power supply must match the nameplate of the unit (208/230V, 1ph, 60Hz).

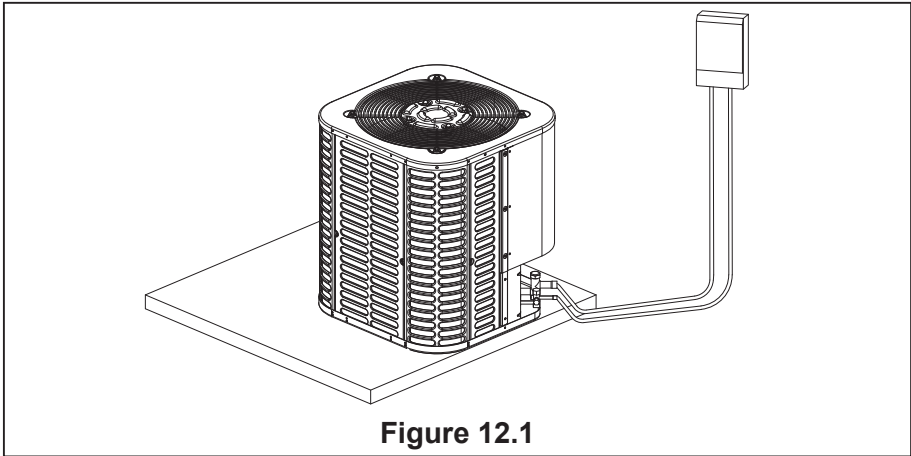


Power supply wiring must comply with national, state and local regulations.

Follow the instructions of the unit wiring diagram located at the back side of control box access panel, and refer to the wiring diagram in this installation manual.

### 12.2 High Voltage Disconnect Switch

Install a separate disconnect switch on the outdoor unit.  
High-voltage wiring must use flexible electrical conduit supplied on site.



### 12.3 High Voltage Grounding

Ground the outdoor unit according to the requirements of national, state and local regulations.

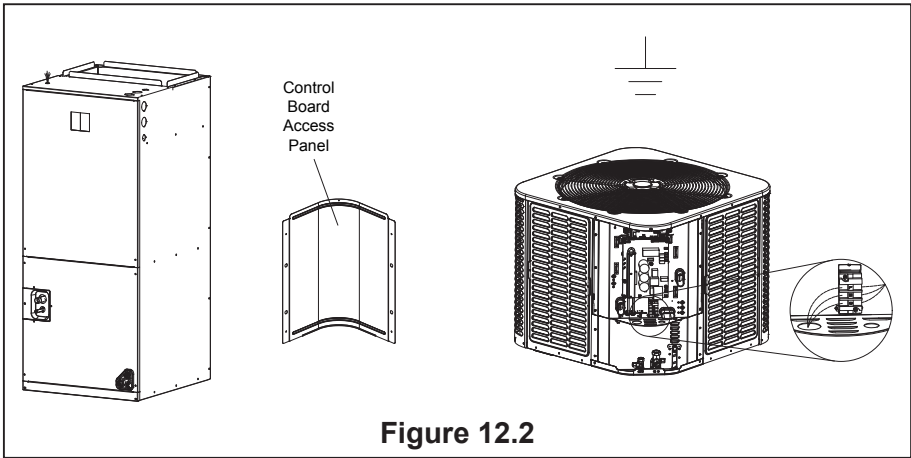


Table 12.1 Wire gauge of high voltage system

Type (Btu/ hour)			24K	36K	48K	60K
Power		Stage	Single			
		Voltage/frequency	208/230VAC, 60 Hz			
Wire gauge	Indoor unit power cord	Conductor quantity	3	3	3	3
		Wire diameter (AWG)	16	16	16	16
	Outdoor unit power cord	Conductor quantity	3	3	3	3
		Wire diameter (AWG)	14	12	10	10

## 13. Start

### 13.1 System Startup

1. Make sure that Step 7, 8, 9, 10, 11 and 12 have been completed.
2. Set the system thermostat to off.



Figure 13.1

3. Turn on the disconnect switch and apply power to indoor unit and outdoor unit.

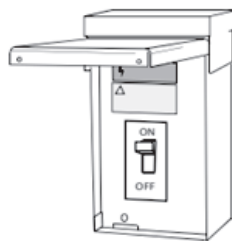


Figure 13.2

4. When starting the unit for the first time and the outdoor temperature is below 70°F, it is recommended to power on and let the crankshaft heater preheat for 1 hour before turning on the unit . When starting the unit for the first time and in heating mode and the outdoor temperature is below 23°F, the system will force to preheat for 1 hour before turning on the unit, PRH will display in screen.



Figure 13.3

5. Set the system thermostat to ON.



Figure 13.4

## 14. System Refrigerant Charging Method

### 14.1 Refrigerant Charging: Weigh-In Method

Use weigh-in method the initial installation, or anytime a system charge is being replaced. Weigh-in method can also be used when power is not available to the equipment site or operating conditions (indoor/outdoor temperatures) are not in range to verify with the subcooling charging method.



The factory charge in the outdoor unit is sufficient for **25 feet** of standard size interconnecting liquid line. Additional **0.54 oz/ft** of R454B refrigerant is needed when length of lineset is more than 25 feet.

#### New Installations — Calculating additional charge for lineset greater than 7.62 m (25 ft).

1. Total length of line (m/ft) = \_\_\_\_\_(a)
2. Standard line setup = 7.62 m (25 ft) (b)
3. (a) minus (b) = \_\_\_\_\_(c)
4. Refrigerant multiplier = 50g/m (0.54 oz/ft) (d)
5. Additional refrigerant quantity (c\*d) = \_\_\_\_\_(e)\*

\* If the line set is less than 7.62 m (25 ft), e=0

#### Sealed-System Repairs — Calculating total system charge.

1. Total length of line (ft) = \_\_\_\_\_(a)
2. Standard line setup (ft) = 7.62 m (25 ft) (b)
3. (a) minus (b) = \_\_\_\_\_(c)
4. Refrigerant multiplier = 50g/m (0.54 oz/ft) (d)
5. Additional refrigerant quantity (c\*d) = \_\_\_\_\_(e) \*
6. Factory filling quantity (nameplate) = \_\_\_\_\_(f)
7. Total system charge (e +f) = \_\_\_\_\_

\* If the line set is less than 7.62 m (25 ft), e =0

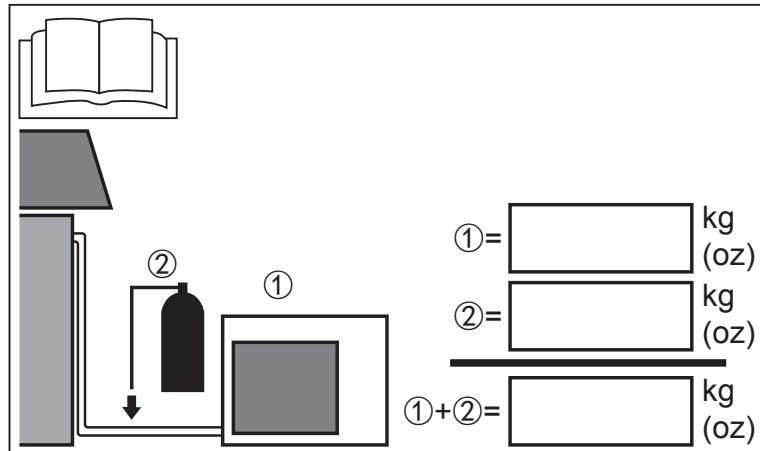


The only mode approved for verifying system charging is in **"forced cooling mode"**. The outdoor temperature must be between **68°F** and **113°F**, and the indoor temperature should be between **68°F** and **89°F**.

You can refer to the above formula for calculation, or you can choose the appropriate refrigerant addition according to the piping length in the below examples.

**Table 14.1 Additional Refrigerant Guidelines**

Piping length (m/ft)	Additional charge (kg/oz)
7.6/25.0	0.0/0.0
15.2/50.0	0.4/13.5
22.9/75.0	0.8/27.0
30.5/100.0	1.1/40.5



- ① REFRIGERANT CHARGE of the precharged part of the appliance  
 ② REFRIGERANT CHARGE added during installation

## 14.2 Subcooling Charging and Refrigerant Adjustment in Cooling Mode

1. Check the outdoor ambient temperature.

Subcooling (cooling mode) is the only recommended charging method when the outdoor ambient temperature is higher than 68°F.

For outdoor ambient temperature below **68°F**, use the weigh-in charging method outlined earlier.



When the outdoor ambient temperature is higher than 68°F, be sure to return in spring or summer, so as to accurately charge the system in cooling mode.

### Subcooling Charging and Refrigerant Adjustment in Cooling Mode

Check the ambient temperature first. Subcooling method (in cooling mode) can only be used when outdoor temperature is between 68°F and 113°F and indoor temperature between 68°F and 89°F. If either temperature is out of the range, use the weigh-in method.

Start "forced cooling" mode. Start the system in cooling mode, press and hold "SET" button until the symbol "dC" is displayed. After entering the "forced cooling mode", symbol "dC" and the current compressor frequency will be displayed alternately on the digital display. "Forced cooling" mode will automatically exit after 60 minutes or press and hold "SET" button again to exit manually.



press and hold "SET" till "dC" displayed to start/quit "forced cooling" mode

**Figure 14.1**



Wait for the system to stabilize, for twenty (20) minutes after “forced cooling” mode has started. Compressor will maintain a specific frequency in “forced cooling” mode.

First determine then optimum subcooling value, based on measured liquid line temperature and pressure, according to Table 14.2.

If calculated subcooling value is lower than the recommended design subcooling value shown in Table 14.3, refrigerant should be added. If calculated subcooling value is higher than the value shown in Table 14.3, refrigerant should be recovered.

Wait for the stabilization of the system for 5 minutes and repeat steps above until the subcooling value matches the design subcooling value shown in Table 14.3. Once finished, remove service tools, press and hold “SET” button to quit "forced cooling" mode. Symbol “dC” should disappear when exiting the “forced cooling” mode.

**Table 14.2**

Liquid Line Temp (°F)	Subcooling Value(°F)							
	6	7	8	9	10	11	12	13
	Liquid Gauge Pressure (PSI)							
55	164	167	170	172	175	178	181	184
60	178	181	184	187	191	194	197	200
65	194	197	200	203	206	210	213	217
70	210	213	217	220	223	227	230	234
75	227	230	234	238	241	245	249	252
80	245	249	252	256	260	264	268	272
85	264	268	272	276	280	284	288	292
90	284	288	292	297	301	305	309	314
95	305	309	314	318	323	327	332	336
100	327	332	336	341	346	351	355	360
105	351	355	360	365	370	375	380	385
110	375	380	385	390	396	401	406	412
115	401	406	412	417	422	428	433	439
120	428	433	439	445	450	456	462	468
125	456	462	468	474	480	486	492	498

**Table 14.3**

Subcooling (°F)		Ambient Temperature (°F)				
		68~77	77~86	86~95	95~104	104~113
Model	24K	10±2	8±2	8±2	6±2	6±2
	36K	10±2	8±2	8±2	6±2	6±2
	48K	8±2	8±2	8±2	6±2	6±2
	60K	8±2	8±2	8±2	6±2	6±2

## 15. System Operation and Troubleshooting

### 15.1 Control Logic Description

- The Inverter system adopts the same 24VAC control as any conventional heat pump.
- The compressor's speed is controlled based on coil pressures monitored by the unit's pressure transducer. To ensure stable and adequate capacity, the compressor speed will modulate relative to evaporator pressure during cooling operation and relative to condensing pressure during heating operation.

### 15.2 Sensors and valves

T3: Outdoor Coil Temperature

- High temperature protection
- Outdoor fan control (Cooling mode)
- Defrost control (Heating mode)

T4: ODU Ambient Temperature

- Maximum compressor frequency limitation
- Defrosting condition (Heating mode)
- Outdoor fan control (Heating mode)

T5: Compressor Discharge Temperature

- High discharge temperature / Low superheat protection
- Electronic Expansion Valve (EEV) control

T7: Control board Heat Pipe Temperature

- Control board Anti-Condensed

Tfin: IPM Radiator Temperature

- High IPM temperature protection

PT: Pressure Transducer

- Detect evaporating pressure in cooling mode and condensing pressure in heating mode.
- Compressor frequency control
- Electronic Expansion Valve (EEV) control
- High pressure protection (heating mode)
- Low pressure protection (cooling mode)

Pressure equalizer Valve (PEV)

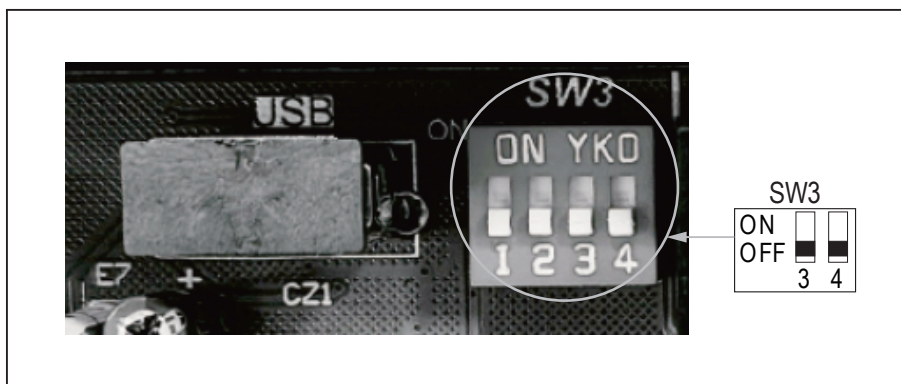
Balance the pressure of the system before compressor start up

Reversing valve

Used to switch the refrigerant flow direction between cooling and heating mode

### 15.3 Accelerated Cooling/Heating

The dip switch SW3-3 and SW3-4 are set to OFF position by default. If switch SW3-3 is set to ON, the target coil temperature will reduce in cooling mode, while switch SW3-4 is set to ON, the target coil temperature will increase in heating mode. Accelerated cooling/heating function improves dehumidification capacity in cooling mode and increases unit capacity.



## 15.4 Defrost Description

### Automatic Defrost Control Function.

The function monitors outdoor coil temperature (T3) and the ambient temperature (T4) to determine whether to defrost or not.

One of the following conditions should be met to run a defrost cycle:

1. The difference between the outdoor ambient temperature (T4) and the outdoor coil temperature (T3) is called Delta T. When  $T4 \geq 19^{\circ}\text{F}$ , the compressor has run for 60 minutes or under PI control for 15 minutes, and  $T3 < 30^{\circ}\text{F}$ , as well as  $\Delta T < 46^{\circ}\text{F}$  lasts for 3 minutes, the unit will run a defrost cycle automatically.
2. When the compressor has run for 120 minutes under the low ambient temperature between  $14^{\circ}\text{F}$  and  $19^{\circ}\text{F}$ , and  $T3 < 5^{\circ}\text{F}$  or the decreasing of T3 is beyond  $5^{\circ}\text{F}$ , the unit will run a defrost cycle automatically.
3. When  $T4 \leq 14^{\circ}\text{F}$ : a) the compressor has run for 90 minutes and  $T3 \leq -13^{\circ}\text{F}$ , or b) the compressor has run for 90 minutes and the decreasing of T3 is beyond  $5^{\circ}\text{F}$ , or c) the compressor has run for 360 minutes, the unit will run a defrost cycle automatically.

### Minimum Run Time (MRT) Defrost.

The MRT Defrost function is based on outdoor ambient temperature (T4), it works when T3 misjudged by chance. One of the following conditions should be met to run a defrost cycle:

- a)  $\text{MRT} \geq 3.5$  hours and  $T4 < 23^{\circ}\text{F}$
- b)  $\text{MRT} \geq 2$  hours and  $23^{\circ}\text{F} \leq T4 < 42^{\circ}\text{F}$
- c)  $\text{MRT} \geq 50$  minutes and the last defrost time  $\geq 7$  minutes

### Low Saturated Discharge Pressure (SDP) Defrost.

It works when T3 misjudged by chance. When the unit has run for 20 minutes under the ambient condition:  $14^{\circ}\text{F} \leq T4 < 28^{\circ}\text{F}$ , monitor the Saturated Discharge Pressure (SDP) to judge whether it drops below  $82^{\circ}\text{F}$  for running a defrost or not.

### Fixed Time Defrost.

When the dip switch SW2-1 is set to ON, the Fixed Time Defrost Mode is activated. For different geographical and ambient conditions, set dip switch SW2-2 to select the fix time for defrost cycle. SW2-1 and SW2-2 are set to OFF by default.

### Accelerated Defrost.

Heating operating time is reduced by 10% and Defrost time is extended for 60 seconds. Valid only for Fixed Time Defrost and Minimum Run Time Defrost.

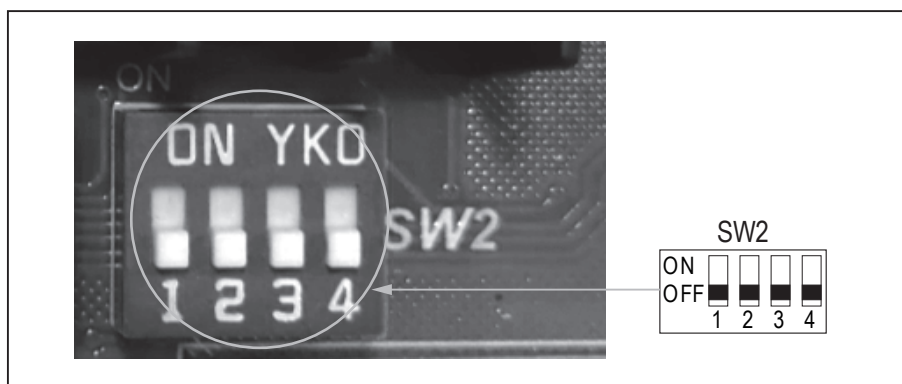
## Manual Defrost.

Press and hold the button “▼” on the display board till the symbol “dF” shows (“dF” and the compressor frequency will be displayed alternately). The unit must have been operating in heating mode for at least 5 minutes. Defrost will terminate automatically, after which the display board will show the compressor speed (Hz).

## O/B Signal.

Thermostat which has O/B signal, should check the default setting. The dip switch SW2-4 is set to OFF by factory default, which requires a B signal call from the thermostat in heating mode. While SW2-4 is set to ON, the unit will operate cooling mode with an O signal from thermostat.

Defrost will terminate once the outdoor coil temperature (T3) reaches 64°F for a period of 1 minute or defrost time has exceeded 8 minutes.



## 15.5 Compressor Crankshaft Heater Control Function

1. Meet one of the following conditions to start the crankcase heater

1.1 Discharge temperature T5 < 73.4°F and defrost is turned on

1.2 Discharge temperature T5 < 73.4°F when powered on for the first time.

1.3 The power off time is longer than 3 hours or more than 2 hours when powered on for the first time.

And at this time T4 < 50°F and the discharge temperature T5 < 73.4°F.

2. Exit conditions:

Discharge temperature T5 ≥ 82.4°F.

## 15.6 Operation of Reversing Valve

▢ The reversing valve is energized in heating mode and de-energized in cooling mode.



During the heating signal of the first operation, the unit will run in the cooling state for about 1 minute, accumulating pressure for reversing the reversing valve.

## 15.7 Defensive Function

- Temperature protection of outdoor coil in cooling mode (T3)

1. If T3 > Maximum set temperature, the system stops for protection.

2. If T3 < the set recovery temperature value, the system restarts.

Note: Please consult the supplier for maximum temperature and recovery temperature.

- Exhaust temperature protection (T5)

1. In cooling or heating mode, if the temperature is higher than the set maximum value, the system will stop for protection.
2. In cooling or heating mode, if the temperature is lower than the set recovery temperature, the system will restart.

Note: Please consult the supplier for maximum temperature and recovery temperature.

- IPM module (inverter) protection (TF)

1.  $TF \geq$  the highest judgment value C. If the outdoor fan does not reach the highest level at this time, the fan speed will be increased one by one. At this time, the compressor frequency is not limited. If the outdoor fan is the highest fan speed, the current frequency is the highest allowable operating frequency.
2.  $TF \geq$  the highest judgment value B, the compressor reduces the frequency successively.
3.  $TF \geq$  the highest judgment value A, the compressor stands by abnormally.
4.  $TF \leq$  the highest judgment value D, the system restarts.

Note: The highest judgment value A/B/C/D are all parameters set in the program. Please consult the supplier for specific values.

**Table 15.1**

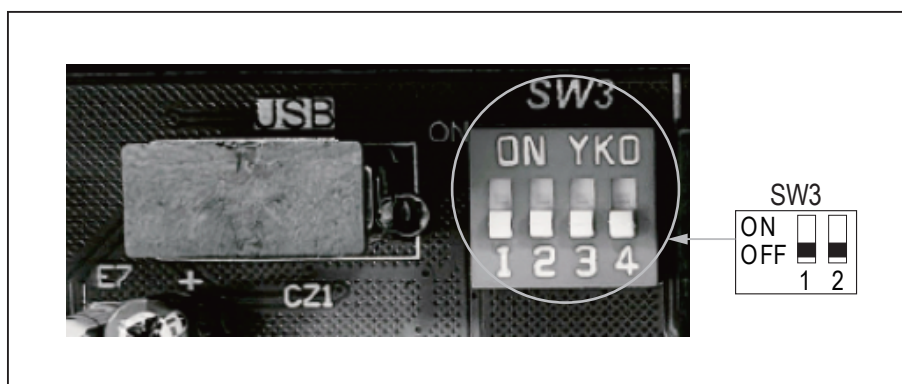
Code	Failure and Protection
E1	Communication error(indoor unit)
E2	T1 sensor error
E3	T2 sensor error
E4	R454b sensor error
E6	Refrigerant leakage error
E7	EEPROM failure (indoor unit)
E8	Fan motor error(indoor unit)
E9	Communication fault of wire control
F0	Communication failure(outdoor unit)
F4	T4 outdoor ambient temp sensor error
F5	T5 exhaust temp sensor error
F6	T3 condensing temp sensor error
F7	T7 temp sensor error
F8	T7 temp sensor error in detecting condensate risks
F9	AC overvoltage/undervoltage protection
FA	EEPROM failure (outdoor unit)
FB	EEPROM failure of driver chip
FC	IPM modular sensor error
FD	HLP pressure sensor failure
FE	T3 or T5 sensor disconnect error
FF	HPS condenser sensor disconnected
P1	High pressure switch error
P2	Low pressure protection
P3	Inverter overcurrent protection

P4	T5 exhaust temp sensor high temp protection
P5	T3 condenser sensor high temp protection(In cooling mode)
P6	IPM protection
P7	T2 freeze protection
P8	IPM high temperature protection (Tf)
P9	DC fan motor error
PC	Wet operation error
PD	High pressure abnormal error(In heating mode)
H0	Communication fault of master board and driver chip
H1	T3 sensor high temperature error(In cooling mode) (3 times P5 error within 180mins)
H2	High pressure switch error(3 times P1 error within 150 mins)
H3	High pressure abnormal in heating mode (3 times PD error within 180 mins)
H4	IPM modular high temp error (3 times P8 within 120 mins)
H5	Low pressure error (5 times P2 within 240 mins)
H6	Discharge temperature abnormal error(3 times P4 within 100 mins)
H7	Wet operation error (3 times PC within 200 mins)
H8	T3 condenser sensor disconnect error (3 times FE within 120 mins)
HC	Discharge temp sensor disconnect error(3 times FE within 180 mins)
HE	Condensate error(3 times F8 within 60 mins)
L0	DC cable bus low voltage protection
L1	DC cable bus high voltage protection
LA	Frequency limitation by voltage
LB	Frequency limitation or decline by high pressure
LC	Frequency limitation by condenser temp
LD	Frequency limitation by discharge temp
LE	Frequency limitation by IPM modular high temp
LF	Frequency limitation by current
d0	Oil return
df	Defrost
dC	Force cooling
ATL	Overtemperature protection
PRH	Crankcase heater preheating,can not start

## 15.8 Capacity configuration selection

System software will recall performance setting parameters according to the DIP switch selection. The DIP should be set according to the matched IDU.

Mode	SW3-1	SW3-2	Remark
2 Ton	OFF	ON	
3 Ton	OFF	OFF	Factory default
4 Ton	ON	OFF	
5 Ton	ON	ON	Factory default



## 15.9 SW1 DIP SWITCH Description

The dip switch SW1-1 is set to OFF, the unit should be controlled by a 24V thermostat. For RS485 communication mode, set SW1-1 to ON. The RS485 communication mode is only valid on the manufacturer approved match indoor unit, outdoor system and manufacturer supplied RS485 communicative thermostat which is optional. The benefits of RS485 communication Mode:

- Modulate compressor speed by indoor temp. to achieve higher energy efficiency and comfort
- Error code display on thermostat
- Allow end user to remotely control system via manufacturer's app

The dip switch SW1-2 is for selection of display temp.& pressure unit.

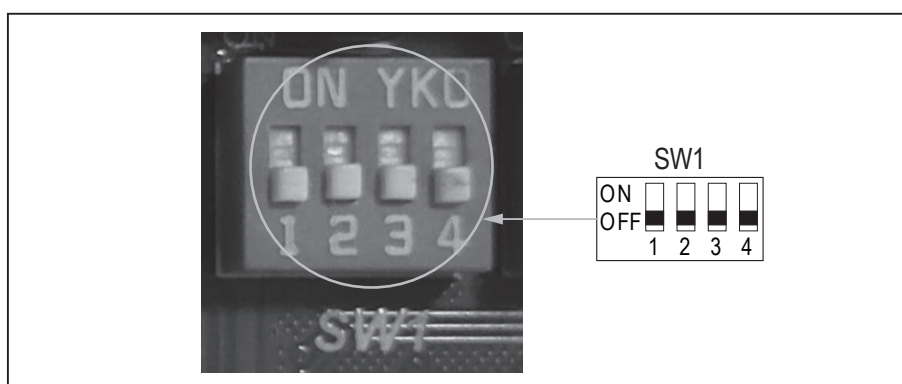
The dip switch SW1-3 is for switching between Cool Only(AC) and Heat Pump(HP).

USB Port Software Update

The dip switch SW1-4 is for USB Port Software Update Function.

First turn off the power supply, then set SW1-4 to ON position and insert the USB flash drive, then turn on the power supply, LED will display the symbol “1”, after which set SW1-4 back to OFF position, then the LED will display the symbol “2”, and then “3”. After the update is completed, it will automatically jump to “8.8.8.” and then disappear.

	SW1-1	SW1-2	SW1-3	SW1-4
ON	RS485	°C & MPa	AC	USB Port Software Update
OFF	24V thermostat (Factory default)	°F & PSI (Factory default)	HP (Factory default)	Software Update (Factory default)





## 15.10 Parameter Point Check Table

- To display system parameters, press the "CHK"(K4) button to run through the series of parameters available. The first time you press the "CHK" button, it will display the NUM of parameter, and after 1 second it will display the value of the parameter. If you press the "CHK" button again, it will go to next NUM of parameter. (Refer to Table 15.2).
- Refer to the picture below for check button location on the display board.
- ▲ : check button、 and set the parameter "+"
- ▼ : check button、 and set the parameter "-"

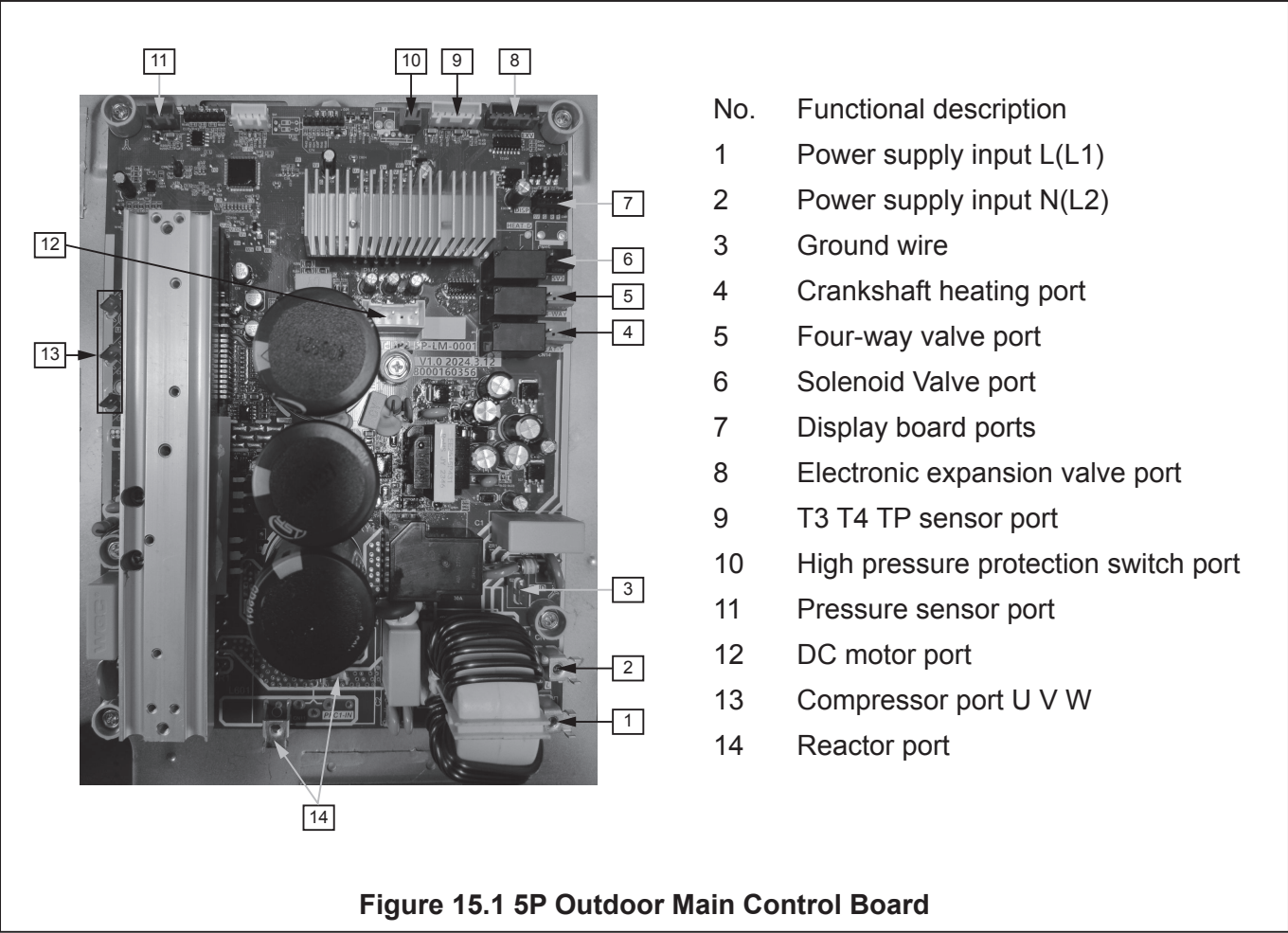
**Table 15.2**

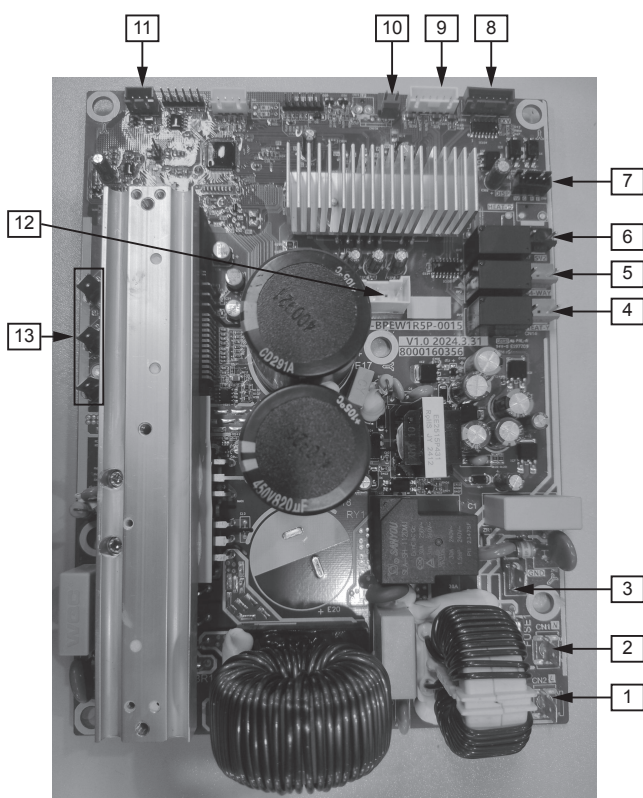
Check Table			
NUM	Display content		
		20	AC current (A; Actual value)
00	Unit type: 0 = top discharge unit 1 = side discharge unit 2 = rooftop unit	21	Compressor current
01	Outdoor power (Model)	22	Oil output (CC; Actual value)
02	Running mode (0: Standby mode; 2: In cooling mode; 3: In heating mode)	23	T1 indoor ambient temp(°F; Actual value)
03	Target frequency (Hz; Actual value)	24	T2 indoor evaporator temp(°F; Actual value)
04	Actual frequency (Hz; Actual value)	25	Concentration value
05	Running frequency (Hz; Actual value)	26	Enter PI control sign (0 or 1)
06	T3 condensing temp (°F; Actual value)	27	Enter defrosting type
07	T4 outdoor ambient temp(°F; Actual value)	28	Test mode (1-40; Mode gear)
08	T5 exhaust temp(°F; Actual value)	29	Frequency increase (Shift; Actual value)
09	Temp transform by pressure sensor (°F; Actual value)	30	△EV (step; Actual value)
10	IPM modular temp Tipm (°F; Actual value)	31	PFC control state
11	Target temp Ttrg (°F; Actual value)	32	Frequency limit item
12	Discharge temp superheat (°F; Actual value)	33	Driving failure code subdivision 1
13	Target superheat (°F; Actual value)	34	Driving failure code subdivision 2
14	Fan speed ( Actual value / 10)	35	Last failure or protection code
15	EXV opening degree (step; Actual value)	36	Software version number (1-255)
16	Pressure value (PSI; Actual value )	37	T7 condensing temp (°F; Actual value)
17	Pressure valve transform by T3 (PSI; Actual value )	38	T30 temp (°F; Actual value)
18	AC voltage (VAC; Actual value )	39	Compression ratio
19	DC voltage (VDC; Actual value )		



# 15.11 Overview of Main Control Board

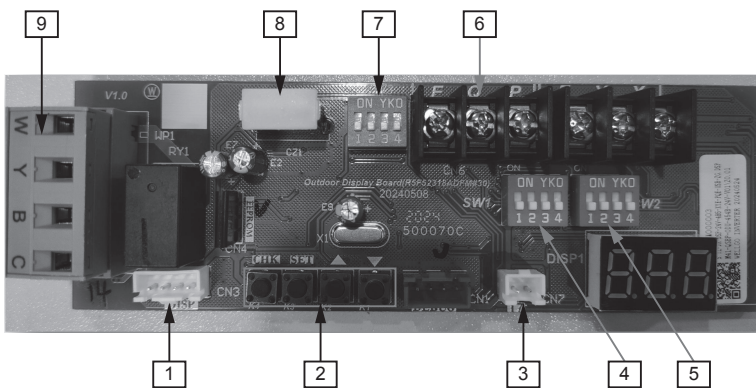
## Outdoor Main Control Board





- | No. | Functional description               |
|-----|--------------------------------------|
| 1   | Power supply input L(L1)             |
| 2   | Power supply input N(L2)             |
| 3   | Ground wire                          |
| 4   | Crankshaft heating port              |
| 5   | Four-way valve port                  |
| 6   | Solenoid Valve port                  |
| 7   | Display board ports                  |
| 8   | Electronic expansion valve port      |
| 9   | T3 T4 TP sensor port                 |
| 10  | High pressure protection switch port |
| 11  | Pressure sensor port                 |
| 12  | DC motor port                        |
| 13  | Compressor port U V W                |

**Figure 15.2 3P Outdoor Main Control Board**



- | No. | Functional description    |
|-----|---------------------------|
| 1   | Display board ports       |
| 2   | Switch (K1 K2 K3 K4)      |
| 3   | T7 sensor port            |
| 4   | Dip switch SW1            |
| 5   | Dip switch SW2            |
| 6   | RS-485 communication port |
| 7   | Dip switch SW3            |
| 8   | USB port                  |
| 9   | 24V communication port    |

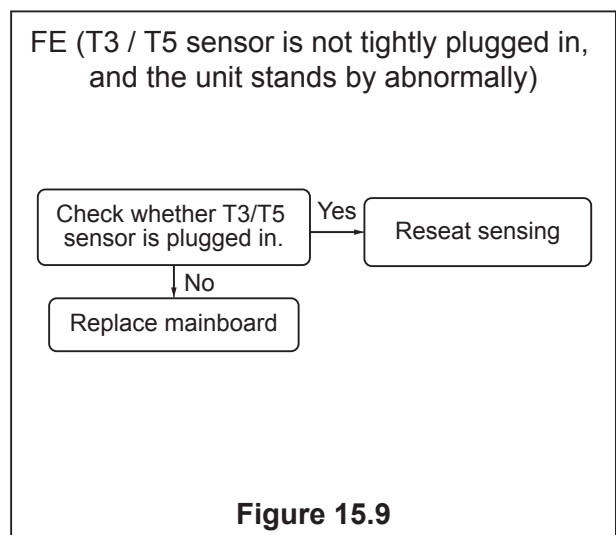
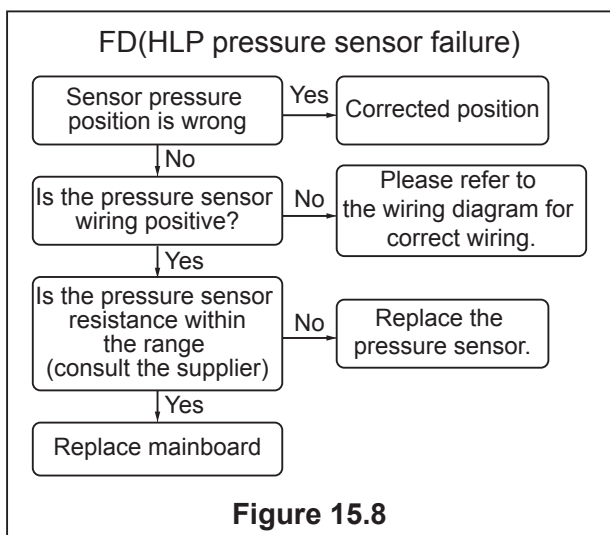
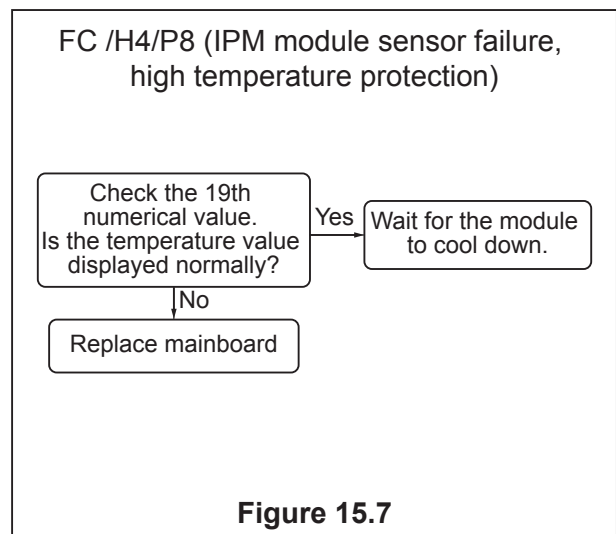
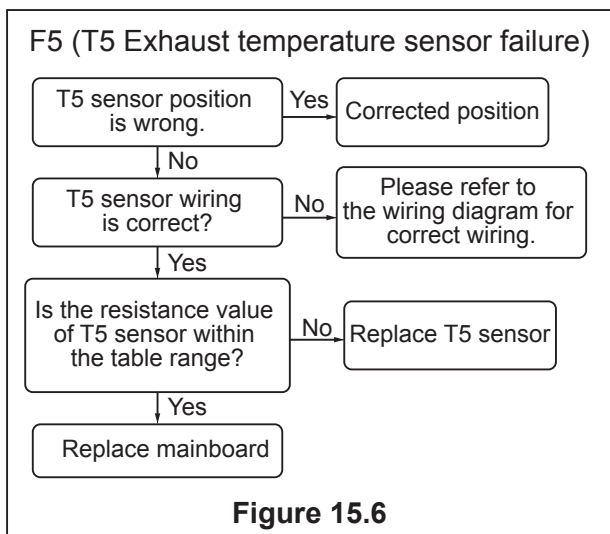
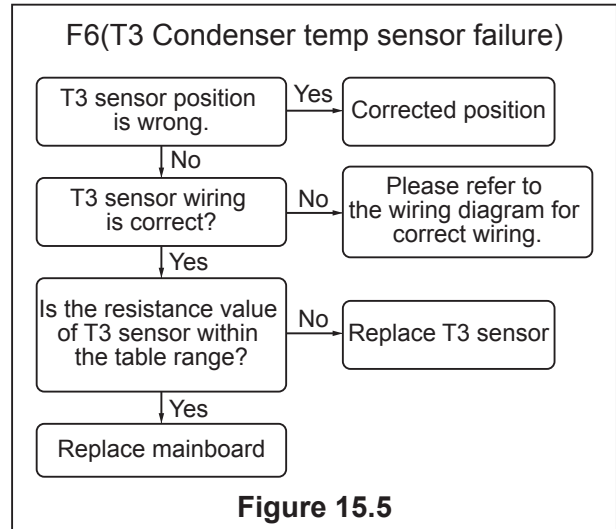
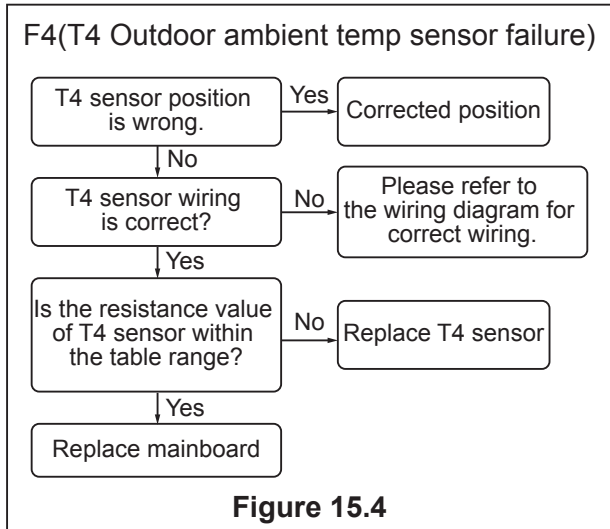
**Figure 15.3 Display Board**

## 15.12 Troubleshooting of Fault Codes

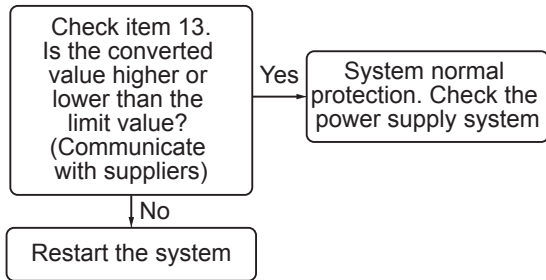


### Warning: Dangerous voltage

- When measuring the resistance, make sure that the power of the unit is turned off and wait for 3 minutes before measuring.

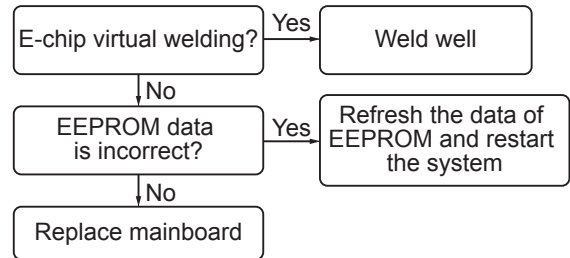


### F9 (Undervoltage on primary side)



**Figure 15.10**

### FA (Outdoor EEPROM failure)



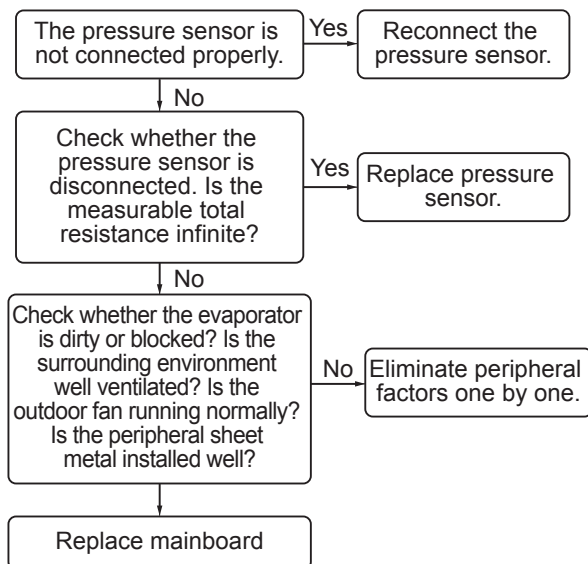
**Figure 15.11**

### H0 (communication failure between main control chip and IPM chip)

Replace mainboard

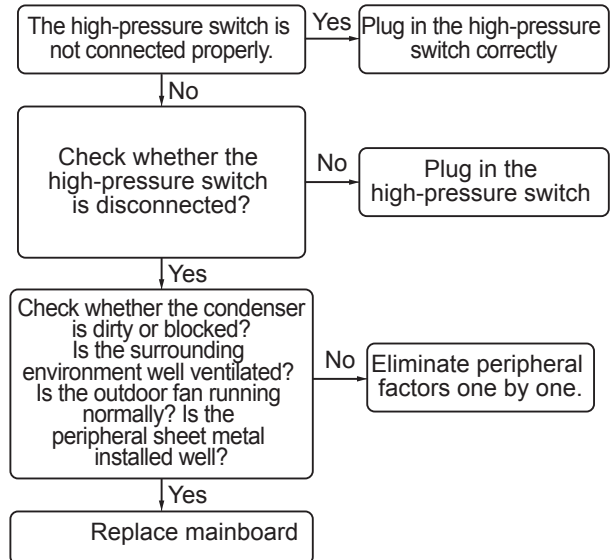
**Figure 15.12**

### H3/PD (High pressure abnormal failure protection in heating mode)



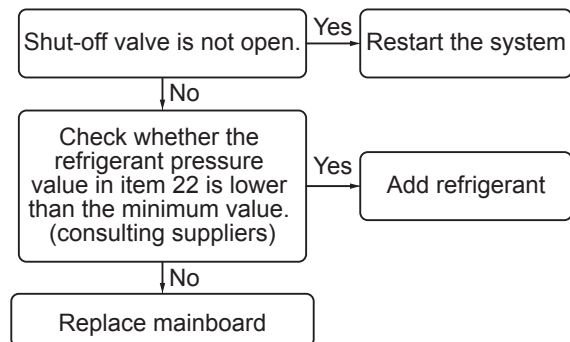
**Figure 15.14**

### H2/P1 (High pressure switch protection)



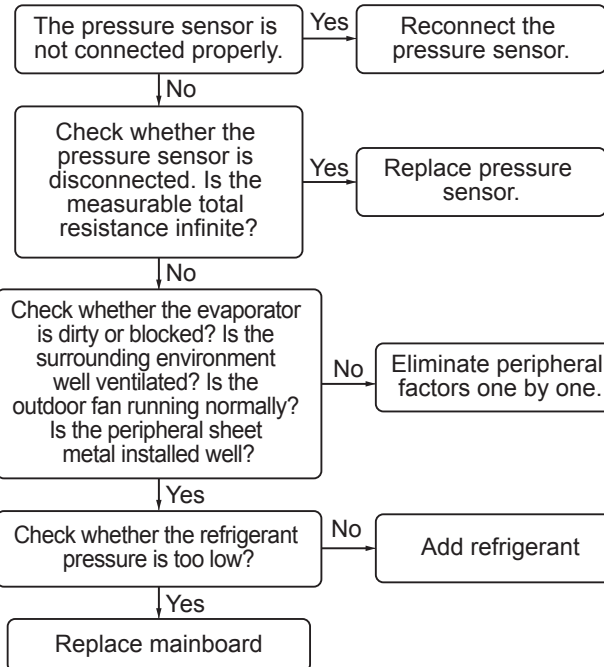
**Figure 15.13**

### H5/P2 (Low pressure abnormal failure protection)



**Figure 15.15**

### H6/P4(T5 Exhaust high temperature abnormal protection)



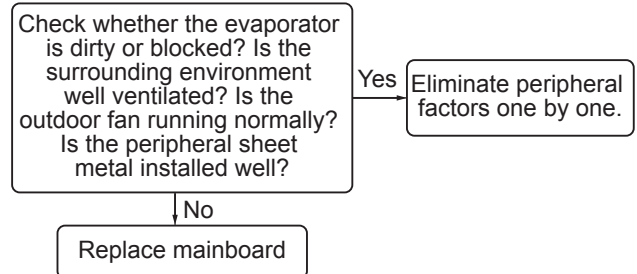
**Figure 15.16**

### PC/H7 (wet operation abnormal protection)

System normal protection

**Figure 15.17**

### P3 (Overcurrent protection of primary side or secondary side)



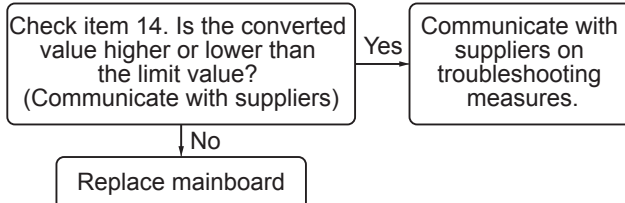
**Figure 15.18**

### P6(IPM module protection)

1. Check the frequency limit items and contact the supplier.
2. Replace the mainboard.

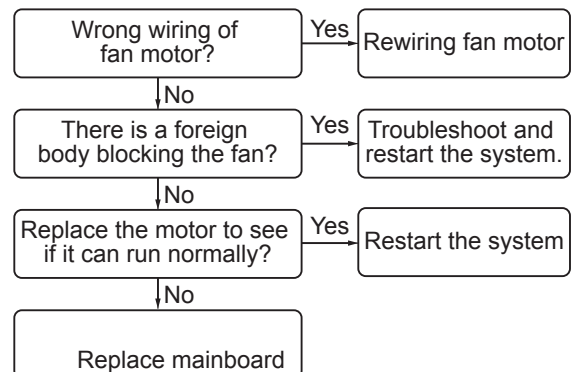
**Figure 15.19**

### L0/L1 (DC cable bus low/high voltage protection)



**Figure 15.21**

### P9 (outdoor DC fan failure)



**Figure 15.20**

## 15.13 Temperature-Resistance Relationship Table (For Sensors)

Table 15.3 for T3, T4, T7

Temperature F	Temperature C	Electric resistance kΩ	Volt DC	Temperature F	Temperature C	Electric resistance kΩ	Volt DC
-5	-20.6	33.367	0.57	90	32.2	3.865	2.63
0	-17.8	29.227	0.64	95	35.0	3.508	2.75
5	-15.0	25.657	0.72	100	37.8	3.187	2.87
10	-12.2	22.595	0.80	105	40.6	2.900	2.99
15	-9.4	19.942	0.89	110	43.3	2.652	3.09
20	-6.7	17.697	0.98	115	46.1	2.421	3.20
25	-3.9	15.673	1.08	120	48.9	2.214	3.30
30	-1.1	13.917	1.18	125	51.7	2.025	3.40
40	4.4	11.060	1.40	130	54.4	1.861	3.49
45	7.2	9.867	1.52	135	57.2	1.706	3.58
50	10.0	8.823	1.64	140	60.0	1.567	3.66
55	12.8	7.884	1.76	145	62.8	1.442	3.74
60	15.6	7.101	1.89	150	65.6	1.327	3.82
65	18.3	6.409	2.01	155	68.3	1.226	3.89
70	21.1	5.767	2.14	160	71.1	1.132	3.96
75	23.9	5.150	2.28	165	73.9	1.046	4.02
80	26.7	4.700	2.39	170	76.7	0.967	4.08
85	29.4	4.266	2.51				

## 15.14 Temperature-Resistance Relationship Table (for T5 sensor)

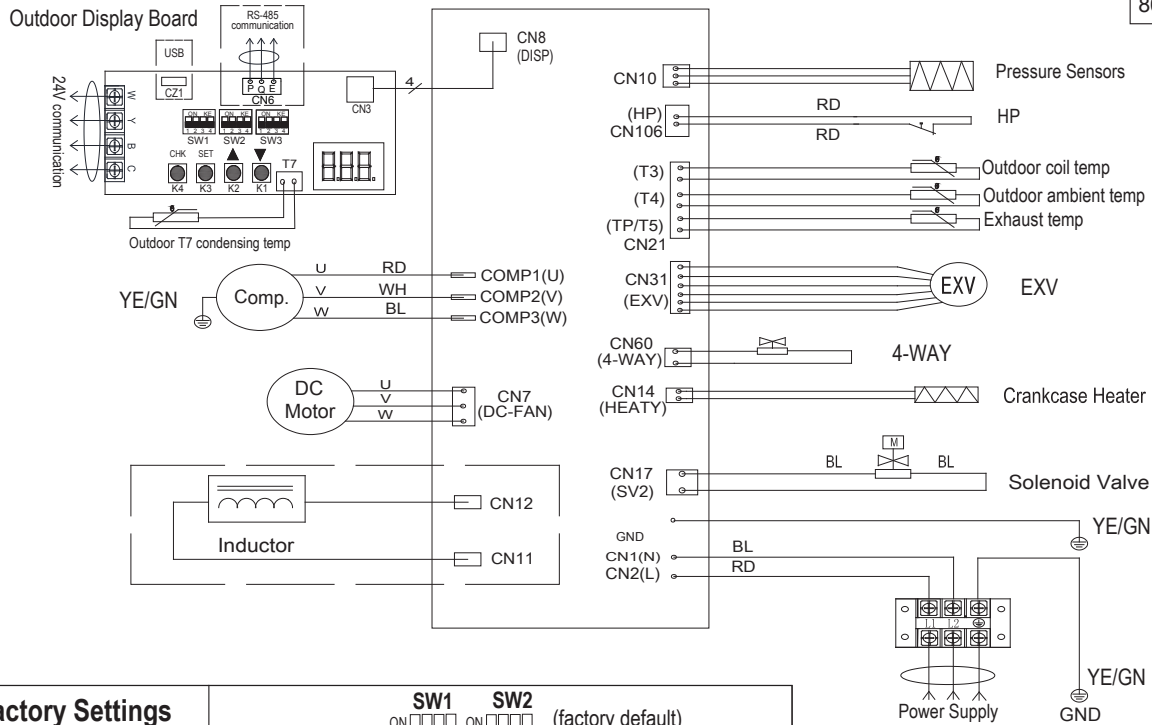
Table 15.4 for T5

Temperature F	Temperature C	Electric resistance kΩ	Volt DC	Temperature F	Temperature C	Electric resistance kΩ	Volt DC
-5	-20.6	496.38	0.08	140	60.0	12.348	1.97
0	-17.8	422.97	0.09	145	62.8	11.164	2.10
5	-15.0	361.35	0.11	150	65.6	10.106	2.22
10	-12.2	309.74	0.13	155	68.3	9.193	2.34
15	-9.4	266.152	0.15	160	71.1	8.344	2.46
20	-6.7	230.462	0.17	165	73.9	7.585	2.58
25	-3.9	198.968	0.19	170	76.7	6.904	2.69
30	-1.1	172.231	0.22	175	79.4	6.313	2.80
35	1.7	149.467	0.26	180	82.2	5.761	2.92
40	4.4	130.642	0.29	185	85.0	5.263	3.02
45	7.2	113.87	0.33	190	87.8	4.815	3.13
50	10.0	99.456	0.37	195	90.6	4.410	3.23
55	12.8	87.095	0.42	200	93.3	4.057	3.33
60	15.6	76.425	0.48	205	96.1	3.724	3.42
65	18.3	67.501	0.53	210	98.9	3.423	3.51
70	21.1	59.457	0.60	215	101.7	3.149	3.60
75	23.9	52.489	0.67	220	104.4	2.910	3.67
80	26.7	46.429	0.74	225	107.2	2.689	3.75
85	29.4	41.322	0.82	230	110	2.476	3.82
90	32.2	36.682	0.90	235	112.8	2.288	3.89
95	35.0	32.619	0.99	240	115.6	2.117	3.96
100	37.8	29.068	1.09	245	118.3	1.965	4.02
105	40.6	25.948	1.19	250	121.1	1.821	4.08
110	43.3	23.291	1.29	255	123.9	1.690	4.13
115	46.1	20.855	1.39	260	126.7	1.569	4.19
120	48.9	18.708	1.51	265	129.4	1.462	4.23
125	51.7	16.809	1.62	270	132.2	1.360	4.28
130	54.4	15.184	1.73	275	135.0	1.266	4.32
135	57.2	13.682	1.85	280	137.8	1.180	4.36



# 16 Wiring Diagram

802035000124



## Factory Settings

SW1 SW2 (factory default)  
ON OFF ON OFF

### MODEL

### CHECK

## Factory Settings

SW3-1	SW3-2	MODE
OFF	ON	24K (2T)
OFF	OFF	36K (3T)
ON	OFF	48K (4T)
ON	ON	60K (5T)

## WIRE COLOR CODE

RD RED	OR ORANGE	BK BLACK
BR BROWN	BL BLUE	GN GREEN
PR PURPLE	WH WHITE	GY GREY
YE YELLOW		

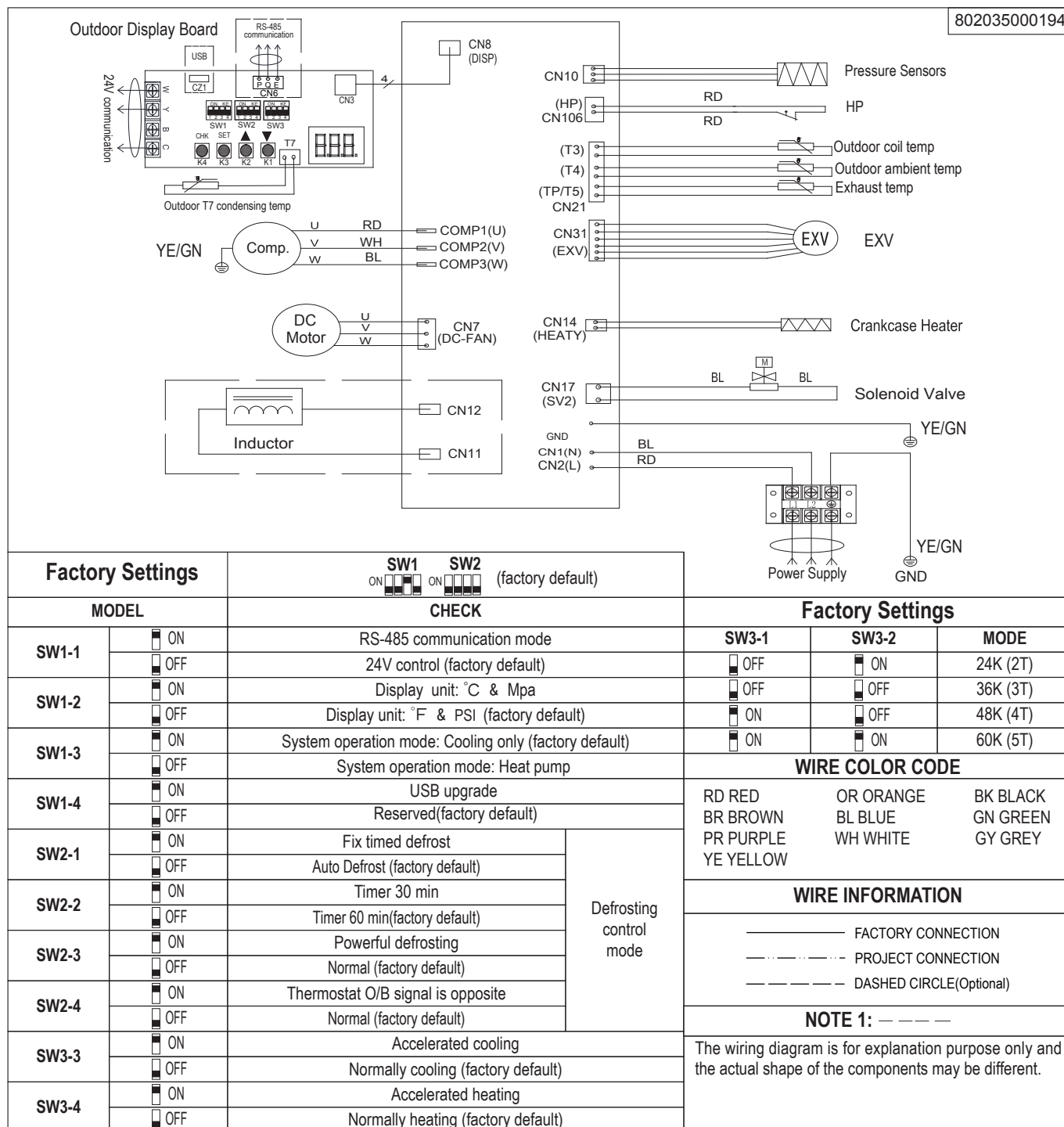
## WIRE INFORMATION

—————	FACTORY CONNECTION
— · — · — · —	PROJECT CONNECTION
- - - - -	DASHED CIRCLE(Optional)

## NOTE 1: — — — —

The wiring diagram is for explanation purpose only and the actual shape of the components may be different.

**NOTE:** For reference only, the actual wiring diagram shall prevail.



**NOTE:** For reference only, the actual wiring diagram shall prevail.



# 17 Cleaning and Maintenance

## 17.1 Cleaning Precautions



### Warning:

- Any maintenance and cleaning of outdoor units can only be carried out by qualified maintenance personnel.
- Any unit maintenance can only be carried out by qualified maintenance personnel.



### Caution: Electric shock

- Be sure to turn off the unit and disconnect the power supply before cleaning or maintenance.



### Note:

- Do not use chemicals or chemically treated cloth to clean the unit.
- Do not use benzene, paint thinner, polishing powder or other solvents to clean this unit.



### Be careful:

- When removing the filter, do not touch the metal parts in the unit. Sharp metal edges can cut you.

## 17.2 Pre-Season Inspection and Maintenance

At the start of each heating or cooling season, do the following:



Turn off the unit and disconnect the power supply.



Check for damaged wires, check for leaks.



Make sure that all air inlets and outlets are not blocked.

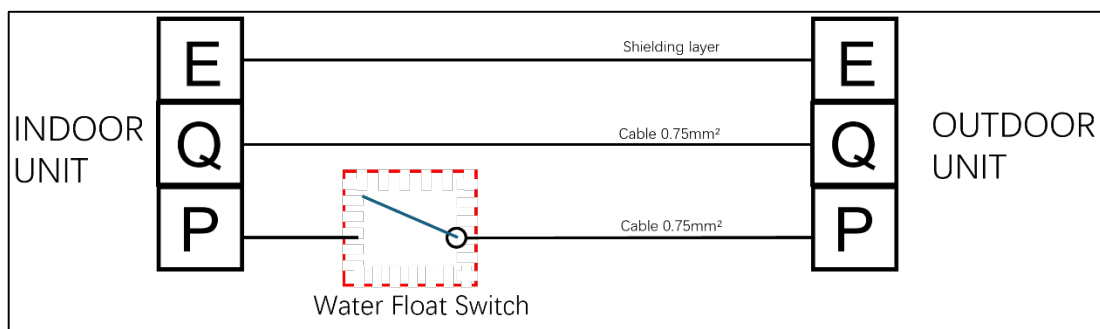
**Table 17.1**

## 18 Water Float Switch Wiring

### 18.1 RS485 Communication Mode

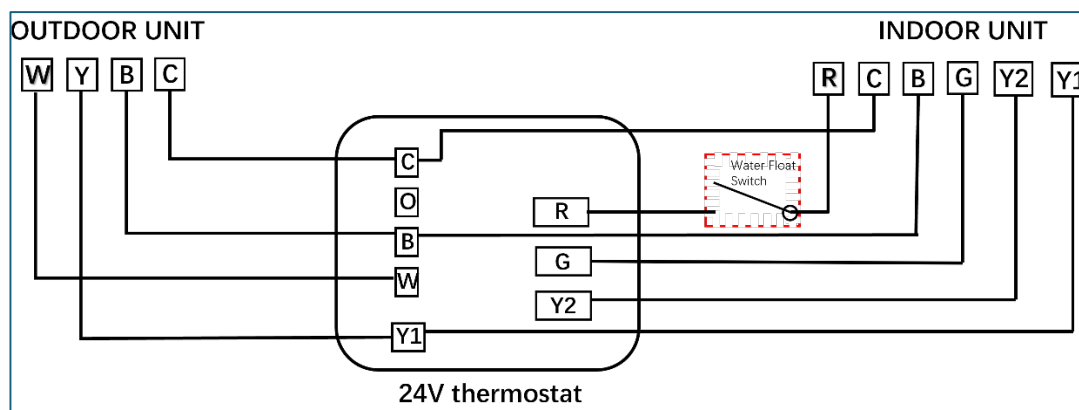
The indoor and outdoor units connect to three communication lines P.Q.E. The water float switch needs to be connected between the P of the communication line, that is, the communication line of the terminal P of the indoor unit first passes through the water float switch and then to the terminal P of the outdoor unit.

Please refer to the following figure for wiring:



### 18.2 24V Communication Mode

The indoor and outdoor units connect with R/C/Y/B/G via 24v thermostat. The R terminal is a 24V power supply. So, the water float switch needs to be connected to the R signal between the thermostat and the indoor unit. When the water float switch is in overcurrent state, the 24V power supply R will be disconnected, and the Y signal of the compressor will also be disconnected, causing the compressor to stop working. Please refer to the following figure for wiring:



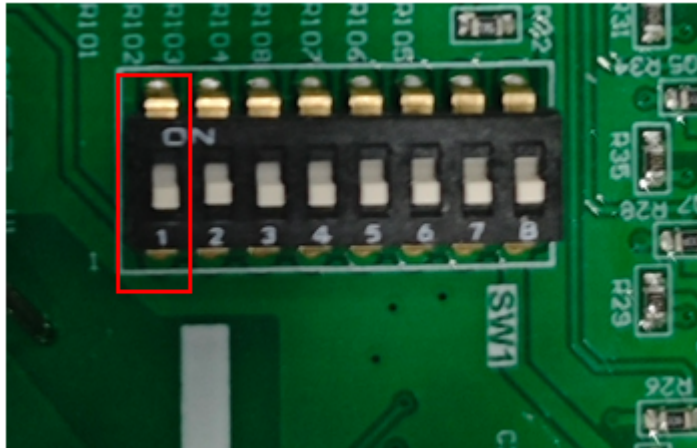
# 19 RS485 Wiring and Thermostat

## 19.1 RS485 Communication Wiring

1. Set the dial switch of the indoor and outdoor units to RS485 communication mode.

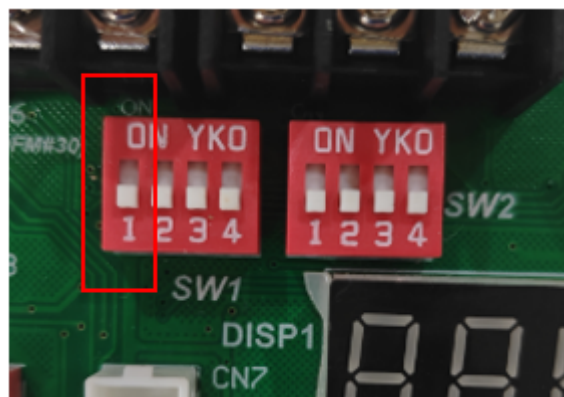
The SW1-1 dial switch on the indoor mainboard and the SW1-1 dial switch on the ODU display board should both be turned to the “ON” position

### Indoor unit



SW1-1	<input checked="" type="checkbox"/> ON	RS-485 communication mode
	<input type="checkbox"/> OFF	24V control(factory default)

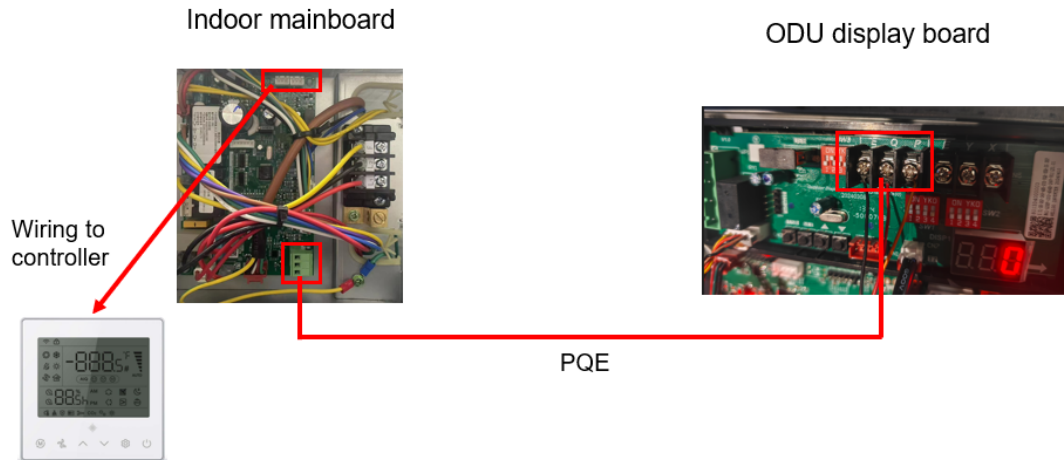
### Outdoor unit



SW1-1	<input checked="" type="checkbox"/> ON	RS-485 communication mode
	<input type="checkbox"/> OFF	24V control (factory default)

## 2. Connect RS485 communication wire

Connect the indoor and outdoor units, P-P, Q-Q, E-E one by one, using 2-core shielded wires, with the shielding layer of the cable connected to E



NOTE: The wired controller communication cable is provided by the factory, and the PQE communication cables for the IDU and ODU need to be purchased by the customer in the local market

## 2. 12V wire controller

The 12V wire controller is provided by the factory and is an optional part. It is only applicable when the machine is in RS485 communication mode.



### Mode:

Set the mode of the air conditioner.



### TEMP+ and TEMP-

Set the setpoint of the air conditioner.



### Fan speed:

Set different fan speeds of air conditioner.



### On/Off:

Start-up and shut-down of air conditioner.



### Function:

Set the timing start-up and shutdown, check mode, filter cleaning, and child lock, etc.

NOTE: For detailed operating instructions, please refer to the manual of the wire controller.

## 20 Product Disposal Guidelines

This appliance contains refrigerant and other potentially hazardous materials. When disposing of this appliance, the law requires special collection and treatment. Do not dispose of this product as household waste or unsorted municipal waste.

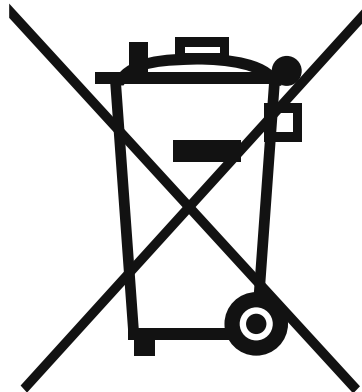
**All refrigerant and oil must be removed prior to disposal as outlined within this manual.**

When disposing of this appliance, you have the following options:

- Dispose of the appliance at a designated municipal electronic waste collection facility.
- When buying a new appliance, the retailer takes back the old appliance free of charge.
- The manufacturer takes back the old appliance free of charge.
- Sell the appliance to certified scrap metal dealers.

### Special Notice

Disposing of this appliance improperly, or in other natural surroundings, endangers your health and is bad for the environment. Hazardous substances may leak into the groundwater and enter the food chain. Please follow proper disposal protocol.



The design and specifications of this product are subject to change without prior notice as development continues. Consult with the sales agency or manufacturer for details. Refer to the equipment nameplate for all other applicable specifications.



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[www.pioneerminisplit.com](http://www.pioneerminisplit.com)

Scan the below code to visit our support page where you can find more installation materials:

